

PREDATOR ALERT



**Attacks on humans by leopards and Asiatic black bear
in the Kashmir valley - Analysis of case studies
and spatial patterns of elevated conflict**



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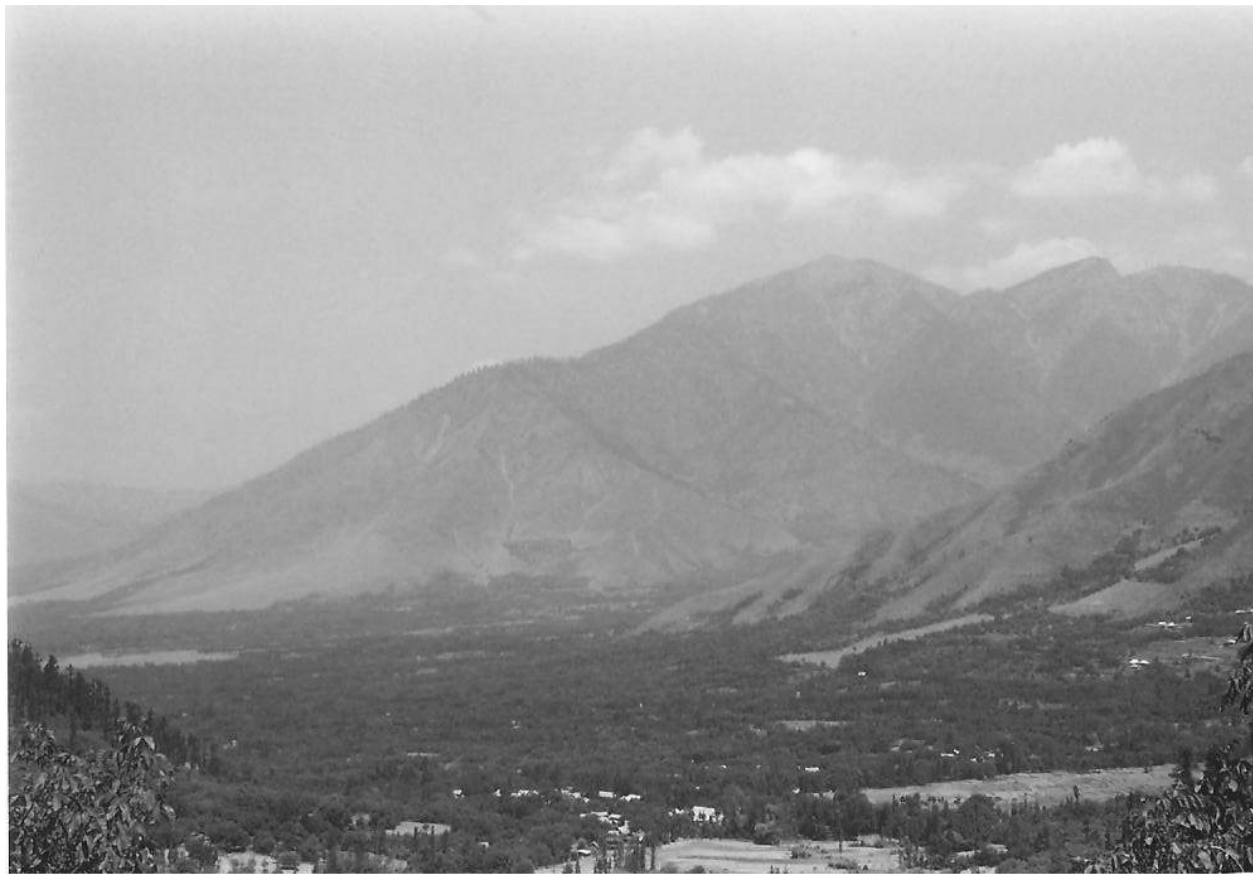
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The Wildlife Trust of India is a non-profit conservation organization committed to help conserve nature, especially endangered species and threatened habitats, in partnership with communities and governments.

Collaborating Agencies:



Department of Wildlife Protection, J&K

Tourist Reception Centre Srinagar-190001

The Department of Wildlife Protection of the J&K Government is responsible for the conservation of all wildlife in the State and the management of the state's Protected Areas network

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PREFACE

The two most pressing man animal conflict situations that plague India today involve elephants and leopards. They cause, between them, the maximum attacks, human injuries and deaths and in many parts of the country, the conservation of wildlife is facing a severe challenge due to public perception and hostility due to these twin attacks. In the state of Jammu and Kashmir, elephants are replaced by bears. The state is home to both the black and the brown bears and these along with leopards have held the state in a veritable state of terror for the past few years. Although conflict is not a new phenomenon in the world, and in Jammu and Kashmir too, there is enough historical evidence to show that it is an old phenomena, it has certainly escalated greatly in the past few years. Whether this is due to change in forest cover, or change in land-use practices and livelihood options practiced by the local populace, or a decrease in wild prey for the predators due to illegal hunting by villagers or indeed, a change in behaviour of the predator due to easy access to stray dogs and livestock, is a moot point, but the statistics definitely do show a rise in incidences of conflict.

Any long-term solution of such conflict is bound to be multi-disciplinary and should deal in equal measure with animal biology and human attitudes. It should also provide succor to the victims of such attacks as quickly and efficiently as possible. Finally land use needs to be addressed. If these steps are not taken and attention is focused only on the problem animal of the instant, then it is likely that the solution is a temporary band aid and that the problem will recur in another place at another time. The Wildlife Trust of India has been working on man elephant conflict for many a year, but over the last two years had decided to also try and deal to some extent with leopard and bear conflicts. To begin with, WTI worked with the Ministry of Environment and Forests to draft a national policy with reference to man-leopard conflicts. The workshop which saw participation of most of the affected state chief wildlife wardens, the ministry officials, biologists who have worked on large predators and other concerned conservationists (largely national but with a spattering of international technical expertise) did draft a national policy and strategy to deal with this issue.

However, while policy deliberations were ongoing in Delhi, as a field based conservation action organization, WTI also wished to get into the thick of action in at least one place in the field and it was the Jammu and Kashmir government that came forward with a request that was undertaken by WTI over the last six months. This was to conduct a reasonably rapid assessment of the conflict situation in the state vis-à-vis these two predators and their conflict with man and to recommend a way forward. This report is the result of this study. If the recommendations are carried forward and implemented, and in this WTI wishes to work shoulder-to-shoulder with the state and the union government, the situation can be brought under control. This will both ease the situation of the long suffering rural folk of the state but also aid in conservation –of wild fauna in Jammu and Kashmir. This activity of WTI complements well, the on-ground conservation efforts it has undertaken on mountain ungulates (markhor, chiru and wild yak) and the alternate livelihoods project involving shahtoosh workers in the state and provides yet another dimension of collaboration between the state and WTI in conservation

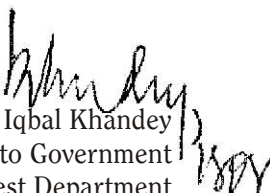
Vivek Menon
Executive Director

FOREWORD

The last decade has seen an increase in human-animal conflicts in many parts of India and the state of Jammu & Kashmir has been no exception. The state has recently been rocked by a series of human-bear/ human-leopard conflicts causing considerable loss to human life and property. Some wild animals too have died or have been seriously injured in retaliatory attacks.

Concerned at the increasing number of such conflicts, the Department of Wildlife Protection, Jammu & Kashmir Government, in tandem with the Wildlife Trust of India, New Delhi to initiate a study to look into the causes of the increased man wild animal conflict in J&K in order to suggest necessary mitigatory measures. The team conducted an extensive survey of the problem areas and interviews with a large number of affected families for making a spatial assessment of the causes of such increase in man-wild animal conflicts. It also went into the organization capacity of the Forest Department / Wildlife Department regarding their preparedness / inadequacies to deal with man-wild animal conflict situations. The findings of this survey were first presented in July 2007 at Srinagar to an audience comprising government officers, concerned NGOs, academic institutions and others. Based on the suggestions received, the findings of the survey and a set of recommendations have been produced in the form of this report.

I am sure that the report will be extremely useful to foresters, wildlife administrators, policy makers, academicians, researchers and local communities in dealing with the complex issue of human-leopard/human-bear conflicts in the State of Jammu & Kashmir.


Iqbal Khandey
Principal Secretary to Government
Forest Department
Jammu and Kashmir

Date: 07-12-2007
Place: Jammu

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EXECUTIVE SUMMARY

The sudden increase in human-wild animal conflict in Jammu and Kashmir has caused immense loss to human life and property which has translated into a public outcry. The government on its part has been concerned and instituted a study conducted jointly by the Wildlife Trust of India and the Department of Wildlife Protection, Jammu and Kashmir. The purpose of this study was to suggest measures which could be employed to reduce this conflict.

The study was mainly centered in the Kashmir valley although surveys were also conducted in the Poonch-Rajouri region of Jammu. Over 200 victims were interviewed and over a hundred locations visited and inspected. The purpose of this exercise was an attempt to understand the underlying causes of this conflict and then suggest prescriptions for its mitigation.

1. The data suggested a seasonal pattern in attacks with bear attacks appearing more in autumn, coinciding with the fruit ripening season while leopard attacks were more common in the winter-spring seasons. Most attacks occurred in daylight hours.
2. Most current attacks by bear occurred in agricultural fields (including orchards) while 52% of all leopard attacks occurred close to habitations.
3. The majority of bear attacks occurred in the southeast of the valley (Tral and Khrew) with some attacks occurring in Kulgam area also. Leopard attacks are higher in concentration in the Kupwara, Handawara areas (north Kashmir) with some dispersed in Khrew-Khonmoh and Shangus areas also.
4. The bear conflict areas were significantly correlated to patch density, total edge length and the juxtaposition of patches of forests. In case of leopards, strong positive associations were found with mean temperatures and annual precipitation, and a lower mean distance to forest edges.

The report made the following recommendations:

- It is also proposed to **re-align the current compensatory mechanism**. As a first step, it is suggested that the term 'compensation' be dropped

in favor of '*ex gratia* payments'. A floating pool of funds should be made available at the level of the Wildlife Warden from which immediate payment of Rs.5,000/- to the victim/next-of-kin should be made. **Inter-sectoral cooperation** from the State's Department of Health is suggested, such that the victim of the attack need not spend the *ex gratia* payment on treatment. To prevent the considerable social opportunity costs often borne by victims who have been permanently disabled, it is suggested that mechanisms for their rehabilitation be developed in consultation with other Government Departments (e.g. the Department of Social Welfare) and the non-government sector.

- **Awareness programs**, targeted at conflict mitigation need to be conducted at all levels – from community levels at the grassroots, through frontline staff and higher echelons of the DWLP and Forest Department. **Sensitization programs** at all levels targeting decision makers, the legislature, bureaucracy, the Police and Security Forces need to be conducted. **Training** in trapping and tranquilization techniques, research and monitoring (pug mark, signs, scrapes recognition etc), and on data entry, analysis and reporting need to be introduced at all levels of the DWLP and FD. The Police and the Civil Administration can also play a significant role in helping to manage conflict, and their active participation should be sought. They should be encouraged to attend training programs on dealing with conflict situations.
- The establishment of a **Central Conflict Mitigation Command Center (CMCC)** to facilitate the 24/7 availability of a telephone number which communities can call to report any incident involving wildlife (sighting, crop raiding, livestock lifting or attacks on people) would form the first step in the process.
 - The development of **community-level Primary Reaction Teams (PRTs)** should be encouraged, comprising of either paid/volunteer local members whose primary responsibilities would include isolation of animals involved in conflict and more importantly, in crowd control, to ensure that local communities do not attempt to tackle dangerous animals without supervision.

- The **creation of Rapid Response Teams (RRTs)** to deal with conflict is essential, requiring both training and investment in specialized equipment. separate RRTs be created should be established at Divisional/Regional levels to deal with distinct but complimentary aspects of conflict management.
- As the majority of incidents recorded have occurred outside of Protected Area jurisdictions, the DWLP is already at a considerable disadvantage - the primary felt need is thus to **improve the manpower resources available to the DWLP**. Poor mobility and communications facilities available to the frontline staff which hampers prompt response to conflict incidents should be addressed at the earliest. At Regional level, mobile animal intervention vans, capable of transporting animals, should be made immediately available. One Wildlife Veterinary officer should also be appointed to each region

Active involvement of the frontline staff of the Territorial Forest Department, Social Forestry Department, SMC Department and other Government agencies would go a long way which calls for both inter-sectoral cooperation, as well as

the need for awareness and training programs for frontline staff beyond just the DWLP.

- It is critical that the DWLP **establish a monitoring and evaluation system**. Such a system will help in terms of conservation management where decisions on the fate of individual animals cannot be taken without a thorough understanding of factors like the density, distribution and dynamics of the surrounding population. There are three distinct means of collecting, processing and analyzing the data necessary for detailed research into these issues:
 - develop and maintain capacity of the DWLP and Forest Department;
 - establish linkages with local educational/research establishments; and
 - contract the work to agencies external to the State.
- **Long-term measures** that should also be considered include habitat improvements/restoration. However, these would need to be carefully considered as any improvement should only be applied in areas where populations of the carnivore in question can be safely augmented rather than by random application.

Introduction

Attacks on humans by large carnivores in India have been attributed primarily to six species – tigers, lions, leopards, Himalayan black bears, sloth bears and wolves

1. Introduction

Human attacks by carnivores occur globally, accounting for hundreds of people being killed annually (Linnell et al, 2002; Löe and Röskaft, 2004). However, while carnivore-conflict 'hot-spots' through much of the world are characterized by varying levels of depredation on livestock, in India high levels of conflict always implies attacks on people (Athreya et al, 2004). This might simply be reflective of the fact that areas of high human density inhabited by large carnivores make encounters with people more likely. In the state of Madhya Pradesh, sloth bears killed 48 people and wounded 638 from 1989 to 1994 (Rajpurohit and Krausman 2000). Löe (2002) found that more than 90% of the recorded attacks on humans by large carnivores between 1950 and 2000 had occurred in Asia and Africa. Attacks on humans by large carnivores in India have been attributed primarily to six species – tigers, lions, leopards, Himalayan black bears, sloth bears and wolves (Saberwal et al, 1994; Jhala & Sharma, 1997; Rangarajan, 2001; Linnell et al, 2002; Athreya et al. 2004). All of these species, with the exception of the leopard, are now restricted in their range.

Any phenomenon as complex as man-eating and marauding seldom has a single cause. Conventional wisdom and anecdotal evidence suggests an 'infirmity theory' – when deprived of the ability to hunt and kill natural prey by chronic injury or illness, individuals may be predisposed to attack humans and livestock (Patterson et al, 2003). The theory has found support from examination of man-eating tigers in India (Corbett 1946, 1955, 1957), lions in Africa (in Patterson et al, 2003) and among livestock depredating jaguars in Latin America (Hoogesteijn et al, 1993; Rabinowitz, 1986; Polisar et al, 2000).

Conover (2000) has identified three major reasons why animals attack humans and these are predatory, territorial, or defensive instincts. Predatory attacks occur when the animal views the person as prey. Predatory attack on adult humans are rare, however, such attacks are sometimes directed at children when alone and undefended (Beier 1991). On the other hand, most wildlife species only exhibit territorial behaviour towards individuals of the same species. However, sometimes people unknowingly invade the personal space of a dominant animal and this can provoke the animal to attack. This is especially a problem in parks, where tourists try to get as close as possible to wildlife. Finally, there are defensive attacks. Usually, in most cases, the animal is acting defensively when it attacks a human. An animal's best defense against a predator is to hide, flee, or at least keep its distance. However, when an animal is cornered, trapped, or constrained by a predator, its best chance to survive is to attack in hopes that it can inflict so much pain that the predator will give up and

seek easier prey. For this reason, even small animals will bite or attack humans when they are being held or feel trapped. Animals will use whatever mechanism is available to them in their attempts to inflict pain.

Experience during recent decades has shown that management, conservation and restoration of large carnivores in our modern world is as much a matter of solving and reducing conflict with humans as of ecology (Mech 1995, 1996; Mech *et al.*, 1996). Linnell (*et al.*, 2001 a, b) from his study in Europe has summed that regions where landscapes are modified and human density high, large carnivores must be conserved in the multi-use landscape surrounding houses, farms, villages and cities.

After facing wildlife attack a person's perceptions about wildlife can also get altered, especially when damage exceeds his/her tolerance (Conover, 2002). Attacks by large carnivores that result in human injury or death undermine conservation by resulting in negative attitudes towards such efforts (Treves and Naughton-Treves, 1999). During the late 1990's much research focus has moved away from the ecology of the carnivores and their prey to the social aspects concerning human attitudes and behaviour. The social issues concerning large carnivore conflicts are complex, and range from fundamental aspects of value systems and human rights, through loss of control, to the most visceral of all- fear for personal safety (Naess & Myrnes 1987; Kaltenborn *et al.* 1998, 1999; Bjerke *et al.* 2000, 2001).

Prevention depends on identifying and understanding the factors promoting human-carnivore conflicts and then focusing outreach and interventions accordingly. Previous researchers have identified husbandry practices, human activities, and carnivore behaviour as attributes that increase the risk of conflict (Jackson & Nowell 1996; Linnell *et al.* 1999). But modifying farmer

Attacks by large carnivores that result in human injury or death undermine conservation by resulting in negative attitudes towards such efforts

practices and the behaviour of individual carnivores appears impractical across regions containing thousands of carnivores and farms. A more efficient approach would be to anticipate the location of human-carnivore conflict and focus interventions in this smaller set of areas. This requires that we identify the intersection of human and carnivore activities in space or consistent landscape features associated with human-carnivore conflicts (Albert & Bowyer 1991; Jackson *et al.* 1996; Stahl & Vandel 2001). This is based on the assumption that landscape features and carnivore-livestock interactions will not change over time. Predicting future sites of conflict with carnivores by identifying the spatial intersections of human and carnivore activities or consistent landscape features associated with conflicts may reduce the costs of control, compensation, and political controversy surrounding their conservation (Albert & Bowyer 1991; Jackson *et al.* 1996; Stahl & Vandel 2001; Treves *et al.* 2003).

Testing conjectures about causal mechanisms underlying human attacks by leopards and bears in India will require behavioral and experimental research. Data available at present however, permits explorations (albeit speculative) of only a few hypotheses.

The present survey attempts to study the human-leopard/bear conflict in Jammu and Kashmir. It hopes to arrive at findings which could develop into effective recommendations and feed into a pragmatic action plan for the government to undertake mitigation in a holistic manner.

Changes in the Study Area

General description

The State of Jammu and Kashmir is India's northernmost, lying between 32° 16' 11.28"N to 37° 6' 28.44"N and 72° 28' 10.92"E to 80° 20' 49.92", and sharing international boundaries with Pakistan to the west and China to the north and east. The Kashmir valley is an ancient lake basin, approximately 140km long and 32km wide, bound by the Great Himalayan ranges in the north and north-east and by the Pir Panjal range along the north-west and south-east. Elevation ranges from ~1500m at the base of the valley to >6000m along the ranges of the Great Himalaya and ~5000m along the Pir Panjal. Sheltered from the south-west monsoon by the Pir Panjal, Kashmir does not experience the periodical (or monsoon) rains of India.

Rainfall is irregular and greatest in the spring months (see Fig.1). Occasional monsoon storms from the Jammu region do pass over the crests of the Pir Panjal and sometimes result in heavy rain on the elevated plateau on the Kashmir side. Snow falls on the surrounding hills at intervals from October to March. In the valley, the first snow generally falls around the end of December. The hottest months are June through the greater part of September and the coldest from December through February. The rich alluvial soils in the Valley are well drained by rivers and streams, yielding rice, wheat, saffron, vegetables and a variety of fruit. Only 16% of the State's area is under agriculture, with 88.50% of this area under food crops. Rice, maize and wheat are the 3 most important crops grown.

Sheltered from the south-west monsoon by the Pir Panjal, Kashmir does not experience the periodical (or monsoon) rains of India

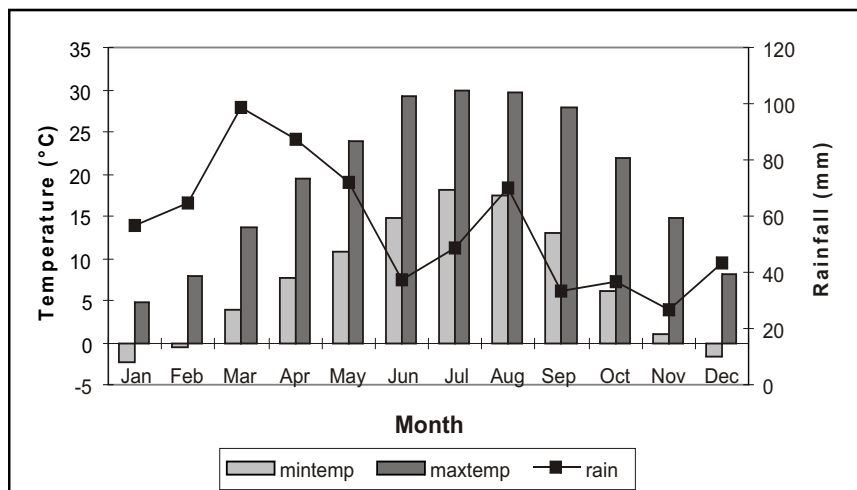


Fig. 1: Climate Normals across the Kashmir Valley.
Source: Indian Meteorological Department, 2003.

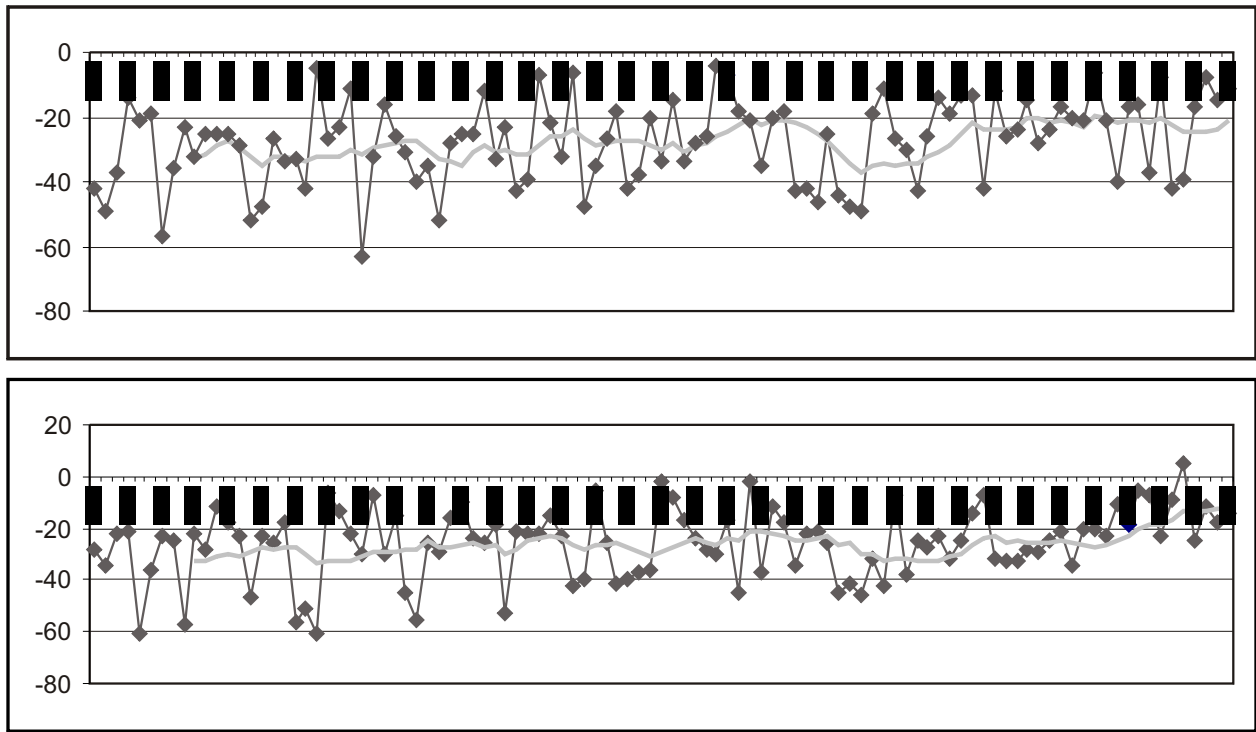


Fig. 2: Decadal moving averages of minimum temperature across the Kashmir region, 1901-2003 for the months of (a) December and (b) February. Units on the abscissa are in °C multiplied by 10.

Source: Indian Meteorological Department, 2003.

Long-term data for the Kashmir region shows that the minimum temperature has risen by $\sim 2^{\circ}\text{C}$ in December and $\sim 1.4^{\circ}\text{C}$ in February over the last century (see Fig. 2), indicating warmer winters and earlier thawing of winter snows.

Forests of the Kashmir Valley

The temperate forests of the Valley show similar altitudinal zonation as found in other parts of the Himalayas. Forests tend to be concentrated along an elevation gradient ranging from $\sim 1600\text{m}$ to 3200m . A lower altitudinal zone extending from ca. $1600\text{--}2000\text{m}$



Temperate Forest of the valley

is dominated by the Blue Pine *Pinus wallichiana*, together with mixtures of deodar *Cedrus deodara*, spruce *Picea smithiana* and Yew *Taxus wallichiana*. Associated shrub species in this zone are *Parrotiopsis jacquemontiana*, *Cotoneaster affinis*, *Rosa* and *Viburnum* spp. The oak *Quercus dilatates*, walnut *Juglans regia*, mulberry *Morus alba* and horsechestnut are the main broad-leaved associates in this zone. The deodar begins to dominate forests between ca. 1850m and 2600m , and begins to be replaced by the silver fir at elevations above 2350m . Towards the upper limits of the tree-line *Abies pindrow*, is associated with the birch tree, *Betula utilis*. The alpine zone begins at about 3000m , where trees become scarce. The alpine vegetation of Kashmir, as elsewhere in the northern hemisphere, is largely comprised of perennial herbs. Shrub elements are few and represented by species like *Cotoneaster microphylla*, *Juniperus communis*, *Lonicera quinquelocaris* and *Rhododendron* spp.

A brief history of Forest and Wildlife Management in the State

The Imperial Gazetteer of India makes detailed notes on the state of the forests of the Jammu and Kashmir region in 1909: "...Before 1891 there was no proper management of the forests, and much damage was done by allowing traders to cut in the forests on payment of royalty without any supervision, while villagers also did immense injury to the forests in various ways, the State

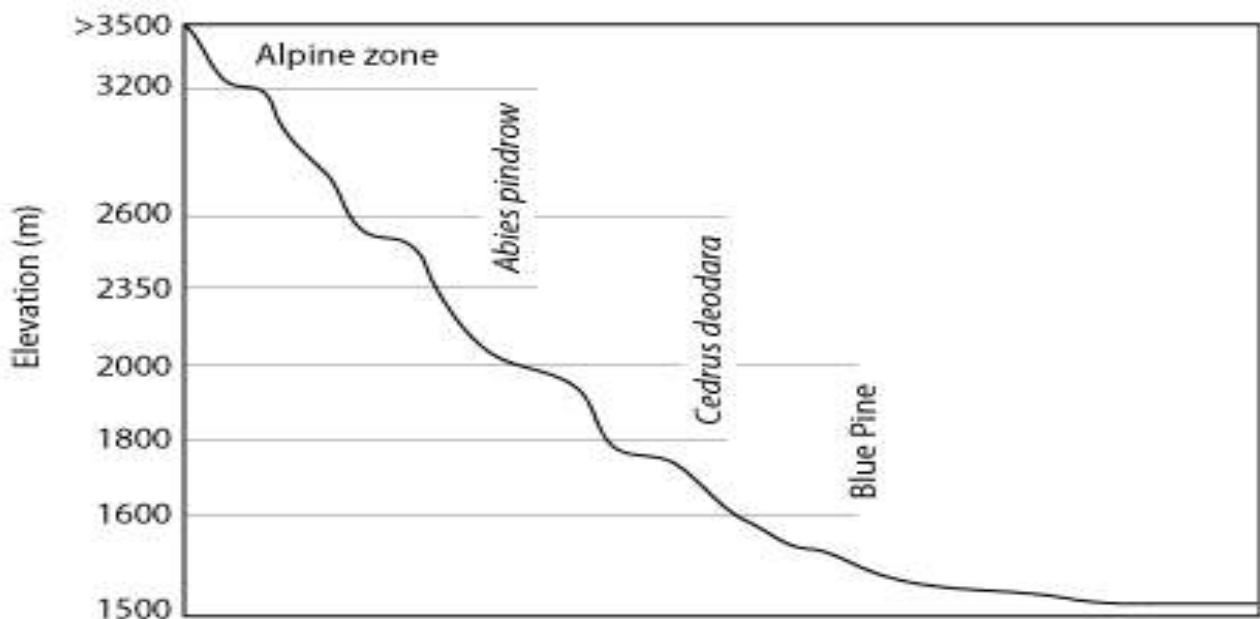


Fig. 3: Dominant tree species along broad altitudinal zones in forests of the Kashmir Valley.

gaining little or no revenue. In 1891 the first attempts were made to put matters on a proper basis, with the result that, while most forms of forest injury except grazing have ceased...Up to the present, owing to the weakness of the forest establishment, little has been done in the matter of artificial reproduction of deodar, nor is it necessary. Owing to the protective measures already undertaken, the three important species - deodar, blue pine and the long leaved pine - are rapidly filling up blanks in the forests." Of particular interest is the fact that the Gazetteer notes: "About three-quarters of the State forests have been demarcated...", indicating that some form of formal forest protection has been in place in the valley since the turn of the 19th century.

Lawrence writes of the Valley in 1895, "...In 1890, the diminution in the big game of Kashmir, led the State to re-introduce rules for the preservation of barasingh, ibex and musk deer, which had fallen into abeyance at the death of Maharaja Ranbir Singh, and it is believed that these rules have already had a beneficial effect. The State maintains a few preserves, in which the public are not allowed to shoot without special permission, and these preserves may have tended to retard the rapid extinction of game." Sir Francis Younghusband, writing some two decades later, states: "Nowadays [one] cannot, as formerly, shoot wherever they like and as much as they like; and in their own interest it is well they cannot, for if they still had the freedom of former days no game would now be left. For some years past a Game Preservation Department has been formed by the Maharaja, and placed under the charge of a retired British officer." He goes on to provide data on the total bags of big game taken from the Kashmir region (including Ladakh, Baltistan and Astor and excluding trophies taken from the Maharaja's preserves), which we reproduce in Table.1 below.

Trophy	1907	1908
Ibex	219	260
Markhor	51	52
Stags	49	51
Black Bears	223	226
Brown Bears	62	59
Leopards	22	27
Shapoo	100	85
Burhel	64	57
Goa	57	57
Ovis ammon	16	15

Source: Kashmir, Sir Francis Younghusband, A. and C. Black, 1909

There have thus been two distinct preservation authorities in the Valley for more than a century: a Forest Department and the Game Preservation Department (later renamed the Department of Wildlife Protection, hereafter DWLP). The distribution of forests under the administration of each of these departments is listed in Table 2 below. Note the marked dominance of forests under control of the Territorial Forest Department – only 20.23% of the total forest area is under control of the DWLP. Note also that two districts – Budgam and Kupwara have negligible or no territories under the jurisdiction of the DWLP.

Table 2: Distribution of Forests under different administrative regimes in the Kashmir Valley.

District	Territorial Forests	Wildlife Forests
Anantnag	2068.00	546.75
Pulwama	810.00	243.88
Srinagar	380.00	366.87
Budgam	477.00	3.25
Baramulla	2690.00	483.25
Kupwara	1703.00	0.00
TOTAL	8128.00	1644.00

It is important to note that the state of Jammu and Kashmir enjoys a separate status compared to other states of the Union of India because of the provisions of the Article 370 of the Constitution. Central Government of India Acts like the Environment (Protection) Act 1986 and EIA notification 1994, Wildlife (protection) Act, 1972 and Forest (Conservation) Act 1980 are not directly applicable to the State, but only serve to provide broad guidelines. However, various acts and statues like the J&K Forest Act 1930 (amended up to December 1997) and the J&K Forest Conservation Act 1997 (Rules and Guidelines) have been enacted that are specific to the State. Following the declaration of the J&K Wildlife Protection Act, 1979 and it's amendments up to 2000, there are currently two National Parks, seven Wildlife Sanctuaries, 13 Wildlife or Conservation Reserves and eight Wetland reserves within the Valley (listed in Table 3 below).

Table 3: Protected Areas (National Parks – N.P.; Wildlife Sanctuaries – W.L.S.; Wildlife Reserves – W.R., and Wetland Reserves, W.L.R.) in the Kashmir Valley.

No.	Name	Status	District	Area (km ²)
1	Dachigam	N.P.	Srinagar/Pulwama	171.25
2	City Forest	N.P.	Srinagar	9.00
3	Overa-Aru	W.L.S.	Anantnag	511.00
4	Gulmarg	W.L.S.	Baramulla	139.25
5	Lachipora	W.L.S.	Baramulla	93.50
6	Hirpora	W.L.S.	Baramulla	114.50
7	Baltal	W.L.S.	Srinagar	210.50
8	Limber	W.L.S.	Baramulla	43.75
9	Rajparian	W.L.S.	Anantnag	20.00
10	Dara/Khimber	W.R.	Srinagar	34.00
11	Brain	W.R.	Srinagar	15.75
12	Khonmoh	W.R.	Pulwama	67.00
13	Khrew	W.R.	Pulwama	50.25
14	Khanagund	W.R.	Pulwama	15.00
15	Panyar	W.R.	Pulwama	10.00
16	Ajas	W.R.	Baramulla	48.00
17	Zaloor-Harwan	W.R.	Baramulla	25.25
18	Naganari	W.R.	Baramulla	22.25
19	Shikargah	W.R.	Pulwama	15.50
20	Khiram	W.R.	Anantnag	15.75
21	Wangath	W.R.	Srinagar	12.00
22	Achabal	W.R.	Pulwama	0.50
23	Narkara	W.L.R.	Budgam	3.25
24	Malgam	W.L.R.	Baramulla	4.50
25	Ajas	W.L.R.	Baramulla	1.00
26	Hokera	W.L.R.	Srinagar	13.75
27	Hygam	W.L.R.	Baramulla	7.25
28	Shallabugh	W.L.R.	Srinagar	16.00
29	Chatlum-Pampore	W.L.R.	Pulwama	0.25
30	Manibugh	W.L.R.	Pulwama	0.25

There are currently two National Parks, seven Wildlife Sanctuaries, 13 Wildlife or Conservation Reserves and eight Wetland reserves within the Valley

Changes in Forest Cover

“State of the Forest” Reports, published every two years by the Forest Survey of India, Dehra Dun provide assessments of change in forest density classes across India. Data for Jammu and Kashmir State is presented in Fig. 4 below, indicating that total forest cover in the State has undergone little change – in fact there has been a marginal (~1.85%) increase since 1987. However, dense forest cover (>40% canopy density) has declined by approximately 19% (from 12,978km² to 10,497km²), but the open forest category has undergone ~36% increase (from 7902km² to 10,770km²) between 1987 and 2003.

Several schemes involving forest 'improvements' and/or community-based forestry activities have been undertaken in the State: these include Social Forestry schemes, Integrated Watershed Development Programs and Soil and Moisture Conservation activities. Such programs have been implemented in degraded forest areas, village woodlots, strip and institutional plantations, around wetlands and pastures, and within farmlands. Changes in the extent and type of such activities are provided in Fig. 6 below. Note that the majority of interventions between 1981-82 and 2003-04 have been implemented within village woodlots and farmlands (22.45% and 42.33% respectively). Interventions in degraded forest areas (20.29%) are only slightly lower than in village woodlots across time, but were largely completed before 1993-1994.

In order to assess additional human impacts on forests, data on timber and fuelwood extraction from the State was accessed with help from the DWLP and is presented in Fig.7, below. Note the considerable reduction in quantities of both types of extractions, with quantities in the late 1990's less than a quarter of what they used to be two decades earlier. Note also, however, the increase in extraction of timber through the nineties and of fuel wood from ca. 1995 on.

Data on the number and extent of forest fires that have occurred in the State between 1947 and 2000 have been depicted in Fig. 8, below. Note that while both the number of forest fires and the total area burnt are at considerably lower levels than in the 1960's and early 1970's, there is a visible increasing trend in both through the decade of the 1990's.

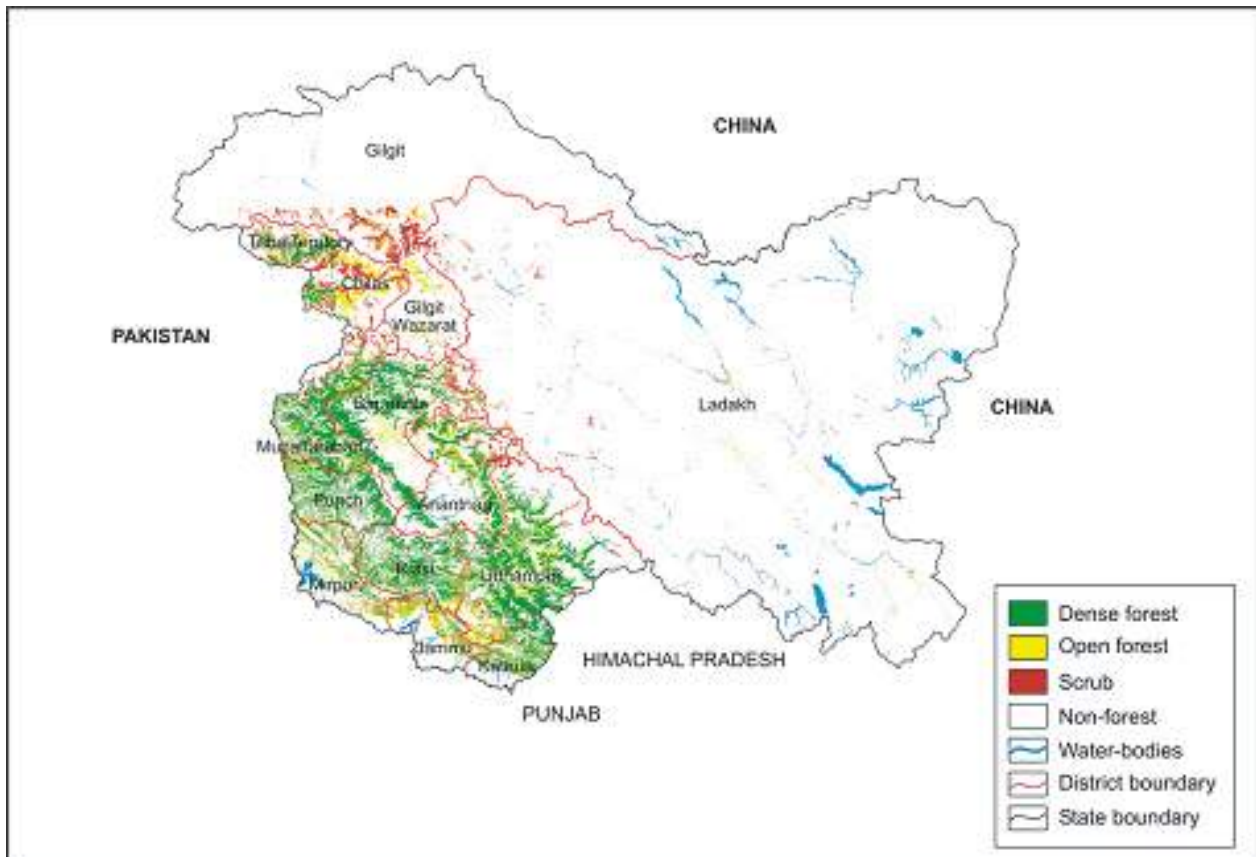


Fig. 4: Forest Cover in J&K State, 2003. Source: State of the Forest Report, FSI, 2003.

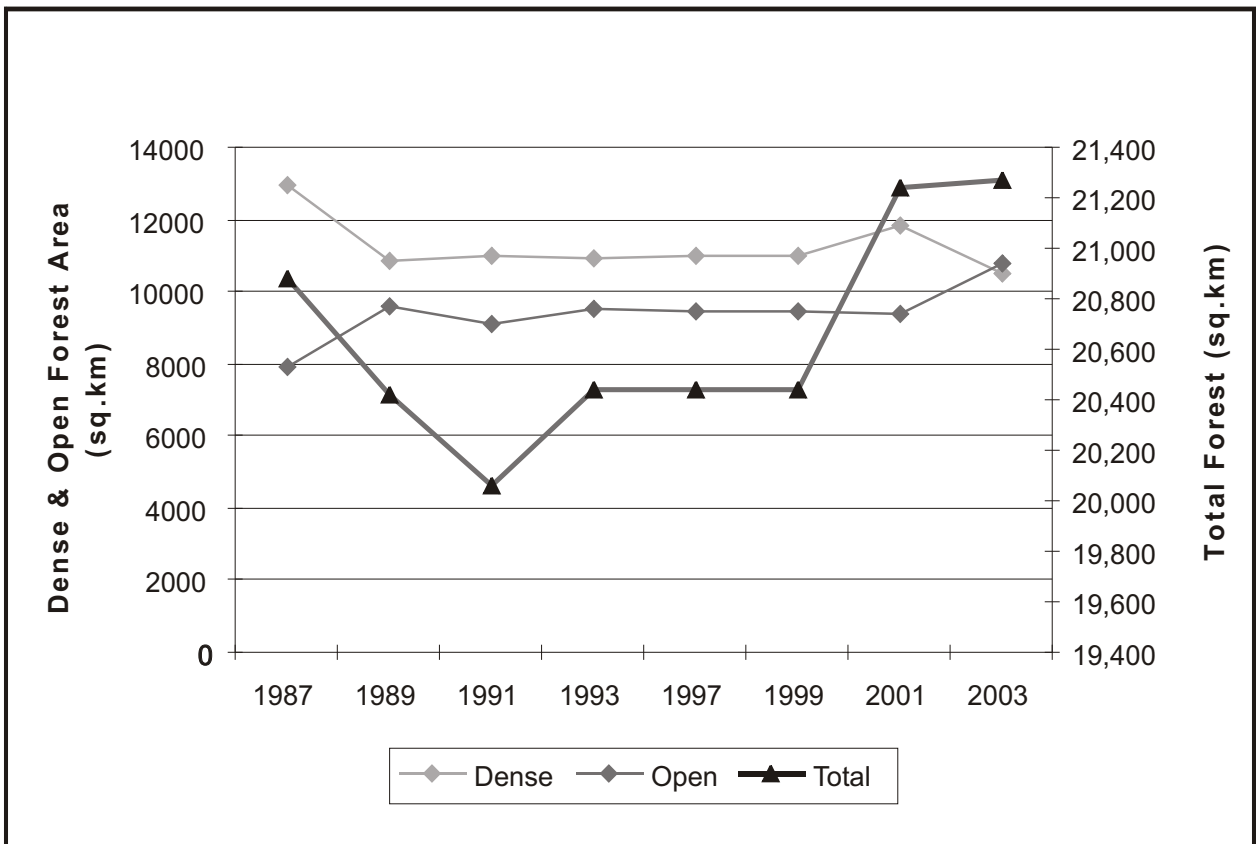


Fig. 5: Change in Forest Cover Classes across J&K State, 1997-2003. Note that data is missing for 1995. Source: State of the Forests Report, FSI, 1999, 2001 and 2003.

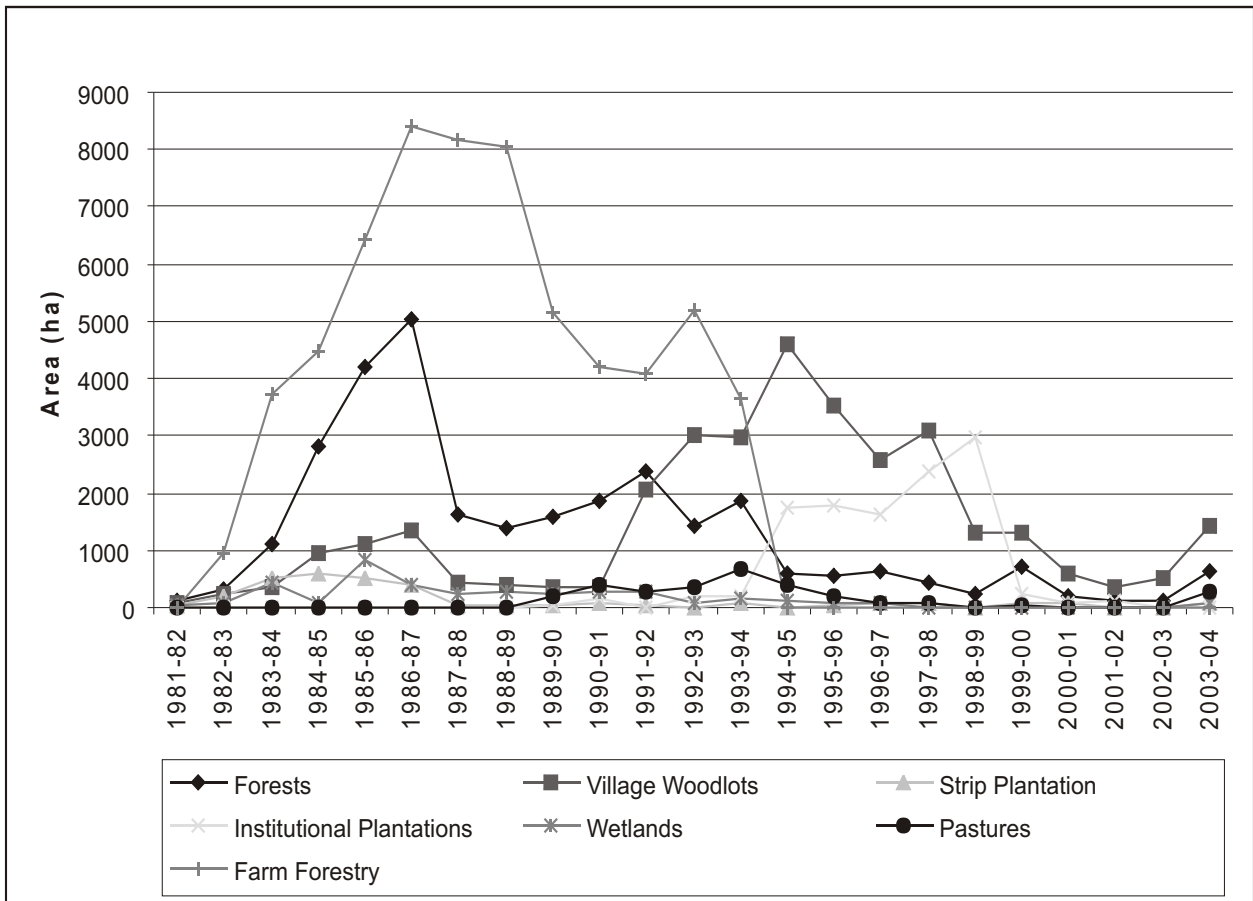


Fig. 6: Forestry activities across the J&K State, 1981-2004.

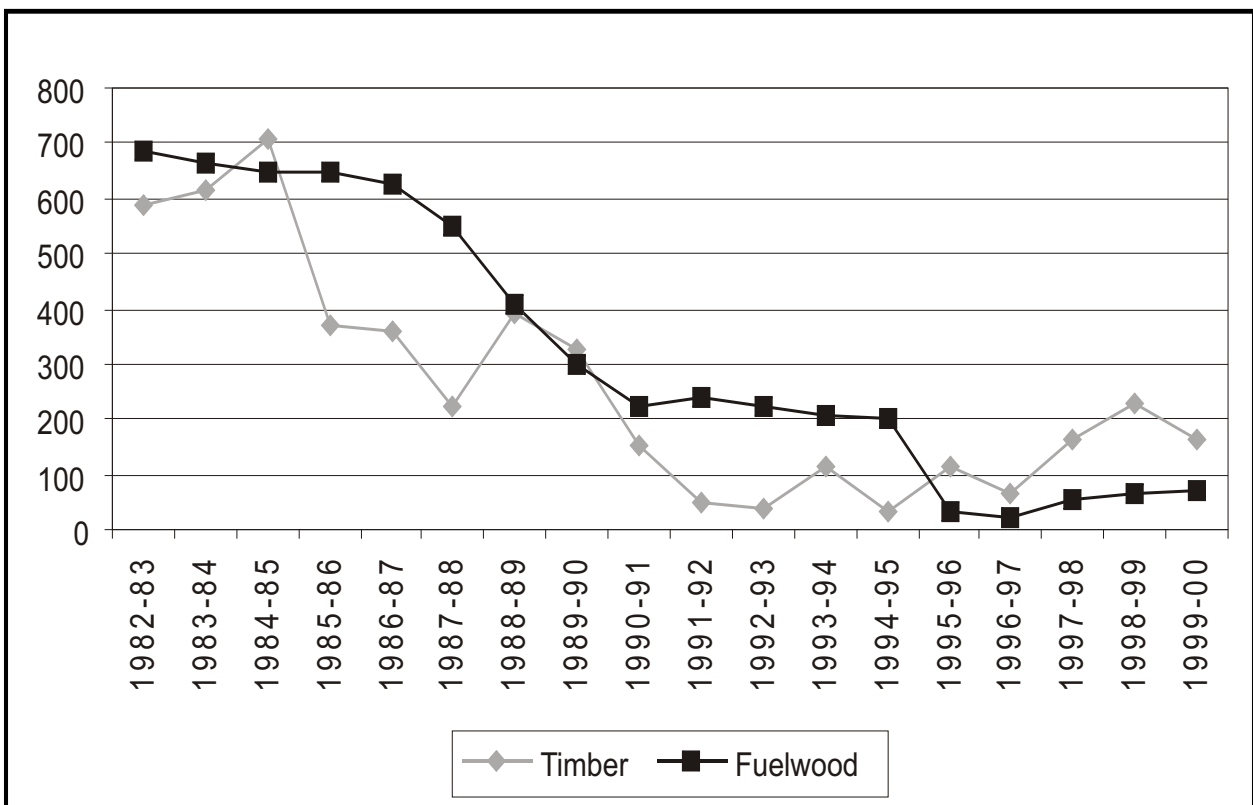


Fig. 7: Timber and Fuel wood extraction across J&K State, 1982-2000.

Values on the abscissa are in cubic meters for timber and thousands of kilograms for fuel wood.

Source: Department of Wildlife Protection, J&K State.

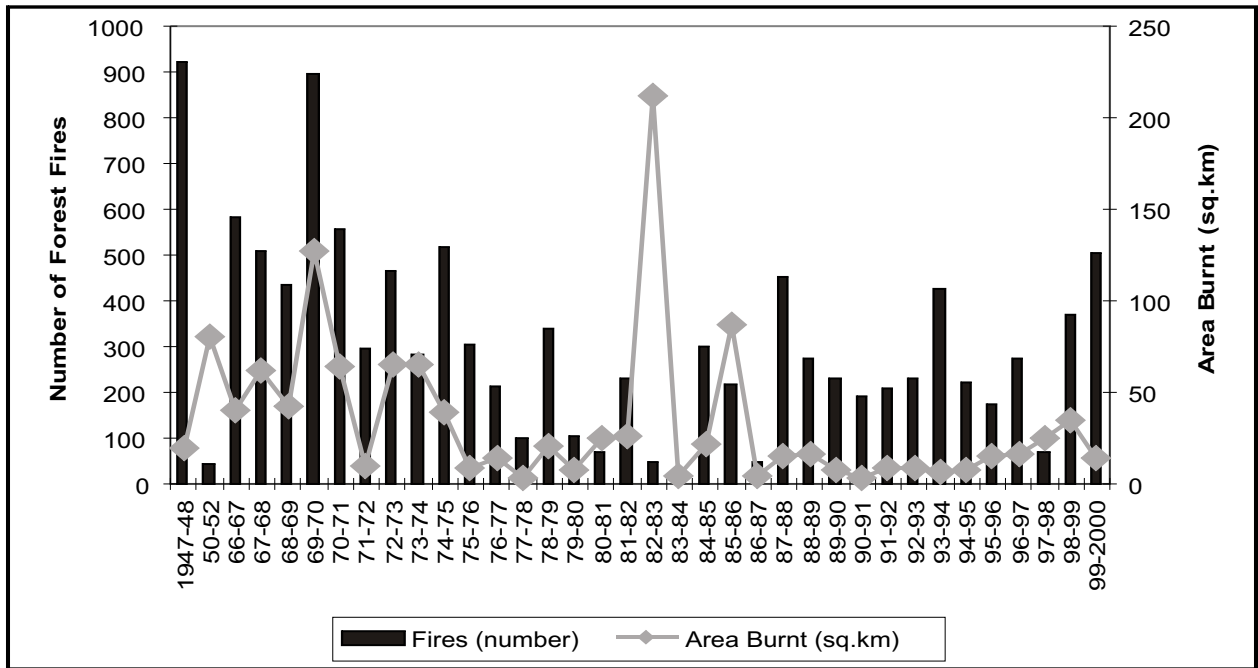


Fig. 8: Forest Fires across J&K State, 1947-2000. Note that data is not continuous for 1947-1966. Source: Department of Wildlife Protection, J&K State.

Other Changes in the region

Human Population

Data from the decennial Census of India operations for the State is presented in Table 4, below. There has been an almost five-fold increase in the human population of

the State since the first Census was conducted in 1901, with a population doubling having occurred in the three decades since 1971.

In the figure below, changes in the density of population for the six districts comprising the Kashmir Valley since 1951 are presented. Examination of the figure shows a

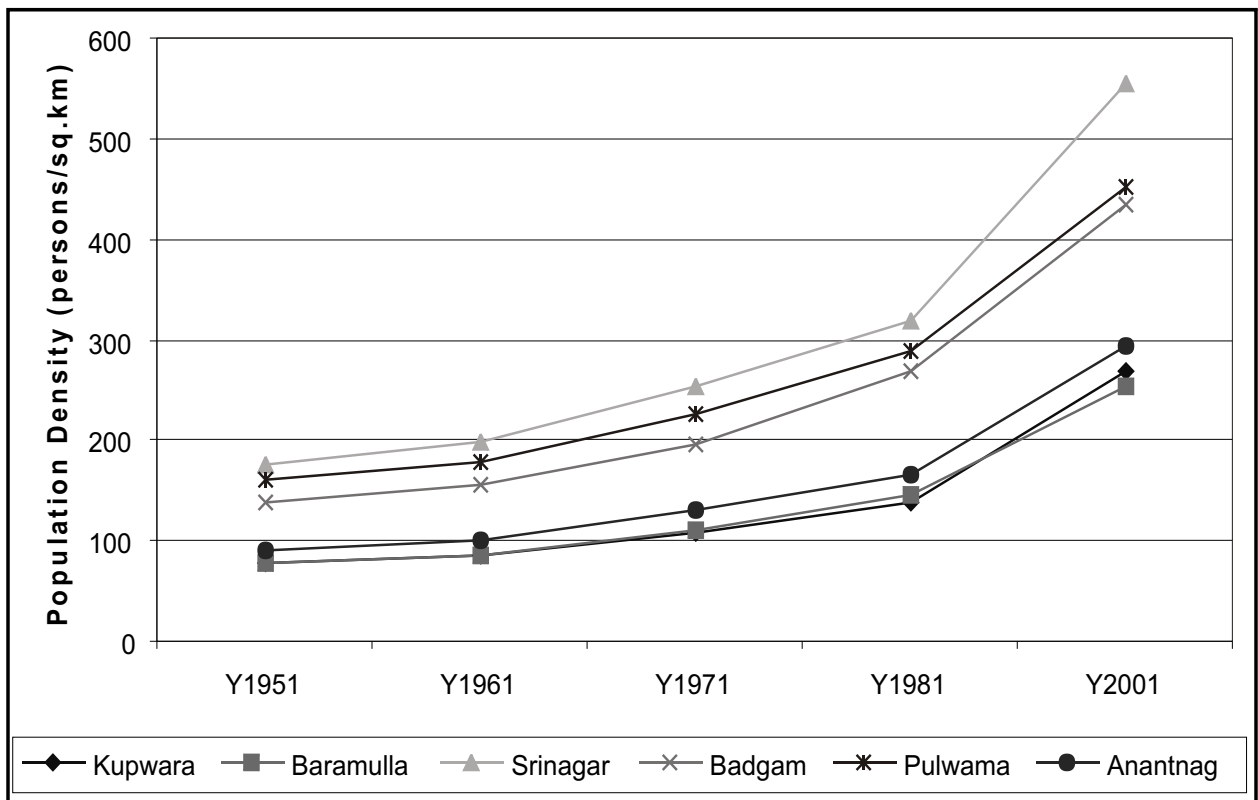


Fig. 9: Changes in density of human populations in the Kashmir Valley, 1951-2001. Note that 1991 is not reported in the figure above as no Census was conducted in J&K that year.

Table 4: Human Population in the J&K State, 1901 to 2001

Year	Population	Absolute Change	Decadal Variation	Average Annual Growth Rate
1901	2,139,362			
1911	2,292,535	153,173	7.16	0.69
1921	2,424,359	131,824	5.75	0.56
1931	2,670,208	245,849	10.14	0.97
1941	2,946,728	276,520	10.36	0.99
1951	3,253,852	307,124	10.42	1.00
1961	3,560,976	307,124	9.44	0.91
1971	4,616,632	1,055,656	29.65	2.63
1981	5,987,389	1,370,757	29.69	2.63
1991	7,718,700	1,731,311	28.29	2.57
2001	10,069,917	2,351,217	30.46	2.69

Source: Census of India, Jammu and Kashmir 2001. Note that no census was conducted in 1951 and 1991 – figures in the table for 1951 are the authentic mean of the 1941 and 1961 population; and for 1991 is the projected population of the State made by the Standing Committee of Experts on Population Projections.

clear distinction: population density is considerably higher in Srinagar, Pulwama and Badgam though the rates of increase are similar across the entire Valley, having increased by ca.3 times since 1951.

Livestock numbers and production

Animal husbandry contributes 0.13% of the State's GDP and provides direct employment to ca. 200,000 persons (State Development Report, 2001). The total livestock population increased from 4,000,000 in 1956 to 8,700,000 in 1982 and to more than 10,000,000 in 2002-03. We were unable to access data indicating change in numbers of all categories of livestock, and in Fig. 10 & 11 below, reproduce data from the State Development Report, 2001 relating to cattle numbers and milk production across the State. Cattle holdings have almost doubled in the four decades since 1956, while milk production has increased by a factor of 6 in three decades since the 1970's.

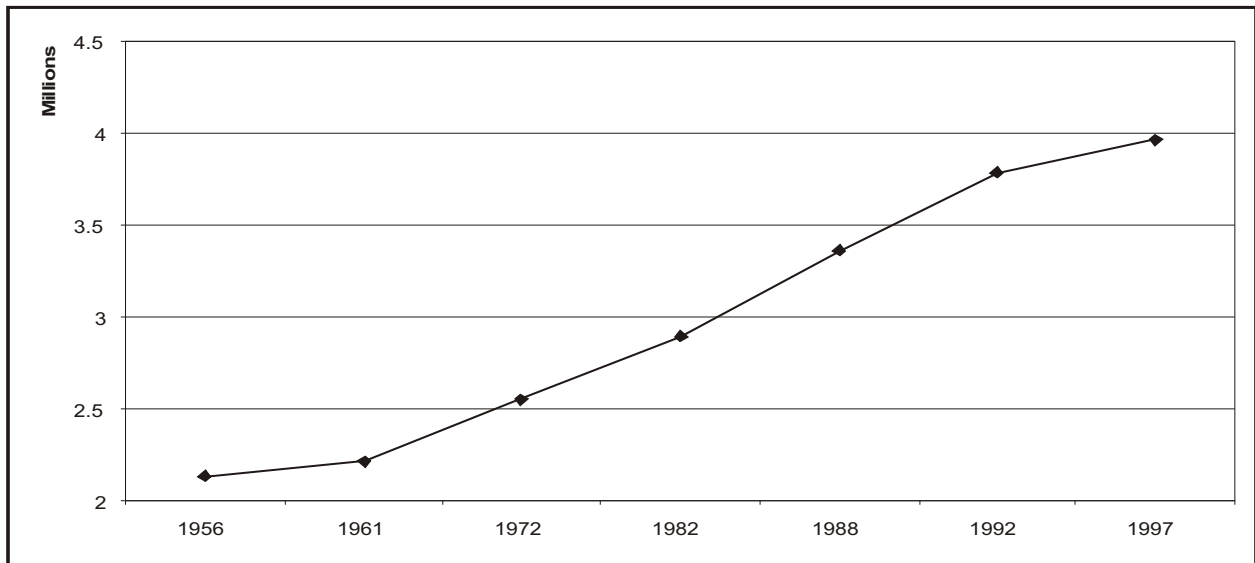


Fig. 10: Changes in cattle populations in J&K State, 1956-1997.

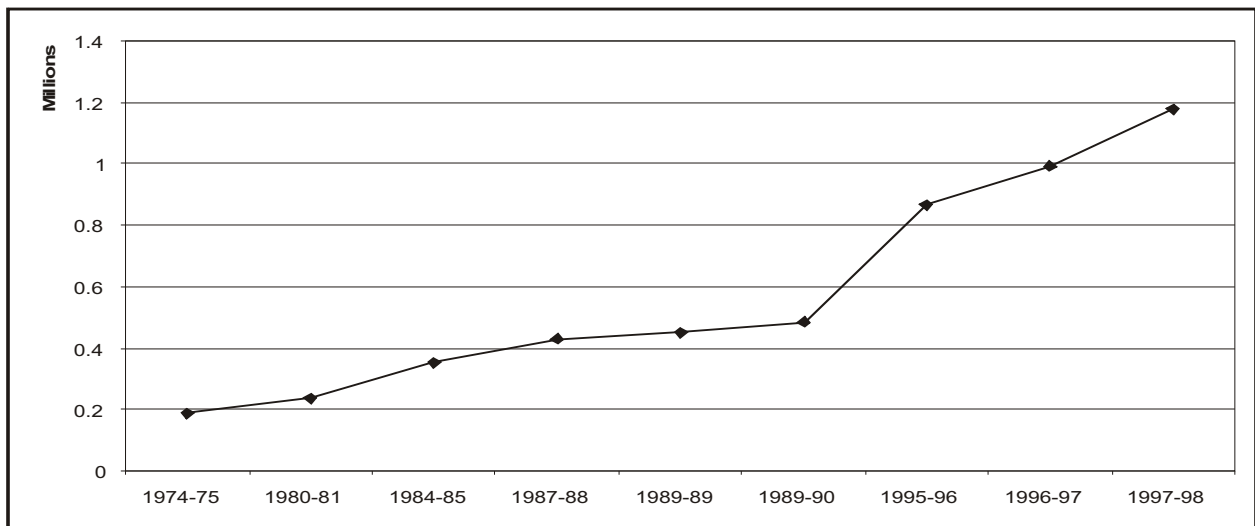


Fig. 11: Changes in milk production in J&K State, 1974-1998.



An apple orchard

Land use Change

An examination of Table 5, below shows that land use has changed little across the State in the 15 years between 1985 and 1999. Within the Kashmir Valley however, all districts except Srinagar have recorded an increase in the area under orchards in the 15 or so years between 1983 and 1999, with the most marked increase observed in the Baramulla and Anantnag districts (see Fig. 9).

Table 5: Change in Land Use categories across J&K State, 1985-1999

Land use	% in 1985	% in 1999
Forest	27.19	27.23
Net area sown	29.53	30.38
Non-agricultural	14.00	12.04
Barren	9.37	12.04
Permanent pastures	5.16	5.21
Misc. trees and groves	4.50	3.02
Cultivable Waste	5.90	75.
Fallow	0.33	0.33
Current fallows	3.75	3.97

Source: J&K Development Report, 2001

Data on the fruit production within the entire State over three consecutive years (April, 1998 to March, 2001) is presented in the graphic below, indicating that new areas have increasingly being converted to horticultural developments, with little impact on overall production.

Road developments

Road development, especially through previously uncovered areas, can potentially cause considerable dissection within a landscape. Fig. 14 shows the changes in road length by type of surface across the entire State between 1956 and 1986: development has been accompanied by an almost three-fold increase in the total length of surfaced roads, while the un-surfaced category has increased more slowly, indicating that a considerable area has been affected both by the metalling of old roads as well as the development of newer ones.

Data on road development accessed from the administrations of the six districts of the Kashmir valley are presented in Table 6, below, showing a considerable increase in total road length within the valley between 1986 and 2001, the greatest increase occurring in the Badgam district (77%).

Table 6: Change in Road Length in the Kashmir Valley, 1986-2001.

Districts	Increase
Kupwara	0.44
Baramulla	0.26
Srinagar	0.57
Badgam	0.77
Pulwama	0.19
Anantnag	0.21

Source: District Administration data

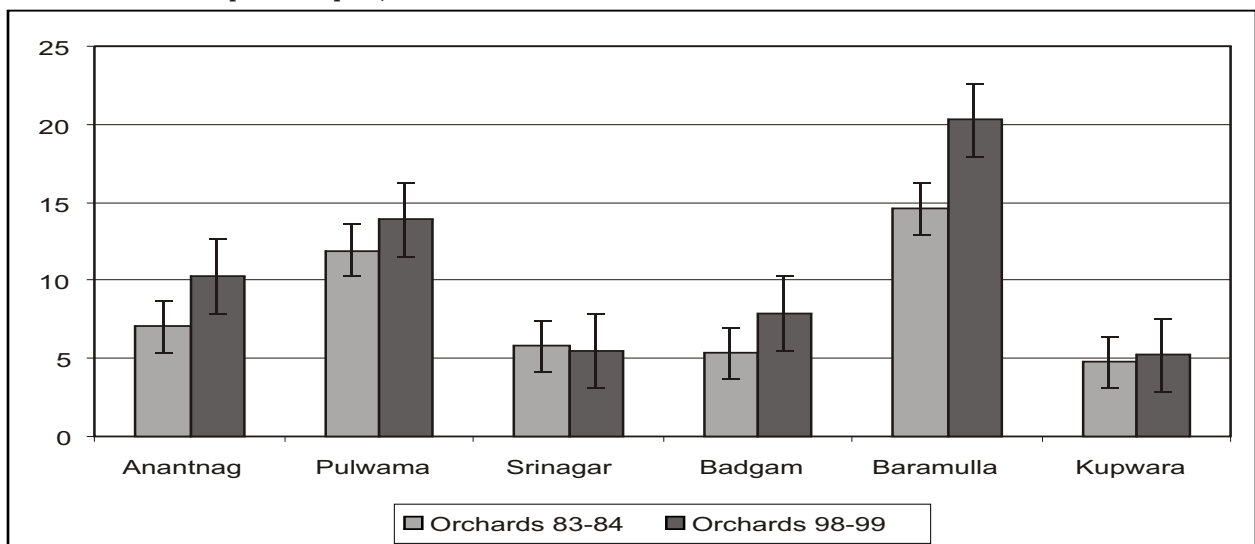


Fig. 12: Changes in area under orchards in the Kashmir Valley, 1983-1999.

Source: State Development Report, 2001.

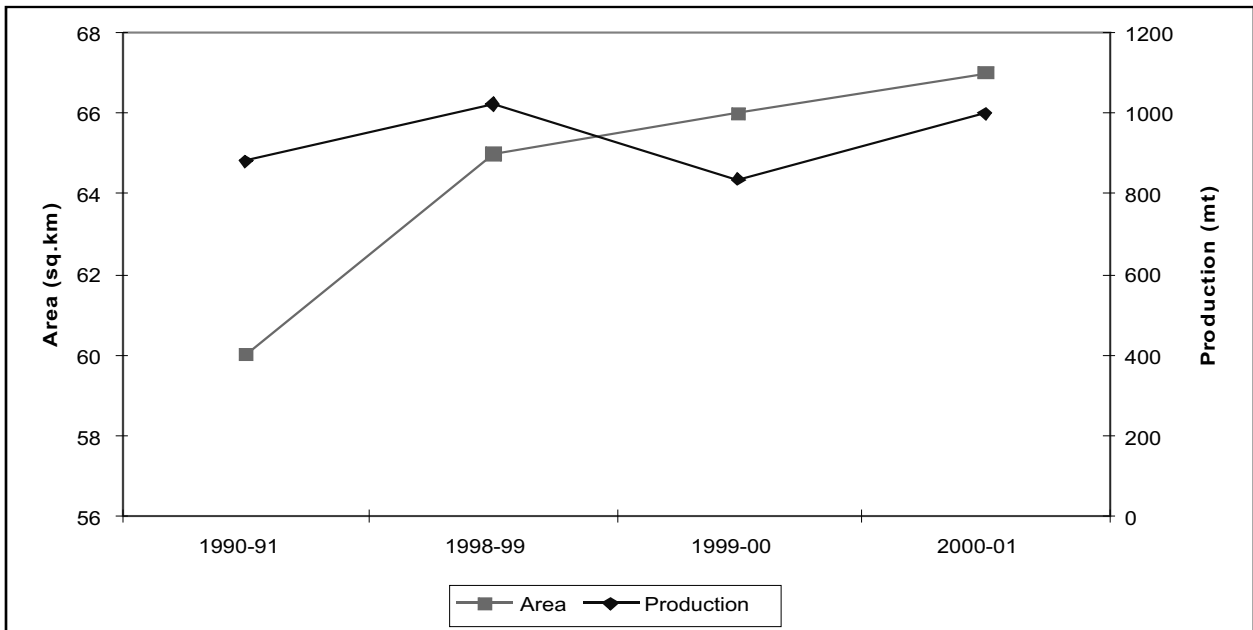


Fig. 13: Changes in area under orchards in the Kashmir Valley, 1983-1999.

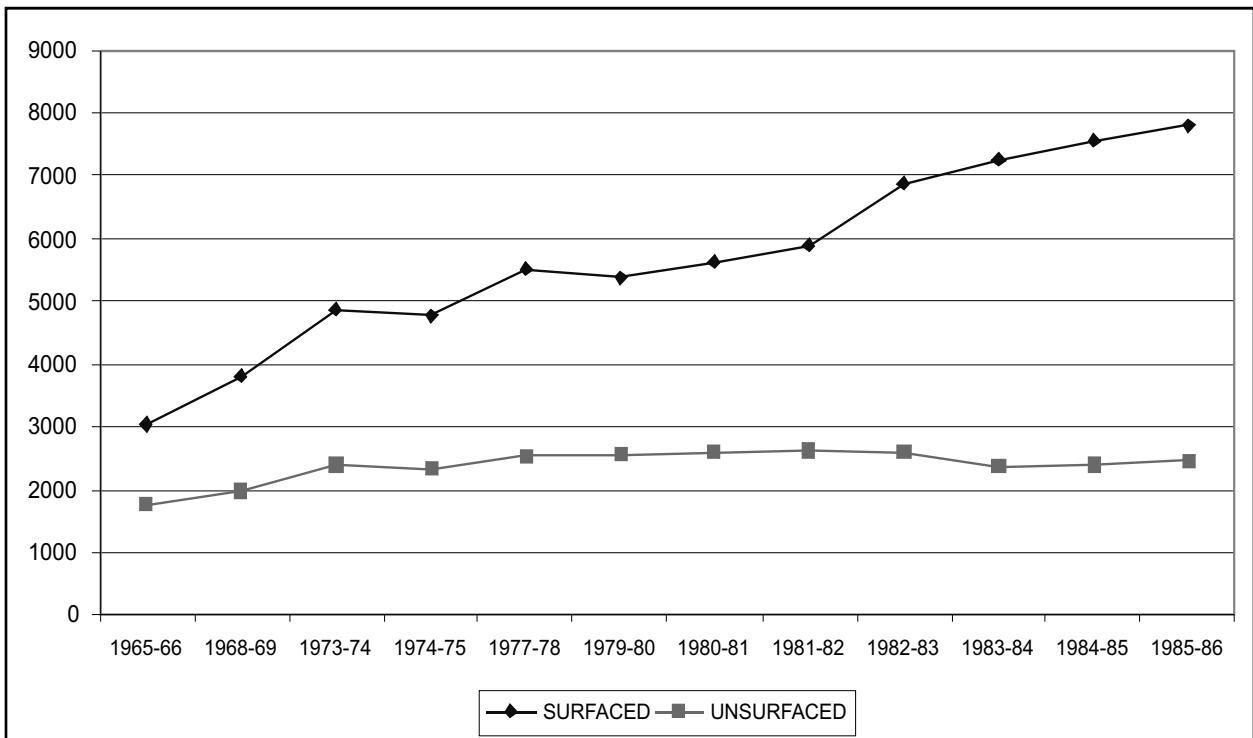


Fig. 14: Changes in total length of roads by type in J&K State, 1965-1986.

Militancy and its impacts

The onset of militancy in the state in 1990 brought about drastic changes in peoples' lifestyles and attitudes, especially in the valley of Kashmir and the Kishtawar, Baderwah and Doda areas of Jammu. The advent of militancy and subsequent deployment of security forces across the valley had an immediate impact on wildlife and its habitats. One of the first things to happen post militancy was the surrender of private fire arms. This coupled with the fact that forest

areas became out of bounds for people (not wanting to confront the security forces or the militant groups) could only have provided opportunities for wildlife in these regions to grow in numbers. This has not been verified through proper surveys and even where numbers have been estimated, relative changes could not be detected for lack of baselines. The only species for which annual estimates are available is the hangul in Dachigam National Park but figures however point towards a declining trend through the militancy period.

The period of militancy has also apparently resulted in felling of large parts of standing forest. This is borne by the large tracts of regenerated young forest one can see in the Lolab valley and around Kupwara. Certain other areas like the Zaberwan range of hills and even the Shankracharya hills in the Srinagar town, however, are much more thickly vegetated than ever before.

There has almost certainly been an increase in the number of domestic/stray dogs as a result of both ineffective systems of garbage disposal and encouragement by the security forces who keep dogs as pets, using them to detect intruders. These could have provided easy prey for leopards, especially in villages where forest fringes are close to habitations.

The movement of security forces within the forest areas has certainly increased as a result of increased patrolling. Also border fencing in certain areas may have hampered animal movements across areas, disorienting animals towards human settlements. However, these are activities which override other concerns including wildlife and thus not taken into

Border fencing in certain areas may have hampered animal movements across areas, disorienting animals towards human settlements

account while addressing man-animal conflicts in the state.

History of attacks on humans by bears and leopards

Writing on the fauna of the region in 1895, Lawrence writes, "...Of the family Ursidae, the black bear is very common, being a great pest to the crops and a danger to the people" (Imperial Gazetteer of India. 1895. v.15., p88), and the people of Kashmir have long been wary of the *bomba hâpat*, with most venturing out with an axe when walking along forested paths (Dar, Tales of Kashmir). There are fewer references to man-eating leopards from the Valley – Lawrence (ibid) mentions only two known records: one in the Lidar Valley (Pahalgam tehsil) and the other in the vicinity of Ganderbal, both active at the turn of the 19th century.



Houses in close proximity to forest pre-dispose them to bear - leopard attacks

Methods

The location of each attack was recorded using GARMIN ETREX series GPS units, making sure that the positional error reported was below 5m. Semi-structured interviews were conducted with the victims or their next-of-kin to determine more details of the incident

Data recorded by the Department of Wildlife Protection (DWLP), J&K State formed the baseline for more detailed interview surveys. The conflict was discussed with each community accessed, resulting in a snowball effect of adding to the baseline data recorded by the department. Our investigations concentrated on two species – the Asiatic Black Bear (*Ursus thibetanus*) and the common leopard (*Panthera pardus fusca*). Our final dataset recorded 230 attacks on humans since 1996: 157 cases involving black bears and 73 involving leopards. Although in J&K, damage to livestock is also caused by Brown bear (*Ursus arctos*), there are no reports on human casualties caused by this species and thus this conflict between brown bear and humans does not form a part of this study.

Analysis of case studies

The location of each attack was recorded using GARMIN ETREX series GPS units, making sure that the positional error reported was below 5m. Semi-structured interviews were conducted with the victims or their next-of-kin to determine more details of the incident (see Annexure 1).

The date and time of each incident was recorded and analyzed to discover patterns in seasonality and diurnal distribution of dangerous encounters with each species. Extent of injury caused, the portion of the body attacked, age- and sex-based differences was explored using simple bar graphs. The location of the incident was determined by the field researcher who made appropriate noting on the datasheets: we compared these to responses of individuals and community (group) respondents on locations where incidents had occurred historically (more than 20-30 years in the past). The activity of the victim was recorded and questions were asked as to the size of the group that may have been accompanying the individual during the encounter. We asked whether the incident had been reported, and if so, to which Government agency. We sought community perceptions of changes in land use, increase in area under agriculture and whether houses were being built inside old orchards. We then discussed with each community we accessed details of how they would be willing to participate in mitigation efforts and what they expected in terms of actions to be taken by the DWLP and Government.

Research Questions and Hypotheses

A number of hypotheses have been suggested to explain the increased conflict with wildlife in India in recent decades (Himachal Pradesh Forest Department, 1988; Vijayan and Pati, 2004; Athreya et al, 2004). Primary among these are (i) habitat loss; (ii) tall crops (such as orchard fruits, tea, sugarcane, maize, millets

etc) provide more attractive habitat options than surrounding forests (especially in relation to i); (iii) the translocation of problem individuals into areas causing artificial, local increases in problem animal population densities; (iv) a decreasing natural prey-base and changing patterns of predation towards dogs and stray cattle ('easy prey') or attraction to sources of food (garbage, fruit processing waste etc), and (v) increasing leopard and bear populations as a consequence of wildlife protection and enforcement over the past three decades.

The occurrence of one or more dangerous encounters was accumulated for each watershed, such that each polygon recorded the total number of attacks for each species separately

The present study uses a cross-sectional approach to explore the effects of landscape change and overall landscape character on the intensity of conflict across the Kashmir Valley. More specifically, the following questions are addressed. First, what landscape level characteristics are associated with elevated conflict levels in Kashmir? Second, does forest habitat quality within the landscape impact overall conflict intensity? Third, what is the association between landscape level change and conflict intensity? Finally, does the spatial patterning of forest habitat, habitat quality or landscape change help explain conflict intensity?

We used Geographical Information Systems (GIS) and Remote Sensing techniques to assess the effects of habitat quality and change in vegetation productivity on human attacks by wildlife at landscape level, in order to explore the relevance of the first two hypotheses. We conducted semi-structured interviews with officials from the State Wildlife Department and with both focus groups and individuals from affected families/villages to find evidence for the third – was translocation a common occurrence in the Valley? Testing the last two hypotheses proved more difficult given available data –no wildlife census data has been conducted for either leopards or bears and resources available within the current study limit our ability to establish such a baseline. Both, however, are related to the first two hypotheses – if both (i) and (ii) are correct, conflict should exhibit a declining trend as more individuals enter conflict situations and are removed in retaliation. At the present time, the semi-structured interviews allow only for a perception survey of increase in wild populations in the Valley.

GIS and RS Methods

The Kashmir Valley, climatically distinct from the Jammu region and the area within the State reporting the majority of attacks, was selected for detailed analysis. Rather than use arbitrary hexagonal or grid based structures to disaggregate the region, we use watershed boundaries instead, because watersheds represent natural divisions within a landscape, and potential errors arising from edge effects and the minimal aerial mappable unit (MAUP) are avoided. From SRTM (Shuttle Radar Topography Mission), DEM (Digital Elevation Model) data available at the Global Land cover Facility (www.landcover.org), 745 watersheds were extracted that covered the Kashmir valley, with mean area of 23.6²km (±13.4 SD). This scale was chosen in particular because the area enclosed by the watershed boundaries closely resembles the home range sizes of both leopards and Asiatic black bears as determined by telemetric studies.

Locations of dangerous encounters between humans and leopards or bears that resulted in injury and/or death that were recorded in the field using GARMIN ETREX series GPS units were imported into a GIS. Our complete dataset consisted of 157 cases involving bears and another 73 cases involving leopards

The occurrence of one or more dangerous encounters was accumulated for each watershed, such that each polygon recorded the total number of attacks for each species separately. The summation of dangerous encounters accumulated within each polygon is assumed to represent the intensity of conflict.

Land use-Land cover (LULC) maps were derived from LANDSAT ETM+ data available for October 2001, by image segmentation and unsupervised iso-clustering algorithms using SPRING GIS, freely available online. To speed analysis times, the LANDSAT data was resampled from the original 28.5m pixel to 114m. A final map was derived from the segmented unsupervised clusters using expert knowledge and data from ground truthing. Care was taken to delineate dense forest and orchards from other land cover elements.

The availability and configuration of 'good' habitat within a landscape has been demonstrated to affect species (and thereby, we assume, conflict) distribution (Foreman and Gordon, 1985). The following metrics were selected to describe landscape structure: one aspatial (class proportion, PROP), three indices of fragmentation (mean patch size, MPS; total edge length, TE and patch density, PD), and one of configuration (interspersion, IJI) derived from classified LULC maps for each watershed using FRAGSTATS (MacGarigal and Marks, 1995).

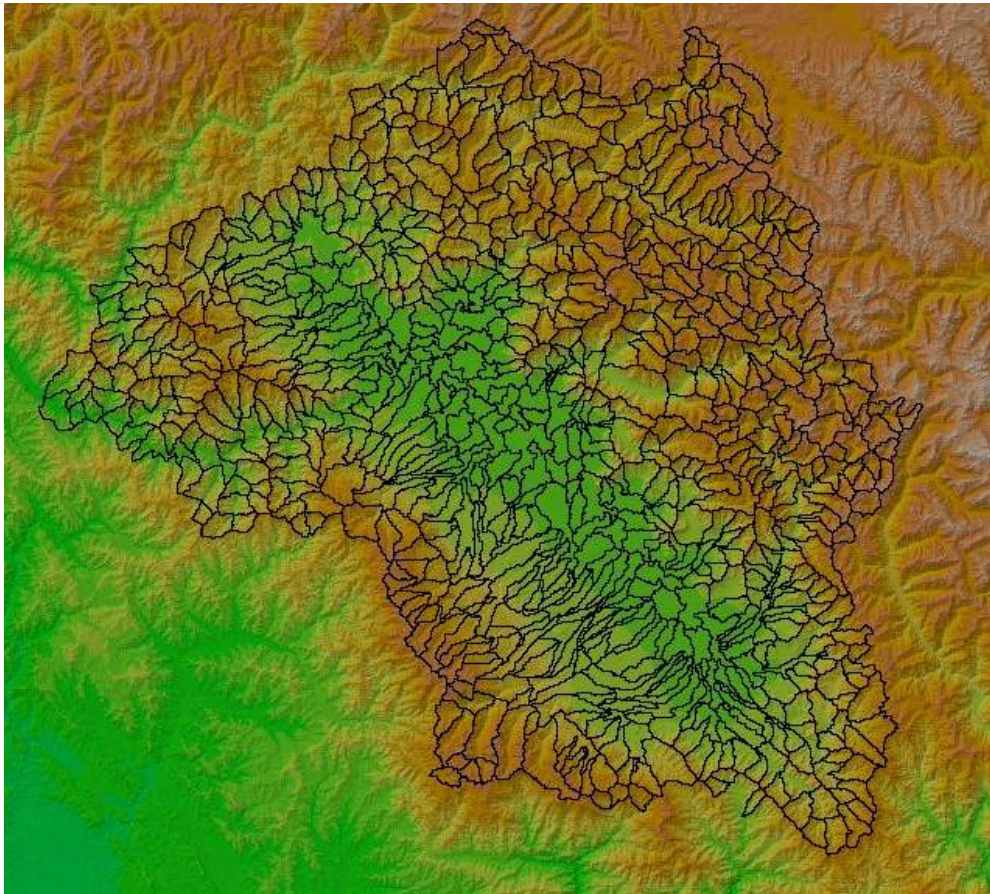


Fig. 15: The 745 Watershed boundaries covering the Kashmir Valley overlaid on a DEM of the region.

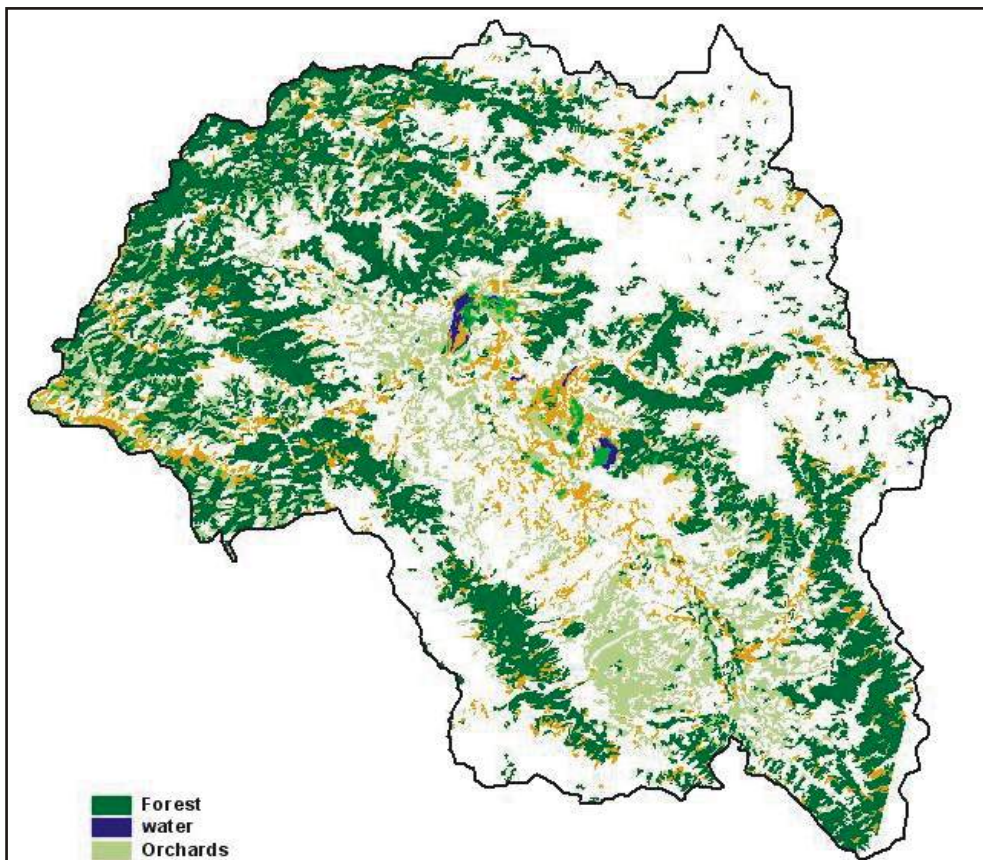


Fig. 16: Land cover map of the valley and its surrounds, extracted from LANDSAT ETM+ imagery dated October, 2001. Only classes used in analysis are shown in the map above.

We assume that the extent of human intervention in a landscape is a function of accessibility, and modeled topographical character and complexity in the belief that landscapes characterized by steeper slopes provided more favorable habitats for leopards and bears. Elevation and slope maps for the region were derived from 90m SRTM data (resampled to 114m) and averaged over each polygon at the two spatial levels.

We expected conflict intensity to be related to proximity of Protected Areas, forest edges and orchards (for bears only). A map of PAs and Conservation Reserves in the valley was digitized from information available with the Department of Wildlife Protection, J&K State. Proximity maps were generated for the PA coverage and for edges to forest and orchards within the GIS.

Productivity of vegetation was estimated using the Normalized Differential Vegetation Index (NDVI) from the ETM+ imagery and from LANDSAT TM5 data collected in the same month from 1991. The earlier (1991) NDVI coverage was calibrated to the 2001 coverage using linear regression to reduce the effects of sensor and time differences. A simple difference between the calibrated NDVI coverages was then used to represent changes in vegetation productivity (MNDVICH) for the decade between 1991 and 2001. MODIS Vegetation Continuous Fields (VCF) Tree Coverage data was accessed for the years 2001 and 2005, and a simple difference image between 2001 and 2005 was derived to represent changes in tree cover within the region. Loss/gain in productivity and tree cover within each watershed and within each land cover element of interest in that landscape was averaged over watershed boundaries to provide six variables representing change: mean change over (i) the entire watershed (MNDVICH and CH0105); (ii) forests (NDFOR and TRFOR); (iii) orchards (NDORC and TRORC); (iv) non-forest (NDNON and TRNON). If the second hypothesis is correct, high intensity conflict is expected to have occurred in landscapes where vegetative productivity and tree cover have decreased in forests and increased in non-forest classes over time.

Since climatic regimes have been demonstrated to exhibit strong correlation with several ecological phenomena, four climatic variables were extracted from the BIOCLIM database – representing Annual Precipitation, Precipitation Seasonality, Minimum Temperature and Temperature Seasonality. As with other variables, each variable was averaged across polygons at watershed scales.

Statistical Analyses

We expected conflict intensity to be highly spatially auto correlated (watersheds reporting elevated conflict are located close together), an idea emerging from Tobler's First Law: 'In Geography, everything is related

to everything else, but near things are more related than distant things' (Tobler, 1970). Failing to account for spatial autocorrelation tends to over-inflate the significance of variables in correlation and regression analyses and increase the chances of committing Type I errors because assumptions of independence are violated.

We explored clustering of conflict and bi-variate correlates of conflict intensity for each species using Moran's I statistics and Local Indices of Spatial Autocorrelation (LISA) using the free software package GeoDa version 0.9.5i (www.csiss.org).

The Moran's I test for global spatial autocorrelation is evaluated to determine the presence or degree of spatial clustering, by explicitly analyzing conflict intensity in a given watershed and its values in neighboring watersheds. The same statistic can also be used to test for bi-variate/cross-correlations – or the extent to which values of one variable observed at a given location show a systematic (more than likely under spatial randomness) association with another variable observed at neighboring locations. The Moran's I statistic ranges from -1 to +1, with values near the limits reflecting strong negative or positive autocorrelations (spatial clustering/association of values) and values close to zero indicating no strong relationships. While Moran's I is a measure of autocorrelation across the entire region being investigated, Local Moran's I disaggregates the global statistic such that the sum of Local Moran's I is proportional to the global Moran's I. LISA Cluster Maps use the values of a single or two variables to categorize each analytical unit (the 745 watersheds) into choropleth maps that highlight polygons with significant *local* clustering. Clusters of low/high values corresponding to positive/negative local spatial autocorrelation are mapped according to four types of spatial association between a given location and its neighbors: bright red for high-high associations (values of both variables are high), bright blue for low-low, light blue for low-high, and light red for high-low. The high-high and low-low classes suggest clustering of similar values (clustering), whereas the high-low and low-high locations indicate spatial outliers. Significance testing in GeoDa is provided for by means of a permutation of the values to generate an empirical distribution of simulated Moran's I – observed values are randomly reallocated to locations and the statistic is recomputed for each such random pattern. The resulting empirical reference distribution provides a way to quantify how extreme the observed statistic is relative to what its distribution would be under spatial randomness. In other words, the null hypothesis we test against corresponds to a scenario of randomness, which suggests that the arrangement of conflict intensity observed across the Kashmir Valley is a result of chance, such that conflict intensity in one watershed is not associated with levels in surrounding watersheds. All

reported significance tests are based on 9999 random permutations of data, with a significance filter of 0.05 applied to the results.

We then estimated the effects of the potential covariates on conflict intensity for each species separately in a multivariate framework, using the program GRASP (Generalized Regression and Spatial Prediction), which permits explicit modeling of spatial autocorrelation. GRASP uses Generalized Additive Modeling (GAM), analogous to Generalized Linear Models but relaxing the assumption that relationships between the dependent variable and independent variables are linear, by estimating a nonparametric smooth function (in this case, splines) to describe the relationships. To ensure that multi-collinearity between predictor variables did not confound independent effects, Pearson correlation coefficients were calculated for all pair-wise combinations of variables entered into each model. The maximum value of the correlation coefficients (Pearson's *r*) obtained were 0.94 (TEALL and AREA), 0.91 (MNDVI and MNDVICH) and 0.84

(NDCHNON and MNDVICH). These variables were excluded one at a time and the models tested against each other before proceeding. The remaining correlations were all below the suggested cutoff of 0.85 which would indicate collinearity for the sample size considered. GRASP allows for stepwise approach to develop more parsimonious models by eliminating variables that do not contribute significantly to lowering the Akaike Information Criterion (AIC) while dropping or adding each variable in the presence of the others. The Akaike Information Criterion [defined as $AIC = -2 * (\log \text{likelihood}) + 2 * (\text{no. of parameters})$], is used a measure of information indicating the tradeoff between fit and parsimony, lower values indicating a better model. The stepwise procedure terminates when the AIC is not improved by the removal of any variable. Convention is that fit of two models is approximately equal when the difference in AIC between them is less than 2 units (in Kery and Gregg, 2004). All statistical manipulations were conducted on the S-PLUS 2000 (Mathsoft Inc, Lucent Technologies, 1999) software platform.

Table 6: Variables used in the GRASP modeling

Code	Variable	Code	Variable
FOREST	Proportion of Forest	NDNON	Change in Productivity within non-forest
ORCHARDS	Proportion of Orchards	NDORC	Change in Productivity within orchards
MPSALL	Mean Patch Size (LANDSCAPE)	CH0105	Change in Tree Cover (LANDSCAPE)
MPSFOR	Mean Patch Size of Forest patches	TRFOR	Change in Tree Cover within forests
MPSORC	Mean Patch Size of Orchard patches	TRNON	Change in Tree Cover within non-forest
TEALL	Total Edge Length (LANDSCAPE)	TRORC	Change in Tree Cover within orchards
TEFOR	Total Edge Length of Forest patches	MELEV	Mean Elevation
TEORC	Total Edge Length of Orchard patches	MSTD	St.Dev. of Slope
PDALL	Patch Density (LANDSCAPE)	FORPROX	Proximity to forest edges
PDFOR	Patch Density of Forest patches	ORCPROX	Proximity to orchard edges
PDORC	Patch Density of Orchard patches	DPAS	Proximity to Protected Areas
IJIALL	Juxtaposition (LANDSCAPE)	MTEMP	Minimum Temperature
IJIFOR	Juxtaposition of Forest patches	TSEAS	Temperature Seasonality
IJIORC	Juxtaposition of Orchard patches	PRECIP	Annual Precipitation
MNDVI	Mean Productivity (LANDSCAPE)	PSEAS	Precipitation Seasonality
MNDVICH	Change in Productivity (LANDSCAPE)	AREA	Watershed Area
NDFOR	Change in Productivity within forests		

Results

Analyses of Case Studies

While encounters with bears appear to have increased almost exponentially since about AD 2000 (Fig. 17), encounters with leopards, like in other areas around the country, appear to show cyclical patterns, having increased and decreased over time. However, it is important to note that the observed increases may be due to the following reasons:

1. Improved reporting and record maintenance in recent years
2. The introduction of a compensatory mechanism since 2005-06
3. Improved communication facilities
4. Intensive recent coverage of conflict incidents by the mass media

Seasonal patterns of dangerous encounters were analyzed from the date of the incident – again, different patterns emerge in cases involving leopards and bears. As was expected, conflict with bears increases during the autumn harvest season. Dangerous encounters with leopards however, are concentrated during the winter-spring seasons (Fig. 18).

The diurnal distribution of encounters was plotted on radial graphs to depict differences in the time of day around which most incidents were recorded. More than 90% of all recorded attacks were reported during daylight hours (0600hrs to 1800hrs) (Fig. 19).

The diurnal distribution of encounters was plotted on radial graphs to depict differences in the time of day around which most incidents were recorded



Chattergal village in south Kashmir - A scene of leopard encounter

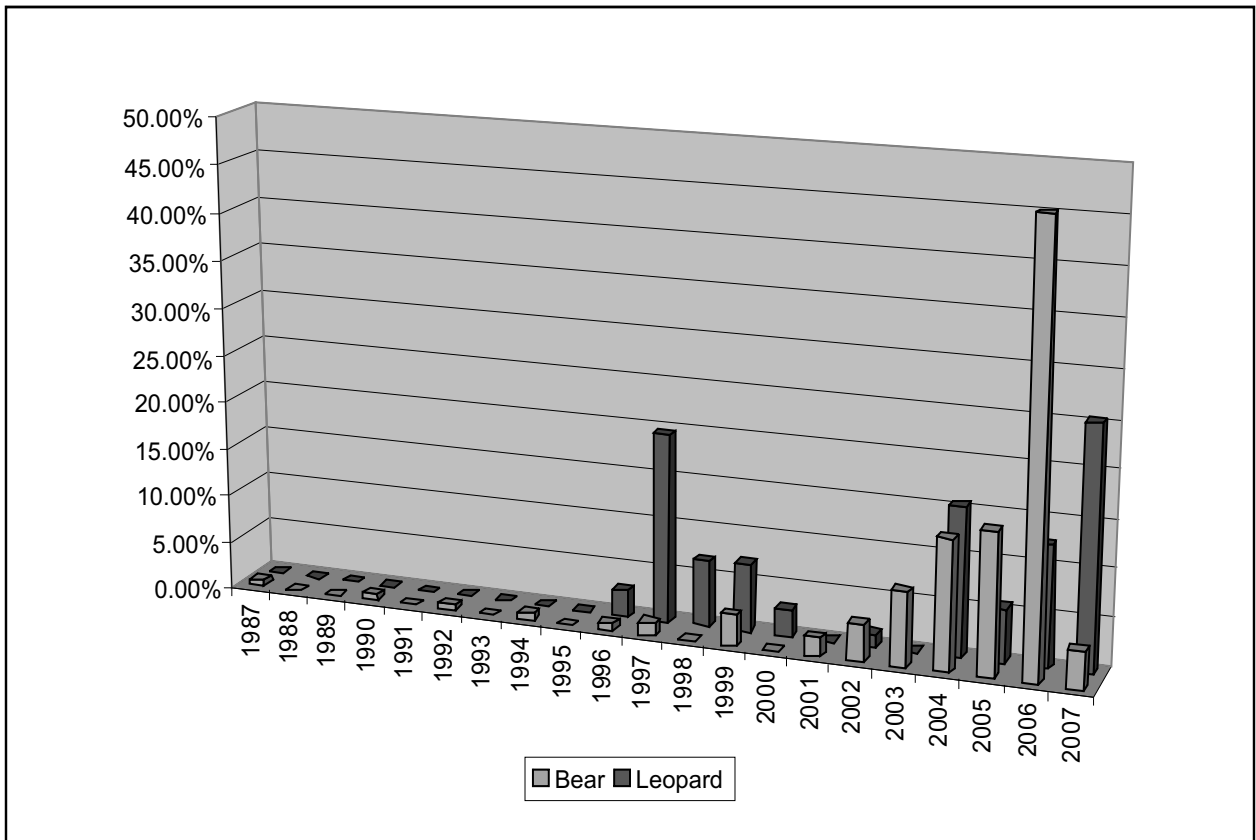


Fig. 17: Temporal patterns of dangerous encounters with bears and leopards in the Kashmir Valley between 1987 - 2007



Public anguish in Tujar after an incident of conflict

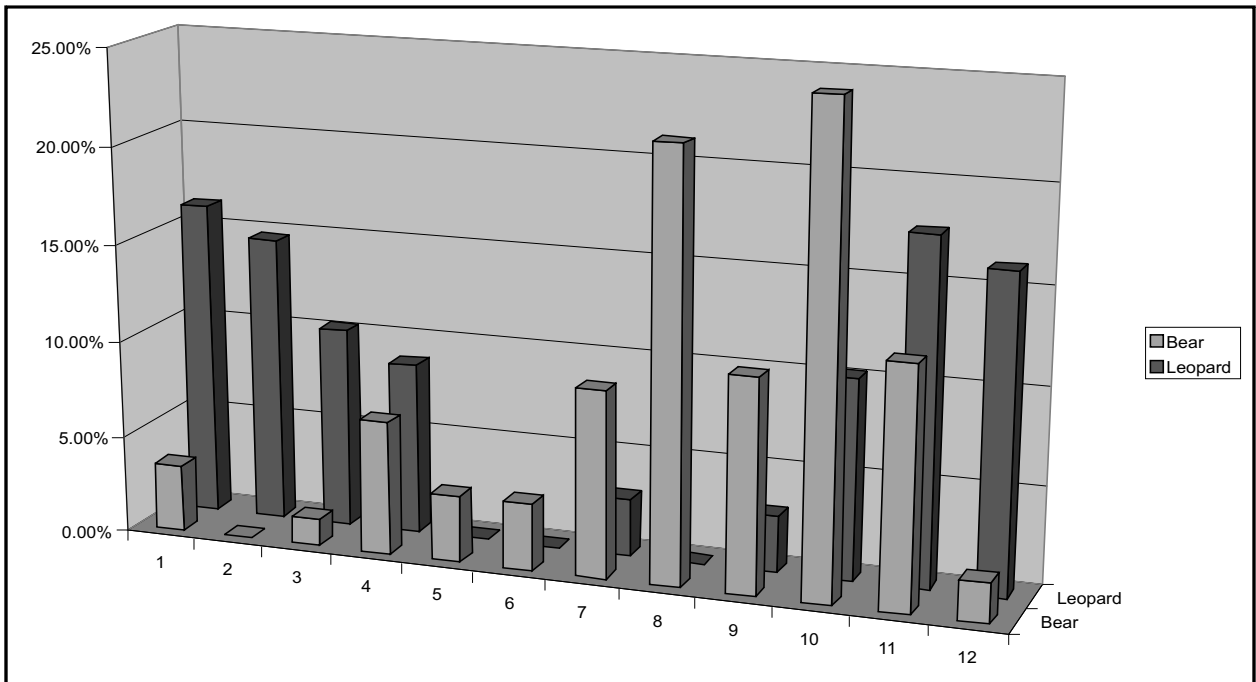


Fig. 18: Monthly differences in dangerous encounters with bears and leopards

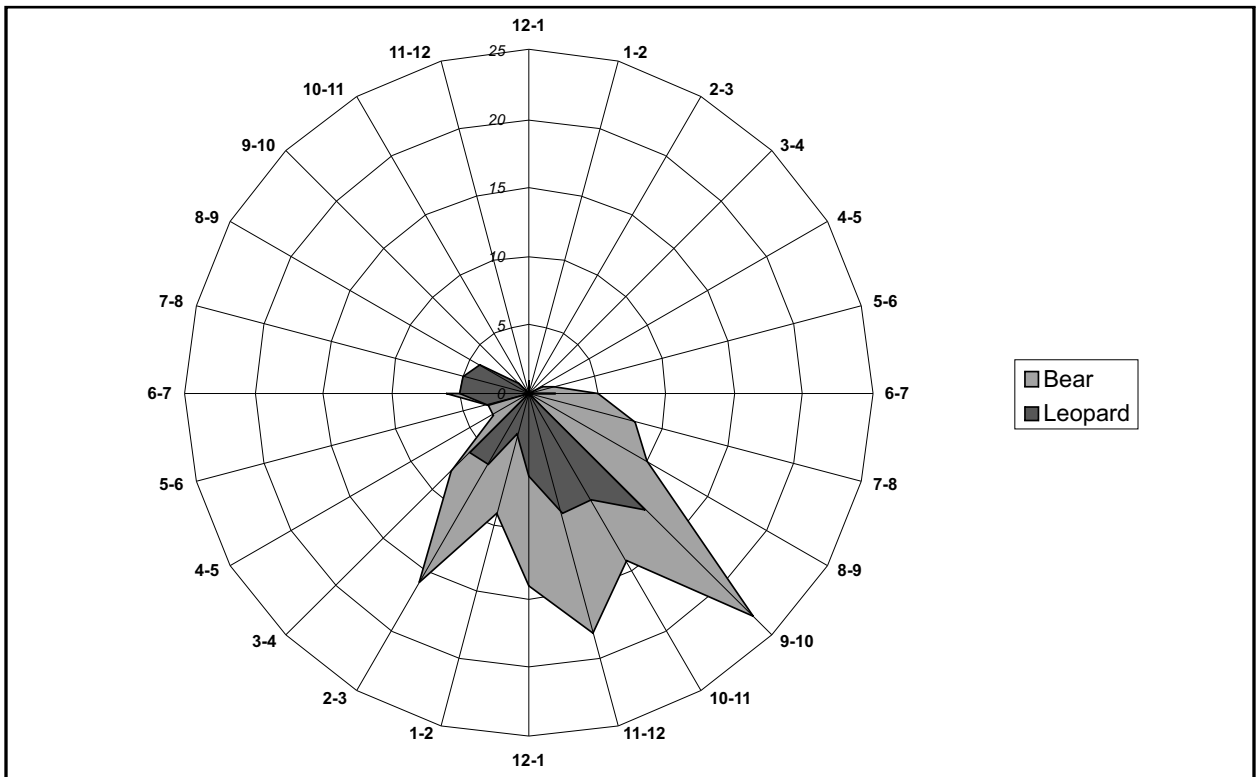


Fig. 19: Diurnal distribution of dangerous encounters with bears and leopards

This is unexpected in case of leopards, where most incidents were expected to have occurred during the very early morning or late evening.

The extent of injury caused was determined during interviews with victims, based on the length of post-incident hospitalization. In terms of a percentage of deaths occurring as a result of the encounters, 58% of incidents involving leopards resulted in the death as

against only 9% with bears. With bears, ~53% of all incidents recorded resulted in grievous injuries (Fig. 20).

The portion of the body attacked or injured was recorded for all cases. Again, clear differences emerge in cases involving bears and leopards – while the head, face and upper torso are primarily involved in incidents involving bears, leopards primarily attacked the neck region of victims (Fig.21).

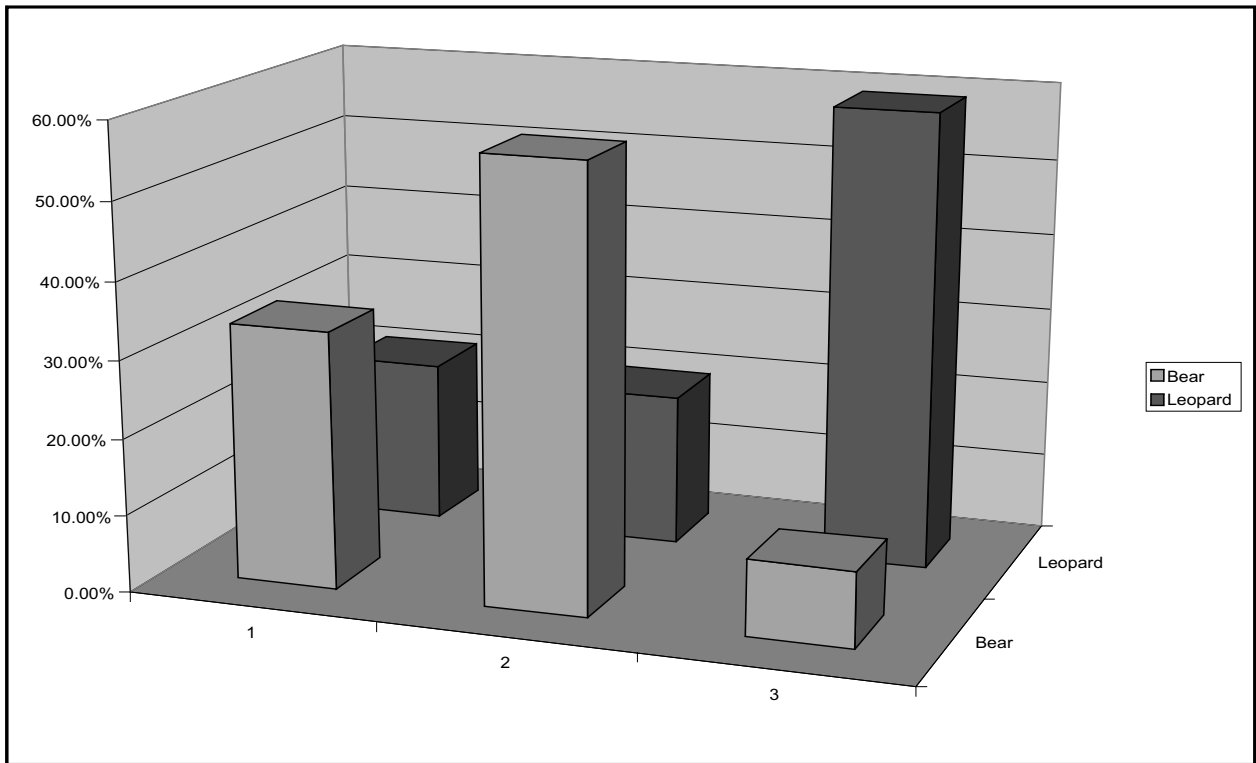


Fig. 20: Extent of Injury caused during dangerous encounters.

1: Minor injury 2: Grievous injury 3: Death

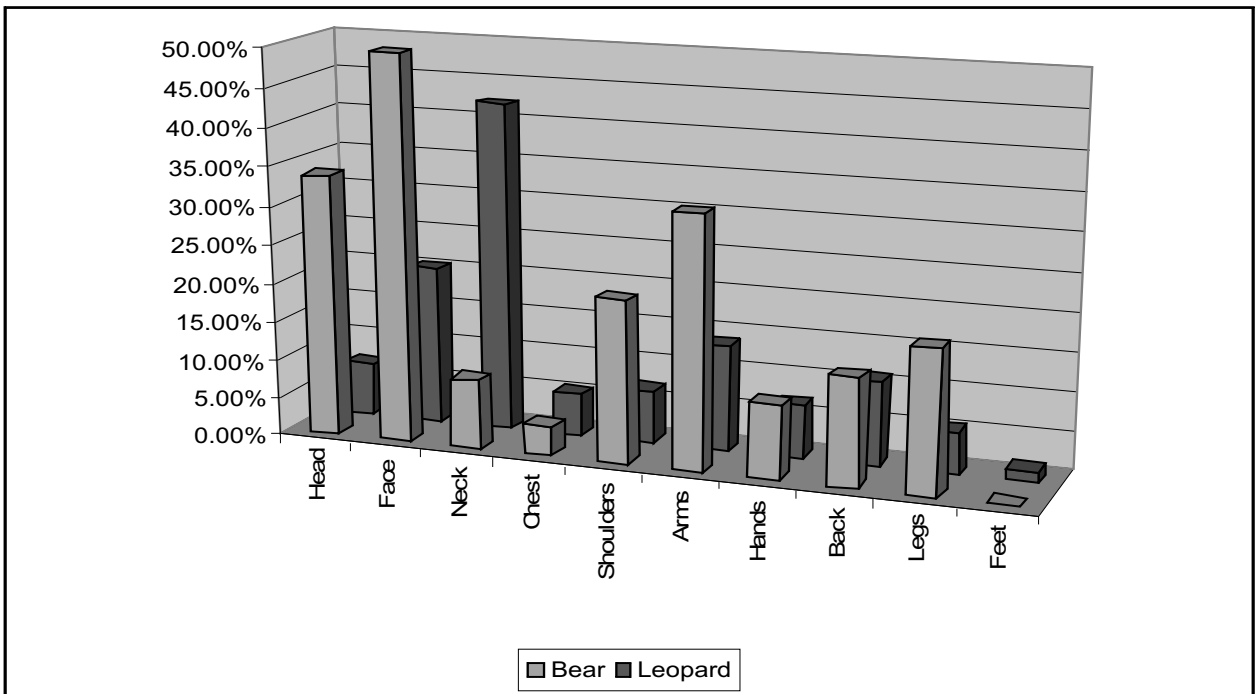


Fig. 21: Body portion attacked in dangerous encounters with bears and leopards

Sex-based differences among victims also clearly indicate differential patterns between incidents involving bears and leopards. While a significant majority of bear victims (~75%) were male, females form the majority among victims of leopard deprecations (~63%) (Fig. 22).

Age-sex differences were also explored (Fig.23), with differential patterns in age-groups emerging from the

analysis. Victims were categorized into five age groups – pre-school children (<7 years), school-going children (8-18 years), young adults (19-34 years), adults (35-49 years) and older adults (>50 years). Among victims of leopard attacks, in both male and female groups, the majority of victims fall in the first two categories. Opposite trends are observed in victims of bear attacks, with adults and older adults forming the majority of cases among both males and females.

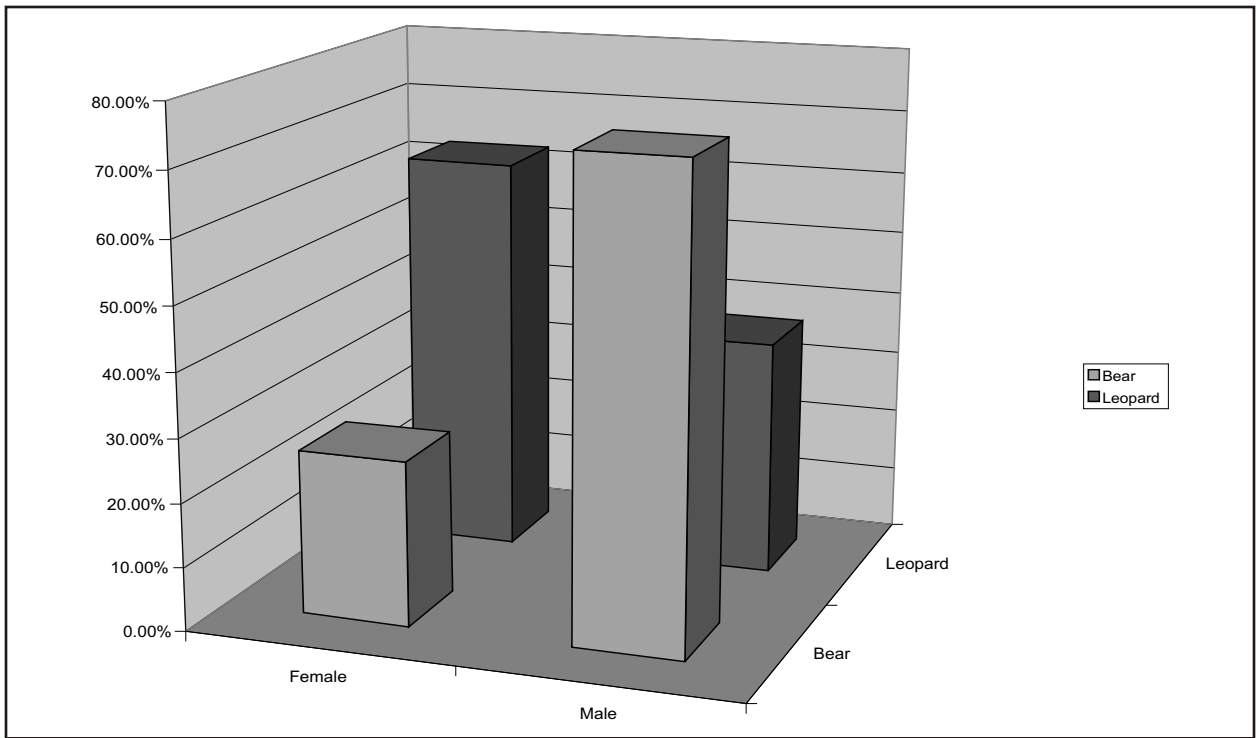


Fig.22: Sex-based differences among victims

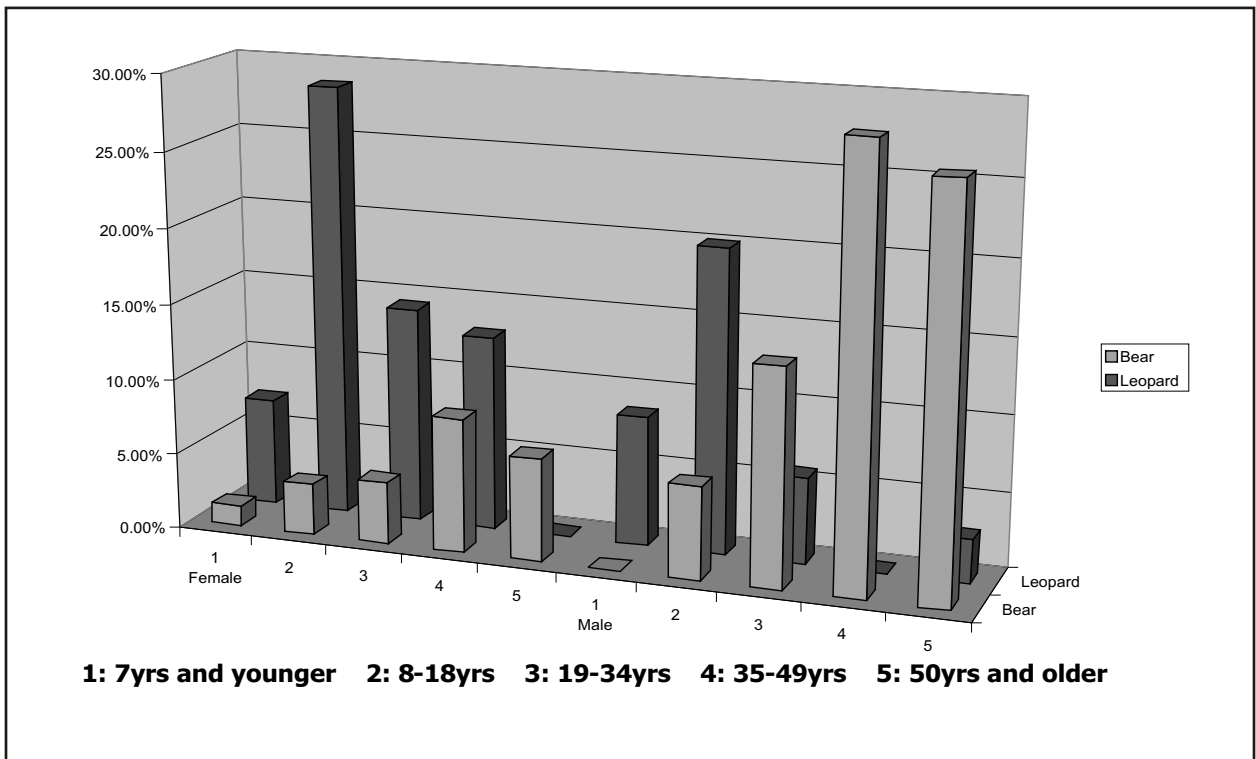


Fig.23: Age-sex differences among victims

Changes in the spatial location of encounters with wildlife were assessed for historical vs. more recent incidents, indicating a major shift – more than 60% of communities reported that historical encounters occurred only within forest areas compared to ~20% of more recent incidents. There has been a perceptible shift in the location of conflict with bears towards agricultural areas (from where ~37% of current

incidents are reported) and towards habitation with leopards (from where ~60% of current incidents have been recorded) (Fig. 24 & 25).

The activity of the victim at the time of the incident was recorded and arranged according to the proximate distance of the incident from activities conducted close to habitation as against those that involved some

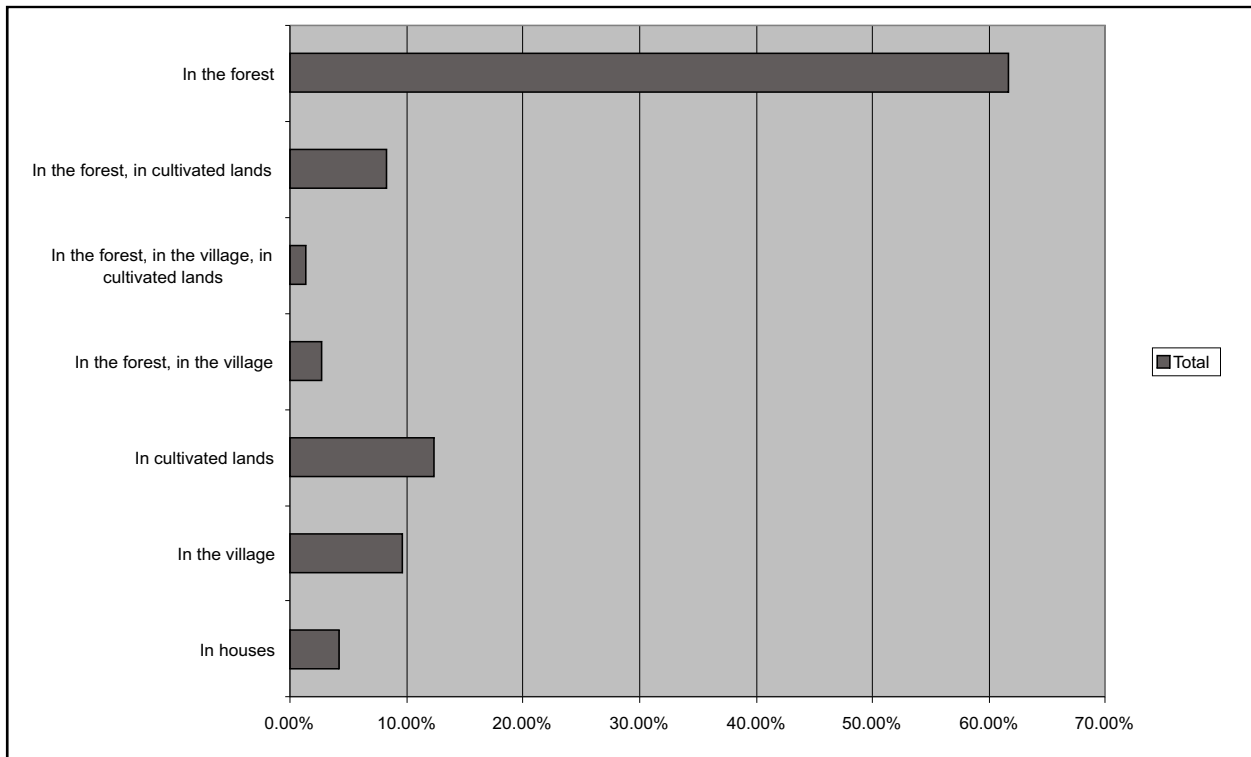


Fig.24: Historical locations of encounters

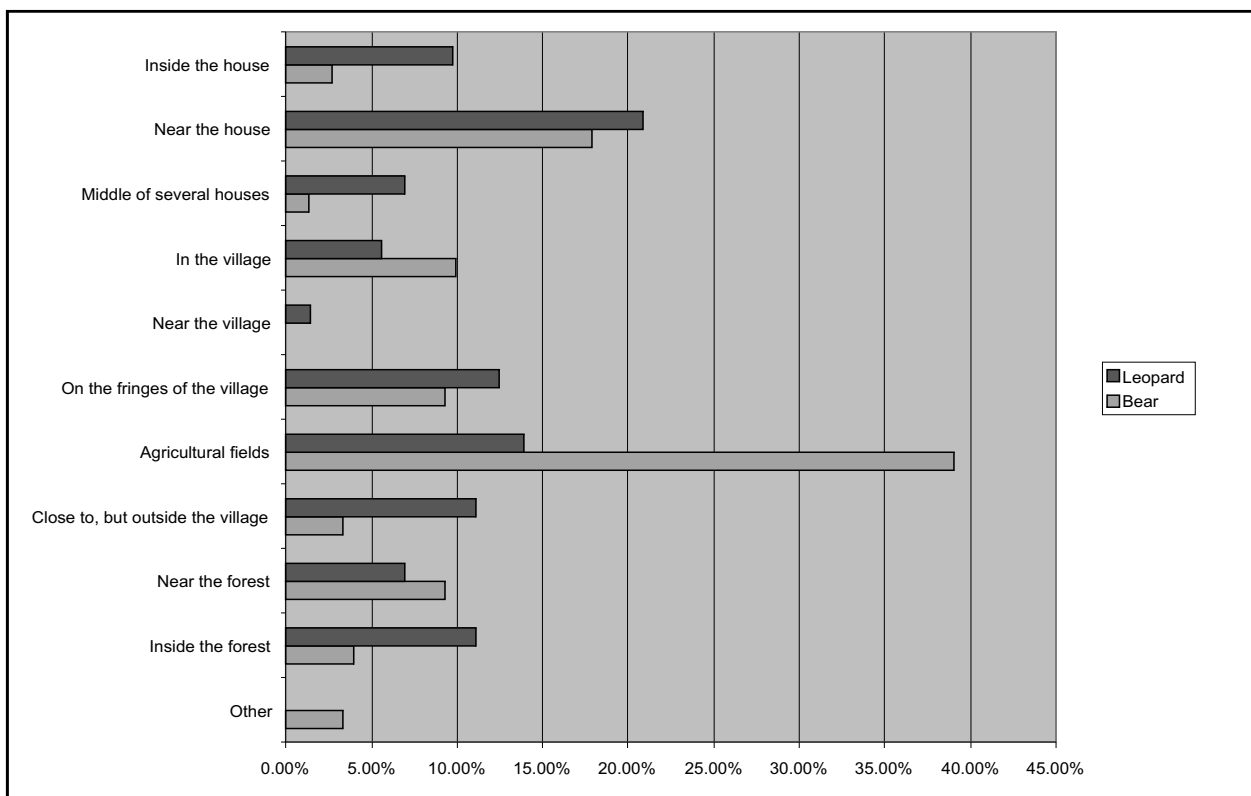


Fig.25: Current location of encounters

movement into forested areas. Close to 44% of leopard incidents were recorded while the victim was involved in activities involving movement into forested areas (tending livestock, NTFP and firewood collection) but ~52% of the incidents were recorded close to habitation, with ~20% occurring close to the homestead. In case of bears, the overwhelming majority

of incidents (~47.26%) were recorded in agricultural fields and orchards where victims were engaged in tending to their fields (Fig. 26).

The number of people accompanying the victim at the time of the incident was recorded to determine the conditions under which the encounters occurred. The

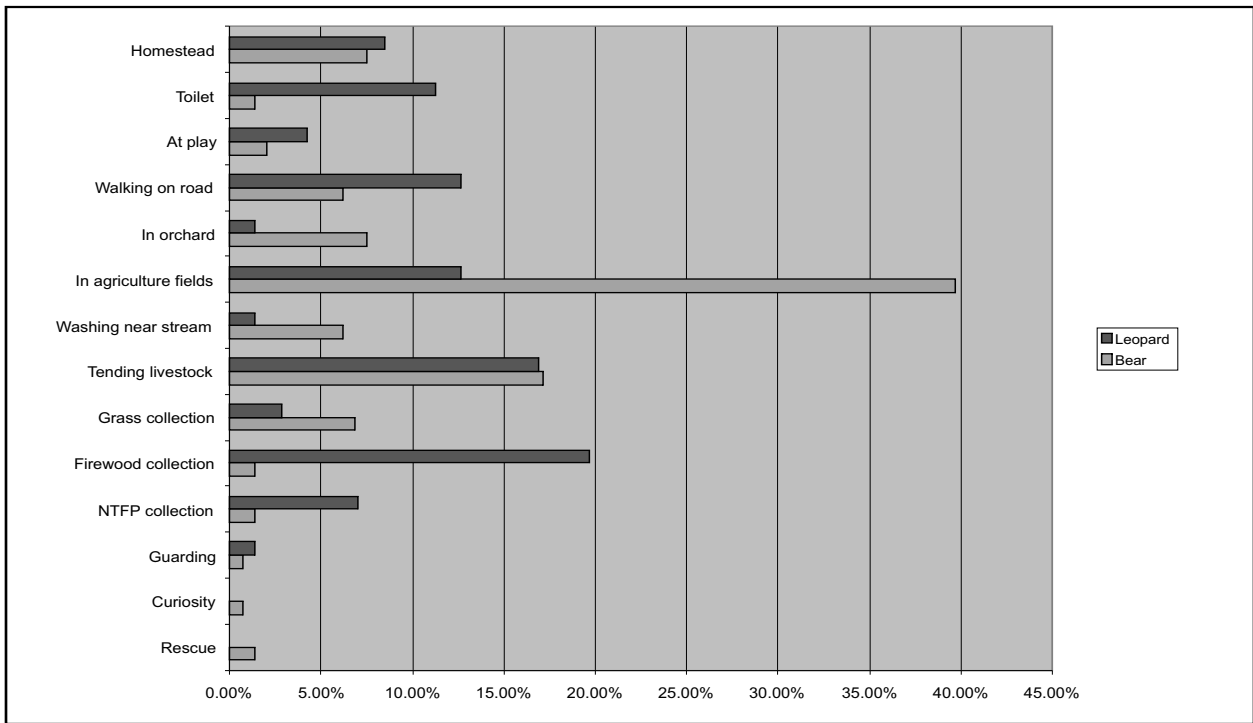


Fig.26: Activity of the victim at the time of the incident

victim was alone in 57% of cases involving bears, and in 30% of cases involving leopards. In an additional 30% of leopard incidents, the victim had been selected out of groups of four or more people. (Fig. 27-a & 27-b)

We found that a majority of the incidents involving both bears and leopards had in fact been reported to at least one Government agency (Fig. 28-a & 28-b), but a greater proportion of cases involving leopards had been reported. This is perhaps due to the fact that most cases involving leopards resulted in death, and such cases are always reported. In a majority of cases (>50%), people reported attacks involving bears or leopards to both the

DWLP and the Police. For leopards, ~22% of cases were reported to only a single department – not the DWLP as expected, but the Police.

Perceptions of Land use change

More than 60% of affected communities reported no perceptible changes in land-use from practices used in the past (Fig. 29). However, 73% of communities that did report perceptible changes reported a shift in agricultural practices from low crops (grains) to tree crops (orchards).

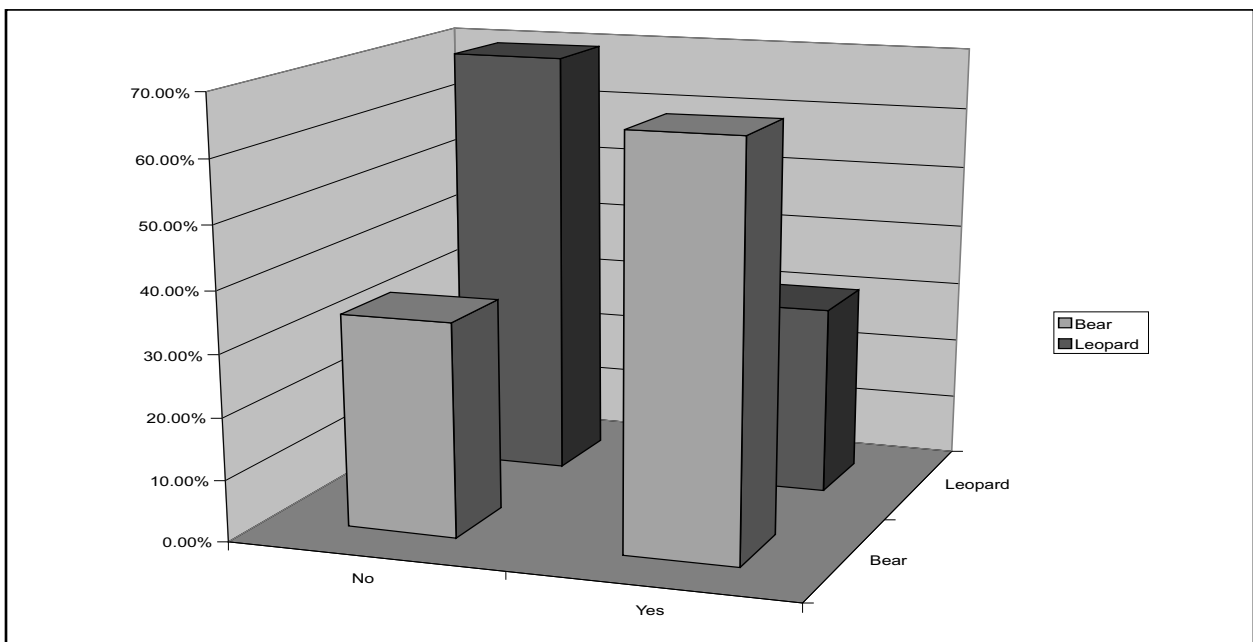


Fig. 27a: Responses of victims to whether they were alone or not at the time of the incident

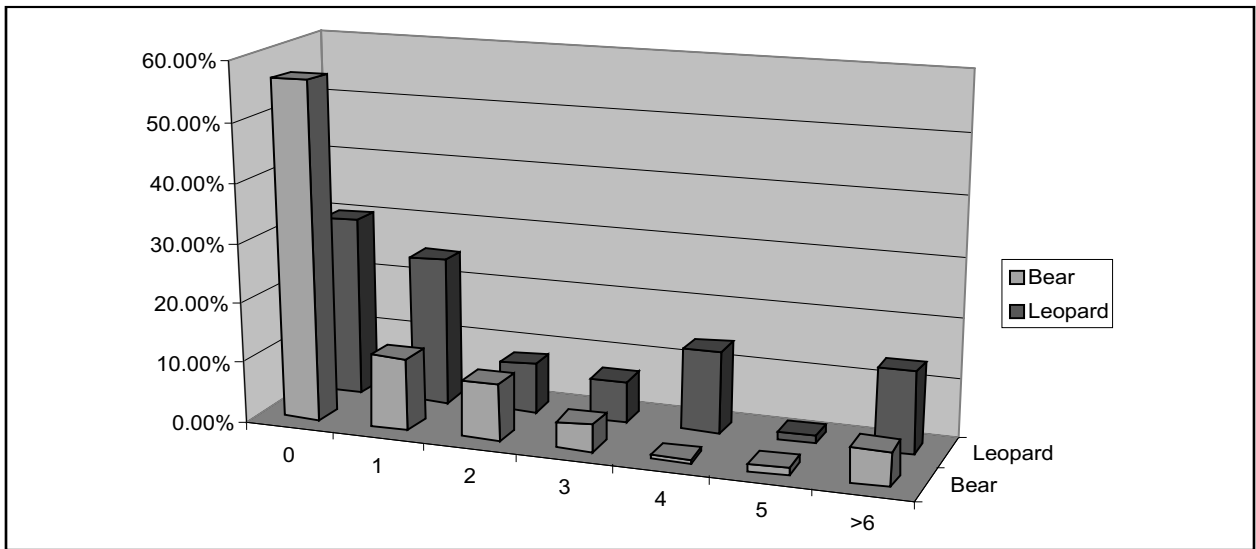


Fig. 27b: Group size involved at the time of the incident

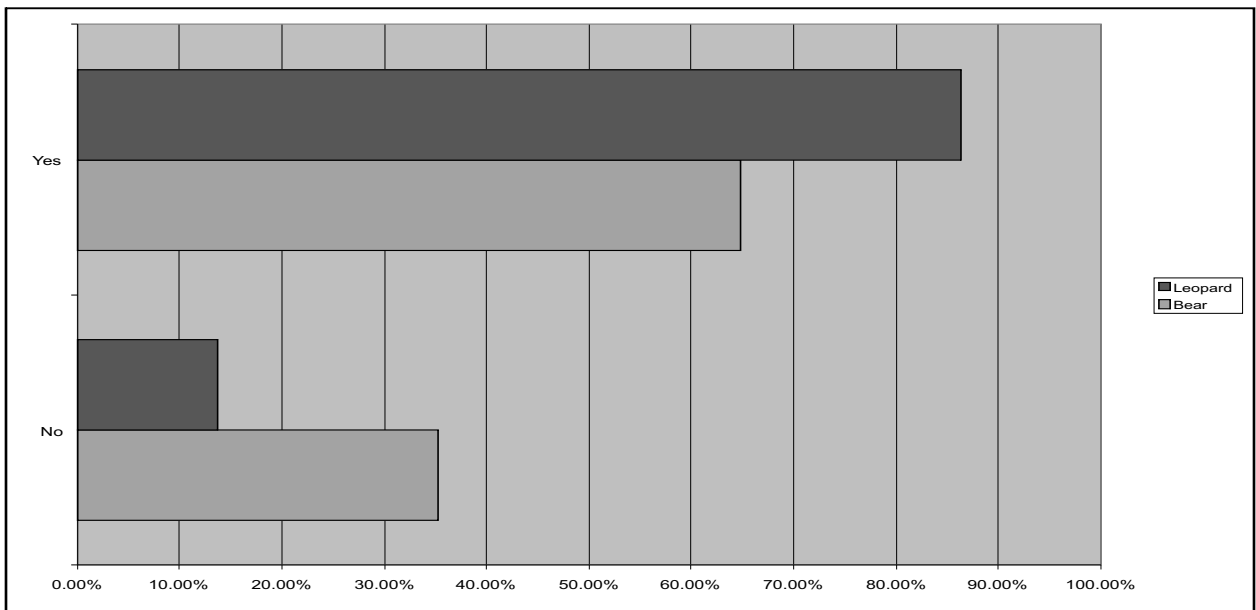


Fig. 28a: Reporting of incident of attack to government agencies

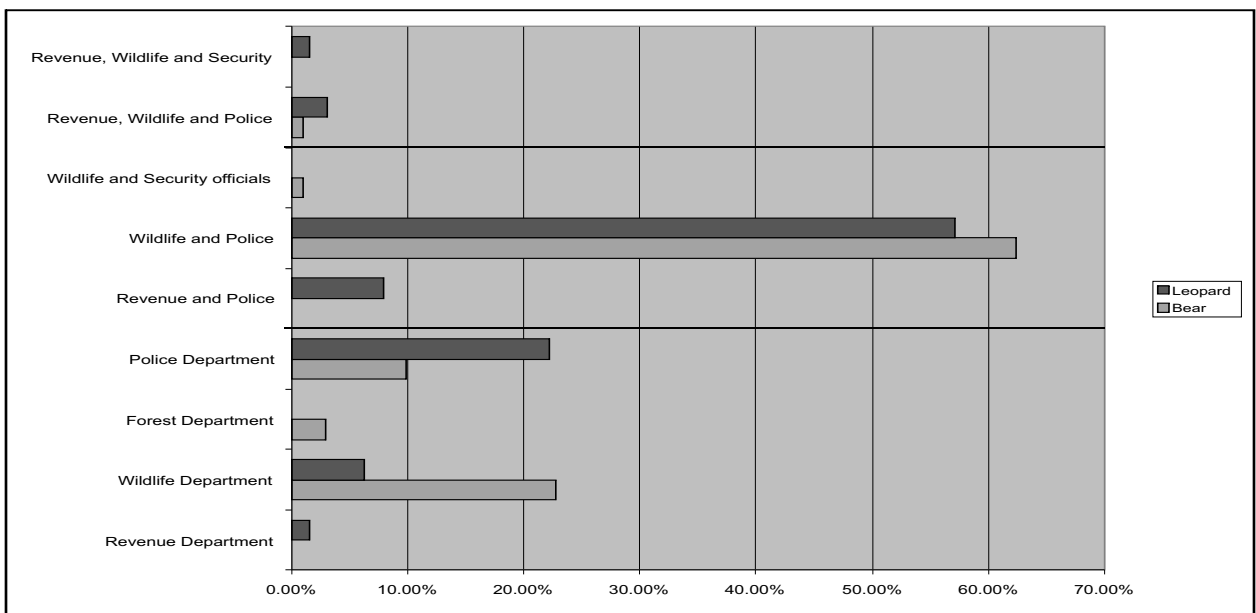


Fig. 28b: Reporting of incident of attack to government agencies

Communities were asked to comment on whether the area under agriculture had increased within their village in the recent past (~ 10 years). More than half of those that responded (~ 20% did not respond) reported no expansion of agriculture (Fig. 30).

An overwhelming majority of communities reported no expansion of houses into orchards (Fig. 31).

Willingness to participate in Mitigation

Close to 60% of communities expressed a willingness to participate in mitigation efforts (Fig. 32a). Communities were asked to detail the mechanisms of participation, details of which are provided in Fig. 32b. Most felt that participation elicited would be greater if provided with adequate awareness and training in dealing with conflict situations. Active participatory mechanisms in

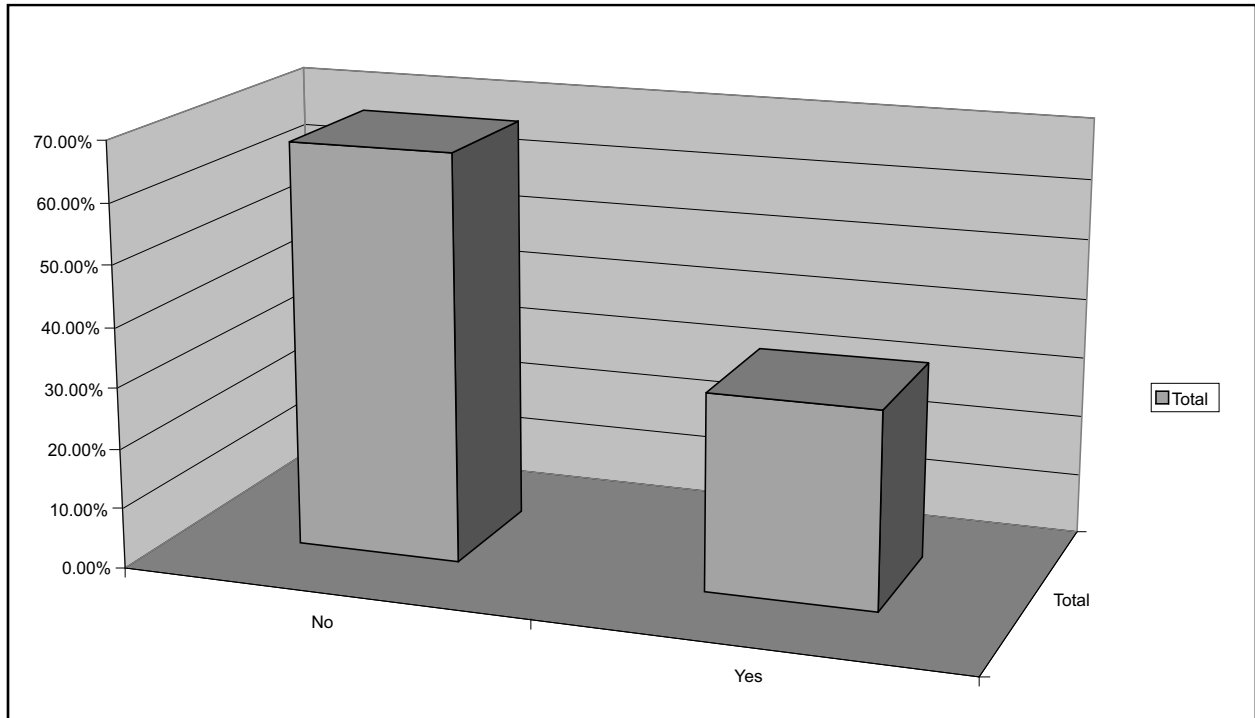


Fig. 29: Community perceptions of changes in land-use practices

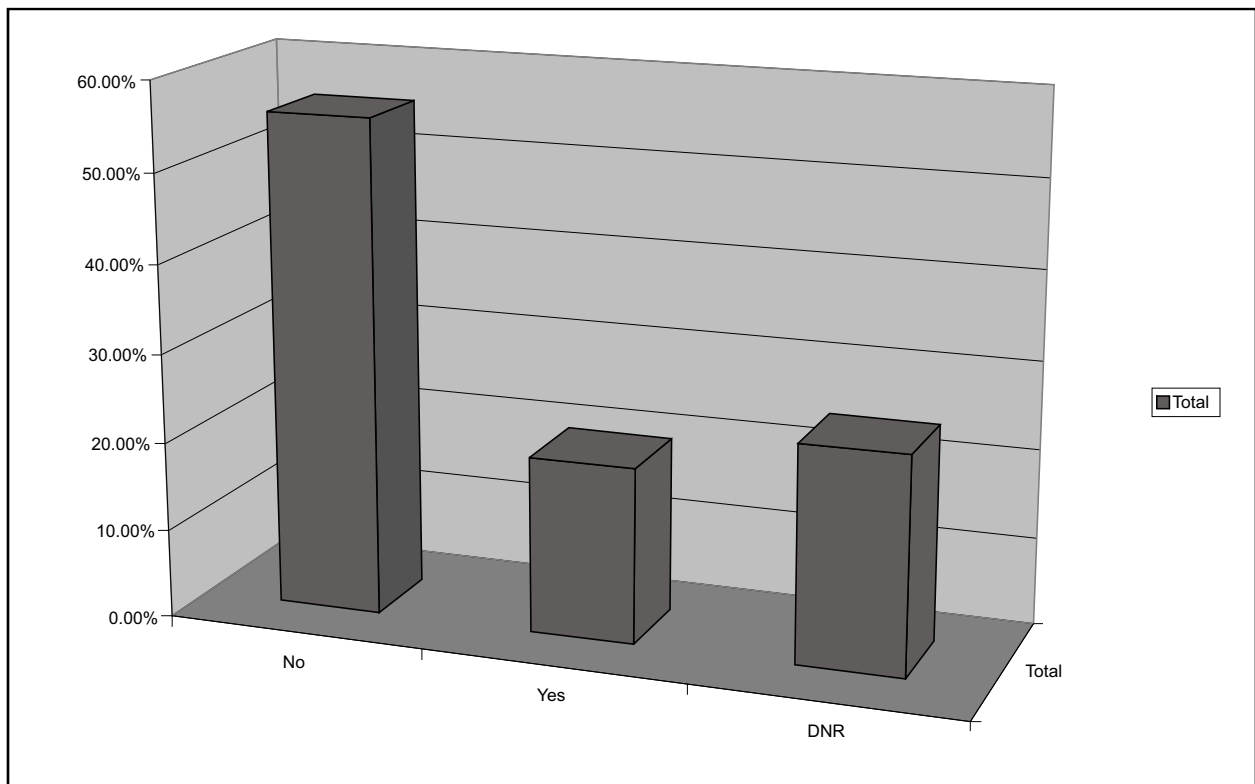


Fig. 30: Community perceptions of increase in area under agriculture

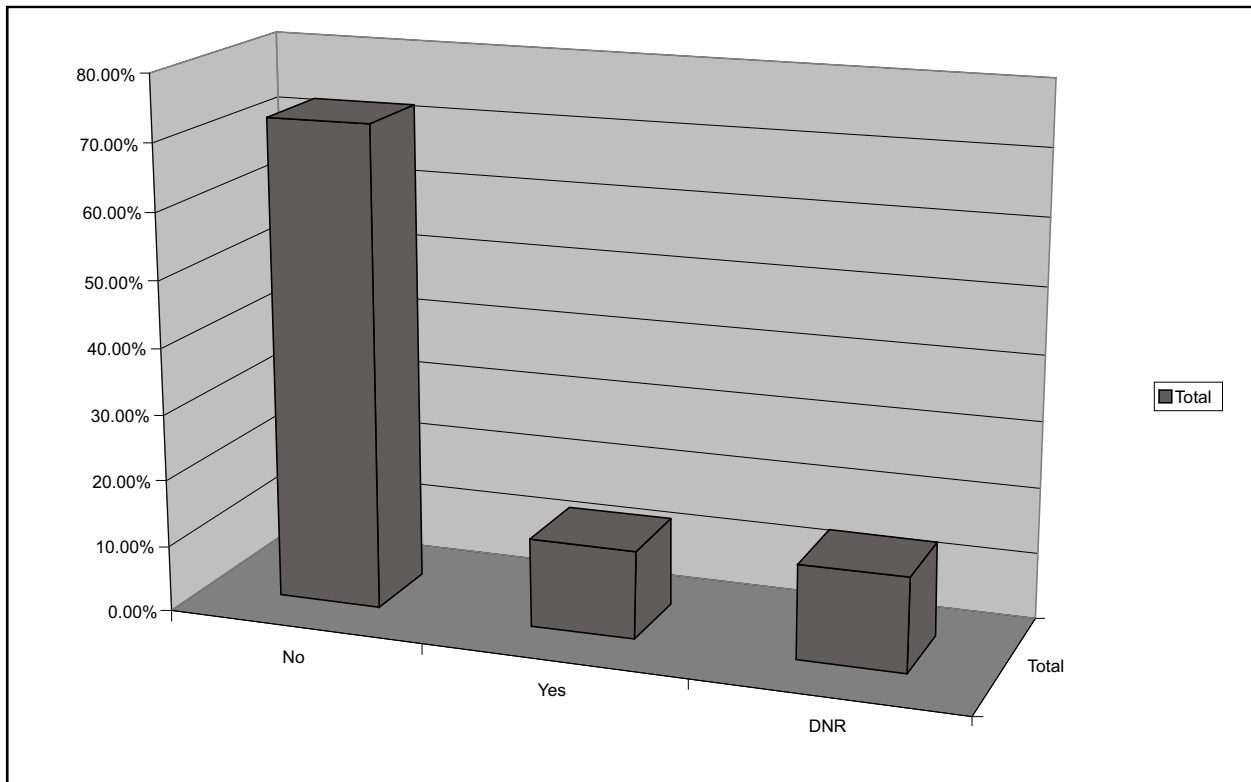


Fig. 31: Community perceptions of expansion of houses in orchards

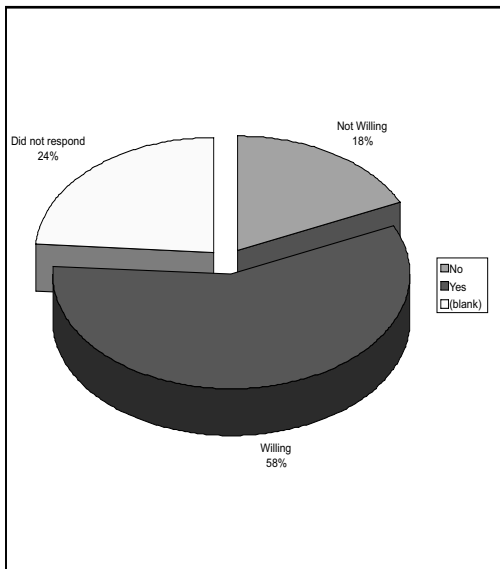


Fig. 32a: Responses of affected communities indicating willingness to participate in mitigation

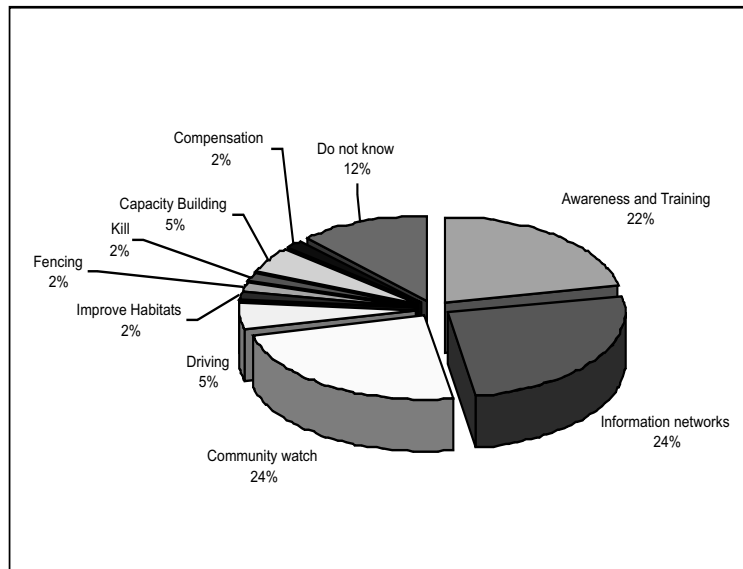


Fig. 32b: Details of participatory mitigation mechanisms elaborated by communities

the form of information provision, community watchers and creation of volunteer squads to deter animals from entering human dominated habitats were also elaborated on by communities. Interestingly, only 2% of communities willing to participate in mitigation expressed the notion that animals entering conflict situations should be killed.

Communities were also asked to elaborate on mechanisms that they expected to be implemented by the State Government and the DWLP. Responses are provided in the Fig. 33.

Spatial Analysis

Spatial analyses were conducted using the location of the conflict and its habitat and topographical features. The purpose of this exercise was to identify hotspots of bear and leopard conflict and more importantly identify factors responsible for its increase. This was expected to improve our chance of trying to predict conflict and thereby pre-empt it in the long term.

The spatial analysis is data dependent and the more information fed into the models, the more precise the

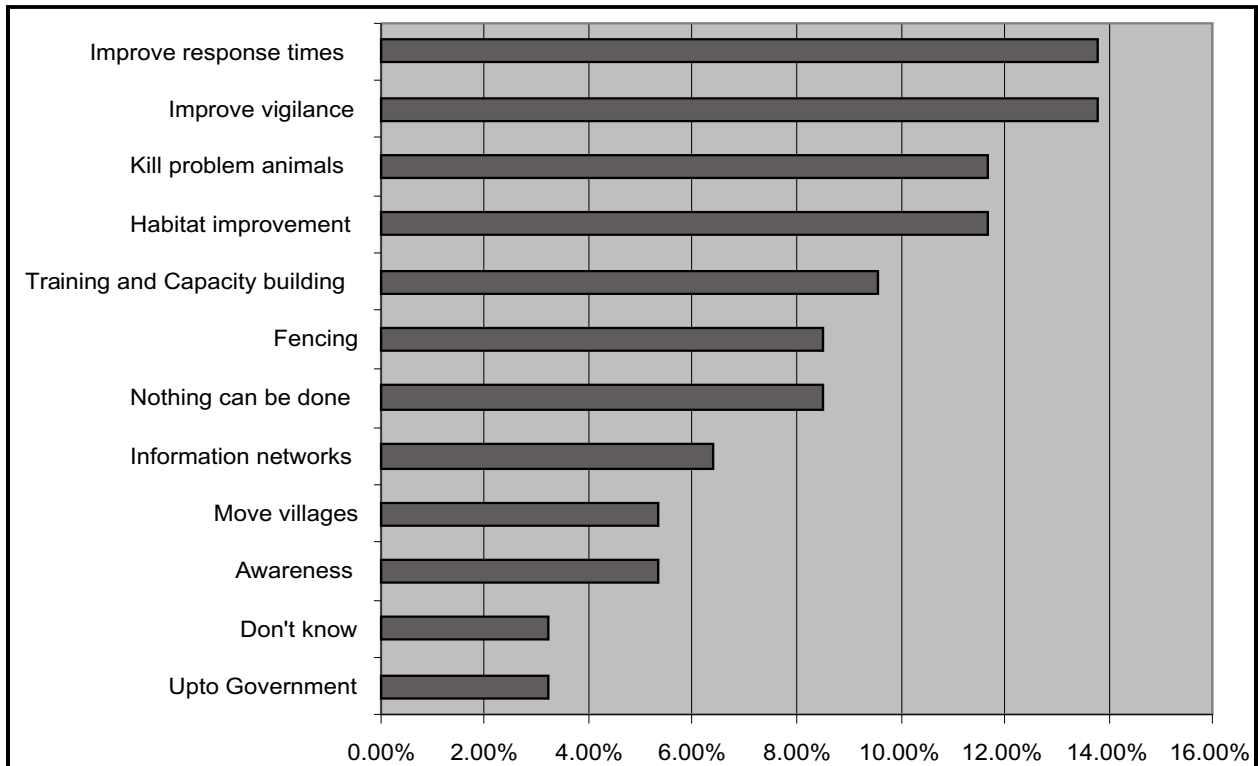


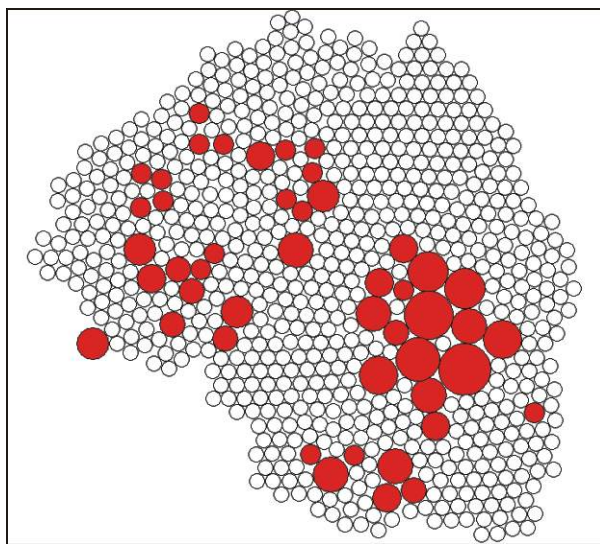
Fig. 33: Responses of affected communities indicating desired mechanisms of control by Govt. and the DWLP

outputs. With the current levels, we have been able to highlight catchments with high probability of conflict but are yet not in a position to make predictions about conflict. This can only happen if more data on sites and animal movements is added to the database.

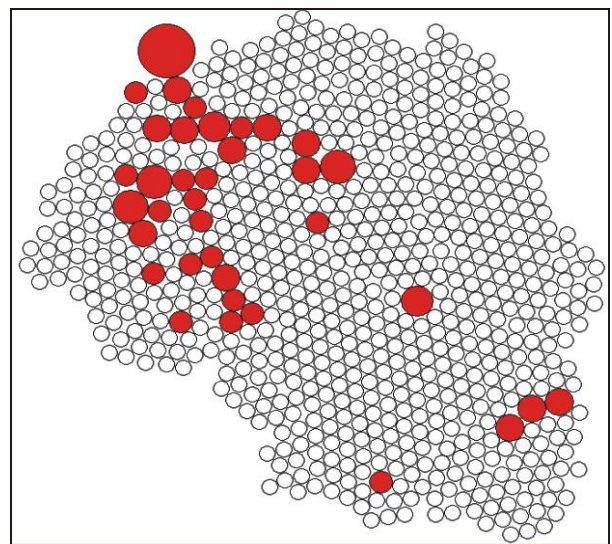
Conflict Hot-Spots (Clustering)

Visualization of patterns through ESDA revealed distinct and separate clusters of elevated conflict with bears and leopards. In Fig. 34 below, conflict intensity is depicted separately for each species as cartograms (where the original watershed map is replaced by a

layout in which the size of the polygons, represented as circles, is proportional to conflict intensity). The bigger red circles (watersheds) reveal the largest cluster of bear conflict in the southeast (the Tral and Khrew catchments), and separate, smaller clusters in Kulgam (southwest), Handwara (northwest) and Bandipora (northeast). The intensity of leopard conflict is distinct from that with bears, with most of the conflict having occurred in the northern quadrants of the valley (Kupwara, Handwara and Bandipora). In the southern regions of the valley, conflict with leopards is far more dispersed in three different regions: Khrew-Khanmoh, Kulgam and Shangus.



(a)



(b)

Fig. 34: Cartograms of intensity of conflict with (a) black bears and (b) leopards in the Kashmir Valley

As expected, conflict with both bears and leopards showed high spatial auto-correlation (Global Moran's $I_{bears} = 0.378, p < 0.001$; Moran's $I_{leopards} = 0.232, p < 0.001$).

The LISA maps for conflict with bears (watersheds with high intensity of conflict that have neighboring

watersheds with high intensity conflict; Fig. 35a) reveal a single, significant high-high cluster, located in the Tral-Khrew catchments. For leopards, four distinct hot spots of high-high clustering are identified: Kupwara, Handwara and Bandipora in the north and the Shangus region of Anantnag in the South (Fig. 35b).

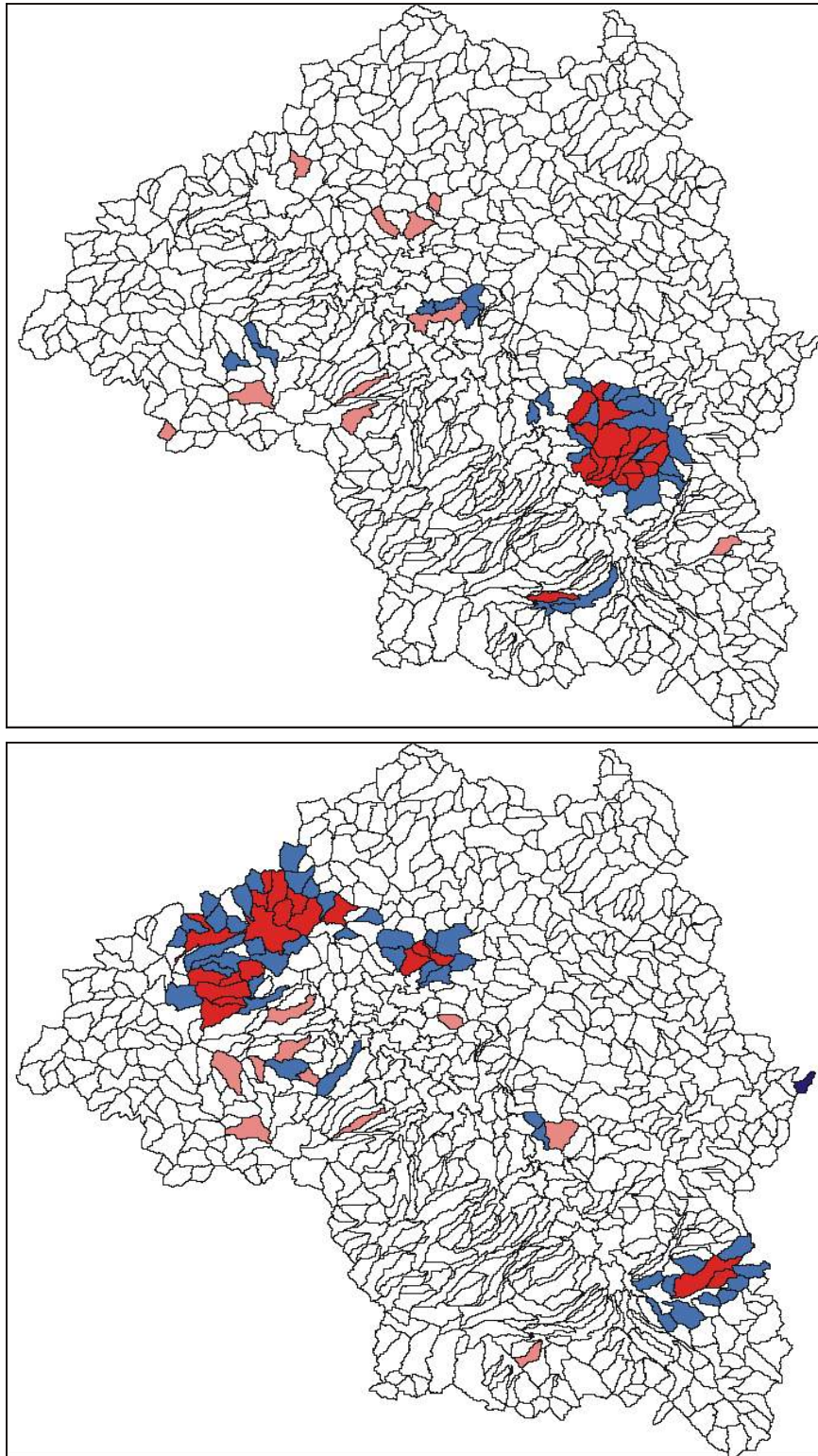


Fig. 35: LISA cluster maps of conflict with (a) black bears and (b) leopards in the Kashmir Valley. High-high clusters are depicted in deep red, low-low clusters in deep blue, high-low in light red and low-high in light blue. Shaded polygons are significant at or below the $p=0.05$ level.

Bi-variate Correlates of conflict intensity

Table 7, below lists the Global Moran's I statistics for different variables thought to influence the intensity of conflict. In the sections that follow, we elaborate on the results for each species separately.

Bears

The intensity of conflict with black bears is significantly positively correlated with increasing proportions of both forest and orchard elements in *neighboring* watersheds. Examination of the LISA maps for each of these land cover elements reveals large regions of significant spatial outliers, indicating the importance of the single Tral-Khrew catchments hotspot in determining the overall Global Moran's I statistic.

In the LISA cluster map depicting spatial correlations between the average of forest composition in neighboring watersheds and the spatial lag of conflict

intensity with bears, at least 5 different high-low (light red) outliers are observed (i.e. watersheds with high proportions of forest but low-no intensity conflict in neighboring watersheds) (Fig. 36). These areas lie along the northern areas of the Handwara-Kupwara region, the Ganderbal and the Kangan catchments, the fringe forests of the Pir Panjal along the Badgam-Beerwah-Chadura tehsils, the Doru-Anantnag regions and the Lidar valley (contiguous with the single high-high cluster depicted for the Tral-Khrew catchments). Similar spatial outliers are found with regard to orchard composition, primarily in the north-west of the Kupwara-Karnah region, the Sopore-Pattan region and across the Beerwah-Badgam-Chadura and Shupiyan teshsils.

Significant correlates were detected for patch density, total edge length and the juxtaposition of patches of forests and orchards in the landscape matrix, with the stronger correlations involving orchards rather than forests in all cases. High intensity conflict is associated

Table 7: Bi-variate Spatial Correlates of Conflict Intensity

	Bear		Leopard	
	Moran's I	Sig	Moran's I	Sig
Composition (%age)				
Forest	0.040	0.018	0.135	<0.001
Orchard	0.045	0.008	0.020	
Fragmentation: Patch Size (ha)				
Forest	-0.007		-0.006	
Orchard	0.023		-0.001	
Landscape	-0.029		-0.008	
Fragmentation: Patch Density (Number of Patches/Landscape Area)				
Forest	0.048	0.005	0.203	<0.001
Orchard	0.116	<0.001	0.077	<0.001
Landscape	0.019		-0.041	0.016
Fragmentation: Total Edge Length (km)				
Forest	0.036	0.030	0.110	<0.001
Orchard	0.067	<0.001	0.031	
Landscape	-0.010		-0.020	
Configuration: Interspersion and Juxtaposition Index				
Forest	0.053	0.002	0.125	<0.001
Orchard	0.119	<0.001	0.097	<0.001
Landscape	-0.004		0.022	
Other factors (Landscape level)				
Vegetation Productivity (NDVI)	0.082	<0.001	0.138	<0.001
Proximity to Protected Areas (km)	-0.160	<0.001	0.081	<0.001
Proximity to Forest edges (km)	-0.040	0.017	-0.100	<0.001
Proximity to Orchard edges (km)	-0.086	<0.001	-0.076	0.001
Mean Elevation (m)	-0.133	<0.001	-0.119	<0.001
Slope STD (degrees)	0.095	<0.001	0.054	0.004
Climate				
Min. Temperature (°C)	0.128	<0.001	0.121	<0.001
Temperature Seasonality (STD*100)	-0.058	<0.001	-0.130	<0.001
Annual Precipitation (mm)	0.108	<0.001	0.072	<0.001
Precipitation Seasonality (CV)	0.027		0.072	<0.001

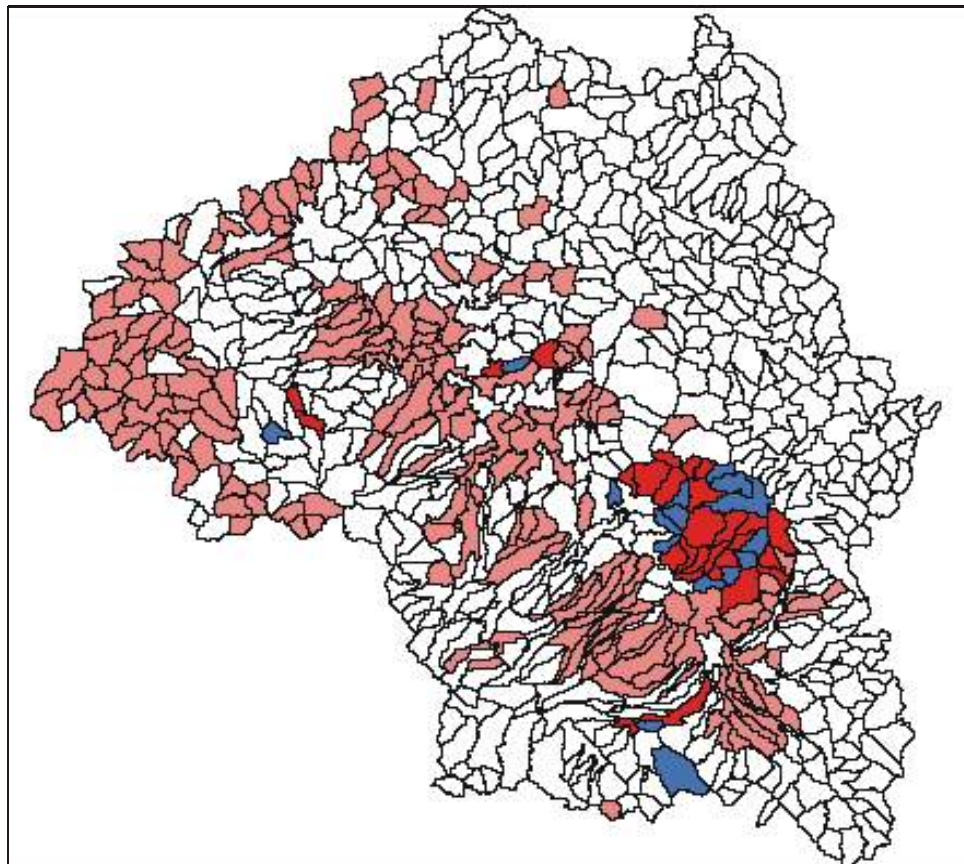
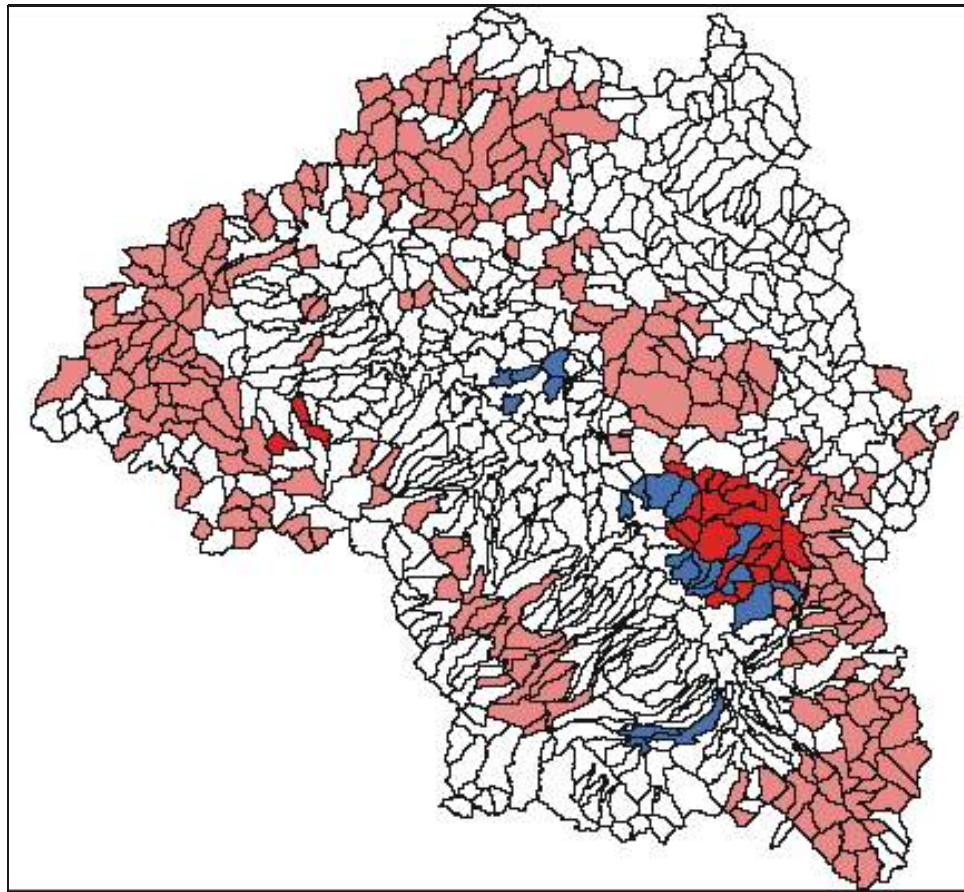


Fig. 36: LISA maps of Black Bear conflict intensity correlations with (a) forest composition and (b) orchards in the Kashmir Valley. High-high clusters are depicted in deep red, low-low clusters in deep blue, high-low in light red and low-high in light blue. Shaded polygons are significant at or below the $p=0.05$ level.

with greater patch density (the number of distinct patches per unit area), greater total edge length, and with greater diffusion of both forest and orchard elements within a watershed.

Watersheds with greater overall vegetation productivity (indicated by the NDVI) and with more complex topography (measured by the standard deviation of slope within a watershed) are associated with higher levels of conflict. All of the proximity measures we tested are negatively associated with intensity: conflict is at lower levels in watersheds located far from protected areas, and with greater average distance to forest and orchard edges. Conflict intensity was also found to be negatively associated with elevation: watersheds with high mean elevation reporting lower no conflict with bears.

Strong, positive associations with minimum temperature and precipitation were detected, but

significant negative associations with temperature seasonality – watersheds abutting those with greater variation of temperature regimes show lower levels of conflict.

Leopards

Conflict with leopards was found to be significantly positively associated with the proportion of forest in neighboring watersheds. The LISA map, shown in Fig. 37 however, reveals several areas where this global relation does not hold true: while significant high-high clusters are found in the Handwara, Kupwara, Bandipora and Shangus hot spots, large regions within the same regions as well as along the fringe forests of the Beerwah-Badgam-Chadura tehsils, the Tral and Khrew catchments, the Lidar valley and the Doru-Anantnag regions which contain high proportions of forest do not report attacks on humans by leopards.

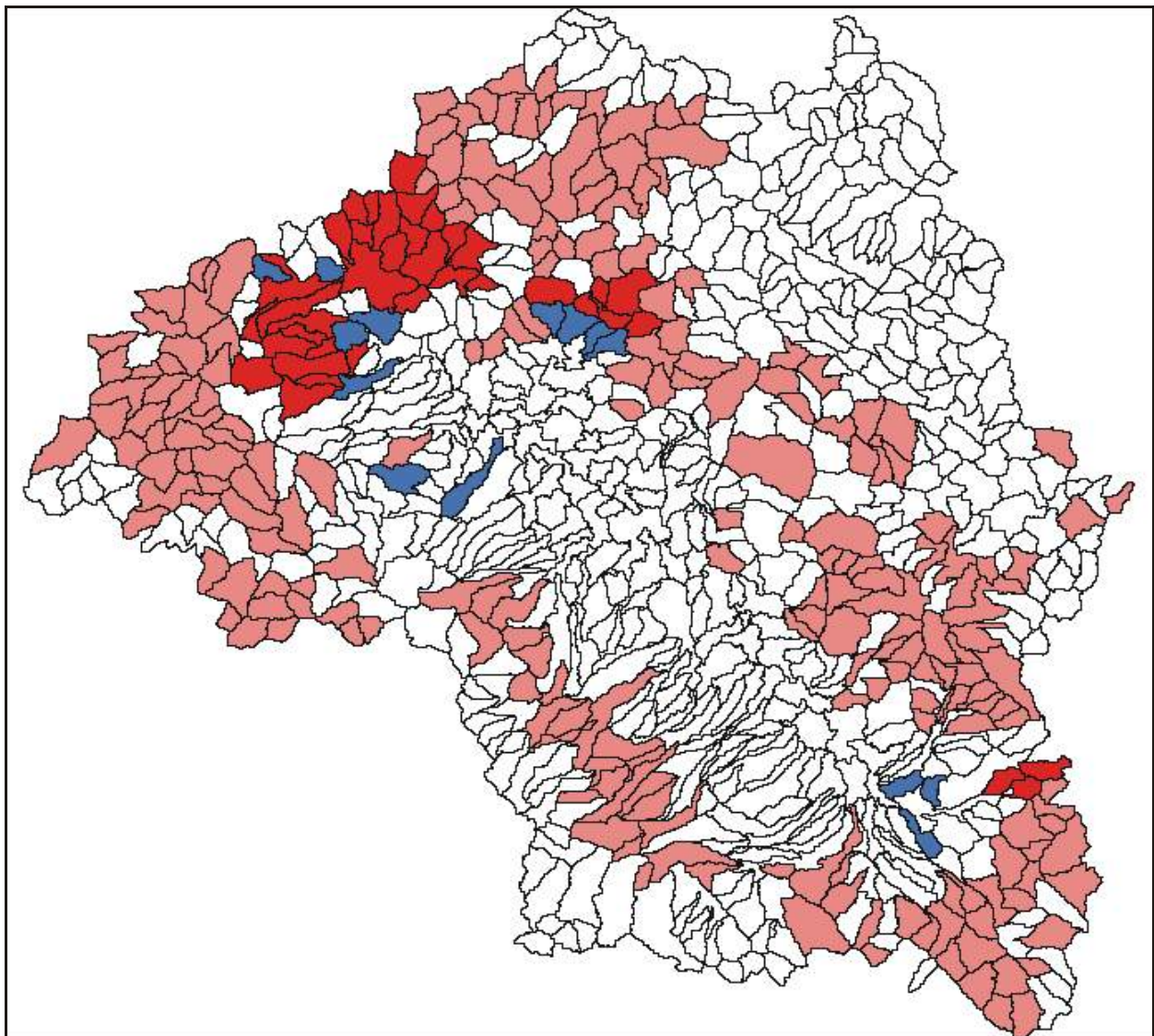


Fig. 37: LISA map of Leopard conflict intensity correlations with forest composition in the Kashmir Valley. High-high clusters are depicted in deep red, low-low clusters in deep blue, high-low in light red and low-high in light blue. Shaded polygons are significant at or below the $p=0.05$ level.

As with black bears, no significant correlations were observed with patch size and intensity of conflict with leopards at either class or landscape level. At the class level, patch density, total edge length and the juxtaposition of forest patches within neighboring watersheds were found to be significantly associated with conflict intensity. At landscape levels, patch density was found to be significantly negatively associated with conflict intensity, indicating that lower levels of conflict are observed in watersheds with high levels of patch dissection.

Vegetation productivity and topographic complexity, like in the case of bear conflict, showed significant positive cross-correlations. The conflict is also more intense in watersheds abutting others with lower mean distance to forest edges, and with lower mean elevation, but unlike the case of bears, conflict levels are elevated in watersheds located far away from Protected Areas.

Strong and significant positive associations were found with mean temperature, annual precipitation and precipitation seasonality, and similar to bears, was negatively associated with greater variation in temperature regimes.

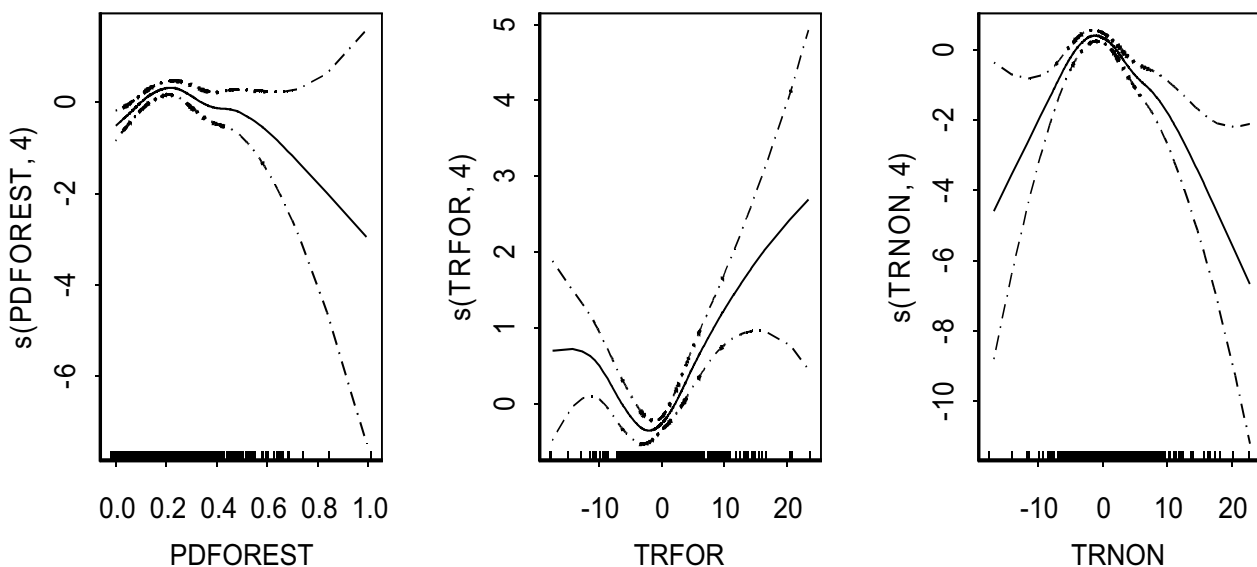
Multivariate Regression Models of Conflict Intensity

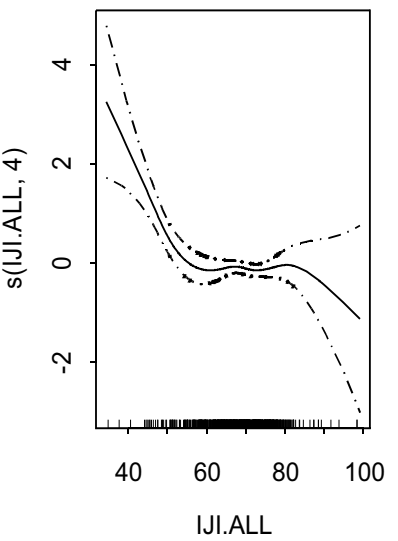
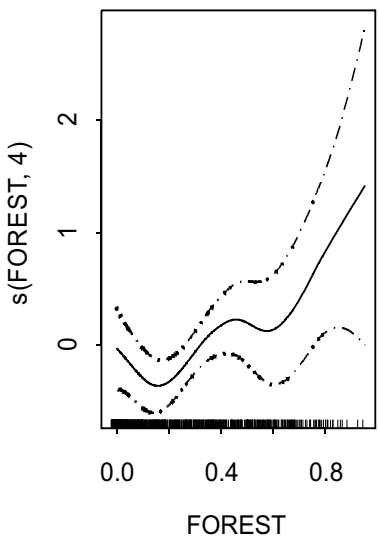
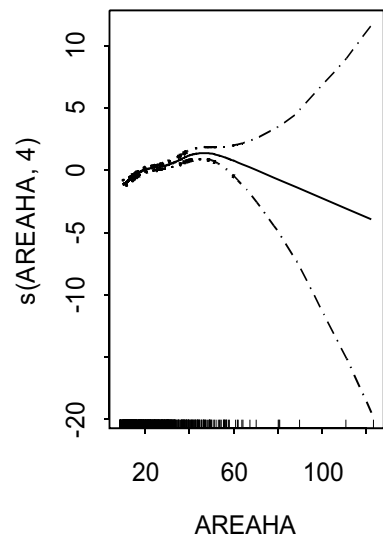
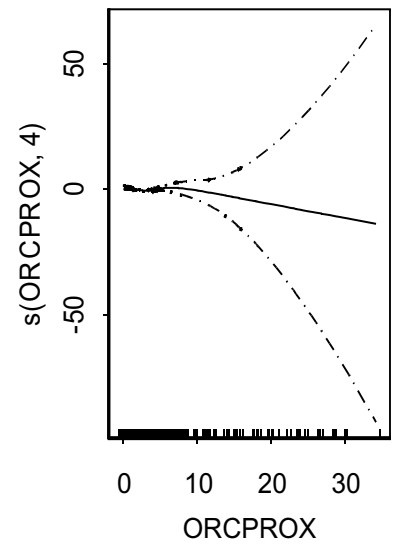
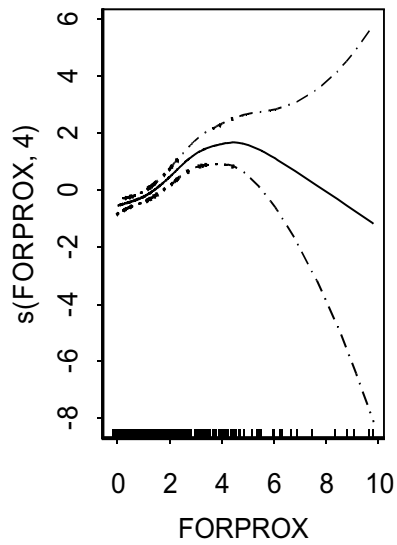
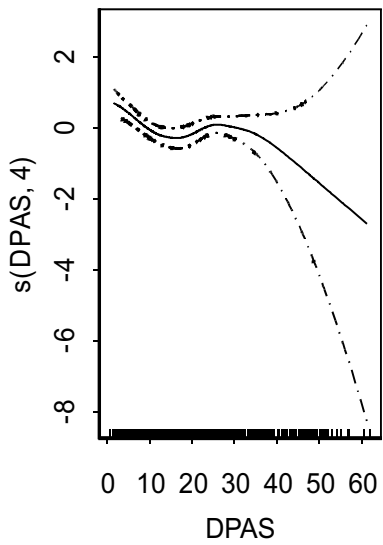
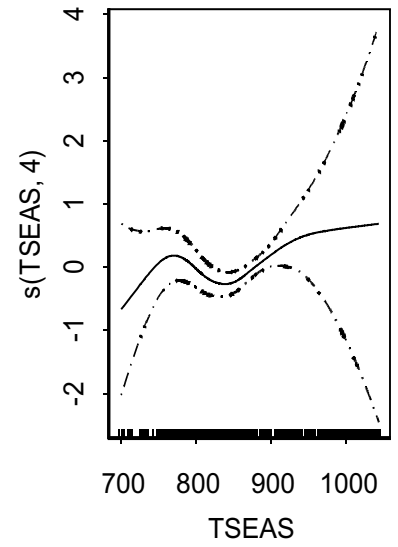
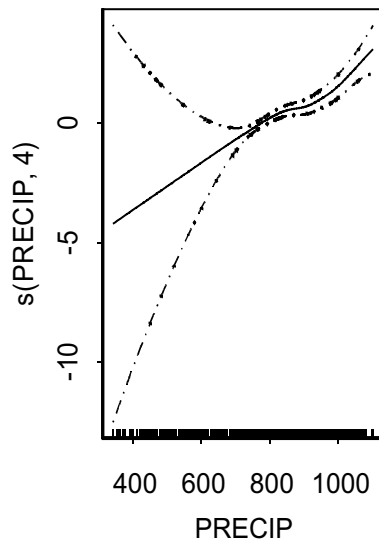
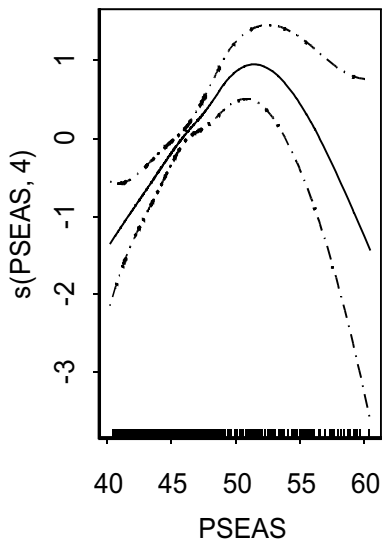
Bears

The final model retained nineteen variables and was highly significant (AIC 250.50; $p < 0.001$). However, the spatially lagged variable (AUTOCOR) remained significant in the stepped down model, and was identified as the single most important variable - indicating missing variables not included in the regression. Greater proportions of forest (FOREST) within watersheds increases conflict probability non-linearly, and at landscape levels, was observed to be higher in watersheds with higher levels of diffusion of

Intensity decreases with increasing distance from Protected Areas (DPAS) and orchards

land cover elements (IJIALL) and higher as the dissection of all cover types (PDALL) and of forest patches (PDFOR) increases up to a threshold beyond which it decreases. As expected, intensity decreases with increasing distance from Protected Areas (DPAS) and orchards (ORCPROX), but first decreases, then increases with mean distance from forest edges (FORPROX). Conflict was predicted to be at the lowest levels where tree cover did not change in forested areas between 2001 and 2005 (TRFOR), conflict increasing in intensity around this zero point - i.e. elevated conflict was recorded in watersheds where tree cover in forests both increased as well as decreased. Attacks were at higher levels in watersheds where tree cover remained constant in non-forested areas (TRNON) and when changes were measured over the entire landscape (CH0105). Conflict intensity with bears was predominantly concentrated at mid-elevations (MELEV) in the Valley, and in watersheds with mid-ranges of topographic complexity (MSTD). Three climatic variables were retained in the final model: intensity predicted to increase linearly with increasing mean annual precipitation (PRECIP), and significant non-linear effects were detected for precipitation (PSEAS) and temperature (TSEAS) seasonality. Area of watersheds was retained in the final model, with conflict predicted to increase with increasing area up to ca. 60sq.km (confidence intervals are widely spaced beyond this limit, reducing confidence in the shape of the relationship). The figures below (Fig. 38 and Fig. 39) show the effect of significant variables on conflict intensity and ranks variables in terms of contribution to the final model, importance increasing from left to right.





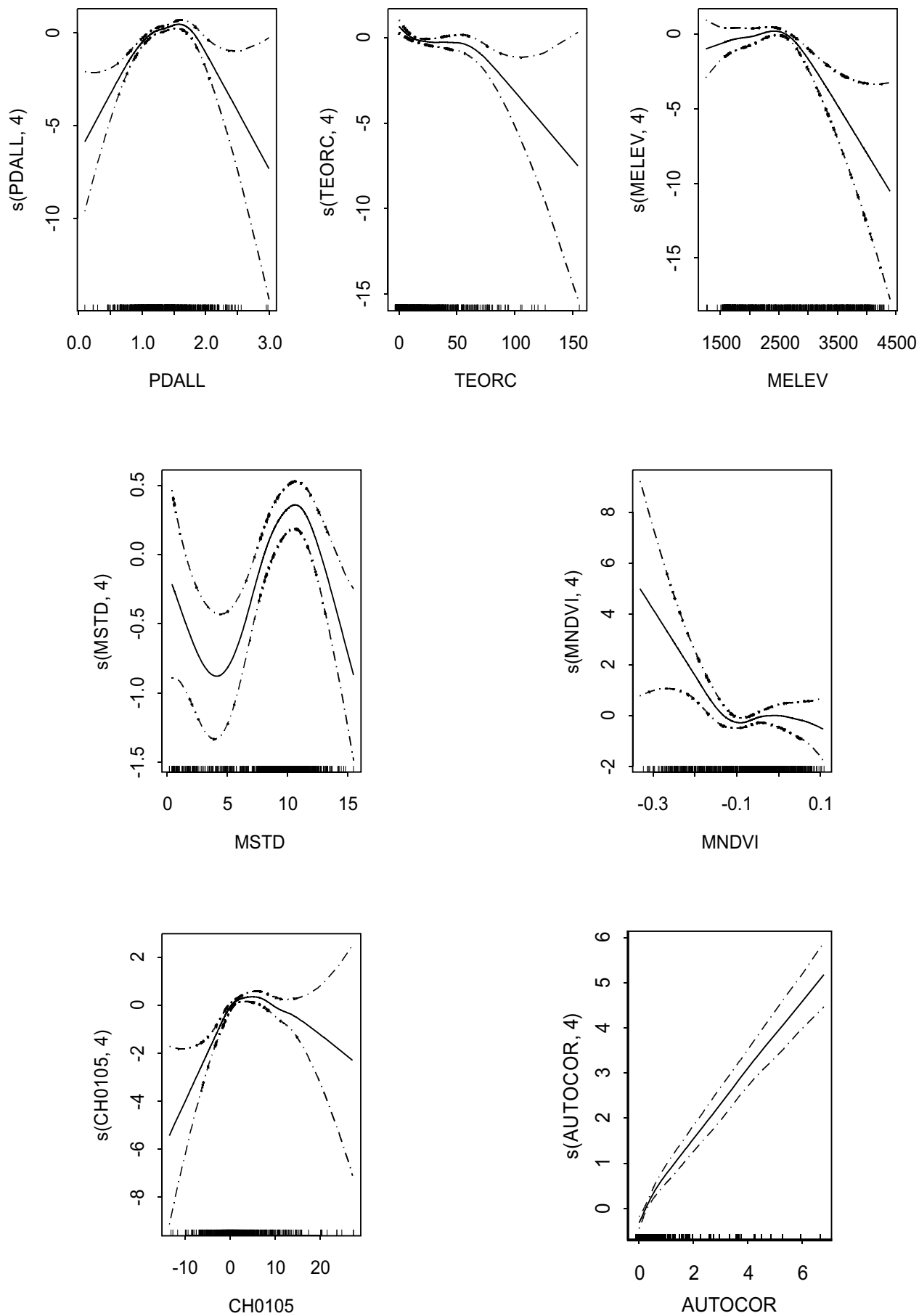


Fig. 38: Independent variables with significant effects on conflict intensity with Black Bears in the Kashmir Valley. 95% confidence intervals are depicted as dotted lines.

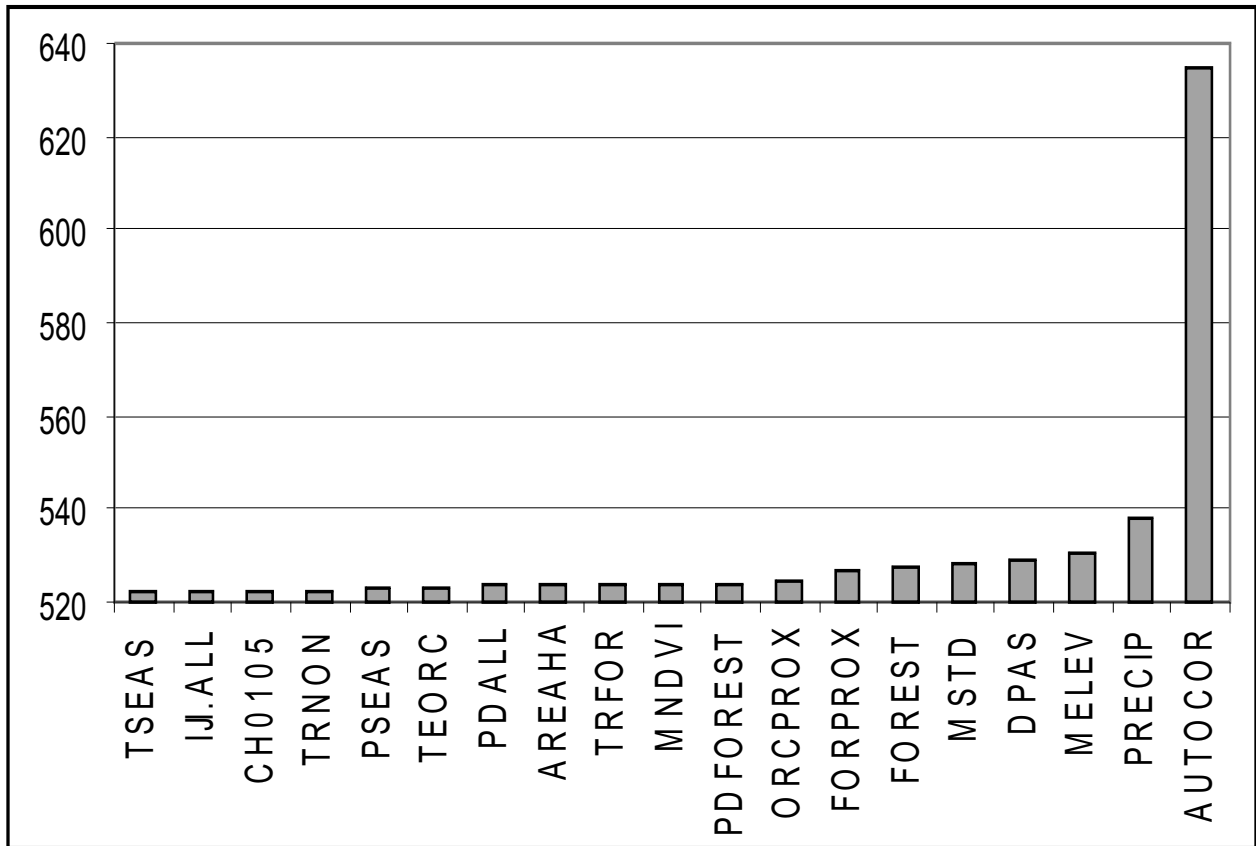


Fig. 39: Relative importance of independent variables in describing conflict intensity with Black Bears in the Kashmir Valley. Units on the abscissa depict the change in AIC resulting from removal of the variable from the model. By convention, two models are considered equivalent if the change in AIC is less than 2 units.

Leopards

The final model retained thirteen variables and was highly significant (AIC 130.07; $p < 0.001$). Changes in vegetation productivity in non-forest areas (NDNON) within watersheds was identified as the single most important predictor of conflict with leopards, intensity increasing linearly in watersheds reporting lower productivity in 2001 than in 1991. However, more attacks occurred in watersheds where tree cover increased between 2001 and 2005 in both forested (TRFOR) and non-forested areas (TRNON), intensity increasing much more sharply for the former variable. Changes in tree cover across the entire watershed (CH0105) revealed a more complex non-linear pattern, with intensity at first decreasing then increasing in watersheds where tree cover improved by between ~5-15%.

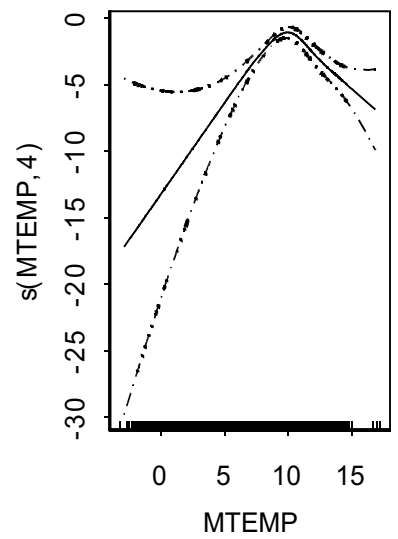
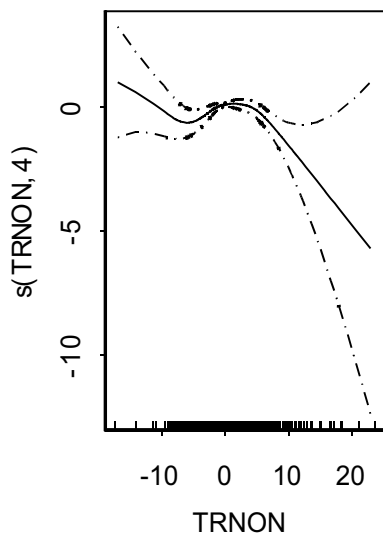
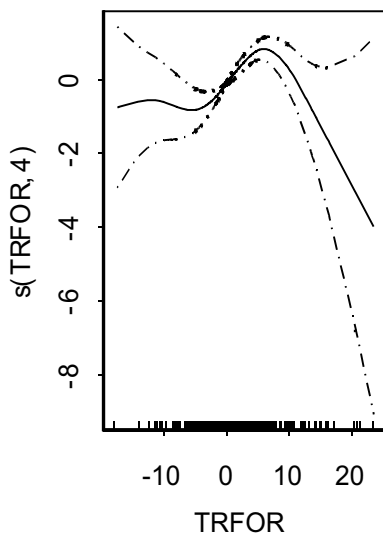
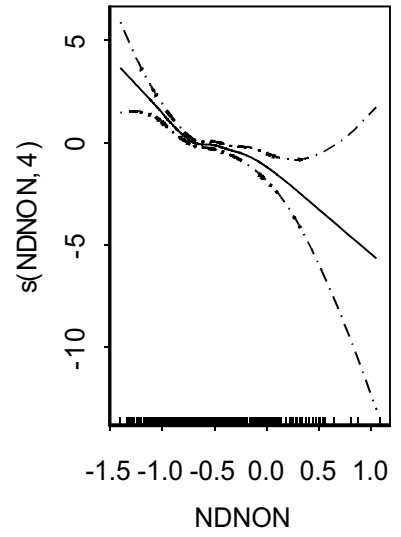
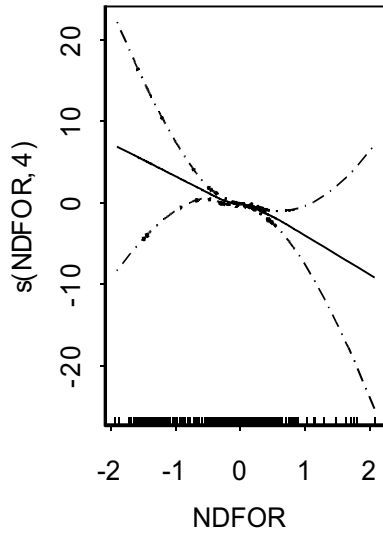
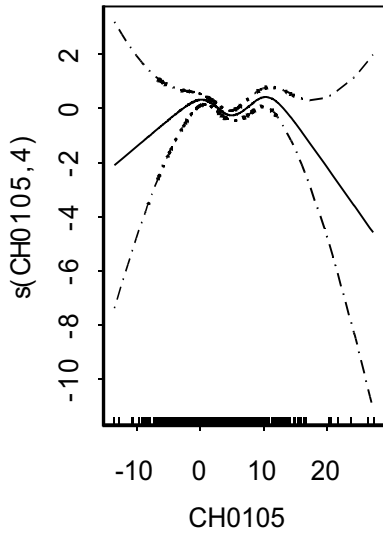
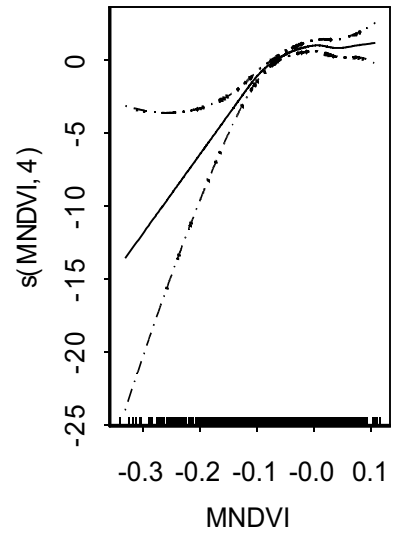
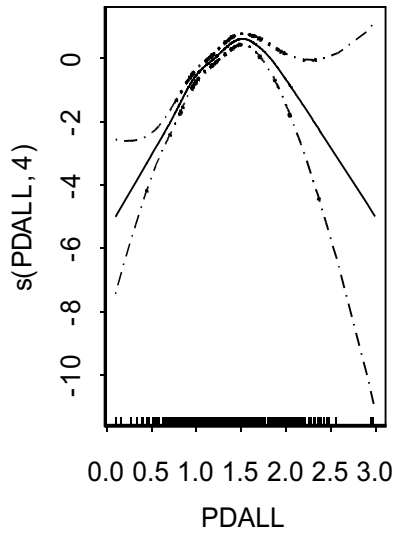
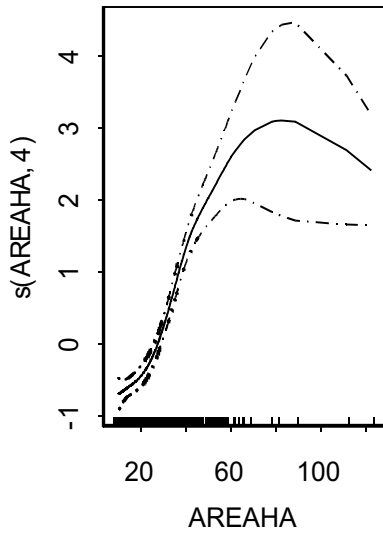
As expected, conflict intensity increases linearly with vegetation productivity measured across the entire watershed (MNDVI). Contrary to expectations however, conflict intensity was found to increase non-linearly with increasing distance from forest edges (FORPROX) and Protected Areas (DPAS). There is an apparent threshold effect of landscape patchiness (PDALL) on conflict, intensity increasing sharply with increasing patch density within watersheds before decreasing.

More attacks occurred in watersheds where tree cover increased between 2001 and 2005 in both forested and non-forested areas

Two weather related variables were retained in the final model: conflict intensity was found to increase non-linearly with increasing mean maximum temperature (MTEMP) to a threshold of about 12°C before decreasing; and increased linearly with increasing seasonality of precipitation (PSEAS). The control variable we tested (watershed area, AREAHA) remained significant, and conflict was greater in larger watersheds (AREAHA).

The spatially lagged variable (AUTOCOR) also remained significant in the stepped down model, indicating some missing variables which we did not include in the regression.

Fig. 40, shows the effect of each significant variable on conflict intensity and Fig. 41, ranks the variables in terms of their contribution to the final model, importance increasing from left to right.



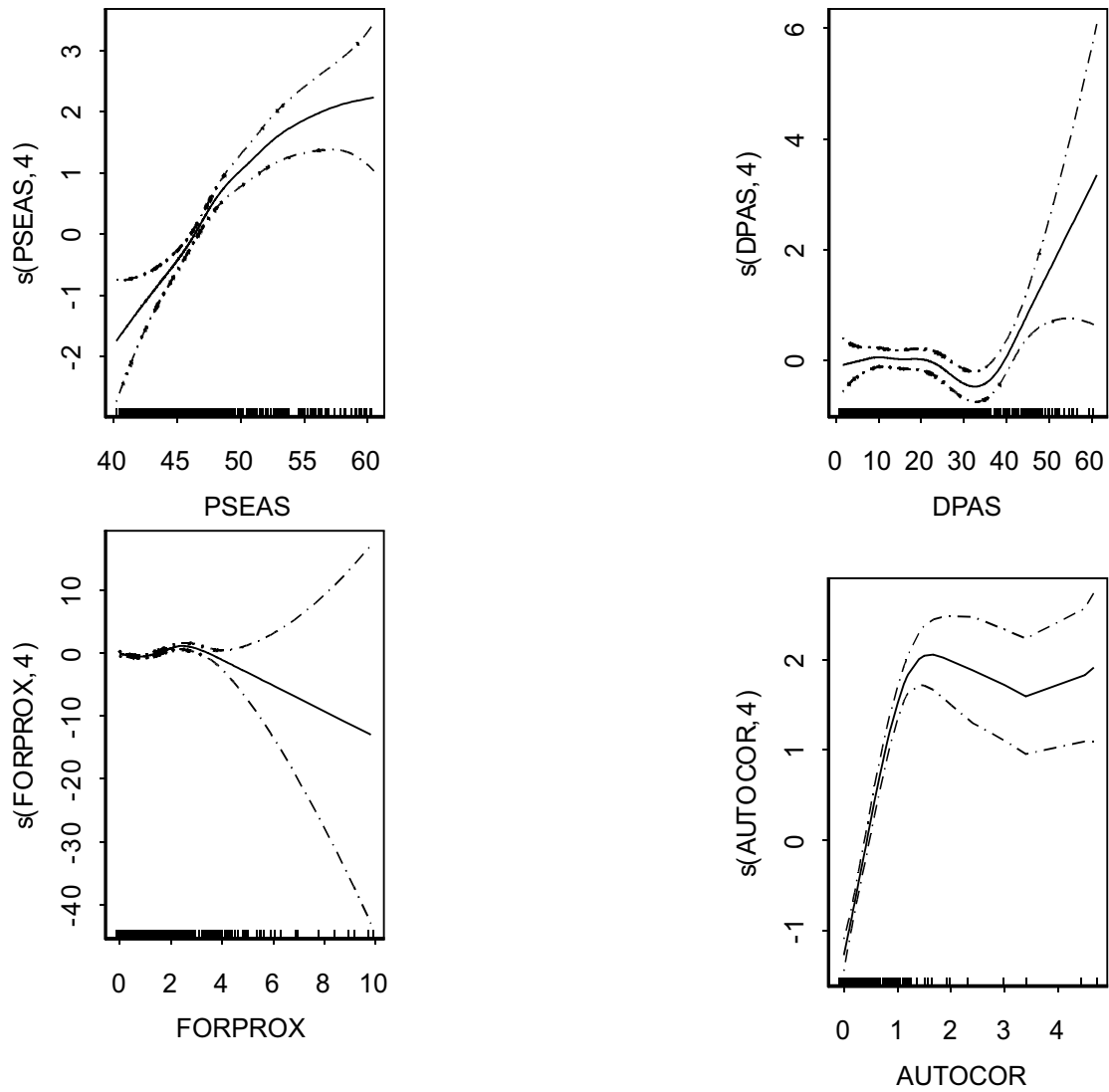


Fig. 40: Independent variables with significant effects on Leopard conflict intensity in the Kashmir Valley. 95% confidence intervals are depicted as dotted lines.

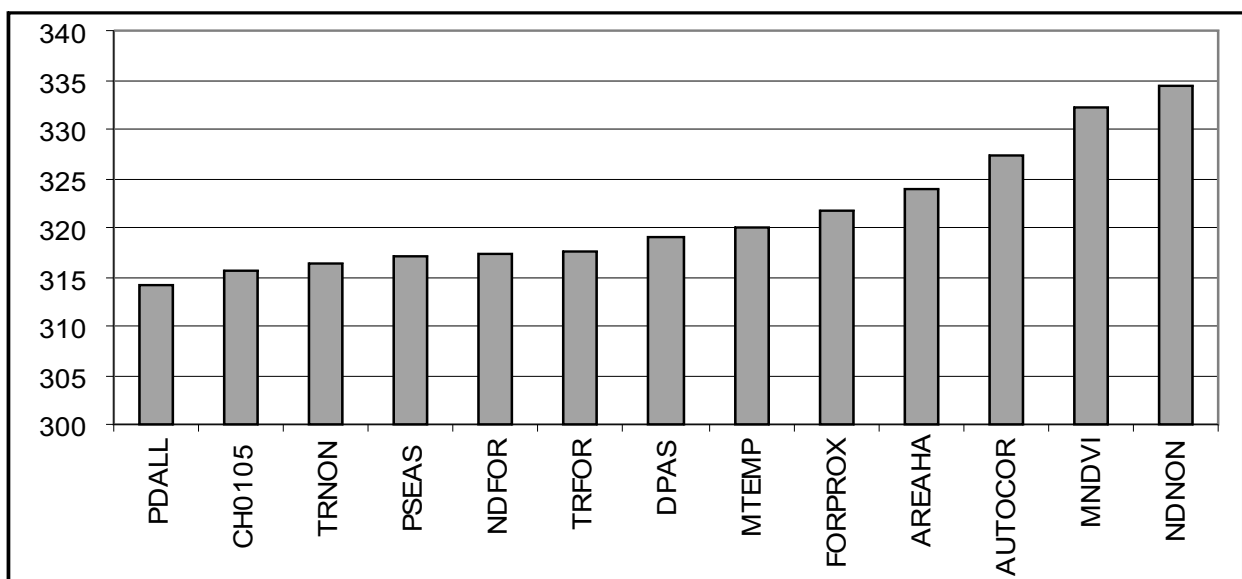


Fig. 41: Relative importance of independent variables in describing conflict intensity with Leopards in the Kashmir Valley. Units on the abscissa depict the change in AIC resulting from removal of the variable from the model. By convention, two models are considered equivalent if the change in AIC is less than 2 units.

The high conflict areas for bear identified by LISA maps are the Tral and Khrew catchments and also areas in Kulgam, Handwara and Bandipora. The few predictor variables for high conflict i.e. presence of forests and orchards especially juxtaposed across the landscape in the form of a matrix, closeness to a PA and mid-elevations are all characteristics of sites identified as areas of high conflict. The exception is perhaps Handwara which is without a PA. Presence of a PA in actual terms would imply a forested area with adequate protection, which acts as a refuge for wild animals.

Presence of a refuge would also suggest presence of wildlife staff to handle the crisis. From our analysis, it does appear that conflicts were higher at sites where officials authorized to attend to such conflict situations took time to reach the spot. Looking at the spread of the conflict locations and capacity within the Department of Wildlife Protection, it is unlikely that they would have been able to tackle the situation any better and that what ever they have been able to achieve has been commendable.

The situation however appears to be typical for Handwara where because of an absence of a PA, no wildlife staff is present and any rescue team sent from the district headquarters may take several hours to reach by which time damage is done.

The LISA maps indicated four areas of leopard conflict in the valley. These are the Kupwara, Handwara and Bandipora areas in the north and Shangus region of Anantnag in the south. The leopard conflict was directly proportional to watersheds under forest, patch density, and juxtaposition of the forest and areas away from protected areas. This is the situation in the north Kashmir where well forested areas juxtaposed with settlements and very less number of Protected Areas occur. The lack of protected areas here could do indicate reduced patrolling and increased poaching of the potential prey species. However, it has also been suggested that translocating conflict animals may not necessarily reduce conflict but only transport it to newer areas. Department of wildlife protection should therefore be careful with dealing with rescued problematic leopards.

It is obvious that the man-animal conflict in J&K has increased. This has assured higher prominence because of either better media access more reporting due to compensations being provided, and perhaps, greater public awareness.

While it is difficult to ascribe a single reason for this increase, it would be fair to state that there are several contributory factors responsible. These may include changes in land use as admitted by farmers who have opted for orchards instead of food grains (paddy) probably because of better returns. Increase in orchards has been shown to be a significant factor in increasing conflict.

There are several other factors which are speculative in nature but may have contributed to the increased conflict. There were arguments in favour of wildlife numbers having gone up in their natural habitats due to guns having been confiscated and to have caused this increased conflict, especially in case of bears and leopards. While this might be plausible, there are no figures to support this claim of increased numbers.

There were also claims that the border fencing has caused a disruption in the movement of wild animals across areas and failing to do so, they get disoriented and end up in settlements. This may be true in areas close to the border but does not explain the increased conflict in Tral or Kulgam areas.

More encounters have happened in orchards in case of bears suggesting that they had come in for the fruit. Seasonality of such encounters also suggests that bears would come for fruit at the time of harvesting. In the case of leopards however, most attacks happened near homesteads followed by attacks in forest areas when victims had gone in to collect forest produce. Attacks near homesteads happened largely in winter and spring months. This is when the cattle remain confined to the village and are grazed in surrounding areas and possibly leopards came into these villages essentially looking for livestock and then encountered people. This is suggested by encounters in Shangus and also in Lolab where initially the leopard had picked up livestock.

With change in our lifestyle, people, especially the younger generation may have 'lost' the way to live in a forest or forest fringe. People, a few decades earlier knew how to deal with conflict situations in when to chase an animal away or when to ignore it. It appears that now people have lost that knack of 'dealing' with a wild animal especially if found in an orchard near a forest fringe which may have led to increased conflict.

Conflict has eroded the tolerance of people who it has affected. There have been instances where kith of the victims have had to carry the injured to hospitals and also pay for their medical expenses which in cases of grievous injury are fairly large. With out any redressal mechanism, the people have turned anti-wildlife and any seemingly harmless animal now attracts large crowds and much antipathy. The wildlife department with its limited man-power and resources has a limited reach and has been rendered ineffective in many areas especially where it does not have a presence.

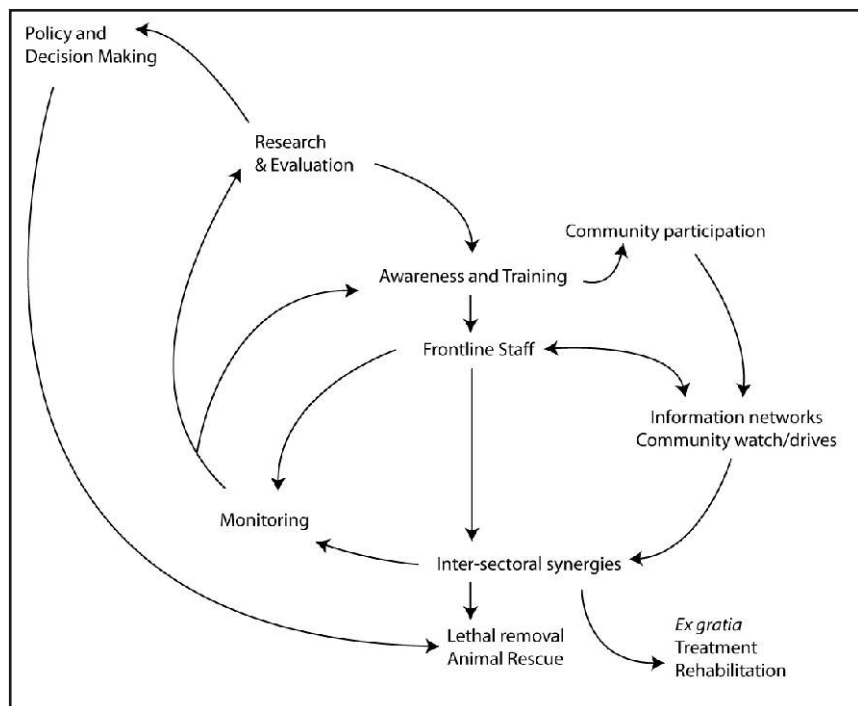
The strategy must therefore address the concerns of the people, augment capacity and capability within the government department and reduce instances of encounters between animals and people, especially mobs in the short term and reduce conflicts (animals coming into human dominated areas) by making natural habitats more suitable for animals in the long term.

Recommendations

The goal of managing conflict with carnivores should attempt to pre-empt and thus prevent attacks on humans. In the immediate short-term, this is extremely difficult to guarantee. The thrust of activities in the short term would be to assuage the feelings of the affected communities by providing immediate help, both ex-gratia and for treatment of victims. While this is important, it is also necessary to build capacity at different levels, from the grassroots to the policy making levels. The purpose of the activities should be to reduce interaction between people (mobs) and wild animals until technical help arrives. It therefore becomes necessary to have a ground level trained team of volunteers, especially in areas of high conflict intensity as identified by our spatial analyses.

To assuage the feelings of the affected communities by providing immediate help, both ex-gratia and for treatment of victims

The other actions suggested address the enhancement of the capacity of the wildlife department to fight the conflict with more sophistication. The recommendations below have been drawn from suggestions received from the officials of the wildlife and forest departments of the state, the respondents and other knowledgeable persons. We have also refined these in light of our findings during analysis of case histories or spatial data. In the figure below, a flowchart is provided detailing the linkages between different actions/



processes involved in management. Note that the flow is circular and not linear, indicating that processes and actions should feed back on each other, with adaptive management applied as more information/resources become available.

Prescriptions for management should endeavor to adequately address both preventive and reactive strategies – while the former should be designed to ensure that attacks are pre-empted, the latter must be implemented in the shortest possible time-frame to show that the State Government and DWLP intend to take any actions necessary to (i) safeguard against further attacks on humans, and (ii) alleviate levels of animosity towards conservation while building confidence in the authorities amongst local people.

1. As an immediate short-term measure, it is proposed to **completely re-align the current compensatory mechanism**. As a first step, it is suggested that the term 'compensation' be dropped in favor of '*ex gratia* payments'. The DFO/RO concerned should make available an immediate payment of Rs.5,000/- to the victim/next-of-kin from a **floating pool of funds** available at the level of the Wildlife Warden. **Inter-sectoral cooperation** from the State's Department of Health is suggested, such that the victim of the attack need not spend the *ex gratia* payment on treatment and convalescence – instead, attacks that are certified by a doctor to have resulted from the actions of a wild animal should be borne in their entirety by the hospital(s) to which victims have been admitted. To prevent the considerable social opportunity costs often borne by victims who have been permanently disabled, it is suggested that mechanisms for their rehabilitation be developed in consultation with other Government Departments (e.g. the Department of Social Welfare) and the non-government sector so that the victim may be gainfully employed. This would go a long way in alleviating some of the negative reactions that have been generated by conflict in the past.

Establish a corpus of funds from which interest the treatment of victims may be expedited – establishment of a society. Issues with government agencies not having stocks of required medicines or the capacity for dealing with more serious medical cases arising from attacks from wildlife must be resolved.

2. **Awareness programs**, targeted at conflict mitigation need to be conducted at all levels – from community levels at the grassroots, through frontline staff and higher echelons of the DWLP and Forest Department. **Sensitization programs at all levels** targeting decision makers, the legislature, bureaucracy, the Police and Security Forces need

Prescriptions for management should endeavor to adequately address both preventive and reactive strategies

to be conducted. **Training** in trapping and tranquilization techniques, research and monitoring (pug mark, signs, scrapes recognition etc), and on data entry, analysis and reporting need to be introduced at **all levels of the DWLP and FD**. As reported in the results of the semi-structured interviews, a majority of conflict incidents are reported to the Police, and it is often expected that the Police undertake immediate action to prevent further occurrences. **The Police Department should be encouraged to attend training programs on dealing with conflict situations**. Infrastructure and capacity available at the State Forest Training Institute should be made available for these programs. The **Civil Administration** can also play a significant role in helping to manage conflict, and their active participation should be sought. Agencies that would be critical to such a process would include the **Health Department** (including PHCs and other Government Hospitals).

3. Establishment of a Central Conflict Mitigation Command Center and Rapid Response Teams:

- a. Pre-empting attacks can only become possible given rapid information collection, processing and evaluation. Participation from local communities (paid/voluntary) should be sought – this would ensure a constant stream of information from local communities so that no information is missing from the decision making process. The establishment of a Central Conflict Mitigation Command Center (CMCC) to facilitate the 24/7 availability of a telephone number which communities can call to report any incident involving wildlife (sighting, crop raiding, livestock lifting or attacks on people) would form the first step in the process. Training should be provided to the staff manning the Centre so that the information can be stored in pre-determined formats and immediately mapped to provide decision-making authorities with the most current state of knowledge of a particular region/series of incidents. With this information in hand, the CWLW/Wildlife Wardens can then proceed to manage each individual incident based on a history of occurrences in the surrounding region.
- b. Interviews in the affected villages revealed that local communities already form the primary interface in dealing with conflict situations –

phones are made available and more importantly, money for immediate hospitalization costs are provided to needy victims. With modifications made to the compensatory scheme as outlined above, this presents a tremendous opportunity of converting this willingness to contribute to alternate and perhaps more useful directions. The development of **community-level Primary Reaction Teams (PRTs)** should be encouraged, comprising of either paid/volunteer local members whose primary responsibilities would include isolation of animals involved in conflict and more importantly, in crowd control, to ensure that local communities do not attempt to tackle dangerous animals without supervision. The DWLP has already proposed a recurring budget of Rs.58.60lakhs for engagement of such community-level teams, a measure that should be implemented as soon as possible.

- c. The **creation of Rapid Response Teams (RRTs)** to deal with conflict is essential, requiring both training and investment in specialized equipment. It is suggested that separate RRTs be created should be established at Divisional/Regional levels to deal with distinct but complimentary aspects of conflict management: (i) teams comprising the Wildlife Warden, frontline staff and Veterinary Officers whose primary responsibility would be to control the animal or animals involved in conflict, and (ii) teams comprising the Police, Civil Administration and Health Department whose primary responsibility would be to control both irate mobs of people and to ensure immediate relief/ medical attention of affected victims.

4. Infrastructure and Man-power augmentation

- a. Quite apart from the DWLPs own admission of the lack of adequate capacity to manage conflict in areas outside of their immediate jurisdiction, even local communities acknowledge the fact, pointing to the need for considerable improvements in infrastructure and capacity available to the Department. As the majority of incidents recorded have occurred outside of Protected Area jurisdictions, the DWLP is already at a considerable disadvantage - the primary felt need is thus to **improve the man-power resources available to the DWLP**. In the Proposal submitted to the Central Government, support for an additional 133 posts within the DWLP has been requested, with an annual recurring budgetary

requirement of Rs.161.20lakhs. While there is little doubt that these posts are extremely essential to improving both response and vigilance of conflict incidents, and indeed is an ideal long-term goal, the Proposal will need to be carefully considered in terms of long-term sustainability, as continued salary support will be required. Alternatively, **active involvement of the frontline staff of the Territorial Forest Department, Social Forestry Department, Directorate of Soil Conservation and other Government agencies** would go a long way in helping to deal with conflict without necessarily imposing additional burdens on available funds. This calls for both inter-sectoral cooperation, as well as the need for **awareness and training programs** for frontline staff beyond just the DWLP. A State Government resolution already exists, requiring coordination at upper levels of DWLP and Forest Department staff, but it is suggested that this be modified and broadened to **facilitate coordination and interactions at a frontline level between local communities, Wildlife and Forest Guards and the local Constabulary.**

- b. One of the important weaknesses of the DWLP that emerged during the survey was the lack of both **mobility and communications facilities** available to the frontline staff which hampered prompt response to conflict incidents. Forced to use public transport and their own mobile devices considerably hampers reaction times. The DWLP has already requested the Center to augment capacities in both these departments, and these should be addressed at the earliest possible date. Procedures for the acquisition of new vehicles should be simplified by the State Government so effective measures can be put in place as soon as possible.
- c. At Regional level, **mobile animal intervention vans**, capable of transporting animals, should be made immediately available. One **Wildlife Veterinary officer** should be appointed to each region, whose primary responsibility will focus on tranquilizing, removing and transporting the animal till further orders pertaining to the animal are passed.

- 5. It is critical that the DWLP **establish a monitoring and evaluation system.**

In terms of conservation management, decisions on the fate of individual animals can only be taken given a thorough **understanding of the density, distribution and dynamics of the surrounding population.** There are three distinct means of

collecting, processing and analyzing the data necessary for detailed research into these issues:

- a. develop and maintain capacity of the DWLP and Forest Department;
- b. establish linkages with local educational/research establishments; and
- c. contract the work to agencies external to the State.

The first option is both the least capital intensive as well as the most sustainable over the long-term. It is suggested that the DWLP invest in 50-100 camera trap units which can be moved around the Valley systematically, so as to contribute continuing information for monitoring. **Training of frontline staff** will be required in order to develop capacities in terms of planning, placing and priming the camera trap devices. Cooperation should be sought from local communities in locations where the traps are to be used, to both inform them of the DWLPs serious intentions of dealing comprehensively with conflict, while also minimizing potential theft of the units. Analysis of the camera trap data collected is more complex, and external support from the NGO sector or local educational institutions should be sought in order to accomplish this. An added advantage of the camera traps is the potential identification of repeat offenders among different animal individuals, thus helping to direct actions against specific targets rather than use a purely reactionary response that more often than not directs actions against non-specific individuals. There are other, both cheaper and simpler, methods of accessing the same information and the DWLP should consider providing training to frontline staff in pug mark, scat, signs (scrapes etc) recognition and collection such that a continuing body of data can be provided for analysis either internally or by external agencies, rather than seek to appoint external agencies to conduct studies that would only provide information in snapshots of time.

6. Decision-making on the fate of individual animals in conflict situations

- a. **Translocation** has often been prescribed for individual animals caught in conflict situations, but we suggest that this measure **not be implemented**, particularly in case of leopards. Conservation-based translocation involves the restocking or re-introduction of a species into areas from which the species has been recently extirpated and where no risk of disease transmission exists. This is quite distinct from randomly shuffling or reintroducing individuals into areas already occupied by other animals of the same species,

which could result in considerable shifts to the dynamics of the local population. A global review of translocation in conflict situations by Linnel et al (2002) indicated that the measure was of no use for a wide range of species – from American Bald Eagles to a number of carnivores.

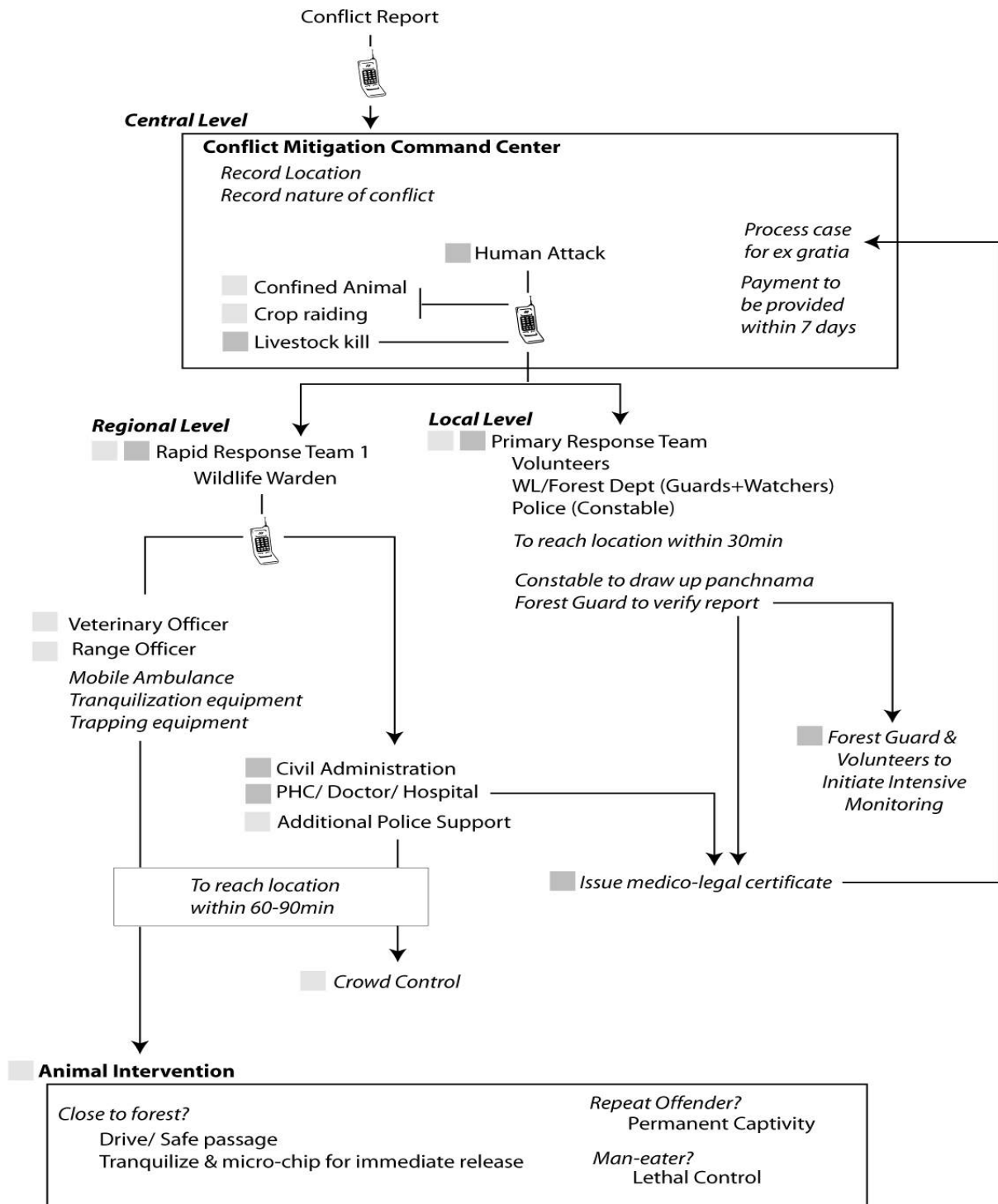
- b. Considerable emphasis has recently been placed on the **establishment of rescue centers** and facilities for the permanent maintenance of individual animals captured in conflict situations. While this is an attractive proposition in terms of acceding to the demands of animal rights activists, these measures **provide only a short-term and limited solution to conflict management**, especially given poor financial resources. *Before decisions to establish such facilities are finally implemented, careful consideration of both their capacity to deal with a fixed number of animals and the long-term costs associated with maintaining animals in permanent captivity need to be assessed.* Serious issues will be raised once the limited capacities of such centers approach their maximum. While not recommending lethal control as an alternate option, a small example involving a man-eating leopard is provided to illustrate the comparative costs: maintenance of a single leopard in captivity requires approximately Rs1.0lakhs per annum and the animal may survive for up to 23-25 years in captivity. Without considering salary and maintenance requirements of the facility keeping the animal, this would impose a potential burden in excess of Rs.20 lakhs on the DWLP.
- c. However, **lethal control is suggested only when it is certain that the problem individual can be ascertained.** In cases involving the lifting of children or adults from within human habitations, it is suggested that the RRTs comprising wildlife staff be immediately mobilized to undertake the task of identifying the responsible individual and its rapid elimination by experienced staff/individual. Rather than wait for subsequent incidents to occur, intensive monitoring across much wider regions than are immediately accessible by road should be undertaken to prevent the occurrence of any further incident. Over the long-term, the attempt should be to shift from using lethal control as a reactive option in conflict management to implementing wildlife population management controls to prevent the very occurrence of attacks on humans.

7. Long-term management

a. Long-term measures that should also be considered include **habitat improvements/restoration**. However, these would need to be carefully considered as any improvement *should only be applied in areas where populations of the carnivore in question can be safely augmented rather than by random application*. What should also be considered is the use of habitat improvements to create buffers and linkages between extant forest patches, while effectively also providing live barriers that deter animals from moving across

them. This form of application would be far more effective than using permanent barriers (fencing, walls) which are hugely capital intensive and require considerable maintenance.

It cannot be stressed enough that any successful conflict management strategy must be preceded and accompanied by thorough research, monitoring and evaluation. In the flowcharts below, the operational structure of potential management prescriptions in different conflict situations has been provided as a guide for implementation.



Intensive Monitoring

Human Attack → If the victim has not yet been located, use a grid-based or radial search pattern to conduct an **intensive search**.

Activate awareness campaign. Inform people of the attack and of the actions the DWLP/FD will be undertaking to protect against further attacks.



Livestock kill → **Initiate beat patrols** within a region at least 5sq.km. around the site of the attack. Use transects and opportunistic searches to look-out for pug marks and other signs (eg. scat). Record locations with GPS and photos. Request camera trap gear and deploy in the region.

Activate local information network. Seek any information pertaining to leopards (eg. sightings, dog and livestock lifts) and process.

Establish/report to a local command center under the WLW. Begin interactions with neighboring frontline staff and the local police. Local command to send daily situational reports to Central command. Share the information you have been collecting with local communities.

Central Command to provide daily situational analysis to CCFWL.

Detailed pug mark, scat and camera trap analysis to be targeted at identifying the individual responsible for the attack(s).

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ANNEXURE I

Case Histories involving bears

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
	8	1987	1600	70	M	Injury	Victim was watching his agricultural field. A black bear was already sitting in the field with its two cubs. It attacked Mohd. Hussain who struggled and tried to free himself and was deeply injured in the process
		1990		>80	M	Injury	Collection of grasses for livestock. Attacked by the bear
		1992	1000	35	M	Injury	The victim had moved with some people about 1/2 km up in the forest base as a picnic adventure and stopped to rest in the shade. The bear came suddenly and attacked the victim
	10	1994	1230	42	M	Injury	Mohd. Amin was walking in the field when a black bear attacked him, but he escaped quickly. The black bear tried to follow him
	8	1996	1200	51	F	Death	Zooni was going towards the market. A black bear came from an orchard and attacked her. The bear bit and tore her face severely and even though Zooni struggled and escaped, she lost her face completely
	8	1997	1500	40	M	Injury	Victim was walking through the village when a black bear attacked and injured him but the victim struggled and escaped from the spot
4	10	1997	1000	45	F	Injury	Black bear was sitting on an apple tree near Saja's house. When she went in her kitchen garden it attacked her. Family members came and rescued her
15	8	1999	830	30	M	Injury	The bear came ferociously and attacked Reyaz Ahmad
15	8	1999	830	>55	M	Injury	The bear came ferociously and attacked Reyaz Ahmed's father.
15	8	1999	845	45	M	Injury	The bear came ferociously and attacked the victim.
15	8	1999	850	60	M	Injury	The bear came ferociously and attacked the victim.
15	8	1999	855	~12	F	Injury	The bear attacked the two girls after already having attacked 4 people in the areas around the site of the incident
7	1	2001	1000	70	M	Injury	The deceased was working in his kitchen garden with his wife when a black bear attacked him and injured critically and died after two days in hospital. The area is surrounded by forest (reserved forest)
7	1	2001	1000	71	M	Injury	The black bear attacked 3-4 persons in this area at almost same time and same day. The victim was on his duty, the black bear was roaming in the same place for half an hour as he had become very violent and started attacking humans whosoever came in his way. But the people and W/L officials chased him and was killed later by gun fire
	5	2001	1200	40	F	Injury	Haleema was working in agricultural field. Black bear came from somewhere and attacked her. Haleema was dead on the spot. She was found dead in the field after one hour by the people
15	7	2002	1600	35	F	Injury	The victim visited her field which is situated between a plantation of walnut and willow trees. The bear came out from the shrubby bushes and attacked the victim seriously

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
21	7	2002	30	48	M	Injury	The victim heard some noise from the cattle shed when he was sleeping. He woke up and came to the cattle shed to see what had happened. He found the door of the shed broken and lit a bulb only to find that a black bear had killed a cow and was eating it. The black bear tried to escape by pushing the victim but its claws were tangled in the victim's arms, resulting in the loss of his right arm
1	8	2002	1700	50	M	Injury	There has been crisis by people that bear had been present in the area. The victim tried to see the bear in the field and was attacked by the bear
14	8	2002	1500	17	M	Injury	The victim went to the maize field to get maize for himself. Black bear who was sitting in the field attacked Hilal. For about 10 minutes Hilal struggled with the bear when people heard his cries, they came and rescued him from the bear.
15	10	2002	800	60	M	Injury	Victim was going to agricultural field. A black bear with 2 cubs was eating maize from the field. Black bear came near the victim and attacked him and ate his chest, face and abdomen. He died on the spot
17	11	2002	800	>45	M	Injury	The victim was washing his face near a spring when the bear attacked him
5	1	2003	1800	35	M	Injury	The victim was trying to move near the stream to wash his face but the bear was there, hidden in the shrubs and attacked all of a sudden. People came out from the mosque and took him to the hospital
20	4	2003	1300	18	F	Injury	The victim was working in her maize fields near and close to forests when the black bear attacked her. Other 8 women along with her rescued her and cried so the villagers came and chased the animals who raced towards the forest area
	4	2003	1000	>40	M	Injury	The bear came out from the vegetation and attacked the victim who was there for the collection of Kikar twigs and leaves
15	5	2003	630	65	M	Death	The victim was washing his face near the small stream passing through a popular willow and walnut plantation and was attacked by a bear
15	8	2003	900	70	M	Death	The victim went to the corn field where he has attacked by the bear and severely injured. The same victim was attacked a year before the incident as well in the same location while guarding the corn fields.
31	8	2003	1000	70	M	Injury	Hari Chand was cutting grass in field when black bear attacked him from backside. Harichand struggled to free himself for about half an hour. A man passing by rescued him from the bear
2	9	2003	1830	60	M	Injury	The victim was in the field harvesting grasses and was attacked by the bear
9	9	2003	800	65	M	Injury	The victim was moving on the road which leads to Satoora when all of a sudden the bear came down from a wall adjoining the field and attacked the victim. The bear escaped and went into the forest zaajin across the nallah
	9	2003	1200	50	F	Injury	Akbar Jani was walking in her fields when a black bear attacked and killed her. She was found dead after two hours by people
	10	2003	1100	16	F	Injury	Hafeeza was coming back from the forest when the black bear attacked her. After some time few other women came and rescued her and black bear ran away

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
6	11	2003	1000	23	F	Injury	The girls were playing near the field across the nallah. The bear came suddenly and attacked the girl and severely mauled her face causing the removal of one of her eyes. Other women came to her rescue, shouting and chased the bear away
		2003	1200	45	M	Injury	The calf had escaped and the victim tried to follow him but the bear attacked him in the forest
2	4	2004	1100	52	M	Injury	Gh. Ahmed was working in an agricultural field which is near a dense forest. Two black bear cubs came near him which he chased away with a stick. The cubs ran away but came back with their mother who attacked the victim. He struggled and escaped from the spot
15	4	2004	1200	60	F	Injury	The victim was collecting grasses nearby in a place of walnut cultivation and was attacked by the bear. The victim was taking her cattle through the modified forest base field and attacked by bear
	4	2004	2130	45	F	Injury	Mahataba was working in the maize field along with four other women at a short distance. Black bear was sitting at hiding spot and attacked Mahtaba. She shouted and the other women working nearby ran towards her and rescued her from the black bear
2	7	2004	830	34	M	Injury	The victim was harvesting grasses and was suddenly attacked by the bear from the back. The site has good hiding cover and also apple and pear trees
24	7	2004	1600	40	M	Death	Was returning home with his cattle when the bear attacked him near his house and injured his face, head and arms. Was hospitalized for over a month at Srinagar
21	8	2004	800	28	M	Injury	The victim was supervising his maize fields at 8 am when a black bear attacked him who was hidden inside the maize. The victim was alone but resisted the attack and get himself free after injuries he got in his hands, by crying and shouting of the victim the locals came out with sticks and chased the black bear till the black bear left the village and went to forest
15	9	2004	1200	80	F	Injury	For collecting firewood in the undulating land at the base of the forest
6	10	2004	700	35	M	Injury	Sona Ullah was going to the flour mill. A Black bear sitting near a tree attacked the victim and injured him seriously. The victim's brother was walking by and rescued Sona Ullah from the bear
10	10	2004	945	45	M	Injury	The victim planned to cross the stone pile wall and was not aware of the bear in the thorny shrub. The bear attacked the victim and severely injured him
15	10	2004	800	35	F	Injury	The victim was in the field to fetch vegetables (Brassica) and was aware of the presence of the bear in the field especially around the Cucurbita vegetables.
15	10	2004	1500	90	F	Injury	The victim had gone to fetch vegetables from the field and was attacked there by the bear. The place is next to a natural gorge
20	10	2004	700	80	F	Injury	The victim came out of her house and walked some distance for toilet purposes in the morning and was attacked by the bear near some walnut trees
26	10	2004	1230	11	M	Injury	The incident took place the Wular lake nursery which is about 20 feet away from the house of the deceased, when he was playing with another boy of his age. Suddenly a black bear came out of the plantation and attacked the face of the deceased who died on spot. Another boy who was witness to the episode went into severe shock and is in an almost comatose state.

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
31	10	2004	2015	42	M	Death	Wali Mohd was walking through his maize field when he saw some damage to the crop. Just then a black bear hiding in the field attacked him. Wali Mohd struggled and rescued himself from the bear
3	11	2004	1200	30	M	Injury	The victim was attacked by a black bear when he was working in agri fields along with the other 5-8 persons. The people resisted the attack and the black bear left the spot injuring many others
3	11	2004	1200	45	M	Injury	The victim was the 2nd attack of the same black bear at the same location injuring the hip of the victim and was taken to hospital by the villagers, after 15 days he was discharged from the hospital
3	11	2004	1210	28	M	Injury	This was the 3rd victim of a black bear in the same village and same location. The two persons injured earlier had put the people on alert but they tried to chase, the black bear, but the black bear keep attacking the people. The black bear was reportedly came out of a plantation of Wular lake at a distant location
3	11	2004	1215	30	M	Injury	This was the 4th victim of the same black bear in the same area again. The victim tried to resist the black bear as he had injured 3 persons earlier, so the people tried their hand to capture or trap the animal but could not do so. This boy was injured by the animal.
3	11	2004	1210	65	M	Injury	This was the 5th and last victim of the same black bear in the same area of location, but this old man was attacked severely as he was working in his orchard. He was hospitalized for more than a year for different surgeries etc. but this man belongs to Asham Area while as rest 4 persons belong to same area i.e., Anderkoot
21	11	2004	1100	40	F	Injury	Hasra was going towards the forest area with her sheep for grazing them. Black bear attacked her and deeply injured her. She was hospitalized by the people and survived for 15 days after which she died
15	3	2005	1300	40	M	Injury	The bear attacked from the back all of a sudden while the victim was taking livestock toward the forest
15	4	2005	1100	53	F	Injury	The ladies were collecting some vegetable near the forest when the bear attacked this victim and injured her badly. Ran away being chased by others
5	5	2005	500	>65	F	Injury	The victim came out of her house early in the morning and was attacked by the bear in her house yard
12	5	2005	1430	28	M	Injury	Mehraj-u-Din was going to have lunch after spraying pesticides on the trees when he heard some strange noise. He stood up but a black bear attacked him from the front and bit his face vigorously with his jaws and then it ran away by itself
15	6	2005	1400	45	M	Injury	The victim had planned to leave the goats on the grazing field and was attacked by the bear
27	6	2005		27	M	Death	The victim was attacked by the bear in the paddy field
15	7	2005	1000	65	M	Injury	The victim was supervising the orchard when a B/B attacked him there injuring his head, arms and back but did manage to escape from the conflict place and was rushed to hospital by his family members and neighbours.
31	7	2005	900	>50	M	Injury	The victim had come out of his home for toilet purposes towards an open place in a densely vegetated natural gorge and was attacked by the bear

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
8	8	2005			F	Injury	Attacked near army camp while collecting grasses from a nearby field (offset 300 °NW, 50 m away)
15	8	2005	1400	10	F	Injury	The girl was sitting in the field near a wall of stones and was attacked by the bear
25	8	2005			M	Injury	
26	8	2005			F	Injury	
	8	2005	1500	45	M	Injury	The victim was attacked in the maize field by a bear
	8	2005	1100	35	M	Injury	The victim was attacked in the maize field by a bear
1	9	2005	900	>45	M	Injury	The victim was trying to harvest the walnuts from the tree but was suddenly attacked by the bear which had remained hidden in the local thorny shrubs
6	9	2005	1100	60	M	Death	The victim had come out and was present in the apple orchard (which is still too young to bear fruits) and was attacked by the bear. He was attacked amongst maize crops situated well within the apple orchard
30	9	2005	1200	90	M	Injury	The victim was rearing goats near the forest base and was attacked by a bear
	9	2005	1400	14	M	Injury	Ab. Rashid was grazing his cattle in an agricultural field near the forest was sitting on a stone. A black bear attacked him from front side and injured him. Two boys were walking from that side who threw stones at the bear and the bear ran away
	9	2005	1600	35	M	Injury	The victim was rearing sheep and was attacked by the bear
11	10	2005	1000	55	F	Injury	The bear that was chased by the mob sneaked into the house yard and attacked the victim
11	10	2005	930	35	M	Injury	Attacked near the fields adjacent to the houses near the village in a popular plantation (20-30 trees)
2005		2005	400	25	M	Injury	To see the crops. The bear came out from the crops (corn) and attacked the victim in the field, near his house.
		2005	900	50	M	Injury	Driving cattle towards forest base and was suddenly attacked by a bear
19	4	2006	1100	40	F	Injury	Mahmooda was coming home. A black bear was walking at some distance when the victim saw it. She tried to run away but the black bear followed her and attacked her. She struggled, managed to free herself, and ran away injured
26	4	2006	1430	40	M	Injury	Gh. Ahmed was working in the agriculture fields when two black bear cubs came and attacked legs of Gh. Ahmed. He pushed them with the help of a stick and they ran away. After some time the mother came and attacked Gh. Ahmed. A man walking by that way threw stones on the bear and rescued him
15	6	2006	1000	15	M	Injury	Was attacked by the bear when the victim was walking towards the Orchard; hospitalized for a month
15	6	2006	1800	45	M	Injury	The victim was moving on a subway adjacent to the forest after coming from begging moving through the adjacent field.
25	6	2006	1135	68	M	Injury	Gh. Rasool heard noise about black bear in the village. He came out of his home and was walking towards the village. Then, the black bear who was running away from the people collided with the victim and pulled him down but ran away quickly
25	6	2006	1130	18	M	Injury	Tariq was having tea at home. He heard noise about black bear in the village and came out of his house and just then the black bear attacked him and dragged him. Villagers ran towards him and saved him from the bear

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
7	7	2006	1430	>60	M	Injury	The victim was in his walnut plantation near the army camp and the bear came all of a sudden and attacked him
12	7	2006	1200	28	M	Injury	The victim along with his wife was in the corn field where the bear had taken shelter and was hidden. All of a sudden, it attacked the victim and his wife injuring both
12	7	2006	1200	25	F	Injury	The victim and her husband were in the corn field where the bear had taken shelter and was hidden. All of a sudden it attacked the victim and her husband injuring both
15	7	2006	1000	45	M	Injury	The victim was guarding the cattle in the forest and was attacked by the bear
15	7	2006	1430	23	M	Injury	The victim was in the forest for the collection of NFTP (shurbs for weaving, such as Parotiopsis) but was attacked by the bear
15	7	2006	1300	70	M	Injury	
15	7	2006	1100	45	M	Injury	The victim was leading his livestock towards the forest and was attacked by a bear near the parotiopsis trees
	7	2006	1520	30	M	Injury	The victim was rearing sheep while he was attacked by the bear
3	8	2006	500	70	M	Injury	Ali Mohd. Was walking towards the masjid in early morning when a black bear attacked him. He struggled for half an hour with the bea and shouted loudly. After half an hour villagers came with sticks and attacked the bear and Ali Mohd was rescued. The black bear ran away
8	8	2006		25	M	Injury	The victim was going through a kacha road from Raiwatan to Halan and was attacked on the way by the bear
12	8	2006			M	Injury	The victim had moved to the alpine grassland so couldn't be contacted
12	8	2006			F	Injury	
15	8	2006	730	~45	M	Injury	The victim was moving towards the stream to wash his face but the bear was thee and attacked him *
15	8	2006	1830	30	M	Injury	The victim along with his wife was working in the field adjacent to his hut. The bear came out from the corn field and attacked the victim and also his wife
15	8	2006	1830	35	F	Injury	The victim along with her husband were attacked in the corn field by a bear
15	8	2006	1400	40	M	Injury	The victim tried to take the cattle near the stream but the bear was drinking water there and attacked the victim
15	8	2006	700	65	M	Injury	The victim was washing his face in the morning near the stream passing through the willow plantations and was suddenly attacked by the bear
19	8	2006	1000	28	M	Injury	Fayaz was cutting grass in the field. A black bear with two cubs were at a distance from him. He thought they were dogs. They came near him and attacked him. Just then, two more black bears came. Fayaz fainted and the black bear went away from the spot
22	8	2006	1830	60	M	Injury	Victim was working in the field along with another person. A black bear after whom villagers were running came into the field and attacked the victim and another person injuring them and ran away quickly
22	8	2006	1830	50	M	Injury	Victim was working in the field along with another person. A black bear after whom villagers were running came into the field and attacked the victim and another person injuring them and ran away quickly

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
22	8	2006		12	M	Injury	People were running after the black bear when abid was attacked by it. The bear injured him but ran away because it was afraid of the people
14	9	2006			M	Injury	
15	9	2006	1600	18	M	Injury	The victim was attacked in the field while collecting grasses for livestock
15	9	2006	1900	25	M	Injury	Attacked by a bear in the corn field
20	9	2006	1100	55	M	Death	Nawab was walking through the village. A black bear that was on a tree came down and attacked the victim's right arm with his mouth and pushed him. Nawab Khan struggled and rescued himself
22	9	2006	1400	52	M	Injury	The victim was working in his orchard and was also rearing sheep. The bear appeared there and attacked the victim to which he slipped down from a steep slope (2 m) along with the bear over him due to which he survived serious injuries leading to spinal cord damage proven by medical certificate.
	9	2006	1200	40	M	Injury	The victim was rearing sheep near the forest on a cleared patch, and was suddenly attacked by the bear
	9	2006	1200	<55	M	Injury	The bear was driven from the Maize cultivation by the people and the bear on the way attacked the victim near the forest while he was tending to his cattle
3	10	2006	1410	>45	M	Injury	The victim was standing near the stony wall fanning around the maize field. The bear came out from nowhere and attacked the victim. The victim was attacked after he had finished a bath near the stream adjacent to the fields
9	10	2006	1800	42	M	Injury	Mohd. Sahrib was returning home in the evening when he saw black bear feeding in the field. He tried to run away but the bear attacked him. Mohd. Sharib saved his face from the bear and ran away from the spot
9	10	2006			M	Injury	
15	10	2006	1200	35	F	Injury	The victim was looking after the cattle at the time of the incident along with 2-3 females and was attacked by the bear near the forest but while in the field
15	10	2006	700	58	M	Injury	The victim was passing by a subway on his way home through a willow plantation and was attacked by the bear near the stream. It was earlier presumed that the bear was lying near there but attacked the victim all of a sudden.
17	10	2006	1500	35	F	Injury	Shada Begum was sitting on the verandah of her home. A black bear came there and attacked her, injuring her badly. She was hospitalized but could not survive
20	10	2006	1400	35	F	Injury	The victim was taking out vegetables and she noticed her daughter crying because the bear was attacking her. She ran towards her and the bear attacked her severely
20	10	2006	1400	11	F	Injury	The kid was attacked by the bear from the back. The bear had already attacked one person in a nearby village.
20	10	2006	1430	30	F	Injury	The victim came out of her home to look for her daughter (7 yrs old) outside but the bear came and attacked the victim after attacking her daughter
20	10	2006	1430	7	F	Injury	The victim was playing outside her home near the yard. The bear attacked the kid. This was the fourth case of the incident

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
20	10	2006	1330	5	F	Injury	The bear had taken the kid in its leap without causing any damage to the kid. Later the bear dropped the kid to the ground with care but she received a minor head injury with his nails. Injuries on forehead and back
21	10	2006	1030	48	M	Injury	Victim was working in the field, a black bear came running after. Villagers were running to get that bear out of the village. It attacked the victim but ran away quickly
21	10	2006	915	50	M	Injury	People were running after the black bear. It ran through the victims house injuring all three of them
21	10	2006	915	40	F	Injury	People were running after the black bear. It ran through the victims house injuring all three of them
21	10	2006	915	28	F	Injury	People were running after the black bear. It ran through the victims house injuring all three of them
26	10	2006	730	44	M	Injury	The victim was checking his saffron field. A female bear with 2 cubs was sitting in the field while the victim was about 10 feet away from them. The mother bear pushed him and attacked him. A boy passing by saved the victim
28	10	2006	1000	50	F	Injury	The victim had gone to visit the field. The bear came suddenly when she entered the field and was attacked severely by the bear
30	10	2006	1230	56	M	Injury	The affected person was in the front yard of his daughter's house filtering the sand when he was attacked by a black bear in front direction and damaged his face leading removal of his nose and teeth fully and was operated later on in the hospital
30	10	2006	1235	28	M	Injury	The victim was busy with qualeen weaving, when he heard the cry and shout that his father is attacked by a B/B, he came out and ran to rescue his father, but the B/B could not spare him and the victim was attacked by the B/B by front, so the conflict started which injured the victim severely
30	10	2006	1235	24	M	Injury	The victim was attacked by B/B when he tried to rescue his father and brother who were attacked by the same black bear and the same time who were already injured by black bear. The black bear was coming back after catching fish from Wular lake the people said.
30	10	2006	1400	60	M	Injury	The victim was offering prayers near an apple orchard and maize cultivation
31	10	2006	930	29	M	Injury	The victim was working in the field and was suddenly attacked by the bear
	10	2006	1000	60	M	Injury	Ab. Khaliq was grazing cattle in the forest. Black bear attacked the victim. Ab. Khaliq struggled to free himself for about one hour and ran away when he finally succeeded
2	11	2006	1030	28	M	Injury	The victim was working in the orchard (apple, walnut etc). The bear was not visible until 12:00 noon and came out suddenly and attacked the victim. The persons shouted and let the victim free from the bear
2	11	2006	1300	75	M	Injury	The victim had gone to the nearby field in the village but the bear attacked the person at the same place where the earlier incident had taken place
2	11	2006	930	23	F	Injury	The victim was standing in her house yard and the bear sneaked in and attacked the girl
10	11	2006	1100	65	M	Injury	Was grazing his sheep when the bear attacked him

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
14	11	2006	1600	35	M	Injury	The bear had caused two incidents and was chased by the mob. On the way the frightened bear entered the house and attacked the victim severely. The people came and rescued him. The bear also attacked a victim on top of a single storied school
14	11	2006	1500	>35	M	Injury	The victim had finished a bath near a stream and was attacked by the bear. There had already been some sounds of shouting from the villagers but when the victim tried to move back, he was attacked suddenly by the bear
14	11	2006	1500	>45	M	Injury	The victim was working in the field and was attacked by the bear
15	11	2006	2100			Injury	The bear had entered the cattle shed and had injured two cows in the shed seriously. The owners came out and lights came on suddenly due to which the bear escaped leaving the cows)
18	11	2006	1100	33	F	Injury	Khatija was burning wood for making wood coal along with her sister. Black bear attacked her and her sister shouted. A few people came and rescued her from the bear
18	11	2006	1300	>35	M	Injury	The bear was present in the mustard field and came out and attacked the victim. The victim was looking after the sheep. The spot where the incident took place had piled up dry mustard plants
1	12	2006	1200	22	M	Injury	The victim was roaming in the agriculture fields when he was attacked by a black bear from front side as the animal was coming from opposite side and attacked the victim injuring him seriously
21	12	2006	1300	42	M	Injury	Victim was grazing his sheep in an agricultural field. A black bear with two cubs tried to attack the sheep which ran away. The black bear then attacked the victim. Two people passing by saved the victim from the bear
28		2006	1200	>55	M	Injury	The victim was rearing cattle near his house which is well seated in the forest and was attacked by the bear
		2006	1500	40	M	Injury	The victim was on duty in the forest and was attacked by a bear
1	1	2007	1000	17	M	Injury	The bear of the granary hutment escaped and on the way attacked the boy who was present in the field. The people came and rescued him and the victim was saved
15	1	2007	800	38	M	Injury	The victim detected some movement in the granary and suspected a thief and tried to look into it but the bear caught hold of his hand. People came and rescued him
	3	2007	1100	35	F	Injury	Mukhta was walking in the field. Black bear attacked her, she shouted and then the villagers came and rescued her
4	4	2007	1500	35	M	Injury	The victim went to fetch vegetables from the field. The bear came out suddenly and attacked the victim
4	4	2007	1700	17-18	M	Injury	The victim was leading the sheep home along the base of the forest road in the walnut plantation
15	5	2007	915	>55	M	Injury	The victim was collecting seeds from oats plants in the field. The bear who was chased by the mob reached there and attacked the victim leading to the death of the victim
			1600	42	M	Injury	Attacked by the bear in the apple orchard
						Death	The bear had raided/damaged 3 beehives. It is important to note that some people maintain small apiaries well within the settlements which attract the bears and as such pose a threat to life and property

ANNEXURE II

Case Histories involving Leopards

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
23	10	1996	1300	27	M	Death	Was serving his cattle in the forest when the leopard attacked him. He succumbed to his injury on his neck in the spot
13	11	1996	1300	30	F	Death	The leopard from nearby bush attacked the victim while she was collecting firewood and died on the spot
28	1	1997	1000	20	M	Death	The leopard attacked him while he was in the forest with his cattle and died on the spot
14	2	1997	1030	30	F	Injury	The deceased was attacked by a leopard when she was collecting forest vegetables in that area near her house in forest along with a group of women and was dragged to 1 km up in the forest, the other women shouted and cried and were feared by this act, the other people tried to chase the animal but collected the dead body on reaching the spot
22	2	1997	1730	12	M	Injury	The deceased 12 years old boy went for shopping in his locality at 5.30 pm. A leopard attacked at him and picked his throat and dragged the boy about 1 km away towards N-E direction. The shopkeeper shouted and people tried to chase the animal and rescue the boy but could not and received the dead body of the boy cut into pieces and abdomen was open
23	2	1997	1000	18	F	Injury	The victim was collecting firewood along with a group of some 20 girls and women when she was attacked by a leopard by neck and dragged her to one km away in the forest. Other women cried and tried to chase but could not many other women fell unconscious due in the havoc and informed the villagers. On changing the direction the villager found dead body of the deceased.
23	2	1997	1100	10	M	Injury	The deceased boy was along with his mother near the forest (she was collecting forest leaves etc for fire) when a leopard attacked the boy and dragged him to about 2 km away up in the forests in NW direction. The mother cried and shouted hence a large no. of people tried to chase the animal but could not save the boy as they found the dead body some 2 km away
25	2	1997	2100	12	F	Injury	The victim was out of her house for toilet facility at 9 pm along with one of her family member to her compound. Suddenly a leopard attacked her and dragged to 1.1/2 km away. The people chased the animal and found the injured victim as the leopard left the area. she was rushed to hospital where she went to plastic surgery and was discharged after 16 days from SKIMS sgr.
28	2	1997	1200	18	M	Death	The victim was walking near his house when the leopard attacked him from back. Others came to his recovery but he succumbed to his injury
7	4	1997	930	35	F	Injury	Saleema opened the door of the cattle shed and near the door she saw a few hens dead and a dog was also lying dead near the door - when she opened the door fully and went inside, the leopard hiding inside the shed attacked her. She shouted. Some people working in the agriculture field rescued her

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
9	11	1997	2000	12	F	Injury	The deceased had just came out of her house for toilet as a leopard attacked her and dragged to about 1 km away and killed her on spot. The family members cried and shouted. Hence, the villagers accompanied them to trace and chase the animal but they found the dead body of the victim. this was the 2nd attack by the leopard in this area in same year
15	11	1997	1230	11	F	Death	The 11 year old girl was visiting her maize fields alongwith other 4 girls of her village when she was attacked in a leopard and dragged her to near by forests where the dead body was recovered into pieces by her relatives and villagers who were chasing the leopard after attack
29	11	1997	1900			Injury	The victim had just came out of the mosque after night prayer when a leopard jumped over him and attacked his chest, but the victim resisted and shouted due to which the people came out and chased the animal but the animal dragged him to about 1/2 km away. The victim was left injured. this was the third attack of the year and 2nd of the same month in same village
	11	1997	1230	11	F	Death	She was attacked by the leopard in her maize field. She succumbed to her neck injury
7	12	1997	930	12	M	Death	The boy was going to school with his 9 yr sister when the leopard attacked the boy and killed both of them
7	12	1997	930	9	F	Death	The boy was going to school with his 9 yr sister when the leopard attacked the boy and killed both of them
13	1	1998	1845	8	M	Injury	The deceased was coming out of his house with mother for toilet (urinal) at the same time a leopard attacked him by throat and dragged to about 2 km away in N-E direction towards a hill over which are the forest. The helpless mother cried shouted but it was too late to chase the animal as they could found the dead body of boy
23	2	1998	2000	7	M	Injury	The deceased was coming out of his house with his mother when a leopard attacked the boy at 8 pm at the main door of his house. He was attacked on throat and the leopard dragged him to a nearby kitchen garden, his mother shouted, people came out and chased the leopard but could not succeed in rescuing the boy as the leopard left the boy killed in about 5-10 minutes time only
10	12	1998	1000	32	F	Injury	The victim was collecting firewood in the forests along with other 10-15 ladies of the locality when she was attacked by a leopard on 10.12.1998 at about 10am. The conflict place is not so far from the village as the whole village falls inside the forests. The victim was dragged by the leopard and about 2km away from the attack site and her dead body was recovered there
27	12	1998	1100	37	F	Death	Saira had gone from his home at 9 a.m. to cut grass (3.5 km away from her home). After 11 am, she was not found there and people started looking for her. She had been dragged by a leopard towards Khanmoh Conservation Reserve and was found dead there
29	12	1998	1200	16	F	Death	The victim was sitting with other girls about 2.5 kms away from her house when the leopard attacked and lifter her.
24	2	1999	1830	8	F	Death	Alfan was sitting at the door of a cattle shed in the ground floor of her house when a leopard came from somewhere and attacked her and dragged her. Her sister shouted and tried to save her but in vain. Later, Alfan was found dead in an agricultural field

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
23	11	1999	1200	10	F	Injury	Qasim Jan was sitting and watching her cattle grazing. The leopard attacked her and then dragged her toward the forest. She died on the spot
7	12	1999	1500	11	F	Death	Parveena was walking through the field when a leopard sitting near a tree attacked her. Her sister rescued her injured, but the leopard counter attacked and dragged Parveena towards an agricultural field. The villagers came running to help but Parveena was dead
-		1999	1530	18	F	Death	The victim along with other girls were grazing sheep when the leopard attacked this victim. Others ran away and when the villagers came, they saw her dead
-		1999	1000	16	M	Death	Was attacked by the leopard while the victim was grazing the sheep and cattle. Others ran away from the site
11	1	2000	1015	10	M	Death	Adil was sitting with his mother grazing his cattle. Leopard attacked him from backside and lifted him almost 50 m. His mother shouted and villagers came running toward the leopard. The leopard ran away but Adil died on the way
11	12	2000	1100	45	F	Injury	Collecting firewood with daughter when the leopard attacked her. Daughter shouted and ran after leopard with a stick. Neighbours also joined in rescue
	4	2002	1300	15	F	Injury	Fahmida was walking in the field where sheep were also grazing. Leopard attacked the sheep. When Fahmida tried to save the sheep, she was attacked by the leopard. A few boys passing by that way rescued her by attacking the leopard
18	3	2004	1130	10	F	Death	Ruksana was sitting under a tree in an agricultural field. Leopard attacked her and deeply wounded her neck. The parents saw this and quickly ran towards her. The leopard ran away. Her family rushed her towards the hospital but ruksana died on the way there
30	7	2004	1600	17	F	Injury	Noseema was carrying food for the family who were working in the field. Leopard attacked her, she shouted and few women walking there tried to rescue her and were injured in the process Saleema is still under treatment
29	9	2004	930	11	M	Death	Was on his way to school when he was attacked by the leopard about 0.5 kms from his house
29	9	2004	2100	13	F	Injury	Had gone to the toilet with mother when the leopard attacked the victim. On hearing the alarm of the mother, neighbors rushed in with torch and light and rescued the girl.
28	10	2004		6	M	Injury	The victim of 6 years age was along with his mother when she was collecting firewood and a leopard attacked him and dragged 1/2km away due to which the boy died on spot. The group of women shouted on the incident, after that the people gathered and chased to trap but could not succeed. they recovered the dead body of the boy
28	10	2004	1030	6	M	Injury	The deceased was along with his mother who was collecting charcoal leaves, when a leopard attacked the boy and dragged to 1 km away in forests in N-E direction. The mother shouted and felt unconscious. The people heard the shouting as it was near the forests but close to villages, so they tried to chase and rescue but could not, but they got the dead body 1 km away
29	10	2004	700	30	F	Injury	She was collecting firewood from the firewood shed when the leopard attacked her and badly injured the neck

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
30	10	2004	1400	30	M	Injury	The victim was with his sheep flock when attacked by a leopard, he was accompanied by four boys who cried and fought with the leopard rescued the victim after he was injured by leopard. The victim was first attacked by throat and then his left arm and hand. He also fought with leopard to get himself free and he managed to do so with the help of other 4 boys
6	11	2004	930	30	F	Death	The victim was collecting fire wood and some vegetable from the forest when the leopard attacked her and dragged her about 0.5km. She was later found dead in the bushes
9	12	2004	1200	26	F	Death	Was collecting firewood in the forest near her house with 15 other ladies when a leopard attacked from back and injured her neck. The leopard ran away after being chased away by people.
26	12	2004	1700	38	M	Injury	Was washing before evening prayers in the Lolab nullah when the leopard attacked him and killed on the spot
-		2004	1400	30	F	Death	The girl during her routing cattle grazing was attacked by the leopard which was hiding in a nearby bush. The victim died on the spot
17	1	2005	1300	35	F	Death	Was killed by leopard at Donewar village, 10kms away from her house when she was returning home from her relative house on the road (Kupwara-Khurhama road).
14	3	2005	1200	27	F	Death	Was attacked by leopard on her neck while collecting fire wood and succumbed to her injury in the spot itself.
21	4	2005	1000	28		Injury	Hajra was collecting firewood in the forest. Leopard was hiding in the spot. When the leopard attacked Hajra, the women accompanying her rescued her
29	12	2005	2100	6	F	Death	Ulfat went out of her home with her father for the purpose of toilet. Leopard attacked her and dragged her. Her father could not find out what had happened because of the severe darkness. She was found the next day dead, with some organs missing, 50 m from the area
19	10	2006	1415	10	M	Injury	Zakir Hussain was playing along with his friends in the agriculture field. The leopard attacked Zakir while the other children ran away. A woman working in a nearby field ran towards the leopard with an axe and succeeded in rescuing Zakir. The lady was also injured in the incident
19	10	2006	1415	38	F	Injury	Saja Begum was working in the field when she heard the noise of a child (Zakir) who was attacked by a leopard. She ran towards the child with an axe in her hand in an attempt to rescue him but was injured in the process
7	11	2006	1535	4	F	Injury	Najma was playing in the orchard of her home while her mother was working. She was attacked by a leopard. Her mother rescued her and shouted for help. Najma lost her right eye permanently in the incident
7	11	2006	1100	13	F	Injury	Sayima was collecting the firewood along with her sister and a few other women. She was attacked by a leopard and was rescued by the other women and her sister who in turn attacked the leopard.
7	11	2006	1500	10	F	Injury	Safeena was working in the field near the house when leopard attacked her. She shouted, her mother and aunt ran towards her and attacked the leopard with stones and rescued her
10	11	2006	1945	4	M	Injury	Raja Adnan was sitting on the verandah of his home. The leopard attacked him from one side of the verandah. Raja Adnan was lifted by the leopard and the next day, his body was found in the forest nearby

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
12	11	2006	1800	6	M	Death	Danish was walking with his maternal aunt towards his maternal home when a leopard attacked him and dragged him towards the forest. He was found dead the next day with some organs missing (eaten by the leopard) in the forest area
16	12	2006	1430	8	M	Death	The boy was following his father through the forest who was there to make coal. On the way the boy was lifted by the leopard. Since the boy was some distance behind and was by himself, the father was not aware that he had been lifted. The body was recovered the next. His whole body had been consumed and only one leg was recovered
28	12	2006	630	10	M	Injury	Farooq Ahmed came out of his home to go to the Masjid. Leopard was sitting on a bundle of grass, Farooq shouted & leopard attacked him, but Farooq's family rescued him
8	1	2007	1500	10	F	Injury	The kids were playing. The leopard came from the forest and lifted the girl from the middle of houses
11	1	2007	2045	11	F	Injury	The kid was lifted in front of the house when she came out along with her 13 yr old brother
12	1	2007	1200	40	F	Injury	Sabia was collecting firewood along with other women. While collecting wood, she came in front of a leopard who was sitting in the bushes. She tried to run away but was attacked from behind. She was rescued by other women who attacked the leopard
13	1	2007	1915	4	F	Injury	The kid came out of her home to receive her father who had come home from the usual work. The leopard was hidden under the open space of the verandah and lifted the kid and fled away. The body was recovered the next day from the forest
14	1	2007	1830	5	M	Injury	Tariq was walking on the road along with his friends towards his home. The leopard lifted him and tried to drag him into the nearby forest. One boy threw angur at the leopard and in the process Tariq fell from his mouth and was rescued
18	1	2007	1200	45	F	Injury	Suddenly the leopard attacked the victim when she was collecting morchella from the forest in Songan/ Jabbar
29	1	2007	1530	67	M	Injury	The leopard was sleeping in the bushes and few children were playing nearby. They saw it and informed the chowkidar about it. When he came to the spot the leopard attacked him and ran away quickly
5	2	2007	2130	4	F	Injury	Ulfat came out of her house followed by her parents to go o a nearby house to sleep. A leopard was sleeping outside their house. Leopard pushed Ulfat with her calves. The parents came running out and the leopard ran away
28	2	2007	1100	35	F	Injury	The victim was collecting morchella from the forest. She was attacked by the leopard. Her cries gathered people and due to this, she was rescued. Later on at 18:00 the leopard was hit by a bullet fired by hunters employed by the government
23	3	2007	1045	9	M	Injury	Javeed was in the agricultural field with his cousin. The leopard attacked him and tried to drag him but Javeed's cousin Attacked the leopard with an axe and rescued him. Leopard ran away in the forest
25	3	2007	1530	35	F	Injury	The victim was washing the clothes at a nallah when she was attacked by a leopard from the front jumping over her hands. But she cried as the houses are very close to the site. People came out with sticks and pelted stones on the animal, then the animal let the victim free. The animal was killed in the same village by people on the same day

D	M	Y	Time	Age	Sex	EOI	Narration of the incident
25	3	2007	1525	20	F	Injury	In this village a leopard attacked three persons one unknown within a time of 15 minutes, first Hameeda when she was working in her agriculture fields along with 4 other girls. Suddenly a leopard pimpled on her but she put hand before the leopard to put her away meanwhile other girls shouted and people came to rescue Hameeda and the leopard left the spot but injured other two persons then was killed by people
25	3	2007	1730	12	M	Injury	Shafiq was playing outside his home when leopard attacked him. His mother coming from outside and his father in home came out and rescued him from leopard
29	3	2007	1000	30	F	Death	Jalla was cutting grass in agricultural field. A leopard was sitting at a distance. It attacked Jalla and killed her. The leopard had eaten her thighs and leg. She was found dead two hours after the incident
7	4	2007	1945	5	F	Injury	Sheema was moving to another house to sleep with her mother. Leopard attacked Sheema and tried to drag her but her mother shouted and other family members came and rescued her
8	4	2007	1330	60	M	Injury	The victim was rearing sheep in his orchard/field and was attacked by the leopard under a Pinus tree. The topography is undulating. Forest ~2 km away but in continuity with the undulating orchard
19	4	2007	1000	26	M	Injury	The victim was returning home from the forest when he was attacked by the leopard. Group of female nearby raised alarm and rescued the man
2	7	2007	1830	9	F	Death	Saiba was going towards the toilet with her father outside his home. Leopard attacked her and dragged her 15 m away towards the forest. She was found dead.
-			1200	18	M	Death	Victim was attacked by the leopard while firewood collection. Other ran away and the victim was found dead after the villagers arrived.

OTHER PUBLICATIONS

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CONSERVATION ACTION SERIES

The sudden increase in human-wild animal conflict in Jammu and Kashmir has caused immense loss to human life and property which has translated into a public outcry.

The government on its part has been concerned and instituted a study conducted jointly by the Wildlife Trust of India and the Department of Wildlife Protection, Jammu and Kashmir.

The purpose of this study was to suggest measures which could be employed to reduce this conflict.

Over 200 victims were interviewed and over a hundred locations visited and inspected.

This report presents the findings of the survey and suggests both short term and long term measures to improve the situation vis-à-vis human-wild animal conflict by addressing issues like human welfare, community participation, infrastructural development and improved capacity.

