

Project Title

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

Project Sponsor

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INTERIM REPORT

Rufford Small Grant Foundation

Submitted by

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1st RSG Recipient

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Himachal Pradesh, India

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Acronyms Used

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

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Introduction

The Kinnaur district (77° 45' and 79° 00' 35" East Longitude and 31° 05' 50" and 32° 05' 15" North Latitude) of Himachal Pradesh, India is surrounded by Tibet in its north-eastern boundary and characterized by a mountainous landscape, alpine vegetation dominated by *Cedrus deodara* and diverse fauna. Common leopard, snow leopard, musk deer, black bear, blue sheep are the main wild taxa distributed throughout its varied elevation from 2345m in the Satluj valley to 6416m. in the higher passes. In Kinnaur, the human population of nearly 80 thousands is scattered in 660 villages. Poaching occurs in many high elevation areas in winter months when snow covers these areas and many wildlife species migrate to lower elevation areas. During the last few years, leopard attacks on cattle and human beings have increased with 50 to 60 cases of attacks occurring in last two years. The human-leopard conflict (HLC) is gradually increasing at several leopard pockets in Kinnaur. At the same time, the poaching of wild animals has become a regular practice in many remote high altitude villages where there is hardly any investigation by the forest department to check the wildlife poaching and educate the villagers about the adverse effect of poaching on the mountain ecology.

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 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 areas in the entire Kinnaur district and generates data on HLC occurrences and wildlife poaching. The Himachal Forest Department, local communities and migratory shepherds are the main stakeholders of this project. The ongoing RSG-sponsored leopard conservation awareness campaign and HLC mitigation initiatives 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 project helps us develop future strategies for successful community-based leopard conservation as well as site-specific HLC mitigation plans.

Objectives

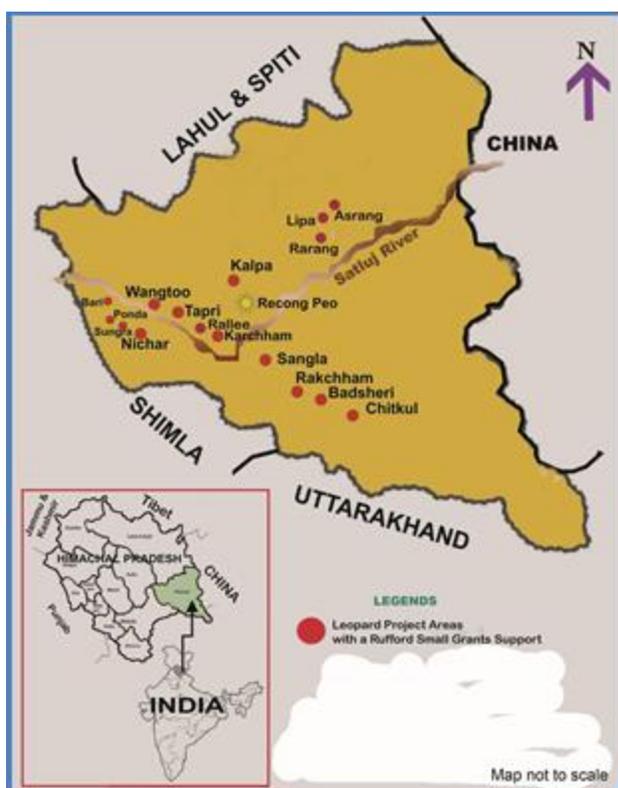
1. To identify and map the human-leopard conflict areas in Kinnaur district, Himachal Pradesh, India.
2. To conduct human-leopard conflict fact finding survey in Nichar, Sangla, Kalpa, Moorang and Puh Tehsils of Kinnaur.
3. To conduct workshops and training programs on human-leopard conflict mitigation 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.

Methodology

➤ Project Area

The project activities were carried out in Nichar, Kalpa, Moorang and Sangla Tehsils. The Pooch Tehsil in Kinnaur is also included in the project area map of this project. This area has not yet been covered with any of the activities of this project. 14 human-leopard conflict (HLC) sites (Map-1) in each of these Tehsils were visited with the help from the local villagers to have firsthand 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, we made efforts 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 prey base status and the grazing pressure from the local livestock population.



*Map-1
Geographical Areas in Kinnaur Himalayas Surveyed to Identify Leopard Conflict (HLC) Areas with Support from the 1st Rufford Small Grants to Aruna Negi.*

➤ *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 will be 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.

Project Activities

➤ *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.

➤ *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 fusca*) 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. 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.

➤ ***Leopard Habitat Mapping and HLC 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,

HLC Fact-Finding Trip to 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-1. 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-1: 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*)

HLC Fact-Finding Trip to 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 the Kalpa areas.

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 falls victim of deadly attack by leopards in Kalpa. The following table-2 shows the leopard related information as given by the participants.

Table-2: Leopard information as reported by the villagers during a HLC fact-finding meeting at Kalpa, Kinnaur

Leopard Sighting Locations around Kalpa	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*)

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.

HLC Fact –Finding Trip to 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-3 shows firsthand 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-3: Leopard information as reported by the villagers during HLC fact-finding survey in the Sangla-Chitkul valley in Kinnaur

Leopard Sighting Locations	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

HLC Fact-Finding Trip to 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, Goral 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 behavior 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-4: 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 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.

➤ ***Big Cat (Leopard) Education Awareness Outreach Activities***

This project's one important objective 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 Kalp, 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.

➤ ***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.