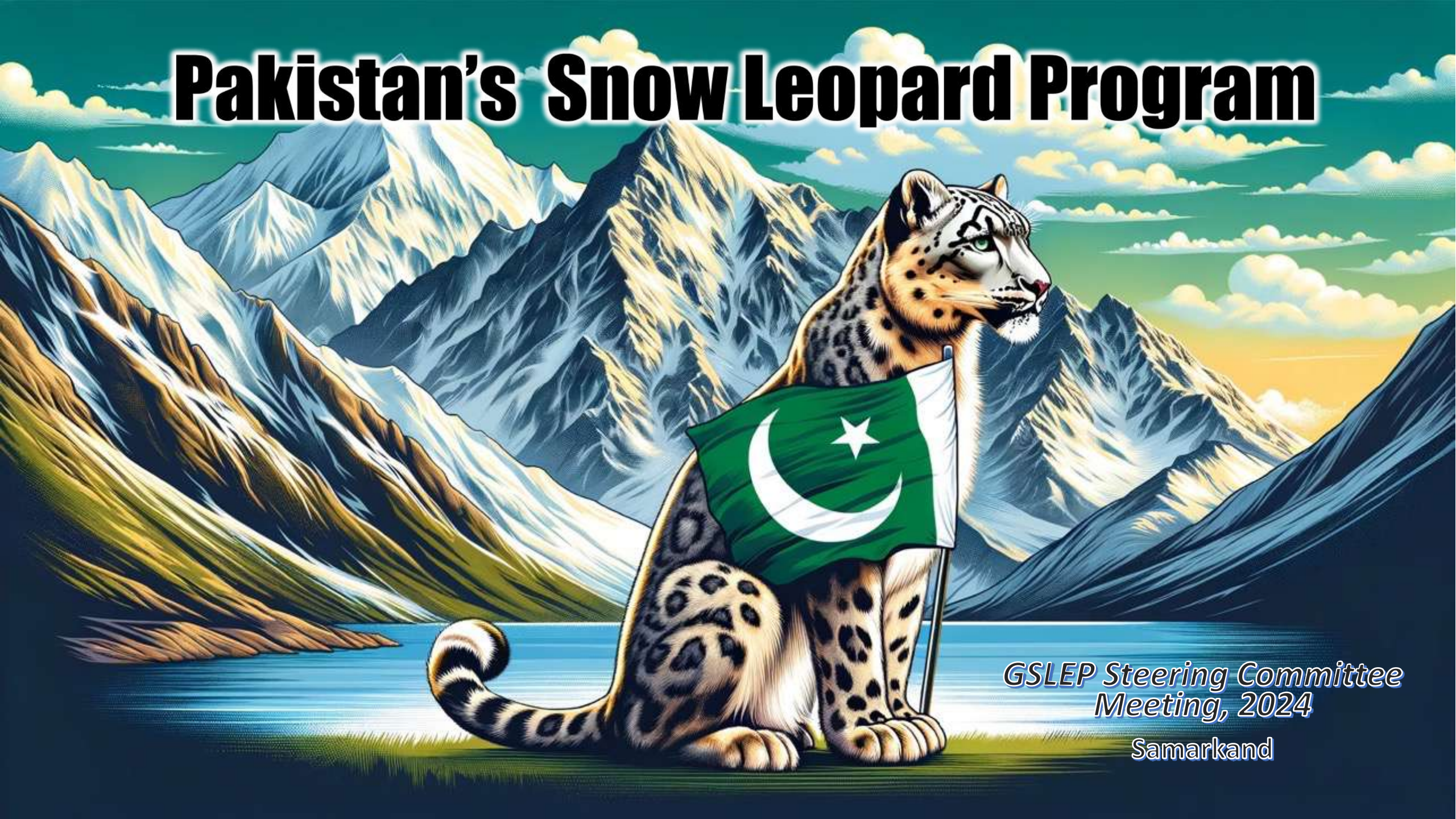
Pakistan's Snow Leopard Program

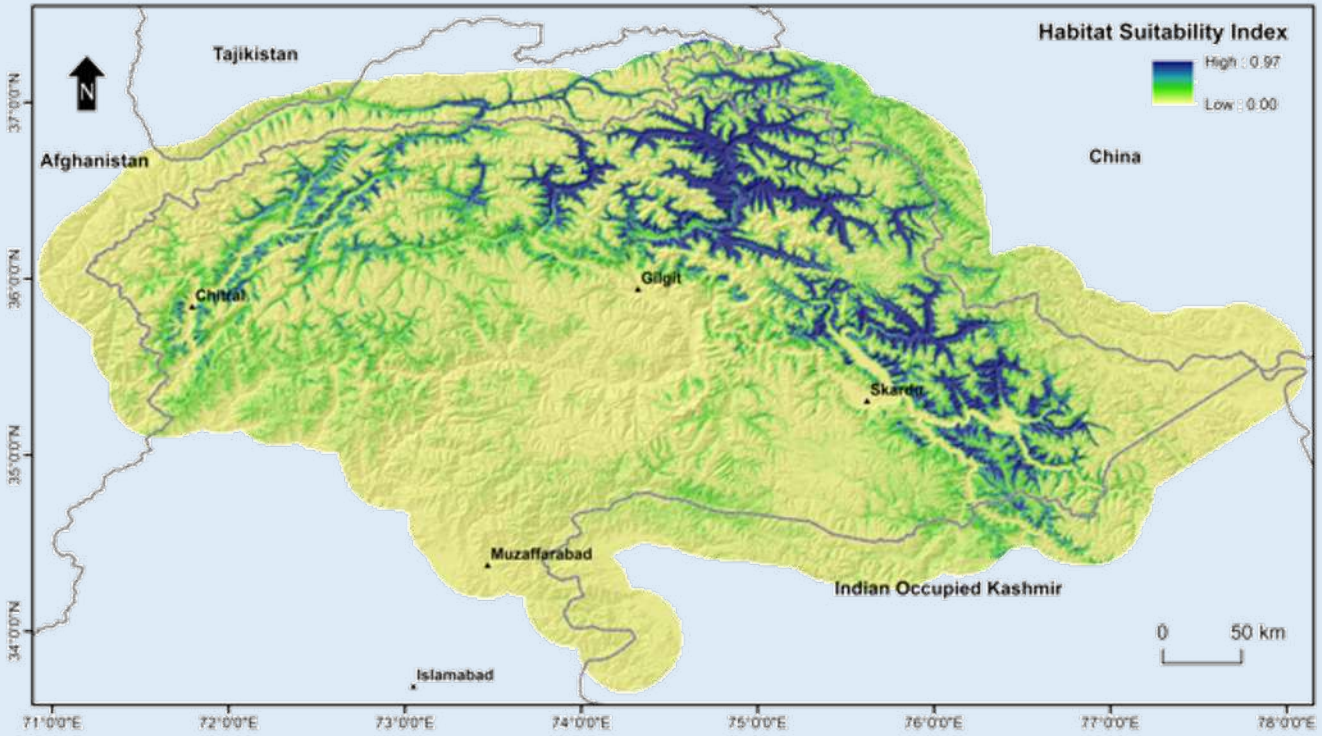


GSLEP Steering Committee Meeting, 2024

Samarkand

SNOW LEOPARD ECOSYSTEM IN PAKISTAN

- Habitat in Pakistan: **80,000 km² –** Major stronghold in Karakoram-Pamir ranges
- Provides subsistence to **9 Million people**
- ES, worth **6730 ± 520** USD/Household (HH)/yr




Contents lists available at ScienceDirect

Ecosystem Services

journal homepage: www.elsevier.com/locate/ecoser

ELSEVIER

Full Length Article

Analysis of provisioning ecosystem services and perceptions of climate change for indigenous communities in the Western Himalayan Gurez Valley, Pakistan

Uzma Saeed, Muhammad Arshad, Shakeel Hayat, Toni Lyn Morelli, Muhammad Ali Nawaz


PLOS ONE

RESEARCH ARTICLE

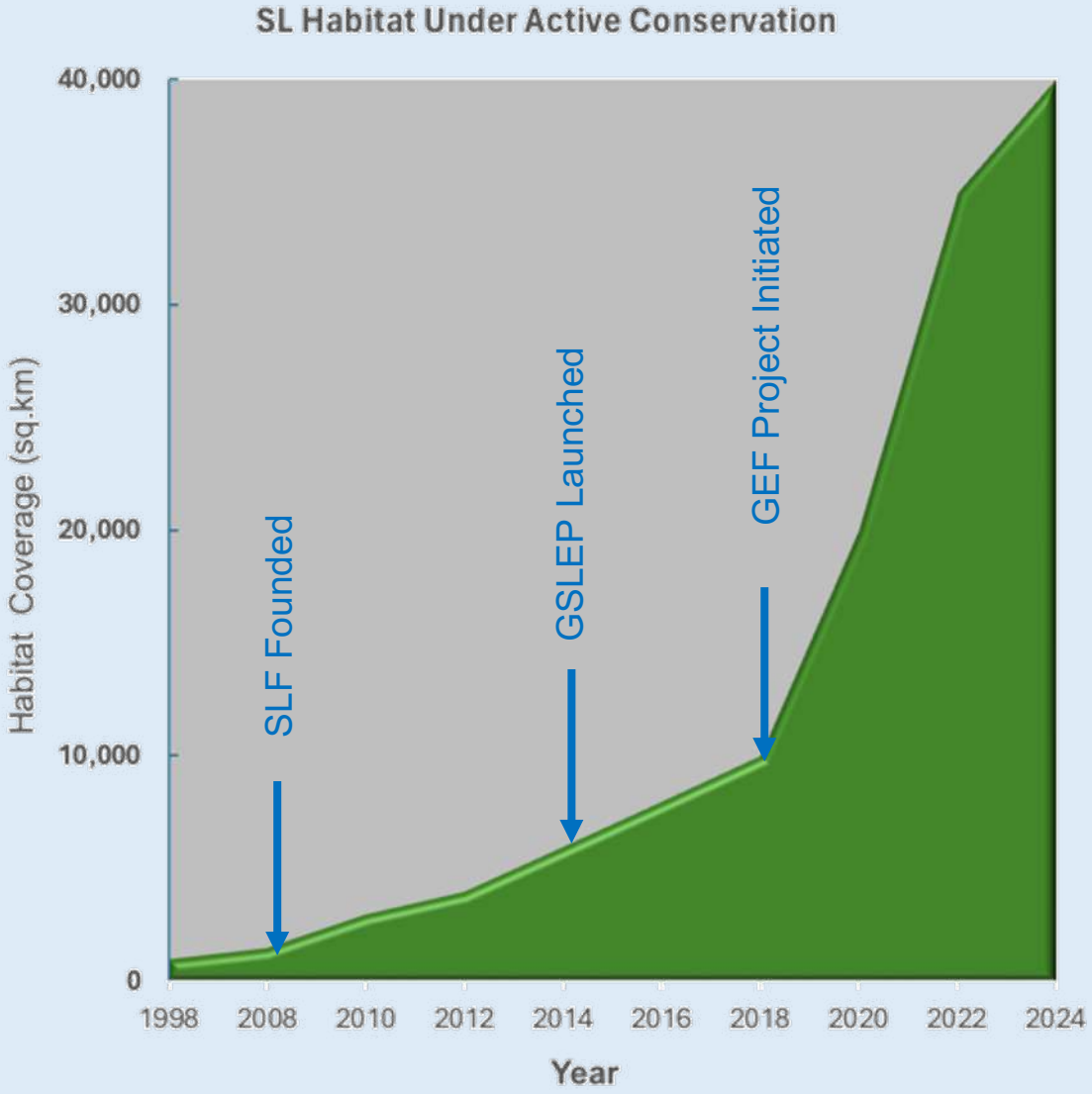
Identifying priority landscapes for conservation of snow leopards in Pakistan

Shoaib Hameed, Jaffar ud Din, Hussain Ali, Muhammad Kabir, Muhammad Younas, Ejaz ur Rehman, Fathul Bari, Wang Hao, Richard Bischof, Muhammad Ali Nawaz

PAKISTAN'S SNOW LEOPARD PROGRAM

IMPLEMENTING PARTNERS

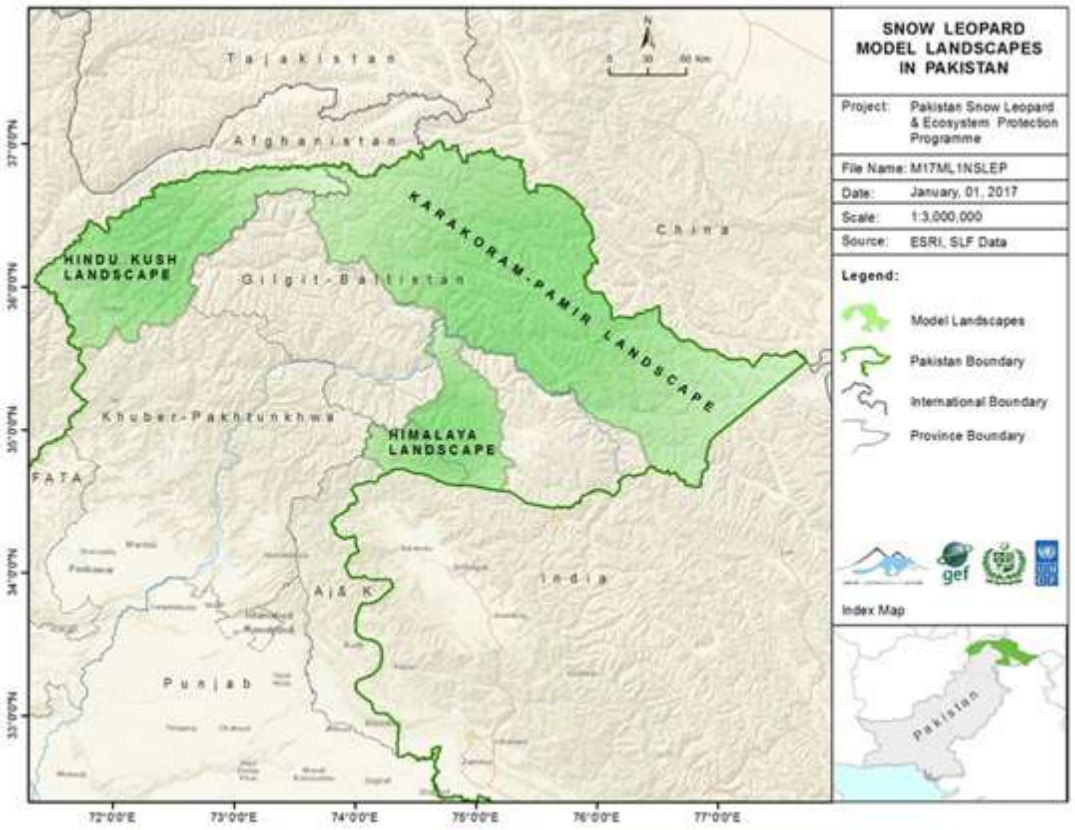
- Ministry of Environment and Climate Change (MoECC)
- Provincial Wildlife Departments (GB, KP, AJK)
- Mountain Communities
- Conservation Organizations
  - Snow Leopard Foundation
  - WWF
  - BWCDO
  - Others
- Donors
  - GoP, SLT, GEF, DARWIN, WFN, US Embassy, SLC, etc



Target 1: Promote landscape approach for snow leopard conservation

Progress: Identified 3 model landscapes and developed management plans;

- ❑ **Hindu Kush** (13,883 Km²)
- ❑ **Karakoram-Pamir** (38,245 Km²)
- ❑ **Himalaya** (7,055 Km²)



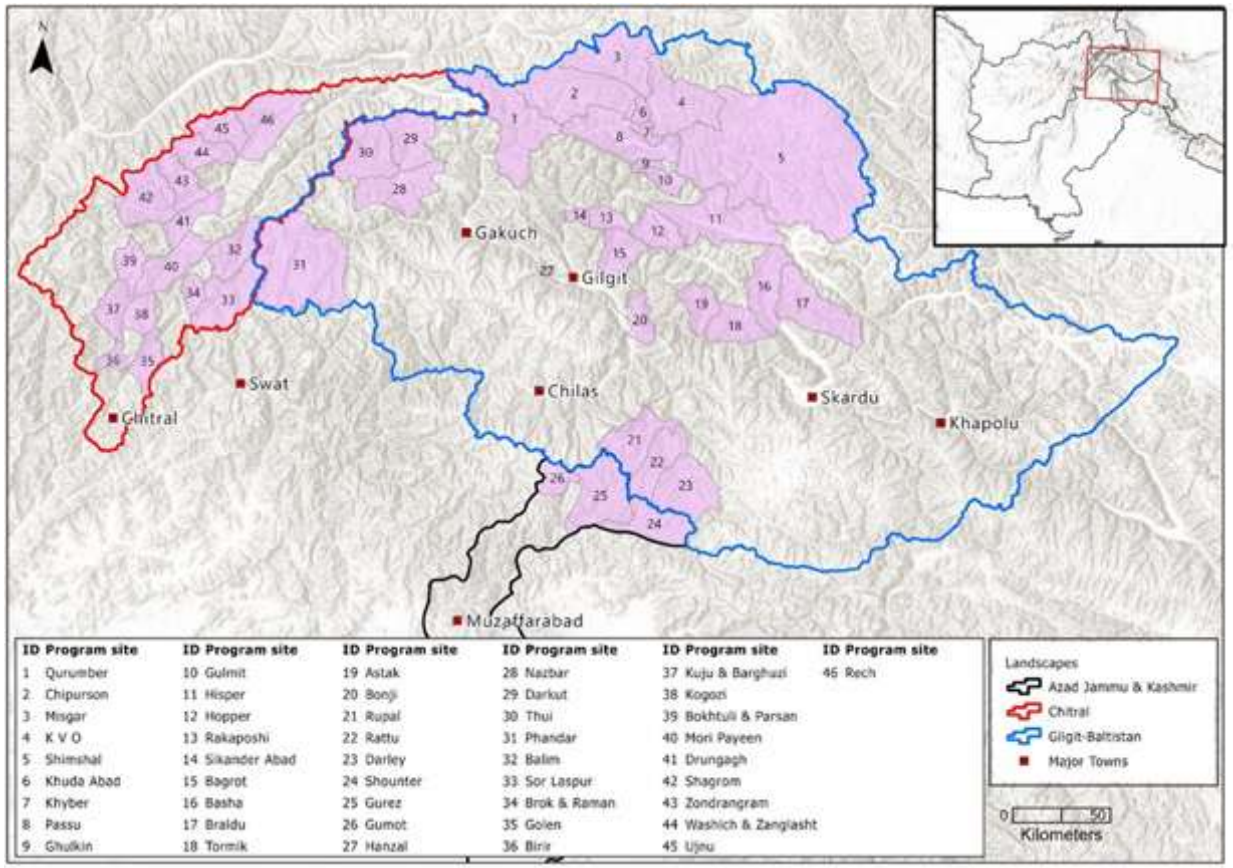
Status: 100% (Achieved)

Target 2: Initiate participatory conservation to enhance tolerance and build support for snow leopards

Progress: Participatory conservation measures benefiting **39,748** households are operational in **50 valleys** across a **30,075 km²** area;

- ❑ **45 Predator-proof corrals**
- ❑ **31 livestock insurance schemes**
- ❑ **400,000 livestock are** vaccinated

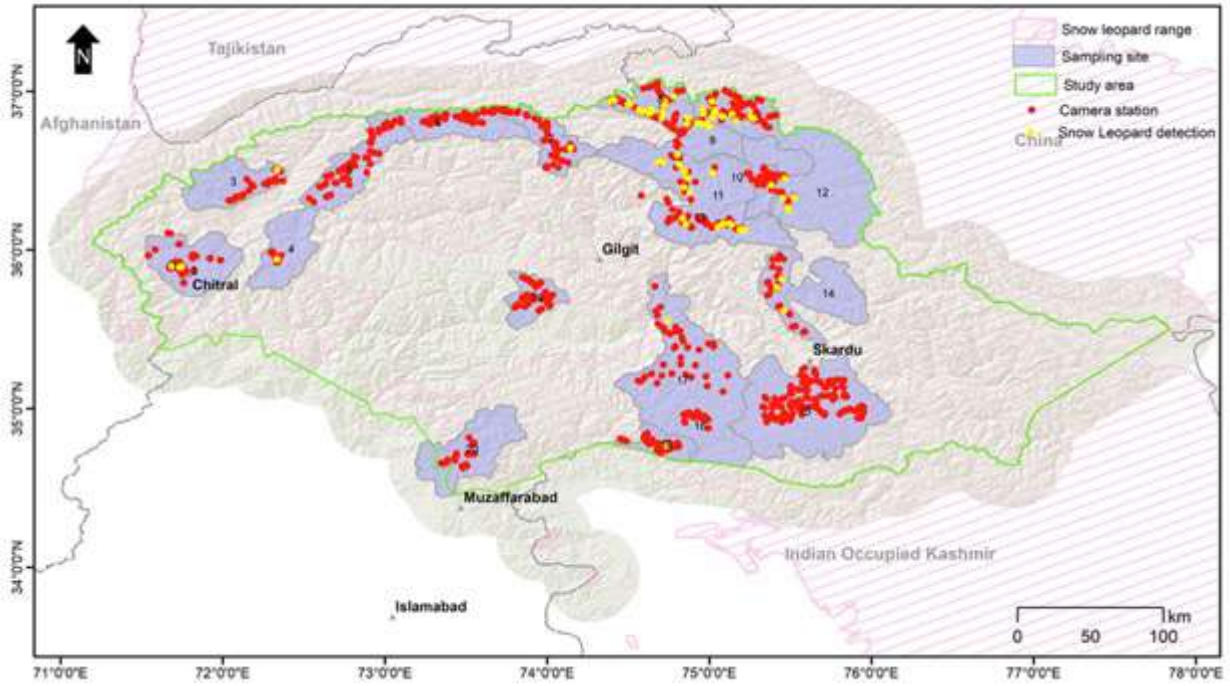
Status: 50% (Spatial coverage)



Target 3: Enhance scientific knowledge on snow leopards, prey species, and habitat

Progress:

- ✓ Extensive ecological surveys using camera traps were conducted across 39,983 km² area;
- ✓ Noninvasive genetic sampling across ~40,000 km² area and 1174 samples were collected;
- ✓ Assessment of wild prey of snow leopards across ~42,000 km² area;
- ✓ Human-carnivore interaction surveys in 60 valleys covering ~72% of the snow leopard range



Status: 90%

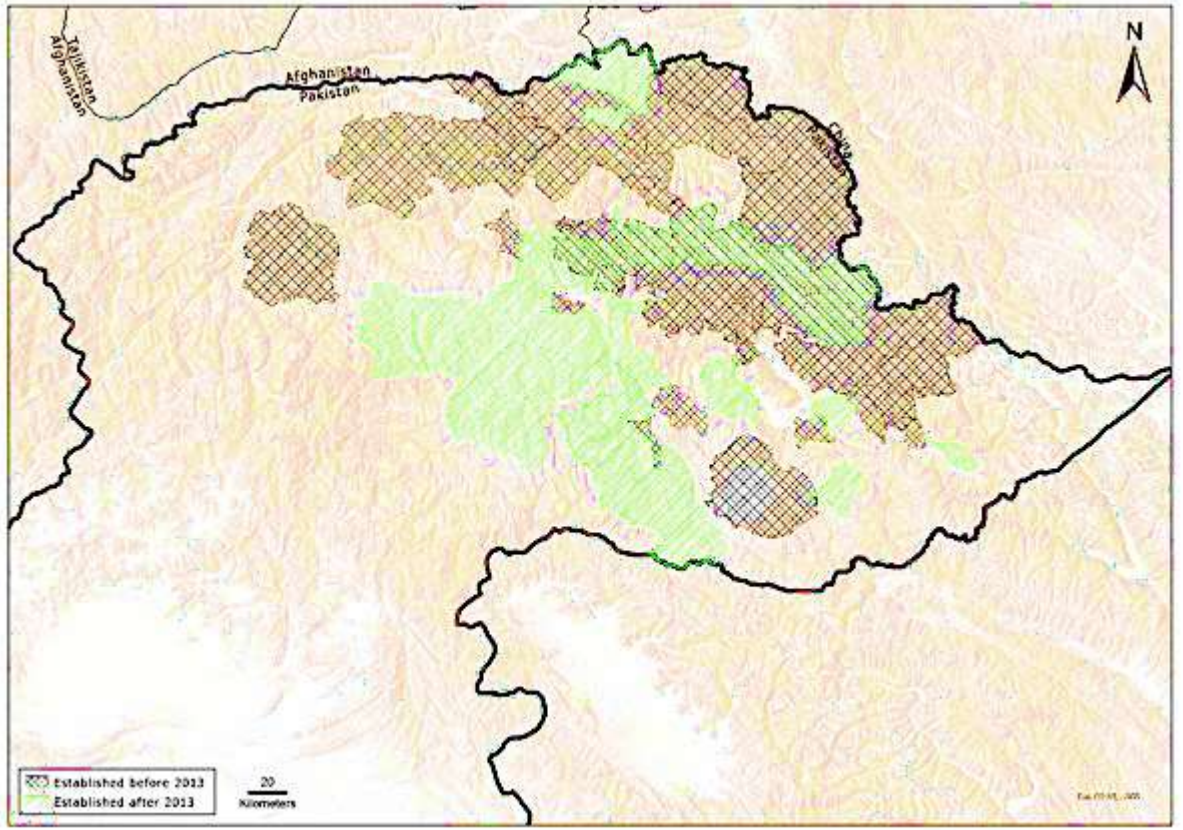
Target 4: The expansion and improvement of the management of the PA network in Pakistan

Progress:

Since, the inception of GSLEP 27,411km² area was brought under the PA network in the snow leopard range:

- CMCAs=39 (18,397km²)
- Biosphere Reserves=2 (5,829km²)
- National Parks=2 (3,185km²)

Status: 100%



Target 5: Institutional strengthening and capacity building

Progress:

- A committee established and operational at national level
- Landscape management committees notified at provincial level
- Seven students completed their PhD dissertations with the snow leopard program
- Fifty master students completed postgraduate degrees
- Over 500 professionals, community members and students were trained in snow leopard research

Status: Ongoing

Target 6: Trans-boundary cooperation

Progress:

- Experience sharing with range countries
- Information on the IWT was periodically shared with the GSLEP Secretariate;
- Major research findings and success stories of the Program were disseminated in the form of Peer Reviewed Scientific Publications.

Status: ongoing

RESOURCE MOBILIZATION FOR NSLEP (National Goals of GSLEP)

Government funded projects:

- Ten Billion Tree Tsunami Programme (TBTTP)= PKR 125.18 billion
- Allocation for the SL Range Provinces= PKR 36 billion
- PKR 15.59 billion is allocated to promote wildlife conservation

Donor Funded Projects:

- GLOF Project=US$ 36.9 million [Operational in GB and KP]
- GEF= US$4.6 million
- Snow Leopard Trust is supporting Pakistan SL Program since, 1998.
- Other donors include Panthera, WFN, Darwin Initiative, WLT

Financial gaps and needs: USD 8-10 million required for the implementation of the Landscape Management Plans

Future plans: Explore potential funding avenues at National and International levels

Re-analysing Threats to Snow Leopards, their Ecosystems, and Local Livelihoods

Most of the **Conventional Threats** to snow leopards, their wild prey
and ecosystems remained un-escalated or reduced.

IWT and habitat degradation due to the climate change will remain a challenge for the upcoming years

SR#	Major conventional threats	Current status
1	Habitat degradation and fragmentation	
2	Poaching of wild prey	
3	Prey reduction due to competition with livestock	
4	Human-snow leopard conflict	
5	Illegal Wildlife Trade	
6	Lack of appropriate policies	
7	Lack of effective enforcement of laws	
8	Lack of institutional capacity	
9	Lack of awareness among local people	

Re-analysing Threats to Snow Leopards, their Ecosystems, and Local Livelihoods……

Climate change and associated disasters have emerged as a major threat to the snow leopard ecosystems and local livelihoods in the recent years.

Proposed strategy:

- Coordination among stakeholders at national, regional and local levels
- Effective enforcement of environmental laws
- Promote Nature-based Solutions

Emerging threats	Status
Climate change and related disasters	
Mining	
Mass Tourism	
Linear infrastructure projects	
Disease Outbreaks/Transmission	

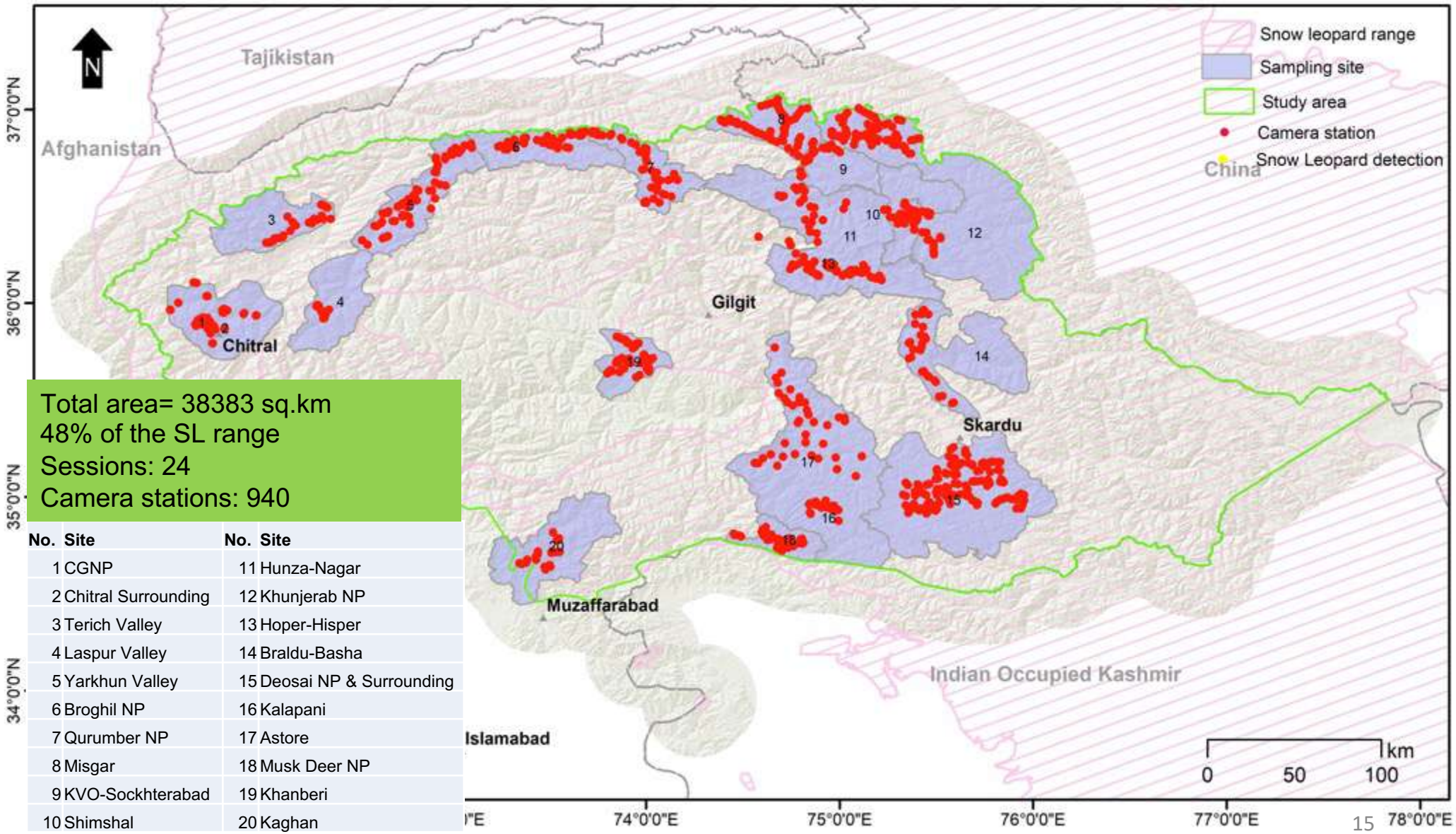
Implementation of PAWS protocols

Studies undertaken

- Extensive camera trapping
- Genetics sampling
- Assessment of prey base
- Climate studies

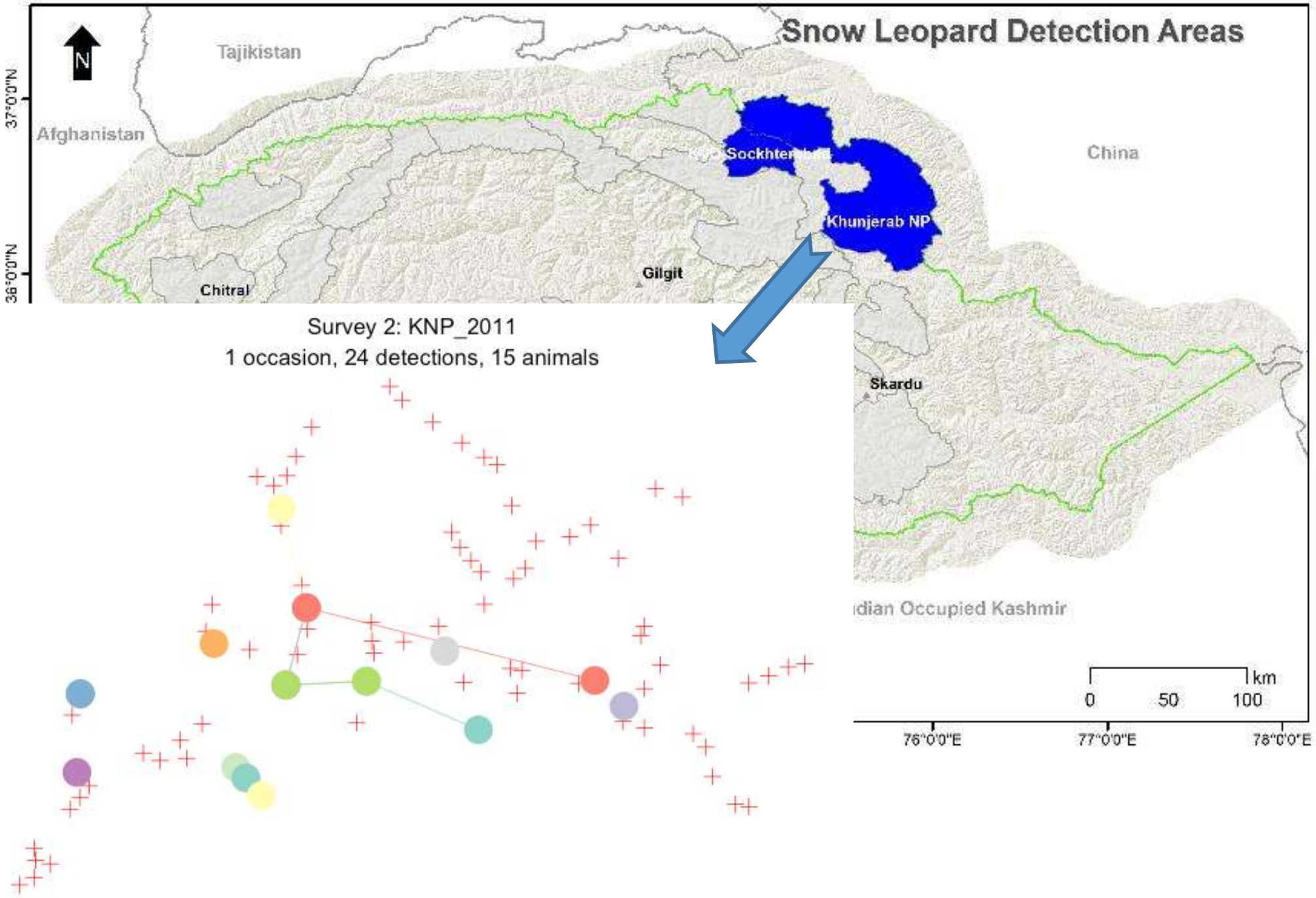
Gaps and needs: **Monitor population trend of snow leopard populations in key landscapes**

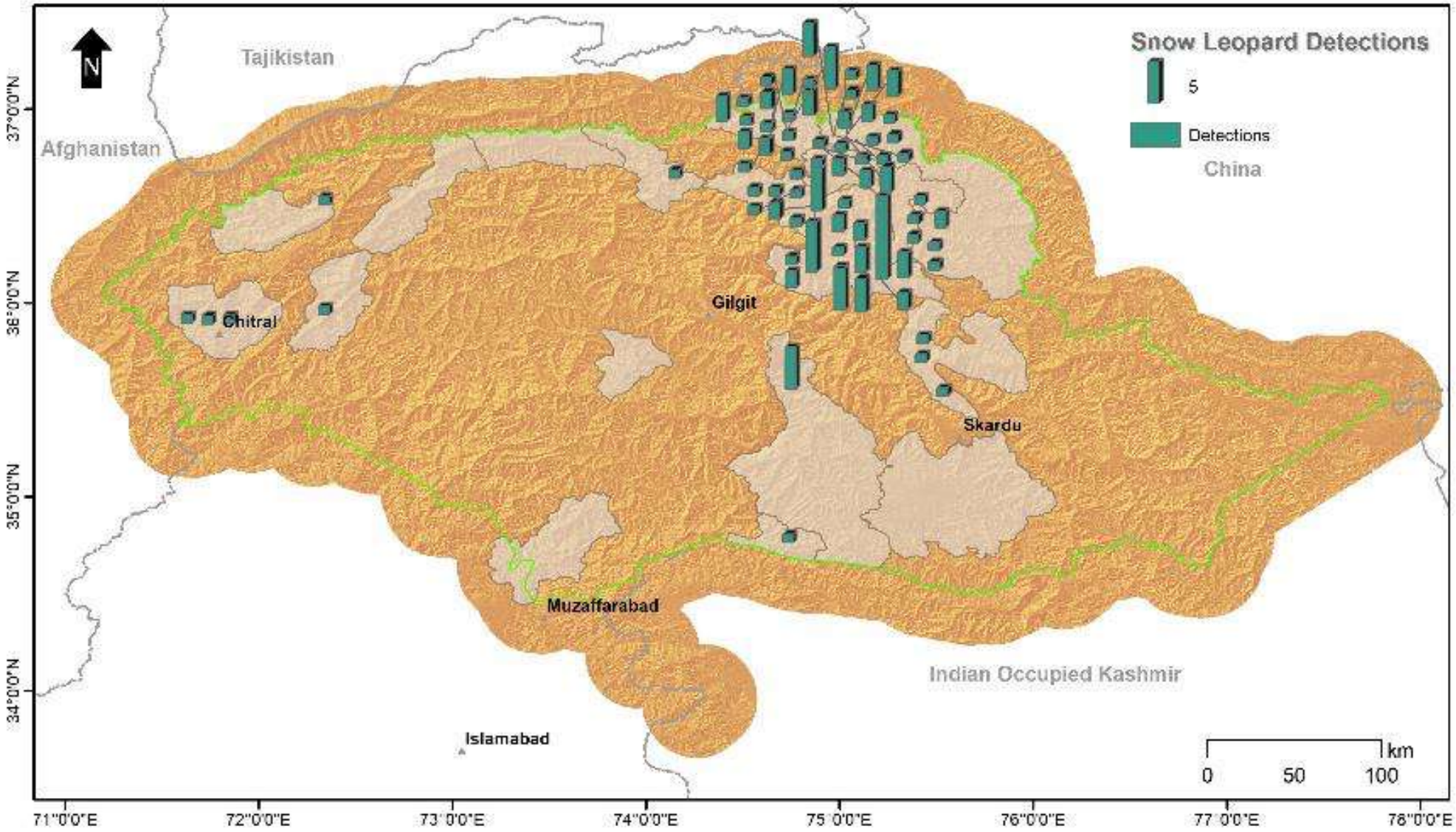
Camera trapping in Paistan



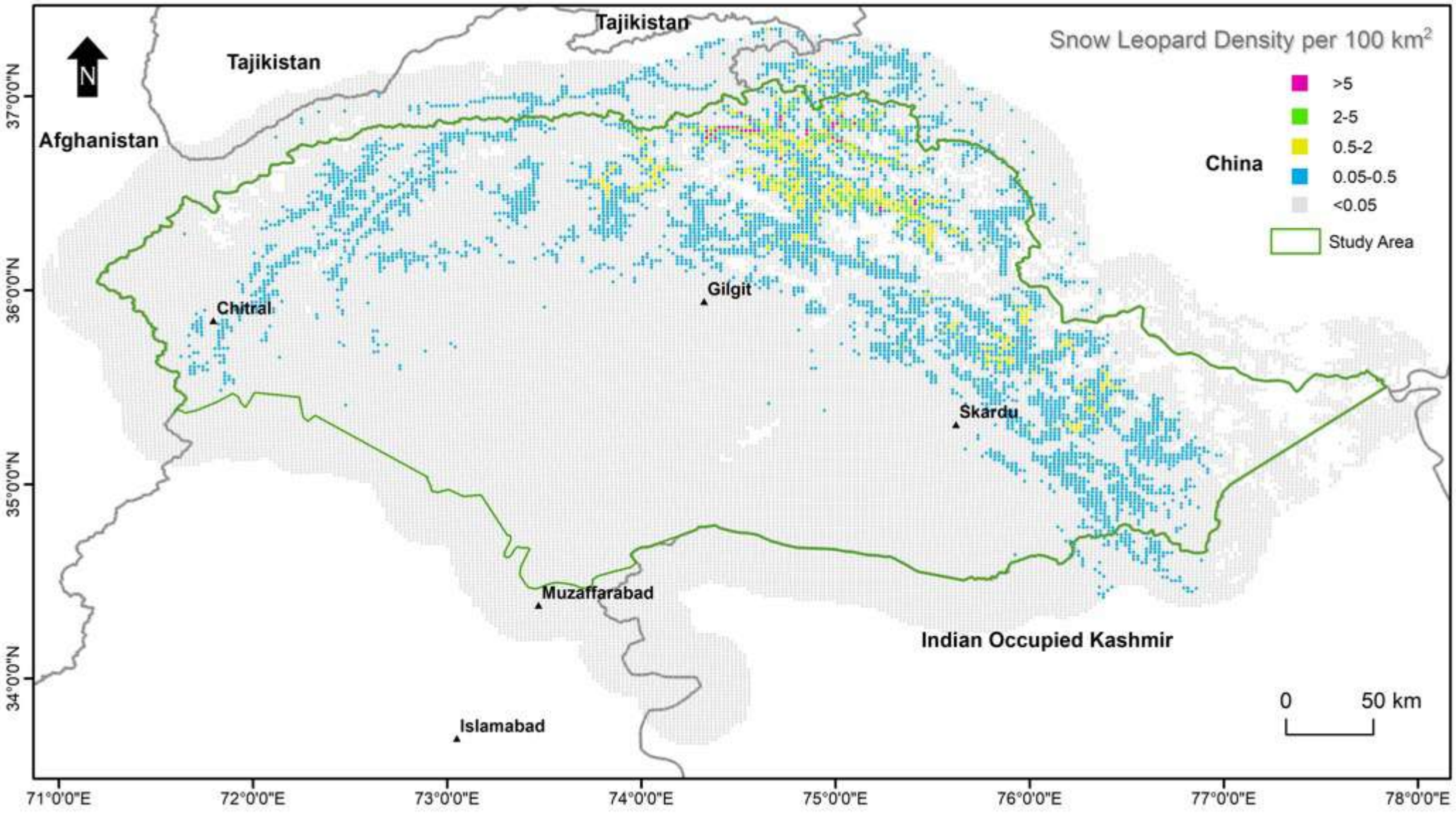
Total area= 38383 sq.km
48% of the SL range
Sessions: 24
Camera stations: 940

No.	Site	No.	Site
1	CGNP	11	Hunza-Nagar
2	Chitral Surrounding	12	Khunjerab NP
3	Terich Valley	13	Hoper-Hisper
4	Laspur Valley	14	Braldu-Basha
5	Yarkhun Valley	15	Deosai NP & Surrounding
6	Broghil NP	16	Kalapani
7	Qurumber NP	17	Astore
8	Misgar	18	Musk Deer NP
9	KVO-Sockhterabad	19	Khanberi
10	Shimshal	20	Kaghan


Snow Leopard Detection Areas
Tajikistan
Afghanistan
China
Khunjerab NP
Gilgit
Chitral
Skardu
Survey 2: KNP_2011
1 occasion, 24 detections, 15 animals
37°0'0"N
36°0'0"N
76°0'0"E
77°0'0"E
78°0'0"E
0
50
100
km


N
Tajikistan
Afghanistan
China
Indian Occupied Kashmir
Snow Leopard Detections
5
Detections
Chitral
Gilgit
Skardu
Muzaffarabad
Islamabad
km
0
50
100
37°0'0"N
36°0'0"N
35°0'0"N
34°0'0"N
71°0'0"E
72°0'0"E
73°0'0"E
74°0'0"E
75°0'0"E
76°0'0"E
77°0'0"E
78°0'0"E

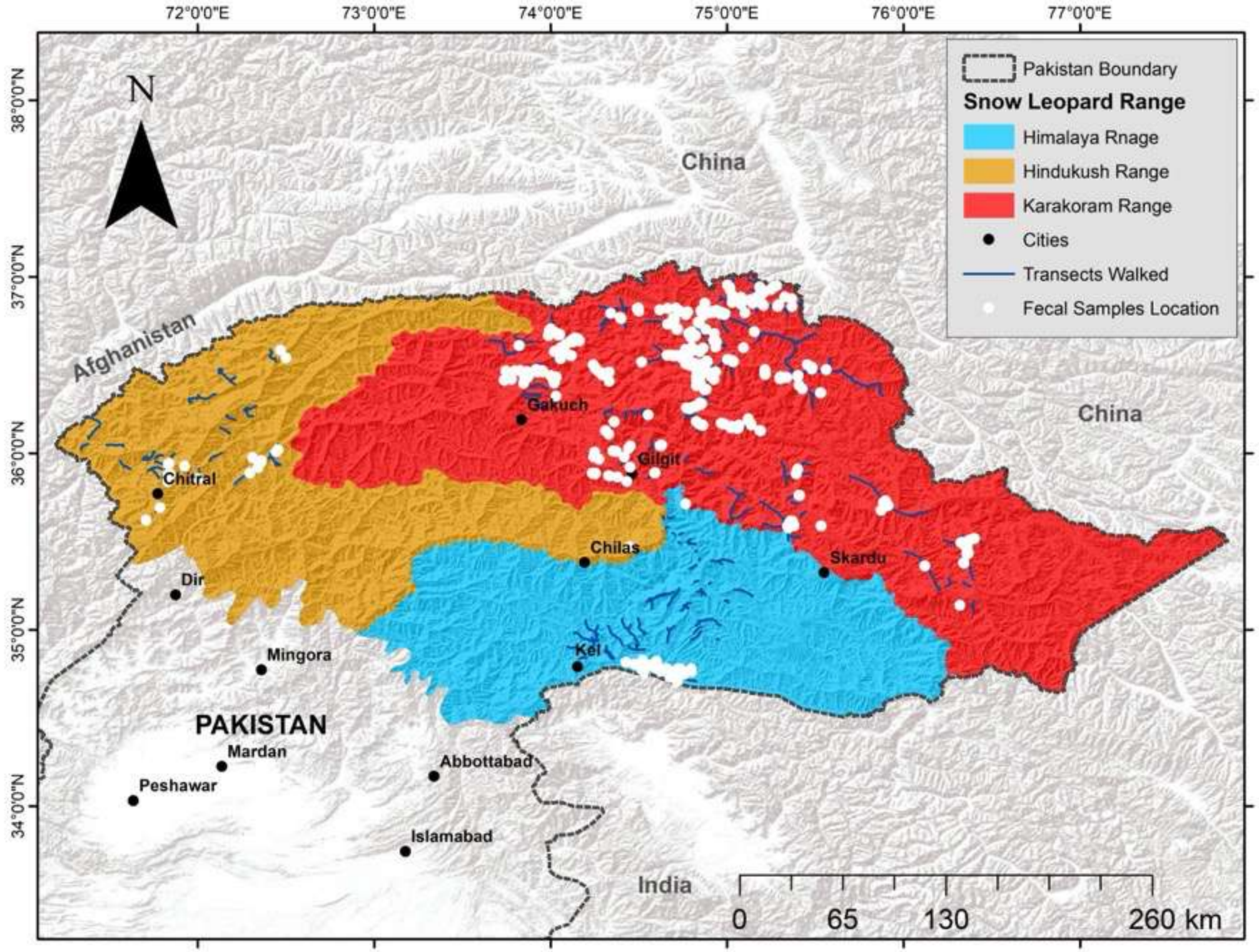
Snow Leopard Density Map



Mean density throughout the study area is 95/96516 = 0.1 animals per 100km^2.
Areas above 5500m elevation were excluded from the habitat mask and study region

Collection of Genetic Samples

Total of 1,174 putative snow leopard feces were collected during the survey period (2017-2023)



Species Identification

Samples analyzed using new SNP panels at
Petrov Lab,
Genomics, Program for Conservation
Stanford University

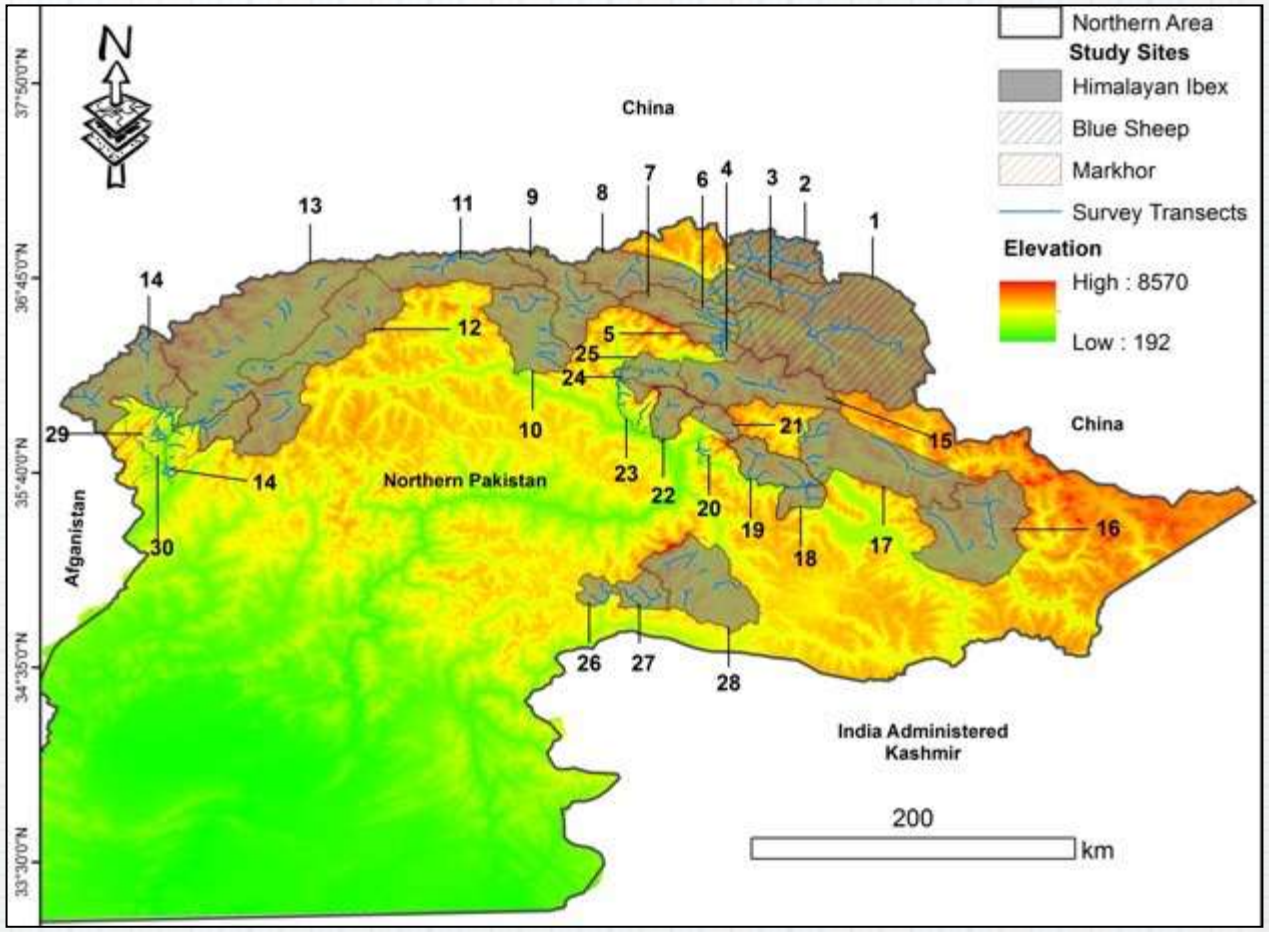
Genotyping of the samples confirmed **267 to be of snow leopards** with **56 unique individuals**

Common Name	Scientific Name	Confirmed Samples
Snow Leopard	*Panthera uncia*	**267**
Common Leopard	*Panthera pardus*	5
Leopard Cat	*Prionailurus bengalensis*	4
Wolf	*Canis lupus*	97
Asiatic Jackal	*Canus aureus*	4
Red Fox	*Vulpes vulpes*	332
Gray Langur	*Semnopithecus schistaceus*	9
Rhesus Monkey	*Macaca mulatta*	3
Himalayan Brown Bear	*Ursus arctos isabellinus*	7
Lynx	*Lynx lynx*	38
Livestock		11
Chukar Partridge	*Alectoris chukar*	2
Snowcock	*Tetraogallus himalayensis*	6
Field Mouse		1
Golden Marmot	*Marmota caudata*	1
No Data		387
Total		**1,174**

Mountain Ungulates: Range-wide population estimates

- **Double observer method:** Developed, tested, and replicated

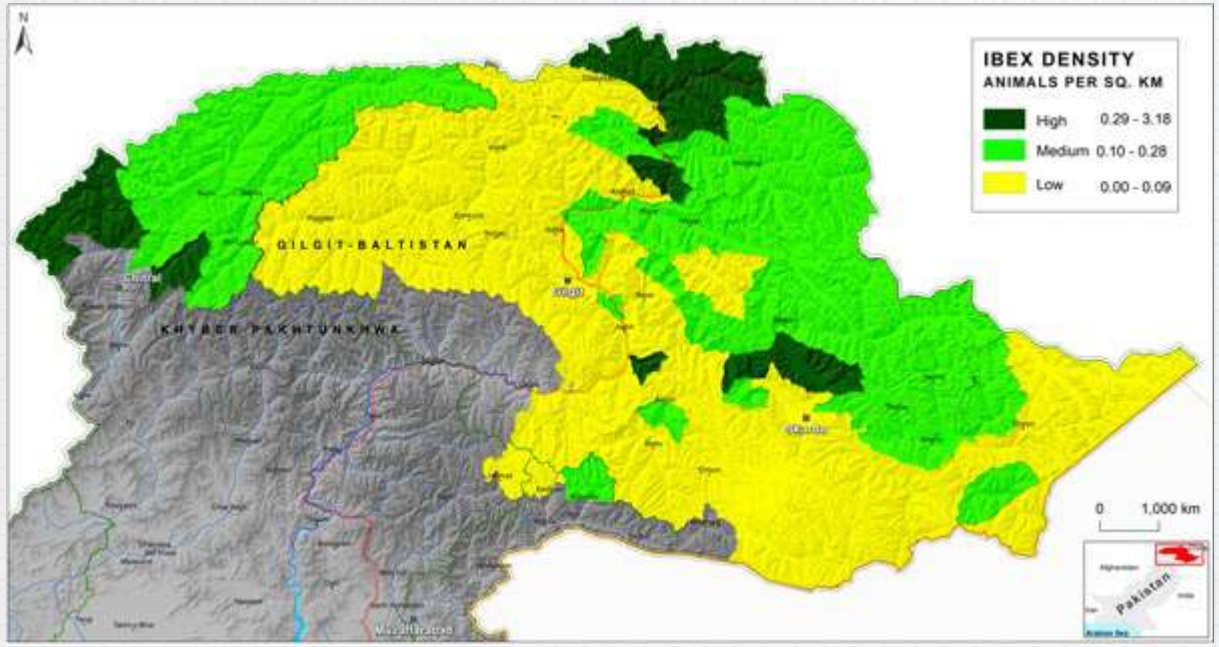
- **Coverage:** **36,381.07 km²** by walking a transect length of **1,755.28** km



1=Shimshal, 2=Khunjerab National Park (NP), 3= KVO, 4= Gulmit, 5= Gulkin and Hussaini, 6= Khyber, 7= Passu, 8= Chupursan, 9=Qurumber NP, 10= Ishkoman, 11= Broghil NP, 12= Mastuj Wildlife Range (WR), 13= Booni WR, 14= Chitral Wildlife Division, 15= Hoper-Hisper, 16= Thalay and Hushe, 17, Basha Baraldu, 18= SKB, 19= Astak Tormak, 20= Haramosh (Markhor), 21= Haramosh (Ibex), 22= Bhagrote, 23= Danyor, 24= Sikanderabad, 25= Rakaposhi, 26= Surgan Valley, 27= Shounter, 28= Astore, 29= Chitral Gol NP, 30= CGNP Buffer Area.

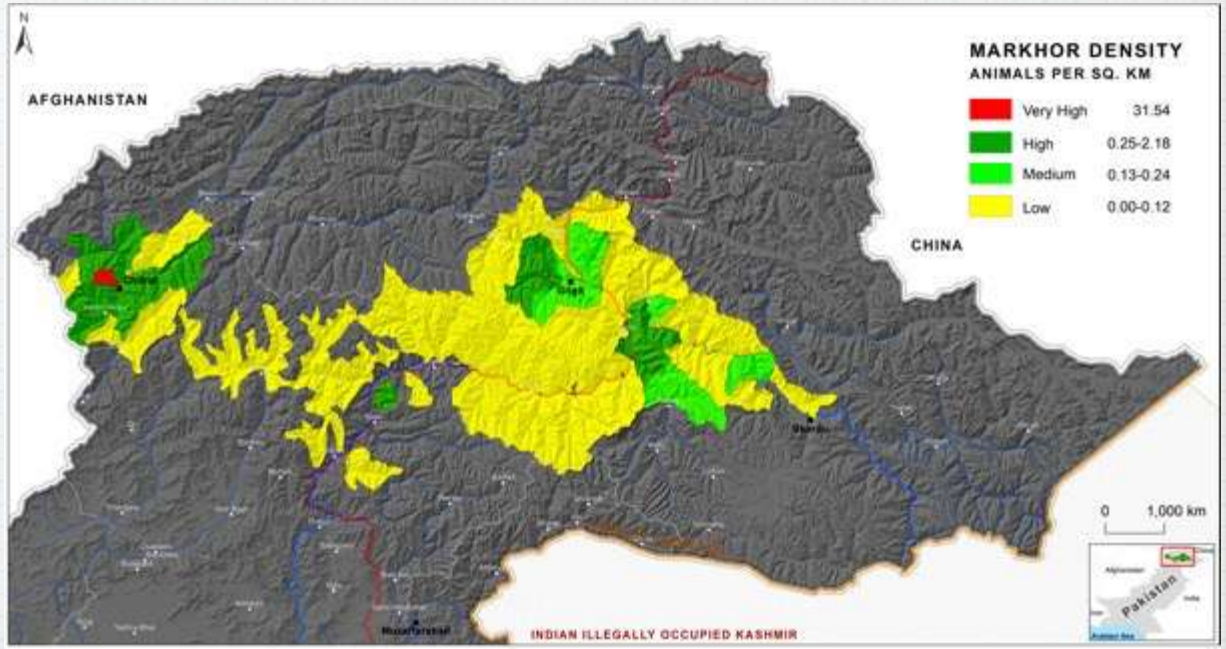
Densities of Prey Base

IBEX



- **Highest Population Areas:**
  - Chitral Wildlife Division: 1,172 (95% CI 1,010.4-1,347.5)
  - Shimshal: 802 (95% CI 382.6-1,943.0),
  - Gulkin –Hussaini: 706 (95% CI 481.0-961.3)
  - Booni Wildlife Division: 681 (95% CI 550.4-807.4)
  - KNP: 676 (95% CI 392.0-1167.7)

MARKHOR



Range shifts in mountain ungulates under climate change

- Species presence locations
- Maximum Entropy Model (MAXENT)
- Environmental variables
- Climate predictions

RESEARCH ARTICLE

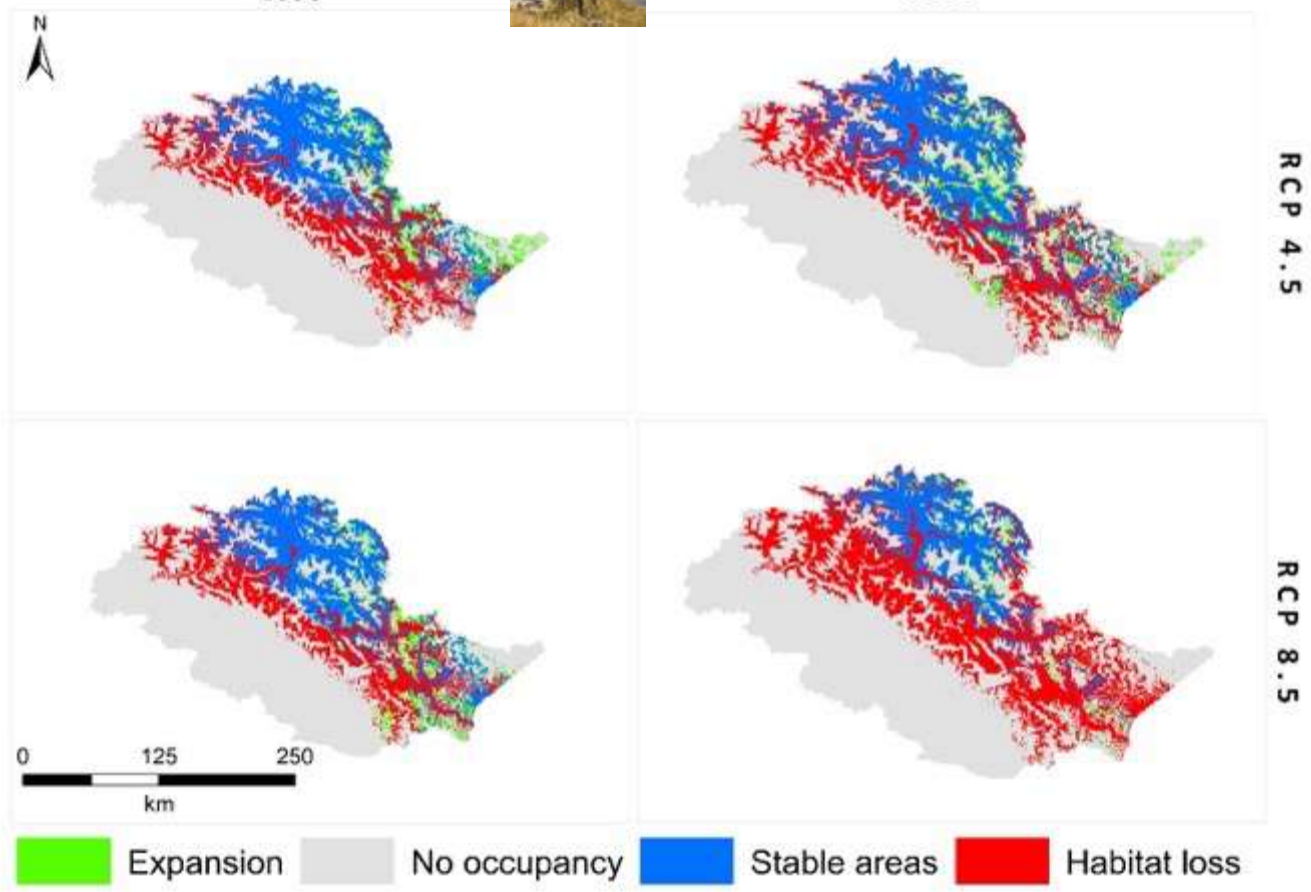
Expanding or shrinking? range shifts in wild ungulates under climate change in Pamir-Karakoram mountains, Pakistan

PLOS ONE

Hussain Ali[1], Jaffar Ud Din[2], Luciano Bosso[3], Shoaib Hameed[1], Muhammad Kabir[1], Muhammad Younas[2], Muhammad Ali Nawaz[4]*

Ibex Habitat Shift Under Climate Change

- Predicted habitat loss 35 to 64% in different scenarios
- Stable areas are mostly in Karakoram range



Climate Adaptations/Nature-based Solutions

Climate adaptation efforts:

- GLOF project covers 10 districts, benefiting 29 million people (15% of the population) in Pakistan.

- **95 percent of households** able to receive and respond to early warnings and take the appropriate action.

- **~250 small-scale engineering structures** established to reduce the effects of Natural Hazards.

- **50 weather monitoring stations** to collect meteorological data in catchment areas; 408 river discharge sensors to collect river flood data.

- **65,000 women will be trained** in home gardening, 240 water-efficient farming technologies will be installed and 35,000 hectares of land will be reforested
- Develop, review or improve policies and strategies

Climate Adaptations/Nature-based Solutions…….

Over 2000 Enclosures to promote natural regeneration and recovery of forests and rangelands

Climate Adaptations/Nature-based Solutions……. ……







Up to 10,000 households are engaged in social entrepreneurship including Snow Leopard Enterprises (SLE), conservation tourism, LPG promotion, apiculture, and fruit processing

Community-based conservation initiatives

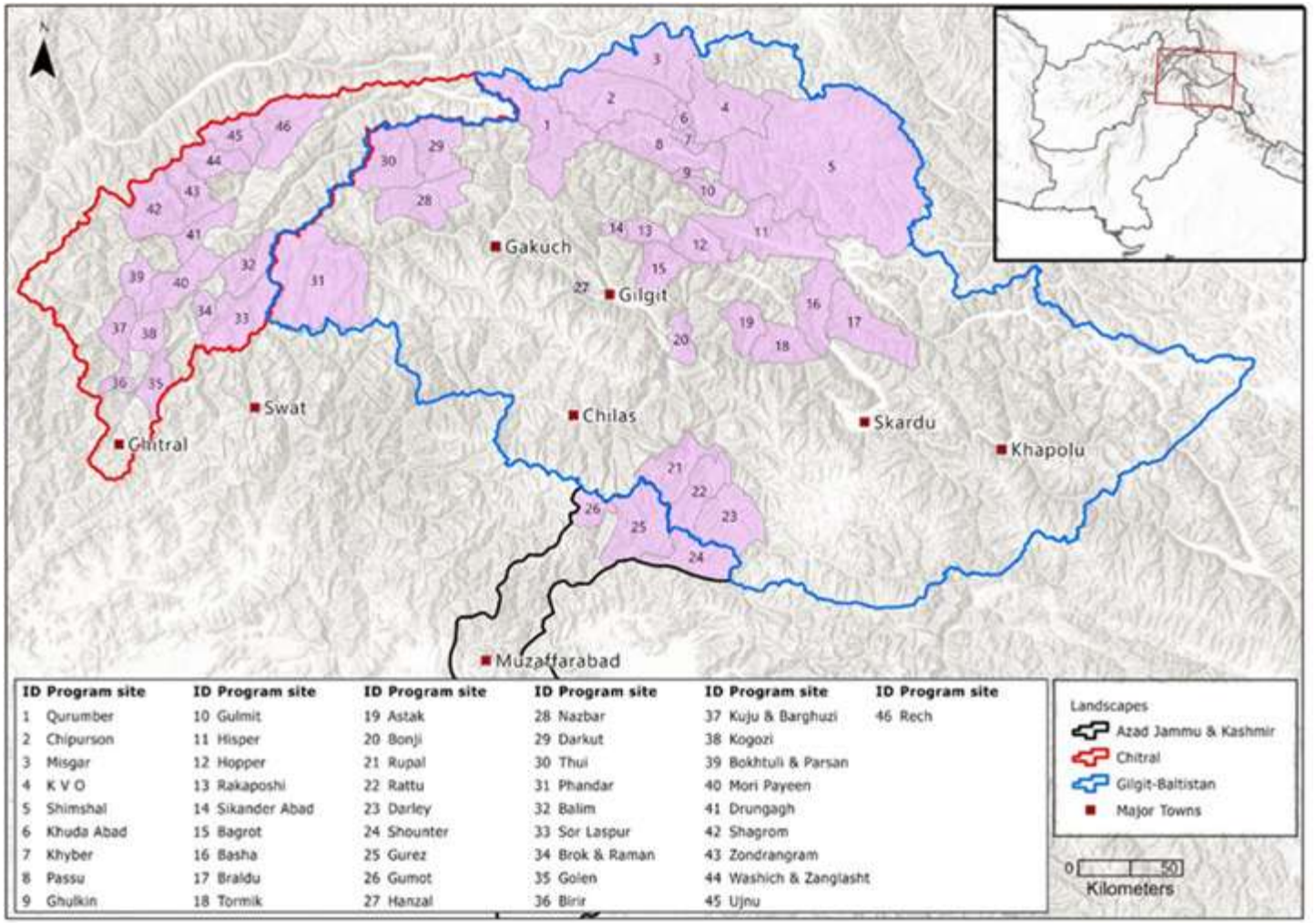
Community-based trophy hunting program supports wildlife conservation in the snow leopard range

- **45 predator-proof corrals** were constructed in the SLF program sites
- **31 livestock insurance schemes** are operational

Community-based conservation initiatives…

Spatial coverage

The conservation benefiting **39,748 households** are operational in 50 valleys across a **30,075 km² area**



ID	Program site	ID	Program site	ID	Program site	ID	Program site	ID	Program site	ID	Program site
1	Qurumber	10	Gulmit	19	Astak	28	Nazbar	37	Kuju & Barghuzi	46	Rech
2	Chipurson	11	Hisper	20	Bonji	29	Darkut	38	Kogozi		
3	Misgar	12	Hopper	21	Rupal	30	Thui	39	Bokhtuli & Parsan		
4	K V O	13	Rakaposhi	22	Rattu	31	Phandar	40	Mori Payeen		
5	Shimshal	14	Sikander Abad	23	Darley	32	Balim	41	Drungagh		
6	Khuda Abad	15	Bagrot	24	Shounter	33	Sor Laspur	42	Shagrom		
7	Khyber	16	Basha	25	Gurez	34	Brok & Raman	43	Zondrangram		
8	Passu	17	Braldu	26	Gumot	35	Golen	44	Washich & Zanglasht		
9	Ghulkin	18	Tormik	27	Hanzal	36	Birir	45	Ujnu		

Management & monitoring of disease systems

- The **Ecosystem Health Program (EHP)** is operational in **50 valleys (30,075Km²)** falling in the snow leopard range.
- Over **100 Ecosystem Health Workers (EHWs)** trained to administer livestock vaccination
- **400,000 livestock belonging to 39,748 households** are vaccinated biannually.
- **~60% reduction in the mortality rate of livestock** in the program sites

Management & monitoring of disease systems….

Gaps and needs

- Assess the disease transmission from livestock to wildlife and vice versa;

- Assess the feasibility of the One Health Program to control zoonotic diseases in the snow leopard landscapes;

- Generate resources to initiate the program

Disrupting illegal wildlife trade in the country

- A detailed assessment of SL poaching/trade was made using multifaceted methods;
- Community Wildlife Guards were engaged, equipped and trained to control the poaching and trade of snow leopards and their wild prey;
- Ranger Reward Program was launched;
- National Committee was notified to manage the Ranger Reward Program.

Din, J.U., Bari, F., Ali, H., ur Rehman, E., Adli, D.S.H., Abdullah, N.A., Norma-Rashid, Y., Kabir, M., Hameed, S., Nawaz, D.A. and Nawaz, M.A., 2022. Drivers of snow leopard poaching and trade in Pakistan and implications for management. **Nature Conservation, 46, pp.49-62.**

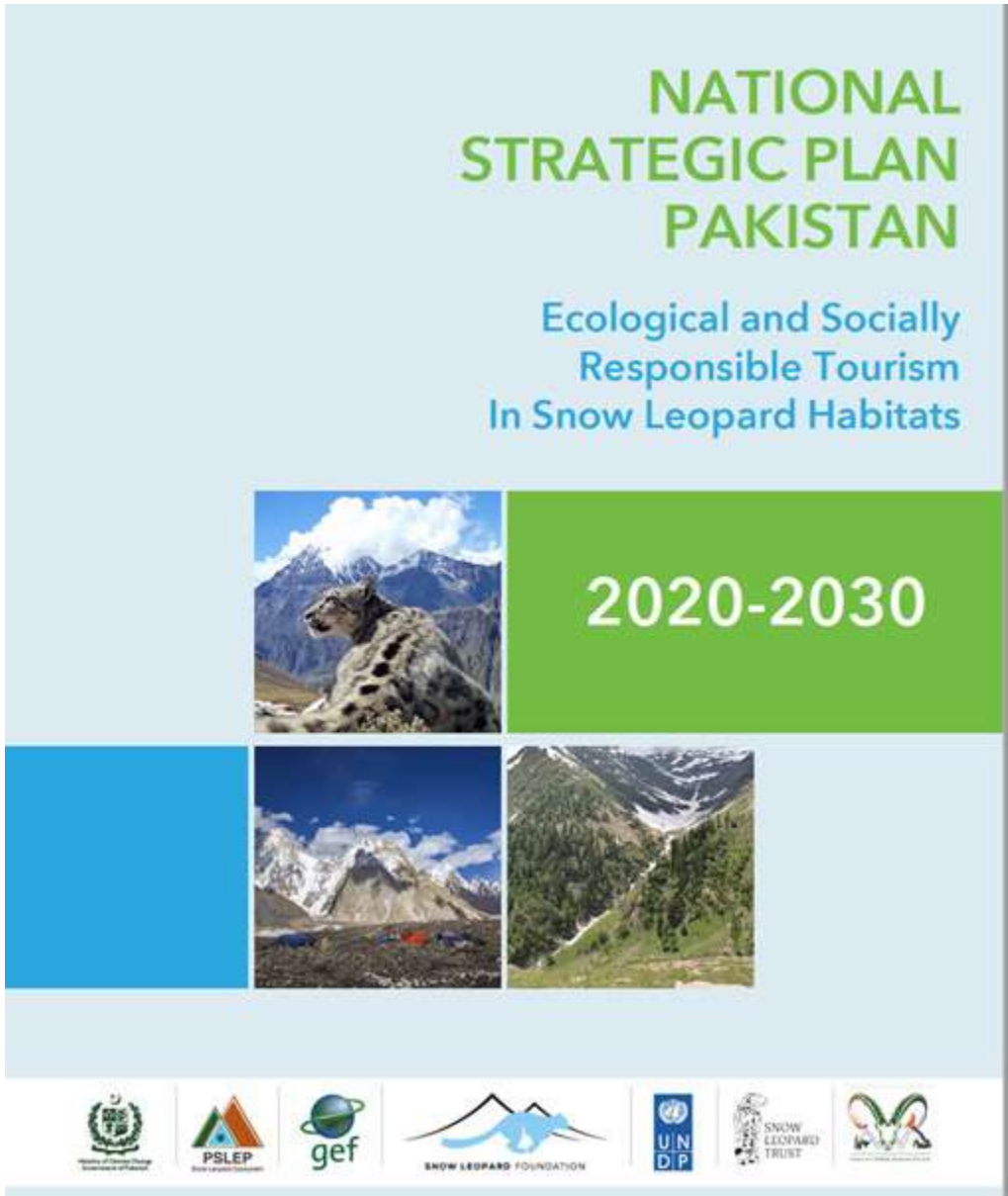
Managing Infrastructure/Developmental initiatives in snow leopard landscape

Snow Leopard Landscapes have remained hub of mass tourism

With the **increase in tourist influx** infrastructure development in SL landscapes has enhanced

Unplanned development has **consequences both for the ecosystems and local livelihoods**.

SLF developed " **National Strategic Plan" to** *promote ecologically and socially responsible tourism in the snow leopard landscapes.*



Managing Infrastructure/Developmental initiatives in snow leopard landscape……

Two model Conservation Tourism Projects were launched in **Hopper and Terich Valleys** to implement the **National Strategic Plan by;**

- Developing Tourism Management Plans
- Glamping sites
- Tourist information Center

Priorities of the Pakistan Snow Leopard Program

1. Continue with the socioecological research focusing on snow leopards, their wild prey, ecosystems, and local livelihoods;
2. Expand/strengthen the community-based conservation programs;
3. Foster Environment-Poverty Nexus and introduce climate change resilient livelihoods under the umbrella of snow leopard conservation;
4. Build capacity of the line departments, academia and communities in ecological research;
5. Assess the spread, intensity and management needs of zoonotic diseases in the snow leopard range under the umbrella of the One Health Program;
6. Enhance wildlife surveillance in the snow leopard range thereby engaging, equipping and building the capacity of community wildlife guards;
7. Promote public-private partnership to improve policies and laws and their effective enforcement to minimize the impact of developmental projects in the snow leopard range


Thank you
for your
attention!