Assessing the Status of Snow Leopard in Torkhow Valley, District Chitral, Pakistan

Final Technical Report

Photo by: Jaffar ud Din (Tooshi Game Reserve 2005

Submitted by:

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Acknowledgements

1. Executive Summary:

This study was aimed at assessing the status of Snow leopard, its major prey base, and the extent of human-Snow leopard conflict and major threats to the wildlife in north Chitral (Torkhow valley) Pakistan. Snow leopard occurrence was conformed through sign transect surveys i.e. SLIMS. Based on the data collected the number of Snow leopards in this survey block (1022 Km²) is estimated to be 2-3 animals. Comparing this estimate with the available data from other parts of the district the population of snow leopard in Chitral district was count to be 36 animals. Livestock depredation reports collected from the area reflect the existence of human-snow leopard conflict and 138 cases were recorded affecting 102 families (in a period of eight years, 2001-2008). Ungulates (Himalayan Ibex) rut season surveys were conducted in coordination with NWFP Wildlife department. A total of 429 animals were counted using direct count (point method) surveys. Other snow leopard prey species recorded include marmot, hare, and game birds. Signs of other carnivores i.e. wolf, jackal, and fox were also noticed. Major threats to the survival of wildlife especially snow leopard reckoned include retaliatory killing (Shooting, Poisoning), poaching, loss of natural prey, habitat degradation (over grazing, fodder and fuel wood collection), lack of awareness, and over population. GIS map of the study area was developed highlighting the area searched for Snow leopard and its prey species.

Capacity of the Wildlife Department staff was built in conducting SLIMS and ungulate surveys through class room and on field training. Awareness regarding the importance of wildlife conservation was highlighted to the students, teachers and general community through lectures and distribution of resource materials developed by WWF-Pakistan.

2. Objectives:

The over all purpose of this study was to assess the occurrence and distribution of snow leopard in the north Chitral. As this was the first ever study therefore, we tried to collect information on

- The occurrence of snow leopard in the survey area
- Snow leopard's relative abundance from sign transects
- Which parts of the survey area support the greatest snow leopard numbers?
- The population size of the major prey species
- Characterization of habitat types and conditions and
- Update the existing range maps by gathering information on snow leopard distribution
- Identify major threats faced by the cat and its prey species and protection measures required

3. Methods:

The following methodologies were applied to achieve the aforesaid objectives.

3.1 *Interviews and Questionnaire surveys:* Questionnaire surveys and observations to assess the occurrence and distribution of predators have widely been used in Europe and North America (e.g.; Fuller et al. 1992 and Martizanis 1994). Focused group interviews and semi structure questionnaires were used as survey tools to get the information on snow leopard sighting, depredation, and major threats to the snow leopard in the survey area. These surveys also helped identify priority areas for SLIMS surveys.

3.2 *SLIMS Surveys:* To assess the relative abundance of Snow Leopard in the study area we applied Snow leopard Information and Management System (SLIMS) second order survey technique. Transects were placed on the potential Snow leopard hotspots and data were decoded as per SLIMS standards (Jackson & Hunter 93)

3.3 *Point method* (direct counting) was used to assess the population of major prey species (Himalayan Ibex) of snow leopard in the study area. Counting was made from the selected observation points and each observation site was set depending upon the visibility and topography of area. Binoculars and spotting scopes were used to visualize animals.

3.4 *Literature* was consulted to compare the trend in population of the species over time.

4. Results:

4.1. Questionnaire surveys

Detailed questionnaire surveys were conducted to enlist depredation cases and identification of hotspots. The major respondents were field staff of the Wildlife Department, hunters, herders, and locals who had interest in wilderness.

4.1.1. Identification of survey sites

Based on the interview data, the survey block i.e. Torkhow valley was divided into three survey sites i.e. Zewar Gol, Ujnu Gol, and Sha Junali. "Gol" in local language referred to Pasture/watershed/stream. In past, these three sites remained the potential hunting grounds (Himalayan Ibex and game birds) of local rulers.

4.1.2. Snow leopard Depredation

To make the information more reliable, we asked depredation losses occurred in eight years i.e. 2001 to 2008. One hundred and thirty eight losses of livestock due to Snow leopard, affecting 102 households were reported during the period of eight years (Figure 1).

Figure 1: Livestock losses due to Snow leopard during 2001-2008

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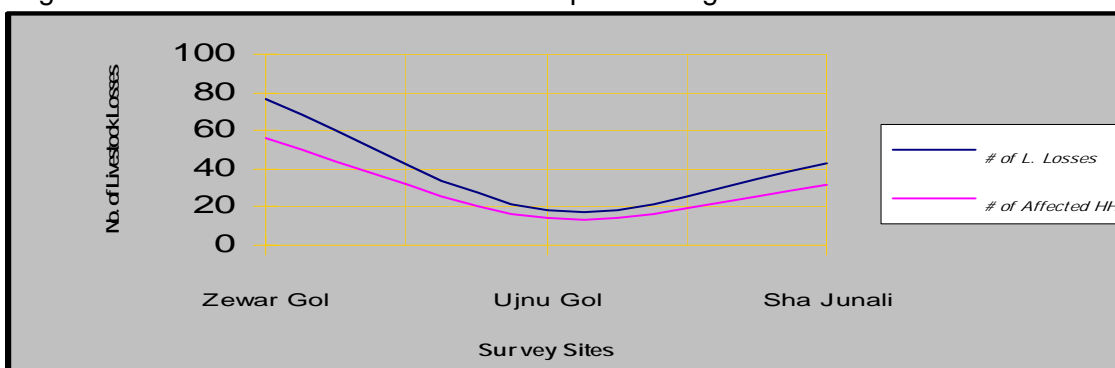
In Zewar Gol, 56 households lost 77 animals, in Ujnu Gol Snow leopard damaged 18 animals of 14 families, and in Sha Junali 32 households lost 43 valuable animals. Cattle made 21% (n=29), goat 68% (n=94), and sheep made 11% (n=15) of the total losses to livestock due to the depredation by the Snow leopard in the three sites (Figure 2).
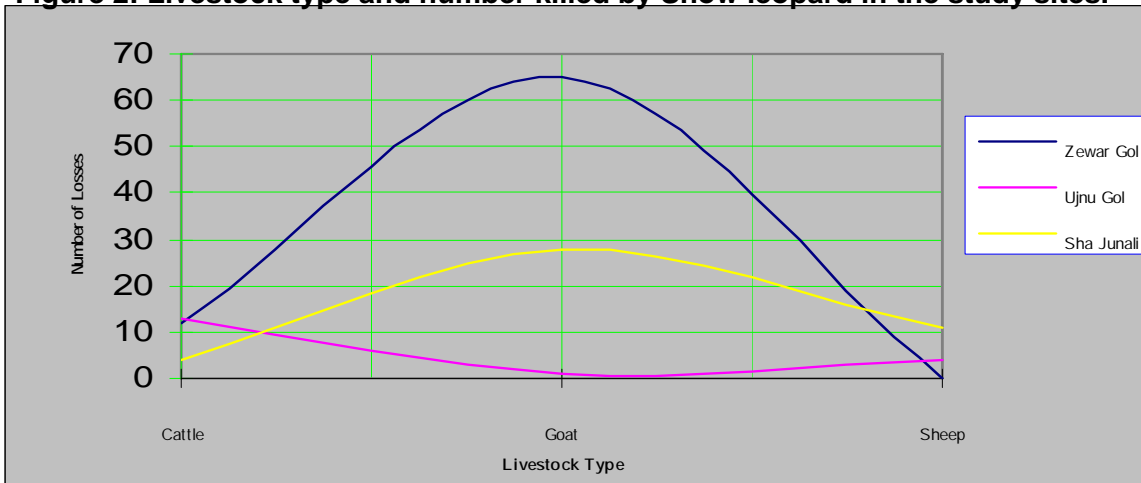
Figure 2: Livestock type and number killed by Snow leopard in the study sites.

4.2. Relative abundance of Snow leopard in the study area

Having identified the survey sites and Snow leopard hotspots, schedule of the SLIMS surveys was chalked out in consultation with stakeholders. Since, SLIMS expeditions need adequate human resource and we were lacking trained personals to assist us in the SLIMS expedition. Given the situation, we decided to train the Wildlife department's field staff in SLIMS techniques.

4.2.1. SLIMS training

Training in SLIMS survey techniques was arranged for the Wildlife Department's field staff and community members. The training was held at a local school in May 2008. Eight Wildlife field staff including a Deputy Ranger, two Head Watchers, five Watchers, and two community members attended the training. The participants get acquainted with handling field equipments, run transect, data recording & arrangement, and reporting through lectures and field demonstration.

4.2.2. SLIMS Surveys

SLIMS sign transect surveys were conducted in the three survey sites. Newly trained Wildlife department's field staff and community members were engaged in the surveys to further build their capacity in undertaking SLIMS. Surveys were conducted the three sites in June, August, and October 2008 respectively.

4.2.2.1 SLIMS in Ujnu Gol

Ujnu Gol was surveyed in the first week of July and seven transects were laid. Major topographic features of the site were rugged snow caped peaks, cliffs, sharp ridges at lower altitudes, and alpine meadows.

The minimum and maximum elevation noted during the transect walk were 3971m and 4088m with mean elevation of 3153m and 3325m at the start and end of the transects respectively. Overall transect length was 3.28km with a mean of 469m for this survey site. Transects length were kept less than a kilometer with the highest length of 850m.

Twenty-three sites containing 42 signs with 16 pugmarks (42.86%), 15 scrapes (35.71), and 6 scats (14.29%) were reckoned while searching for Snow leopard's signs in 7 transects. Sign density of all transects for this survey site was 12.79 (Table 1).

Table 1: Transects Summary

	sites	signs	Pug	Scrapes	Feces	Rock scent
Total	23	42	16	15	6	3
Average	3.29	6	2.57	2.14	0.86	0.43
Minimum	2	5	2	1	0	0
Maximum	5	9	3	4	2	1
Sign/km		12.79	5.48	4.57	1.83	0.91
%age			42.86	35.71	14.29..	7.14

Almost all the signs were old i.e. 66.67% signs were of age class 0 (very old) and 33.33% signs fell into the category of age class 1 (old).

4.2.2.2. SLIMS in Sha Junali

This survey site was visited in August 2008. Six transects with a total length of 5.29km were searched for Snow leopard signs. Mean transect length measured was 882m with elevation raging from 3750m to 3996m at the start and end of the transects respectively. The shortest transect measured 325m while the longest transect length was 1500m. The topography varied consisting of alpine meadows leading to the permanent glaciers. Ridge lines were associated with the streams running down from the glacier melt. Majority transects were ridgelines followed by glacier bases.

Fifteen signs including 2 pugmarks (13.33%), 10 scrapes (66.67%), and 3 scent spray sites (20%) were reckoned in 11 sites with an average of 1.83 sites per transect (Table 2).

Table 2: Summary of sign frequencies in Sha Junali

	sites	*signs*	*Pug*	*Scrapes*	*Rock scent*
Total	11	15	2	10	3
Average	1.83	2.5	0.33	1.67	0.5
Minimum	1	1	0	1	0
Maximum	2	4	1	3	1
Sign/km		2.84	0.38	1.89	0.57
%age			13.33	66.67	20

All the signs represent only two age classes i.e. age class 0 (73.33%0 and age class 1 (26.67%) highlighting no recent visit of the cat in this territory. Furthermore, feces were scarce in this survey site. May be the excessive snow falls and winds washed away signs lying on the sharp and high ridges. Other signs counted were also weathered.

4.2.2.3. SLIMS in Zewar Gol (Site III)

Zewar Gol was visited in the second week of October 2007. It's a deep narrow valley which bifurcates into many similar landscapes each leading towards a separate permanent glacier. We observed 33 signs in the 24 sites of the 8 transects walked. Total transect length measured was 7.24 km with a mean transect length of 905m. Mean elevation ranged 3239m to 3550m. Transects length varied from 255 m to 1430 m. All the signs were old and fell in age class o and age class 1 respectively (table 3).

Table 3: Summary of SLIMS findings in Zewar Gol

	sites	signs	Pug	Scrapes	Feces	R. scent	Age Class 0	Age Class 1
Total	24	33	8	13	7	5	18	15
Average	3	4.13	1	1.63	0.88	0.63	2.25	1.88
Minimum	2	2	0	1	0	0	1	1
Maximum	4	7	2	2	5	1	4	5
Sign/km		4.56	1.1	1.8	0.97	0.69		
%age			24.2	39.4	21.2..	15.2	54.55	45.45

As a whole, 21 transects were placed in the survey block having 15.36 km in length with mean transect length of 732m. Over all site number was 58 with mean sites per transect of 2.76. Maximum sites per transect was estimated 5 while minimum 1.
Ninety signs with maximum 9 and minimum 1 sign per site were recorded. Sign density estimated was 5.86, showing low density of the cat in the survey area.
Figure 3 gives the detail of the sign frequencies of for the entire area recorded during the three surveys.
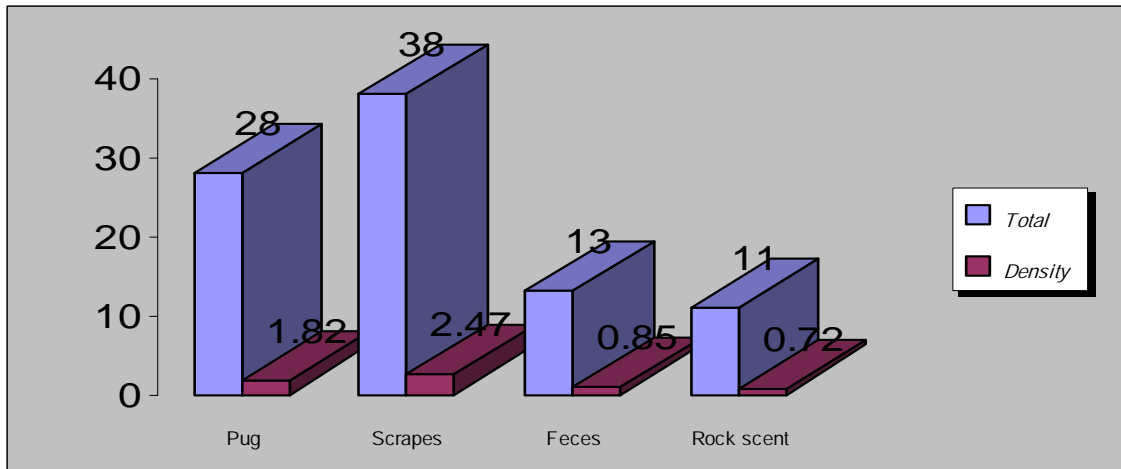
Similarly, all the signs recorded were old and weathered, thus fell into the two age classes i.e. Age class 0 and age class 1 respectively (Figure 4).

**Figure 4: Sign age Classes**
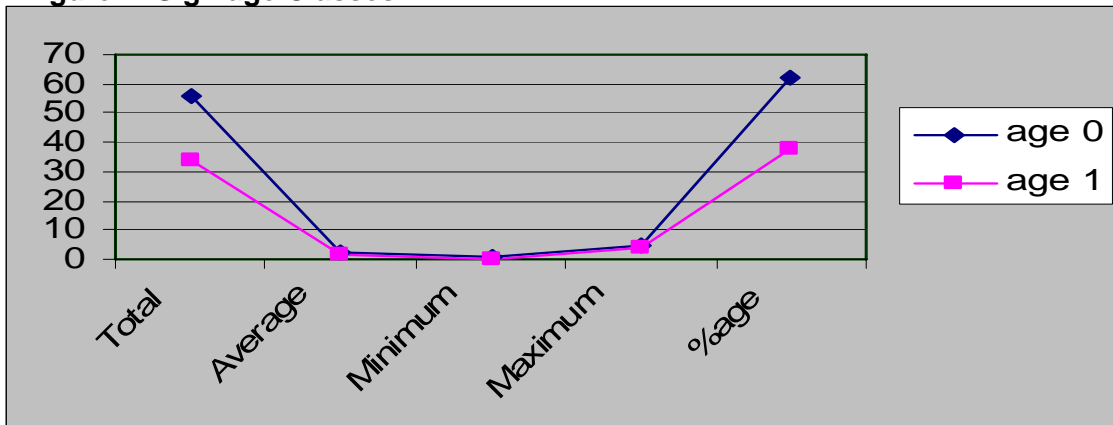
4.3 Ungulates Surveys

Himalayan Ibex (*Capra ibex)* is the only wild goat present in the study area. Ibex rut season surveys were conducted in the three study sites (Ujnu Gol, Sha Junali, and Zewar Gol) in the last week of December 2008. Direct counting (Point method) was used to assess the Ibex population and counting was made from the specific vantage points.

Ibex was sighted in each survey site. Count was made in each vantage point and data was summed up to represent the over all population status in each site and the whole survey block subsequently.

Total count for the survey block revealed the population of 429 animals with 128 in Zewar Gol, 184 in Ujnu Gol, and 117 in Sha Junali respectively (Figure 5).

Figure 5: Population status of Ibex in the survey sites
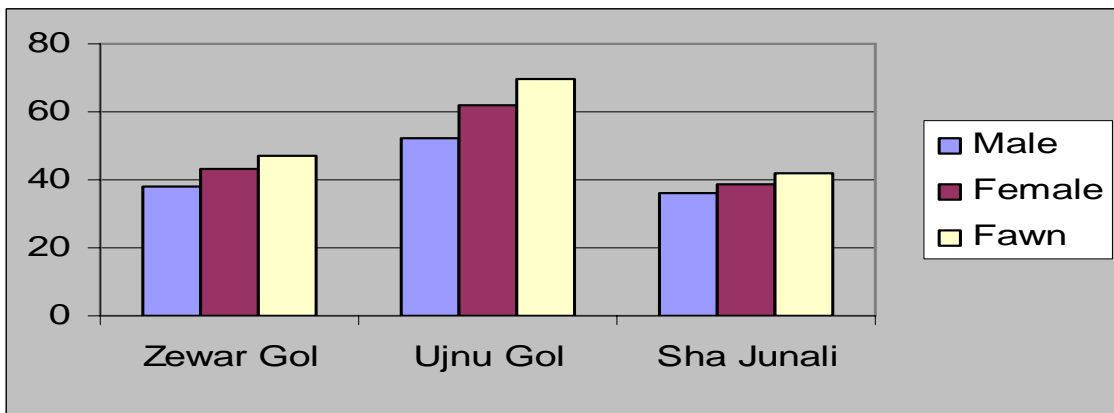
In Zewar Gol male constitute 30%, female 34%, and fawn 36% of the total count respectively. Ujnu Gol had Ibex population having 28% male, 34% female, and 38% fawn, while in Sha Junali male were 31% of the total population, female 33%, and fawn 36% respectively. Overall sex proportion of the survey block was very much close to the individual sites (Figure 6).

Figure 6: Overall sex ratio of Ibex population in the study area
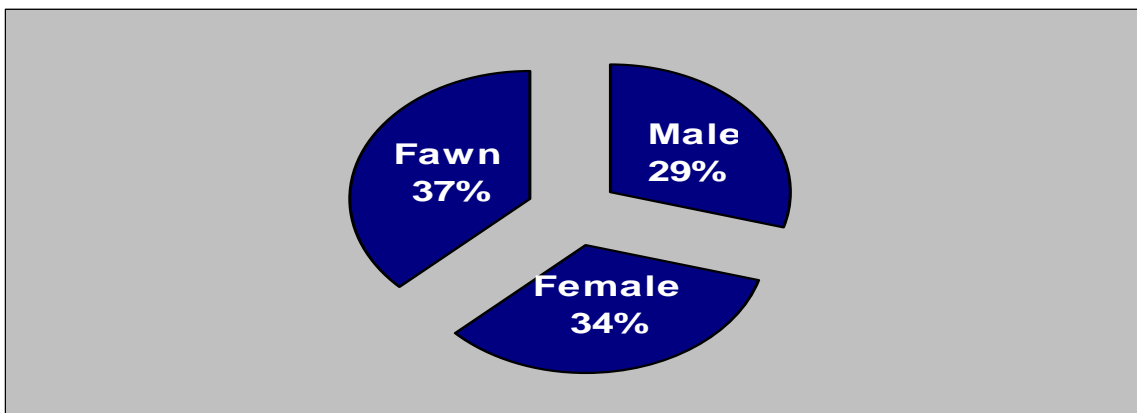
4.4 Other wildlife observed

During the surveys other wildlife observed (signs and sighting) include wolf (*Canis lupus*), jackal (*Canis aureus*), fox (*Vulpus vulpus*), hare, (*Ovis oitolus*), marmots (*Marmota caudata*), Snow cock (*Tetragallous Himalayansis*), and chukar partridge (*Alectores chukar*). Marmots were quite abundant in Sha Junali, while scats of fox were the other dominant signs noticed during the survey.

4.5 Threats to Snow leopard and other wildlife

All the big threats noticed during the study were human-induced and economically fueled. The following major threats were identified:
  ❖ Retaliatory killing (Shooting, Poisoning)
  ❖ Poaching
  ❖ Loss of natural prey
  ❖ Loss of habitat (over grazing, fodder and fuel wood collection)
  ❖ Lack of awareness
  ❖ Over population

The threats were ranked on the basis of their intensity as per respondents is given in Figure 7.

Figure 7: Intensity of threats to the wildlife in the survey area.
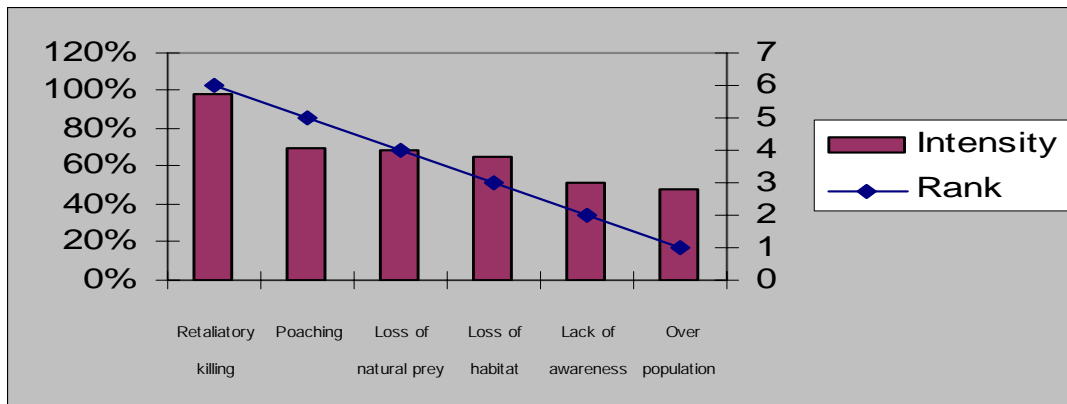
4.6 GIS mapping of the study area

Good map nor only make survey easy but also helps future such efforts if undertaken in the same area and also adds to the validly of the information. An attempt was made to develop GIS map of the study area showing the transects placed and total area covered. GIS calculation revealed that the snow leopard habitat in this survey block was estimated to be 635 square miles (1022km²).   Map is attached as annex 1.

5. Discussion:

Snow leopard range in Pakistan is estimated to be 80,000 km^2 (Fox 94). Snow leopard occurs in the Hindu Kush range in the Northwest Frontier Province's Chitral District, and in the Karakorum Range of the Northern Areas in the Gilgit, Hunza and Baltistan districts. A good population of snow leopard is reported from the Shimshal area in Hunza, but no density estimates are available (Wegge 1988). Its presence in Azad

Kashmir Province remained unconfirmed (Roberts 1977) until recently. However in surveys in 2008, carried out jointly by SLT, AJK Wildlife Department and HWF, some fresh sign of snow leopard were observed in Shontar Valley (Neelam District of AJK). Schaller, 1976 placed snow leopard number in Pakistan 100-250 but assuming a mean density of 1/250 km^2, the total population for Pakistan would be no more than 320.

Chital district (14,850 km$^{2)}$ fall in the Hindu Kush mountain range and mostly comprises of arid alpine habitats with good population of wild ungulates i.e. markhor and ibex along with game birds, wild hares, and marmots. Most of its area provides potential habitat for snow leopard, however remains largely unexplored. Our study area (Torkhow valley), is one of such areas, where no scientific information regarding this elusive cat was available.

Thus, this study provided first ever density estimates of snow leopard from Torkhow Valley, which lies in the north of Chitral district. Based on the sign densities calculated and comparing these with the standard SLIMS estimates we expect occurrence of 2-3 Snow leopards in the study area.

Relative abundance of snow leopard in this study area is low and comparable to other parts of the district. SLIMS surveys conducted in Chitral Gol National Park in 2008 (Annual Report of SLT Pakistan 2008, unpublished report) showed the mean density of 5.86 very close to that of our study area. Similarly, SLIMS surveys conducted in 12 other valleys of Chitral (SLT, Pakistan, 2001-07) reveled similar densities i.e. low. Furthermore, the first ever GPS collared snow leopard captured form Chitral Gol National Park (SLT, 2006-07) showed home range of the cat more than 1500 square kilometer, supporting our observation of low sign density in the area.

Based on compilation of various reports on sighting, depredation, and other indirect sightings, the NWFP wildlife Department estimated snow leopard numbers in NWFP to be 76 animals (Malik, 95). Based on our results (2-3 (average 2.5) animals/1022 square kilometer) we estimate the number for Chitral (14850 square kilometer) to be 36 animals.

According to NWFP Wildlife Department annual survey reports (NWFP WL Dept: 2004-07) based on sighting and livestock kills there are 2,2,4,2 (for 2004-07, respectively) snow leopards in the Torkhow valley and 25,24,25,21 (for 2004-07, respectively) snow leopards in district Chitral, respectively. These numbers (2, 2, 4, 2 [average 2.5) are very much same as that of our findings but the total numbers for the Chitral district seems under estimated.

The study also reveals a good population (429 animals) of primary natural prey of snow leopard (Ibex) in the study area. The highest number noticed in Ujnu Gol (1840, while the lowest was recorded in Sha Junali (117). Zewar Gol had total Ibex population of 128 animals. NWFP Wildlife department reported 403 animals in 2004, 326 animals in 2005, 327 animals in 2006 and 245 animals in 2007 (NWFP Wildlife Dept: 2004-07). Thus an average population in five years calculated is 346 animals.

Depredation surveys from 2001 to 08 divulge total losses of 138 domestic animals (average 17.25 per year) affecting 102 families (average 13 families per year). Thus indicates the existence of human-predator conflict, which is also reflected by the retaliatory killing being the major threat in the area.   Other threats were poaching, loss of natural prey, loss of habitat (over grazing, fodder and fuel wood collection), lack of awareness, and over population.

NWFP Wildlife Department received 59 claims for the losses of 303 livestock head mostly sheep and goat form Chitral and other parts of NWFP in a period of ten years

(Malik, 1995). The situation creates an alarming threat to snow leopard as people tempt to kill the cat in retribution. A few instances of such killings have been reported from Chitral as well as northern areas but understandably most of the killings go unnoticed and very few dead snow leopards are documented by the Wildlife staff (Ahmad 1994). Ahmad (1994) reported the availability of Snow leopard skins in the market.

Though there were no reports of snow leopard killing in the area, yet the depredation issue makes the species vulnerable in the study area.

To document the densities of snow leopard, its prey species and depredation pressure trained human resource is prerequisite. We felt that the non-availability of trained staff in the study sites was the main cause of the lack of data regarding Snow leopard. We hope the wildlife staff trained during the study, will maintain information collection from the area in the future.

During the questionnaire surveys, it was noticed that the locals are unaware of the ecological importance of the wildlife especially carnivores, therefore revulsion against carnivores was noted in the community. An effort was made to educate people i.e. students, teachers and general community on the importance of wildlife conservation through lectures and distribution of available recourse material.

5.1. Recommendations

- Although the occurrence of snow leopard in the study area was conformed yet we suggest to repeat these transects periodically to better understand the variation in the density of Snow leopard.

- Like our study area, more than 50% of snow leopard habitat in Chitral district lies along the border with Afghanistan.   Therefore, we recommend conducting similar surveys in the Afghan territory as well. This will help better understand the movement and range of snow leopard in the region.

- To address human-snow leopard conflicts we suggest initiation of community based conservation program in the study area.

- Educating locals of the importance of biodiversity conservation would also be helpful in conserving this elusive cat.
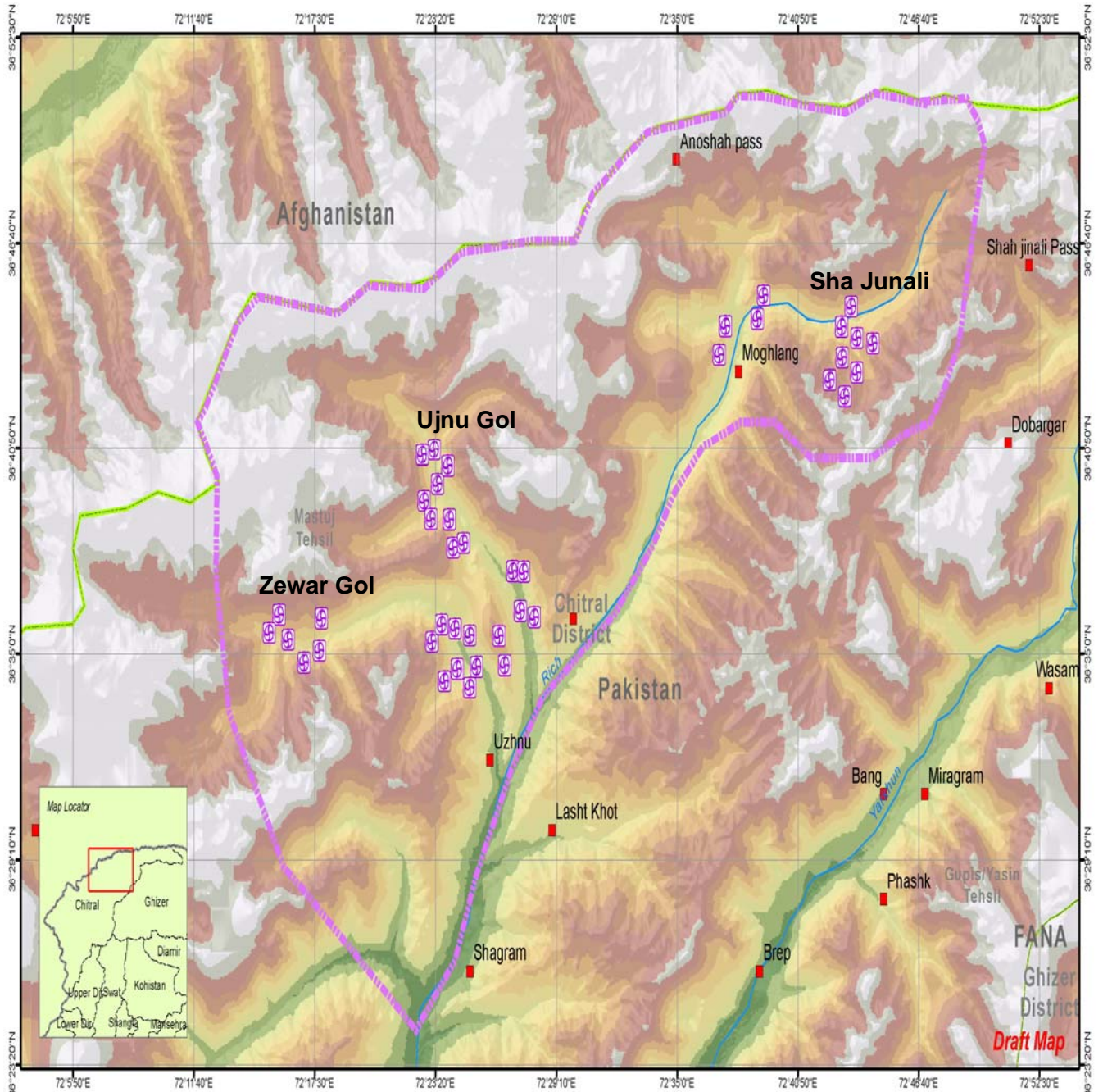
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6. Photographs:

Photos are attached as annex II.

Annex 1: Map of the study area

Snow Leopard Habitat in Torkhow Valley, Chitral

Annex 2: Photographic review of the study

SLIMS Training (class room)

SLIMS Training (Field work)

Depredation surveys

SLIMS Training (Field work)

Snow leopard sign identification

Livestock depredation

Snow leopard scat

Hunter's camp at Zewar Gol

Overview of the sites surveyed

Search for Snow leopard signs

Survey Team

Camp site

Cattle herd at Sha Junali