Fieldwork Report "The Role of Cultural Norms in Wildlife Conservation in Arunachal Pradesh"
First Phase Dec 2013 – June 2014
SN, UCL and ZSL

This report presents a detailed account of the first phase (Dec 2013 – June 2014) of my PhD fieldwork in Dibang Valley. I spent time in three distinct sites in Dibang Valley during this time. The report discusses research methodology, results till date, key observations and future plans in each site separately. The report concludes with the research plan for the next phase commencing Sept 2014 and ending July 2015.

Summary

I camera trapped 3 sites covering a total area of about 200 km² in Dibang Valley between Dec 2013 – June 2014. Two sites were in the community forest while the third was inside a protected area. About 60% of the cameras failed shortly after placement in the first site (community forest) so I have very patchy data from it however cameras performed quite well in the remaining sites. Evidence of existence of tigers was found in both the community forests however, no evidence of tigers was found from the site inside the protected area. Starting Sept 2014, I plan to survey 2, possibly 3, more sites. The first site will be inside the protected area but different from the one surveyed previously. I will resurvey the community forest where my cameras failed the first time and will possibly survey a third, yet unidentified, site.

SITE 1: CF1 (Community Forest)

a. About CF1:

1. Dibang Valley, the catchment of river Dibang, is administratively divided into two districts – Lower Dibang Valley (headquarters in Roing) and Dibang Valley (headquarters in Anini). Idu Mishmis however divide Dibang Valley into 3 broad geographical and cultural zones which they call – lower belt, middle belt and upper belt. The lower belt includes tropical foothills and plains around Roing town; middle belt is the geographic center of the Valley with Etalin (approx. 100 households) as the focal town and is composed of rugged tropical and subtropical mountains; and the upper belt, with Anini as the primary urban center, is marked by wide river valleys, rolling hills mosaicked with grassland patches and a temperate climate. Idu Mishmis in these three belts speak slightly different versions of the Idu language. The culture, especially with respect to interactions with the forest and wildlife (hunting taboos in particular), also varies between the belts. A social features that sets the middle belt apart from the other two is widespread opium use. One is hard-pressed to find a man above the age 15 in the middle belt who does not smoke opium. Even in developmental terms, the middle belt lags behind the upper and lower belts. More than half the population lives in settlements without road connectivity and electricity. There are few jobs within the government sector (with the exception of the newly arrived dam companies, private sector is largely absent from the entire district), no high schools or major hospitals. Consequently, livelihoods are essentially nature-dependent - *jhum* agriculture (commonly known as

slash and burn or shifting agriculture), hunting and cane collection. This is supplemented with aid from state and federal agencies, and occasional small scale contractual work with the local government. The first study site, CF1, represents the middle belt in all three aspects - geography, i.e. steep terrain and elevation that ranges from 800 m in tropical valleys to above 4500 m on the highest ridges, culturally and in terms of development.
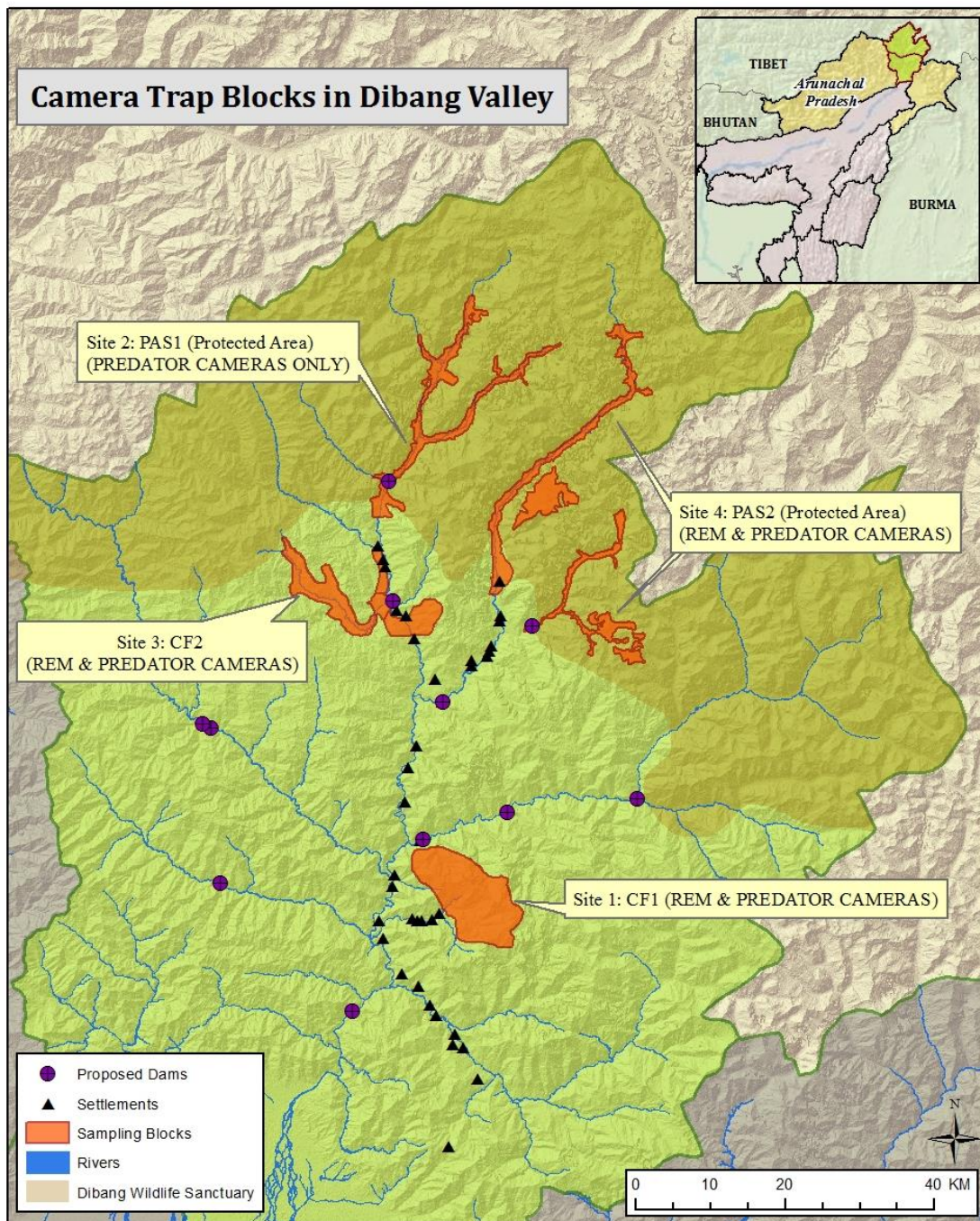

Figure 1: Camera trap blocks in Dibang Valley

2. This site is located in the catchment area of one of the smaller tributaries of Dibang. There are 10 longhouses in 6 distinct settlements in this valley (Figure 2). The settlements are located at varying distances from the district road (the only road in the district connecting Roing to Anini), the closest at 2.5 km and the farthest at about 9 km.

Each settlement claims ownership over an area of forest in which they lay traps for wild animals, rear mithun and cultivate crops. The boundaries of each settlement's forest are marked by natural features like rivers and mountain ridges. The last two settlements, with five longhouses combined, lay claim to the largest community forest in the area. These five longhouses and their adjoining community forest will be referred as CF1. Fieldwork in CF1 comprises of camera trapping and SMART surveys in the community forest and social science surveys with the households. CF1 has 12-14 mithun (new calves born this season). Each male member of the village owns between 1-3 mithun.

3. In April this year (after the fieldwork was completed), CF1 was connected to the state power grid. However, power supply is erratic and restricted to a few hours of the day. There is proposal for a road connecting CF1 with the district road. A survey was done last year by the state authorities but construction is yet to begin.

4. CF1 has a sister settlement located on the district road called CA. It came up in mid-1990s when the road connecting Roing to Anni was finished and people living in settlements that the road didn't pass through started to see the amenities (e.g. access to modern health care facilities in Anini and Roing, access to government subsidized food) and sources of income (road side shops) that one has access by being closer to the road. CA started as a temporary settlement when a few houses from CF1 moved out to a small piece of flat land by the road. Over the years more and more households from the interior have moved out to CA. It now has a primary school (though severely underfunded and understaffed), public distribution center, power connectivity, few small grocery stores, a community center and a satellite phone station. Most households in the CF1 have a secondary house in CA. Most young people prefer spending time in CA however they frequently go back to CF1 (and sometimes spend several weeks there at a time) for hunting and during harvest season. Some households have permanently moved to CA and no longer have a base back in the village. However, they still hold claim to land in CF1. With the plans for a new road connecting CF1 to the district road, some of these families have started laying claims over plots of land where they are likely to build a house once the road is finished. CF1 and CA to a certain extent have a shared economy. The produce that is not used in the village, including rice beer, vegetables, wild meat, is sometimes sold in CA. In addition to houses in CF1, I will conduct interviews with households in CA that have ancestral ties with CF1.
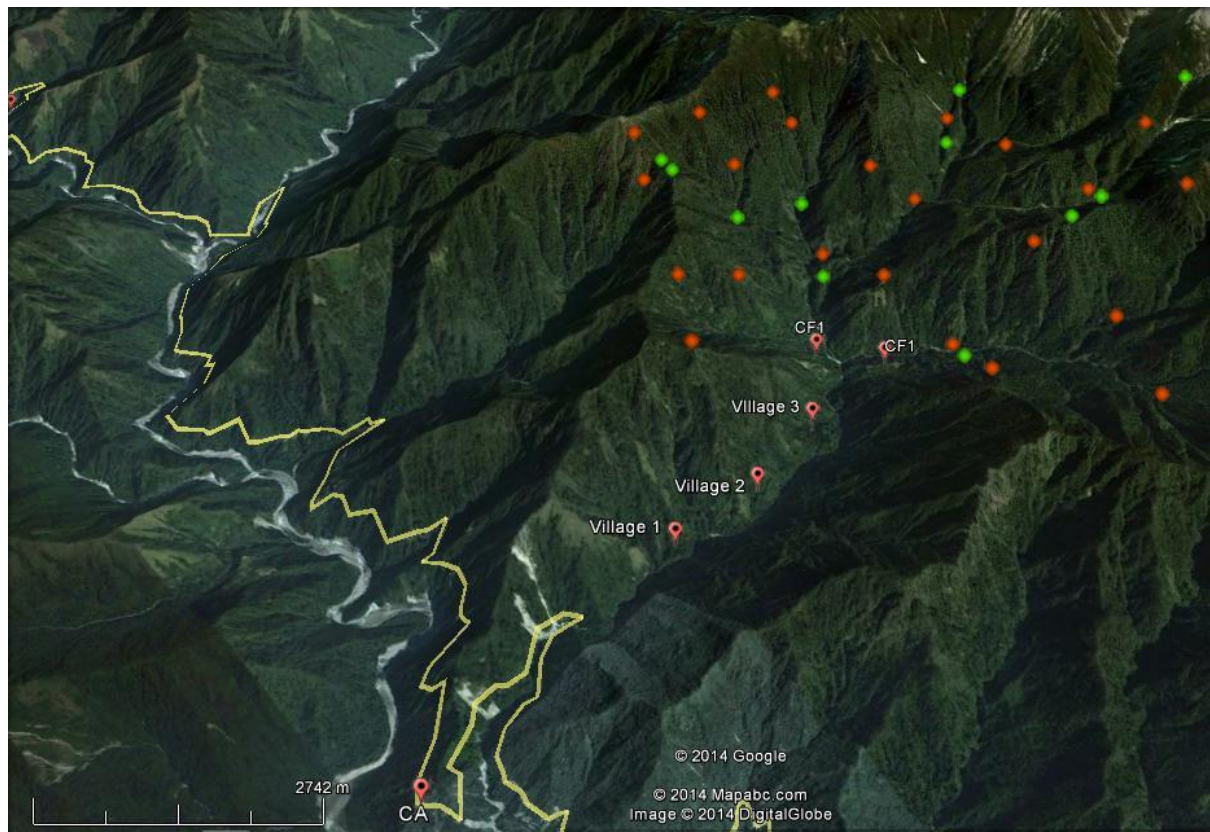
Figure 2: CF2 – red dots represent REM camera locations, green dots represent predator camera locations

b. *Field work this season:*

1. I arrived in CF1 on Dec 4, 2013. We placed the first camera trap on Dec 7th and over the next 21 days deployed a total of 39 cameras. Twenty four cameras were placed as REM points in predetermined (random) locations, hereafter called 'REM cameras'. The remaining 15 were placed in locations large predators (tiger, leopard) are likely to use, such as ridge tops, water holes and salt licks, hereafter called 'predator cameras'. Camera locations spanned an altitudinal range of 1465 to 3180 m. With CF1 village as our base camp we made several 4-5 day trips in different directions to place cameras, always coming back to the village and resting for a day or two before going on the next trip.

2. It took much longer than anticipated to place cameras in CF1. The fact that all the equipment had to be moved on foot considerably slowed us down. In addition, random camera placement strategy for REM was very time consuming. Prior to starting fieldwork I'd overlaid a 1.5 x 1.5 km grid on the study area and decided place a single camera station at each of the nodes of this grid. It was very time consuming and physically exhausting to locate these points on the ground. Though on paper the distance between two adjacent points is only 1.5 km, at times it took us a whole to get from one camera point to the next. We had to frequently hack our way through dense vegetation on > 60 deg slopes.

3. Of the 39 cameras placed in CF1, 33 were Panthera cams and the remaining 6 were Reconyx HC600/500 hyperfire series. Sensor sensitivity in all the cameras was set to the

highest option. All the cameras were programmed to take 10 pictures per trigger and the delay between consecutive triggers was set to zero, i.e. cameras could be retriggered without any delay. Reconyx cameras take black and white IR pictures at night and are able to take consecutive pictures without much delay. However, Panthera cams take flash photos in low light conditions and there is a significant time delay between consecutive pictures as the capacitor needs to recharge. It also consumes battery faster. Therefore, Panthera cameras were programmed to take only 3 night time pictures.

4. We started removing cameras in the same order in which they were placed. The first camera was removed on Jan 22, 2014 and the last on Jan 28, 2014. Cameras were in the field somewhere between 29 and 51 days.

c. *Results and Observations*

1. An alarming number of cameras stopped working shortly after placement. Only 15 out of 24 REM cameras and 3 out of 15 predator cameras were active for longer than 3 weeks in the field i.e. 18 out of 39 cameras (~55%) stopped working within three weeks of deployment. There were several reasons behind such a high rate of camera failure, the most prominent being the camera model used. Thirty one of the 39 cameras placed in CF1 were of Panthera Cam V3 series - a relatively old camera model that, due to some glitch in its circuitry, has been reported to drain batteries very quickly. I was unaware of this problem at the time of placement. Because it was so challenging, time consuming and expensive to reach camera locations, and because I had to start placing cameras in site 2 immediately after CF1 (limited time window when fieldwork is possible), cameras could not be revisited and monitored overtime. Therefore, the fact that most of them had stopped working soon after deployment wasn't known until they were finally retrieved. In addition, a few cameras that did hold the batteries maxed out their storage capacity within a few days. I'd set camera sensitivity to 'highest' - it was the recommended REM setting for Reconynx cameras and I assumed the same for PantheraCams - but for PantheraCams it meant an incredibly sensitive sensor that was triggered by slight twitch of a leaf about 200 meters away. The cameras took pictures nonstop until the memory ran out. In sum, it was a combination of the unique characteristics of this site (tough terrain), the seasonal nature of fieldwork in Dibang Valley, bad cameras and my inexperience with these cameras that resulted in a high failure rate. Though highly disappointing, I did learn from this experience and have since had a fairly high success rates with cameras in the other sites.

2. The cameras had did function in the field suggested a richly diverse environment in CF1. Twenty one species of mammals were recorded including five species of cats – tiger, black leopard, Asiatic golden cat, marbled cat and leopard cat. Following species of medium-large animals were also captured (pictures at the end of the report): Asiatic wild dog, spotted linsang, yellow throated marten, yellow bellied weasel, a yet unidentified weasel/stoat, Mishmi takin, Himalayan serow, Gongsham muntjac (possibly), Indian muntjac, wild pig, red goral, two species of macaques and Himalayan pika.

3. The camera trap data are inadequate and inconsistent to be used to draw inferences on animal abundance based on an REM analysis as I'd initially proposed. However they do

provide evidence of the exceptional diversity of the forest in CF1 and the fact that it is able to sustain a variety of large predators. We didn't capture clouded leopards or Himalayan black bears during the survey. Though I was told that bears are very abundant in the area and a huge menace as they regularly raid *jhum* fields. I was informed that no bears were photo-trapped because in this area they hibernate through winter months.

4. We walked trails totaling 265 km during camera placement. Snares/traps, for small or large mammals, encountered on these trips were properly registered in the standard SMART format. Information such as the GPS location, target species, material of the trap, who placed it etc. was also recorded. We found only 2 large animal traps made of metal cables during the entire survey. They were laid for wild pigs, barking deer and serow. The rest of the traps, some 84 of them, were made of locally available material (boulders, cane, strings) and were set primarily for rodents and terrestrial birds.

5. A note on random camera placement for the REM analysis – the REM requires data from camera traps placed randomly with respect to animal movement and distribution. To randomize camera placement in this study, I superimposed a 1.5 x 1.5 km grid on my study sites and decided to place a single camera trap at each of the nodes of this grid. I transferred the geo-coordinates of the nodes onto my GPS and sought out to locate them in the field. Some of these points fell in inaccessible locations such as deep gorges and treacherous mountain slopes. In such instances, we attempted to get as close as possible to the actual location and placed a camera in a suitable spot. Though not entirely random, in the interest of our safety, this was the best we could do. In other cases where camera locations could be accessed, most points fell in places with dense vegetation. We had to clear a significant amount of area around the camera to give it a field of view. Although random in their location, such an apparent modification of the habitat around the camera may introduce a bias in the way animals utilize human-modified areas. I was warned by my field guides that in this area wild animals tend to avoid places cleared by people. After discussing with Dr Marcus Rowcliffe we've agreed that in future if a random location is covered in dense vegetation then, instead of clearing the area to create space for the camera trap, we'll place the camera in a naturally open space closest to the random point which would require minimal clearing.

d. Interesting Observations and Notes:

1. After my arrival in CF1 I personally met and explained to everyone in the village about the reason for my presence in the area i.e. research. Shortly afterward as the word about my arrival in the village spread to CA, there were questions about my true intention and affiliation. There were doubts that I worked with the forest department and had come to the village to map their forest so it could be declared a reserve. Two people from CA dropped in for a surprise visit to the village to talk to me. My host and guides in CF1 discussed this issue with me and told me that although they trusted me, they'd like to me to show a proof of my student status. I showed them my ID card. There was one particular older man in the village who was not convinced and refused to speak with me even after several attempts. He also made it clear to my guides that I must not be taken to the part of the forest where he hunts. Towards the end of my stay in CF1 (and CA), I think most people were quite convinced that I was actually a student (and not a secret

agent of the forest department) and the main purpose of my presence in their village, and the Valley in general, was to understand their culture and the animals in their forest.

2. A small note on hunting in CF1 - I spent about 32 days in CF1 in total between Dec, 2013 and Jan, 2014. During this time whenever we ate in the village we were almost always severed small game meat – dried birds mostly. Men in the village always made sure that there were birds and rodents in the house for the women. In those two months, three large game animals were hunted – a barking deer, a wild pig and a juvenile serow. Except the barking deer the other two were snared in wire traps. No takin were hunted this year and last year 3 were killed – two sub adults and one juvenile.

3. CF1 lost 4 mithun to predators 2 years ago. It was thought that tigers were responsible for the attack. Wild dogs also attack and kill mithun throughout Dibang Valley. Wild dogs are just seen as predators that kill mithun however there are multiple cosmological meanings associated with tigers killing mithun because both tiger and mithun share kinship with the Idu people. Idus say that like people, tigers and mithun also have a destiny. A tiger killing a mithun is not a chance occurrence, much like a person killing a tiger isn't one either. Death of an Idu, a tiger and a mithun carries a deeper meaning, an act in which greater spirits are involved.

4. Each village has a well-defined community forest. Within this forest, each adult man in the village has claim to a clearly defined patch of forest where he places traps for wild animals. They can hunt with guns anywhere in the entire community forest however the traps are only laid within their individual areas. Most of the trapping in done in the winter months from November through February. When asked why only this time of the year, I was given two reasons – a. cold weather delays decomposition and traps don't need to be checked every day, b. animals descend to lower altitudes in winter and can be caught relatively close to the village. Most species of birds and small mammals reproduce during spring and summer months when there is no trapping. Below is a calendar of activities that people of CF1 engage in in a typical year:

Month	Activity					
	Traps	Takin Hunting	Musk deer hunting	Fishing	Clearing jhum field	Harvest
Jan	███	███				
Feb	███	███				
Mar		███				
Apr						
May				███		
June				███		
July			███			

Aug			🟧			
Sept			🟧			
Oct						
Nov	🟧					
Dec	🟧					

5. People in CF1 observe elaborate hunting taboos. Adult women neither consume large game nor participate in its preparation (note: prepubescent and post-menopausal women do not follow this restriction on consumption of large game meat). It is prepared by the men of the family in a separate section of the longhouse. It is cooked and served in a separate set of utensils that women do not touch. However, women do eat rodents, birds and fish (referred to as small game). The men of a household consider it their duty to provide the women with constant supply of small game. Therefore, trapping for small game is taken very seriously by men in CF1. No taboos are observed by men and women alike on consumption of small game. A hunter who has killed a large game observes a strict taboo for 5 nights during which he should not consume onion and garlic, have sexual contact with women (including his wife), wash clothes, eat food prepared and served by a menstruating woman, go to the *jhum* field or attend a death ceremony even if it is of a close kin. When a large animal is killed the meat is distributed to all households in the village. Anyone else who consumes wild meat also observes the same taboo as the hunter but only but only for a single night. I noticed very strict adherence to these taboos by everyone, young or old, in CF1. In addition, the following species of animals are not hunted – all members of the cat family (considered human kin), hoolock gibbon (considered human kin), yellow throated marten (meat is distasteful and sighting one while on a hunt is a bad omen), mongoose family (meat is distasteful), wild dogs (killed to protect mithun but the meat is not consumed), snakes (though most young people have starting eating pythons) and owls (though owlets are hunted I was told).

6. The hunting of musk deer has been for many generations a very significant economic activity for most hill tribes of Arunachal Pradesh, including the Idus. Because of its economic significance, it is a much ritualized event. The hunters are after the musk gland found in adult male of the species. The gland sells for a high premium in the international market and is used in traditional Asian medicine and perfume industry in the Middle East. The musk deer is found in the highest reaches of the mountains which are treacherous, difficult to access and support reduced oxygen level. Some hunts last longer than 30 days. Therefore, only the most daring hunters are said to pursue them. There are several stories of hunters losing their way and perishing in the forest. There are a number of taboos and restrictions that are observed both by the hunter and his family back in the village while he is on the musk deer hunt. Hunters use a combination of snares and guns. Because they are after the musk gland which is only found in the adult male (which has tusk like canines) of the species, females and juveniles are spared whenever possible. I was told that hunters usually release female and juveniles found caught in the snares.

7. A hunter performs a small ceremony after a large animal is killed. It is meant to serve two purposes, a) offer thanks to *Golon*, the supreme forest spirit, for presenting the animal to him the animal, b) to symbolically 'purchase' the animal from *Golon*. A small part of the animal's ear is sliced off and wrapped in a leaf with a small amount of brass scrapped off the bullet that was used to shoot the animal. It is kept on the spot where the animal was shot. The metal scrape is the ceremonial price the hunter pays to *Golon* to ensure that the animal become his. The hunter also chants prayers while making the offering. I am not sure if the same ceremony is performed when an animal is snared.

e. Future plans

1. I think CF1 closely characterizes middle belt in terms of its geography, subtly different Idu sub culture (strict adherence to hunting taboos), low literacy rate, high unemployment rate and limited infrastructure development. Because I am interested in studying interactions between Idu culture and wildlife across the district of Dibang Valley, which includes both the upper and middle belts, CF1 becomes important as the sole representative of the middle belt. This year's camera trapping failed to yield data suitable for any type of quantitative analysis to draw comparisons between different study sites. I'd therefore be keen to reattempt camera trapping in CF1 this upcoming field season. During the last camera trapping session, I developed an in-depth knowledge of the landscape in CF1 and mapped all the existing trails due to which I believe camera placement would be much faster this time.

2. While in CF1 in Dec 2013 – Jan 2014 during camera trapping, I did a pilot survey to collect data on hunting offtake. In my upgrade proposal, I'd suggested using skulls displays as a medium to gather information on hunting offtake rates of large game. However, after spending time in CF1 I learnt that not all trophies are preserved (for instance, almost no barking deer trophies are kept while most takin trophies, whether big or small, are preserved) and that the displays represent a small fraction of the animals actually hunted. I therefore decided to collect detailed and systematic data using hunter diaries. During the pilot, I gave a form to household heads in CF1 with an explanation of the information I was interested in recording. They filled out the forms, which were very basic and mostly objective, themselves but I visited each household once a month to review the information. I went over each item recorded in the form, at times cross checking with other members of the household to ensure there was no underreporting. I did that for two months and it worked very well. This upcoming field season, I'd like to conduct the same exercise from Sept 2014 through to July 2015 with all the households in CF1 and a few in CA as well. I will use our monthly review meetings as an opportunity to collect additional socio-economic information such as on education, employment, income etc. and discuss other issues such as adherence to taboos or instances when hunting restrictions were not observed during the hunting events.

3. In addition, I'd also conduct participatory exercises and individual interviews. Participatory exercises will be used to do wealth rankings (PWR) and will also be an opportunity to talk about issues related to dam development, importance of mithun and land ownership in a group. I plan to do one PWR in CF1 and at least one, possibly two, in CA. I will also conduct structured interviews with individuals to understand attitudes towards the forest and wildlife. I will try to interview almost everyone in CF1

individually and about 15 people in CA making sure that the sample represents a balanced mix of age, gender, education qualification and the extent of prior interaction with me.

Site 2: PAS1 (Protected Area)

a. About:

1. This site lies in the valley of River Mathu, one of the main tributaries of Dibang. The site is inside Dibang Wildlife Sanctuary (DWLS). Inside the sanctuary, Mathu river valley is relatively flat (over 2 km wide in places) and, covered in temperate and subtropical forest with trees such as fir, birch, poplar and pine. The mountains rise sharply from the valleys before plateauing into alpine meadows around 4000 m. Areas above 1800 m receive light snowfall from January to March while higher elevations are covered in snow until late May. The boundary of DWLS is clearly defined on the map though there is no official demarcation or enforcement on the ground. There is one longhouse inside the protected reserve occupied by an elderly couple. They do not own any mithun. The nearest settlement from the park boundary is about 2 km away and has 5 households. Their mithun do not enter the park. A permanent army camp, including a helipad, is being developed inside the park to house a small battalion throughout the year.

2. The area inside the present day wildlife sanctuary is the ancestral property of about 8 Idu clans. Though there are no longer any settlements inside the park, barring one longhouse of the elderly couple, the members of these clans still lay claim to the land inside the park. The few hunters that go into this area are all members of these clans. My guide for this site was an exceptional young man named CM (named changed to protect the identity of the informer). His clan owns a large portion of the land in the Mathu Valley including the area inside the protected reserve. He makes a living by selling musk deer pods, doing odd contractual jobs, porting supplies for the army during summer patrols to the international border and, occasionally, guiding the few foreign tourists that come to the area on hikes inside the wildlife sanctuary. He is one of the very few people in Dibang Valley who can speak both the language of the Idu shamans, called *igu*, and the scared language of the supreme forest spirit, *Golon*.

b. *Fieldwork this season:*

1. We placed the first camera trap in PAS1 on Jan 8th, 2014 and over the next 10 days placed 33 cameras in 24 locations. The selected locations were most likely to be visited by a large predator (predator cameras). No REM cameras were placed in this site. I did not have sufficient camera units to place a paired station at each location. Therefore the most important 9 locations were given a paired camera station while at the remaining 15 locations a single camera was placed. All the locations were in the valley bottom spanning an altitudinal range of 1700 to 2280 m. We walked 110 km in 9 days.
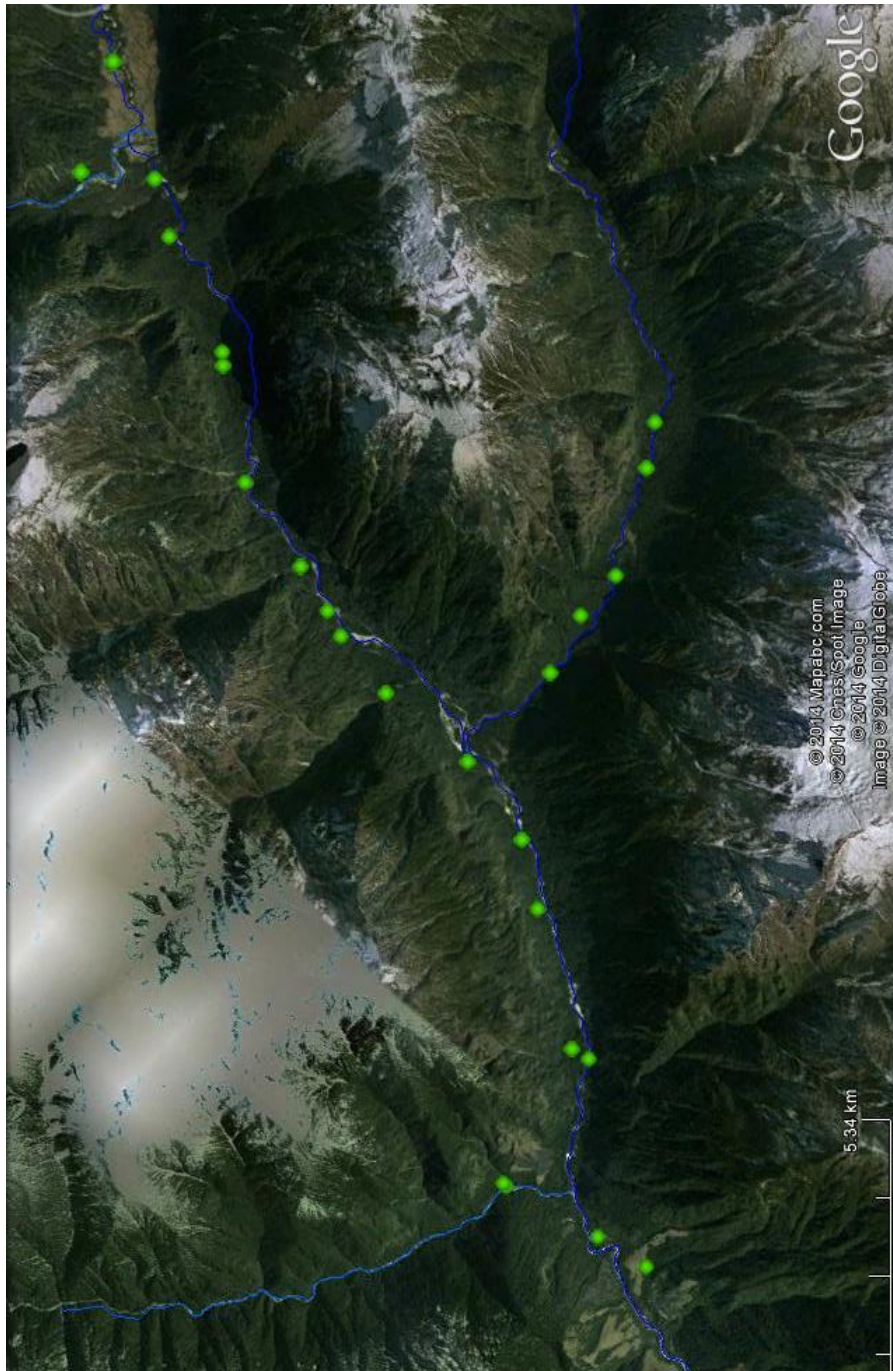
Figure 3: Site 2: PAS1 – green dots represent predator camera locations

2. Of the 33 cameras placed, 19 were of Panthera V4 series, 4 of Panthera V3 series and the remaining 10 were Reconyx HC600/500 hyperfire series. Sensor sensitivity in Reconyx was set to 'Medium/High' and in Panthera cams to 'Medium'. All the cameras were programmed to take 3 pictures per trigger and the delay between consecutive triggers was set to 1 second. Panthera cams were set to take 1 flash photo.

3. We recorded lots of prey and carnivore signs during camera placement such as barking deer, wild pig, takin, serow, otter, wild dog, bear and a few smaller cats. No tiger or leopard tracks were detected. A number of large carnivore scats were collected however, it is unsure how many are of big cat origin.

4. No traps, big or small, were encountered in the area surveyed during fieldwork.

c. Results

1. The cameras were removed between Feb 19th and 22nd, 2014. Except 2 Panthera V3 models that failed within a few days of deployment, all the camera were active at the time of retrieval. We did not record any tiger or leopard signs at the time of camera removal either. However, we sighted a takin, 5 red goral and a few small mammals during the removal.

2. Fifteen species of medium to large sized mammals were recorded. Tiger, leopard and bear were not captured. Overall species diversity was much less than the one recorded in site 1 (CF1). Although we did capture a clouded leopard walking against snow in the background, probably the first photograph of a clouded leopard in the wild utilizing a snowy landscape in winter. Following species of medium-large animals that were captured (pictures at the end of the report): Asiatic golden cat, marbled cat, Asiatic wild dog, yellow throated marten, a yet unidentified species of weasel/stoat, masked palm civet, Mishmi takin, Himalayan serow, Gongshon muntjac (possibly), Indian muntjac, red goral, wild pig, an unidentified species of otter, Tibetan/Arunachal macaque.

3. The cameras recorded lots of pictures of prey animals – Indian muntjac, Gongshan munjtac, wild pig, takin, serow and a lone red goral. It was the only site during this season's fieldwork where we were able to sight these animals. There were also a very large number of wild dog pictures. Wild dogs in packs of 4-5 individuals were captured frequently. Wild dog tracks and scat were also plentiful in the site. It is possible that in absence of larger predators (tiger, leopard), the wild dog is the most numerous and most dominant predator in the area.

4. My guide, CM, mentioned that until a few years ago, tigers were so numerous in the area that hunters were scared to sleep on the ground at night. Tiger tracks could be seen frequently. According to him, about 5-7 years ago they started to notice fewer tiger signs and now they no longer see any tracks. CM has encountered various groups of heavily armed Tibetan hunters who cross the border into Dibang Valley in summer to look for musk deer and tigers. They usually travel in groups of 4-5 people and unlike Idu hunters have 3-4 hunting dogs and advanced rifles. They also carry a significant supply of ammunition. They stay on the ridge tops or the alpine plateau and seldom descend to the valley bottoms. CM has shared camp sites with Tibetan hunters on two occasions where they asked him about tigers. CM and other hunters believe that Tibetans hunters have killed off all the tigers in the valley. He also mentioned that he has tried to explain to the Tibetans that they are not to come into Idu territory.

5. There could be two possible reasons why no tigers were recorded in this site even though large prey appears to be abundant - a) Tibetan hunters have eliminated tigers almost entirely, b) the absence of mithun lowers the carrying capacity of the valley, especially in winter when the camera trapping was done and when most cases on depredation on mithun are reported. However, given my existing knowledge of the area, it is very difficult to identify the true reason. The next study site in Dri Valley which will be surveyed using camera traps in the upcoming field season may provide a possible explanation. These two valleys, Dri and Mathu, are quite similar - they are

geographically and ecologically alike, both are inside the protected area and have no human settlements within the PA boundary. In Dri, mithun range till about 1 km inside the park boundary.

Site 3: CF2 (Community forest)

a. About:

1. This site is located in the lower catchment of River Mathu outside the protected area. It is the biggest site surveyed this season and incorporates community forest of a number of different villages and clans. Each settlement claims ownership over an area of forest in which they lay traps for wild animals, rear mithun and cultivate crops. The boundaries of each settlement's forest are marked by natural features like rivers and mountain ridges. Mathu and its surrounding landscape take on a new character as the river leaves the protected area. The river becomes faster and the valley bottom is much narrower. It is flanked on either side by rolling hills covered in grassland interspersed with patches of subtropical and pine forest, and bamboo plantations. As one travels away from the river the mountains become steeper, taller and more rugged. The study area includes the community forest of the four villages. This is the only site in this study area that has a paved road running through it. The road connects the town of Anini with an army camp located 33 km into the Mathu Valley. All, except one, of the villages in this valley located beside the road.

2. There are certain socio-economic characteristics common across the settlements in Mathu Valley. Firstly, many people over the years have left their ancestral villages and migrated to Anini. Most migrant families still maintain active ties with their ancestral villages through various means. For instance, in one of the villages there were about 14 households before the road was constructed in 2007-08. There are four houses at present, the rest have moved permanently to Anini and a few to Roing. Most migrants still keep their mithun in ancestral village and some have hired non-Idu laborers to look after the mithun and cultivate small pieces of land for them. Secondly, there is a much higher level of literacy as compared to the middle belt. There is a primary school in one of settlements and a high school in Anini, both very accessible. Thirdly, baring a few, most households are relatively financially well off. Most people own motorbikes and/or cars. Most households have at least member who is either permanently employed by the government in Anini or does high paying contractual work for the government.

3. During the summer months of May - August additional army battalions arrives in the area to run long range patrols (LRP) to the Tibetan border. LRP teams are typically composed of 20-30 army personnel accompanied by an equal number of porters hired locally. Most men from the area who do not have permanent employment are hired as temporary porters. Because LRPs overlap with school vacations, a large number of school children are also hired as porters. The porters are paid handsomely, about $10/20kg load/day.

b. Fieldwork this season -

1. This was the largest site surveyed this season and one that included community forests of several different villages. Consequently, various trips were made over a month to deploy cameras in different areas. We had a different guide for each community forest to place both REM and predator cameras. Camera placement began on March 4th, 2014 in the community forest of the first village. The last camera was placed on March 27th, 2014 in another community forest located the right bank of River Mathu. In total 32 REM stations and 29 predator camera stations were placed over 23 days across an attitudinal range of 1605 to 3128 meters.

2. A total of 73 cameras were placed in CF2. Of these 16 were Reconyx HC600/500 hyperfire series, 56 Panthera V4 series and 1 Panthera V3 series. Sensor sensitivity in Reconyx was set to 'High' and in Panthera cams to 'Medium'. All the cameras were programmed to take 10 pictures per trigger and the delay between consecutive triggers was set to zero. Panthera cams were set to take 3 flash photos at night.
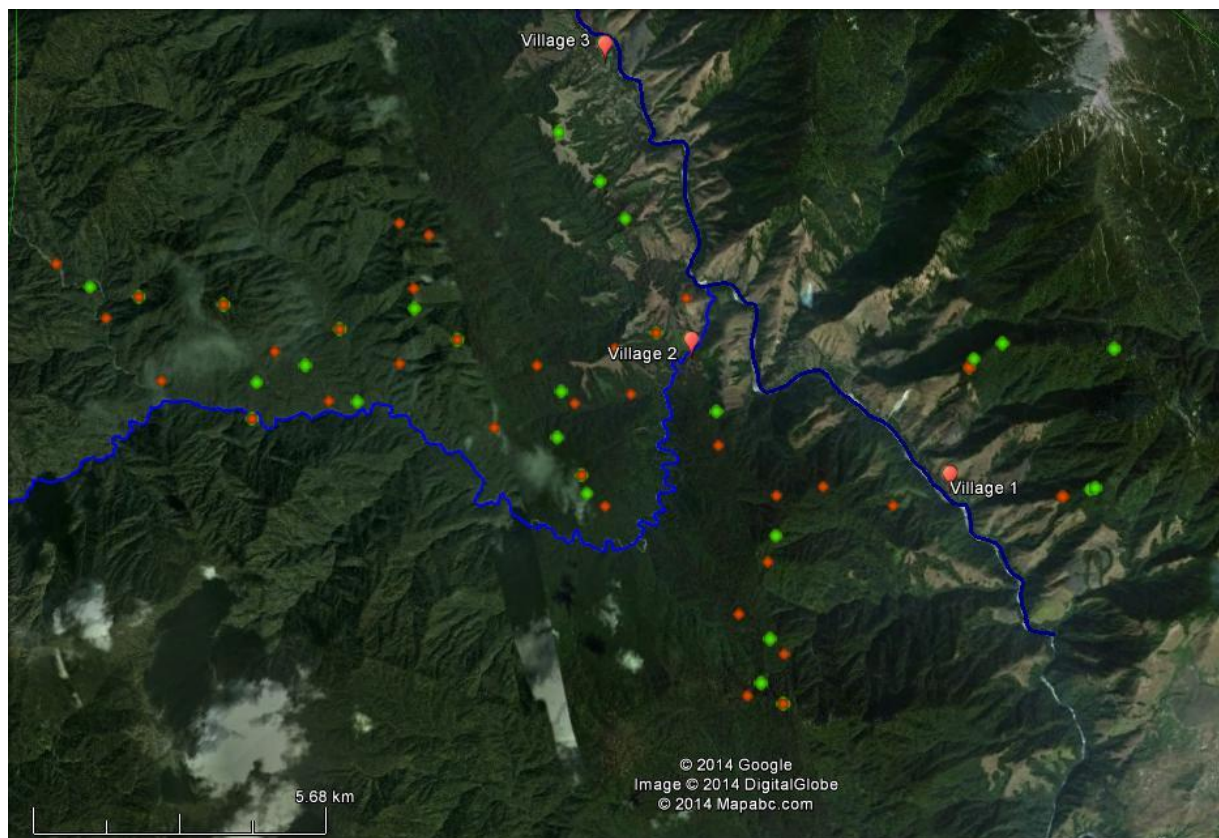

Figure 4: Site 3 CF2 – red dots represent REM camera locations, green dots represent predator camera locations.

3. The REM camera placement in CF1 was a valuable learning experience and helped us come up with a more practical strategy for future REM placements. In CF2, I decided on a slightly altered approach explained below:

   i. Using the GPS, we tried to get as close as possible to the random location. Once we were within a 50-100 meter radius, we looked for a naturally open spot closest to the REM location and placed a camera unit there. The idea was to introduce as little visual disturbance as possible.

ii. In several instances, random locations were in places too difficult to reach, such as on the other bank of a stream that could not be crossed, or on a steep slope too treacherous to navigate, and in a few rare occasions, we lost our way and ended up on the wrong mountain. In such situations we placed the trap as close to the actual location as possible.

iii. Quite a few points ended up on the ridge tops because the faces were too steep and very densely vegetated to allow for proper camera placement. We picked a point on the ridge top closest to the random location to place the trap. A few such points doubled up as REM and predator camera locations. Two cameras were placed in these locations - one was designated as the REM camera but together they also made a predator camera point.

iv. Overall there was a diverse representation of landscape features where the cameras ended up being placed - from ridge lines to river banks to mountain faces to valley bottoms.

c. *Results:*

1. The cameras were removed in the same order they were deployed. Each camera was in the field for a minimum of 45 days. Overall, the camera success rate was quite high. Though about 11 cameras, or 15% of the units, stopped working in the field following a heavy downpour. After speaking with Panthera's camera developers, it was found that nearly 30% of the Panthera V4 cameras used in this site had a manufacturing defect that allowed water to seep into the unit destroying the circuitry.

2. Overall the results of the survey pointed to a very rich environment that is not only capable of supporting a wide diversity, but also a very high abundance of species. A total 18 species of large and medium sized mammals were phototrapped. A large percentage of animals were photographed with young, perhaps due to the timing of the survey, i.e. early spring. Himalayan back bears recently emerged from hibernation were phototrapped in many locations. Following species of medium-large animals that were captured in this site (pictures at the end of the report): tiger, clouded leopard, Asiatic golden cat (a bewildering array of color variations of the golden cat were photographed including deep red, silver, spotted, grey and a very unique ocelot form - the first record from India! The ocelot form was previously known only from Central China though more recently a specimen was recorded from Bhutan), marbled cat, leopard cat, Asiatic wild dog, Himalayan black bear, spotted linsang, masked palm civet, yellow throated marten, a yet unidentified weasel/stoat, Mishmi takin, Himalayan serow, Gongsham muntjac (possibly), Indian muntjac, wild pig, red goral, Tibetan/Arunachal macaques.

Interesting Observations:

1. There appears to be widespread dislike for the forest department and any entity they represent (for instance, wildlife conservation). The District Forest Officer (DFO), the senior most forest official in Dibang Valley, has been unresponsive to people's complaints about mithun depredation by wild animals. However, recently he sent around a notice to the villages within a certain radius of the protected area boundary declaring that their land was going to be included in an eco-sensitive zone with

restrictions on hunting and farming. This has created further mistrust between the people and the department. Though the land is described as "useless and unproductive" by some local people, the idea that the forest department can take it or control access to it by simple issuing a notice, is unacceptable.

2. While at the same time huge swaths of forested land are being prepared for eventual sale to private dam developers at a huge premium. The state government is in the process of assigning formal land tittles to land owners. I wasn't able to completely understand the true nature of land ownership in Dibang Valley. However, according to my preliminary understanding, land ownership in Dibang Valley was a multi layered system – there was clan land within which was village land and finally a small amount of land in the immediate vicinity of the village was private. There are plans to build two dams in the Mathu Valley which will collectively inundate the area around the stretch of forest I camera trapped. The dams are being built by two of the biggest multinationals in the country.

d. *Future plans:*

This upcoming season I am keen to do the following in this site:

1. Household hunting surveys in the same format as explained in the section e.2 in CF1. I will select a few households in each of the villages in this site. The head of each household will be given a simple form to fill out every time a large-medium sized animal is hunted/consumed in the house. Either I or my field assistant will visit each house at least once a month to review the information.

2. I will also conduct participatory wealth rankings, structured interviews with individuals to understand attitudes towards wildlife and mithun depredation surveys in the four villages in this study area.

Overall observations:

1. History of movement and migration within Dibang Valley - There has been a long history of population changes, and movement of people within, into and out of Dibang Valley. The movement of Idus within the Valley was driven in the past by inter clan conflict, Tibetan invasion, changes in the geography and natural calamities. For example, 1951 saw a major earthquake in the Valley. According to local estimates it wiped out more than half of the Idu population. The stories of the devastation of entire clans and villages after the earthquake are still very much a part of the living oral tradition. Such stories of migration, of the route Idus took to reach their current destination, are alive and known even by young Idus. Throughout history and even more recently, Idus have left their traditional homes and moved to newer locations, very rarely, if ever, going back to the old villages. Both study site 2 (PAS1) and site 3 (CF2) had sizeable settlements. It is likely that, over a large time scale, wildlife abundance in the Valley as a whole has remained largely unchanged. However, wildlife distribution and local abundance within the valley would have changed after every migration event. Lu (2010) documented that animal populations in the Hourani territory had remained largely consistent over a 10 year period. She argued that it was not due to a reduction in hunting, but because of socio-political reasons such as communal conflicts and movement that created new sources and sinks.

2. In the 7 months I spent in Dibang Valley, I noticed widespread observance of restrictions and taboos associated with hunting and consumption of wild meat. Almost all the Idus I met and interacted with observed taboos regardless of the level of education, income or location in the district. Young people who lived away from their family, due to education or work, most often did not know much about the taboos. At the same time they didn't go hunting often. My host in Anini is a young well respected local school teacher named AR. AR has a college degree. His wife, also well educated, works as the urban planner with the state govt. Both of them observe food taboos whenever they consume jungle meat. I had an interesting discussion with Alinji's wife. In her own words, "I am educated and I understand science and modern medicine but I still follow the restrictions. There is definitely something there, these are not just superstitions. We are Idu after all and must follow the rules created for us by our ancestors no matter how developed and educated we become. I've seen bad things happened to Idus who did not follow the restrictions. Also our community looks down upon people who don't follow the restrictions. It doesn't just bring harm to the individual breaking the taboo but to other people associated with him."

3. I did come across two people who did not observe cultural taboos – P1 and P2 (names changed to protected informer's identity) – both young men currently living in. P1's wife is a Christian convert and so is P2. As far as my preliminary understanding goes, Christianity seems like the primary reason for changes attitudes towards nature. I would be very interested in following this up in more detail however there are very few Christian Idus in Anini, and the upper and middle belts in general. I'd like to explore this topic in more detail in Roing which has a sizeable Idu Christian population.

Future plans:

1. Place cameras in site 4 (PAS2) in Dri Valley – Sept – Oct, 2014

2. Place cameras in site 1 (CF1) – Nov-Dec, 2014

3. Hunting offtake surveys – Sept, 2014 – Aug, 2015

4. Participatory wealth rankings, focus groups and semi structured interviews – Jan – Aug, 2015

5. Participatory mapping exercises – March – July, 2015

6. Mithiun depredation surveys – March – July, 2015

Selected camera trap pictures:
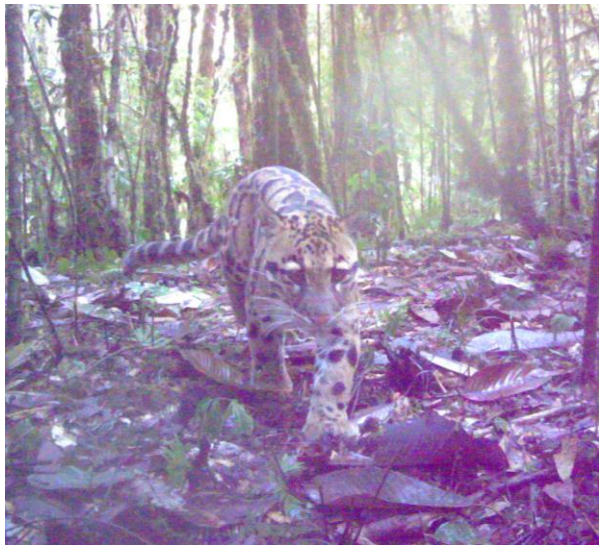
f) Some clouded leopards from CF2

g)   Different color morphs of Asiatic Golden Cat
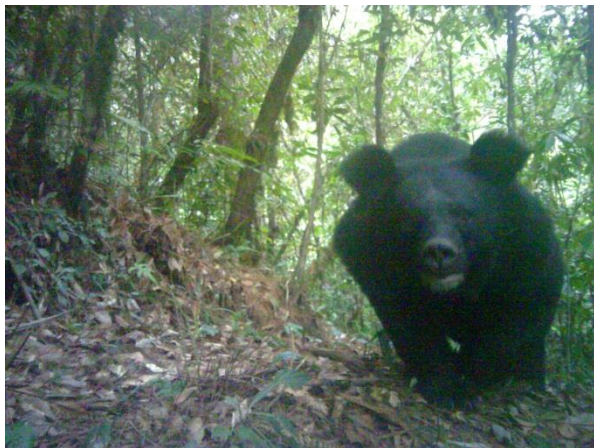
h) Leopard cat   k) Marbled cat

l) Wild dog   m) Spotted linsang
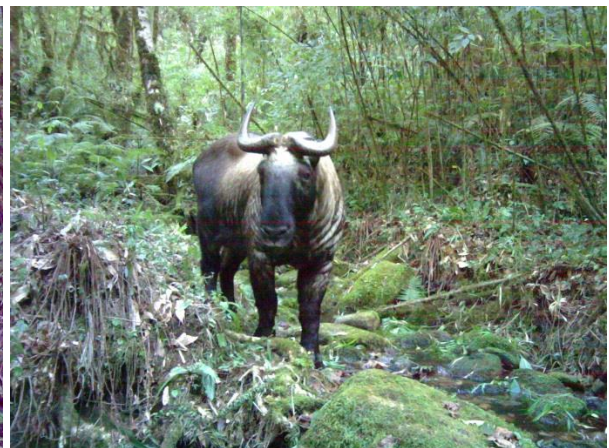

n) Himalayan Black Bear   o) Tibetan macaque (possibly)

p) Mishmi takin

q)   Himalayan Serow

r)   Gongshon muntjac (possibly)

s)   Indian muntjac   t) Red goral

u) Wild pig

v) Temmenick's tragopan

w) Pika

x) An unidentified species of weasel/stoat