

RSG Project Title:

**Mapping of the Human-Leopard Conflict (HLC) Areas and
Community based HLC Mitigation Campaign in Kinnaur
Himalayas, Himachal Pradesh, India.**

Name of RSG Recipient:

Aruna Kumari Negi

RSG Reference Number:

RSG_18.11.09

FINAL REPORT

Submitted by:

Aruna Kumar Negi
1st RSG Recipient
VPO Meeru, Tehsil Nichar
District Kinnaur, Himachal Pradesh, India
Tel. +91 90 23 36 51 04 / Email: **arunameeru@hotmail.com**

Submitted to:

Rufford Small Grant Foundation

19 February 2013

Contents

Acknowledgements	3
Abbreviations Used	4
List of Tables and Maps	5
1.0 Introduction	6
2.0 Objectives	7
3.0 Methodology	7
3.1 Project Area	7
3.2 Survey Methods	8
4.0 Project Activities	8
4.1 Development of Leopard Educational Resource Materials	8
4.2 Human-Leopard Conflict Mitigation Training Workshops.	9
4.3 Human-Leopard Conflict Fact-Finding Survey	12
4.3.1 HLC Fact-Finding Survey in Nichar Tehsil	12
4.3.2 HLC Fact-Finding Survey in Kalpa Tehsil	13
4.3.3 HLC Fact-Finding Survey in Sangla and Rakchham-Chitkul	14
4.3.4 HLC Fact-Finding Survey in Lipa-Asrang WLS and Moorang Tehsil	15
4.4 Human-Leopard Conflict Mitigation Awareness Signage	17
4.5 Leopard Habitat Landscape Mapping Survey	17
4.6 Big Cat (Leopard) Education Awareness Outreach Activities	22

Acknowledgements

This project entitled “*Mapping of the Human-Leopard Conflict (HLC) Areas and Community based HLC Mitigation Campaign in Kinnaur Himalayas, Himachal Pradesh, India*” was conceived by

Aruna Negi during her association with the Conservation Himalayas as a Field Program Officer to identify human-wildlife conflict areas in the foothills of the Himalayas. This conceived idea was put into practice after the project was approved by the Rufford Small Grants in the name of Aruna Negi. Conservation Himalayas thanks to the Rufford Small Grants (RSG) of the Rufford Foundation, London for considering Aruna Negi's application for a 1st RSG to work on the human-leopard conflict issues in the higher mountainous landscapes of the Kinnaur Himalayas. I am grateful to Prof. Charles H. Southwick, University of Colorado, USA, Prof. Mukesh Chalisa, Tribhuvan University, Nepal and Prof. Anil Chhangani, for their kind recommendations to my project. I extend my humble thanks to Jane Raymond, Trust Administrator, Rufford Small Grants for allowing me extension to my project period which I had requested for on the ground of my pregnancy and maternity of my new born baby.

The project was launched with official permission from Mr Khus Dil Singh, Divisional Forest Officer of the Kinnaur district. I am therefore thankful to him for his interest in this leopard project and for granting permission to carry out different activities of this project in all the forest ranges of the Kinnaur Forest Division.

In the Kinnaur region, different activities of this project were conducted with assistance from a number of local people. I am thankful to Ram Kumar Negi, Ranjeet Singh, Smt. Vinod Kumari (*ex-president*, Meeru village, Kinnaur), Jagat Singh Negi (M.L.A, Kinnaur), Ranjeet Negi (*Vice President*, Gram Panchayat, Kalpa), Sanjeev Kumar and Vipin of Kinnaur for extending their assistance at different stages of this project in the difficult terrains of the project area in Kinnaur. At Conservation Himalayas' Chandigarh office, the office assistance by Loukender, Martha, Hira Singh and Love Kumar is gratefully acknowledged. I am especially thankful to Dr Santosh Kumar Sahoo for assisting me at all stage of this project. I am thankful to Conservation Himalayas for helping me to receive the RSG award fund in its FCRA A/c and also for providing support of its USFWS-sponsored project vehicle and other field equipment to work on this project in remote corners of Kinnaur. I also specially thanks to all members of the leopard film making team (Anup, Sohail, Norbu, Ravi and Sanjay) from Mumbai for the field support they provided during my field work in the remote corners of Kinnaur district.

Aruna Kumari Negi
RSG Recipient (RSG 18.11.09)
VPO, Meeru, Tehsil: Nichar
Kinnaur, Himachal Pradesh,



India

Abbreviations Used

A/c	:	Accounts
-----	---	----------

CH	:	Conservation Himalayas
DFO	:	Divisional Forest Officer
EMRC	:	Eklavya Model Residential School
FCRA	:	Foreign Currency Regulation Act
GMS	:	Govt. Middle School
GSSS	:	Govt. Senior Secondary School
HLC	:	Human -Leopard Conflict
HP	:	Himachal Pradesh
M.L.A.	:	Member of Legislative Assembly
RO	:	Range Officer
RSG	:	Rufford Small Grants
USFWS	:	U.S. Fish and Wildlife Service
VPO	:	Village and Post Office
WLS	:	Wildlife Sanctuary

List of Tables and Maps

Map/Table SI No	Title	Page
Map 1	Showing Human-Leopard Conflict locations in the Rufford Small Grant-Supported Leopard Project Sites in Kinnaur District of Himachal Pradesh, India.	8
Table 1	Leopard Conservation Education Resource Materials Developed and Used for Different Audience Groups During the HLC Mitigation Awareness and HLC Fact Finding Survey Programs in Kinnaur District of Himachal Pradesh.	9-10
Table 2	Leopard information as reported by the villagers during a HLC fact-finding meeting at Bari village in Nichar Tehsil, Kinnaur	15
Table 3	Leopard information as reported by the villagers during a HLC fact-finding meeting at Kalpa, Kinnaur	16
Table 4	Leopard information as reported by the villagers during HLC fact finding survey in the Sangla-Chitkul valley in Kinnaur	18
Table 5	Leopard information as reported by the villagers during HLC fact-finding survey in the Rarang-Lipa Asrang WLS areas in Kinnaur.	19
Table 6	Human-Elephant Conflict (HLC) Fact Finding Survey Outputs as reported by the participants of the HLC fact finding meetings in 25 HLC-sensitive sites in Kinnaur district of Himachal Pradesh, India.	21
Table 7	Number of Human Leopard Conflicts (HLC) as Reported by the Local Villagers at 25 HLC-Sensitive Villages in Varied Habitat Types in Kinnaur District of Himachal Pradesh	22
Table 8	Capacity Building Training Activity Initiatives in 5 Selected Human-Leopard Conflict Hotspot Villages	23
Table 9	Number of Human Killings, Human Injuries, and Livestock Killings by the Common Leopard / Snow Leopard Species in the Human-Leopard Conflict (HLC) Hotspots in Kinnaur District of Himachal Pradesh.	23
Table 10	HLC Fact Finding Information as Reported by the Buddhist Monks during one HLC fact-finding and HLC Mitigation awareness education program conducted by Aruna Negi at Shimla.	27

1.0 Introduction

The district of Kinnaur is located in the eastern part of the Indian state of Himachal Pradesh. This district lies between 31° 06' & 32° 06'' North latitude and 77° 45' & 79° 00' East longitude Latitude. Spread in a total geographical area of 6401 sq. km, this district is surrounded by the international border with China (Tibet) in east, Lahaul & Spiti district in the north, Kullu district in the northwest, Shimla district in the southwest and Uttarakhand state in the south. The landscape of Kinnaur district is characterized by rugged mountainous terrains, alpine vegetation dominated by *Cedrus deodara*, snow clad mountains, cold desert landscapes, Satluj water basin, many small water channels and diverse flora and fauna. Common leopard, snow leopard, musk deer, black bear, blue sheep, Himalayan ibex are the main wild taxa distributed throughout its varied elevation from 2345m in the Satluj basin to 6416m. in the higher passes. The human population in Kinnaur is nearly 80 thousands with density of 12 persons per sq. km. The variance of climate is as varied as the area topography. The climatic condition in this area varies from the heat of tropical zone to the freezing temperature in the entire landscapes. A moderate to heavy snow occurs in almost all areas during the winter months which span from November to March every year. In recent years, there have been rising number of big and mini hydropower projects across the Satluj basin and small river channels causing apparently extensive damage to the natural habitats of many wild taxa including the leopards. Large scale drilling, blasting and excavation of the natural mountainous slopes in Kinnaur have seriously been posing threats not only to the existence of many villages but also to the wildlife population in the region.

As reported by some local villagers in Kinnaur, wildlife poaching occurs in many high elevation areas in winter months when snow covers these landscapes forcing many wildlife species to move from higher mountains to areas of lower elevation. The incidents of leopard attacks on the livestock population and human beings occur at many locations with 50 to 60 cases of leopard related attacks occurring during the last three years. The human-leopard conflict (HLC) is gradually increasing at several leopard landscapes in Kinnaur. At the same time, the poaching of wild animals has been a regular practice in many remote high altitude villages where hardly any investigation is conducted to check the status of wildlife poaching and educate the villagers about the adverse effect of poaching on the mountainous ecology.

The continuous decrease in the goat and sheep livestock population in Kinnaur indicates that shepherds face challenges in the open pasture lands on higher hills to protect their livestock herds from the leopard attacks. This is apparent from the point of view of many native Kinnauri shepherds who have left the livestock herding and grazing business following heavy loss they incurred due to frequent leopard attacks on their goats and sheep. This often raises the question why leopards target shepherd's livestock population? and what ground circumstances force the shepherds to stop herding sheep and goats. Another striking factor responsible for the increase in the incidents of human leopard conflict in Kinnaur landscapes is due to the fact that there is no human-wildlife conflict mitigation training and HLC mitigation education program ever conducted in Kinnaur. This ground situation of HLC in Kinnaur stimulated me to develop this project to identify poaching and HLC sensitive areas and mobilise HLC mitigation and anti-poaching campaign among the communities in Kinnaur.

In recent years, the human-leopard conflict (HLC) shows rising trends in the hills of Himachal Pradesh, India. In many high elevation areas in Kinnaur, the HLC situation is becoming a serious issue gradually as the leopards frequently roam around the human

habitation areas creating terror among local communities and forest department. In the last for months, nine villagers have fallen victims of leopard attack. This has further increased the HLC situation in the area. Wildlife poaching, developments, road networking, hydro-electric projects and green felling are some of the key factors affecting ecological health of this zoogeographical mountain region. This project aims at scientific mapping of the HLC sensitive and HLC hotspots in Kinnaur district and generates data on the status of HLC occurrences and wildlife poaching. The Forest Department of the Himachal Pradesh, local communities and migratory shepherds are the main stakeholders of this project. The RSG-sponsored leopard conservation awareness campaign and HLC mitigation initiatives of this project will not only promote community awareness to protect and preserve the Himalayan biodiversity in the Kinnaur region, it will also help the community stakeholders to get scientific feedback to minimize the human-leopard conflict and live in harmony with the wildlife. This initial project helped in developing future strategies for successful community-based leopard conservation as well as site-specific HLC mitigation plans.

2.0 Objectives

1. To identify and map the human-leopard conflict areas in Kinnaur district, Himachal Pradesh, India.
2. To conduct human-leopard conflict fact finding survey in Nichar, Sangla, Kalpa, Moorang and Puh *Tehsils* of Kinnaur.
3. To conduct workshops and training programs on human-leopard conflict mitigation for the communities and forest staff.
4. To prepare big cat conservation education materials including human-leopard conflict mitigation manual for the HLC affected communities in Kinnaur.
5. To mobilize big cat conservation awareness campaign in Kinnaur.

3.0 Methodology

3.1 Project Area

The project activities were carried out in Nichar, Kalpa, Moorang and Sangla and Puh *Tehsils* in Kinnaur district of Himachal Pradesh, India. During this project period, a total of 23 human-leopard conflict (HLC) sites (Map-1) were targeted to ascertain the possibility of occurrences of the HLC with assistance from the local villagers who provided first-hand information about the potential locations where the incidents of leopard attacks on livestock population and human beings had occurred earlier prior to this HLC area mapping instigation. In each HLC survey village, efforts were made to reach out to the families/individuals who had incurred loss of their livestock due to attack by the leopards. In Kalpa, Sangla and Nichar *Tehsils*, some of the high altitude leopard habitat landscapes were surveyed to gather data on the status of the leopard prey species and of the grazing pressure from the local livestock population. In order to have significant data on the human snow leopard conflict, five high altitude locations (Chitkul, Puh, Nako, Sumdo and Chango) were selected for the fact finding survey. In each of these HLC landscapes,

The village head in each of these *tehsils* coordinated with us in arranging HLC fact finding meetings in the village. Despite the rough mountainous terrain in many parts of the project site, the HLC fact finding survey was also carried out in selected high elevations pockets in the Puh *tehsils* where there have been reports of livestock depredation by the snow leopards. The research team of Conservation Himalayas assisted me during the survey activities.



Map 1

Showing Human-Leopard Conflict locations in the Rufford Small Grant-Supported Leopard Project Sites in Kinnaur District of Himachal Pradesh, India

3.2 Survey Methods

The project encompassed the following methods to achieve its target goals:

- i) Mapping of the human leopard conflict areas through a Questionnaire Survey.
- ii) Gathering information pertaining to the human-leopard conflict through HLC fact finding meetings.
- iii) Capacity building training to the villagers and shepherds on the cattle shed designs and on protective methods they need to adopt to keep their livestock safe in the open grazing fields at night. (Efforts were made to provide a few search lights to the local shepherds as HLC mitigation support items).
- iv) Propagating of the HLC mitigation awareness education through a specially prepared HLC mitigation manual.
- v) Human-leopard conflict mitigation training programs for the forest staff and villagers. Collaboration between the local environmental NGOs and forest department on community-led programs that can benefit the leopards and the villagers.
- vi) Women empowerment education on alternate income generation strategies and sustainable livelihood.
- vii) Plant-a-Tree drive motivation training in remote high altitude villages.

4.0 Project Activities

4.1 Development of Leopard Educational Resource Materials

In order to conduct different community-oriented field activities relating to the education on the human-leopard conflict issues, a number of educational resource materials were developed focusing on common leopard and snow leopard species. The leopard educational resource materials were developed in the form of program banners, posters, stickers, placards, booklet folders, education kits and HLC mitigation signage banners. Given below is a list (Table 1) of leopard educational resource materials used on different program events of this project.

Table-1

Leopard Conservation Education Resource Materials Developed and Used for Different Audience Groups during the HLC Mitigation Awareness and HLC Fact Finding Survey Programs in Kinnaur District of Himachal Pradesh.

HLC Resource Material Types	Quantity	Purpose
Common Leopard Program Banner	4	Used during Human-Leopard Conflict (HLC) fact finding meetings and leopard anti-poaching awareness camps with the villagers
Snow Leopard Banner	4	Used during Human-Leopard Conflict (HLC) fact finding meetings and leopard anti-poaching awareness camps with the villagers
HLC Mitigation Folder / Manual	1000	The HLC Mitigation manuals / folders were distributed to the HLC affected villagers with information about the Do's and Don'ts while taking preventive measures to minimize the human leopard conflicts, special designs of cattle shed as a measure to prevent the leopard predation of livestock population and leopard awareness facts.
Leopard Education Awareness Kits	1000	Each leopard education resource kit includes an equal number of leopard education booklet, leopard rakhi, leopard sticker, HLC mitigation manual, leopard mask and leopard education head strap. These resource materials were given to the varied audience groups that included forest staffs, HLC affected communities and students.
HLC Mitigation Signage Banners	3	Three signage hoardings with information on HLC mitigation strategies were installed in Nichar tehsil: one at village Baro, one at village Sungra and one at village Bari. These banners were used as roadside signage hoardings in the HLC sensitive areas for public education on how to reduce conflict with the leopards.



4.2 Human-Leopard Conflict Mitigation Training Workshops

The first phase of the Rufford Small Grant-sponsored leopard project under the leadership of Aruna Kumari Negi was launched in Kinnaur in order to make a preliminary assessment of the present status of the human leopard conflict, to identify the human leopard conflict areas and to reach out to the communities with HLC mitigation education. In order to gather information pertaining to the human-leopard conflict cases in different parts of Kinnaur, two workshops were

conducted in Kinnaur in collaboration with the Kinnaur Forest Division. The first workshop was conducted in the Nichar Forest Range campus with the participation of 20 forest guards and rangers from the Nichar, Sangla and Bhavanagar forest ranges and Chitkul-Karchham wildlife sanctuary. The range officer of the Nichar Forest Range chaired the workshop. The

workshop had two sessions- one focusing on the theme *Knowing the Human-Leopard Conflict* and the second one focusing on the *Protecting Community Livestock from the Depredation by Leopards*.

Ms. Aruna Negi introduced the participants with the topic of Human-Leopard Conflict and gave a brief talk on the human leopard conflict issue with reference to the growing cases of HLC in the Shivalik hills of the Himachal Himalayas. The HLC case reports from the Sangla, Bhavanagar and Nichar ranges and Rakchham-Chitukul wildlife sanctuary were discussed in details to ascertain the HLC trend in these ranges in the last few years. Each participant from each range narrated from his own field experience the HLC related problems of the local communities. Each forest guard was asked to fill in one HLC occurrence checklist which contains ten questions pertaining to the occurrences of leopard population, HLC incidences during the last five years, HLC management by the local forest department and community-based wildlife protection activities. This checklist data served the purpose of extracting the reported incidences of HLC which was later verified by making a site survey by the project team in each range.

The second session was taken by Dr Santosh Sahoo, Chairman, *Conservation Himalayas*. In his presentation, Dr Sahoo highlighted the issue of habitat loss and biotic pressure as the prime factor leading to the population fragmentation of the leopard species and prey base loss in the Kinnaur Himalayan landscapes. The poaching factor was also associated with this explanation on how poaching of wild animals mainly of leopard's prey base by the local communities gradually endanger the life of the leopards in their natural habitats forcing them to either migrate to another prey-base rich habitat or compete with the existing degraded habitat by adopting alternate predation on livestock population. On this line of presentation, the participants were encouraged to interact with Dr Sahoo and share with him the experience they had in their working areas in the high altitude landscapes. One participant from the Rakchham-Chitukul wildlife sanctuary and one from the Nichar range explained to the audience about their experience of handling a few cases of leopard predation on the domestic sheep in the high altitude makeshift cattle shelter (locally called *Khud*). According to what they explained it was clear that in Nichar Range the species usually involved in the cattle depredation was Common Leopard (*Panthera pardus*) while in the Rakchham-Chitukul wildlife region, the cattle depredation was presumed to be caused by the snow leopard (*Uncia uncia*). Since it was a discussion point to understand possible population distribution of the leopard species in the Kinnaur region, Dr Sahoo gave a description about the population distribution and feeding behavioral habits of the common leopards and the least studied snow leopard in the Kinnaur Himalayan region.

A part of this session concentrated on the mapping of the leopard area and the human-leopard conflict locations on a piece of paper. This session was named as the Sketch-the-HLC-Map session. The forest guards made separate groups with each group representing the range they work for and plotted the locations of the HLC and the leopard population distribution on the map drawn by them to show the range and its topographic features. One person from each group presented the group activity of HLC mapping to the audience.

The next session was on the theme *Protecting Livestock Population from Leopard Predation*. It was an interactive session with each range participants trying to suggest strategies as could be applicable under the topographic condition of the landscape of the HLC areas. Dr Sahoo suggested some HLC mitigation tips of the HLC mitigation applicable under the high altitude habitats of leopards. All the participants received HLC mitigation manual



developed by the Conservation Himalayas in consultation with Aruna Negi. At the end of the workshop, Aruna Negi distributed leopard educational resource materials to each participant.

The second HLC workshop was conducted in the office of the Divisional Forest Officer at Reckong Peo, Kinnaur. A total of 35 forest guards and rangers representing Lipa-Asrang Wildlife Sanctuary, Moorang, Puh and Kalpa forest ranges of the Kinnaur Forest

Division participated in this one day workshop. Aruna Negi and Dr Sahoo coordinated all the four sessions of this workshop. In the first session, Aruna Negi introduced the audience with an illustrative model describing the impact of anthropogenic influence on the natural habitats of the leopards and its repercussion on both the humans and the leopard species. Added to it, a description of the RSG project on the mapping of the human leopard conflict was given to the audience by Aruna Negi, while Dr Sahoo gave an introductory presentation on the origin of Aruna Negi's leopard project in Kinnaur and its need for the development of a long-term conservation plan to protect the high altitude habitat of the species and develop effective community education on the scientific management of the livestock population in the leopard range landscapes of the high mountains.

In the second session, Dr Sahoo taught the audience on the theme 'Prey base and Habitat Protection as a long term solution to HLC issue'. Explaining the concept of biodiversity in a simple lay man language, Dr Sahoo linked the HLC issue to the growing biotic pressure on the natural landscapes of the Himalayan Mountains. The audience group from the Lipa-Asrang wildlife sanctuary participated in a question-answer hour on the HLC issue around the Lipa Asrang wildlife sanctuary. The field staff of the Lipa-Asrang WLS admitted the fact that poor scientific management and least use of the scientific tools by the government agency to investigate the poaching and other human induced activities in the natural habitats of both the *Panthera pardus* and *Uncia uncia* species have caused proportionately high rate of loss to their wild habitats to the extent that a considerable scientific planning along with a community-based orientation is needed to protect the existing floral and faunal resources.

All the participants agreed to this notion with little apprehension over the community-based approach to safeguard the leopard habitats. According to them, the hill communities in Kinnaur follow traditional rules as determined and regulated by their local deities. So any scientific planning of habitat and species management in the local areas though a community support must go through a rigorous community opposition on the ground of the community need for encroached land area for sustainable agriculture and horticulture. This is truly a trend in Himachal Pradesh in recent times as in many high altitude landscapes villagers do commercial farming in the encroached forest land on the high mountain alpine ridges. This has caused gradual disappearance of a variety of leopard's prey base including the Himalayan musk deer (*Moschus chrysogaster*), Himalayan thar (*Hemitragus jemlahicus*) and a variety of pheasant species.

In the next session, the participants made four groups representing Puh, Kalpa Moorang and Lipa-Asrang wildlife sanctuaries. Each group did an assigned task of drawing sketch maps of

their respective range and plotting possible human-leopard conflict interface zones. One participant from each group illustrated the HLC sketch map. These maps are being used as reference maps for the subsequent HLC habitat mapping survey in the buffers of all the forest ranges and wildlife sanctuaries in Kinnaur. In the last session, Aruna Negi distributed HLC mitigation manuals and other leopard conservation educational resource materials to all the participants.

4.3 Human-Leopard Conflict Fact- Finding Survey

Many parts of the Kinnaur Himalayan mountainous landscapes were surveyed by Aruna Negi and her team with a view to i) gather information from the local villagers about the leopard related conflicts, ii) make direct observation of the habitat types, vegetation distribution, wild prey base status, poaching trend and natural and human-designed landscape pattern, and iii) conduct human-leopard conflict fact-finding meetings with the local communities. In the first fact finding trip, Aruna Negi and her team visited selected locations in Nichar, Moorang, Kalpa, Rakchham-Chitkul

4.3.1 HLC Fact-Finding Survey in Nichar Tehsil: With support from the Conservation Himalayas, Aruna Negi visited Bari, Baro, Sungra and Ponda villages to interact with the local villagers to understand the status of their stake on the issue of leopard related attacks on the livestock population and human beings in their villages. At Baro the villagers gathered to attend the fact- finding meeting and to share their personal experience with the leopard related conflicts. Aruna Negi and Dr Sahoo led the meeting session with the main objective to gather information about the leopards in the local habitats. Two locations in this region were reportedly having leopard terror due to recent killing of three men due to leopard attacks in Bari, Sungra and Panvi villages in Nichar Tehsil. Aruna Negi made her intension clear to the villagers that the information shared by the villagers will be kept confidential in the light of the apprehension by the villagers that their information about the killings of three leopards at the Baro village might lead to investigation and subsequent legal indictment against them.

Aruna Kumari started the session with a brief introduction on the ecological value of carnivores in a wild habitat and the threats that surround the leopards from human activities. Example of Food Chain system was explained through a simple game activity by the local children who came to participate in the fact finding meeting. The children followed the game guidelines as explained by Aruna Negi in the local language. 7 children volunteered to participate in the game activity through which the villagers were made aware of the significance of the leopard species in the rugged mountain habitats where the herbivores share the same niche the leopards share for a competitive survival. The information as given by the villagers is listed below in Table-2. Later Aruna Negi distributed leopard education resource materials to the villagers. Each villager was given a HLC mitigation manual for ready reference to follow the instructions to protect their own lives and the life of livestock from the attack of leopards. Aruna Negi suggested the villagers to build completely enclosed and strong cattle sheds with protective wooden entry gate. A light posting at the entry gate of the cattle shed was recommended if the area is connected with the power supply. Most of the villagers who attended this workshop have their cattle sheds near to their living houses. To accommodate large herds of cattle some villagers have cattle sheds built at a solitary location on the hills far away from the main village. The leopards usually target such cattle sheds and kill the livestock on many occasions.

The villagers appreciated the suggestions for strong cattle sheds and appealed to Aruna Negi to come out with a capacity building support to the poor shepherds for renovating cattle sheds with seed money to buy the recommended items.

Table-2

Leopard information as reported by the villagers during a HLC fact-finding meeting at Bari village in Nichar Tehsil, Kinnaur

Leopard Locations	Sighting	Number of times Leopards (2008-2010)	Types of Reported HLC cases (2008-2010)	Leopard Species* Sighted /involved in HLC	Remarks (HLC since 2008)
Bari (lower slope)		8	Livestock killing	CI	Local shepherds report of livestock killing possibly by the snow leopard on the snowline hill top pasture land and surrounding snowbound hinterlands. Scientific Investigation needed to ascertain if this report confirms the presence of snow leopard in this area.
Bari (upper slope)		4	Livestock killing	CI	
Sungra		3	Two kids killed by leopards	CI	
Nichar		11	one child killed by leopards	CI	
Panvi		12	One man killed by leopards and Livestock killing	CI	
Terenda		5	Livestock killing	CI	
Ponda		2	Livestock killing	CI	
Meeru		6	Livestock killing	CI	
Chagaon		2	Livestock killing	CI	
Yulla		9	Livestock killing	CI	

* CI = Common leopard (*Panthera pardus fusca*)

4.3.2 HLC Fact-Finding Survey in Kalpa Tehsil: Located at an altitude of 2500m.a.s.l. in the western Himalayan sector in Kinnaur district of Himachal Pradesh, Kalpa is surrounded by high snow clad mountains and dense pine vegetation up to the snow line areas. As reported by the local people of Kalpa, there is a good leopard population in Kalpa region because of rocky mountain habitat suitable for the common leopards to live. During winter months, leopards in this part of Kinnaur are frequently seen near the village peripheries during early morning and evening hours. Incidents of livestock depredation by the leopards occur frequently during the winter months between November and March when the area receives moderate to heavy snow depending on the condition of winter precipitation. The leopards move from the high altitude forest landscapes down to the human habitation areas around Kalpa and remain active in killing livestock and even domestic dogs.

Aruna Negi visited Kalpa and conducted one fact finding meeting with two local *Panchayat* leaders and 25 villagers on the issue of human leopard conflict in and around the Kalpa Tehsil. Dr Sahoo and Aruna Negi conducted the meeting sessions while Mr. Ramu Negi of the local temple coordinated on behalf of both the Conservation Himalayas and the local representatives. Dr Sahoo gave a detail explanation about Aruna Negi's RSG-sponsored Kinnaur leopard project with description of each objective of this project with regard to the mapping of the Human Leopard Conflict Areas. The villagers narrated some of the old and recent cases of leopard attacks on human beings and livestock in Kalpa.

One senior participant recalled his past when he had encountered with one common leopard while he was talking drunk on a hill track at night. It was a thrilling experience for him as he had no option to escape from the leopard attack right on the track. He used his little presence of mind by screaming aloud repeatedly. This screaming scared the leopard to run away in another direction by scratching his back. Some other participants worship leopards and consider this species as an important creature that their local goddess accepts as the symbol of power and strength. Because of this myth, the local people have never thought that there is any conflict with the leopards although hundreds of livestock population fall victim of deadly attack by leopards in Kalpa. The following table shows the leopard related information as given by the participants (see Table 3).

Based on this fact-finding information from the local villagers on leopard issues, Aruna Negi works out with Dr Sahoo a habitat survey plan in different parts of Kalpa hills to confirm the fact finding report by the villagers on the HLC and other related information on the livestock depredation. At the final part of the program, Aruna Negi distributed the leopard educational resource materials including a HLC manual.

Table-3
Leopard information as reported by the villagers during a HLC fact-finding meeting at Kalpa, Kinnaur

Leopard Locations Kalpa	Sighting around	Number of times Leopards (2008-2010)	Types of Reported HLC cases (2008-2010)	Leopard Species* Sighted /involved in HLC	Remarks (HLC since 2008)
Kalpa		9	Livestock killing	CI	The HLC fact finding meeting attendees report of the HLC cases from adjoining villages around Kalpa and never consider that the snow leopard has ever attacked their livestock.
Duni		6	Livestock killing	CI	
Chungling (Kothi)		3	Dog killing	CI	
Roghi		15	Livestock killing	CI	
Roonang		12	Livestock killing	CI	
Pangi		7	Livestock killing	CI	
Purvani		3	Livestock killing	CI	
Powari		4	Dog killing	CI	
Yuarangi		7	Livestock killing	CI	
Ralli Mewar		3	Dog killing	CI	
Barang		5	Dog killing	CI	

* CI = Common leopard (*Panthera pardus fusca*)

4.3.3 HLC Fact-Finding Survey in Sangla and Rakchham-Chitkul: The Sangla, Rakchham and Chitkul sectors of the Kinnaur Himalayas are important because of the mountain valley dividing the Sangla-Rakchham-Chitkul valley from the Kinnaur Kailash high range bordering with the Tibet. The leopard species distribution in this southern sector of Kinnaur Himalayas is sparse with the *Panthera pardus fusca* population occupying the down valley habitats and the *Uncia uncia* population has reportedly a very thin distribution along the higher elevation ranges in the Rakchham-Chitkul wildlife sanctuary. The snow leopards come down to the lower elevations during the winter months, while in the summer months this species remains in the higher elevation rugged mountain ranges beyond 4500m and above. The HLC fact finding trip to this remote part of Kinnaur was aimed at gathering relevant information about the human-leopard interfacing reports from the local forest department staff, villagers and shepherds. The 28-Km long stretch from Sangla to the Chitkul valley was surveyed to identify the locations of HLC based on the verbal report by the local

villagers who were interviewed in an informal interaction. The status of the human-leopard conflict was assessed by using a short Habitat Profile Checklist (HPC) developed by Conservation Himalayas in consultation with Aruna Negi. The HPC includes pertaining questions on livestock depredation incidents, frequency of leopard sightings, leopard population status, people's perception on livestock killing by leopards, leopard conservation activities by the HP forest department and other national and international NGOs.

This part of the work is in progress using a 'Leopard Information Appraisal Questionnaire'. Table-4 shows first-hand information about the human leopard conflict in areas from the Sangla up to the Chitkul village. Seven locations in the Sangla-Chitkul stretch were selected for this information. The GPS data were taken from each survey site in order to prepare a HLC map and develop conservation and management plan to increase leopard prey base status in human-leopard conflict sensitive landscapes. Aruna Negi made an intensive survey of this remote areas and made efforts to establish a community link network for her future plan for a community-based habitat protection and HLC mitigation campaign among the stakeholders in all the leopard range villages in Kinnaur.

Table-4
Leopard information as reported by the villagers during HLC fact finding survey in the Sangla-Chitkul valley in Kinnaur

Leopard Locations	Sighting	Number of times Leopards (2008-2010)	Types of Reported HLC cases (2008-2010)	Leopard Species* Sighted /involved in HLC	Remarks (HLC since 2008)
Sangla		13	Livestock killing	CI	The shepherds in Chitkul report of the presence of Snow Leopard in the Rakchham-Chitkul WLS. Most of the HLC cases in this region occur with the sheep herds in their remote grazing locations on the mountain pastures.
Badseri		4	Livestock killing	CI	
Rakchham		7	Livestock killing	CI	
Chitkul (lower valley)		8	Livestock killing	CI	
Chitkul (upper valley)		3	Livestock killing	SI	
Kamru		4	Livestock killing	CI	
Chhasu		6	Livestock killing	CI	

* CI = Common leopard (*Panthera pardus fusca*), SI = Snow leopard

4.3.4 HLC Fact-Finding Survey in Lipa-Asrang WLS and Moorang Tehsil: The Lipa-Asrang Wildlife Sanctuary is located in the north-western sector of the Kinnaur Himalayas having its geographical area spread in about 3100 hectare of forested and barren Rocky Mountains with its elevation varying between 4000 and 5200 m.a.s.l. The inhospitable landscape of this WLS is the home of a variety of Himalayan wildlife including Himalayan Black Bear, Himalayan thar, Bharal, Gorals and a variety of pheasant species.

This area has also reported occurrences of both the common and snow leopard species. To date, there is little available data on the population status of both the snow leopard and common leopard because of the difficult terrain system that deters to make proper survey of the population ecology and feeding behaviour of these leopard species in the Lipa-Asrang WLS. Aruna Negi could not enter into this tough geographical landscape due to her new born baby, Prince Lee Caleb who was also with Aruna Negi up to Rarang, a village nearly 25 km

behind Asrang station. On way to Rarang Aruna Negi conducted a GPS survey of many areas in Moorang Tehsil. Aruna Negi conducted HLC fact finding meeting at Moorang for leopard related information from the tribal women. At Rarang, one HLC fact-finding was conducted with a hospitable support from the *Mahila Mandal* (all women's groups) and the Rarang Gram Panchayat,

The *Panchayat Pradhan*, *Mahila Mandal* members and villagers participated in the HLC fact-finding meeting at Rarang Buddhist Monastery. Dr Sahoo briefed the participants about the objectives of Aruna Negi's RSG project on the HLC area mapping and HLC mitigation education. The villagers narrated their experience with leopards and other wild animals. They voiced their concern over the threats from the wild animals including leopards. According to them, their domestic animals are sometimes attacked by leopards. Some of the sheep herders targeted snow leopard as the main attacker on their sheep herds on the high mountain pasture landscapes where they use to go with their herds during summer months. Few instances of leopard attack on the domestic cows and goats were explained by some women while other women highlighted monkey crop depredation over the issue of leopard predation on livestock in Rarang.

Table-5
Leopard information as reported by the villagers during HLC fact-finding survey in the Rarang-Lipa Asrang WLS areas in Kinnaur.

Leopard Sighting Locations	Number of times Leopards (2008-2010)	Causes of Human Leopard Conflict (2008-2010)	Leopard Species* Sighted /involved in HLC	Other wild animals in conflict with the villagers	Remarks (HLC since 2008)
Rarang	13	Livestock killing	CI	Rhesus Monkey	Within the Lipa-Asrang WLS, there is good Livestock population, and the loss of the leopard prey base is rapid due to poaching. Leopard habitat in this WLS is at high risk increasing the chance of HLC.
Aakpa	4	Livestock killing	CI	Rhesus Monkey	
Lipa	7	Livestock killing	CI	Himalayan Bear and Rhesus Monkey	
Asrang	8	Livestock killing	SI and CI	Himalayan Bear and Rhesus Monkey	
Jhangi	3	Livestock killing	CI	Rhesus Monkey	

* CI = Common leopard (*Panthera pardus fusca*), SI = Snow leopard (*Uncia uncia*)

The *Panchayat Pradhan* of Rarang village and two women leaders gave information (see Table 5) about the past and recent cases of leopard sighting, livestock depredation, dangers from wildlife, leopard attacks on human beings, cattle loss compensation due to leopard predation, etc. The HLC reports from adjoining remote inaccessible villages were collected from some women who are familiar with those remote high altitude villages. In the last part of the meeting, Aruna Negi distributed leopard educational materials to the participants. HLC mitigation manual folders were distributed after the *Panchayat Pradhan* explained in the local tribal language the tips for the villagers to follow in order to protect their livestock from the leopard attacks. Aruna Negi suggested the villagers to modify their cattle shed design with strong leopard deterrent locking system so that the leopards may find it hard to break open the cattle shed and do any killing of the livestock. Aruna Negi visited the remote Asrang village and conducted one HLC fact finding meeting with the local residents. Although this group responded positively and gave information about the occurrences of leopard attack on

their livestock population, they apparently preferred to draw her attention towards their demand for the shifting of the boundary of the Lipa-Asrang Wildlife Sanctuary at least 10 km. ahead of its current boundary along the Asrang village. They further demanded that the forest department should increase compensation amount for the loss of their livestock due to leopard attack. As they refused to know anything on the HLC mitigation topic, Aruna Negi distributed the leopard kits to them and assured them to that she will make all possible effort to bring their demands to the knowledge of the HP forest department in due course of time.

4.4 Human-Leopard Conflict Mitigation Awareness Signage

Signage hoarding is a powerful medium to alert the villagers about the impending dangers from the leopard attacks. It is also a source that provides instant information on how one should escape and protect the livestock from the leopard attacks in the leopard ranging areas. Nichar is one of the HLC-sensitive hotspots in Kinnaur, and it is pertinent that everybody who is either a permanent resident of Nichar or is a temporary visitor to Nichar, must know that it is a land of leopards and in the evening hours, the possibility of leopard sightings increases at few locations on the main road connecting Nichar with the Bhavanagar downtown. After intensive HLC fact finding habitat surveys and meetings with the local villagers, the demand for signage hoardings on the HLC mitigation tips came from the villagers and finally three HLC mitigation signage hoardings were installed on the roadside of Baro village in Nichar. Few other same signage hoardings are also being planned for installation in other HLC sensitive hotspots in Kinnaur.

4.5 Leopard Habitat Landscape Mapping Survey

Aruna Kumari made an extensive survey in the Moorang, Nichar, Sangla Puh and Kalpa tehsils of the Kinnaur district covering nearly 2200 km² along with the Mumbai leopard filming team members. Dr Sahoo of the Conservation Himalayas led the group to the locations reportedly identified earlier as the HLC sensitive hotspots by the forest staff during two RSG-sponsored HLC Mitigation workshops which Aruna Negi conducted at the DFO office in Reckong Peo and at Nichar Forest Rest House. During this habitat survey, Aruna Negi visited 27 selected sites which were identified as the HLC sensitive pockets in Kinnaur. During this survey, two activities were conducted. The habitat profile data of the HLC sensitive areas were collected besides collecting additional supportive data regarding the HLC issue from the local villagers (see Tables 6, 7 and 8). In the second activity, some capacity building supportive items like Halogen Torch and Shoes) were distributed to the Panchayat Pradhan of a selected HLC sensitive villages (see Table 9).

Table-6

Human-Elephant Conflict (HLC) Fact Finding Survey Outputs as reported by the participants of the HLC fact finding meetings in 25 HLC-sensitive sites in Kinnaur district of Himachal Pradesh, India.

HLC Fact-Finding Survey Sites in Kinnaur	Participants / Informants for the HLC Fact Finding information	HLC Fact Finding Outputs
Chango	Local residents	Local resident's complaint of regular incidents of cattle depredation by the snow leopards.
Sumdo	Local Panchayat Pradhan	Snow Leopard sighting occurs occasionally during the winter months

Puh	Village Communities	Few cases of snow leopard attack on the livestock population reported
Khab	Local Panchayat Leader	Local shepherds report of the occasional sightings of snow leopard
Nako	Local residents	The livestock population is often predated upon by the snow leopards
Asrang	Local residents	Villagers demand for shifting of reserve forest status to areas beyond 5 km from the human habitation at Asrang. Poaching threats to leopards and their prey species prevail from the villagers who have no concern for the wildlife conservation.
Ropa	Local Apple Growers	Common leopards are sighted on many occasions
Lippa	Panchayat Pradhan	Cattle depredation cases occur every year during winter season
Kanam	Village communities	Migratory Shepherds often report of some cases of cattle depredation by the common leopard. Villagers have no complaint regarding HLC.
Rarang	Mahila Mandal	Common Leopards often attack local livestock during the snow time.
Pangi	Local villagers	Village farm house cattle shed are often attacked by common leopard every year. Many villagers bear the economic loss due to this HLC
Moorang	Village elder	HLC occurs sometimes but the villagers take little interest in it because of their ignorance on the issue of human-wildlife conflict.
Reckong Peo	NGO leaders and Forest Guards	Leopards cause damage to the livestock population at several locations in Kinnaur but no HLC data is being documented for future course of action.
Kalpa	Village communities	Common leopard sightings are frequent in Kalpa region particularly after heavy snow falls on higher hills. Multiple cases of livestock depredation are reported from Kalpa as reported by the villagers.
Meeru	Local Shepherds and villagers	Ignorance and poor cattle shed conditions in this remote village often lead to cattle loss due to common leopard attack during winter months. As many as 35 sheep were killed in one HLC case as reported by the villagers.
Brua	Village Head	One case of leopard attack-on-human occurred in 2011. There is little awareness among the villagers on how to get protection from the leopards.
Urni	Village Gram Pradhan	Villagers believe that the local forest dept has released a number of wild common leopards in their areas as a result of which their cattle shed are targeted by the leopards for predation.
Chagaon	Village Gram Pradhan	Two cows were killed by the leopards in 2010 and one herd consisting of 45 sheep was completely killed by leopards in 2009. Such incidents of HLC occur frequently in winter months.
Bari	Villagers and forest guards	HLC occurs as common leopards often attack upon the livestock in this region. Villagers have negative attitude towards the leopards. Three common leopards were poisoned to death and buried in 2010 without the knowledge of the forest department.

Sungra	Forest Beat Guards	Leopards prowl in this area mainly in winter months. People live in fear of the leopard attack during the evening and night time. HLC occurs during winter months.
Nichar and Panwee	Village political Leader	Common leopard sighting occurs in Nichar and Panwee areas during winter and rainy seasons. Some instances of leopard attacks on humans were reported from this area.
Sangla	Village Panchayat Pradhan	The HLC occurs in the upper Sangla belt with rare case of common leopard related cattle depredation at some locations.
Batseri	Local Shepherds	Common leopards are often seen in the outskirts of Batseri village as this village is surrounded by a dense pine forest and snow clad high mountains. Three cases of leopard attack on the sheep herds were reported during 2011-2012.
Chitkul	Local Shepherds	Winter snow time is an ideal period for the sighting of snow leopard in this remote region of Kinnaur. Occasionally, HLC cases occur during this period.
Roonang	Local villagers	HLC occurs during winter months. Livestock population is the main target of the leopards
Ralli	Local Shepherds	Winter snow time is an ideal period for the sighting of snow leopard in this remote region of Kinnaur. Occasionally, HLC cases occur during this period.
Roonang	Local villagers	HLC occurs during winter months. Livestock population is the main target of the leopards

HLC= Human-Leopard attack; CL= Common Leopard; SL= Snow Leopard; ** HLC Photo Available;

Table 7

Number of Human Leopard Conflicts (HLC) as Reported by the Local Villagers at 25 HLC-Sensitive Villages in Varied Habitat Types in Kinnaur District of Himachal Pradesh.

HLC Sites	Big Cat Species Occurrence	Altitude	Habitat Type	Number of HLC Cases during 2009-2012
Chango*	SL	2854m.	Cold Desert / Alpine Pastures	4 attacks on Sheep herds
Sumdo	SL	2550m.	Cold Desert / Alpine Pastures	2 attacks on Sheep herds
Puh		2440m.	Alpine Scrub	2 attacks on humans and 1 on Sheep herds
Khab	SL	2434m.	Cold Desert	1 attack on sheep herd
Nako	SL	2544m.	Cold Desert	3 attacks on local livestock
Asrang	CL and SL	2306m.	Dry Alpine Scrub	2 attacks on livestock and on the sheep herd
Ropa	CL	1875m.	Alpine Forest Dry, Himalayan Temperate Forest	1 fatal attack on a local villager

Lippa	CL	2167m.	Alpine Forest Dry Himalayan Temperate Forest	2 attacks on livestock
Kanam	CL	2034m.	Alpine Forest Dry Himalayan Temperate Forest	1 attack on livestock
Rarang	CL	2212m.	Alpine Forest	2 attacks on livestock
Pangi	CL	2175m.	Alpine Forest	2 attacks on livestock
Moorang	CL	2355m.	Coniferous Forests	1 attack on sheep herd
Reckong Peo*	CL	2215m.	Coniferous Forest	3 attacks on cows
Kalpa*	CL	2480m.	Coniferous Forest	1 attack on human and 3 on livestock
Meeru*	CL	2355m.	Dry Alpine Scrub and Coniferous Forest	1 attack on sheep shed killing 35 sheep
Brua	CL	2100m.	Coniferous Forest	1 attack on human
Urni	CL	2145m.	Dry Alpine Scrub and Coniferous Forest	1 attack on human
Chagaon	CL	1988m.	Dry Alpine Scrub and Coniferous Forest	No data available
Bari*	CL	2312m.	Coniferous Forest	5 attacks on sheep herds and 5 on humans
Sungra	CL	2189m.	Coniferous Forest	2 attacks on humans and one on livestock
Nichar and Panwee*	CL	2290m.	Coniferous Forest	One fatal attack on J Payee hydel project laborer**
Ralli	CL	2124m.	Coniferous Forest	2 attacks on livestock sheds
Barang	CL	2350	Coniferous Forest	3 attacks on humans and 3 on cow sheds
Sangla	CL	2356m.	Alpine Forest Dry Himalayan Temperate Forest	1 attack on the sheep herd
Batseri	CL	2445m.	Dry Alpine Scrub and Coniferous Forest	5 attacks on sheep herds and 1 on the local livestock
Chitkul	SL	2545m.	Dry Alpine Scrub and Coniferous Forest	2 attacks on sheep herds
Roonang	CL and SL	2630m.	Dry Alpine Scrub and Coniferous Forest	3 attacks on local livestock

*HLC Hotspots

Table-8
Capacity Building Training Activity Initiatives in 5 Selected Human-Leopard Conflict Hotspot Villages

HLC Hotspot Villages in Kinnaur	Type of HLC Mitigation Education	Capacity Building Items Given
Meeru	HLC mitigation Capacity Building Education	5 Halogen Torches
Kalpa	HLC mitigation Capacity Building Education	5 Halogen Torches and 5 Shoes
Nichar and Panwee	HLC Mitigation Training for Local Rangers and Villagers	HLC Mitigation Education Signage Board in Public Interest and 6 Halogen Torches
Reckong Peo	HLC Mitigation Training for Local Rangers and Villagers	5 Halogen Torches in local Kothi Village
Moorang	HLC Mitigation Awareness Education	3 Halogen Torches
Bari	HLC mitigation Capacity Building Education	2 Halogen Torches
Chango	HLC mitigation Capacity Building Awareness Program	3 Halogen Torches 5 Shoes

Table-9
Number of Human killings, Human Injuries, and Livestock Killings by the Common Leopard / Snow Leopard Species in the Human-Leopard Conflict (HLC) Hotspots in Kinnaur District of Himachal Pradesh.

HLC Hotspot Villages in Kinnaur	Number of Livestock lost due to Leopard Attacks During 2009-2012	Number of Human Killings Due to Leopard Attack During 2009-2012	Number of Human Injuries Caused by Leopard Attack During 2009-2012
Meeru	Cow=3; Sheep=44	NIL	2
Kalpa	Cow=5; 24	NIL	3
Nichar and Panwee	Sheep= 7	1 Migrant Labourer of the Jaypee Hydel Project*	4
Reckong Peo	Sheep=11	NIL	NIL
Moorang	Sheep=34; Cow= 5		
Bari	Cow= 11; Heard of 60 Sheep	5 local villagers	4
Chango	Herd of 30 Sheep	--	--

* Photo of the human kill of the man eater leopard is available

4.6 Big Cat (Leopard) Education Awareness Outreach Activities

One important objective of this project is to conduct leopard conservation education and human-Leopard conflict mitigation awareness programs for students, villagers and HLC-affected communities living in and around the leopard ranging landscapes. In each HLC fact finding meeting the communities was given big cat awareness education and also about the causes and mitigation strategies of the human leopard conflict in areas of human habitation.

Three separate Big Cat Awareness programs were conducted in Nichar and Kalpa Tehsil. At Kalpa, the leopard education awareness was conducted in the government senior secondary school. About 100 students from 6th to 12th grade participated in this program. Dr. Sahoo, Chairman, Conservation Himalayas conducted the first half of this program on the theme '*Leopard Habitat in Danger*' while Aruna Negi conducted two sessions on the theme '*Reducing Human Leopard Conflict: Common Tips*'. In his presentation Dr Sahoo taught the leopard basics- big cat family, Big cats in India, Big cats of the Himalayas, Threats to big cats in India, and Conservation priority on the natural habitat restoration and community based approach to reduce local human leopard conflicts. A few students participated in two game activities on the '*Leopard Habitat-in-Danger*'. Aruna Negi conducted these two game activities through which the audience got the message on how the ceaseless logging and mountain blasting damage to the fragile mountain habitats of leopards and their potential prey base and *how* conservation education motivates communities to raise voice against such developments on the mountains and collectively coordinate with the local administration for a sustainable developmental plan to restore the natural resources for the future generation.

In an interactive session Aruna Negi asked several questions on the concept of ecology, biodiversity, food chain system, pressure of human dependency on forest resources, human-wildlife conflict with specific reference to the HLC, role of school eco-clubs for big cat conservation, and on local strategies for mitigation of human-wildlife conflict. The students showed their keen interest to respond to the questions by Aruna Negi who later gave satisfactory answer to each question. Some of the students asked questions on the value of snow leopards in ecology when this species lives in remote inaccessible Himalayan landscape where there is no human habitation. Aruna Negi offered the leopard education kit and HLC mitigation manual to the participants who actively answered the questions. At the end of the program, Aruna Negi distributed leopard educational resource materials to each participant and also to all the teachers who participated in this program.

Aruna Negi closed this program with a pledge taking session with all the students and teachers. The students took a pledge to make practical effort to plant more trees in their villages so as to reduce pressure on the reserve protected forests. The second leopard conservation awareness program was conducted in the middle school at Sungra in Nichar. All the students from 5th to 8th standard and teachers participated in the program. The theme of this program was "Learn about Leopards." 75 students participated in this program. Aruna Negi conducted the program activities- basics about big cats, habitats of big cats, ecology of big cats, feeding behavior of leopards, leopard population in Kinnaur district, villager's conflict with leopards, leopard attack of children and site specific tips to escape leopard attacks. Some of the children narrated their experience when they had come across leopards in the Nichar areas. For them encounter with leopard is not common in Nichar because leopards are sometimes seen near Sungra and Bari village during the winter months when the top hill slopes remain covered with a thick blanket of snow. However, these children were seemingly ignorant why the leopards leave their natural habitats and remain in the periphery of the human habitation in the villages.

Aruna Negi explained the basics of wildlife ecology through examples of snow leopard habitat and the feeding ecology in the high mountain rugged slopes. Talking on the snow leopard, Aruna Negi focused on the bad side of the snow leopard's natural food which is losing its abundance due to biotic pressure of grazing by the sheep herds and poaching of its natural prey base by the villagers and shepherds on many occasions. The children were taught about the differences between the snow leopard and common leopard and their population distribution, feeding ecology, threats to their habitat and human-leopard conflict. Each student received educational materials prepared by Aruna Negi on both the snow leopard and common leopard. Some students took a pledge with Aruna Negi that they will keep educating others about leopards and other wildlife and do no harm to the wild animals and to their natural habitats.

The children of the Eklavya Model Residential School (EMRC) at Nichar in Kinnaur participated in one leopard conservation education program organized and conducted by Aruna Negi and Dr Sahoo. All the resident children of the EMRC participated in the program. The Principal of the school introduced the students with the RSG-sponsored leopard project of Aruna Negi and gave a brief talk on the man-made threats to the Himalayan wildlife in the Kinnaur region. Citing the example of environmental impact of the growing number of hydroelectric power projects on the course of Satluj River in Kinnaur, the EMRC principal cautioned that the wildlife habitats in the Kinnaur will certainly be damaged extensively if the mountain range around the River Satluj is left without any scientific management of its ecology, vegetation and wild habitats.

One session on the leopard HLC issue was taken by Dr Sahoo who made his presentation in a simple language. There was a question-answer session during which the students were allowed to ask any question on the issue of Human Leopard Conflict. Dr Sahoo and Aruna Negi answered to the questions through illustrations and examples. The last session of the program was conducted by Aruna Negi. In this session, the senior students stood in pairs and tied on each other's wrist one small round 'Rakhi' made up of hard paper with an image of one Indian leopard species on one side and leopard conservation message on the other. This session was followed by a group pledge taking ceremony in which Aruna Negi gave pledge to the students to enhance the curiosity to learn about the wildlife species that live close to the villages on the mountains and take precautionary steps to protect one's life from the leopard attacks by consulting the local conservation NGOs, the wildlife wing of the local forest department from time to time. The program ended with a concluding remark by the EMRC principal that Aruna Negi and her team should keep coming to the EMRC with conservation education programs which the EMRC will endorse partially in terms of logistic support. Finally, the students received from Aruna Negi leopard education kits, HLC mitigation folder, leopard posters and calendars. Few students volunteered to coordinate human leopard conflict mitigation education program for the villagers in their native villages in other parts of Kinnaur.

At Kinnaur Tribal Bhawan in Shmla, one HLC fact finding meeting was conducted with the women Buddhist monks (*Jomos*) from Kinnaur and Lahaul & Spiti region of the Himachal Pradesh. The purpose of this meeting was two-fold: Firstly to collect first-hand information from this tribal community group about the incidents of human leopard conflicts in the higher reaches of the Kinnaur district and its neighbouring landscapes falling in Lahaul & Spiti, and secondly to educate this group about the leopards and also about the role they could play in minimizing the cases of leopard predation on livestock population in the high altitude human

habitation and pasture landscapes. In this program, 35 *Jomos* participated voluntarily. The *Jomos* from the Kinnaur landscape provided important information about their personal experience with the leopards particularly the snow leopard in their native high altitude villages in Puh and Nichar tehsils in Kinnaur. Details of the HLC information as given by the *Jomos* are given in Table-10.

Table-10
HLC Fact Finding Information as Reported by the Buddhist Monks During one HLC Fact-Finding and HLC Mitigation awareness education program conducted by Aruna Negi at Shimla.

Number of Jomo Respondents	HLC Sites	Nature of HLC Occurrences	Remarks
4 Buddhist monks	Meeru Village	Common leopard as a threat to the local livestock population	Heard about 4-5 cases of leopard attacks on the livestock population in Meeru and Roonang Areas.
12 Buddhist monks	Nako Village	Snow Leopards sighted six times on the stiff rocky slopes of the cold desert mountains the local Gompa	One Jomo had seen one leopard chasing one ibex on the rocky mountain slope overlooking the Gompa at Nako village
19 Buddhist monks	Chango Village Giyu village Koumic village Keylong village	There are reports of snow leopard attacks on the sheep herds in the open pasture landscapes of the higher mountains in Lahaul & Spiti district	Each year, at least one case of HLC occurs on these areas. Snow Leopard is the target species involved in the HLC cases. No work has ever focused on educating the local public about the preventive measures to protect lives of livestock population from the leopards in the local landscape.

Besides giving information about the HLC occurrence reports from their high altitude native lands in Kinnaur and Lahaul & Spiti, these Buddhist Monks showed their excitement to learn about the leopards from Aruna Negi. In a separate open door class room setting, Aruna Negi gave information about the basic facts on leopard species, mainly common leopard and snow leopard and their significance in maintaining ecological balance in the high altitude habitats of the Kinnaur Himalayas. She taught this group about the leopard with very simple illustration on leopard species types, population distribution, habitat types, habitat ecology, feeding ecology, feeding behaviour, prey-predator relationship, human-leopard conflicts, people's participation on the leopard conservation and on the HLC mitigation and other related information. Game activities were played on three important concepts-i) prey predator relationship, ii) HLC type leading to loss of livestock and iii) people's participation on HLC

mitigation. At the end of this program, Aruna Negi distributed leopard education awareness kit to each participant and involved them in taking one group pledge to educate other communities to save leopard habitat and the leopard prey animals in this habitat.

In one school outreach program, Aruna Negi conducted leopard education program with the nearly 100 students of the government high school at Nichar in Kinnaur. The theme of this program was on the 'HLC Mitigation Strategies'. Aruna Negi conducted this program. In her presentation, she highlighted the importance of the student communities in minimizing the HLC occurrences in villages. She gave some effective site specific as well as situation specific tips of preventive measures to stop any types of confrontation with the leopard.

A question answer session was conducted to know the level of awareness of the students about the leopards and also to know from students about what precautionary steps they take to escape from any types of leopard attack on humans and livestock. Some teachers also participated in this session. All teachers and the students denied that they had ever participated in any leopard education program. They appreciated Aruna Negi's first ever leopard conservation education mission in Kinnaur region. They learnt from Aruna Negi's Leopard education program about why leopard conservation is important? and also why leopards move in areas adjacent to the human habitation? The students also learnt some of the basic tips on the Do's and Don'ts in the leopard ranging areas as strategies to minimize HLC occurrences. Aruna Negi distributed leopard education resource materials to each student and teacher whom participated in this program.

Another HLC mitigation program was conducted with the students of Himalayan Public School at Reckong Peo. All the 86 students and ten teachers of this school participated in this leopard awareness program. Aruna Negi conducted this program in two parts. In first session, Dr Sahoo of Conservation Himalayas took one one-hour class on the ecological roles of big cats in the Himalayan ecosystem. The students were taught the basics of Biodiversity Concept through a simple game activity played by 15 students using masks of different wild animal and plant species. Along with this game activity, the concept of Food Chain was explained in order to make them understand the concept of prey-predator relationship. The concept of human-leopard conflict was explained in the context of the habitat and prey base loss. The students were also explained how these two phenomena are responsible for the occurrences of HLC in many leopard habitat pockets.

The second session was conducted by Aruna Negi. In this session, she gave a brief talk on the habitat types of both common and snow leopard in Kinnaur and Lahaul & Spiti mountains. Some of the students raised questions on the economic and ecological value of the leopards in mountains. Answering to their questions, Aruna Negi gave explanations with ecological and economic justifications of the leopard presence on the mountain landscapes of the Himalayas. Two teachers wanted to know the reasons how snow leopards are in conflict with the human beings. Aruna Negi answered that the prey base of the snow leopards is threatened due to growing grazing pressure of the herds of sheep from the local villages. This ultimately affects to the survival of the snow leopards and forces them at many habitats to search for the easy prey animals from among the grazing livestock population on the high hills. Often the shepherds retaliate against the leopard predation on their sheep by killing snow leopards through leg-snare trapping and poisoning.

The program was concluded by distributing the leopard education resource materials to each participant student and teacher. Extra 25 leopard education kits were distributed to the

teachers with advice to use these materials judiciously as resource material for their class room students who participate in the environment education program conducted by the school.

The school outreach program of the leopard awareness was also conducted in the Sunrise Public School at Moorang village. The students were given special awareness education about the snow leopard and about the conservation importance of this critically endangered big cat in its ranging habitats. The students learnt about the snow leopard facts through game activities conducted by Aruna Negi and a leopard film making team from Mumbai. The students used snow leopard masks and performed action-based activities to learn how snow leopards lose their natural prey base and how their conflict with the human beings lead to the loss of livestock population at many pockets in their range. Aruna Negi showed a detailed map of snow leopard population distribution and population status across its range countries including India. The students also learnt about the feeding ecology of the snow leopard on its high rising mountain habitats in the Himalayas. Brief information was also given on the habitat status of the natural prey animals of the snow leopard. At the end of this program, Aruna Negi distributed special brochure folder of the snow leopard and snow leopard poster to each student, leopard film making crew and also to all the teachers who participated in this program.

Aruna Negi conducted one big cat awareness education program among 60 10th standard students of the govt. senior secondary school at Kothi village in Reckong Peo. The 5-member leopard film making crew from Mumbai also participated in this program. Aruna Negi and Dr Sahoo conducted this program in two different sessions. In the first session, Dr Sahoo talked about the common leopard population distribution and about the human leopard conflict in Kinnaur Himalayan region. The students were shown a leopard population distribution map and details of this map were explained in terms of habitat types, population distribution, HLC sensitive pockets and leopard conservation priority locations. A photo image of the common leopard and snow leopard was shown to the students and they were asked to differentiate between the snow leopard and common leopard in terms of body colour, body structure, population occupancy, natural prey animals and HLC types. In the second session, Aruna Negi, conducted a drama activity to show how the habitat loss and destruction force leopards to target the livestock population as their prey animals. In another game activity on 'anti-poaching and people's participation' the students took part in the role play to act according to the script of this topic. The role play characters included *Poacher, Police Officer, Forest Guard, Forest Officer, Village Head and Two Leopards*. Through this game activity, the students learnt how the population of leopards is declining and how poaching has been a major factor responsible for the leopard to become an endangered species. At the end of this program, each participant received leopard resource material packets that included one leopard education kit and two leopard posters as resource materials.

Aruna Negi visited the remote Asrang village in Moorang Tehsil and conducted one HLC mitigation education program with the local tribal residents. Although this tribal group responded positively and gave vital information about the occurrences of leopard attack on their livestock population, they apparently preferred to draw Aruna Negi's attention towards their impending demand for the shifting of the boundary of the Lipa-Asrang Wildlife Sanctuary at least 5 km. ahead of its current boundary along the Asrang village. They further demanded that the HP forest department should increase the ex-gratia compensation amount for the loss of their livestock due to leopard attack tie and again. As they refused to know anything on the HLC mitigation topic, Aruna Negi distributed the leopard kits to them and

assured them that she will make all possible efforts to bring their demands to the knowledge of the HP forest department in due course of time.