

COUNTRY UPDATES 2021









GLOBAL SNOW LEOPARD AND ECOSYSTEM PROTECTION PROGRAM







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The GSLEP Country Updates 2021

What is GSLEP?

The Bishkek Declaration, endorsed by the snow leopard range countries on October 23, 2013, aims "to protect and recover snow leopard populations and their fragile habitats for all people to enjoy." Further, the snow leopard range countries "pledge to ensure that snow leopards and the people who live among them thrive in healthy ecosystems that contribute to the prosperity and well-being of our countries and the planet." The Bishkek Declaration led to the initiation of the Global Snow Leopard and Ecosystem Protection Program (GSLEP) with its Secretariat in Bishkek, Kyrgyzstan.

The goal of GSLEP is for the 12 range countries, with support from interested organizations, to work together to identify and secure 23 snow leopard landscapes (Figure 1) across the big cat's range over the next few years. Snow leopard landscapes are defined as those that:

- 1. Contain at least 100 breeding age snow leopards, conserved with the involvement of local communities;
- 2. Support adequate and secure prey populations,
- 3. Have functional connectivity to other snow leopard landscapes, some of which cross international boundaries.

In June 2014, the representatives of snow leopard range countries came together for an Action Planning, leadership and capacity development Global Workshop in Issykkul Lake District, Kyrgyz Republic. A total of 23 landscapes were identified to be secured under this first phase of GSLEP. The area of each GSLEP landscape in each range country is provided in Table 1.

This report describes the progress made by each country toward securing the future of the snow leopard and meeting the goals of GSLEP. The GSLEP landscapes for each country are described in Appendix 1.



Figure 1: Snow leopard range with the GSLEP landscapes marked

Country	Landscape	Area in Sq. Km
Afghanistan	Wakhan National Park	10,951
Bhutan	Snow Leopard Habitat	12110.35
China	Qilianshan Tuomuerfeng Taxkorgen	13,600 2,376 15,000
India	Hemis-Spiti Nanda-Devi Gangotri Kanchendzonga-Tawang	29,000 12,000 5,630
Kazakhstan	ZhetysuAlatau (Jungar Alatau) Northern Tien Shan	16,800 23,426
Kyrgyzstan	Central Tien Shan	13,201

 Table 1: GSLEP landscapes in snow leopard range countries and their area in Sq.km

Mongolia	Altai South Gobi North Altai	56,000 82,000 72,000
Nepal	Eastern Conservation Central Conservation Western Conservation	9674 9258 10811
Pakistan	Karokoram-Pamir Hindu-kush Himalaya	38, 245 13,888 7,055
Russia	Altai	48,767
Tajikistan	Pamir	92,000
Multi-national Landscapes	Landscape	Area (Sq km)
Kyrgyzstan-Tajikistan	Allay-Gisar	30,232

Country Updates for 2021

The GSLEP Resolution 2020, endorsed by the snow leopard range countries identified resource mobilization, inclusive economic development, animal-human healthcare, and disease surveillance as priority areas. The range countries also extended their support to the ongoing efforts of coordinating the initiative on Population Assessment of the World's Snow Leopards (PAWS); information management on poaching and illegal wildlife trade; efforts to reduce consumption of illegally hunted wildlife; and the implementation of the guidelines for conservation education and managing snow leopards in unusual and conflict situations.

In spite of the restrictions caused by the on-going pandemic, significant progress has been made across the snow leopard range towards achievement of the GSLEP goals. We would like to thank the range countries for providing the GSLEP Secretariat with the country updates from October 2020 to August 2021. We present a brief summary of the updates provided by the range countries.

- Ø > 8 million USD was mobilized for snow leopard conservation across the range. This funding was obtained from governments, international funding agencies, and NGO's.
- Ø Several programmes were initiated to manage and monitor disease in snow leopard landscapes. They included a holistic approach to health by preventing and managing wildlife disease and it's risk of spillover to humans and livestock, monitoring of livestock health, livestock vaccination programmes, and opportunistic monitoring of zoonosis in snow leopards. Some programmes also trained community members as health workers.
- Ø Green economic initiatives, focused on climate-smart habitat management and creating alternative livelihoods were initiated. These included ecotourism programmes, development of orchards, handicrafts, and sustainable resource management. Climate-smart interventions such as low-cost solar water systems and improved heating mechanisms were also created. Climate Vulnerability assessments were initiated to plan future climate adaptation strategies.
- Ø Conservation interventions to foster snow leopard and human coexistence were implemented across the landscape. These included conflict mitigation measures like coral improvement and livestock insurance, SMART patrolling and monitoring, community-based monitoring, and strengthening capacity. There was also a focus on strengthening protected area networks and

improving degraded habitats. A trans-boundary initiative in Central Asia between three countries was also launched.

- Ø Snow Leopard Population assessment continued across the range using the PAWS protocols, with some countries close to national-level estimates. Prey surveys were also initiated in some countries.
- Ø Efforts to disrupt illegal wildlife trade including training programmes for enforcement officials, anti-poaching patrols, and other surveillance and monitoring activities. Across the range there were reports of 4 trade-related incidents involving snow leopards, and two incidents involving falcons. These cases were apprehended at international customs.
- Ø Conservation Education programmes were held across the range focusing on both children and adult stakeholders. A range of materials and resources were also produced.
- Ø Mitigation measures to decrease instances of unusual encounters with snow leopards were initiated across the range. These included installation of mobile electric fences and building of predator proof-corrals. The GSLEP guidelines for managing unusual encounters were translated into 8 languages and made available to each country across the range. One example of the guidelines being implemented was the safe release of the SL back into its habitat, after a 36 hour ordeal, when it was trapped in a corral.

The following section of this report provides country-wise updates on the progress made nationally until September 2021.

Bhutan

Resource Mobilization

Resources were mobilised through the Bhutan for Life (BFL) Programme which was established for financing of conservation activities in the protected areas. In 2020, approximately USD 550,000 was allocated through BFL programme and other donors for snow leopard conservation and associated activities. This is besides the regular funding from the Royal Government of Bhutan to meet the operational cost.

Managing and Monitoring Disease Systems

Bhutan developed the Wildlife Health Strategy in order to implement the One Health Initiative and to take a holistic approach towards preventing and managing wildlife diseases and its risk of spillover to humans and livestock. The strategy includes measures to prevent and manage wildlife diseases besides including means to resolve key issues of capacity and coordination amongst relevant stakeholders.

Green Economy, Ecosystem based adaptation and climate-smart interventions:

- a. In order to take the green initiative forward, the ecotourism facilities in the snow leopard habitats were enhanced through maintenance of trek routes, camping sites and engagement of local communities in ecotourism activities through home stays, local guides and investment in their capacity building.
- b. Climate smart alpine habitat management interventions were implemented including improvement of alpine meadows and water holes for wild ungulates.
- c. Sustainable resource management strengthened with focus on high altitude medicinal plants and non-timber forest products

Conservation interventions

The main ongoing project in the snow leopard landscape in Bhutan is the Bhutan for Life (BFL) programme which covers the entire protected area system in Bhutan. The project is in the third year of implementation and it will go on till 2032. The main snow leopard conservation activities supported through the project are population survey, conflict mitigation, prevention of poaching, prey habitat improvement, livelihood support and research works.

The Global Environment Facility Small Grants Programme and Bhutan Foundation supports a project focussing on enhancing livelihood and promoting citizen science of highland communities of Soe and Lingzhi under Thimphu district.

Population Assessment of the World's Snow leopards

Bhutan has planned to conduct the second nationwide snow leopard survey in 2022. The survey design and protocol for the second snow leopard survey is under

development which is being developed following the Population Assessment of the World's Snow Leopards (PAWS) guidelines and process. The experts from the PAWS technical team are consulted and engaged for the same.

Disrupting Illegal Wildlife Trade

There is no record of snow leopard poaching and trade in the last two years. Surveillance and patrolling activities are regularly implemented.

Conservation Education

Conservation education programmes are conducted regularly to the communities living in and around the snow leopard habitats on the need to conserve snow leopards. Highland festivals like Royal Highland Festival at Laya and Jomolhari Mountain Festival are celebrated to increase awareness on snow leopard conservation and mountain ecosystem. For example, students of Soe School performed a snow leopard dance during the mountain festival.

Unusual encounters with snow leopard

In order to reduce human snow leopard conflict, community conservation groups were formed and community-based insurance schemes were instituted.

- a. In addition, mobile electric fences are piloted to protect the yak calves from snow leopards at night in the herding camps.
- b. Yak herders are compensated by providing amenities like improvised tents, trainings on livestock product diversifications and non-timber forest produce value addition, conservation education and awareness, etc.

India

The Government of India and the State Governments have taken several steps for the conservation and protection of wildlife and their habitats by providing them legal protection and listing them in the Schedules of the Wild Life (Protection) Act, 1972. Considering the need for taking concerted action for conservation of the species and their habitats, the Government of India has initiated focused conservation of flagship species on a Project Mode. The Snow leopard is one such species for which focussed programme has been initiated by the Government of India. Project Snow Leopard has also been initiated by the Government of India in this direction in 2008.

The snow leopard habitat in India has several protected areas covering notified area of about 36,000 km² where it is found in 4 States (Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh and 2 Union Territories (UTs) namely UT of Jammu and Kashmir and UT of Ladakh. The Snow Leopard conservation initiative of the country supports conservation linked income generation and incentive programmes for local communities, through provisioning of alternative income sources to local communities and value addition to locally produced goods and services.

The year 2020-21 was a challenging year for the world due to the COVID-19 pandemic. Nonetheless, conservation efforts have been undertaken in the country during the period.

Resource Mobilization

The Ministry of Environment, Forest and Climate Change has been providing financial assistance under the Centrally Sponsored Scheme of 'Development of Wildlife Habitat' for conservation of wildlife including Snow leopard since 2009 as per the requirement of States. During the year 2020-21, an amount of Rs. 1595.256 lakhs was released for snow leopard conservation.

Green Economy, Ecosystem based adaptation and climate-smart interventions

In the State of Himachal Pradesh, climate change interventions like installation of low cost mountain solar water heaters as an alternative energy solution to reduce the dependency on fuel wood, community fodder bank (through plantation of fodder species in wasteland/degraded land) have been taken up. In the state of Arunachal Pradesh, improved heating systems for herders are being taken up. Further, capacity building programmes for handicraft & handloom development, homestay and cultural tourism development, ecotourism development, strengthening the value chains of Non-Timber Forest Produce, etc. have also been taken up. The State Climate Change Cell for Sikkim, chaired by the Hon'ble Chief Minister, is actively looking at carrying out activities like vulnerability assessment of villages, capacity building of government departments, research & development etc.

Conservation interventions

The Ministry of Environment, Forest and Climate Change had undertaken a Management Effectiveness Evaluation of National Parks and Sanctuaries in the country, including the Protected Areas covering the snow leopard landscape. The results of present assessment indicate an overall mean MEE score of 62.01% which is higher than the global mean of 56%.

An Integrated Landscape Level Participatory Management Strategy has been developed for the Lahul Pangi Landscape. Draft People's Biodiversity Registers (PBR's) have also been prepared for the 35 Biodiversity Management Committees in Himachal Pradesh. The Wildlife Institute of India in coordination with the State of Himachal Pradesh has identified, mapped and delineated 17 High Conservation Value areas covering 74,700 Ha and 40,400 Ha in Lahaul and Pangi respectively. Further activities like enhanced management in Snow leopard landscapes, engaging with communities in enhancing alternative livelihood opportunities, garnering more support from the local communities in snow leopard conservation, strengthening protection measures, management interventions for reducing human wildlife conflict situations, etc.

Population Assessment of the World's Snow leopards

The Government of India has developed a National protocol on Snow Leopard Population Assessment in India (SPAI) which was launched in October 2019. A Steering Committee for implementation of Project Snow Leopard, which also monitors the implementation of snow leopard population assessment in snow leopard range States/UTs has been constituted by the Ministry of Environment, Forest and Climate Change.

The Wildlife Institute of India, Dehradun is the nodal agency for implementation of snow leopard population assessment. Training and Capacity building workshops, field surveys, camera trapping, collection of samples and analysis of data have been undertaken.

Disrupting Illegal Wildlife Trade

Reports of illegal wildlife trade of Snow leopards have not been reported. The Wildlife Crime Control Bureau, a statutory organization under the Wild Life (Protection) Act, 1972, have been carrying out training programmes for enforcement officials for control of illegal trade in wildlife and its parts and products.

Conservation Education

Awareness generation programmes are a regular feature in the conservation of wildlife. Activities for garnering the support of the local communities through awareness generation have been taken up in the snow leopard landscape as well. Training programmes for forest department staff and local communities on wildlife conservation, human wildlife conflict mitigation, control of wildlife crime, etc have also been initiated. Financial support for communication and outreach activities is also provided by the Ministry of Environment, Forest and Climate Change under the Centrally Sponsored Scheme: Development of Wildlife Habitats, to the States including snow leopard landscapes, based on the proposals submitted by them.

Mongolia

Resource Mobilization

The government of Mongolia is already implementing snow leopard conservation-focused projects for years. The projects are implemented in collaboration with the Ministry of Nature, Environment and Tourism of Mongolia, WWF Mongolia Program Office, United Nations Development Programme Mongolia (UNDP-Mongolia), Provincial Nature conservation departments, local communities, academia, and conservation NGOs.

- a) WWF-Mongolia is implementing a 5 year conservation project for the snow leopard and its prey in six different Mountains in the Western Mongolia, Altai Sayan Ecoregion. The project's overarching goal is that "The future of the second largest global population of the snow leopard "Irbis" – the Northern subspecies – is fully secured through functional connectivity of subpopulations in Russia and within Mongolia and elimination of poaching and retaliation killing in the sustainably managed critical habitats". The project duration is period of 2019-2023 by setting aside USD 5.0 million under the WWF International and Mongolia grant. The project's focus toward conservation of snow leopard and prey include:
- Addressing human-snow leopard conflict
- Ensuring zero poaching of snow leopards
- Supporting national efforts against wildlife trade
- Changing attitude of local residents on sustainable use and conservation of natural resources and legal literacy
- Ensuring continuous connectivity and migration corridors for key habitats of targeted species and promoting sustainable grazing system.
- b) Ensuring Sustainability and Resilience (ENSURE) of Green Landscapes in the Mongolian project is implemented for the 2018-2026 period under the GEF USD 5,043,283 grant. The project objective is to enhance ecosystem services in multiple landscapes of the Sayan and Khangai mountains and Trans Altai Gobi by reducing rangeland and forest degradation and conserving biodiversity, endangered wildlife species like snow leopards, musk deer and goitered gazelle through sustainable livelihoods. The project strategy will be to engage multiple stakeholders as follows:
 - Enhanced enabling framework and systemic tools help conserve biodiversity and ecosystem services.
 - Key results will include strengthened legislation and financial mechanisms for green development, incorporation of measures to conserve biodiversity and ecosystem services into local development plans, development of new tools for enhanced capacity for green development, and improved systemic measures for conservation of globally threatened / iconic biodiversity.

- Rangelands, forests and biodiversity are restored and protected areas strengthened at landscape scale.
- Key results will include reduced degradation of 300,000 ha of rangelands, plus 20,000 ha of boreal and 25,000 ha of saxaul forests, protected area system expanded by 0.94 million ha and strengthened, and threats to globally threatened/iconic biodiversity reduced.
- Sustainable livelihoods provide benefits to local communities and support biodiversity.
- Results will include strengthened community groups, more sustainable livelihoods, public private partnerships and raised public awareness for green development approaches.
- Improved knowledge management, monitoring and evaluation supports sustainability and up-scaling.
- Results will include new and effective mechanisms for knowledge management, monitoring and evaluation and gender mainstreaming.
- Overall the project aims to demonstrate how green development can deliver improved biodiversity and ecosystem services and resilience at landscape scale within the context of a changing climate.

In Khovd Province in western Mongolia—one of five "green provinces" in the country—TNC Mongolia is working in the Altai mountain ranges of Bumbat Khairkan and Sutai Khairkhan to demonstrate a protected area management approach that supports the values that ecosystems provide to people as well as to wildlife, including rare species such as snow leopards, argali, saiga antelope and goitered gazelle. The Institute of Biology Mongolian Academy of Sciences and Irbis Mongolia Center NGO helps the snow leopard, its prey, and habitat conservation projects with expert advice, consultations and worked in 2020-2021 in transboundary areas to study and conserve the snow leopard subpopulations along the Mongolia – Russia and Mongolia – China borders.

- a) Snow leopard population monitoring program in the transboundary areas of Russia and Mongolia was developed and finalized, discussed at Intergovernmental Meetings several times and expected to be approved at the next meeting.
- b) Snow leopard sub-populations were surveyed and assessed at the same time in Sailugem NP, Russia and Siilkhem A NP, Mongolia using camera traps.
- c) Snow leopard research and telemetry projects are ongoing in the transboundary areas in Segs Tsagaan Bogd mountain, Southern Mongolia and Northern China, involving Mongolia and China PhD students and academic researchers.

Snow Leopard Conservation Foundation (SLCF) is a non-profit organization established in 2007 with the mission to protect the snow leopard and its habitat throughout Mongolia. SLCF manages grassroots conservation programs like snow leopard enterprises, research, educational outreach, political advocacy, and management planning. They work in seven

provinces in Mongolia that have snow leopards. The foundation is financially supported by USA based Snow Leopard Trust and other donors.

Green Economy, Ecosystem-based adaptation, and climate-smart interventions

The following activities were undertaken under the snow leopard and PSLEP projects:

- Within the project "The future of the second largest global population of the snow leopard "Irbis" the Northern subspecies" WWF Mongolia Program Office team undertook the following activities:
 - Developing and leading the economic analysis and marketing options for existing and potential products by the project beneficiaries / local communities.
 - Helping with marketing survey, event/campaign and ensures its implementation and results.
 - Initiating rural market research and converts complex analysis with recommendations for local marketing initiatives.
 - Supporting business plans development by the project beneficiaries and its implementation by herders, communities and local administration.
 - Creates innovative ways to link herders and local communities with the existing and potential businesses.

The TNC snow leopard conservation program in Sutai mountain range in western Mongolia established 2 tourist camps managed by the local conservation community and supported them to maintain the activities.

Conservation interventions

Major conservation interventions undertaken during the reporting period include:

human snow leopard conflict mitigation, snow leopard enterprises project, livelihood projects implemented by local herders and communities, and ecosystem health programs to maintain health ecosystems and ecosystem services.

Population Assessment of the World's Snow leopards

Mongolia Nationwide snow leopard survey was implemented in compliance with the PAWS methods and aimed to:

a) Assess the national snow leopard distribution incorporating both presence and absence data, and accounting for imperfect detection and variable survey effort using occupancy modeling approaches (MacKenzie et al. 2002, 2018; Mackenzie et al. 2003).

b) Used the distribution assessment to inform the sampling of more intensive population assessments by camera trapping across high, medium and low snow leopard occupancy areas.c) Aimed to provide a preliminary snow leopard population estimate for Mongolia.

The nationwide snow leopard survey report represents an important first step towards obtaining the final robust snow leopard national estimate for Mongolia (2017-2020). WWF-Mongolia initiated a comprehensive study, Mongolia's Nationwide Population Assessment of snow leopard in 2017, and completed it along with partner organizations, including the Snow Leopard Conservation Foundation (SLCF), GSLEP, the Snow Leopard Trust (SLT), the Institute of

Biology of the Mongolian Academy of Sciences, National University of Mongolia, University of St Andrews, Irbis Mongolian Centre (IMC) and Ministry of Environment and Tourism of Mongolia (METM). The Nationwide Population Assessment of Mongolia's Snow Leopards has provided a valuable contribution to development of the PAWS Programme in successfully achieving its target of robust and reliable population assessment of the World's snow leopards.

The two step process was used in order to assess the snow leopard abundance at the national scale of Mongolia. The sampling approach was developed in collaboration with the PAWS technical advisory panel. A four-day long PAWS planning workshop was organized in Ulaanbaatar in May, 2018. The workshop focused on planning the implementation of a nationwide snow leopard population assessment in a collaborative effort between WWF-Mongolia, Ministry of Environment and Tourism of Mongolia, SLCF, GSLEP, SLT, National University of Mongolia, the Institute of Biology of the Mongolian Academy of Sciences and Otgon-Bor khavtsal NGO. The workshop also aimed to align the proposed project with PAWS and aimed to build an understanding of the basic sampling theory, methods of occupancy estimation and spatial capture recapture modeling. The workshop specifically focused on preparing participants from various organizations to lead teams and conduct sign based occupancy surveys across all of Mongolia's supposed snow leopard range.

Following the workshop, the entire country of Mongolia was divided into grids of 20x20 km (400 km²). This consisted of 4,163 grid cells (1,665,200 km²). In Mongolia snow leopards are known to select rugged habitat and live almost exclusively in mountainous areas with marginal or no tree cover. The species is known to inhabit a wide range of altitude from 900 m to 3500 m a.s.l. across the country. They do however travel across or use steppe, depressions, sand dunes and frozen water bodies, which are considered as non-habitats for snow leopards. A MaxEnt habitat preference model based on 15 collared snow leopard individuals with 26,000 locations in Mongolia was used to inform the occupancy planning stage and ensure that no areas that were predicted to be suitable for snow leopards were left out. A terrain ruggedness index (Riley et al. 1999) map was created for the entire country to demarcate areas of mountainous habitat (defined by slope> 5%) and non-habitats. Digital elevation models were used to create slope surface of Mongolia at ArcMap 10.7 with software downloaded from Shuttle Radar Topography Mission, SRTM (http://srtm.csi.cgiar.org/) and excluded 400 km² grid cells that had less than 5% (20 km²) of the total area as mountainous. We also excluded grid cells that were predominantly forested (defined as more than 50% forests) or were separated from known snow leopard distribution range by 400 km (assuming these were only used for transit purposes). A remaining total of 1,200 grid cells (480,000 km² referred to as sampling units) fit the criteria (Map 1). More information is provided at Bayandonoi et al., (in review). Each sampling unit size was chosen to be 400 km² (20x20 km), which will comfortably accommodate a single snow leopard home range in Mongolian case study (336-617 km² by Kernel utility distributions, 327-615 km² by Minimum convex polygons, and 129-220 km² by Local convex hulls methods; from the Johansson et al., 2016). A total of 12 teams (consisting of 60 researchers from Academic institutions and National and International NGOs, 126 rangers from State protected areas and 31 drivers) were trained to survey the 480,000 km² in a coordinated effort between August 2018 and March 2019. Each survey team consisted of 7-8 members with at least two individuals who

had experience in detecting and recognizing snow leopard signs. Transects were planned in such a way that they surveyed the rugged areas within the sampling units along the mountain ridgelines and valleys where snow leopards are likely to leave a sign. Observers recorded snow leopard sign detections on the edges of canyons, on ridgelines or under overhanging rocks and recorded the location of each scrape, scratch, spray, pugmark, scat or direct observation. The occupancy model extension of Hines et al. (2010) was used to allow for correlated detections between transect segments as they tended to follow travel paths such as ridges and valleys. A candidate model set for possible effects of covariates on detection and occupancy was defined and run in software PRESENCE (2.12.36 version) using standard approaches. Each model was ranked by Akaike's Information Criterion (AIC) to choose the best model balancing between likelihood (fit) and over parameterization (number of parameters). We ran a total of 27 models, each with different combinations of site and survey covariates. We used AIC weights of models to define variable importance. We used the top model to predict the probability of sites being used in unsampled areas. To assess the effective coverage of our sampling, we plotted occupancy as a function of different covariates and marked the covariate values represented by sampling units to assess the sufficiency of the sampling effort.

The assessments indicated that habitat in Mongolia has a high (>0.5) probability of being used by snow leopards.

In total, teams covered 19,924 km in transects (13,130 km on vehicles, 6,794 km on foot). We recorded 1,421 snow leopard signs (scrapes, pugmarks or spray markings, excluding putative scats) in a total of 235 grid-cells out of 1,017, thus providing a naive occupancy estimate of 0.22 (i.e. 235/1017). The assessments indicate that only 78,000 km² (5%) of Mongolia's total land mass has a high probability (Psi>0.75) of being used by snow leopards, followed by 135,200 km² (8%) as a moderately high (0.5 (Psi<0.75) 230,400 km² (14%) as moderately low (0.25<Psii≤0.5); and the remaining 73% to be least likely (Psi≤0.25) to be used by snow leopards.

Total snow leopard numbers in the Mongolia snow leopard population was estimated as 953 adults.

Disrupting Illegal Wildlife Trade

The WWF Mongolia Program Office are local stakeholders assisting with development and implementation of project activities along with Wildlife Traffic, Law Enforcement and Communication Staff.

Irbis Mongolia Center conducted snow leopard poaching surveys with a small grant of SLC donors.

Incidents of snow leopard poaching during the present reporting period are shown in the table below:

Date	Observed / Confiscated organization	Age	Quantity	Origin and Derivates

September 1, 2021	Ovorkhangai police	young	1	Baga Bogd mtn, Ovorkhangai province
October 15, 2021	Irbis Mongolia research team	cub	1	Bayankhongor province, Khar argalant mtn
October 26, 2021	Irbis Mongolia research team	cub and adult	2	Bayankhongor province, Segs Tsagaan Bogd mtn
June 2, 2020	Police department, Gobi-Altai province		1	Gobi-Altai province, bones
June 12, 2020	Ecological police department, Ulaanbaatar		1	1 skin
March 26, 2020	Ecological police department, Ulaanbaatar		3	3 skin, frozen
February 29, 2020	Ecological police department, Ulaanbaatar		2	2 skin with a skull

Conservation Education

World Snow Leopard Day Festival and World Wildlife Day are the main events to gather together and disseminate education awareness. The organization of the events are financially supported by WWF Mongolia, Irbis Mongolia Center, SLCF and other national and international organizations, NGOs and projects. The children eco club activities supported by WWF Mongolia, Irbis Mongolia Center, SLCF, and activities of the clubs have a lot of influence on school children, local communities and local authority. First snow leopard exhibition room was established in the Uvs province museum in Ulaangom city with the support of Irbis Mongolia Center and SLC, USA.



Figure 2: Opening ceremony of the snow leopard exhibition room

Research articles were published to disseminate research findings to a wide range of stakeholders.

- Barry Rosenbaum, Sebastien Comte, Andrey D. Poyarkov, Bariushaa Munkhtsog, Ochirjav Munkhtogtokh, Jose Antonio Hernandez-Blanco, Dmitry Y. Alexandrov, Buyanaa Chimeddorj, Bayandonoi Galtulga, Dalannast Munkhnast, Munkhtsog Bayaraa, Viatcheslav V. Rozhnov, 2022. Spatial ecology of snow leopards (*Panthera uncia*) in the Altai Mountains of western Mongolia. Plus one. In publication.
- Bayandonoi G, Lkhagvajav P, J.S. Alexander, I. Durbach, D. Borchers, B. Munkhtsog, O. Munkhtogotkh, B. Chimeddorj, E. Sergelen, K. Sharma (eds), 2021. Nationwide Snow Leopard Population Assessment of Mongolia: Key findings. Summary report. WWF Mongolian Programme office, Ulaanbaatar, Mongolia. 39 p.
- Claudio Augugliaro, Stefano Anile, Bariushaa Munkhtsog, Choikhand Janchivlamdan, Enkhzorig Batzorig, Ivan Mazzon & Clayton Nielsen, 2021. Activity overlap between mesocarnivores and prey in the Central Mongolian steppe. Ethology, Ecology and Evolution. <u>https://doi.org/10.1080/03949370.2021.1975312</u>
- Gantulga Bayandonoi, Koustubh Sharma, Justine Shanti Alexander, Purevjav Lkhagvajav4, Ian Durbach, Chimeddorj Buyanaa, Bariushaa Munkhtsog, Munkhtogtokh Ochirjav, Sergelen Erdenebaatar, Bilguun Batkhuyag, Nyamzav Battulga, Choidogjamts Byambasuren, Bayarsaikhan Uudus, Shar Setev, Lkhagvasuren Davaa, Khurel-Erdene Agchbayar, Naranbaatar Galsandorj, Darryl MacKenzie, 2021. Mapping the ghost: Estimating probabilistic snow leopard distribution across Mongolia. Diversity and Distributions. 00:1–13. DOI: 10.1111/ddi.13412
- Miroslav P Korablev, Andrey D Poyarkov, Alexander S Karnaukhov, Elena Yu Zvychaynaya, Alexander N Kuksin, Sergey V Malykh, Sergey V Istomov, Sergey V Spitsyn, Dmitry Yu Aleksandrov, Jose A Hernandez-Blanco, Bariushaa Munkhtsog,

Ochirjav Munkhtogtokh, Nikolay I Putintsev, Alexander S Vereshchagin, Atobek Becmurody, Shodi Afzunov, Viatcheslav V Rozhnov, 2021. Large-scale and fine-grain population structure and genetic diversity of snow leopards (Panthera uncia Schreber, 1776) from the northern and western parts of the range with an emphasis on the Russian population. <u>Conservation Genetics</u> volume 22, issue 3, pages 397–410. Springer Netherlands. <u>https://doi.org/10.1007/s10592-021-01347-0</u>

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Unusual encounters with snow leopards

In 2020-2021, 8 cases of the dispersal of young snow leopards migrating from one mountain range to another crossing the wild steppes were encountered. These individuals were photographed and filmed by locals. Local administration and protected

area administrations were informed that the snow leopards traveled safely and reached their habitat in next mountain ranges. These events show that people's attitudes have changed a lot positively to the snow leopards.



Figure 3: Photo by locals. Snow leopard on migration in Shinejinst sum, Bayankhongor province.

Nepal

Resource Mobilization

The Government of Nepal (GoN), Ministry of Forests and Environment, Department of National Parks and Wildlife Conservation (DNPWC) is mobilizing more than 3.5 million USD annually for snow leopard conservation through the protected area conservation program. The Government of Nepal with the support of WWF Nepal has been continuously raising funds for the snow leopard conservation program in the Western and Eastern Landscape. The joint project of DNPWC and WWF spent about 20 million Nepali Rupees (NRs) focusing on snow leopard conservation in Shey Phoksundo National Park (SPNP), Dolpa in the year 2020-21. Additionally, the project has pledged to allocate some 30 million NRs in SPNP focusing on snow leopard research, habitat management, human-snow leopard conflict mitigation, and stakeholder's capacity building for snow leopard conservation for the year 2021-2022. Local NGOs such as the Third Pole Conservancy raised some financial aid to work in the Western Landscape outside the protected area system.

Managing and Monitoring Disease Systems

Four snow leopards have been collared with GPS satellite radio collars in SPNP. SPNP has proposed to conduct an opportunistic sampling of diseases in livestock and snow leopard with support from WWF Nepal this year. The National Trust for Nature Conservation (NTNC) is also conducting snow leopard monitoring in the Central Landscape. The Government of Nepal has promulgated and implemented One-health Policy in 2020. One-health Strategy for Nepal is under preparation.

Green Economy, Ecosystem based adaptation and climate-smart interventions

Implementation of Climate Smart Eastern Snow Leopard Landscape Management Plan in place.

Conservation interventions

The Snow Leopard Conservation Action Plan (2017-2021), and the Snow Leopard and Ecosystem Management Plan (2017-2026) provide a strategic framework for snow leopard conservation in Nepal. Key activities/interventions and projects focusing on snow leopard conservation in Nepal include the following:

- The Snow Leopard Research Centre is being constructed in KCA to facilitate snow leopard and high altitude research.
- With WWF Nepal's financial support, SPNP is implementing the project "Snow leopard and prey species conservation in SPNP and its Buffer Zone" since 2018, and nearly 50 million NRs has been mobilized for research, conservation, management and livelihood improvement, human snow leopard conflict mitigation and capacity building.

- Ten SLCCs (5 in SPNP, 4 in Kangchenjunga Conservation Area (KCA) and 1 in Lamtang National Park (LNP) are actively involved in research and conservation of snow leopards.
- These SLCCs are implementing community managed Livestock Insurance Schemes (LIS) to help mitigate human-snow leopard conflict. These SLCCs have about 250 thousand US dollars in their endowment fund to support small-scale conservation activities and help compensate for livestock loss caused by snow leopards. About 1000 households are involved in the LIS program.
- Other specific programs include camera trapping survey of snow leopard in SPNP and Annapurna Conservation Area (ACA) by NTNC, satellite telemetry of snow leopard in SPNP.
- Snow leopard habitat with protected areas are conducting anti-poaching operations to nab illegal poaching and trade via anti-poaching units, and Community based Anti-poaching Units (CBAPUs).
- Local municipal governments (e.g. Namkha Rural Municipality in Humla outside protected area, and Shey-Phoksundo Rural Municipality in Dolpa inside SPNP) are also supporting community institutions (e.g, SLCCs, and LIS funds) for snow leopard research and conservation.
- GoN compensates herder families for the livestock loss caused by snow leopards and wolves. SPNP and Sagarmatha National Park (SNP) have provided about 7 million NRs (~60 thousand USD) compensation/relief to wildlife victim families for the livestock loss caused by snow leopards and wolves.
- GoN, with support from WWF Nepal, has launched Snow Leopard and Its prey species conservation in SPNP and its Buffer zone since 2018 under National Conservation Area Priority Program focusing on snow leopard conservation. Similar project is on-going in (LNP).
- Snow leopard conservancy with support from the UK Government's Darwin Initiative has been implementing a 3 year-long project titled "Sustaining snow leopard conservation through strengthened local institutions and enterprises" since 2018 to improve security and resilience of snow leopards, prey and biodiversity at two model sites (ACA and SNP) by institutionalizing conservation financing and stewardship at local levels.

Population Assessment of the World's Snow leopards

- With the financial support of DNPWC and WWF Nepal, intensive camera trapping surveys and wild prey-base surveys were conducted in SPNP in 2020-21.
- Himalayan Thar and Blue sheep counts were conducted in Dhorpatan Hunting Reserve (DHR) in 2020.
- Regular prey-base monitoring is being conducting in SNP, SPNP, ACA, Gaurishankar Conservation Area (GCA), and KCA.
- Due to COVID Pandemic, a nation-wide snow leopard population assessment is postponed.

Conservation Education

- Regular conservation education activities by protected areas and conservation partners.
- In partnership with Snow leopard conservancy, Teka Samuha Nepal, the Himali Conservation Forum, DNPWC published snow leopard-based conservation education reference books for school children.
- Regular School conservation program being conducted in schools of snow leopard habitats.

Unusual encounters with snow leopards

A snow leopard entered the corral of a herder in Manang district on 18 May 2021 and killed 44 goats out of 45. The same snow leopard entered the corral the next day and killed 10 goats. It took 35 hours to release the snow leopard safely into the wild.

Pakistan

Resource Mobilization

The government of Pakistan has already initiated a snow leopard conservation-focused project "Pakistan Snow Leopard and Ecosystem Protection Program (PSLEP)" by setting aside USD 4.6 million under the GEF-6 grant cycle. The SLF is implementing this five years (2018-2023) project in collaboration with the Ministry of Climate Change (MoCC), United Nations Development Programme Pakistan (UNDP-Pakistan), Provincial/Territorial Wildlife Departments of Gilgit Baltistan (GB), Khyber Pakhtunkhwa (KP) and Azad Jammu & Kashmir (AJ&K), local communities, academia, and conservation NGOs.

Conservation of wildlife and their habitats is also a major focus of the Ten Billion Tree Tsunami Program (TBTTP) project being implemented by the Federal Government of Pakistan in collaboration with Provincial/Territorial Wildlife Departments. The entire snow leopard range in Pakistan falls in the area of operation of TBTTP.

Four National Parks falling in the snow leopard range are included in the Prime Minister's Protected Areas Initiative- a component of Ten Billion Tree Tsunami Program (TBTTP) project. This unique initiative is aimed to expand the Protected Areas Network in the country from 13% to 15% by 2023 through quality enhancement to achieve international standards.

The Snow Leopard Foundation (SLF) Pakistan through its core program is providing backstopping to the above initiatives by extending technical support, capacity building, and providing a platform for the replication of established research and conservation models.

Managing and Monitoring Disease Systems

Livelihood systems throughout the snow leopard's range in Pakistan are predominantly agro pastoral where livestock plays a central role. Disease and predation, which often operate in parallel, cause considerable livestock loss, affecting the local economy. The annual loss to disease in northern Pakistan ranges between 3% and 14% across different valleys, averaging 7.8% of livestock holdings. This translates into a 60% drop in disposable income from livestock sales^[1]. Moreover, the disease death toll is estimated to be 1.5–5times greater than that by predation. The contagious diseases are not only threatening local livelihoods but are also transmitted to wildlife and impact the overall health of ecosystems.

The SLF converted this threat into an opportunity by formulating a systematic livestock vaccination program termed the "Ecosystem Health Program (EHP)". Under the EHP, the communities sign an enforceable conservation contract with the SLF and pledge not to harm snow leopards and their wild prey. They nominate selected community members to be trained as Ecosystem Health Workers (EHWs). The SLF arranges training and provides vaccines to the community as per the vaccination calendar. The vaccination drive is launched bi-annually and the EHWs vaccinate livestock in their respective jurisdiction. A well-defined monitoring system is in place and vaccination data of each household along with other important parameters such as the number of livestock consumed locally, animals lost to predators, and diseases in between

the vaccination drives are recorded. A vaccination fund is established at the community level to ensure the sustainability of the program in the longer run.

At present, the SLF is implementing the EHP in 40 valleys including 22 valleys in GB, 15 in Chitral, KP, and 3 valleys in AJ&K. A total of 316834 animals belonging to 15918 households translated into 20 animals per household were vaccinated during the spring vaccination campaign 2021. Sheep constituted 40%, goat 32%, cattle 24% and yak 4% of the livestock vaccinated.



Figure 1. The livestock vaccination campaign in Himalaya Landscape, GB

Green Economy, Ecosystem-based adaptation, and climate-smart interventions

The following activities were undertaken under the SLF core program and under the PSLEP project.

A community-based conservation tourism model project was developed and launched in Hopper valley, GB. It is the first model project of its kind in the snow leopard range in the country. Three state-of-the-art facilities including a Glamping site, View Point, and Tourist Information Center& Natural History Museum were developed.

The Federal Minister/Special Assistant to the Prime Minister on Climate Change inaugurated the project and stated "I am sure it will become a model for country-driven eco-tourism and snow leopard conservation^[2]."



Figure 2. Federal Minister addressing the community at the Glamping site

More than 34,000 fruit plants were distributed among communities for orchards development in the Himalaya Landscape. About 4,000 households have been engaged in social entrepreneurship including Snow Leopard Enterprises (SLE), conservation tourism, Liquefied Petroleum Gas (LPG) promotion, fodder and fruit trees cultivation, apiculture, and fruit processing, etc.

To reduce grazing pressure on the rangelands and to enhance motivation in the communities to opt for quality livestock rather than quantity, improved sheep breeds were provided to 50 households in Chitral as a pilot initiative.

Sixty-two Community Wildlife Guards and 13 Forest Guards were hired to improve wildlife surveillance and protect ~500 hectares of high-altitude forest patches through social fencing. As a water conservation and pasture management measure, two irrigation channels were constructed to irrigate ~250 hectares area and three solar pumps were installed to uplift river water and irrigate agricultural land. Similarly, about 350 hectares of degraded rangeland/pasture were protected through water harvesting and reseeding and protection from livestock grazing.

As a land stabilization measure, three gabion walls were constructed and ~180,000 forest plants were planted to meet the energy and timber needs of the snow leopard range communities.



Figure 3. LPG cylinders and stoves were distributed in the Himalayas landscape

Conservation interventions

Major conservation interventions undertaken during the reporting period include human-snow leopard conflict mitigation and compensation measures and ecosystem health programs as discussed earlier.

So far, 50 predator-proof corrals constructed under the PSLEP and the SLF core program in GB, KP, and AJ&K. Livestock insurance schemes have so far been implemented in 30 valleys in the snow leopard landscapes.

Five skill centers have been established and 35 women were trained in embroidery and tailoring under the umbrella of Snow Leopard Enterprises (SLE). Other conservation-linked livelihood improvement initiatives were described under thematic area # 3.



Figure 4. Livestock are housed inside a summer predator-proof corral

Population Assessment of the World's Snow leopards

Methodological approaches to design, conduct remote sensing surveys, and analysis of the data were upgraded. A research article "An empirical demonstration of the effect of study design on density estimations^[3]" was published.

Since 'No Objection Certificates (NoCs)/permits' for the camera trapping studies in the snow leopard landscapes were not secured, these surveys were postponed.

Genetic sampling, however, continued in some of the valleys in AJK and Chitral. Lab analysis will be started, once adequate samples are collected from the three landscapes.

Rut season surveys of major wild prey of snow leopard were completed in the project sites in 2020. Different species counted include Ibex (5,408 in an area of 13,332 km²), Markhor (5,367 in an area of 189 km²), Marco Polo Sheep (110 in 40 km² areas), and Blue Sheep (695 in 2,001 km² area).

Surveys planned for 2021 will start in December.



Figure 5. Map of the study sites showing herd sighting locations

Disrupting Illegal Wildlife Trade

So far, there have been no incidents of snow leopard poaching during the present reporting period.

Conservation Education

Major interventions under the national and regional communication and education plans included the development and dissemination of resource material and mass awareness campaigns on the eve of the international environmental days such as Global Snow Leopard Day and World Wildlife Day etc.

The Clean Green Pakistan Index (CGPI) is a city/tehsil and neighborhood-level index which aims to rank cities/tehsils and neighborhoods according to their cleanliness and greenery. One of the objectives of the assignments of implementation of national and regional communication plans was to increase the CGPI for project valleys by awareness-raising of 20 existing and 17 new Snow leopard/Nature Clubs regarding CGPI and improving the relevant performance indicators including safe drinking water, solid waste management, liquid waste management/hygiene, plantation, and total sanitation in schools falling in the project sites in AJ&K, GB, and KP. Nature Study Camps were organized for the schoolchildren. Journalists were engaged by the SLF in reporting the environmental issues and PSLEP's initiatives.

Research articles were published to disseminate research findings to a wide range of stakeholders.

Unusual encounters with snow leopards

None

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Kazakhstan

Resource Mobilization

Funding for the conservation of the snow leopard in Kazakhstan is at a steady level with a marked upward trend. The large-scale GEF-UNDP-Government of Kazakhstan project continues: "Conservation and sustainable management of key globally significant ecosystems for various benefits", with special logistical support for protected areas; all national parks and reserves inhabited by the snow leopard received new conservation equipment, including drones and camera traps; Institute of Zoology of the Ministry of Education and Science conducts basic scientific research to clarify the current status of the snow leopard populations. Conservation efforts worth \$240,000 USD were implemented in 2020.

The NGO "Wildlife Without Borders - Kazakhstan" through conservation programs funded by IUCN (in the framework of the Central Asian program Save Our Species), WWF-Russia, CEPF and others have raised funds totaling more than 50,000 USD.

Managing and Monitoring Disease Systems

Monitoring of livestock diseases is carried out on a permanent basis by the regional veterinary services. The Laboratory of Parasitology at the Institute of Zoology started special work to study the spread of diseases among livestock and wild animals in the range of the snow leopard; during the next three years this work will be carried out in the mountains of the Northern Tien Shan.

Green Economy, Ecosystem based adaptation and climate-smart interventions:

No information.

Conservation interventions.

In the framework of the GEF-UNDP-Forestry and Wildlife Committee project "Conservation and sustainable management of key globally important ecosystems for multiple benefits"

(A) Prepared an annual national report (2020) on the assessment of the snow leopard population with a level of confidence of 95%. The reliable data was facilitated by studies of the Kazakh population of the snow leopard, as well as photo data obtained from 300 photo traps (purchased by UNDP under the Project), working in protected areas and forestry since 2019.

(B) The Project has been conducting scientific research on the population of the snow leopard since the end of 2019. The conducted research covers the entire range of the Kazakh population of the snow leopard with the inclusion of specially protected natural areas. These studies have identified new habitats of the snow leopard in the Western

and Central Tien Shan, previously unaccepted in the system of accounting and analysis. Work is still being carried out in the mountain ecosystems of Altai-Saur, Western Tien Shan, Northern and Central Tien Shan. Works on definition of the range of the snow leopard, study of the ecological state of the species, the state of the forage base, as well as the risk analysis are carried out. The study will be completed in 2022.

(C) Work on implementation of SMART-patrolling and monitoring system in 7 pilot protected areas: in the National Parks Zhongar-Alatau, Tarbagatai, Kolsai-Kolderi, in the reserves Markakol, Aksu-Zhabagly and Karatau, as well as in Merken Forestry. 108 pcs. of field smartphones with accessories were purchased and handed over to 7 pilot PAs.

(D) The project is working systematically to create new and expand existing protected areas to include the habitat of the snow leopard. Scientific and economic feasibility studies have been prepared for the creation of the Merken Regional Nature Park (in the Kyrgyz Alatau).

(E) The project purchased 25 quadcopters, 2 thermovisors for wildlife observation and handed them over to specially protected natural areas and forestries.

II. The Snow Leopard Foundation Kazakhstan, together with national and international partners since 2018, is implementing a project on the conservation, rehabilitation and breeding of the snow leopard, in order to restore the extinct and maintain the declining population of the snow leopard in Kazakhstan. In the course of this project it is planned to build a Center for Conservation, Rehabilitation and Breeding, where the following will be carried out: formation of a breeding group of snow leopards and their food supply; restoration of habitat in the areas of reintroduction; breeding of snow leopards; adaptation of cubs and their release into the wild; post-monitoring; information work with the local population. The project is currently at the preparatory stage. The project is approved by the Government of Kazakhstan and is included in the National Program for the conservation of endangered species - "Zhasyl Kazakhstan". The territory is chosen and the design of the Centre for Conservation, Rehabilitation and Breeding is under way.

III. The Institute of Zoology together with the NGO "Wildlife Without Borders" are implementing a program to protect the critical mountain ecosystems around the megalopolis of Almaty (Northern Tien Shan). Work is underway to involve civil society in protecting the ecosystems of the Northern Tien Shan (including residents of Almaty and the Almaty region), to strengthen the capacity of protected areas, scientific research and population monitoring, as well as the development of recommendations for conservation and tools for assessing the effectiveness of conservation measures. The project is supported by the International Union for Conservation of Nature (IUCN) under the Central Asian SOS (Save Our Species) Program and the Cooperative Fund for the Conservation of Ecosystems in Critical Condition (CEPF) with the regional partner of the World Wildlife Fund (WWF).

IV. Conservation of the snow leopard in the Altai-Sayan ecoregion of Kazakhstan. As part of the project initiated in 2017. WWF-Russia implements various conservation

activities in the Kazakh part of the Altai, related to finding out the current state of the population (using camera traps and genetic studies), studying the state of the forage base of the snow leopard, identification and analysis of threats, anti-poaching activities to detect traps and loops (using SMART-patrolling technologies), work with the local population. The project is implemented by the Institute of Zoology, Wildlife Without Borders NGO with the participation of Katon-Karagai National Park.

V. Transboundary Snow Leopard Conservation Initiative (SL-TBI). Initiated in 2016. SL-TBI is a regional transboundary initiative for snow leopard conservation between Kazakhstan, Kyrgyzstan and China. The project focuses on the high mountain border areas around Khan-Tengri Peak (7010 m) and Pobeda Peak (7439 m). The project area is a key landscape for GSLEP as it lies at the junction of the three countries and provides a vital link between different parts of the world's snow leopard habitat. Initial results from the collaboration between the international teams will enable the development of effective transboundary conservation. The project is initiated by Marwell Wildlife (UK) in partnership with Beijing Forestry University (China), NABU (Germany) and the National Academy of Sciences of Kyrgyzstan. From the Kazakh side, the Institute of Zoology of the NGO "Wildlife Without Borders" participates in the project.

Population Assessment of the World's Snow leopards

The Institute of Zoology of the Ministry of Education and Science of Kazakhstan continues multi-year (annual) monitoring of the snow leopard in Kazakhstan. Since 2020, the use of PAWS methodological protocols in several mountain ranges of southeastern Kazakhstan has been started for this work. According to the results of the monitoring there is a marked increase in the number of the snow leopard in Kazakhstan - 135-170 individuals (including young individuals). There is a gradual recovery of the historical range in Kazakhstan. Snow leopards appeared in those low ridges of the desert zone (below 1000 m), where they were exterminated in the last century (for example, mountain ranges in the national park Altyn-Emel, etc.).

Disrupting Illegal Wildlife Trade

There are no reported incidents of poaching and illegal trade in snow leopards.

Conservation Education

Conservation education is carried out on a permanent basis in the framework of the work of "Environmental Education Departments" in nature reserves and national parks within the range of the snow leopard in Kazakhstan. The United Nations Development Program in Kazakhstan in 2020 held several large-scale events on environmental education of the population and the promotion of the conservation of the snow leopard in Kazakhstan, one of them is a competition of children's drawings for the residents of the regions inhabited by the snow leopard. The NGO "Wildlife Without Border - Kazakhstan" is implementing a project to involve residents of Almaty city and Almaty region in the process of conservation of the snow leopard, with a special emphasis on environmental education of children of all ages (kindergartens, schools).

Unusual encounters with snow leopards

Against the background of the positive process of increasing the overall population of the snow leopard in Kazakhstan, and, as a consequence of the dispersal of individuals outside the protected areas, in some mountain regions there are episodic conflicts with the participation of the snow leopard. Attacks of snow leopards on livestock have been recorded in the Kyrgyz Alatau and Jungar Alatau. In this regard, the Institute of Zoology is developing proposals to minimize conflict situations; these activities will be included in the Landscape Management Plans.

Kyrgyzstan

Resource mobilization

DCB SPNAs do not have specific details of resources raised or allocated from various sources to support upcoming or ongoing snow leopard conservation programs. The activities of DCB SPNAs related to the snow leopard were carried out only within the framework of the established state funding. At the same time, the Working Secretariat of the Global Snow Leopard and its Ecosystem Protection Program (GSLEP Secretariat), the international organization Snow Leopard Trust (hereinafter SLT), the non-governmental organization Snow Leopard Foundation in Kyrgyzstan (further SLF), Public Foundation "Ilbirs", Branch of the German Nature Conservation Union (NABU) in Kyrgyz Republic.

Management and monitoring of disease systems

In 2017, on October 3, a Memorandum of Cooperation was signed to reduce the risks of the emergence and spread of infectious diseases among wild animals (hereinafter - the Memorandum). The parties to this Memorandum are:

- State Inspection for Veterinary and Phytosanitary Safety under the Government of the Kyrgyz Republic;

- Department of Pastures, Livestock and Fisheries of the Ministry of Agriculture and Food Industry of the Kyrgyz Republic;

- Republican Center for Quarantine and Especially Dangerous Infections of the Ministry of Health of the Kyrgyz Republic;

- Biology and Soil Institute of the National Academy of Sciences of the Kyrgyz Republic;

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- National Association of Pasture Users of Kyrgyzstan "Kyrgyz Zhaiyty";

- Kyrgyz Society for the Conservation of Wildlife (Public Association KSCW);

- Association of Hunting Users of the Kyrgyz Republic;

- Public Foundation "Snow Leopard Foundation in Kyrgyzstan";

- Public Foundation "Panther in the Kyrgyz Republic" (now - Public Foundation "Ilbirs ").

DCB SPNA jointly with the Ilbirs Foundation and the Kyrgyz Research Institute of Veterinary Medicine named after V.I. A. Duisheeva (KSRIV) is implementing a project to identify diseases of wild animals by laboratory tests of samples collected during the periods of legally controlled trophy hunting.
Green economy, ecosystem-based adaptation and climate change responsive measures

In 2019, the development of the Landscape Management Plan for the Central Tien Shan (LCTSH) was completed, approved by the order of the State Agency for Environmental Protection and Forestry dated 11.12.2019 No. 01-9 / 329 "On the conservation of the snow leopard".

In the process of developing the Landscape Management Plan for the Central Tien Shan (LCTSH), the working group formed by the order of the SAEPF dated June 28, 2016 No. 01-9 / 180, analyzed the climatic conditions of the region to understand their possible impact on the socio-ecological features of the landscape, taking into account scenarios of greenhouse gas emissions, and their possible impacts on various aspects of protection in the landscape. It reflects that the Central Tien Shan landscape plays an important role in enhancing human well-being, as a source of several ecosystem services, and is important at the local, regional and global levels due to the huge supply of fresh water on the glaciers of Northern and Southern Enilchek.

While preventing dangerous climate change is beyond the scope of this Management Plan, it can help build a clear understanding of the problem and find ways to adapt to change. Information on this aspect is insufficient at this stage, but adaptation to climate change may become a key area in the near future.

At the same time, the implementation of this Management Plan is not carried out due to the lack of funding sources, assistance in identifying which and attracting funding is assigned mainly to the GSLEP Secretariat.

Conservation measures

Since 2017, the UNDP / GEF project "Conservation of globally significant biodiversity and associated land and forest resources of the Western Tien Shan to support sustainable livelihoods" to promote regional and global cooperation between Kyrgyzstan and stakeholders on the conservation of the snow leopard and its ecosystems.

As mentioned above, the development of Landscape Management Plan the Central Tien Shan (LCTSH) was completed in 2019.

Currently, in order to achieve the goals of the project of the UN Environment Program "Vanishing Treasures", it is envisaged to develop a Landscape Management Plan for Ala-Too (northern and inner Tien Shan), for which, by order of the SCEC of September 7, 2021 No. 51-p, a working group was created in composed of representatives of the central office of the SCEC, the GSLEP Secretariat and public (including international) environmental organizations.

Population assessment of snow leopard.

Whereas the recognition by snow leopard range countries of the need for more reliable and widespread monitoring of its populations and the prioritization of the Population Assessment Worlds Snow Leopard (named PAWS) of the Global Snow Leopard and Its Ecosystems Protection Program (GSLEP) in the Kyrgyz Republic, Snow Leopard Population Assessment in the Kyrgyz Republic (PASK), a component of PAWS, is expected to be launched. For this, republican and foreign experts with the support of the Snow Leopard Foundation in Kyrgyzstan (SLF), the International Snow Leopard Trust (SLT), the Ilbirs Public Foundation and other environmental organizations, based on the PAWS protocols a draft of the Guidelines for Assessing the number of snow leopards in the Kyrgyz Republic was developed. Its implementation will make it possible to obtain scientifically based national and regional estimates of the snow leopard population in its habitat.

Every year on hunting grounds and specially protected Natural Areas of the Kyrgyz Republic, counts the number of wild animals that are carried out. Census work mainly covers wild animals and birds of certain species / subspecies, both hunting animals and those listed in the Red Book of the Kyrgyz Republic, including the snow leopard. As of the beginning of 2021, based on the available information, there are about 400 snow leopards in the Kyrgyz Republic. However, not all areas of potential snow leopard habitat have been surveyed. Probably the most complete information can be obtained from the Kyrgyz Republic Snow Leopard Assessment (PASK) according to the above Guidance.

Combating poaching of illegal trade of wild animals

DCB SPNA, which is currently a subordinate subdivision of the SCEC, in its environmental activities (combating poaching), carried out under the slogan "Nature protection - protection of the Fatherland, protection of the Fatherland - protection of Nature", constantly interacts with law enforcement agencies, customs and border services of the Kyrgyz Republic . In 2020, with the joint participation of employees of DCB of SPNA and law enforcement officers of the city of Bishkek, a violator of the environmental legislation of the Kyrgyz Republic was detained when selling the skin of a snow leopard listed in the Red Book of the Kyrgyz Republic. Currently, investigative measures are underway on this fact.

Employees of the customs service in the customs terminal of "Manas Management Company" detained a citizen of Uzbekistan who illegally imported into the territory of the Kyrgyz Republic for training purposes birds of prey of the falcon family in the amount of 10 (ten) individuals belonging to a citizen of Syria. During a joint inspection by the employees of the DCB of the SPNA, it was revealed that only 8 (eight) out of 10 (ten) birds of prey had identification numbers (chips).

On this fact, the employees of the DCB of the SPNA, together with an employee of the SS UVDT of the Ministry of Internal Affairs of the Kyrgyz Republic, drew up an act of seizure of these birds of prey and handed it over to the rehabilitation center of the Branch of the German Nature Conservation Union in the Kyrgyz Republic (NABU).

In addition to the aforementioned birds, on November 22, 2020, at the Manas International Airport, Management of Internal Affairs officers in transport detained foreign citizens who were trying to illegally carry birds of prey of the falcon family in the amount of 5 (five) individuals.

In 2020, on January 9, a snow leopard with a gunshot wound was found in the Talas region and delivered on January 10 to the Bishkek city for assistance (operation). When examining a snow leopard, more than 70 pieces were found in its head. The pellets, from which veterinarians removed 18 pieces, representing the greatest danger to the life of the snow leopard. For rehabilitation, it was handed over to the head of the Public Foundation "Bugu Ene", which contains a zoological park in the Issyk-Kul region (Karakol city) and a rehabilitation center in the Chui region (Novo-Pokrovka village).

In order to preserve biological diversity, increase the use of illegal use of objects of the world, including endemic and listed in the Red Book of the Kyrgyz Republic, to comply with the requirements of the legislation of the Kyrgyz Republic in the field of environmental protection and natural resource use, the Resolution of the Government of the Kyrgyz Republic of December 7, 2020 No. 595 amended the Resolution Of the Government of the Kyrgyz Republic of May 3, 2013 No. 224 (as amended by the Resolution of the Government of the Kyrgyz Republic of August 18, 2017 No. 501) regarding the expansion of the list of protected species, increasing the amount of taxes for some types.

Education in the field of nature conservation.

Within the framework of cooperation on the project "Building international potential and transboundary interaction to counter illegal trade in big cats", the Ilbirs Foundation is supporting and, with the participation of project staff and partners, certain work is being done to strengthen the potential of the ranger service at organized ecological posts (in Issyk-Kul and Naryn regions). In each region, trainings for rangers were held (in August 2019 and in March 2020). The trainings discussed topics on the review of illegal trafficking in wildlife at the global and regional levels; an introduction to the course on employee safety; survey and documentation; identifying signs of lies; the use of technology in the fight against illegal trafficking in wildlife; effective work of checkpoints.

Also in March 2020, a project employee and an employee of the DCB of the SPNA underwent a 2-week training on working with service dogs at the dog training center of the

State Customs Service in Bishkek, in connection with the acquisition of the Ilbirs Foundation and the transfer of the service German Shepherd to support the work of the gamekeepers.

Unusual encounters with snow leopards

In 2020, on January 11, to the office of the NABU Branch in Kyrgyz Republic, its employees, together with a representative of the DCB of SPNA, delivered a snow leopard (female) 11-12 years old, in an emaciated state, caught by residents of the Naryn region during his attempt to attack a stallion. After additional examination, significant deterioration of the teeth of this snow leopard was established, which became a likely reason for its weakened state and inability to independently survive in the wild. For rehabilitation and subsequent maintenance, it was transferred to the rehabilitation center of the NABU Branch in Kyrgyz Republic, located in the Issyk-Kul region. However, it was not possible to save this leopard - it did not survive.

Russia

Conservation interventions

3 public anti-poaching brigades were established in 3 regions in the snow leopard range in the Republics of Altai, Tuva, and Buryatia. The Conservation Departments of the Sailugemsky National Park and the Tuva Nature Park were supported with transportation by WWF Russia.

Population Assessment of the World's Snow leopards

Transboundary snow leopard survey along the Russian-Mongolian border in 3 sites was carried out. First observation of the snow leopard in the Mongolian part of the Eastern Sayan Ridge using camera traps was done. The captures included two male snow leopards called Munko and Champion, which were previously captured by cameras in the Russian part. The next nation-wide snow leopard census is planned to be carried out in the beginning of 2022.

Disrupting Illegal Wildlife Trade

A new case was registered during the reporting period. Two snow leopard pelts were seized by the Customs Department in Barnaul city.

Conservation Education

A series of trainings on law enforcement for protected area rangers within the framework of the Presidential Grant were provided in the Republics of Altai, Tuva and Buryatia.

Trainings were offered for upskilling on biological forensic techniques for the Veterinary Committee of Altai Republic. At least 12 expert trainings for environmental protection agencies were done in the last 3 months. Training for protected areas staff on GIS will be held in Altai Republic in September 2021.

Unusual encounters with snow leopards

Monitoring of human-wildlife conflicts was done in the snow leopard habitat in Altai Republic. A new case of snow attack on livestock was observed in South Chuya ridge and a new project on minimizing conflicts was started there after that.

Tajikistan

Resource Mobilization

Funding for snow leopard conservation was mobilized from the GEF project "Conservation and Sustainable Use of Pamir Alay and Tien Shan Ecosystems for Snow Leopard Protection and Sustainable Community Livelihoods".

Managing and Monitoring Disease Systems

Nothing to report

Green Economy, Ecosystem based adaptation and climate-smart interventions

During the reporting period (2020), the project small grants program supported three (3) community projects in Ayni and Shamsiddin-Shokhin districts aimed at restoring pastures and introducing alternative energy technologies:

(a) Sustainable pasture management:

– 13 households in Dashtijum village of Shamsiddin-Shokhin district benefit from a grant project on building corrals for 600 small cattle (10 direct beneficiaries, including 5 women, and 30 indirect beneficiaries, including 12 women).

– 40 households in the Dashtijum Jamoat of the Shamsiddin Shokhin district benefit from grant project on restoration of 4 hectares of degraded forest ecosystems and 6 hectares of pastures located in snow leopard habitats (25 direct beneficiaries and 220 indirect beneficiaries, including 75 women).

(b) Fuel and energy technologies:

508 people directly and 24,894 indirectly (including 12,355 women) benefit from a grant project on creation of a demonstration site for energy-efficiency technologies at the boarding school in Mehron village, Gorno-Machinsky district, where solar batteries and water heaters were installed.

60 people, including 14 women from pasture user unions, local communities and dekhkan farms in Rasht, Khujand and Kulob districts, were trained in the requirements and rules of preparing small grant project proposals and participating in small grant projects during three training workshops offered by the project.

Along with that, as recommended by the project Mid-term Review, in 2020 the next extended cycle of project small grants has been launched, covering 12 SGP projects addressing the thematic areas as follows: sustainable pasture and forest management and restoration, reducing conflicts between wildlife and humans in snow leopards' habitats, alternative sources of income.

Conservation Interventions

Progress was made through improved capacity of protected areas, enhanced forest and pasture management in Hissar-Alay and Vakhsh-Darvaz areas, capacitation of environmental staff in

wildlife enforcement and continued online regional and transboundary consultations on snow leopard ecosystem conservation. The project gained significant results in capacitating ranger and administration staff of targeted protected areas (Sangvor and Lakhsh sections of Tajik National Park), implementing the SMART patrol system and enhancing community involvement in cooperation with protected areas. For the first time the boundaries of the Sangvor zakaznik have been indicated through the installation of 30 banners, signs and pointers along the borders of Sangvor and Lakhsh sections of Tajik National Park. 2 checkpoints and boom gates were installed at the entry points of Sangvor section to enhance protection and control of visitors to the park.

To enhance staffing and patrolling capacities 18 rangers in Sangvor and Lakhsh sections of Tajik National Park were supported with a portion of a monthly salary; the PA staff was equipped with communication equipment (phones, radios, tablets), furniture and equipment for smart patrolling. Along with that, as the result of 20 capacitating workshops and trainings, 200 individuals improved their skills in the principles of monitoring, smart patrolling, inventory of wild animals, and suppressing poaching. Within the activities of deploying the smart patrol system, supported by international provider the NextGIS company, more than 80 individuals were trained in methods of smart patrolling and monitoring. At present, this is the only system of thematic control and monitoring in protected areas; and the relevant works on introducing the smart patrol system are carried out for the first time in the history of Tajikistan.

In terms of engaging communities, the project succeeded to engage more than 2,000 people, including 500 women, through awareness raising campaigns, and improved their knowledge about snow leopard and prey conservation, and the opportunities for cooperation with protected areas.

One of significant achievement in 2020 was the progress on adopting the Central Asian Memorandum on conservation of snow leopard, its prey, landscapes and ecosystems in Western Tien-Shan and Pamir Alai, which has been approved by the Decree of the Government of Tajikistan No. 546 on 27 October 2020.

Disrupting Illegal Wildlife Trade

Monitoring and enforcement in the areas outside of PAs was facilitated through development of a training program on monitoring and law enforcement and conducted more than 50 seminars and trainings for representatives of environmental agencies of the CEP and forestry departments, who improved their knowledge and skills in monitoring and law enforcement, restoration of pastures and forests in the snow leopard habitats. Along with that a Wildlife Monitoring Center was built in Sarikhosor Jamoat, and equipment, furniture and alternative energy efficient technologies were procured to equip the Center.

Populations Assessment of the World's Snow Leopards

Standard procedures for the study and monitoring of snow leopard ecosystems and the structure of unified methods for assessing the condition of large animal species in high-mountain ecosystems were developed. Relevant workshops and trainings on the principles of SLIM monitoring were offered in Dushanbe, Kulob, Bokhtar, Shurabad and Shakhrinav. The issues of using SLIM monitoring were also discussed at the online meeting of the GSLEP with

participation of Tajikistan, Afghanistan, Bhutan, China, India, Kazakhstan, Mongolia, Pakistan, Uzbekistan, Russian Federation and international organizations such as the International Snow Leopard Fund, and UNDP.

In 2020, the project and its partners (within the agreements concluded to cover wider area by monitoring and other activities) supported installation of 70 camera traps in natural protected areas and reserves (in 8 project areas).

National coverage of snow leopard and prey monitoring activities reached 25% of snow leopard range and 20% of its prey range.

Conservation Education

Project partners conducted 20 workshops with the participation of 400 people from Pasture Users Unions on methods of restoration/rehabilitation and management of high-altitude pastures and forests. 3 Participatory Forest Management committees were involved in planning, management and monitoring of Hissar-Alai and Vakhsh-Darvaz highland forests.

Uzbekistan

Resource Mobilization

No additional resources mobilized since 2020. UNDP/GEF project on Conservation of Mountain Ecosystems Conservation has been the primary initiative supporting snow leopard conservation in the country.

Managing and Monitoring Disease Systems

No animal disease programme has been initiated yet. Work in progress.

Green Economy, Ecosystem based adaptation and climate-smart interventions

Green Economy, Ecosystem Based Adaptation and Climate-Smart Interventions are currently being carried out within the UNDP/GEF project at the community levels who are being engaged in green and environmental forms of economic activities such as orchards creation, eco-tourism, etc. In order to to provide alternative livelihoods to traditional economic activities such as livestock grazing and medicinal plants collection from the wild. At the state level, green economic development resolution of the government has been issued which lays the foundation for green development not only within snow leopard landscapes but across the country.

Conservation interventions

There are no newly initiated conservation interventions projects but ongoing one which is the UNDP/GEF project on Mountain Ecosystems Conservation.

Population Assessment of the World's Snow leopards

According to expert assessments, there are about 105 snow leopards in the country.

Disrupting Illegal Wildlife Trade

The Snow Leopard is included in the Red List (endangered species list for Uzbekistan) in the country, and no incidences of poaching and/or illegal trade has been registered.

Conservation Education

Conservation education activities are being implemented within the frameworks of the UNDP/GEF project, and the activities are still on-going.

Unusual encounters with snow leopards

Guidelines to manage Unusual Encounters with snow leopards have been prepared.

Appendix 1

The GSLEP Landscape described in each range Country

Afghanistan



Figure 2: Areas of potential habitat for snow leopards in Afghanistan (revised from (Moheb and Paley (2016))

Snow Leopard Landscape(s):

In Afghanistan, the preferred habitat for snow leopard extends through the Hindu Kush in 10 provinces of northeast Afghanistan. Within this range, and for the last 15 years, snow leopard presence has been confirmed in Wakhan National Park, buffer zone districts of Ishkashim and Zebak, and Darwaz-e-Payin district in Badakhshan Province, and in the eastern districts of Bargi Matal and Kamdesh in Nuristan Province (Fig. 1).

Landscape's area, in square kilometers

52,047.12 km²,

Description of landscape boundaries

Wakhan National Park is an area of outstanding ecological, cultural and aesthetic value, where the Hindu Kush, Pamir and Karakoram mountains meet. Wakhan National Park is part of the headwaters of the Panj-Amu River Basin and shares international borders with Tajikistan (north), China (east) and Pakistan (south), where the snow leopard preferred habitat extends along mountain corridors into neighbouring countries. Within Afghanistan, it extends to Nangarhar province to the south and Baghlan province to the west. According to the World Wildlife Fund's (WWF) Global Terrestrial Ecoregion classification it includes parts of seven separate global ecoregions: The Pamir Alpine Desert and Tundra, Karakoram-West Tibetan Plateau Alpine Steppe, Paropamisus Xeric Woodland, Afghan Mountains Semi-Desert, Northwestern Himalayan Alpine Shrub and Meadows, Hindu Kush Alpine Meadow, and Ghorat-Hazarajat Alpine Meadow.

Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria:

Wakhan National Park is considered a hotspot for snow leopards in Afghanistan. About 75% of the confirmed snow leopard range within the country lies within Wakhan. The current snow leopard population for WNP is conservatively estimated at 110-136 individuals. The area also supports healthy populations of prey species (Siberian ibex, Marco Polo sheep, long-tailed marmot and other small mammals).

Countries/provinces/states sharing or adjoining the landscape

The landscape is shared with Xinjiang Uygur Autonomous Region (China), Gilgit-Baltistan and Khyber-Pakhtunkhwa (Pakistan) and Gorno-Badakhsahn Autonomous Region (Tajikistan). In Afghanistan, the snow leopard potential landscape covers parts of 10 provinces including Badakhshan, Baghlan, Kapisa, Kunar, Laghman, Nangarhar, Nuristan, Panjshir, Parwan, and Takhar but to date its presence is only confirmed in Badkahshan and Nuristan.

Name and total area of protected areas existing within the landscape

On 30th March 2014, the entire Wakhan District (10,950.66 km²) was declared as a National Park. The Big Pamir Wildlife Reserve (577 km²) and Teggermansu Wildlife Reserve (169.5 km²) within the Wakhan National Park were designated as Strict Protection Zones within Wakhan National Park.

In June 2020 the National Environment Protection Agency (NEPA) declared a new protected area in Nuristan (i.e. Nuristan National Park), where snow leopard presence is confirmed in the eastren districts of Bargi Matal and Kamdesh. There are also areas with favorable habitats for snow leopards in Panjshir that shall be proposed for protection in the future.



Bhutan

Figure 3: Snow leopard landscape in Bhutan

1. Snow Leopard Landscape

Snow Leopard Landscape Conservation Area of Bhutan

2. Landscape's area, in square kilometers

The approximate Snow Leopard landscape area in Bhutan is 12110.35 km2 but after removing the small disjoined habitats, it is 10981.90 km2. This landscape is drawn based on the potential habitat mapping from an elevation of 3500 meters above the sea

level.

3. Description of landscape boundaries

The landscape covers the entire snow leopard distribution of Bhutan, including Jigme Dorji National Park, Wangchuck Centennial National Park, Bumdeling Wildlife Sanctuary, Jigme Khesar Strict Nature Reserve, Sakteng Wildlife Sanctuary, and Paro Forest Division. Potential snow leopard landscape also covers the high-altitude Black mountains in Jigme Singye Wangchuck National Park in central Bhutan.

4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria

The proposed landscape falls within the country's approved Protected Areas and Biological Corridors, and preliminary assessments conducted in these areas show the presence of the snow leopard including abundance of prey species such as blue sheep, Himalayan marmot and other ungulates. The snow leopard in Bhutan is included under Schedule I of the Forest and Nature Conservation Act 1995, thereby providing the highest level of protection as per conservation law. The snow leopard population is estimated at 96 individuals with an estimated abundance of 79 - 112 individuals (DoFPS 2016).

5. Countries/provinces/states sharing or adjoining the landscape

The Snow Leopard landscape in Bhutan is contiguous with habitats in China and north-east India (snow leopard habitats of Sikkim and Arunachal Pradesh).

6. Name and total area in sq. km of protected areas existing within the landscape

Bhutan's Snow Leopard landscapes cover Jigme Dorji National Park (4374 km2), Wangchuck Centennial National Park (4915 km2), Bumdeling Wildlife Sanctuary (1534 km2), Jigme Khesar Strict Nature Reserve (784 km2), Sakteng Wildlife Sanctuary (742 km2), Jigme Singye Wangchuck National Park (1730 km2) and Paro Forest Division (3032 km2). A part of Biological corridor No. 8 (120 km2) connecting Jigme Singye Wangchuck National Park with northern protected area also forms a part of the landscape. The Protected Area coverage is 14199 km2, while potential snow leopard habitat (areas above 3500 m) is 10981 km2.

China



Figure 4: GSLEP landscape in China

1. Snow Leopard Landscape(s):

Pamir Tienshan Mountains Qilian Mountains

2. Landscapes' area, in square kilometers

31,000 km2

3. Description of landscape boundaries

The three landscapes represent key snow leopard habitats across the distribution range in China. Two landscapes share boundaries with those of neighbouring countries.

 Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria: Currently, snow leopard population estimates are lacking, though their estimated population in the landscapes (c.1000 individuals) may represent one fourth of the snow leopard population of China. The landscapes have a good prey base. Some parts are influenced by intensive human footprints over the last three decades.

- 5. Countries/provinces/states sharing or adjoining the landscape
 - 1) Pamirs: Tajikistan, Afghanistan, Pakistan.
 - 2) Tianshan Mountains: Kazakhstan, Kyrgyzstan and Uzbekistan.
 - 3) North Qilian Mountains: Xinjiang, Gansu and Qinghai within China.
- 6. Name and total area of protected areas existing within the landscape

The Pamirs landscape is situated in the Taxkorgan Administrative Division in the Xinjiang Province, covering the 15,000 km2 of Taxkorgan Provincial Nature Reserve. Tienshan landscape is encompassed by the 2,376 km2 of Tomur Nature Reserve in Wensu Administration Division, Xinjiang; and the Qilian Mountains are characterized by the 13,600 km2 of the Yanchiwan National Nature Reserve in Subei Administrative Division of Gansu Province.

India



Figure 5: GSLEP landscape in India

1. Proposed name of the Snow Leopard Landscape(s):

Hemis-Spiti Landscape; Nanda Devi - Gangotri Landscape; & Kanchendzonga-Tawang Landscape.

2. Landscape's area, in square kilometers:

29,000 km2, c. 12,000 km2 c. 5,630 km2.

3. Description of landscape boundaries

The Hemis-Spiti landscape is spread across the Leh District of Jammu & Kashmir and Lahaul & Spiti District of Himachal Pradesh. In the Ladakh region of Jammu & Kashmir State, the area is bounded by the Zanskar River towards the west, the Indus River (till

Mahe) towards the north, the eastern ridges of Quin Tso and Tso Mororiri towards the east. Much of the Hemis National Park and parts of the Changthang Wildlife Sanctuary are enclosed in this area. In the south, the landscape extends into the Lahaul & Spiti areas of Himachal Pradesh. The ridge extending southeast from the Gya peak at the tri-junction of Ladakh, Tibet and Spiti marks the eastern boundary in the state, which continues down along the Tibetan border till the Sutlej Valley, which marks the southern boundary. The Greater Himalayan (PirPanjal) Ridge extends all along the western border

bending into the Kunzam La, and then along the upper Chandra River, the Zanskar Range, all along the west, to join the left bank of Zanskar River near Nimoo.

The proposed Nanda Devi-Gangtori Snow Leopard landscape (c. 12,000 km2) is located in the northern region of the State of Uttarakhand. This landscape encompasses the Trans-Himalayan and Greater Himalayan regions above an elevation of 3,200 m; from Gangotri National Park in the west, to the Nepal border in the east, and the Tibetan region in the north. The protected areas enclosed in the Landscape include the Govind and Gangotri National Park, Nanda Devi Biosphere Reserve (including Nanda Devi National Park and Valley of Flowers National Park), Kedarnath Wildlife Sanctuary, and Askot Wildlife Sanctuary. The Sacred Kailash Landscape, a cooperative conservation initiative of India, Nepal and China (catalyzed by the ICIMOD) also forms part of the proposed Snow Leopard Landscape's eastern portion. The upper catchments of Tons, Yamuna, Bhagirathi, Jadhganga, Mandakini, Alaknanda, Dhauliganga and Kaliganga Rivers are part of this landscape.

The Kanchendzonga-Tawang Landscape is spread in the two eastern Himalayan States of India, Sikkim (3,570km2) and Arunachal Pradesh (2060km2), separated spatially by parts of China and Bhutan. The Indo-Nepal border that includes the Khanchendzonga peak, forms the western boundary of the proposed landscape. From here, it encompasses the northern areas (> 4,200m) all along the Indo- Tibetan border to join the Indo-Bhutan border to the east of this landscape.

The Tawang and West Kameng Districts in the State of Arunachal Pradesh have potential snow leopard habitat and are suggested as the second unit of the proposed landscape. The boundary here begins at the Indo-Bhutan border in the west, going along the border with Tibetan region in the north into the West Kameng region of the State and then turning south along the 4,200m contour all the way back till the Indo-Bhutan border.

4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria

Hemis-Spiti is among the best-known areas of snow leopard and prey species in the world, although the information is still far from complete. A large number of Protected Areas and other conservation areas are enclosed in this proposed landscape. The Jammu & Kashmir Department of Wildlife Protection and the Himachal Pradesh Forest Department with their partners are already at different stages of implementation of

India's flagship species programme, the Project Snow Leopard. Based on a conservative density of 0.6 snow leopards, per 100 km2, the landscape can house c. 120 snow leopards.

Nanda Devi is a large landscape with adequate prey populations and is connected to other snow leopard landscapes in Uttarakhand, Nepal and China. The Nanda Devi National Park is among the few pristine areas of the Himalaya, and along with the Valley of Flowers National Park, the buffer zone of Nanda Devi Biosphere and the Kedaranth Wildlife Sanctuary are well studied in terms of vegetation and prey. The Govind and Gangotri National Park is known to have a substantial blue sheep Pseudois nayaur population which is guite habituated to human presence. Further east, the Askot Wildlife Sanctuary forms a part of the Sacred Kailash Landscape and has a functioning conservation-livelihoods programme. Snow leopard and prey abundance estimates suggest a fairly high density in Nanda Devi National Park, Valley of Flowers National Park, buffer zone of Nanda Devi Biosphere Reserve, and Gangotri National Park. Preliminary results of surveys in other parts of this landscape indicate the presence of snow leopard and its prey. Kanchendzonga-Tawang landscape is among the least studied regions in India, however recent preliminary work has established presence of healthy populations of prey and also snow leopards in parts of the proposed landscape. The prey species abundances in Sikkim for example are mostly three to four times higher than in the western parts of the Himalaya. One important reason for this could be the overall higher moisture and productivity of the high mountains in the northeastern parts of the Himalaya compared to the western portions.

5. Countries/provinces/states sharing or adjoining the landscape

Hemis-Spiti Landscape is within Jammu & Kashmir, Himachal Pradesh, and borders with Tibetan region.

The Nanda Devi Landscape and Askot Wildlife Sanctuary (part of Kailash Sacred Landscape) are connected to potential snow leopard habitat range in Nepal and Tibetan region. Similarly, the Govind and Gangotri landscape is connected to the potential snow leopard habitat range within Uttarakhand State, adjoining State of Himachal Pradesh, as well as with the Tibetan Region. Pin Valley National Park, Great Himalayan National Park and Kheer Ganga Wildlife Sanctuary, Rupi Bhabha Wildlife Sanctuary, Lipa Asrang Wildlife Sanctuary, and Rakchham & Chitkul Wildlife Sanctuary are protected areas adjoining the landscape.

Both the units of the Kanchendzonga-Tawang landscape in Sikkim and Arunachal Pradesh are contiguous with international borders. Sikkim landscape unit has Nepal to the west, the Tibetan region to the north and east and a small portion is also contiguous with Bhutan. The Arunachal unit has Bhutan in the west and the Tibetan region in the north. India has ongoing agreements for transboundary cooperation and cooperative conservation programmes with both Nepal and Bhutan.

6. Name and total area of protected areas existing within the landscape

Hemis-Spiti Landscape includes Hemis National Park (4400 km2), Changthang Wildlife Sanctuary (c. 5,000 km2) in Jammu & Kashmir; Pin Valley National Park (675 km2), Kibber Wildlife Sanctuary (2200 km2), Rupa Bhaba Wildlife Sanctuary (503 km2), Chandra Tal (38 km2), and Lipa Asrang (31 km2) in Himachal Pradesh. Nested within the landscape is the Upper Spiti Landscape (c. 4,000 km2), which also includes the Kibber Wildlife Sanctuary. The Upper Spiti Landscape and Pin Valley National Park are also part of the Cold Desert Biosphere Reserve (c. 10,000 km2). The Hemis-Spiti landscape has trans-boundary potential with parts of Tibet. Nanda Devi Landscape includes Gangotri National Park (2390 km2), Govind National Park (559 km2), Nanda Devi National Park (625 km2), Valley of Flowers National Park (88 km2) and Askot Wildlife Sanctuary (600 km2). The buffer zone of Nanda Devi Biosphere Reserve (2620 km2), including the Khanchendzonga National Park (1784 km²), Singba Rhododendron Wildlife Sanctuary (43 km²), and the proposed HH Tsangyang Gyatso World Peace Park (2520 km²).

Kazakhstan



Figure 6: GSLEP landscape in Kazakhstan

1. Proposed name of the Snow Leopard Landscape (s)

Jungar Alatau (Zhetysu Alatau) and Ile Alatau (Northern Tien Shan)

2. Landscape's area, in square kilometers

16,000 km2 and 23,400 km2

3. Description of landscape boundaries

The Jungar Alatau landscape borders China in the South. Towards the east, it spreads up to the tip of the ridge in the Jungar gate, towards the north the northern foothills of the mountain range, whereas towards the west the peripheral arrays of Altyn-Emel, Koyandytau, Toksanbay and Tyshkantau ranges define the landscape's boundaries.

The Northern Tien Shan landscape is bounded towards the south by the ridges of the Trans-Ili Alatau, Kungei and Terskey Alatau ranges. Towards the east, the landscape is characterized by the end of the ridge which also coincides with the State's border. The

northern boundary of the landscape is defined by the foothills of these ranges, whereas the western tip of the Trans-IIi Alatau defines the western boundary of the landscape.

4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria In Jungar Alatau, the snow leopard and its prey, characterized by ibex, roe deer, red deer, wild pig and argali are reported from most parts of the landscape. The landscape seems to have a functional connectivity with the snow leopard populations towards Bedzhintau and Borohoro in China.

A good snow leopard population is reported from the Almaty Reserve of the Ile Alatau (North Tien Shan) landscape. Snow leopard prey in the landscape is represented by ibex, roe deer, red deer, wild pig and argali (in the eastern parts), gray marmot and hare. The snow leopard populations may have functional connectivity with different mountain ranges within Kazakhstan, as well as across the international borders, in Kyrgyzstan and China.

5. Countries/provinces/states sharing or adjoining the landscape

The Jungar Alatau landscape is situated in the region that borders China. The Ile-Alatau landscape is situated in the region and borders China towards the east and Kyrgyzstan in the south. The Chon-Kemin National Park in Kyrgyzstan in the south and the Tomur National Park in China in the east are important protected areas with known snow leopard populations. The Ketmen ridge is divided into half with the western half in Kazakhstan and eastern half in China.

6. Provide name and total area in sq. km of protected areas existing within the landscape

Jungar Alatau State national park (3560 km2). The Ile Alatau includes the Almaty State nature reserve (717 km2) and the Ile-Alatau State Nature Park (1992 km2). Kungei Alatau includes the Kolsay Koldery State Nature Park (1610 km2).

Kyrgyzstan



Figure 7: GSLEP landscape in Kyrgyzstan

1. Proposed name of the Snow Leopard Landscape (s)

Sarychat Landscape (Central Tien Shan Landscape) Alay-Gissaro Landscape (trans-boundary, shared with Tajikistan and Uzbekistan)

2. Landscape's area, in square kilometers

13,201 km2(Central Tien Shan Landscape) (The details of the trans-national Alai Gissar landscape are not yet clear)

3. Description of landscape boundaries

The Central Tien Shan Landscape (CTSL) has been defined by enclosing the country boundary with China in the east, south-east and south. The western boundary is defined by those of an existing hunting reserve, Sarychat Nature Reserve and Karakol Nature Reserve. The area towards the north is bounded by an existing paved road. The Alay Gissar Landscape is shared between Kyrgyzstan and Tajikistan.

4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria

The total area suitable for snow leopard habitat in the country is about 89,000 km2 (45%) in the Northern, Central, Western Tien Shan and Pamir-Alai ridges. In the CTSL, the snow leopard is found in an area of approximately 6,635 km2, or about half of the area of the CTSL.

The region belongs almost entirely to the Kashgar floristic province, its flora is quite rich, but insufficiently studied. At present, over 450 species of vascular plants are known in the Kyrgyz part of the Central Tien Shan, but the potential flora includes at least 700 species, which is a significant part of the total floristic wealth of the country. The fauna as a whole has been studied extremely unevenly and insufficiently. Also, about 1,300 insect species are known in the Kyrgyz part of the Central Tien Shan. Therefore, it can be assumed that the Sary-Jaz basin is inhabited by: 6 species of fish, 1 species of amphibians, 6 species of reptiles, 121 species of birds (including migrants) and 26 species of mammals, this constitutes a significant part of the total faunal wealth of the country. 15 species of animals noted here (1 species of insects, 8 - birds and 6 - mammals) and 5 species of higher plants are listed in the Red Book of the Kyrgyz Republic. The area is rich in mineral resources and mining is a potential activity in the landscape, although there is no mining at present.

5. Countries/provinces/states sharing or adjoining the landscape

The landscape is entirely within the Issykkul province of Kyrgyzstan. It borders Kazakhstan towards the north and China towards the East and South.

- 6. Provide name and total area in sq. km of protected areas existing within the landscape Within CTSL are three specially protected areas (PAs):
 - Sarychat-Eertash State Nature Reserve (SNR) on an area of 1 491.18 km2,
 - State Nature parks (SNP) "Karakol" 382.56 km2 and
 - "Khan Tenir" 2,758.00 km2, the total area of which is approximately 41% of the total area of the CTSL.

The territory of the hunting grounds of eight game users in the landscape is 6,536.27 km2.

Mongolia



Figure 8: Map of GSLEP landscapes in Mongolia

- Snow Leopard Landscape(s) Altai South Gobi North Altai
- 2. Landscape's area, in square kilometers

Altai - 56,000 km2 South Gobi - 82,000 km2 North Altai - 72,000 km2

3. Description of landscape boundaries

The North Altai landscape is situated in the Bayan – Ulgii, some parts of Khovd and Uvs provinces. It is adjacent to the Altai landscape identified by the Russian Federation. It borders Russia towards the North-West and China towards the South-West. The landscape is the main source for fresh gene flow for the Russian snow leopard

population in the North and North-West. The Eastern boundaries border with Altai snow leopard landscape. Altai snow leopard landscape is located in the main Altai mountain ranges and it is the most suitable habitat for this endangered cat. This landscape is situated in the territory of Khovd, Gobi-Altai Bayankhongor and provinces. The North East boundary connected with corridor sites at the edge of the Khangai Mountain ranges. The South Gobi landscape is situated in Bayankhongor, Uvurkhangai and Umnugovi provinces. It is connected to the Southern area towards China. The Southern part of the region is occupied by intensive copper, gold and coal mining activities. The South-Eastern edge of the snow leopard distribution is located here.

4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria Snow leopard density is relatively high in Altai landscape. There are various species such as Siberian ibex, Altai argali, Siberian marmot, Altay snowcock, the red deer (in forest areas), and Mongolian saiga and black tailed gazelle in the desert steppes.

The South Gobi landscape reports high density of rare and endangered snow leopards and its prey base. The northern areas include well- developed shrubs, bushes and endemic desert species. Compared with North Altai, the region has relatively low level mountain chains. The Gobi landscape is affected by mining, ninja mining, and linear infrastructure development. The Gobi landscape includes Dzungarian Gobi desert and Alashan plateau. It includes specific endemic flora and fauna.

The North Altai landscape has a supposedly high snow leopard density in the Mongol Altai/ North Altai Mountain. Apart from the snow leopard and its primary prey, the area supports populations of beech marten, gray wolf, red fox and a number of endangered birds. Several forest dwelling species are also found in the landscape including musk deer and red deer.

5. Countries/provinces/states sharing or adjoining the landscape

The Altai landscape is connected to China towards the south-western border and to the North West Altai landscape. Eastern boundaries cover Zavkhan and Gobi-Altai provinces. The southern parts connect with steppe, semi desert and desert steppe ecosystem zones.

The South Gobi landscape is situated in Bayankhongor, Uvurkhangai and Umnugovi, provinces. It is connected to China in the south. The Northern boundary is at the edge of the Khangai Mountain ranges.

The North Altai landscape is situated in the Bayan-Ulgii, some parts of Khovd and Uvs provinces. It is adjacent to Russia in the North-West and with China in the South-West. Some protected areas in Bayan-Ulgii and Uvs provinces connected Russia and China PA network to protect biodiversity of national and global level in Altai-Sayan Ecoregion.

6. Name and total area of protected areas existing within the landscape

The Altai landscape includes Munkhkhairkhan Mountain and Uench Canyon National Park (5060 sq.km), Khar us Nuur National Park (8529 sq.km), Mankhan Nature Reserve (828 sq.km), Bulgan river Ikh Ongog National Park (927 sq.km), Myangan Ugalzat National Park (3037 sq.km) in Khovd and Bayan-Ulgii provinces, Sharga Nature Reserve (3134 sq.km), Alag Hairkhan Nature Reserve (367 sq.km) and Great Gobi Strictly Protected Area Part B (9271 sq.km) in Khovd and Gobi- Altai provinces.

The South Gobi landscape contains Gobi Gurvan Saikhan National Park (26971 sq.km) in Umnugovi and Bayankhongor provinces and Ikh Bogd National Park (2628 sq.km) in Bayankhongor province.

The North Altai landscape includes Altai Tavan Bogd National park (6561 sq.km), Siilkhem A (699 sq.km) and Siilekhem B National Parks (779 sq.km), Khokh Serkhiin Nuruu Strictly Protected Area (757 sq.km), Develiin Aral Nature Reserve (106 sq.km), Tsambagarav National Park (1137 sq.km) in Bayan-Ulgii and Khovd provinces. Altan Khokhii Mountain Nature Reserve (907 sq.km), Turgen Mountain Strictly Protected Area (1304 sq.km), Tsagaan Shuvuut Strictly Protected Area (333 sq.km) in Uvs and Khovd provinces.

Nepal



Figure 9: GSLEP landscape of Nepal

1. Snow Leopard Landscape(s)

Eastern Conservation Landscape (ECL)

Central Conservation Landscape (CCL)

Western Conservation Landscape (WCL).

2. Landscape's area, in square kilometers

Eastern Conservation Landscape (ECL): 9674 km2

Central Conservation Landscape (CCL) : 9258 km2

Western Conservation Landscape (WCL): 10811km2

3. Description of landscape boundaries

The Eastern Conservation Landscape stretches from Kangenjunga Conservation Area (KCA) in the East to Rasuwaghadhi (Lamtang National Park) in the West. This complex covers Kangenjunga Conservation Area, Makalu Barun National Park, Gaurishankar Conservation area, Sagarmatha National Park, Lamtang National Park and the adjoining National Forest.

The Central Conservation Landscape covers the eastern border of Rasuwaghadhi in the east to Tscharka Pass, the western border of Annapurna Conservation Area. This complex includes the entire area of the Annapurna and Manaslu Conservation Areas.

The Western Conservation Landscape extends from Tscharka pass in the East to the Western border of Darchula district (Api Nampa conservation area), which lies along the Nepal-India border and includes Dhorpatan hunting reserve, Shey Pholsundo National Park, Rara National Park and Khaptad National Park and their adjoining national forest.

4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria:

The Eastern Conservation Landscape covers the trans-border areas of Nepal, China and India. This area plays a significant role in the conservation of carnivores. The eastern part of this complex includes KCA, only one area managed by local communities. This landscape has good population of herbivores such as blue sheep (*Pseudois nayaur*), Himalayan marmot (*Marmota himalayana*), pika (*Ochotona princeps*), Himalayan tahr (*Hemitragus jemlahicus*), musk deer (*Moschus chrysogaster*), barking deer (*Mutiacus muntjac*) wild boar (*Sus scrofa*) and Royle's pika (*Ochotona royalei*) apart from several species of birds. The prey species are relatively abundant, because of low human interference and certain areas fall under the protected area system. Local communities have been mobilized for the conservation and management of protected areas. The communities benefit from sharing protected area revenue and getting support from the NGOs involved in conservation. That would be the major reason for a high population density of snow leopards in comparison to other areas in the Eastern Conservation Landscape.

The Central landscape is connected with the landscape of TAR China. So, it has trans-boundary value for long term conservation and management of mega herbivores like snow leopard and its prey species. It has a good population of mega herbivores such as blue sheep, Himalayan marmot, pika, Himalayan tahr, musk deer, barking deer, wild boar and Royale's pika apart from several species of birds including snowcock.

The Western landscape includes Shey-Phoksundo National Park (SPNP) where the first scientific study on snow leopards was conducted. This National Park has the highest snow leopard density in Nepal. This landscape has trans-boundary importance among Nepal, China

and India. Blue sheep, Himalayan marmot, pika, Himalayan tahr, musk deer, barking deer, wild boar and Royale's pika apart from several species of birds including snowcock. The Western Conservation Landscape is connected with India and China.

5. Countries/provinces/states sharing or adjoining the landscape

Three snow leopard conservation complexes are envisioned in Nepal for long term management of the minimum viable populations (MVP) of at least 50 breeding snow leopards. All the landscapes have been managed with the collaboration between government, NGOs, local communities, and other stakeholders.

The Eastern Conservation Landscape is connected with Sikkim, India and Tibetan Autonomous Region of China. It has trans-boundary values to protect carnivores. The Eastern Conservation Complex has been fragmented because of human habitation, river gorge, rock terrain and others. Therefore, there is the lack of East and West connectivity. Maintaining the minimum viable population of snow leopards depends on the trans-border landscape of China and India. There is an established system to have regular meetings between Nepal, India and China as well on trans-boundary issues focusing on snow leopard conservation.

The Government of Nepal in collaboration with conservation partners namely the National Trust for Nature Conservation and WWF Nepal and local communities have initiated a satellite collaring of four snow leopards in KCA in 2014, and satellite collaring of two snow leopards in SPNP in 2019. The movement of snow leopards from the satellite data in KCA has shown its movement in the trans-boundary area between Sikkim, India and Nepal. An adult male snow leopard has been recorded travelling about 1000 km2.

The Central Conservation Landscape is connected with Tibetan Autonomous Region of China.

6. Name and total area of protected areas existing within the landscape.

The Eastern Conservation Landscape includes Kanchanjunga Conservation Area (2035 km2), Makalu Barun National Park (2330 km2), Gaurishankar Conservation Area (2179 km2), Sagarmatha National Park (1148 km2), Lamtang National Park including the buffer zone (2130 km2). There is an additional surrounding forest area of approximately 1000 km2, summing it all up to 9674 km2.

The Annapurna Manaslu Conservation Landscape (Central landscape) comprises Annapurna Conservation Area (7629 km2) and Manaslu Conservation Area (1663 km2), summing up to a total of 9258 km2.

The Western Conservation Landscape has Dhorpatan hunting reserve (13255 km2), Shey Phoksunda National Park (49040 km2), Rara National Park (304 km2), Api Nampa Conservation Area (1,903 km2) and an adjoining forest area of approximately 2000 km2. The total area is10,436 km2.

Pakistan



Figure 10: GSLEP landscapes in Pakistan

1. Snow Leopard Landscape(s)

The Pakistan snow leopard range is spread across 80,000 km2 and encompasses four high mountainous ranges, namely the Hindu Kush, the Pamir, the Karakorum, and the Himalaya. These mountain ranges are home to some of the world's most fascinating and endangered wildlife species, including the Himalayan ibex (*Capra sibirica*), markhor (*Capra falconeri*), blue sheep (*Pseudoisnayaur*), Marco Polo sheep (*Ovis ammonpolii*), musk deer (*Moschus spp.*), Himalayan lynx (*Lynx lynxisbellinus*), brown bear (*Ursus arctos*), Grey wolf (*Canis lupus*), and the snow leopard (*Panthera uncia*), which is an umbrella and indicator species of this high altitude mountainous ecosystem. Apart from the rich and unique biodiversity, these mountainous systems are supporting remote and diverse human cultures. Consequently, the snow leopard ecosystems are important for the coexistence of both indigenous people and wildlife.

Although the country's snow leopard population estimates are as uncertain as those of any other range state, it is estimated that 200-420 snow leopards occur in Pakistan's northern

mountains across Khyber Pakhtunkhwa (KPK), Gilgit-Baltistan (GB), and Jammu and Kashmir (AJK). Besides being down listed (Endangered to Vulnerable) by the IUCN, a national-level assessment considered the snow leopard critically endangered within the country. The snow leopard population in Pakistan though small, yet, it represents the world's third largest by size and significance of this number can be gauged by the population sizes in neighboring India, Afghanistan, Tajikistan, and China, respectively.

Pakistan partnered with the snow leopard range countries by endorsing the 'Bishkek Declaration' in 2103 and subsequently developing its National Snow Leopard and Ecosystem Protection Priorities (NSLEP) to secure the GSLEP goal of "20 by 2020" i.e. to protect at least 20 healthy populations of snow leopards across the cat's range by 2020. Out of these landscapes identified across the snow leopard global range, three fall in Pakistan. Description of the landscapes is provided below.

Karakoram-Pamir: Falls in Gilgit-Baltistan (GB)Province and borders with China, Tajikistan and Afghanistan.

Hindu Kush: Situated in Upper and Lower Districts of Chitral in Khyber Pakhtunkhwa (KP) Province and connected with Wakhan Corridor of Afghanistan.

Himalaya: Adjacent to the effective line of control between India and Pakistan and is situated partially in Astore District of GB and Neelum District of Azad Jammu & Kashmir (AJ&K) State.

Together, these landscapes cover 59,188 km2 area and constitute ~74% of the snow leopard range in the country. These landscapes have been identified using the GSLEP guidelines and in consultation with the Ministry of Climate Change (MOCC), respective Provincial/Territorial Wildlife and Forest Departments, conservation NGOs, and communities.

2. Landscape's area, in square kilometers

Karakoram-Pamir 38,245 km2; Hindu Kush 13,833 km2; Himalaya 7,228 km2

3. Description of landscape boundaries or attach map

The Hindukush landscape borders the Wakhan landscape from Afghanistan to the north. It constitutes the westernmost snow leopard habitat within the country. The Karakoram Pamir landscape is the northern range of the snow leopard distribution in Pakistan and is entirely within the Gilgit-Baltistan province.

The Himalaya landscape is adjacent to the effective line of control between India and Pakistan and is situated partially in Gilgit-Baltistan and partially in AJK province.

4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria:

The Snow Leopard Survival Strategy (SLSS) (McCarthy and Chapron, 2003) and Pakistan's strategic plan for snow leopard conservation in 2008 (Khan, 2008), identify information gaps in snow leopard ecology as one of the major limitations in formulating and implementing an effective conservation strategy. To address this issue, an ambitious data collection program was initiated in the snow leopard range in 2008, to understand snow leopard distribution, habitat requirements, and conservation challenges. Three model landscapes have been selected in Pakistan, based on habitat suitability analysis and snow leopard habitat connectivity (map attached). Moreover, understanding gained from other data (genetic, conflict, and sign surveys), and consultation with concerned departments were also considered for the selection of landscapes.

A study was conducted that focused on the known snow leopard range in Pakistan, which encompass four high mountainous ranges; Himalaya, Karakoram, Pamir and Hindu Kush, spread across three administrative units i.e., Khyber Paktukhwa (KPK) Province, Gilgit-Baltistan (GB) Province and State of Azad Jammu and Kashmir (AJK). We targeted major protected areas and other potentially suitable habitats in the snow leopard range, and sampled 21areas spanning around 40000 km2. Our sampled area covers about 50% of reported snow leopard habitat in Pakistan (80,000 sq.km, McCarthy and Chapron, 2003). Data of snow leopard's occurrence was collected using camera trapping and sign-based site occupancy surveys, and DNA analysis of scat samples. Entropy modeling was used for predicting habitat suitability of the snow leopard in Pakistan. Modeling of potential movement corridors of the snow leopard was achieved through Circuitscape 4.0 software. Pairwise modeling mode was used that iterates across all pairs in a focal node file.

Snow leopard detection was low as it was photo-captured in 64 capture events at only 46 stations (in 736 stations). In total 178 locations in different areas with fresh signs (either scrape or pugmark, or both) were acquired. DNA analysis of scats samples confirmed that 111 belonged to the snow leopard. Combining results of all three methods, a total of 335 confirmed locations of snow leopards were acquired, which were used in the maxent model.

Habitat suitability map (Figure 10.1), was divided into four classes based on the probability of habitat suitability of snow leopard. These classes were; none or very low (0-0.5), low (0.05-0.4), medium (0.4-0.7), high (0.7-1). Most of the area falls under none or very low class. The areas of Khunjerab National Park, Misgar, Chapursan, Qurumber National Park, Broghil National Park fall in the category of medium suitability. Limited areas in Khunjerab and Misgar appeared to be of high suitability. Based on scores of the habitat suitability model and natural connectivity, three snow leopard model landscapes, namely Hindu Kush, Karakoram-Pamir and Himalaya were identified.

Circuit model (Figure 10.2) revealed an interesting pattern with respect to the snow leopard habitat connectivity. The population in Hindukush landscape appears to be more connected with the population in Afghanistan, as compared to other populations in Pakistan. Similarly the

Pamir-Karakoram population is better connected with China and Tajikistan, and Himalayan population is connected with the population in India.



Figure 10.1: Habitat suitability map of snow leopards



Figure 10.2: Circuit model showing the potential movement corridors of snow leopard. Blue areas are strong links while brown areas are weakest.

5. Countries/provinces/states sharing or adjoining the landscape

The Karakoram-Pamir Landscape is connected with the China, Afghanistan, and Tajikistan

The Hindu Kush Landscape is connected with Afghanistan.

The Himalaya landscape is adjacent to India (Jammu & Kashmir disputed territory)

6. Name and total area of protected areas existing within the landscape.

The three landscapes encompass a myriad of protected areas of different management categories. The Karakoram-Pamir Landscape encircles three National Parks (NPs) namely the Central Karakoram, Khunjerab and Qurumbar, the Hindu Kush Landscape encompasses Chitral Gol and Broghil National Parks and Himalaya Landscape encompasses Musk Deer and Gamot National Parks (Fig. 10.3). Other PA categories include the Game Reserves, Wildlife Sanctuaries and Community Managed Conservation Areas (CMCAs).



Figure 10.3: Map of existing PA's in the three landscapes

Russia



Figure 11: GSLEP map of Russia

1. Snow Leopard Landscape(s)

Altai Mountain Transboundary Snow Leopard Landscape

2. Landscape's area, in square kilometers

48767 km2

3. Description of landscape boundaries

The landscape has been defined by encompassing the Argut River Basin, South Altai, Sailugem, Chikhachev, Kuraisky ridges in Altai Republic and surrounding area in Tuva Republic (Mongun-Taiga Massif, Tsagan-Shubetu and Shapshalsky ridges).
4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria:

The landscape, jointly along with the Mongolian one can be considered as a home to 92-122 snow leopards. In 2019 during the annual snow leopard census it was observed that Argut River Basin (Russia) may have 17-18, South Altai Ridge (Russian part) 3-5, Chikhachev Ridge (Russian part) 7-8, Kuraisky Ridge (Russia) 10, Sailugem Ridge (Russian part) 6, Mongun-Taiga Ridge (Russia) 2-3, Shapshal Ridge (Russia) 4-5, and Tsagan-Shibetu Ridge (Russian part) may have 4-5 individual snow leopards.

The area reports high abundance of Siberian ibex (compared to other ibex' populations in Russia), Altai argali, musk deer, roe deer and Siberian elk (14,620-18,420 individuals of ungulates in total). Specifically, Argut River Basin and surrounding mountains (Russia) may have 5450-6290, South Altai Ridge (Russia): 50-60, Sailugem Ridge (Russia and Mongolia) 1500-1800, Chikhachev Ridge (Russia and Mongolia) 1250-1450, Kuraisky and Chulyshman Ridge (Russia) 530-810, Mongun-Taiga Ridge (Russia) 140-210, Shapshal Ridge (Russia) 600-700, and Tsagan-Shibetu Ridge (Russia and Mongolia) 1100-1500 prey animals, but that is only expert's guesstimates. There is no exact information on prey abundance in Russia.

All the snow leopard populations in the Altai Mountain Landscape are seemingly well connected via mountain ridges, including Mongol Altai, Sailugem, South Altai, Katunsky, South and North Chuisky, Kuraisky, Chikhachev, Shapshal and Tsagan-Shibetu ridges. There are multiple conservation projects for snow leopards and other species (including Community-Based Conservation Initiatives) are implemented by WWF and other organizations in the Russian, Mongolian and Kazakh parts of the SL Landscape.

5. Countries/provinces/states sharing or adjoining the landscape

The landscape is within Altai and Tuva Republics in Russia. It adjoins parts of Bayan Ulgii and Uvs aimags in Mongolia, connects to Xinjiang Province in China and parts of the Eastern Kazakh region in Kazakhstan.

6. Name and total area of protected areas existing within the landscape

The landscape encompasses Altaisky Biosphere Reserve (Zapovednik), Katunsky Biosphere Reserve (Zapovednik), Ubsunurskaya Kotlovina Biosphere Reserve (Zapovednik), Sailugemsky National Park, Belukha Nature Park, Uch-Enmeck Nature Park, Ukok Plateau Nature Park, Ak-Cholushpa Nature Park, Tuva Nature Park and Shavlinsky Wildlife Refuge (Zakaznik).

Tajikistan



Figure 12: Map of GSLEP landscape in Tajikistan

1. Snow Leopard Landscape(s)

Pamirs Alay-Gissaro (transboundary, shared with Kyrgyzstan and Uzbekistan)

2. Landscape's area, in square kilometers

92,000 km²

3. Description of landscape boundaries

The Pamir Landscape is geographically situated at the intersection of the Himalaya, Karakorum, Tian Shan, Alai, Hindu Kush, Kunlun mountain ranges, which jointly comprise the vast majority of global snow leopard habitat. To the southwest, it borders

the Hazratisho range and the northeast the Hissar range.

4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria:

The landscape is of global significance to snow leopard conservation, serving as a corridor to link snow leopard populations across the species' range. Nonetheless, the fundamental knowledge needed to inform effective conservation strategies in the Landscape is still far from complete.

Siberian ibex (Capra sibirica), argali (Ovis ammon Polii) and the markhor (Capra falconeri heptneri) are the primary prey species. In the absence of robust wild ungulate populations, snow leopards generally incorporate a high proportion of domestic livestock and small mammals into their diets. Declining prey availability is one of the main factors limiting snow leopard populations. Poaching pressure on prey species remains while simultaneously reducing habitat quality via overgrazing and overharvest of woody plants for fuel. Well-managed areas show higher densities of the prey which translates into higher snow leopard numbers. There are more than 20,000 argali across the eastern Pamirs, mostly in well- managed areas. The most recent markhor survey (2016) shows a total of 1298 markhor in the conservancies alone (the markhor in the Dashtijum PA were not counted in 2016 due to security concerns).

In 2012, cameras were deployed from early July through late September in two areas of 1000 each in the Eastern Pamirs. During that period, in one area we captured photographs of 19 uniquely identifiable individuals in 70 distinct events. Fecal DNA yielded a minimum of 23 individuals. In the other area, we detected six unique individual snow leopards on 14 separate occasions. By contrast, fecal DNA produced a minimum population estimate of 16 individuals in the study area. In 2013, cameras were deployed from January to March 2013 in an area of 73 km2 in Darvaz, in the Western part of the Pamir landscape. We detected six unique individual snow leopards on 58 separate occasions. In 2013, cameras were deployed in an area of 700 km2 in the Wakhan Valley. We detected seven unique individual snow leopards on nine separate occasions. In 2014, cameras were deployed from January to March in the Southern Alichur range in the Eastern Pamirs. We detected one snow leopard in an area of 1000 km2.

5. Countries/provinces/states sharing or adjoining the landscape

The Pamir Landscape is connected with the Kyrgyz Republic, China and Afghanistan

6. Name and total area of protected areas existing within the landscape

The Pamir landscape includes Zorkul Strict Protected Area (8770 km2), Tajik National

Park (26000 km2), Dashtijum Strict Protected Area (197 km2) and Dashtijum Zakasnik (500 km2)

Trans-Boundary



Figure 12: Map of trans-boundary landscape Alay-Gissaro

1. Proposed name of the Snow Leopard Landscape(s):

Alay-Gissaro

2. Landscape's area, in square kilometers:

30,232 km2

3. Description of landscape boundaries

The Alay Gissar landscape is the only GSLEP landscape shared by up to three countries. From the Eastern tip of Uzbekistan towards the South-East of Samarkand, the landscape covers the mountain ranges north of Dushanbe and South of Leninobod. It covers the entire Alay Mountain range in Kyrgyzstan.

4. Rationale for selection and estimated snow leopard population, status of prey, and connectivity following the GSLEP criteria:

The Alay Gissar Mountain range, along with the Pamir Mountains constitute the bottleneck of the Northern and Southern distributions of the global snow leopard distributions. As the link between the Himalaya-Hindukush in the South and the Tien Shan and Altai mountain chains in the North, they have high biogeographical and conservation importance. Recent studies have reported significant shrinkages in sites used by snow leopards and also Marco-Polo sheep in the Alay region, even though some areas towards the center of the landscape still continue to be the strongholds of large mammalian populations.

5. Countries/provinces/states sharing or adjoining the landscape

The landscape is shared by Uzbekistan, Tajikistan and Kyrgyzstan.

6. Name and total area of protected areas existing within the landscape

The Alay-Gissaro Landscape includes: Shirkent natural park (319 km2), Zeravshan (23 km2), Sayvotinsky (42 km2) Iskandarkul (300 km2), Almasinsky (60 km2) and Kusavlisaysk (198.44 km2) reserves.