ANNEX

GLOBAL SNOW LEOPARD & ECOSYSTEM PROTECTION PROGRAM

October 2013

How to cite this document: Snow Leopard Working Secretariat. 2013. Global Snow Leopard and Ecosystem Protection Program Bishkek, Kyrgyz Republic.

Global Snow Leopard and Ecosystem Protection Program

ANNEX

Governments of the Snow Leopard Range Countries

Islamic Republic of Afghanistan
Kingdom of Bhutan
People's Republic of China
Republic of India
Republic of Kazakhstan
Kyrgyz Republic
Mongolia
Nepal
Islamic Republic of Pakistan
Russian Federation
Republic of Tajikistan
Republic of Uzbekistan

Partner Organizations of the Snow Leopard and Ecosystem Protection Program

Convention on International Trade in Endangered Species of Wild Fauna and Flora
Convention on the Conservation of Migratory Species of Wild Animals
Flora and Fauna International
Global Environment Facility
Global Tiger Initiative
INTERPOL
Nature and Biodiversity Conservation Union (NABU)
Snow Leopard Conservancy
Snow Leopard Network
Snow Leopard Trust
TRAFFIC
United Nations Development Programme
USAID
WildCRU
Wildlife Conservation Society
The World Bank
WWF

The Global Snow Leopard Ecosystem Protection Program (GSLEP) is built on a foundation of 12 National Snow Leopard and Ecosystem Protection Priorities (NSLEPs) and the Global Support Components (GSCs) found in this Annex.

Table of Content

Afghanistan

Government of the Islamic Republic of Afghanistan

National Environmental Protection Agency (NEPA)

National Snow Leopard Ecosystem Priority Protection(NSLEP) forAfghanistan

2014-2020

Acronyms

AWEC	Afghan Wildlife Executive Committee
BACA	Band-e Amir Community Association
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
ISAF	International Security Assistance Force
IUCN	International Union for the Conservation of Nature
GEF	Global Environmental Facility
GIS	Geographical Information System
GPS	Global Positioning System
MAIL	Ministry of Agriculture, Irrigation and Livestock
MoIA	Ministry of Interior Affairs
NEPA	National Environmental Protection Agency
NGS	National Geographic Society
NSLEP	National Snow Leopard Ecosystem Priority Protection
UNEP	United Nations Environment Program
USAID	United States Agency for International Development
WCS	Wildlife Conservation Society
WFP	World Food Program
WPA	Wakhan Pamir Association

Importance of Snow Leopard Conservation and Snow Leopard Ecosystem

The snow leopard (*Panthera uncia*) is sparsely distributed across an area that exceeds 1.2 million square km (Jackson, et al., 2005) and extends across twelve countries: Afghanistan, Bhutan, China, India, Kyrgyzstan, Kazakhstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan and Uzbekistan (Hussain, 2003). Afghanistan encompasses the far western range extent of the snow leopard's distribution. Included within Afghanistan's range is the Wakhan Corridor, the narrow panhandle of land in Badakhshan province (in the far northeast of the country) that connects Afghanistan with China (Figure 1). Wakhan is renowned for its wildlife, beinghome of Afghanistan's only populations of Marco Polo sheep (*Ovis ammon polii*) and various other threatened species, including snow leopards. Wakhan is also the "corner" of Asia's great mountains, and connects snow leopard ranges in the east such as the Pamirs, Karakorams, and Himalayas with the Altais, Kunluns, Tien Shans and other ranges to the north. At the international snow leopard conservation conference in 2008,Wakhan was identified by experts as a global priority Snow Leopard Conservation Unit.

Previous estimates for snow leopards in Afghanistan placed the number at only around 100 animals, but this was based entirely on an estimate of appropriate habitat in the country and the likely density of snow leopards, not actual data. Since 2009, the National Environmental Protection Agency of the Government of the Islamic Republic of Afghanistan with the cooperation of Wildlife Conservation Society (WCS) and community rangers has used camera traps, which have documented snow leopards in Wakhan. The surveys have produced a high frequency of photos, to-date;over 1,300 capture events have been recorded across 20 different locations in the landscape. This suggests that Wakhan is a particularly rich area for snow leopards and a global priority site for their conservation (Simms et al. 2011).

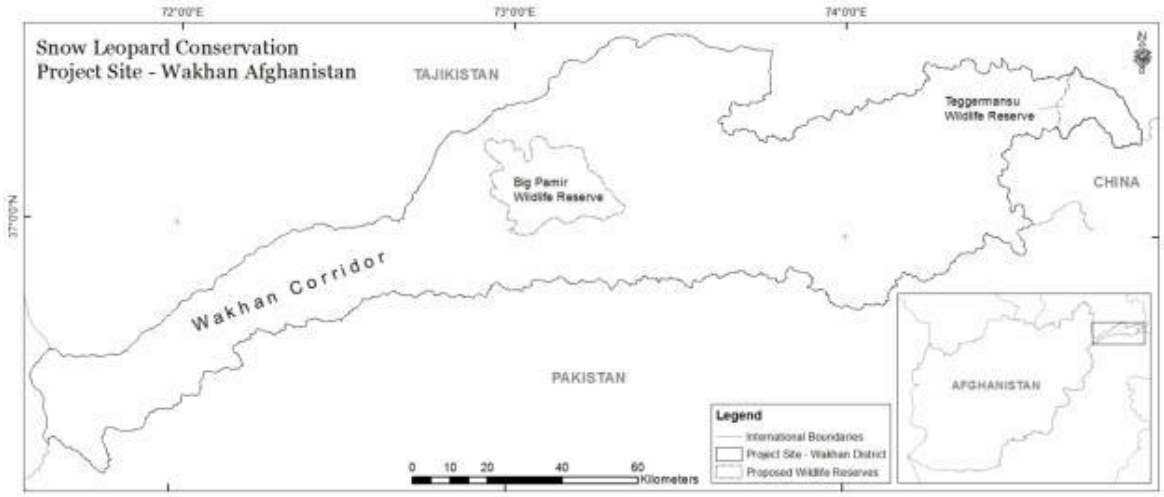


Figure 1: Geographical location of the Wakhan Corridor

The snow leopard is threatened and listed as Endangered (C1) on the IUCN Red List (IUCN, 2010) and it is also included in the Afghanistan Protected Species List. The snow leopard is an apex predator of the high mountain ecosystems and as such is an indicator of ecosystem health. There must be robust populations of prey species (mountain ungulates as well as smaller species such as marmots) and in turn healthy plant communities to support these if snow leopards are still present. Snow leopard habitat range intersects with the distribution range of the Marco Polo argali, Siberian ibex (*Capra sibirica*), urial (*Ovis vignei*), markhor (*Capra falconeri*) and other small and medium size mammals. In addition to thisWakhan is home for other predator species such brown bear,high altitude bird species, medicinal plants and local communities who have shared the area with snow leopards for thousands of years. Healthy snow leopard ecosystems also mean rich biodiversity and a healthy and well-functioning ecosystem for otherwildlife present in the area.As Afghanistan is in conflict for over three decades now, and because of this and

other resources constraints as a least developed country, there have been very limited studies on the ecosystems of Afghanistan and almost no studies on the value of ecosystem services to local communities and the nation. However the Environment Law of Afghanistan mandates NEPA to carry out research and studies on ecosystem services and quantify the value of such services to promote the realistic cost benefit analysis of the impact of development projects on ecosystem and set priorities for their protection and conservation.

A large number of communities living in snow leopard area and high mountain area of Afghanistan are comparatively economically poor and heavily reliance on the local ecosystem for their livelihood, particularly for pasturelands for their livestock and traditional medicines for trading. The presence of snow leopard indicates the healthy ecosystems which is equally important for rural communities for their livelihood.However, excess use of the pastureby communities posesa threat to the snow leopard in some areas. High mountain ecosystems where snow leopards exist are the primary water source with large glacial areas feeding major rivers that are the source of drinking water, irrigation, and electricity for millions of Afghan and their future prosperity. Healthy mountain ecosystems with good vegetation coverplay an important role in regional climate regulation, water balance of the Mountain Rivers, and clean source of waterfor Afghanistan and downstream countries.Mountain ecosystem including snow leopard ecosystem carry great cultural and religious importance to Afghan and the value of this cannot be quantified in the economic terms. Further, the presence of snow leopards living in health ecosystems can be a considerable attraction for the development of eco-tourism industries not only benefiting local communities but also more revenuesand employment at national level.

The snow leopard ecosystem is vulnerable to climate change, human disturbance and excess livestock grazing. Conservation and careful management of the snow leopard and its ecosystem can ensure the sustainability and future protection of the ecosystem, for the benefit of communities in the region.

Disseminating Information on the Value of the Snow Leopard Ecosystem and Generating Support for Conservation

Three decades of war and civil conflict kept wildlife issues as low priorities in Afghanistan. However, in the recent years,following the end of the Taliban regime, conservation initiatives havestarted and are beginning to yield positive results for wildlife conservation. In the past 6 – 8 years NEPA with the cooperation of WCS has undertaken major activities in the field of snow leopard conservation in Afghanistan. These activities are not limited to but include:

- Research and monitoring of the snow leopard and the large prey species in the Hindu Kush and Pamir ranges
- Community outreach programs
- Environmental education programs in the snow leopard distribution range
- Workshops and seminars for the community leaders, stakeholders and local governmental authorities
- Public awareness about the Environment Law and the Presidential Decree banninghunting
- Celebration of snow leopard day and other environmental oriented events in schools in the rural areas
- Environmental social awareness campaignswildlife posters, dramas, and brushers
- Engaging communities and strengthening governance in the snow leopard range areas
- Establishing social organizations such as the Wakhan Pamir Association (WPA) which has proven very active in snow leopard conservation in the Wakhan Corridor
- Employment of community rangers who regularly patrol wildlife protection areas
- Training border police and customs officers in how to prevent smuggling of snow leopards and wildlife parts out of the country
- Education ofspiritual and religious leaders on the importance of snow leopard and its ecosystem so that they can influence and promote conservationin their local communities

- Initiating the establishment of important areas for snow leopard conservation as protected areas
- Raising public awareness through numerous national and international media outlets including TV, radio, newspaper and magazines
- Celebration of the Environment Week at national level

Goals of the National Snow Leopard Ecosystem Protection Priorities (NSLEP)

The primary goal of the NSLEP is to increase the snow leopard and prey population through initiatives at national and regional level in the protection and conservation of mountain and snow leopard ecosystems in Afghanistan by mitigating various threats for the benefits of local communitiesand preservation of the associated cultural, religious and economic importanceof snow leopard and snow leopard ecosystem for generations to come. Takinginto consideration the social and political dynamics of Afghanistan in the coming yearsand with support from international communities, the following most realistic secondary objectives for snow leopard conservation are set to achieve this long-term primary goal.

- Enhance the knowledge base on the population-size, distribution and ecology of snow leopards and their prey species so as to better inform communities and implement conservation interventions through communities participation
- Identify the critical areas for snow leopard conservation and secure them within the protected area system
- Monitor regularly the threats to snow leopards and their prey and ensure that identified mitigation measures are effectively implemented; and
- Make Wakhan-Corridor as a global priority Snow Leopard Conservation Unit, and also a well-known eco-tourism place of Afghanistan.

Major Threats: Traditional and Emerging, in terms ofAreaCovered, Severity, Urgency, and Impact on Snow Leopards and their Ecosystems

The major threats to the survival of the snow leopard in Afghanistan are human disturbances (including hunting), declines in prey species, and livestock conflict. Snow leopards are hunted for a number of reasons. Pelts and body parts are sold for significant sums of money in domestic markets. In the 1970s, Rodenburg (1977) estimated that 50-80 skins were produced and sold in Afghan markets per year and recent excursions into the fur markets of Kabul indicate that snow leopard peltsare still available. Whole snow leopard pelts may sell for as much as USD $1,000 in tourist markets and coats may sell for between USD $500-1,000.

Snow leopards are also hunted in retaliation for livestock depredation (Hussain 2003, Habib 2006). Depredation by snow leopards causes economic losses among the local communities. These losses fuel negative attitudes towards large predators, especially the snow leopard, which is considered to be a primary predator of domestic livestock. Habib (2008) reported a 0.65% total stock mortality within one year in the Wakhan Corridor due to snow leopard predation that constituted around11% of snow leopard diet (percent occurrence) whereas around 89% of its diet consisted of wild species. More research is required to understand the extent to which livestock depredation affects local communities across the snow leopard range in the country.

Decline in prey species is another major threat to the survival of the snow leopard in the country. Although, the total snow leopard habitat range is not known and sufficient data on snow leopard and its prey species is lacking for most snow leopard range, very recent surveysconducted show that prey populations have shrunk in specific areas.Decreasesamong prey populations will not only increase snow leopard-human conflict but will also have a negative impact on the reproduction of the snow leopard.This will result ina significant decline in snow leopard populations. According to local communities from northern Badakhshan, in the border areas with Tajikistan, wild ungulates face a seriousdecline in their

numberswhencompared to the 1970s (Moheb and Mostafawi 2011, 2012 & 2013). In the 1970s, most of the areas along the Amu Darya River in Darwaz region were home for ibex, markhor and urial but recent surveys show a significant decline or even local extinction of some of these mountain ungulates,which led to a corresponding decline in large predator species such as snow leopard.

The table below indicates the major threats to snow leopard in terms of area, intensity, urgency and impact on snow leopard ecosystems.

Table 1: Major threats to snow leopard in terms of area, intensity, urgency and impact on snow leopard ecosystems

Major threats to snow leopard	Area	Intensity	Urgency	Impact on SL Ecosystem
Category 1: Habitat & Prey Related				
Habitat Degradation	4	4	3	4
Habitat Fragmentation	3	3	4	4
Prey Reduction due to Illegal Hunting	5	4	4	3
Prey Reduction due to Competition with Livestock	3	3	5	5
Category 2: Direct Killing or Removal of Snow Leopards				
Retribution for Livestock Depredation	5	4	4	2
Poaching for Trade in Hides or Bones	2	3	4	2
Secondary Poisoning and Trapping	1	1	1	1
Capture of the cubs for pet trade	4	2	1	2
Category 3: Policy and awareness issues affecting conservation of snow leopards, prey and habitat				
Lack of Appropriate Policy	5	4	4	3
Lack of Effective Enforcement	5	4	5	3
Lack of Transboundary Cooperation	5	2	2	2
Lack of Institutional Capacity	5	5	4	3
Lack of Awareness Among Local People	2	3	3	4
Lack of Awareness Among Policy Makers	5	4	5	4
Category 4: Other Issues				
War and Related Military Activities	5	2	2	5
Human Population Growth (rapid) / Poverty (indirect threat)	5	3	2	5
Poaching by military personnel	5	4	4	2
Emerging Threats				
Climate Change	5	3	2	3
Growing Livestock Populations & Intensifying Human-Wildlife Conflict	5	3	3	4
Other:				
Snow leopard is considered as a pest species	5	3	2	3

Threat Values: 0 or 1 = no & low threats; 2 or 3 = intermediate threat level; 4 or 5 = high threat level
AREA: Rank each threat according to how wide-spread it is (where 5 indicates it occurs across most or all snow leopard range within country; and where 1 indicates it is extremely limited in areal extent)
INTENSITY: Threats ranked from 5 = the most destructive impact to 1 = the least negative impact
URGENCY: Rank each threat identifying if it needs immediate & urgent attention (very time sensitive) (value = 5) to being of least concern or urgency (value = 1)
IMPACT ON SNOW LEOPARD ECOSYSTEM: Rank each threat according the degree of its negative impact on the snow leopard ecosystem; 1 shows the lowest while 5 shows the highest impact

Isolation or Fragmentation: Snow leopard populations may be isolated but more research is required to understand regional population dynamics.

Afghanistan population trends: Trends for the snow leopard in Afghanistan are unknown but it is not likely to be less than a 20% decline over 2 generations.

Mitigating the Snow Leopard Threats based on Successful pastConservationActivities

- Expansion of the protected area network to include key areas for snow leopard and its prey species. This will automatically protect other wild speciesin accordance with Afghanistan's Environmental Law
- Increase scientific research on the snow leopard and its prey species. This could act as a baseline for the monitoring of population trends and the effectiveness of conservation activities in short and long terms
- Grazing and pasture management in important snow leopard areas in order to reduce the forage competition between livestock and wild ungulates
- Construction ofpredator-proof corrals in the snow leopard-livestock conflict zones,would mitigate the depredation events, which will eventually reduce incidents of human retaliation
- Conducting environmental education programs and public awareness in the mountainous areas where snow leopards exist. This will mitigate the negative feelings of the local communities towards this large predator species
- Increasing local knowledge about the status, distribution, ecology and behavior of the snow leopard and its prey species, which will increase the capacity of the local communities for better management of the snow leopard and its prey species
- Enhancement of law enforcement
- Control illegal hunting of snow leopard prey species
- Generation of job opportunities through natural resource management for the local communities, which automatically reduces snow leopard and wild prey species poaching activities in the snow leopard range areas
- Creation of self-sustainable community development projectsthat could act as an alternative for natural resource use across some of the priority snow leopard habitats in the country
- Design of community based climate change adaptation projects for the communities in the snow leopard range areas with co-benefits in resilience to the impact of climate change and bio-diversity protection
- Prioritize the snow leopard ecosystem protection and conservation as regional program of biodiversity protection and conservation in the NBSAP

Snow Leopard Conservation Management

The National Environmental Protection Agency (NEPA) has so far conducted numerous snow leopard conservation activities in Afghanistan since 2006. These activities include policy and legislation, trans-boundary actions, research and monitoring including eco-system health program and wildlife trade monitoring in order to manage and protect snow leopard and other wildlife of the Afghan Wakhan.

Moreover, the creation of community governance structures, deployment of 65 community rangers, building of predator-proof corrals and environmental education programs and community capacity development are among the activities so far conducted aiming to conserve the snow leopard in the Wakhan, northeastern Afghanistan.

The establishment of Afghanistan Wildlife Executive Committee (AWEC) that evaluate the wildlife based on IUCN criteria which enlisted the snow leopard into the protected species list of Afghanistan after specialized scientific evaluation, prevention of snow leopard hunting and smuggling, as well as, prevention of the sale and trade in their physical body parts, including pelts.

The presidential Decree to prevent the trafficking, trapping, causing habitat disturbance and illegal trade of wildlife, including snow leopards and other protected species which are now in the protected species list of Afghanistan have been announced through the mass media and educational programs for Afghan National Police and the Afghan Border Police, as well as, the Customs Department of the Ministry of Finance.

The National Environmental Protection Agency has informed all customs entry/exit points at airports, border crossings and other routes to interdict all illegal export/import of wildlife according to the Environment Law and its Bylaws with the assistance of relevant Ministries.

A. Policy and Legislation

The policy and legislation for snow leopard conservation includes the adoption of the Environmental Law, Afghanistan Protected Species List, National Biodiversity Strategy and Action Plan, National Protected Area System Plan,preparation of a Wildlife Regulation Law and CITES Regulationfor consideration by the National Assembly. TheNational Environmental Protection Agency (NEPA)is currently working to create the Big Pamir Wildlife Reserve comprising 57,664 ha, the Teggermansu Wildlife Reserve covering 24,851 ha, and the Wakhan Conservation Area covering 1,145,678 ha, to increase intactness and improve connectivity across the landscape to protect snow leopards and other biodiversity. In order to support effective implementation of the regulatory system through use of economic instruments the development of the methodologies and tools for the valuation of the ecosystem services will also be the part of strengthening of legal system.

B. Trans-boundary Actions

The Government of Afghanistan attended the Urumqi conference in 2006 in which the four neighboring countries (Afghanistan, China, Pakistan and Tajikistan) defined and agreed to declare a Trans-boundary Protected Area in their respective border areas.

The mentioned countries have not signed any formal agreement as of yet. We did, however, agree that we will continue our discussions in the near future. Those discussions, while very important, have not produced any binding agreement. This will include the Afghan Wakhan Corridor, so far considered the hot spot for snow leopard in Afghanistan.

Following the 2006 conference, in 2011 another transboundary workshops took place in Dushanbe and a further three –country ecosystem health project workshop was conducted in 2011.

The National Environmental Protection Agency is actively trying to engage all Snow Leopard Range Countries in order to prevent the threat of extinction of the snow leopard with the assistance of Wildlife Conservation Society (Afghanistan).

Afghanistan is party to the UNCBD, CITES and UNFCCC and regularly participating and contributing to the objectives of these conventions, trans-boundary actions will also be developed and implemented in line with the objectives and obligations of these conventions among the range countries.

C. Research Activities

The National Environmental Protection Agency(NEPA)with the coordination of Wildlife Conservation Society(WCS), has surveyed the north and northeastern parts of Badakhshan Province (including Wakhan Corridor) that intersect with the snow leopard range in the northeastern parts of Afghanistan. Camera trap surveys have been conducted in the Wakhan Corridor; snow leopard prey-base studies as well as a depredation survey have been conducted in the Wakhan Corridor.

In June 2012 two male snow leopards were captured and collared with GPS collars and were successfully released back to the wild. Soon after, in September 2012 a female snow leopard that was followed by two cubs was captured and fittedwith a third GPS collar. These three collared snow leopards continue their normalmovements in the north-facing foothills of the Hindu Kush range in Wakhan. The collars send their locations regularly (Figure 1) and camera traps have photographed the collared leopards several times (Figure 2). This research aims to discover the snow leopard’s movement, habitat use, home range and eventually population estimation for snow leopard Through GIS habitat modeling. This study is in progress and the final results are expected by the end of summer 2013.

Since April 2009 camera trap surveys for snow leopard have been conducted in the Hindu Kush range in Wakhan.Twenty nine Reconyx plus 6 Bushnell photo and video cameras respectively have been used which have so far captured around 1300 snow leopard pictures (figure 2). The camera trapping is ongoing.

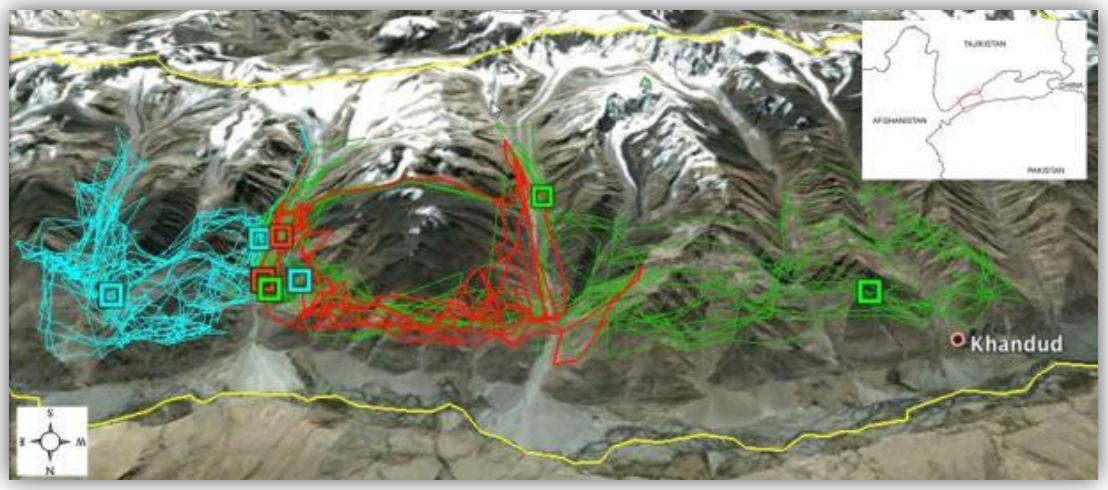


Figure 2: Tracks of the three satellite collared snow leopards

Wild ungulates such as urial, ibex, Marco Polo sheep (argali) constitute the major prey base species for snow leopard in the area, with marmots, hares and other small mammals also present in the snow leopard range in the northeastern part of Afghanistan. Comprehensive prey base surveys have been conducted in the Hindu Kush (Moheb et al. 2012) and Pamir ranges (Habib 2006; Habib 2008; Moheb 2009; Harris et al. 2010).

The WCS Ecosystem Health program in coordination with the National Environmental Protection Agency (NEPA)works in Wakhan carries out research on disease factors that may spill over from livestock to wild ungulates and they have trained local paravets who vaccinate livestock in Wakhan and monitor the domestic stock disease trends across the landscape. With funding support from USAID, which vaccinates thousands of the sheep, goats, cattle and yaks in Wakhan every year? The livestock vaccination program aims to decrease the spillover ofcontagious disease between the livestock and wild ungulates that are the primary prey species for snow leopard in the area. It also supports local communities by increasing their livestock productivity, which will automatically decrease their dependency on the available natural resources and will ultimately have positive impactson snow leopard conservation in the region.

A Himalayan Climate Change Adaptation Programme (HICAP), with support from Norway and implemented by ICIMOD in partnership with the Center for International Climate and Environment Research – Oslo (CICERO), and UNEP/GRID-Arendal is ongoing which will help to develop knowledge and enhance capacities to assess, monitor, and communicate the impacts of and responses to climate change (compounded with other drivers of change) on natural and socioeconomic environments at local, national, and regional levels.

D. Wildlife Trade Monitoring

The National Environmental Protection Agency (NEPA) with the Cooperation of Wildlife Conservation Society (WCS) developed a trade monitoring system for the International Security Assistance Force (ISAF) that regularly inspected on-base bazaars for snow leopard products this commenced in 2008 and continues today. Recognizing the success of this program, the US Department of Defense supported the making of a film about the dangers of trade for military personnel in products of endangered species such as snow leopard. This is now in use in ISAF bases.

The development of the community ranger program has also led to effective on-ground protection in Wakhan such that authorities such as National Environmental Protection Agency (NEPA) are now quickly informed of any illegal hunting incidents.

E. Community Engagement

With assistance from National Environmental Protection Agency (NEPA) and Wildlife Conservation Society (WCS) the local community developed a governance structure that enables functionality across

the geographical area. A legally recognized social organization, the Wakhan-Pamir Association (WPA), has been established. The WPA belongs to the people of Wakhan and is managed by a Board of Directors (BoD), a Chairman and a Secretary, who are elected by the community. The WPA is mandated to oversee sustainable natural resource management and socio-economic development in Wakhan. The National Environmental Protection Agency and Wildlife Conservation Society work in partnership with the WPA. The WPA receives support and training in conservation management and livelihood development. The WPA is helping to link the communities across the region, which in turn gives them additional strength and a better ability to protect their snow leopards.

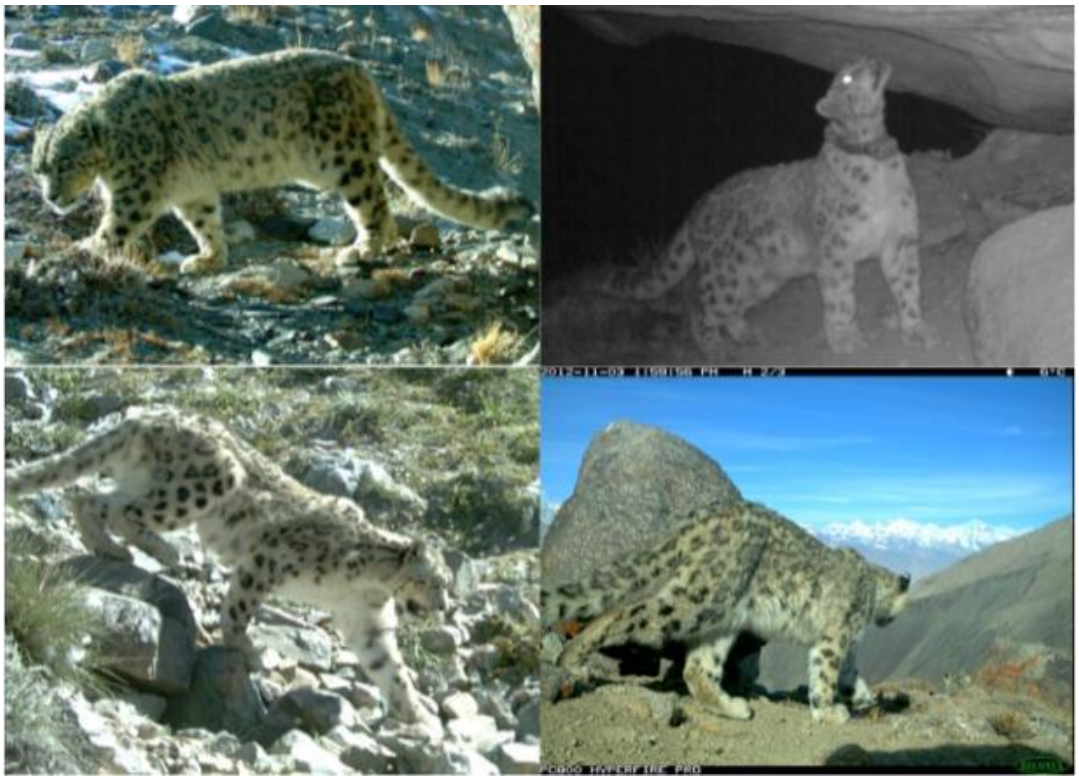


Figure 3: Snow leopards photographed by the camera traps in the Wakhan Corridor

Snow leopards are directly protected through the development of a ranger program in the Wakhan Corridor. Since 2008 sixty-five community rangers plus ten government rangers have been appointed who regularly patrol the area to protect the snow leopard and other wildlife in the landscape. The rangers have been recruited from the local communities throughout the landscape. As a result of this network there are now seldom instances where wildlife crimes are committed and not reported.

Predator-proof corrals have been piloted in predation trouble spots determined through an analysis of past predation data collected from earlier surveys throughout the Wakhan Corridor. Livestock (up to 500 sheep and goats) are corralled communally in each of these structures. Depending on circumstance, the corrals are owned by a single village or cluster of villages. The recipient villages enter into a conservation agreement, formally committing them to not hunting snow leopards and other wildlife.

The National Environmental Protection Agency (NEPA)in collaboration with WCS and the WPA has also enacted a comprehensive Environmental Education Program that reaches all 15 schools in Wakhan and has a focus on snow leopard conservation initiatives.

Time-phased implementation program:

A. Implementation Bodies involved in the Snow Leopard Conservation Programs in Afghanistan

- National Environmental Protection Agency (NEPA)
- Ministry of Agriculture Irrigation and Livestock (MAIL)
- Afghan Wildlife Executive Committee (AWEC)
- Ministry of Interior Affairs (MoIA)
- International counterparts such as Wildlife Conservation Society (WCS), UNEP
- Local community structures such as Wakhan Pamir Association (WPACustoms Department
- Government's focal points for the International Conventions

The National Environmental Protection Agency (NEPA) acts as leading and coordinating body for the implementation and monitoring of the NSLEP in Afghanistan. However, the NSLEP working group is consisted of the representatives of the other organizations including WCS.

B. Priority Activities and Costs for the implementation of the Snow Leopard Conservation Actions

Cost Structure of the Snow leopard Conservation Management in the recent past

Table 2: Cost Structure of Snow Leopard Conservation Management in Afghanistan

No	Donor Organization	Implementer Organization	Duration of the project	Cost Structure in USD $					
				Operation	Infrastructure	Staff	Training	Equipment	Total
1	USAID	WCS	2006 - 2013	557,148	87,646	564,090	34,613	104,059	1,347,556
2	USAID	ECODIT+ NEPA	2009-2010	-	-	-	-	-	125,066
3	NGS	WCS+WPA	2012 - 2013	-	-	-	-	-	75,000
4	WFP	WCS+WPA	2010 - 2013	-	-	-	-	-	144,000
5	Gov. of Afghanistan	NEPA	Up to 2013	-	-	-	-	-	100,000
		MAIL	Up to 2013	-	-	-	-	-	200,000
Total Expenditure									**1,991,622**

Major Financing Sources

The major financing source for snow leopard conservation in Afghanistan includes the Government of Afghanistan, the United States Agency for International Development (USAID), the Global Environment Facility (GEF) the United Nations Environment Program (UNEP), and the National Geographic Society. However, up to the present USAID has remained the major funding source for snow leopard conservation in Afghanistan. The Government of Afghanistan hopes that World Bank and other donor agencies will contribute to funding of these initiatives not only for snow leopard but also other conservation-valued species throughout the country.

Monitoring the Implementation of the Snow Leopard Program through Key Indicators

- Major threats to the snow leopard and their prey species have been identified throughout the snow leopard range in Afghanistan
- Threats to snow leopards and their prey species have been mitigated throughout the snow leopard range in the country
- Local communities have been educated about the importance of the species within the snow leopard range
- Some of the key areas where this animal is abundant are identified and included in the protected area system of the country
- Population size and density of the snow leopard as well as the prey species in priority areas are known
- Management plans for snow leopard and major prey species e.g. Marco Polo sheep (argali), ibex, markhor and urial conservation have been provided
- Human-snow leopard conflict has decreased
- Snow leopard is declared as Afghanistan's National Animal

Table 3: Cost Structure of the Snow leopard Conservation Management in the future [First 3-year Action Plan (2014-16)]

Table 3: Cost Structure of the Snow leopard Conservation Management in the future [First 3-year Action Plan (2014-16)]

Actions	Threats	Actions	Measurable Outcomes	Estimated Costs, $m	Expected Donors
Institution	Lack of Knowledge regarding snow leopard and its prey species population	Engage appropriate research	Status of the snow leopard and the major prey species are known; Better management of the species/areas based on the available monitoring data; creation of a Database of the gathered data	1.95	USAID, GEF and WB
Policy	Habitat degradation, over grazing, poaching and retaliatory killing	Adopt, draft and enforce new laws, regulations and policies	Educate related agencies through workshops, conferences and trainings; draft and enforce laws, regulations and policies, reduction on illegal trade	1.5	USAID, GEF and WB
Conservation	Excess livestock population, retaliation, poaching, illegal trade, poor law enforcement in remote areas, lack of education and awareness	Identification and declaration of protected areas and key snow leopard habitats;	National Protected Area System Plan are implemented; Protected Areas are declared; Management Authorities are established; communities are educated and empowered, benefit sharing systems are set up;	7.1	USAID, GEF and WB
Transboundary	Illegal trade across borders; weak transboundary cooperation; lack of institutional capacity	Re-establish Oromchi Conference on Transboundary Protected Area	Cooperation among the range countries; establishment of transboundary management plan; establishment of transboundary management authority	0.1	USAID, GEF and WB
Monitoring	Lack of knowledge about snow leopard and prey species; lack of institutional capacity; lack of data on habitat degradation, fragmentation, poaching and illegal trade	Scientific monitoring of snow leopard, habitat, and threats: current practice and areas for improvement	Technical reports; development of research center; institutional capacity development; successful prosecution of poachers and smugglers	0.25	USAID, GEF and WB
Communication Strategies	Lack of Knowledge regarding snow leopard and its prey species population; lack of institutional capacity; lack of data on habitat degradation, fragmentation, poaching and illegal trade	Dissemination of the reports/articles; media and press releases; Environmental education programs for schools throughout the snow leopard range	Increase knowledge and understanding among the stakeholders; enhance better coordination among the conservation bodies; increase local knowledge and capacity in the snow leopard distribution range; mitigate the illegal poaching and trade	0.5	USAID, GEF and WB

Major Cross Border Collaboration Needs and Actions

- Establish an effective mechanism for the exchange of available data on the snow leopard throughout the species' range. Creation of database by range countriesto improve data sharingon monitoring, scientific research, poaching and smuggling of snow leopard and it prey species. Afghanistan may not be able to take the lead on such an initiative but can be part of the efforts together with other range countries.
- Agreement on regional standardized monitoring methods for the species. This is only possible if all the range countries agree to create a GSLEP Secretariat that could monitor and control all the scientific and management activities for snow leopard conservation throughout the region.
- Provide legal protection tools for the border areas. The Government of Afghanistan is working to bring the entire Wakhan Corridor under legal protection by declaring it as protected area. However, progress towards this goal is subject to security conditions within the country.
- Sign a formal transboundary cooperation agreement with the neighboring countries lay under the snow leopard range
- Development of the International Tran boundary Protected Area in the area between Afghanistan, China, Pakistan and Tajikistan (as defined and agreed upon at the 2006 Urumqi Conference)
- Development and implementation of regional programs that generates benefits for snow leopard ecosystem protection and conservation, climate change adaptation and mitigation, and biodiversity conservation exploring related MEAs financial mechanisms.

Effective Communication Strategies

- Snow leopard survey reports are prepared and widely disseminated to Government and local authorities.
- Press releases on snow leopard conservation efforts are regularly produced.
- The environmental education program in local schools continues to reinforce the messages about snow leopards and the importance of their conservation.
- Snow leopards remain a major source of interest to all media bodies for their proactive participation in awareness creation.

Awareness is given, on a continuous basis, about the Protected Species Program to the Law Enforcement Agencies, which include but is not limited to, the Afghan National Police, National Border Police, Directorate of National Security, Customs Department of the Ministry of Finance), as well as, Ministry of Agriculture, Irrigation and Livestock(MAIL).

Awareness about the Protected Species Program is continuing for entire police stations, border police stations and sub- stations about the religious and scientific value of biodiversity and specially the snow leopard in order to prevent the smuggling and the illegal trade of wildlife.

Local Community Leaders, Elders, Volunteers, Environmentalists, Ecologists, Wildlife Specialists in the snow leopard hot spots are actively assisting the National Environmental Protection Agency and its national and international partners to conserve, rehabilitate and protect the snow leopard and its natural habitat.

When caring individuals from different nations, languages, cultures, walks of life, join hands together as part of a greater team to protect God's Majestic Creations, success can surely be achieved.

References

Habib, B. (2006) Status of large mammals in Proposed Big Pamir Wildlife Reserve, Wakhan, Afghanistan, *WCS unpublished report.*

Habib, B. (2008) Status of mammals in Wakhan Afghanistan. Afghanistan Wildlife Survey Program, *WCS unpublished report*.

Hussain, S. (2003) The status of the snow leopard in Pakistan and its conflict with local farmers. *Oryx*. 37(1): 26-33.

IUCN (2010) IUCN Red List of Threatened Species. Version 2010.4.www.iucnredlist.org.

Jackson, R. M., Roe, J. D., Wangchuk, R. and Hunter, D. (2005) Surveying Snow Leopard Populations with emphasis on camera trapping: a Handbook. The Snow Leopard Conservancy, Sonoma, California.

McCarthy, T., Sanderson, E., Mallon, D., Fisher, K., Zahler, P. and Hunter, L.In Prep.Range-wide conservation planning for snow leopards.*Report on the 2008 International Snow Leopard Conference.*

Moheb, Z. (2009) Food habit and diet overlap between male and female Marco Polo argali *Ovis ammon polii* and domestic yak *Bos grunniens* in Big Pamir Wildlife Reserve. *M.Sc. Thesis, Aligarh Muslim University (AMU), Aligarh, UP., India.*

Moheb, Z. and Mostafawi, N. S. (2011) Biodiversity Reconnaissance Survey in Shahr-e Buzurg District, Badakhshan Province, Afghanistan. *WCS unpublished report.*

Moheb, Z. and Mostafawi, S.N. (2012) Biodiversity Reconnaissance Survey in Darwaz Region, Badakhshan Province, Afghanistan. *WCS unpublished report.*

Moheb, Z. and Mostafawi, S.N. (2013) Biodiversity Reconnaissance Survey in Maymai Disrtict, Badakhshan Province, Afghanistan. *WCS unpublished report.*

Ostrowski, S., Yacub T., and Zahler P. 2012. Transboundary ecosystem health in the Pamirs.*Unpublished Report in partnership with the Wildlife Conservation Society, AAAS, USAID, and University of Lahore, Pakistan.*

Rodenburg, W.F. (1977) The trade in the wild animal furs in Afghanistan. Unpublished report

Simms, A., Moheb, Z., Salahudin, Ali, H., Ali, I., and Wood, T. (2011) Saving threatened species in Afghanistan: snow leopards in the Wakhan Corridor. *International Journal of Environmental Studies*, 68(3): 299-312.

Xie, Y., Kang, A., Wingard, J. and Zahler P. 2007. The Pamirs Transboundary Protected Area: A report on the 2006 International Workshop on Wildlife and Habitat Conservation in the Pamirs. *Unpublished Report in Partnership with the Wildlife Conservation Society, USAID, and the Governments of Tajikistan, Pakistan, Afghanistan, and China.*

Zahler, P., Ostrowski, S., and Rosen, T. 2012. The Tajik Pamirs: Transboundary conservation and management. *Unpublished Reportin partnership with the Wildlife Conservation Society, the US Forest Service (USFS), and the Committee for Environmental Protection under the Government of the Republic of Tajikistan.*

Bhutan

National Snow Leopard Ecosystem Protection Priorities (NSLEPP)

Bhutan

Executive Summary

Pastoralism is highly predominant in the highlands of Bhutan stretching from East to West, an ecosystem widely regarded a treasure trove for medicinal herbs and home to the endangered snow leopard *Uncia uncia*. In March 2005, the Royal Government of Bhutan (RGOB) in collaboration with World Wildlife Fund (WWF) hosted the first-ever South Asian Regional Consultation Workshop to develop a regional strategy and action plan to conserve the Snow leopard. The workshop identified four main areas to address snow leopard conservation in Bhutan and neighboring countries: (i) protecting snow leopard habitat and ecosystems, (ii) management of human wildlife conflicts, (iii) management of illegal wildlife trade in snow leopard body parts, and (iv) transboundary initiatives and co-operation.

Unfortunately, the strategy could not be fully implemented due to lack of adequate resources and proper follow-up. Therefore, conservation work on the snow leopard continued sporadically across range countries. For Bhutan, in spite of a good network of protected areas interconnected by biological corridors (50.44%, MoAF 2012), the absence of species-specific information posed serious challenges to conservation. To address this, RGOB initiated steps to establish species-specific baseline information. Considering the contiguity of snow leopard habitat with neighboring countries, the snow leopard population in Bhutan is estimated at about 100-200 animals, distributed over a potential area of 10,000 square kilometres (Jackson et.al.,1997, 2000 in Wikramanyake et.al., 2005).

The National Snow Leopard Ecosystem Protection Priorities (NSLEPP) framework, with its strong base on previous works, will address immediate needs in strengthening the effectiveness of snow leopard conservation in Bhutan, by (i) valuing snow leopard ecosystem and its economic, biodiversity and spiritual/cultural services to the community, (ii) disseminating information on the value of snow leopard ecosystem and generating support for conservation, and (iii) assessing threats to snow leopard and its habitat, both traditional and modern, from infrastructure development, market demand, tourism, and climate change. NSLEPP is expected to be implemented over seven years (2014-2020).

Introduction

The snow leopard *Uncia uncia* is a top predator and flagship species of the alpine ecosystem. In spite of this important status, their conservation is posing tremendous challenge due to limited information about their ecology and distribution across the range countries. Studies accomplished so far show their population to be declining due to killing by herders as a livestock predator (Oli et al. 1994, Bagchi and Mishra 2006, Wegge et al. 2012), poaching for fur (Theile 2003), and loss of habitats (Hunter and Jackson 1996, Jackson 2002, Xu et al. 2008, in Shrestha 2013).

Bhutan represents the southern periphery of the snow leopard range and offers promising opportunities to secure remnant snow leopard populations.Here, nature protection is not only embedded as a cultural and religious practice, but also a government policy as exemplified in the country's constitution that mandates the government to maintain over 60 percent of country under forest cover in perpetuity. As such, more than a third of the country has been designated as protected areas and biological corridors (50.44%, MoAF 2012). It also presents a unique opportunity for understanding snow leopard ecology in an area of minimal current threats where ecological conditions within the range have not changed much for the last century. Intact connectivity of natural habitats within Bhutan also allows for lowland species like tiger and common leopard to overlap with snow leopard at the foot of glaciers.

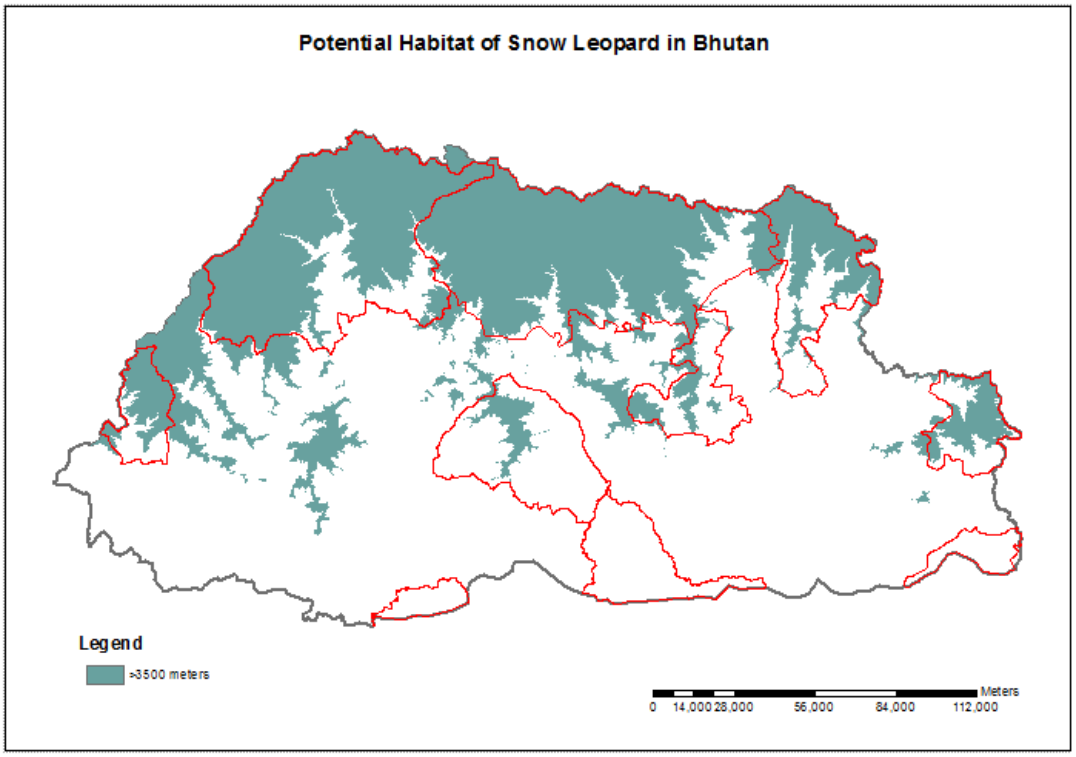


Fig. 1: Potential habitat of snow leopard in Bhutan. This map is based on the single parameter (altitude)modeling, considering the potential snow leopard range from 3500m onwards.

Currently, snow leopard is confirmed to occur in three of the five protected areas in the northern region, namely Toorsa Strict Nature Reserve (TSNR), Jigme Dorji National Park (JDNP) and Wangchuck Centennial Park (WCP). Other PAs with potential snow leopard habitat include Sakten Wildlife Sanctuary, Jigme Singye Wangchuck NP and Bumdeling Wildlife Sanctuary (BWS). These parks also extend to the Tibet Autonomous Region of China with however no protection regimes or Protected Areas in place for the adjoing areas on their side. Pastoralism in this region is predominant as most of the communities residing are nomads migrating from one place to another with their livestock *viz*. yak.

Snow leopard ecosystem and its economic, biodiversity, and spiritual / cultural services

The highlands of Bhutan Himalayas, which form the potential habitat for snow leopards, offer several vital ecosystem services. The services provided through this system is not only important to the pastoralists living in these areas but also to the people living in the lowlands including the countries adjoining to Bhutan. Three main types of ecosystem services can be discussed in the preceding paras.

Regulating and supporting services

The entire potential snow leopard habitat in Bhutan is a treasure trove of alpine flora and fauna. Bhutan is known as the land of medicinal herbs and 80% of the medicinal plants habitat extends to the snow leopard ecosystem. These medicinal plants collection contribute to a great extent for the upliftment of the livelihood of the high land communities. Since the entire Snow Leopard habitat is unsuitable for agriculture farming, the only means for the livelihood of the communities residing in the snow Leopard habitat is through livestock rearing. Livestock rearing is a main economic mainstay of the communities residing in the snow leopard habitat and the entire snow leopard habitat serves as the grazing land for the same.

Provisioning services

Almost all the alpine region constitutes catchment of major rivers in Bhutan. This can be named as Sankosh, Mangdechu, Toorsa, Dangmechu, etc. and have tremendous potential in providing drinking water and irrigation facility to the communities living in the lowlands. These resources also contribute to the food security of the nation. Another importance is the hydro power generation downstream. As a country which is dependent on the hydro power generation for the national economy, saving and conserving those water towers is crucial for Bhutan. Putting an effort into conserving the snow leopard and its habitat will ensure the mountain landscapes are kept intact which in turn will contribute to hydropower generations in the years to come.

Religious and Cultural services

Many highlands in Bhutan are closely associated with religious significance like the Singye Dzong in Bomdelling Wildlife Sanctuary, Lingshi Dzong in Jigme Dorji National Park and several other places where Guru Rimpoche and his consort, Yeshey Tshogyel, meditated several times. The Buddhist texts describe these lands as spiritual places devoid of suffering of *samsara* or karmic and provide tremendous opportunities for pilgrims visiting all round the year to receive blessings and cleanse themselves of evil deeds. Of equal importance are also the highland nomads in Sakten Wildlife Snctuary and Jigme Dorji National Park that present differing culture and customary backgrounds for the nation.

Generating support, value based: disseminating information on the value of the snow leopard ecosystem and generating support for conservation

Past efforts

The importance of wildlife conservation is deeply ingrained in Bhutanese society through the Buddhist ethos. Firstly, as majority of Bhutanese are Buddhist, killing or taking the life of others is strictly against the Buddhist principles. Secondly, due to the fact that Bhutan is agrarian economy based, the value of wildlife and nature conservation is also deeply ingrained to majority of the Bhutanese individuals inline with the nature friendly childhood upbringing. Therefore, dissemination of information on the importance of Snow Leopards is more or less reached. However, apart from the species conservation perception, information on the value of its ecosystem is at low scale and has not been much emphasized and it has been an emerging subject towards conservation through a community based approach.

Future possibilities

- Educate the Bhutanese public in general, and communities residing in Snow Leopard habitat in particular, on the importance of the species and its ecosystem through the religious organizations, public meetings, mass media, conservation campaigns and also by having a small component in the school curriculum.
- Initiate snow leopard tourism in Snow Leopard habitat that will address the conservation aspect as well as peoples' livelihoods.
- Develop and implement targeted information campaigns for various populations living within the snow leopard's range including the monks and armed personnel. Monks will be trained on the importance of snow leopard and its ecosystem conservation first and make them as a conservation ambassador. Since the snow leopard habitat falls along the northern borders of Bhutan where army outpost are there, armed personnel can be educated on the conservation importance. This will have direct impact on the curbing of the illegal trade and poaching in the remote areas where full-time park patrolling is difficult.
- Conduct a Snow Leopard festival as an annual event to mark the survival of snow leopards and also as part of a conservation campaign for the species. Snow leopard and its ecosystem conservation awareness through festival will be first held in Jigme Dorji National Park in the fall of 2013. The festival will be celebrated in the name of Jomolhari mountain festival which is one of the most critical snow leopard habitats in Bhutan.

- Engage monastic bodies in Snow Leopard range as leaders in conservation campaigns as Citizen Scientists.
- Engage the local communities in Snow Leopard conservation as Citizen Scientists.
- Engaging government through national, relevant dzongkhags and geog's /policies/internal seminars to bring the snow leopard issue up to an equal footing with tiger awareness.

Assessing threats, both traditional and the new ones from infrastructure development, market demand, tourism, and climate change to snow leopard and its habitats

Table: Key threats score for snow leopards in Bhutan

Threat	Area	Intensity	Urgency	Total Ranking
Category 1: Habitat & Prey Related				
Prey Reduction due to Illegal Hunting	1	2	2	5
Prey Reduction due to Disease	1	1	3	5
Habitat Degradation	1	2	2	5
Prey Reduction due to Competition with Livestock	1	2	2	5
Habitat Fragmentation	0	1	1	2
Fencing that Disrupts Movements / Natural Migration	0	0	0	0
Prey Reduction due to Legal Hunting	0	0	0	0
Category 2: Direct Killing or Removal of Snow Leopards				
In Retribution for Livestock Depredation	2	1	2	5
Poaching for Trade in Hides or Bones	1	1	4	6
Zoo and Museum Collection of Live Animals	0	0	0	0
Traditional Hunting of Snow Leopards	1	1	1	3
Secondary Poisoning and Trapping of Snow Leopards	1	2	2	5
Diseases of Snow Leopards	1	1	3	5
Potential threat from legal hunting of snow leopards	0	0	0	0
Category 3: Policy and awareness issues affecting conservation of snow leopards, prey and habitat				
Lack of Appropriate Policy	1	2	2	5
Lack of Effective Enforcement	1	2	2	5
Lack of Trans-boundary Cooperation	4	4	5	13
Lack of Institutional Capacity	3	3	4	10
Lack of Awareness Among Local People	4	4	5	13
Lack of Awareness Among Policy Makers	3	3	4	10
Category 4: Other Issues				
War and Related Military Activities	0	0	0	0
Human Population Growth (rapid) / Poverty (indirect threat)	1	2	2	5
Feral dogs attacking snow leopards and prey	3	3	4	10
General Poaching and Wildlife trade by migrant workers	0	0	2	2
General poaching by military personnel	2	2	2	6
Emerging Threats				
Climate Change	5	4	4	13
Growing Livestock Populations & Intensifying Human-Willdife Conflict	4	3	3	10

Threat	Area	Intensity	Urgency	Total Ranking
Large-scale Development Projects -	0	0	0	0
Direct & indirect impacts due to mineral exploration & mining (local)	0	0	0	0
Impacts due to hydroelectric projects	2	2	2	6
Impacts due to roads or railroads	0	0	0	0
Disturbance related to Cordyceps Collection	3	3	4	10
Other:(write below & add rank values)				

Note:

On Ranking Threat Values: 0 or 1 = no or low threat; 2 or 3 = intermediate threat level; 4 or 5 = high threat level

AREA: Rank each threat according to how wide-spread it is (where 5 indicates it occurs across most or all snow leopard range within country; and where 1 indicates it is extremely limited in area l extent)

INTENSITY: Threats ranked from 5 = the most destructive impact to 1 = the least negative impact

URGENCY: Rank each threat identifying if it needs immediate & urgent attention (very time sensitive) (value = 5) to being of least concern or urgency (value = 1)

a. Direct threats

As most of the snow leopard habitat in Bhutan are also a traditional grazing area for the nomadic communities, livestock rearing is a primary livelihood alternative for those communities. Since the same habitat is being used by people, livestock and Snow leopards, livestock predation (commonly on yak calves) by snow leopards is on rise. Therefore, retaliatory killing by the frustrated herders is foreseen as the most immediate and direct threat although such cases are not reported until now. So an assumed or predicted threat!

b. Indirect threats

Since the predator population depends directly on the population status of the species upon which it preys, sustained prey base is essential for the long term survival of the Snow Leopards. Due to the disturbance on the habitat by the *Ophiocordyceps* collectors, there is definitely an impact on the health of the prey species which will ultimately affect the Snow Leopard survival. Further, the livestock intensification programme has increased the size of the yak population, therefore increasing the pressure on the wild prey's resources. Due to grazing competition between the domestic and wild prey, the prey base will be affected which will in turn limit the survival of the predators (snow Leopards). One of the indirect threats is also the emerging scenario of climate change where the alpine vegetation is pushed up by the low land woody vegetation due to warming. This would shrink the potential space for both the snow leopard and its prey.

Dealing with above threats

Replicating known good practices (mainly for traditional threats)

- Since the main cause for the retaliation on snow leopards by the communities is due to snow leopard-yak conflict, addressing the human wildlife conflict has been a priority. Awareness creation on the communities on the importance of the species and the ecosystem has been a continuous process through park officials while conducting meetings, patrolling and during the public gatherings. Department of Forests and Park Services also supports schools in the respective parks in creating awareness on the species and landscape conservation.. Further, the Royal Government of Bhutan has been compensating the livestock losses due to wildlife predation since 2003. This compensation scheme has been initiated to offset the livestock losses to the wild predators. Once the kill of a livestock is verified by the forestry officials, the compensation payment is then processed. This scheme although not sustainable, has greatly contributed to the conservation of wild predators mainly through reduction of retaliation from

the farmers. This timely scheme has really consoled the agitated farmers and helped to minimize retaliatory killings. In gearing up the sustainable conservation incentive to the farmers and herders, the Bhutan Government has initiated the community based livestock insurance scheme in 2011. The above livestock compensation scheme has been found unsustaibable because of the one way process of government compensating to the affected farmers. It has been felt that sharing the responsibility would be more effective as the farmers would be given the ownership for the conservation scheme. In this scheme, government provides a seed money to the community groups. The community will top up the seed money through insuring their livestock. The annual interest accrued would be then managed by the community board of members to offset the livestock losses. These initiatives are expected to minimize the retaliatory killing of the species.

- On the issue of grazing competition through increased livestock population, Ministry of Agriculture and Forests has initiated a livestock intensification initiative through high value low number cattle. To reduce the grazing pressure through huge less prodective livestock numbers, the government has initiated improving the cattle breed. This initiative of livestock intensification program through better and productive breed has led to reduction in the number of animals and increased productivity thereby minimizing the grazing pressure. If this succeeds, the grazing competition with the wild prey would substantially reduce in long run.
- Scale up livestock community insurance scheme (with modification on existing scheme)
- Engage local herders in conservation through activity like “citizen scientists modality”e.g. bytraining them on survey methodologies and information collection through minimum possible incentives.
- Improve animal husbandry practices and alternative livelihoods(herding, pasture management, dairy product diversification, disease management, adventure tourism)

Developing new counter measures (for new threats) including pilots where needed

- Strengthening anti-poaching team and illegal trade surveillance through increased man power and better trainings.
- Exploration of ecotourism potential sites in the snow leopard habitat to address the conservation significance and also to include communities into conservation thereby providing alternative livelihoods as well.
- Strengthen livestock insurance scheme in various communities in the snow leopard habitat to mitigate retaliatory killing
- Transboundary collaboration initiative to protect the Snow Leopard habitat (with China) on both sides of the boundary. This has to be addressed as the conservation in one country would be meaningless if the adjoining country doesnot take it seriously where the species habitat is transboundary in nature.

Organization, empowerment, and support

National institutions for SL conservation: strengths and weaknesses to be remedied

National institutions for SL conservation in Bhutan is Department of Forests and Park Services with technical input from Wildlife Conservation Division spearheading the program and supported by different agencies like Ugyen Wangchuck Institute for Conservation and Environment, Department of Livestock, and Gewog administration with the local communities playing key roles.

Table: National institutions for SL conservation for Bhutan: strengths and weaknesses

Organization	Strengths	Weaknesses
Department of Forests and Park Services (technical inputs: Wildlife Conservation Division)	• Supreme body for conservation of Wild Flora and Fauna. • Strong networking within the	• Lack of professional species experts • Lack of funding

Organization	Strengths	Weaknesses
	protected area network. • Strong governance	
Ugyen Wangchuck Institute for Conservation and Environment (UWICE)	• Research Institute in place • Dedicated people working on conservation biology	• Lack of funding • Lack of enough manpower • Lack of expertise on Snow Leopard
Department of Livestock	• Veterinary expertise available • Rangeland expertise human resource	• Lack of communication and planning with the Department of Forests and Park Services on wildlife issues • Dedicated to domestic cattles thereby weakening focus on wildlife
Protected Areas	• Appropriate location and area for snow leopard conservation • Local staff and good knowledge of snow leopard distribution	• Lack of sustainable funding • Lack of professional staff • Limited field staff • Staff frequently transferred to non-SL parks
Local Communities	• Associated closely with the Snow Leopard and its ecosystem • Strong traditional knowledge • Excellent knowledge of snow leopard distribution in limited areas	• Conservation awareness is lacking • Unemployment and prone to poaching activities • Low interest in conservation of snow leopard and less concerned

Legal framework for protecting SL and habitat: strengths and weaknesses to be overcome

Forest and Nature Conservation Act, 1995 is the legal document where Snow Leopard is listed under the Schedule I (Totally Protected Species) and treated at par with the Appendix I of CITES. Subsequent to the act, we also have the Forest and Nature Conservation Rules 2006 in place which serve as the guiding document on the implementation of the act in detail. For further strengthening of the SL conservation in Bhutan, there is a strong need for a National Snow Leopard Conservation Action Plan for Bhutan.

Wildlife law enforcement and combating crime: current practice and areas for improvement

In general, most of the anti-poaching and patrolling activities are carried out by the field staff of the various field divisions and protected areas. However, in case of special requirement for combating wildlife crime, under the purview of department of Forests and Park Services, a Forest Surveillance unit has been created in 2010. This unit operates to conduct surveillance and also to deal with most of the enforcement issues. This unit needs to be strengthened to provide more effective services in the near future through additional staffing and advanced trainings in surveillance and crime handling.

Legal framework for empowerment of community for co-management of wildlife and habitat; current practice and areas for improvement

Bhutan does not have a separate legal framework for empowerment of community co-management of wildlife and habitat, however, the strong Buddhist ethos had till now played a strong role in supporting conservation. Currently, the focus of conservation through community based approaches is on the formation of natural resource management groups. This is to give the ownership of natural resources to the community along with the responsibility for sustainable use without jeopardizing the conservation importance attached to it. This program needs to be strengthened and replicated in all the areas to garner community support for wildlife conservation.

Support mechanism for building community organizations: current practice and needed strengthening

- Non Wood Forest Produce group formation: Training needs to be imparted to the local community on the group functioning.
- Livestock Insurance Scheme: the management of the seed money and the maintenance of the fund needs to be handed over to the community, and necessary training provided. .
- Community based snow leopard ecotourism group formation is foreseen as one of the most important initiatives for the conservation of the species.
- Knowledge on rangeland management must be imparted to alpine (snow leopard habitat) pastoralists.

Development and implementation of programs for education and training

Only limited data is available on snow leopards in Bhutan. In developing a program on education and training, on snow leopards, the following areas should be considered:

- Study the snow leopard's current range, population, and other dynamics, and create habitat, prey species distribution, and SL distribution maps.
- ii. Study the roles of natural and anthropogenic factors affecting Snow leopard conservation.
- Identify key sites for snow leopard reproduction and the population demography of the sub-populations.
- Identify potential migration/movement corridors for snow leopards and their prey.
- Identify the target audience for education and training, e.g. citizen scientists and prepare the training materials accordingly.

Cooperation in the application of results of scientific research

Firstly, there is a strong need for information and knowledge sharing amongst the researchers and the institutions/organizations. For this, it is very important to publish the findings of research work in collaboration (individuals, groups, institutions and various other organizations). It is essential to use the findings from scientific publications as a basis for management interventions. For Bhutan, management interventions will be based on the scientific findings.

Time-phased implementation program, budget, and indicators for snow leopard conservation in 2013-2022

a. Long term goal:"To maintain a viable interconnected population of breeding snow leopards in Bhutan and trans-boundary landscapes, a population existing predominantly on wild prey and in harmonious coexistence with the communities and conserving the mountain ecosystem of Bhutan."

b. Medium-term goal:'By 2017, secure two populations of Snow Leopards in Bhutan Biological Corridor Complex (B2C2)'.

Program outcomes

- By 2017, secure two populations of Snow Leopard in Bhutan Biological Corridor Complex (B2C2)'.
- By 2022 have the stable snow leopard population with intact mountain ecosystem in Bhutan through the park-people joint conservation for coexistence.

Program indicators

- Baseline for the snow leopard and prey population established for Bhutan for tracking future population trends
- Standard snow leopard survey and monitoring protocol in place for routine monitoring
- Community stewardship on snow leopard enhanced through functional community based initiatives (livestock insurance scheme, citizen scientists, animal husbandry, ecotourism)
- Focal person/ institution identified for snow leopard conservation program

- Use of law enforcement monitoring tool (SMART) by the enforcement staff.
- *Ophiocordyceps* collection impact study report produced and debated by policy decision makers.

Table 4.1. Priority conservation actions to implement National Goals

Actions	Responsible agencies	Time period	Budget, US$, in m	Output
Survey to assess the snow leopard in the potential habitats	Snow Leopard range protected areas (Toorsa Strict Nature Reserve (TSNR), JigmeDorji National park (JDNP), Wangchuck Centennial Park (WCP) and Bumdeling Wildlife Sanctuary (BWS) Wildlife Conservation Division (WCD) and Ugyen Wangchuck Institute for Conservation and Environment (UWICE)	2013-2015	0.5	Presence confirmed
Habitat mapping	Snow Leopard range protected areas, WCD and UWICE	2013-2015	0.2	Map produced
Monitoring of the populations	Snow Leopard range protected areas	2013-2014	0.3	Population monitored
Community participation for conservation	Protected areas, WCD and Local Government	2013	0.2	Joint /partnership conservation
Conflict mitigation	WCD and Snow leopard range protected areas	2013-2015	0.2	Co-existence with minimum retaliatory killings
Addressing Poaching and Illegal trade	Forest Protection and Enforcement Division (FPEDand Snow leopard range protected areas	2013	0.15	Poaching and illegal trade curbed
Conservation education and awareness to communities residing in the snow leopard range protected areas, school children, armed force personnel and monastic bodies.	Parks, Nature Recreation and Ecotourism Division (NRED) and Wildlife Conservation Division (WCD)	2013-2014	0.2	Knowledge upgraded

Table 4.2: Priority Research actions to implement National Goals

Actions	**Responsible agencies**	**Time period**	**Budget, US$, m**	**Output**
Long term monitoring of SL and prey base	Snow Leopard range protected areas, WCD and UWICE	2013-2018	0.3	Understand the population and its interaction throughout it's range
Habitat use and movement ecology	Snow Leopard range protected areas, WCD and UWICE	2013-2018	0.2	Movement pattern along with the habitat understood
Study adverse impact of *Ophicordyceps* collection on SL habitat	Snow leopard range protected areas, Research and Development Center (RDC)Yusipang and UWICE	2013-2018	0.1	Severity of threat report produced
Human Snow Leopard conflict including predation by feral dogs	Snow Leopard range parks and Department of Livestock	2013-2018	0.1	Understand the conflict scenario and produce report
Snow Leopard and Environment interaction	Protected areas and Local government	2013-2015	0.1	Impact study carried out
Genetic study on SL	Snow Leopard range protected areas, WCD and UWICE	2013-2017	0.1	DNA individual print stored in data base

Table 4.3.Priority Human resource development (capacity building) actions to implement National Goals

Actions	Responsible agencies	Time period	Budget, US$, m	Output
Training on scat collection and analysis	UWICE and WCD	2013-2015	0.1	50 Staff trained
Training on animal immobilization and satellite tracking collaring?	UWICE and WCD	2013-2015	0.05	30 Staff trained
Training on using field equipments	UWICE and WCD	2013-2014	0.05	120 Staff trained
Training on survey and research design	UWICE and WCD	2013-2014	0.1	Staff trained and research works designed

Tracking implementation progress and monitoring results

Scientific monitoring of SL, habitat, and threats: current practice and areas for improvement

Survey to assess the snow leopard in the potential habitats

Although Bhutan is known for having snow leopards, till date there is no concrete study on the population status, behavior and habitats carried out except in several isolated areas of JDNP and WCP . As snow leopards require large home ranges (McCarthy, Fuller et al. 2005), understanding their movement and securing connectivity between these protected areas (TSNR, JDNP, WCP and BWS) are pre-requisites to enhance ecological resilience of snow leopards to cope with adverse effects of the global climate change (Hannah, Midgley et al. 2002; Wangchuk 2007). Therefore, study should be carried out to understand snow leopard's habitat requirements and availability, functionality of biological corridors, identification of climate-resilient core areas and corridors. Such information will form a basis to devise science based, climate-integrated snow leopard conservation strategies for Bhutan.

Habitat mapping

Entire northern Bhutan is considered to be snow leopard habitat stretching from east to west (TSNR, JDNP, WCP and BWS). For effective species conservation and protection, it is useful to know the species range, distribution and habitat. Since there are communities living within the snow leopard range, mapping the critical habitats and potential migratory routes and human snow leopard conflict and prey species distribution needs to be mapped. This will ensure focused conservation and efficient use of resources as well.

Monitoring of the population

Based on the experiences gained from the recent snow leopard work in Jigme Dorji National Park and Wangchuck Centennial Park, a standard monitoring protocol willbe developed in collaboration with the WCD and UWICE and adopted for monitoring and establishing the snow leopard and its prey baseline in the country. The parks holding snow leopard in Bhutan will have their staff capacity built to have enough technical capacity to carry out regular monitoring of snow leopard and prey.

Monitoring implementation progress through Key Indicators: setting up a robust system

- Improve survey methodologies within the boundaries of key snow leopard habitats by incorporating new techniques like camera-trapping and scat collection to collect more precise data on snow leopard populations

- In some cases, radio telemetry methods will be used to study the movement ecology in key snow leopard areas
- Engage local communities through citizen scientist approach in monitoring of key snow leopard population; and
- Maintain robust data center on the species for annual and seasonal monitoring

Summary of costs and financing possibilities (US$ in millions)

- landscape-level approach to snow leopard conservation – 0.240
- Refinement of national policy and update – 0. 040
- Managing Habitat and prey – 0.400
- Engaging local communities and reduce human wildlife conflict – 0.240
- Transboundary landscape management and monitoring – 0.110
- Strengthen capacity of national institutions – 4.000
- Research and monitoring – 2.500

Total: US$ 7.530

Based on the above listed activities, US$ 7.530 million will be required to implement the snow leopard Ecosystem Protection Priorities over a period of 7 years. Of this, about 20-30% may be mobilized from internal resources and the balance fund requires to be mobilized from donors like WWF, Bhutan Trust Fund for Environmental Conservation, Bhutan Foundation, GTI and other interested agencies. The recent initiative of the Bhutan Government's Department of Forest and Park Services to set up an endowment fund in collaboration with donor agencies, currently coined as the "Project Finance for Permanence" which is meant for long term financial sustainability of the protected areas could be seen as a positive development in the Bhutanese conservation sector.

References

Shrestha, R. et.al. 2013. A report on the Snow Leopard population survey in the Central Range of Wangchuck Centennial Park, Department of Forest and Park Services and WWF Bhutan Programme, Thimphu. Unpublished report submitted on 10 March 2013.

Royal Government of Bhutan, 2012: National Input Document on Bhutan. Unpublished draft report submitted to the First Consultation Meeting on Snow Leopard Conservation, Bishkek, in December 2012.

Wildlife Conservation Division, DoFPS, November 2012: Unpublished meeting minutes from the first stock taking forum on Snow Leopard Conservation in Bhutan, Thimphu, Bhutan.

Wangchuk, T.R. 2009.On the trails of Snow Leopard in Singye Dzong, Bhutan Tourism.

Wikaramanaye, E.; Moktan, V. et.al. 2006: The WWF Snow Leopard Action Strategy for the Himalyan Region, July 2006.

WWF. 2005. Proceedings of the WWF South Asian Regional Consultative Workshop on

Snow Leopard Conservation. Paro, Bhutan. March 2005.

Preparation team

Lhendup Tharchen[1], Sonam Wangchuk[2], John D. Farrington[3], Vijay Moktan[4], Damber Singh Rai[5], Sherub[6]

[1] Park Manager and National Focal for Snow Leopard Conservation, Jigme Dorji National Park (JDNP), DoFPS

[2]Chief of Wildlife Conservation Division (WCD), DoFPS.

[3] Program Manager, Asia High Mountains Project, World Wildlife Fund, PO Box 201, Kawajangsa, Thimphu, Bhutan

[4]Conservation Director, WWF Bhutan Programme, PO Box 201, Kawanjangsa, Thimphu, Bhutan.

[5]Chief of Wangchuck Centennial Park (WCP), DoFPS.

[6]Chief, Research Department, Ugyen Wangchuck Institute for Conservation and Environment (UWICE), DoFPS.

China

China Snow Leopard Conservation Action Plan
(Revised Manuscript)
State Forestry Administration,
People's Republic of China
September, 2013

Evaluation and Argument Comments for China Snow Leopard Conservation Action Plan

Snow leopards, as a top predator and umbrella species in alpine mountain plateau ecosystem, are highly endangered big cats. International attention has been drawn to the protection of snow leopards. Among 12 snow leopard range countries in the world, the distribution area and population of the species in China accounted for more than 50% of the global total, and it occupies an important status in protecting snow leopard globally. In order to promote the recovery and growth of snow leopard populations in China the Department of Wildlife Conservation and Nature Reserve Management of State Forestry Administration organized and drafted a China Snow leopard Conservation Action Plan (Draft) (hereinafter referred to as the 'Plan (draft)') according to the present status of conservation management for snow leopard population and habitat, and combined with the present global snow leopard conservation situation. The Plan (draft) was then reviewed and argued on 13thof Aug, 2013 to ensure it was scientific, accurate, and feasible. Evaluation and argument committee includes experts from Beijing Forestry University, Northeast Forestry University, Feline Research Center of SFA, Chinese Academy of Forestry, World Wildlife Fund, World Conservation Union, and academicians Mr. Ma Jianzhang and Mr. Yin Weilunfrom the Chinese Academy of Engineering. Mr. Ma Jianzhang and Mr. Yin Weilunhave been selected and agreed to take charge of chairman and vice chairman of the committee, respectively.

The evaluation and argument committee has gone through the objectives, priority area, priority action and policy guarantee in the Plan (draft), examined the scientific content, necessity and feasibility, and verified the scientific basis for them, and comments were formed as follows: First, the existing snow leopard population of China is facing serious survival threats due to constant snow leopard habitat loss, illegal hunting, other human interference, and other reasons. In order to conserve snow leopard population resources based on the existing conservation outcomes, we should combine implementation of Natural Forest Protection, Returning Farmland To Forest, Wildlife And Plants Conservation And Nature Reserve Construction, and in a timely manner carry out habitat restoration of snow leopard and its prey, strengthening specific scientific research, and compensating the human and livestock injuries. With the implementation of targets listed above and other conservation activities, we hope to promote the quality of snow leopard habitat restoration making snow leopard populations show a gradual recovery trend. However, there is an urgent need to develop a strategic, comprehensive, systematic plan to guide the orderly implementation of conservation actions. Therefore, the drafting of "Chinese Snow Leopard Conservation Action Plan (Draft) ", is not only very necessary and timely, but also will play an important role in guiding the conservation of snow leopard population of China in the future. In addition, in the situation of high concern about snow leopard conservation from the international community, the drafting of the "Plan (Draft)" will make the foundation of strengthening further cooperation and exchanges on snow leopard conservation.

Second, the "Plan (Draft)" accurately grasps the four major constraints of conservation work based on the analysis of wild snow leopard population and habitat management status. Setting conservation targets on reasonable conservation outcomes and economic development will help to ensure the realization of the objectives within the capacity of the country. The proposed five priority areas and 12 priority actions for the content, highlights the future direction and focus of conservation efforts, especially the habitat restoration. China is implementing eco-civilization construction through the convergence with Beautiful China Construction, Protection of Natural Forests, Returning Farmland to Forests, Wildlife Conservation and Nature Reserve Construction, Returning Grazing Land to Grassland, and other projects, as well as wildlife damage compensation and the second national survey of wildlife resources, etc. It is scientific, rational, and orderly in planning. The objectives can be achieved through piloting and demonstration work steps, but also ensuring that the various tasks are steadily pushed forward, helping improve the efficacy as much as possible in order to maximize the protection of the minimum investment objectives. The policy support is mainly based on existing laws, regulations and policies, which needs to be adjusted based

on new proposed policy direction, also in line with the overall direction of China's ecological construction. The above arguments, the committee agreed that the "Plan (Draft)"had a strong scientific basis and is feasible enough to be used as a guiding framework document for the future of snow leopard conservation and restoration work.

Third, the evaluation and argument committee has put forward some suggestions about the format and content of the Plan (draft). In addition, the committee pointed out the inappropriate and unscientific statements one by one in the Plan (draft) and proposed amendment suggestions.

Fourth, the committee indicated in the Plan (draft)the budget for specifically estimating the expenditures for future actions, and this can be considered later for future specific assignment according to actual situation after being accounted and declared. However, considering the important significance of snow leopard on ecology, culture and international cooperation, and the particularity and professional nature of the related work, the committee thinks it is necessary to arrange special funds and specify total amount of the funds. Funding allocation to different regions will be based on declared projects, and used to implement tasks scientifically, moderately and reasonably. In addition, it is necessary to announce the amount of the investment for planned expenditure, which would further indicate the position of China towards practical actions and active protection, which is conducive to establish the image of a responsible country and enhance the international reputation.

Fifth, according to the present conditions of the endangered status for snow leopard population in China and the situation of international conservation, the committee strongly suggested early releasing and implementing the Plan (draft) based on the relevant regulations and process of the state, and afterwards adjusting and improving it.

Argument committee Chairman: Ma Jianzhang

Vice Chairman: Yin Weilun

13th of Aug, 2013

China Snow leopard Conservation Action Plan (Draft) (2013-2020)

Snow Leopard (*Pantherauncia*) is on the top of the food chain in the plateau and mountainous region ecosystem, and it plays a very important role in maintaining the balance and stability of the plateau ecosystem. However, the wild snow leopard populations are facing threats of climate change, habitat destruction and degradation, poaching and illegal trade. Chinese government attaches great importance to the snow leopard and habitat protection. In 1988, Snow Leopard was included in national class I Protected wildlife, and through a series of measures like the construction of nature reserves, returning grazing land to grassland, compensating losses caused by snow leopards, and combating poaching and illegal trade, projects have been actively improving the habitat conditions for snow leopard and maintaining the security of the snow leopard population. In the future, China will further strengthen the wild snow leopard population and habitat monitoring and conservation, crack down on poaching and illegal trade, extensively carry out publicity and education, coordinate the conflict between snow leopard conservation and local production, living and economic development, and finally achieve the balanced and sustainable development of snow leopard conservation, ecological optimization and coordination of local social economic.

1. Basic Situation

Basic situation of snow leopard population and habitat

In China, the snow leopard mainly distributes in the mountainous region between 3000-4500 meters above sea level of the Pamirs, Qinghai-Tibet Plateau, Kunlun, Altun, Tianshan, Altai and Qilian Mountain. In recent years the species has been found in some low altitude areas of Hami of Xinjiang, Urat and Alashan of Inner Mongolia. The distribution region includes Xinjiang, Qinghai, Gansu, Sichuan, Yunnan, Inner Mongolia and other provinces. It is initially speculated that its historical distribution area is about 1.82 million square kilometers, the distribution area has been reduced to 1.1 million square kilometers nowadays, accounting for more than 50% of the total area of the global distribution of snow leopard; its population is initially estimated between 2000-2500, also share more than 50% of global snow leopard population. Due to natural and geographical changes, anthropogenic disturbances and other reasons, our snow leopard habitat is divided into more than a dozen areas of varying sizes, which in some regions like northern Yunnan, western Sichuan, Altay of Xinjiang, Yin Mountain of Inner Mongolia, the populations are isolated in their relatively small scale, and they are in a very endangered status and need to strengthen conservation urgently.

Conservation Status

As the world's most important snow leopard range country, the Chinese government has been making great efforts to conserve snow leopard and has made a series of conservation outcomes.

a) In 1988, the PRC State Council approved the snow leopard as a class Ⅰ national protected wildlife, to implement rescue and conservation according to the law;

b) China has established 26 nature reserves in snow leopard distribution range with a total area of about 600,000 square kilometers, and covering more than 50% of the snow leopard habitat, which constructing the most basic network for snow leopard conservation and monitoring. It plays an extremely important role in maintaining snow leopard population and the safety of their habitats.

c) Since 1950s, snow leopard has been listed as one of the elements of natural scientific investigation. After carrying out regional surveys and biological and ecological research, snow leopard was listed as the priority species for the first national survey of terrestrial wildlife resources. Meanwhile, a more comprehensive preliminary investigation was also carried out. On this basis, China began to insist on monitoring and evaluation for snow leopard key population and the habitats, to grasp snow leopard population and habitat conditions and the facing threats, and finally to provide a reliable scientific basis for snow

leopardconservation.

d) Since 2000, many snow leopard distribution areas have been included in some major ecological construction projects such as China's natural forest resources protection, returning farmland to forests, returning grazing land to grassland, wildlife conservation and construction of nature reserve etc. It is efficiently curbing habitat reduction trend and greatly promoting the improvement for snow leopard habitat;

e) In Tibet, Qinghai, Yunnan and Gansu provinces, damages caused by snow leopard have already been included in the range of government compensation, which ease the conflicts between snow leopard and the local people's production and living and to promote understanding and support of the local public for snow leopard conservation.

f) China does not have clothing and apparel production industry that using snow leopard and snow leopard bone is not listed in China's official pharmacopoeias as medical ingredients. Since2008, we have started identification management system and implementing registration for snow leopard skins and products from personal history collections and other legitimate sources. The commercial sales of snow leopard products are not permitted and it is effectively curbing the illegal trade in snow leopard skin products.

g) Snow leopard poaching and smuggling, illegal deals of snow leopard skin and bones and other crimes have long been as priorities for wildlife law enforcement to crack down on, and through continuing to strengthen habitat patrol, port inspection and market inspection, we effectively curbed the momentum of illegal and criminal activities of snow leopard.

h) Carrying out publicity and education of snow leopard and other wildlife conservation includes warning the public not to buy snow leopard skins and bones products, to encourage the public to report illegal activity information by setting up telephone hotlines and e-mails, and to emphasize the time sensitive nature of snow leopard conservation.

i) Efforts to gradually expand and strengthen international communication and cooperation in snow leopard conservation through information exchanges and training with relevant international organizations and institutions in snow leopard researches, and also by actively participating in and promoting global snow leopard conservation cooperation process.

Threats and Problems

According to the present stage of snow leopard population and habitat surveys, monitoring and research, snow leopard population and habitat is facing the following main threats:

a) In China, the snow leopard core distribution area basically remains in its natural state, but the edge of its distribution area has long been impacted by grazing activities, resulting in habitat encroachment and vegetation degradation. Prey populations are in decline as are their sympatric distribution, so that the capacity for bearing snow leopard and other top predators has been reduced. It is effective to eliminate the grazing activities encroaching on the snow leopard habitat, but in some areas fencing would have a negative impact on snow leopard activities, especially in a few areas it isolated snow leopard populations.

b) Snow leopard distribution range is more sensitive to climate change and they are also extreme natural disaster-prone areas. Wildlife diseases in these areas have occurred as well. The above will affect the abundance of vegetation, water conservation and prey resources in the range resulting in habitat change, then it can affect the survival and reproduction of snow leopard population directly and indirectly.

c) Illegal mining and inappropriate road construction will not only have a direct interference with snow leopard behavior and activities, it will also reduce habitat quality and cause habitat fragmentation.

d) Although cases of poaching snow leopard for a special purpose to get skin and bones rarely happens, there are still cases of poaching wild animals such as ungulates, leading to

decreased snow leopard prey resources. By using hunting sets, clamps and other illegal hunting tools sometimes create accidental injury and death to the snow leopard. In addition, there are still a few cases of smuggling, illegal sales of snow leopard skins and bones.

e) In strengthening snow leopard population and its habitat protection, we are also facing many difficulties and problems, they are embodied as follows:

f) Many snow leopard distribution areas have not been included in the nature reserve system yet and there are no appropriate protection and management institutions.

g) Some problems, like understaffing and uneven quality in the protection agencies at a local level isvery common. The equipment and facilities are extremely undeveloped, the funding is deficient, and it is difficult to establish corresponding effective monitoring and protection duties.

h) The data for the snow leopard population and its habitat conditions is insufficient. There is also no adequate understanding of its ecological habits and activity patterns. The impact of climate change on snow leopard population and its habitat is almost blank, which restricts protection decisions and scientific management on snow leopard population and its habitat.

i) Education publicity on snow leopard protection is weak, even in some communities surrounding the snow leopard distribution range, and the significance of snow leopard conservation has not been widespread understanding and perceiving. For local people, the participation, the willingness, and initiative of supporting snow leopard conservation is also relatively lacking.

j) The compensation for the losses caused by snow leopard attacking livestock is relatively low, which to some extent dampened the willingness of local people to protect snow leopard, and it is not conducive to mobilize local people for anti-poaching.

2. Conservation goals and Counter-measure

In snow leopard distribution areas, the vast plateau and mountain region share unique biodiversity. The ecosystems play a very important role in water conservation, carbon exchange reserves, climate regulation and so forth. Snow Leopard, also known as "Mountain Plateau Wizard", owns a unique cultural symbol and high aesthetic value. Therefore, the conservation of snow leopards and their habitats will not only improve regional biodiversity conservation, promote ecosystem stability and health, improve ecological functions in water conservation, carbon exchange reserves, climate regulation and so on, but also in the promotion of ecological culture, and ultimately helping to maintain the coordination of local social and economic sustainable development.

Based on the huge significance of snow leopard conservation, in accordance with the present stage to strengthen eco-civilization requirements, snow leopard conservation objectives and countermeasures are proposed as follows:

Conservation goals (2013-2020)

Conservation goals throughout the sub-region include carrying out surveys and monitoring the snow leopard population and habitat in the field, scientific planning, rational distribution, improving the basic protection management system, strengthening the technology support system, implementing habitat restoration, optimizing ecological corridor construction, cracking down on illegal poaching snow leopard and snow leopard products and other illegal activities, extensive publicity and education, expanding international cooperation and exchanges, and supporting local eco-friendly economical pattern. By 2020, the trend of the rangelands occupying and encroaching on snow leopard habitat should be curbed; the habitat of snow leopard activities should be optimized and extended; the ecological corridor between isolated populations and important populations should be constructed and achieve gene flew, ensure the snow leopard populations overall increasing steadily, habitat quality improving significantly and effectively promote the harmonious development between snow leopard conservation and local production and living.

Conservation measures

a) To strengthen scientific and technological support on snow leopard conservation to ensure population and habitat monitoring, assessment, basic research, and providing a scientific basis for scientific conservation.

b) The national wildlife protection and nature reserve construction work can gradually improve the monitoring system to protect the grass-roots level of the snow leopard distribution, and also to improve the protection and management capacity to ensure that the important snow leopard habitat can be effectively patrolled and scientifically managed to prevent the poaching of snow leopards and other wildlife activities;

c) the implementation of the specialized projects, such as protecting the natural forests, restoring farmland to forest and pasture, and other major projects, to promote snow leopard habitat improvement and optimization, and establish an ecological corridor between the isolated populations and the source populations

d) To improve multi-sectorial law enforcement coordination system to strengthen law enforcement information exchange, to achieve multi-link linkage enforcement in combating poaching, smuggling and illegal trade of snow leopard, their prey, and their products;

e) Extensive publicity and education to raise public awareness of conservation, especially in the surrounding communities, can encourage the public making them conscious of snow leopards living in their home areas. In hopes that the public will resist purchase of the illicit snow leopard and other wildlife products. Also encouraging the public to report information on illegal activities, improving the efficiency of law enforcement

f) Losses caused by snow leopards attacking people and livestock are compensated and compensation standards should be improved reasonably. Exploring proactive preventive measures to support eco-friendly production and lifestyle by promoting the coordinated development between snow leopard conservation and local production and living;

g) To expand international cooperation and exchanges which adapt to the protection of snow leopards, promoting multi-level cross-border area snow leopard protection to share protecting experiences and information, improve international law enforcement coordination mechanism to promote the protection of the global snow leopard.

3. Priority areas and actions

To realize the snow leopard conservation objectives of China, according to snow leopard conservation strategy, China will take conservation actions in the following priority areas:

Investigating and monitoring snow leopard populations and habitat dynamics, strengthening basic research and conservation planning

Carrying out snow leopard population and habitat surveys in different regions, comprehensively and systematically to grasp the basic situation and to monitor their dynamic changes in order to provide a scientific basis for the study of developing snow leopard conservation strategies and measures. Key habitats can be selected for climate change impact studies to enhance habitat management and recovery technology. Undertake population ecology and other basic research that provides scientific and technical support to related protection and management work. According to the results of survey monitoring and basic research, regionally coordinate geographical habitat conservation planning to guide conservation management practices.

Action 1:Carry out snow leopard population and habitat survey and monitoring

Based on the existing information and data, China's snow leopard population distribution area is divided into nine regions: the Pamir’s Kunlun Mountains - Karakoram, Himalayas, Hengduan Mountains, Qinghai-Tibet Plateau -Tanggula - Hoh Xil - Gangdis - Bayan Kala Area, Altun-Qilian Mountains region, the Tianshan Mountains, Altai, Yinshan, Helan Mountain and so on. We will

regionally form our professional teams to individually carry out a comprehensive, systematic investigation and scientific assessments to determine snow leopard key distribution, population size, habitat area, structure, diffusion channels, and the main threat factors; making some investigation and assessment to their populations and habitats, establish snow leopard databases and geographic information system to determine the sampling points, lines, and transects on snow leopard population for habitat dynamics monitoring. This proposes to create an accurate scientific basis for snow leopard conservation and management policies and strategies' development.

Activities :

a) Teams composed of experts from protection and management institutions to develop technical solutions and procedures for survey monitoring. Technical training can be divided into different levels and phases;
b) Inspecting and collecting the existing snow leopard population distribution and their surrounding area on topography, vegetation, roads, residential areas and other information on all aspects. Carry out field surveys and assess their habitat conditions based on existing research results, and model future important habitat of snow leopard and possible ecological corridors, to determine the area of operation at each stage's objectives;
c) Within the snow leopard distribution plots and transects assess the quality of habitat;
d) Doing the analysis of the survey data, summarizing the results, completing the surveys and evaluation reports of the snow leopard population and their habitat, and creating snow leopard conservation GIS databases for supporting information and data of scientific conservation;
e) Carry out follow-up monitoring of the snow leopard and their habitat, in the meantime to grasp the snow leopard population and habitat dynamics.

Action 2: Strengthen basic research about the snow leopard conservation impacts of climate change, habitat management recovery technology, population ecology and so on

Within the snow leopard distribution, doing the survey and collecting information about temperature, precipitation, vegetation, and other indicators of biodiversity data. Conduct research and monitoring of climate change impacts and assessment of climate change on the impact of the snow leopard and their habitat; identify the major threats to their population and habitat, study and propose snow leopard population rejuvenation and habitat management techniques for the snow leopard population structure, territorial behavior, diffusion mechanisms, predation ecology and so on.

Activities:

a) Organizing experts propose some important basic research projects on snow leopard conservation impacts of climate change, habitat management recovery technology, population ecology and so forth, meanwhile in the key distribution area of snow leopard selecting and delineating study area;
b) Investigating meteorological data of the study area like temperature, precipitation and other related data, through quadrates, transects and other methods monitoring vegetation, biodiversity and other related indicators' dynamic change; analyzing meteorological factors and ecological factors data, building models of climate change impacts, assessment of climate change on their populations and habitats;
c) Conduct some surveys inside of the snow leopard habitat such as mining, road construction, grazing and other human disturbance factors, analyzing the factors of such behaviors on snow leopard populations and their habitats, and proposing coping strategies and techniques to study the development of snow leopard habitat restoration and management technical regulations;
d) Using camera traps and non-invasive genetic sampling, GPS tracking, geographic information

systems and other means to carry out snow leopard population ecology, conservation biology and other aspects of basic research for technological supporting of protecting snow leopard and their habitat scientifically.

Action3：Sub-regionally make scientific planning for snow leopard

According to snow leopard distribution natural geography, then divide them into different territory, and compile planning for snow leopard population and their habitat research according to survey results.

Activities:

a) According to the results of investigation on snow leopard population and their habitats: Do protection tactic research, compiling the protection planning, and then dividing the habitats into high quality habitats (habitats that need expanding, potential habitats and ecological corridor) and ensure the corresponding protection measures.

b) For construction activities within the planning area: During the environmental impact assessment we must take the influences on snow leopard population and their habitats into the first consideration and prevent the inappropriate construction activities from doing harm to snow leopard habitats which cannot recover.

c) Coordinate the implementation of ecological construction programs different sub areas; carry out the effect of assessment program.

Perfect the management system of protection, enhance the protection of habitats

Working within nature reserves and conservation areas to arrange the basic snow leopard protection system scientifically, and enhance the scientific technological support system, ability building, wildness patrol, management and recovery of habitats, build ecological path between isolated population and source population, thus realize the development of leopard habitats and the stable growth of leopard's population.

Action 4: Perfect the system of conservation management of snow leopard population and their habitats, which is with the nature reserves as mainstay.

About 50% of snow leopard range in China has been zoned into nature reserves, and some basic conservation stations have also been built outside the nature reserves. To enhance snow leopard population and habitat conservation, strengthening of existing nature reserves and establishment of ground conservation stations is primarily needed. For those places that have snow leopard but without protection management organization, we will try to adjust the range and level of existing nature reserves, and build new protection management organizations in batches, eliminate the dead zones step by step; establish expert group of snow leopard researchers, provide technical guidance for snow leopard protection actions, collect the information of snow leopard protection, assess the development of protection program and efficiency.

Activities:

a) Focus on strengthening construction and management of existing nature reserves within snow leopard range based on snow leopard population and habitat survey results, and then adjust nature reserve range to ensure effective protection for snow leopard core populations and habitat, and promote their continuous improvement;

b) Studying and analyzing the existing setting of conservation and monitoring areas, finding conservation and monitoring blind areas, and gradually establishing ground conservation stations in the blind areas, effectively expanding conservation and management range.

c) Establishing snow leopard conservation expert group under the guidance of national wildlife management department, taking the responsibility of technical support and coordination of snow leopard population and habitat survey, monitoring and implementation of conservation projects over China. According to the actual situation and scientific evaluation adjust the existing nature reserve areas if necessary, and strengthen conservation more

scientifically and effectively.

d) Divide responsibilities within snow leopard conservation areas, having clear responsibility forth conservation and monitoring units, ensuring action regions are covered in a comprehensive conservation and monitoring range.

Action 5: Strengthening the capacity building of snow leopard conservation and management system

Actively increasing team capabilities through professional trainings and upgrading equipment for the existing conservation and management units. The actions include increasing management ability of anti-poaching, scientific management, habitat restoration, and coordinating local society.

Activities:

a) According to the area of responsibility staffing each conservation and management unit with appropriate personnel to increase conservation, monitoring and conservation team scale.

b) Improving conservation and monitoring equipment, introduce new techniques for conservation and management. Making work guidelines for field patrol, habitat management restoration, community coordination in snow leopard distribution range, guiding conservation management units carry out work according to the unified standard.

c) Organizing and having training for conservation and management staff at different levels.

d) Through the development of meeting system, information system, joint action system and a series of rules and regulations, establishing a coordinating mechanism between conservation and management mechanism, ensuring that the field patrol, anti-poaching, habitat management and restoration, community co-management and other work can be done comprehensively and coordinately in snow leopard distribution areas.

e) Regularly assessing the conservation management, improving conservation and management measures and effectiveness.

Action 6: Conserving, restoring and extending snow leopard habitat

Combined with the implementation of key national ecological projects like “Returning farmlands to forests”, “Returning grazing land to grassland”, “Wildlife conservation and nature reserve construction”, strengthening the construction project and environmental impact assessment along with the coordination of snow leopard conservation, conserving snow leopard core habitat from damaging, scientifically managing and restoring snow leopard habitats which are located in the overlap areas of agriculture and grazing, and gradually establishing ecological corridors between isolated populations and source population, improving habitat conditions, promoting the snow leopard population stability and growth.

Activities:

a) Establishing and improving rules and regulations, strengthening field patrol in snow leopard distribution area, timely finding and stopping illegal mining activities and improper grazing, cleaning traps, snares and other illegal hunting tools.

b) Investigating and evaluating the impact of over grazing, fencing, illegal mining, improper road construction, excessive tourism development and other human activities on snow leopard population and habitat. Proposing policies and technical specifications of various production development activities in the snow leopard distribution ranges. To strengthen the coordination of the construction monitoring environmental assessment and snow leopard conservation in the snow leopard distribution area, effectively preventing the undue influence on snow leopard population and habitat from construction, or reduce it to an acceptable minimum level.

c) In key snow leopard habitat including where agriculture and grazing overlap area, the ecological corridors between isolated populations and source population, take measures to forbid hunting activities, strengthen scientific management strictly according to the technical

standard, and prevent further disturbance and crowing of grazing.

d) Studying and formulating necessary policies, implementing special projects of habitat restoration, restoring the important areas which have been occupied by the overlap areas of agriculture and grazing into snow leopard habitat, establishing ecological corridors between isolated populations and source population, improving snow leopard habitat quality.

e) Regularly assessing effectiveness of snow leopard habitat conservation, management and restoration, pertinently improving conservation and management measures to improve effectiveness.

Coordination of snow leopard conservation and the local community's social and economic development

We need to strengthen conservation publicity and education, compensating livestock damage or loss done by snow leopards, and highly concerning the demands of local community economy development, supporting and developing eco-friendly production modes.

Action 7: Compensating damage or loss of snow leopard depredation

Based on the current development of compensation work, focusing on improving compensation mechanism, scientifically and reasonably adjusting the compensation standards, strengthening supervision and inspection to ensure that the compensation in place, safeguarding the legitimate rights and interests of the public, alleviating people – snow leopard conflict.

Activities:

a) Formulating more convenient reporting and verification procedures, ensuring local residents can timely report and get compensation after the depredation;

b) Actively promoting the compensation extending to all the snow leopard distribution areas, and other wildlife species which distribute in the same areas with snow leopard.

c) According to the actual compensation, promoting rational adjustment of compensation standard, exploring the compensation system that combined with the commercial insurance.

d) Regularly and irregularly supervising and inspecting compensation, investigating the local residents' attitudes on compensation and snow leopard conservation.

Action 8: Preventing damage or loss caused by the snow leopard attacks on people and livestock

Popularizing the safety knowledge of snow leopard attacking on human and livestock, researching and promoting initiative preventing measures which coordinate with snow leopard habitat management and restoration.

Activities:

a) Strengthening public education through the establishment of billboards, signs, printed brochures and community advocacy training activities, improving the snow leopard conservation awareness of local residents, promoting safety prevention knowledge.

b) Guiding local residents to gradually change the free range grazing and other grazing methods, which are easy to cause snow leopard livestock depredation. Along with combining habitat restoration, scientific management and prevention of snow leopard depredation, studying, formulating and actively promoting improved grazing and set up and strengthening of fencing.

c) Gradually having centralized resettlement of the household that is scattered in the frequently used snow leopard areas or key ecological corridors, combining habitat restoration and snow leopard depredation prevention, effectively preventing and reducing livestock and human attacks caused by snow leopard.

Action 9: Pilot demonstration of eco-friendly mode of economic development

Investigating, researching and assessing the local eco-friendly life and production modes, gradually having pilot demonstration and essential policy support, guiding the coordination of local

community economy, sustainable development, and the conservation of snow leopard and habitat, getting broader understanding, support and involvement from local communities.

Activities:

a) Systematically investigating production and lifestyle mode of local communities, evaluating the effects of different production and lifestyle modes of the snow leopard, prey resource and habitat, identifying the economic behavior needed to be adjusted and changed.
b) Researching alternative ways of life and production modes, which are adverse to conservation, together with local residents and on the basis of scientific assessment, through small grants, technical guidance and other measures, encouraging local residents to allow a voluntary pilot demonstration.
c) Time sensitive assessment of economic benefits and conservation effects of pilot demonstration, and then gradually encourage the eco-friendly lifestyle, and production modes, and, market prospects through the combination of demonstration and subsidies.
d) Combining project support, reward and punishment system, and stop the activity modes which are not conducive to the snow leopard conservation, achieving the coordination between snow leopard conservation and sustainable development of local livelihoods.

Strengthening law enforcement propaganda, cracking down on illegal activities

Strengthening law enforcement capacity building by improving interagency law enforcement coordination mechanism, maintaining a high pressure on activities of hunting snow leopard and other wildlife, smuggling and illegal business of snow leopard productions. Carrying out extensive publicity and education by establishing public report hotline, encouraging the public to consciously resist the illegal sources of snow leopard and other wildlife products, and actively help conservation law enforcement, effectively improving law enforcement strengthening

Action 10: Strengthening law enforcement capacity building of institutions, and more effectively carrying out the inspection of law enforcement and special combat operations.

Identifying the key areas for hunting snow leopard and its prey, smuggling, and illegal business using snow leopard products. This includes strengthening law enforcement training, improving law enforcement and checking equipment, improving law enforcement system in the key areas, and finally improving law enforcement ability towards effectively combating the illegal activities.

Activities:

a) Collecting public report information, actively carrying out market survey and illegal case reports analysis, analyzing illegal activities trends, identifying key areas of poaching and smuggling snow leopard and prey, illegal business of snow leopard products, including: poaching prone areas, key ports, border area, bazaars, flow distribution, transportation line and commercial websites, etc.;
b) For the law enforcement agencies in key areas and links: enriching and improving law enforcement and checking equipment, strengthening the law enforcement training and discussion, improveing law enforcement consciousness and ability.
c) Improving the interdepartmental enforcement coordination mechanism by developing an anti-poaching patrol system, a market inspection system, a law enforcement information notification system, a joint meeting system, and a responsibility system ensuring law enforcement measures in the different departments to achieve inspections and effective law enforcement.
d) Strengthening anti-smuggling information management and risk control, increasing efforts on combating snow leopard products smuggling, cracking down on smuggling and snow leopard products criminals through controlled delivery. .
e) Strengthening the analysis of illegal activity trend by carrying out multi development joint inspection of law enforcement and special combat operations. , Time sensitive discourse

cases results, forming a strong deterrent force, effectively curbing the smuggling, illegal business of snow leopard products, etc.

Action 11: Develop extensive publicity and education on snow leopard conservation.

Actively carry out various forms of publicity and education on snow leopard conservation; create greater awareness among the public on snow leopard conservation; popularize knowledge of laws and regulations on snow leopard conservation; advocate the public to boycott smuggling and illegal operation and utilization of snow leopard products on their own initiative; actively inform against illegal activity; effectively support the law enforcement on conservation.

Activities:

a) Firstly, carry out various forms of thematic campaigns via media such as newspapers and magazines, radio and television; set up outdoor advertising, billboard and distributing brochures to improve the public's understanding and cognition of the legal requirement and significance on the snow leopard protection; warn the public of harmfulness of smuggling and illegal operation, using snow leopard products to improve their awareness on conservation.

b) Secondly, set up billboard, warning signs and organizing thematic campaigns in key ports, border areas, bazaars and flow distribution areas; carry out pointed publicity and education on snow leopard; encourage the public to consciously stop illegally purchasing of snow leopard product, etc.;

c) Thirdly, set up telephone hotlines and network platform for prosecution; establish incentive system to encourage the public to prosecute illegal activity;

d) Fourthly, choose a typical case to carry out extensive publicity; promote public understanding of the consequences of illegal activities; improve the effect of publicity and education.

e) Fifth, establish a conservation platform for volunteers; arise volunteers assist in investigating information on illegal activities involving snow leopards and other wildlife; strengthen the protective power; strike poaching, smuggling and illegal business, etc. more effectively.

Expanding International Cooperation and Exchanges on Global Snow Leopard Conservation

Under the framework of cooperation for global snow leopard conservation, promote the establishment of bilateral coordination and cooperation mechanisms between the protection management organizations and law-enforcing departments in border areas; carry out the investigation, monitoring and conservation projects in border regions; accelerate the exchange of information and strengthen law enforcement coordination; promote the exchanges of advanced technology and management experience on snow leopard conservation; facilitate improvement of conservation and management ability.

Action 12: Improve international cooperation mechanisms on snow leopard conservation

Under the framework of cooperation for global snow leopard conservation, promote the establishment of more effective multilevel international cooperation mechanism; achieve a more effective exchange of technology and experience, information sharing and coordinate actions, etc.

Activities:

a) Firstly, in the Pamirs, Altaimountains the Himalayas and other border areas of snow leopard range, discuss future snow leopard trans-boundary conservation cooperative actions, projects and programs with neighboring countries, and conduct cooperative nature reserve activities to promote the overall conservation of trans-boundary snow leopard distribution areas, improving the effectiveness of the snow leopard and habitat conservation.

b) Secondly, promote communication between management agencies, research institutions and primary conservation organizations and explore the development of cooperative nature reserve activities in the border areas where snow leopard distributed in.

c) Thirdly, promote and establish cooperation mechanisms on information exchanges and law enforcement among basic law enforcement agencies in the border trade zone and ports to achieve rapid response and strike on cross-border smuggling.

d) Fourthly, strengthen the information exchange with the World Customs Organization(WCO), Convention on International Trade in Endangered Species of Wild Fauna and Flora(CITES) and International Criminal Police Organization(Interpol), etc.; guide basic law enforcement to act and introduce into advanced techniques and experience to improve law enforcement capabilities.

e) Fifthly, regularly assess the trans-boundary conservation activities for snow leopard and habitat, continuously improving cooperation mechanisms and methods, and optimizing the effectiveness of joint conservation.

4. Policy Guarantee

Existing Policy Guarantee

a) China has established a relatively comprehensive systematic law and regulations framework on wildlife conservation and management and has ranked snow leopard as the national Ⅰ level protected wild animal, making the conservation of snow leopard and its habitat as an explicit demand of the law and its regulations. According to existing laws and regulations, the behaviors of unauthorized hunting snow leopard and selling, purchasing, transporting, smuggling snow leopard product, etc. are classified as serious criminal acts. Severe punishment including fines and imprisonment will be given; in serious cases will even resulted in life imprisonment.

b) China has initially established the conservation management system which combined with forestry authorities at various levels, nature reserves, ground conservation and management unit in the snow leopard range, carrying out returning grazing land to grassland, wildlife protection, and the nature reserve construction and other projects. By restoring the prey population, livestock damage compensation, strengthening habitat patrol monitoring and conservation capacity building, we have achieved initial results in the optimization of snow leopard habitat and snow leopard population growth.

c) China has established the multi-leveled, multi-linked wild animal conservation law enforcement system and mechanism of law enforcement coordination among departments of forestry, public security, industry and commerce, customs department. And also strengthened capacity building continuously through perfecting equipment, information exchange, personnel training, and improving the system. Carrying out joint law enforcement inspections and special operations regularly or irregularly, effectively curb the momentum of illegal crime of the smuggling and snow leopard products trading.

d) For the construction projects that would have the adverse effect on the habitat of wildlife under special state or local conservation, Chinese law stipulates clearly the environmental impact assessment shall solicit opinions from the departments of wildlife. This rule provides the system guarantee to prevent the improper construction projects in the range of snow leopard. And according to this rule, China's related large construction activities are all in accordance with the requirements of scientific evaluation taking corresponding measures of conservation management, which reduce the adverse effect to the greatest extent as possible, maintaining the snow leopard species' normal survival and reproduction.

e) For the damage or loss of human and stock caused by snow leopard, Chinese law stipulates clearly the government compensation requirements, and arranges the corresponding funds

from central to local governments at various levels, ensuring that the losses of the most relevant areas can be compensated necessarily. All of these safeguard the legitimate rights and interests of the local public and make them support the conservation of snow leopard.

Improve policy for snow leopard conservation

To strengthen the conservation of Chinese snow leopard population and its habitat, we need to further improve and enrich the relevant policies including:

a) Formulating and publishing a "snow leopard and its habitat conservation plan" in accordance with the procedures for review and approval, which can have the appropriate legal effect.
b) At the basic level, we still need to further improve the field patrol system, monitoring and evaluation system, responsibility system and department coordination system, etc. for management of snow leopard and its habitat conservation;
c) In some places, the compensation methods and standards for damage or loss of human and livestock caused by the snow leopard have not been formulated yet, which should be in accordance with the procedures and strive for an early release. For the place which has issued compensation methods and standards, they still need to adjust compensation standard reasonably in accordance with the formal procedures.
d) Against smuggling and illegal snow leopard products, we also need to further refine and clear market patrol system, responsibility system, the public report reward system.

5. Evaluation indicators

To assess the effectiveness of the snow leopard conservation action, we will use the assessment indicators as follows:

Snow leopard population change, snow leopard distribution and activity area expansion, habitat environment changes, prey density change, snow leopard illegal case happening, local residents' livelihood improvement, conservation management monitoring station and staff set up, staff training, the threat factors etc.

We will adopt different evaluation index respectively for the effectiveness of each priority area of action, the specific points mentioned as below:

Investigating and monitoring the snow leopard population and habitats dynamically, strengthening basic research and conservation planning

Evaluation indicators include: snow leopard habitat geographic information system data, population change, the snow leopard activity area extension, climate change impact assessment results, snow leopard populations in different regions and habitat quality, overall habitat changes, prey density changes, snow leopard activity in ecological corridor regions, etc.

Improve the conservation management system, and strengthen habitat conservation

Evaluation indicators include: conservation monitoring stations amount and scope of responsibility, staff numbers, improvement of facilities equipment, developing and updating the patrol monitoring technology guide and management manual, the related system, etc., the field patrol and amount of monitoring data and effectiveness, situation of the snow leopard illegal cases happening, number of the illegal hunting traps and snares confiscated, etc.

Coordinate the snow leopard conservation and local community's social and economic development

Evaluation indicators include: snow leopard and livestock losses, amount of compensation and funds, quantity and rationality of warning signs and billboard settings, prevention of snow leopard damaging livestock facilities construction, the improvement on grazing modes, the quantity of model

pilot demonstration of economic development which is good to the snow leopard conservation, annual income growth of model household, demonstration promotion, amount of supporting investment, the reduction of economic behavior which is unfavorable for snow leopard's conservation.

Increase the intensity of law enforcement and propaganda, crack down on illegal activities

Evaluation indicators include: the number of law enforcement agencies and personnel in the enforcement area, the situation of equipment improvement, developing and updating different rules, the number of business personnel training, market patrol record and cases investigated, the situation of hotline set up and report information quantity, reporting investigation processing, joint inspection and special operation frequency, uncovered illegal case amounts and handling results, etc.

Expand international cooperation and communication for global snow leopard conservation

Evaluation indicators include: Update the number of international cooperation agreements or memorandums, different administrative level meetings, trainings, the number of exchange visits and the number of participants, communication channels for information, international advanced technology and management experience in application, and effectively, the number of multinational snow leopard and their habitat conservation projects in the border area, evaluating species and habitat quality change in the project area, the project effectiveness and influence on snow leopard cross-border conservation, etc.

Capital budget and source

In order to ensure the implementation of the action, we need to have the huge sums of funding; the specific amount shall be according to the geographical distribution conservation planning of the snow leopard for accounting.

According to the need of the snow leopard conservation action, we will raise funds through the following channels:

a) Firstly, we will combine with China's "twelfth five-year" ecological construction, the project of returning grazing land to grassland, wildlife protection and nature reserve construction should be priority supported in the snow leopard distribution area

b) Secondly, Chinese rare and endangered species rescue breeding, investigation and supervision and the second national terrestrial wildlife resources survey projects etc., we will gradually increase capital investment to the snow leopard conservation ;

c) Third is launching civil body or other non-governmental organizations to give the necessary funding for snow leopard conservation project;

d) Last, strive for international assistance, mainly used for cross-border conservation action or other international cooperation projects.

Appendix: Snow leopard nature reserve list of China.

Province	ID	Nature Reserve Name	Region ID*	Administration Division (County)	Area (ha)	Level
Xinjiang	1	Tomur	1	Wensu	237600	National
	2	Altun	2	Ruoqiang	4500000	National
	3	Kanas	3	Buerjin, Habahe	220162	National
	4	West Tianshan	1	Gongliu	31217	National
	5	Taxkorgan	4	Taxkorgan Tajic	1500000	Provincial
	6	Middle Kunlun	4	Qiemo	3200000	Provincial
Tibet	7	Mount Qomolangma	5	Dingri, NIelamu, Dingjie,Jilong	3381000	National
	8	Qiangtang	6	Anduo, Nima, Gaize, Shuanghu, Geji, Ritu, Geer	29800000	National
Qinghai	9	Sanjiangyuan	6	Yushu Tibet Guoluo, Hainan, Haixi, Huangnan	15230000	National
	10	Hoh Xil	6	Yushu Tibet	4500000	National
	11	Haibei Qilian Mountain	7	Haibei Tibet	834700	Provincial
Gansu	12	Gansu Qilian Mountain	7	Wuwei City, Zhangye City, Jiuquan City	230000	National
	13	Yanchiwan	7	Subei Mongolia	1360000	National
Sichuan	14	Wolong	8	Wenchuan	200000	National
	15	Gonggashan	8	Luding, Kangding, Jiulong	400000	National
	16	Chaqingsongduo White-lipped Deer	8	Baiyu	143683	National
	17	Changsha Gongma	8	Shiqu	669800	National
	18	Xinluhai	8	Dege	16875	Provincial
	19	Luoxu	8	Shiqu	155350	Provincial
	20	Riba Xueshan	8	Xinlong	21064	County
	21	Gajin Xueshan	8	Derong	30000	Municipal
	22	Zhaga Shenshan	8	Litang	84581	County
	23	Xionglongxi	8	Xinlong	171065	Provincial
Inner Mongolia	24	UradHaloxylon forest-Mongolian Wild Ass	8	Wulate Houqi	68000	National
Yunnan	25	Baima Xueshan	8	Deqin, Weixi Lisu	276400	National
	26	Daxueshan	8	Weixin	2153	Municipal

* Gegion ID: (1). Tianshan Mountain, (2). Altun-Qilian Mountain, (3). Altai, (4). the Pamirs Kunlun Mountains - Karakoram (5). Himalayas, (6).Qinghai-Tibet Plateau -Tanggula - Hoh Xil - Gangdis - Bayan Kala Area, (7)Altun-Qilian Mountains region, (8). Hengduan Mountains.

India

National Snow Leopard Ecosystem Protection Priorities India

EXECUTIVE SUMMARY

Snow leopard habitats in India are spread over the northern Himalayan mountains of the states of Jammu and Kashmir, Himachal Pradesh and Uttarakhand in western Himalayan region and Sikkim and Arunachal Pradesh along the eastern Himalayan areas. The range occupied by snow leopard has immense ecosystem significance in terms of values for watershed services, biodiversity, aesthetics and resultant interface of people with nature for life support systems and cultural diversity. Therefore ecological integrity of the snow leopard habitats has attributes related to the socio-cultural wellness of the area as well as economic well-being of the populations in the watersheds downstream. Conservation of Snow leopard is a concern due to a range of traditional and modern threats in its habitats varying in the regions. Prominent among these threats include conflicts with herders, sometimes leading to retaliatory killings, poaching for bones and skin, reduction in wild prey due to poaching and competition with livestock, habitat degradation due to anthropogenic pressures and in the recent years, increasing infrastructure development pressures. Shortage of frontline staff along with challenges of capacity upgradation needs for changing paradigms, poor infrastructure/logistic support and science based information for adaptive management are the factors related to the efficacy of management efforts.

Recognizing these issues and the uniqueness of the area, the Ministry of Environment & Forests (MoEF), Government of India, embarked upon a process of consultations with States and numerous agencies since 2004 that resulted in the formulation and launch of the Project Snow Leopard (PSL) in 2009. PSL is a strategy for planning and implementation of knowledge and landscape based participatory conservation initiatives using snow leopard as a flagship. The PSL suggests preparation of scientific management plans for carefully identified priority landscapes, that are zoned and threats mitigated through participatory approaches, collaborations and enforcement. This initiative has provided a timely thrust to the conservation needs of this flagship species representing the Indian high altitudes.

India has strong wildlife legislations and snow leopard is conferred the highest level of conservation status. The country also has policies geared to enable participation at different levels. There are a few scientific institutions that are partnering with State Forest Departments to help design and implement better programmes for snow leopard conservation.

Some quality research from the area are available, but it is suggested that in the near future robust data are generated on snow leopard and prey abundance, diets and other aspects of ecology so that these are available for adaptive management. The PSL provides a strong strategy framework for participatory planning and implementation of programmes. One landscape in each of the five States is being selected and management plans are being prepared by the Forest/Wildlife Departments in collaboration with scientific agencies. In the National Snow Leopard Ecosystem Priorities, actions will be largely in tune with the PSL. The conservation action is proposed to use about 60% of the allocated resources. Investment on capacity enhancement and research is contemplated to use about 30% of the resources and better coordination of the programme at the Federal level will take the remainder 10% of the allocations. 'Good practices' discussed in the PSL and the Global Snow Leopard Initiative will assist in sound implementation of the conservation programmes. Committees constituted at the national, state and landscape levels, with assistance of organizations such as the Wildlife Institute of India, would be monitoring the programme to ensure effective implementation of the various activities.

Introduction

Snow leopard inhabits the rugged high Himalayan ranges in India, spread over the landscapes over about 130,000 km^2 in five provinces. The habitats are spread along the northern borders in two distinct

landscapes comprising the contiguous terrain of J&K, HP and Uttarakhand in western Himalayan range, and Sikkim and Arunachal Pradesh in eastern side, with Bhutan in between. Within these landscapes, coarse estimates suggest occurrence of 400 to 700 snow leopards (c. 10 % of global estimates) in about 2% of its global range[7]. Although the range already covers some 20 odd wildlife protected areas, most of the snow leopard and its prey occur all over the larger landscape in the sub-alpine and alpine regions of the Greater Himalaya and Trans Himalayan regions.

Forming an estimated 1,30,000 km² within India, these areas generally comprise the non-forested or sparsely-forested high altitude alpine and subalpine regions of the Himalaya and Trans-Himalaya, above elevations of c. 3,200 m in the Western Himalaya and above c. 4,200m in the eastern Himalaya. In each of the five Himalayan States, the proportion of area falling under the purview of the potential snow leopard habitat ranges between 20 to 60% (Table 1).

In the alpines and higher altitudes of its range, snow leopard shares its habitat with human populations including seasonal migrants and permanent inhabitants. The life support for these populations generally includes subsistence agro-pastoralism for which the area is critical for cultivation, pastures and other biomass collection. This interface between people and wildlife results in certain traditional threats to snow leopard. In recent years some development activities in the higher altitudes are also expected to impact the habitats. Tourism, by bringing more information and awareness on nature, is a sector, which ensures close interaction between the society and nature and in turn impacts conservation in many aspects.

The area calculations are indicative based on GIS based calculations and may not be accurate.

Table 1: Snow Leopard Range in the five Himalayan States* of India.

State	State's Area(km²)	Potential Area Under PSL (km²)	% of totalarea of State
Jammu & Kashmir**	1,52,582	76,601	50
Himachal Pradesh	77,060	28,843	37
Uttarakhand	71,648	14,271	20
Western Landscape	3,01,290	1,19,716	
Sikkim	9,075	2,390	26
Arunachal Pradesh	1,05,173	4,736	5
Eastern Landscape	1,14,248	7,126	
Total	4,15,538	1,26,842	**31**

*The figures for the Western Himalaya include areas above 3,200 m and those for the Eastern Himalaya are above 4,200 m. Estimates are based on Digital Elevation Model from Shuttle Radar Topography Mission (SRTM).

** Includes area only within the LOC and the LAC

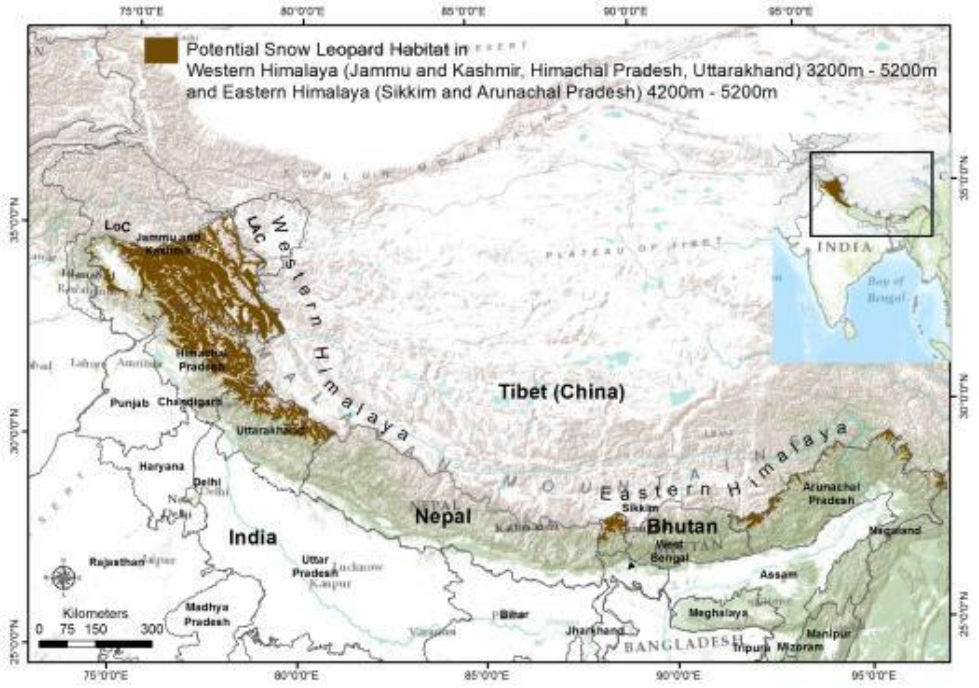
Objective and relevance of the national snow leopard ecosystem priority strategy

It is in view of the growing interaction of such ecosystems with the human beings that the flagship wild species of alpines - the snow leopard - has been recognised as its core and need has been felt for concerted efforts for understanding the habitats and plan for its conservation in most appropriate and sustainable way. National Snow Leopard Ecosystem Priority Strategy (NSLEP)NSLEP represents a road map for this effort.

[7] Snow Leopard Trust (http://www.snowleopard.org/learn/cat-facts/habitat)

A flagship species recovery programme called the Project Snow Leopard (PSL) is already under implementation in the country aimed at strengthening the population status of the species and conservation of its habitats with active cooperation of the local inhabitants and scientific institutions. PSL has established the mechanism for participatory planning and implementation of conservation in large landscapes, and the NSLEP will strengthen it further. An important aspect of this strategy will be to bring to the fore the importance of the landscape and the charisma of this species, to enable the civil society to appreciate and support the conservation efforts.

Figure 1: Snow Leopards range in the Indian Himalayan Region



Snow leopard ecosystem services

High altitudes of Central Asia and the Himalayas, which form the home range for snow leopards, offer several vital ecosystem services. In India, the snow leopard habitat includes areas roughly above 3,200 meter altitude in the Himalaya and Trans-Himalaya biogeographic zones.[8] These mountain ecosystems are extremely important and provide a large number of ecosystem services, not only to the people living in these regions, but also to the people living in the lowlands. Followingthe Millennium Ecosystem Assessment of mountain habitats evaluation of three main types of ecosystem services[9] for the community, nation and region can be identified.

- Provisioning services such as extractive resources that primarily benefit the communities (water for drinking and irrigation, biomass etc.) and ecosystem production (agricultural production for local subsistence, rangelands for animal husbandry and medicinal plants; and non-timber forest products);
- Regulating and supporting services such as biodiversity, watershed and hazard prevention, climate modulation, migration (transport barriers/routes), soil fertility, soil as storage reservoir for water and carbon, and so on; and

[8] *PSL (2008).The Project Snow Leopard.Ministry of Environment & Forests, Government of India, New Delhi.*

[9] *Millennium ecosystem assessment. 2005. Ecosystems and human well-being. Current status and trends assessment.Chapter 24. Island press.*

- Cultural services such as spiritual role of mountains, biodiversity, recreation, local health traditions, related traditional knowledge, cultural and ethnological diversity.

Provisioning services

Most of the alpine regions constitute upper catchments of all major rivers of northern India. Perennial rivers such as the Indus, Ganga, Yamuna, Sutlej, Teesta, and Brahmaputra, have their main catchments in the Indian Himalayan high altitudes and supply drinking water, irrigation, and opportunities to generate electricity to the entire northern and northeastern regions of India. These resources accordingly contribute to the nation's food security[10] also apart from providing the local provisioning services.

These Himalayan states have tremendous potential for hydroelectricity, a crucial need for the country's economy. Even though these hydro projects are mostly downstream, the primary glaciers and watersheds are in the snow leopard range. The current production is reported as of the order of 13,400 MW in western Himalayan snow leopard range states and 975 MW in Eastern range states. Identified capacity for large hydel projects has been projected about 6 times, amounting to potential of expansion of 94% in Arunachal Pradesh, 74% in Jammu-Kashmir and Uttarakhand, 39% in Himachal Pradesh, and 30% in Sikkim respectively, from their current levels of power generation.[11] However, feasibility of use of this potential lies in the analysis of ecological and socio-cultural impact on the landscape.

The people of these regions are mainly agro-pastoralists. The traditional subsistence crops grown here are barley, wheat, buckwheat and black pea. Some areas also cultivate various millets, corn and rarely, rice. The major cash crops grown are green pea, potatoes, apples, wheat, and apricots. A broader look at the information available on official district websites for agricultural and horticultural produce across 12 districts falling within snow leopard ranges and taking into account the current market price for these commodities, as published by the Ministry of Agriculture, the quantum of annual revenues generated is about US$ 60 million.[12].

The region supports a number of traditional transhumant pastoralists. These are represented by castes or ethnic groups with a strong traditional association with livestock-keeping, where a substantial portion of the group derive over 50% of household consumption from livestock products or their sale, and where over 90% of animal consumption is from natural pasture or browse, and where households are responsible for the full cycle of livestock breeding.[13] In the five snow leopard States, these include the *Gujjars* from Jammu and Kashmir, Himachal Pradesh, and Uttarakhand; *Changpas* from Ladakh; *Gaddis* and *Kinnauras* from Himachal Pradesh; *Bakkarwals* from Jammu & Kashmir and Himachal Pradesh, *Bhotiyas* from Uttarakhand; *Bhutias* from Sikkim; and *Monpas* from Arunachal Pradesh.[5] Many of these pastoralists are transhumant, *i.e,* they graze their livestock in the high altitudes in summer and in the foothills in winter, while others such as *Changpas* were truly nomadic traveling to several seasonal camps through the year on the Tibetan Plateau. There is increasing trend in most pastoralists, with considerable economic transformations occurring, to resort to sedentary life.

While there is a paucity of compiled information on livestock holdings by these transhumant pastoralists, information on livestock holdings in each of these States is available through the 18th Livestock census conducted in 2007. In Himachal Pradesh, a total of 1,108,075 livestock is recorded in Chamba, Kinnaur, Lahaul and Spiti, the main areas of snow leopard occurrence in the State.[14] In Uttarakhand, livestock population in the range districts of Bageshwar, Pithoragarh, Uttarkashi and Chamoli districts is 1,150,438.[15] In the corresponding district North Sikkim the number amounts to 43,870 livestock[16] while

---

[10] *PSL, Same as 2*

[11] *Central Electricity Authority, http://www.cea.nic.in/archives/hydro/status_hep/dec12.pdf*

[12] Data compiled from State Government NIC Websites

[13] *Sharma, P.V, Köhler-Rollefson, I, Morton,J. 2003. Pastoralism in India: A scoping study. Centre for Management in Agriculture, Indian Institute of Management (IMM), Ahmedabad, India and League for Pastoral Peoples, Ober-Ramstadt, Germany.*

[14] *Department of animal husbandry.Government of Himachal Pradesh.Livestock census 2007.Retrieved on 20/2/2012 from http://hpagrisnet.gov.in/animalhusbandry/Ahd%20Docs/18th%20Livestock%20Census-2007.aspx*

[15] *Department of animal husbandry.Government of Uttrakhand.Livestock census 2007.Retrieved on 20/2/2012 from http://www.ahduk.org/census.html*

for the two districts of Dibang Valley and Tawang in Arunachal Pradesh, the number adds up to 55,690 livestock.[17] The livestock in these areas represent major economic activities that sustain several forms of livelihoods including those based on crafts and skills. The economic activities related to the pastoralism include the wool-based crafts and trade including the well-known *pashmina* wool.[11] Rearing for milk, milk products and meat are the other important economic activities of herders.

A variety of high altitude plants, some of which are rare, are also harvested from the alpine and steppes for use in local traditional medicines as well as supply for various formulations in various industries of pharmaceuticals and indigenous systems of medicine.[2]

Regulating and supporting services

The snow leopard habitats are represented in the Trans Himalayan as well as the high altitude areas (> 3,000m) of the Himalayan biogeographic regions. In these regions wildlife is distributed across the landscape and not restricted to protected areas[18]. The area supports 350 documented species of mammals, 1,200 species of birds, 635 species of amphibians and reptiles. This habitat of snow leopard (*Panthera uncia*), is shared by at least two species of bear (*Ursus* spp.), wolf (*Canis lupus*), red panda (*Ailurus fulgens*), mountain ungulates such as wild yak (*Bos grunniens)*, chiru or Tibetan antelope (*Pantholops hodgsoni)*, Tibetan argali (*Ovis ammon)*, Tibetan gazelle (*Procapra picticaudata)*, Ladakh urial (*Ovis vignei)*, four species of musk deer (*Moschus* spp), the *hangul* or Kashmir red deer (*Cervus elaphus)*, three species of goral (*Naemorhedus* spp), serow (*Capricornis thar)* Himalayan tahr (*Hemitragus jemlahicus*) and takin (*Budorcas taxicolor)* to name a few. The high altitude lakes and bogs are breeding grounds for avifauna such as the black-necked crane (*Grus nigricollis)*, bar headed geese (*Anser indicus)*, brahminy ducks (*Tadorna ferruginia)*, and brown-headed gulls (*Larus brunnicephalus)*. Numerous endangered and medicinal plants occur in these areas.[19] Over 335 species of wild relatives of cultivated crops are found in the region.[20] Wild relatives of all major domesticated livestock, namely, cattle, equids, sheep and goats, also occur in this region. The biodiversity resources of the area not only provide life support to the people in the area, but also serve as the critical gene pool for biodiversity based solutions for a variety of concerns of humanity.

These mountains play a key role in the water cycle with feedback to the regional climate and by modulating the runoff regime. The critical role of mountains in maintaining water quality and quantity cannot be overstated. Mountain vegetation and soil plays a key role in reducing or mitigating risks from natural hazards.[21]

Cultural services

The lifestyle, religious and spiritual beliefs, traditional agriculture, food, marriage systems, governance of societies inhabiting these areas are all unique and generally gel well with the ecological aspects of the landscape.

India is a religiously diverse country and the birthplace of four major religions: Hinduism, Sikhism, Buddhism and Jainism. Himalayan ranges harbor many mystical and sacred linkages to several religions and beliefs. Nature and wildlife conservation has been part of several such religious beliefs and practices, which have benefitted species such as the snow leopard and its prey. The region continues to inspire scholars, artists, poets, spiritualists, and the citizens at large. Today, the extent of tourism and pilgrimage is rapidly expanding.

---

[16]Department of animal husbandry.Government of Sikkim.Livestock census 2007.Retrieved on 20/2/2012 from http://sikkim.nic.in/ahvs/ahvs_state.asp

[17]Department of animal husbandry, dairying and fisheries.Ministry of agriculture, Government of India.Livestock census 2007.Retrieved on 20/2/2012 from http://dahd.nic.in/dahd/WriteReadData/7.%20Part%20IV%20Livestock%20Census%20BAHS%202012.pdf

[18]PSL, Same as 3.

[19]Pei, S. 1996. (ed.) Banking on Biodiversity, Report of the Regional Consultation on Biodiversity Assessment in the Hindu Kush-Himalayas, ICIMOD

[20]Arora, R. and Nayar, L. 1984 Wild relatives of crop plants in India. NGPR Science Monograph, New Delhi

[21]PSL, Same as 2.

Uttarakhand harbours several ancient shrines at very picturesque locations at as high altitudes as 4,632m (Hemkund Sahib). Himachal Pradesh has strong Buddhist traditions in the remote valleys of Lahaul, Spiti and Kinnaur with splendid gompas and monasteries. Dharamsala, the centre of Tibetan exile and the residence of the Dalai Lama, attracts numerous pilgrims and tourists from the world over. Ladakh, in the State of Jammu and Kashmir is renowned for its well-preserved Tibetan Buddhist culture and has all four Tibetan Buddhist sects. Sikkim is the seat of the Karmapa sect of Tibetan Buddhism and Arunachal Pradesh has the famous Tawang Monastery.

In the entire length and breadth of the Indian Himalayas, the two mountainous States of Himachal Pradesh and Uttarakhand experience perhaps the highest concentrations of pilgrims in the world. It is estimated that pilgrimages and or religious tourism accounts for approximately 18–20% of total tourist flow.[22]

Apart from religious pilgrimage based tourism, nature tourism has gained a substantive momentum in recent years. Tourism as such has been contributing substantially in the economy of the range states accordingly. In terms of revenues, tourism alone accounts for 6% of the national GDP[23].

The trans-Himalayan habitats that support snow leopards are ecosystems of immense value. While a comprehensive economic evaluation of these services would call for thorough research, a rapid estimate of the economic value of some prominent services generated from these habitats is provided below.

Table 2: Rough estimates of the economic value of snow leopard range in India.

Service	Estimation Method	Approx. Economic Value
Hydro Electricity	• The current electricity production capacity of mega projects (greater than 25 MW) across 12 districts falling within snow leopard ranges is 14,367 MW. [24] • Assuming a conservative load factor of 35% [25] these plants account for power generation of 44,049 million-units (MU) of power that translates to revenues of **USD 3 billion** (accounting the cost of power at USD 0.069 per kWh [26]).	**USD 3 billion**
Agriculture	• Based on agricultural and horticultural produce published on official district websites and taking into account the current market price for these commodities, as published by the Ministry of Agriculture, the quantum of annual value generated is at least **USD 60 million**.[27]	**USD 60 million**
Livestock	• Taking a look at the information published on official district websites for livestock holding across 12 districts falling within snow leopard ranges the livestock population accounts to 3,140,511. [28] • Valuating the cost of equines (horses/pony/mules/donkeys etc) at USD 460, of cattle at USD 266, and of sheep, goats and pigs at USD 55 the net value of within snow leopard range districts sums up to **USD 411 million**. Most of this stock is resident.	**USD 411 million**
Tourism	• Only looking at pilgrimage loads in these areas, State Tourism Development Board approximates that nearly 10.4 million domestic tourists and 55,000 international tourists visited Uttarakhand in 2001.[29]	**USD 375 million**

[22] *Singh, S. (2005) Secular pilgrimages and sacred tourism in the Indian Himalayas.Geojournal, 64: 215-223*

[23] *Ministry of tourism.Government of India. Retrieved on 14/2/2013 from http://business.gov.in/outerwin.php?id=http://tourism.gov.in/*

[24] http://www.cea.nic.in/archives/hydro/list_station/dec12.pdf

[25] *Calculated based on the target for hydro-projects 2009-10 as published* http://www.cea.nic.in/archives/col18/dec09/opm_04.pdf

[26] Central Electricity Board – Average Domestic Tariffs for the first 50 kWh: http://ceb.intnet.mu/

[27] Data compiled from State Government NIC Websites

[28] Data compiled from State Government NIC Websites and sources of data in public domain

[29] *Uttarakhand Tourism Development Board. Retrieved on 14/2/2013 from http://uttarakhandtourism.gov.in/*

Service	Estimation Method	Approx. Economic Value
	• Tourism alone accounts for 6% of the national GDP [30]. This accounts to revenue of USD 120 per tourist, calculated based on the number of international and domestic tourists in India and the national GDP between 2000-2010. • Based on the tourist numbers for the major pilgrim centres, this amounts to annual turnover of over **USD 375 million per year**	

Thus, the value of various ecosystem and other services across major districts of the snow leopard range in India roughly amounts to at least **USD 4 billion**.

Generating value based supportfor conservationof the snow leopard ecosystem

Past efforts

There is considerable literature in India about the value of the Himalaya, especially in context of providing water to the populous Indo-Gangetic plains and regulating India's monsoons and climate in general. The floral wealth in terms of its importance for medicinal plants is also fairly well known. Information on biodiversity and ethno-biology is also well known. However, information on endangered species such as snow leopard is extremely scarce. Himalayan ecology has always been of utmost importance in the economic context in view of the facts that it provides the basis for the whole agro-economy of the southern alluvia of the rivers originating here. Accordingly dedicated institutions like Wadia Institute of Himalayan Geology, GBP Institute of Himalayan Environment and Development, Snow and Avalanche Study Establishment (SASE), are engaged in studies related to various aspects of Himalayan landscapes. International Centre for Integrated Mountain Development (ICIMOD), located in Kathmandu, Nepal functions on larger landscape of Hindukush Himalayan region. In the National Action Plan on Climate Change, a dedicated National Mission for Sustaining the Himalayan Ecosystem has been taken up for dealing with the concerns related to climate change. Thus while the Himalayan landscapes are focus of attention from ecological and economic viewpoints, snow leopard, being the flagship life form of higher alpines, is to be the focus of attention as an indicator of the ecological niches it occupies.

Snow leopards constitute a valuable component of Himalayan biodiversity and are afforded the highest conservation category under law; little information on the species was available till recently. In 1986 the J&K Department of Wildlife Protection collaborated with the International Snow Leopard Trust to hold an international snow leopard symposium, which gave a boost to snow leopard conservation in India. A 'Snow Leopard Scheme' was conceived to improve conservation initiatives in the country and the Wildlife Institute of India (WII) launched its first collaborative survey on snow leopard distribution in western Himalaya. This was followed by a telemetry study on snow leopard in Ladakh.

With the emergence of credible information on snow leopard and successful conservation models, various agencies have initiated conservation education programmes targeting local communities. Among the notable efforts, NCF-SLT, WWF India and Snow Leopard Conservancy-India Trust (SLC-IT) have initiated awareness programmes targeting school children and youth covering many sites in the western Himalaya.

Future Possibilities

Effective implementation of the Project Snow Leopard and awareness programmes targeting all relevant sections of society are the priority areas for disseminating information and generating support for snow leopard conservation.

[30] *Ministry of tourism.Government of India. Retrieved on 14/2/2013 from http://business.gov.in/outerwin.php?id=http://tourism.gov.in/*

PSL is likely to gain momentum with States gaining from additional technical inputs and funds for the development and implementation of the management plans. With more upcoming plans for research and conservation, there is a good scope for studies and dissemination of credible information on snow leopard ecology, threats and conservation issues.

With the increasing awareness about the ecological and economic importance of Himalayan Ecosystem in context of ecosystem services flowing from this area, sustenance of the life forms as the indicator of its state of integrity needs to be communicated effectively. It is in this context that a strong communication strategy is needed to be formulated and adopted. It is therefore important that the sections of the local population, like the community, Government departments, developmental agencies, military and other stakeholders are targeted with information on snow leopards and their threats. The indulgence of corporate entities engaged in natural resource use based enterprises, particularly in the command area of the snow leopard range, can play a very critical role in conservation of these ecosystems. Such participation can be through their corporate social responsibility (CSR) and environmental offsets based on comprehensive programmes. Government agencies with help from NGOs and corporates too can develop large-scale campaigns to reach out to the nation.

Most of the snow leopard range in India is spread along international borders with Pakistan, Nepal, Bhutan and China and most of the border areas are manned by the Indian Army and paramilitary forces. Therefor the border forces are critical stakeholders and programmes will need to be carried out to specifically involve these organisations by creating awareness and developing a sustained partnership for conservation.

Threats

Snow leopard and its habitats face threats from to a variety of traditional and modern factors, and in India the importance of these vary between States. Primarily, for the snow leopard habitats being in the most difficult terrains of Himalaya, with perhaps least human population density and minimum conflicts of development related environmental impacts, the traditional threats to ecological resources are far less compared to rest of India. Nevertheless, considering the critically vulnerable nature of the ecosystems, endangered status of the flagship species i.e. snow leopard, and overlap of habitat and life support systems for human as well as this species pose definite threats which can be and are needed to be managed.

For the local communities inhabiting the snow leopard range in India livelihood is based on conditions of very sparse resources. Usually a fraction of the area is arable (in Spiti for example, it is 0.24% of the geographical area), and irrigation is primarily from snowmelt in summer. Cultivation thus is limited to 3-4 months in summer when people grow staple cereals and recently, some cash crops. The surrounding rangelands, however allow them to maintain a variety of livestock. Winters are harsh and people need to stock enough fuel wood for warmth and cooking and fodder for stall-feeding their livestock. The entire region is still considered to be rather remote and development of infrastructure and industry has been slow. However, there is considerable pressure in recent years to bring the remote border regions more in the national mainstream and thus developmental attention to these areas has enhanced. Further, much of the snow leopard range in India is in, or near the borders and there has been a recent thrust to improve access and infrastructure in these areas due to national security concerns.

Traditional Threats

- Unsustainable livestock grazing in some areas impacts the population status of wild ungulates, the pre base of snow leopard.
- Biomass extraction for fuel and other uses near the habitations also lead to pressure on the availability of resources for wildlife including wilderness status in some areas.
- In some areas livestock depredation by wild carnivores leads to threat perception among the people towards these life forms, which can result into retaliatory killing of the predators.
- Poaching, though not very common, does exist in parts of the landscape, of ungulates for meat more than of the predators. Neighbouring range countries of Pakistan, China, Nepal and Bhutan share the concern of illegal trade and related threat to Snow Leopard with India, while other

countries like Bangla Desh and Myanmar are also used as routes for smuggling of wildlife products.

Emerging Threats

- With the thrust on infrastructure and general development, parts of habitats are being lost resulting in fragmentation.
- Influx of migrant labourers in the region to enable all the construction work may also put pressure on local resources, and on the socio-cultural and ecological integrity of the area. They are also involved at times in poaching, even in areas where this was traditionally absent.
- As the fallout of increased migrant population and tourism, garbage accumulation often causes problem of free ranging dogs in and around the centers of activity, not only causing direct harm to the livestock, but also increasingly attacking wildlife including carnivores.
- Climate Change:Higher Himalayan ranges including the habitats of snow leopard are intrinsically very vulnerable to the microclimatic changes also, atmospheric temperature being the main determinant of survival. The life forms, though have high adaptation potential to climatic variations, in such altitudes, tend to evolve responses to such changes by migration and phonological changes to suit the changes. The life forms in the snow leopard range in India are also facing these threats of changing weather patterns affecting agriculture, and these shifts in temperature and precipitation can influence wildlife too.

Capacity and Awareness Related Threats

- Primary mandate for conservation of wildlife and nature lies with the State Forest or Wildlife Departments. While the policies for management of forests and wildlife prescribe participatory engagement with communities and other stakeholder agencies, the modalities are often impaired by limited capacity of the establishment to plan and effectively implement meaningful participatory conservation programmes.
- In the forest administration in the areas of snow leopard range, the staff strength is generally poor and ill equipped, which limits their ability to respond to the conservation needs.
- There is a general lack of awareness regarding conservation challenges to this fragile landscape among the local communities, local Government agencies, and general public as well, which can result in insufficient support for conservation.

Threat mitigation: dealing with the threats

The traditional threats to snow leopard are related more to the state of landscape and are to be managed by addressing the issue of conservation oriented sustainable land use. Since there is a significant interface between the communities and wildlife in the region, use of approaches that effectively involve these communities will be critically important. There are some successful models from India on experimental/ pilot scales on enhancing local livelihoods (eg. SLC-IT, NCF-SLT), managing conflicts (NCF-SLT, SLC-IT, WII, WWF), maintaining small incentive based community managed reserves (NCF-SLT and SLC-IT) and conservation planning (WII and NCF-SLT) that can be replicated over larger parts of the landscape. These and other best practices, as known from time to time in other SL range countries, will be suitably implemented in the area.

Wildlife management department of Jammu and Kashmir has provided a successful model for engagement of local communities in conservation by linking their strengths of traditional culture and skills to ecotourism like wilderness and snow leopard tracking, thereby evolving stakes in its conservation.

Participation in conservation planning needs to be expanded from just local communities to involve other agencies too. It is important that landscape level participatory management is encouraged where conservation is carried out with greater acceptance locally.

With increased immigration of outside labour and increased local poaching in some areas, enforcement too becomes important. Since the Snow Leopard range is almost along the international borders, some pockets are susceptible to illegal wildlife trade. In the circumstances the interface between the Forest/Wildlife Departments and other paramilitary border forces needs to be strengthened for collaborating in recognizing and dealing with such issues. Curbing wildlife trade is an area where trans-boundary collaboration can be very helpful.

Many of these ideas are incorporated in the PSL that provides the background, framework and activities to take this forward. The PSL notes that threats need to be understood well for each site, monitored and the response needs to be adapted to the current threat. Good monitoring can also help in averting the threat altogether. It was also noted that most of the time threats need a multipronged and multilevel approach.

Institutional analysis

India has a forest management establishment that has existed over a century with practices of conservation under strict laws [31]. The focus however was mostly on use of forest tracts and management of game. Organised forest protection and management systems came into existence in 19th century with creation of the Imperial Forest Department in 1864 and the Indian Forest Act of 1878, which formed the basis for the subsequent Indian Forest Act of 1927. However, these measures were for overall management of forest wealth as the primary objective rather than protecting species.[32]

India today possesses a century old forest and wildlife establishment, which caters to the needs of forest management. The responsibility of forest and wildlife management lies with the states and the Central Government oversees the practice from national policy and priorities viewpoints. The management units are constituted of forest and wildlife reserves with varying administrative and legal categories of interventions prescribed. The states maintain the forest establishment of an approximate ratio of 1 person for every 10 km^2 of forests. However, in the snow leopard areas the ratio is much poorer (eg. 1 staff for every 200 to 600.km^2). Teams of officials are entrusted with the responsibility of protection, management, investigation of offences and prosecution in the courts of law.

Each management unit is covered under a management plan or working plan, which is prepared through a well laid process of assessments, analyses and interpretation, in view of the well-considered objectives of management, by a consultative process among managers, professionals and stakeholders.

Scientific institutions for support to forestry and wildlife include the Indian Council for Forestry Research and Education (ICFRE), the Wildlife Institute of India, several state forest research institutes and several dedicated institutions outside government like Bombay Natural History Society, Nature Conservation Foundation, World Wildlife Fund/ TRAFFIC INDIA, Wildlife Trust of India etc. The interface is evolving in a robust manner and several experts from such institutions take active part in policy level deliberations within the government like National Board for Wildlife.

In order to encourage partnerships between the forest departments and local communities the National Forest Policy of 1988 and the Joint Forest Management Guidelines of 1990 provide policy and organizational support. Among the legal provisions, Indian Forest Act 1927 and several state Forest Acts are in place, which primarily provide for organization of forests for management in private as well as public custody, legal provisions including protection related regulations and powers/ responsibilities of the administration for that. Corresponding law for wildlife management is the Wild Life (Protection) Act 1972, which provides for the establishments like National Board for Wildlife, National Tiger Conservation Authority, Central Zoo Authority, Wildlife Crime Control Bureau, and setting up of National Parks, Sanctuaries, Community Reserves and Conservation Reserves etc. for conservation of specific biomes. It

[31]Rangarajan, M. (2001).*India's Wildlife History*, (1st edition), New Delhi: Permanent Black

also provides regulation for trade and varying degree of protection to specific life forms facing threat in conservation status. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 empowers communities to sustainably use and manage the forest commons. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2005 undertakes to provide a 100-day employment guarantee every year to adult members of any rural household, and provides opportunity to the state forest departments to engage local communities to work for conservation activities while providing wages. Thus several policy and legal provisions already provide enabling environment for an inclusive conservation efforts.

Special legal instruments for conservation and sustainable management are in place in form of robust impact assessment and regulatory regimes. Under the Environment (Protection) Act 1986, Environment Impact Assessment regulations prescribe appraisal by expert groups and clearance from the EIA Authorities before any high impact development projects is initiated. In case of requirement of use of forest lands for any non-forestry purpose, prior concurrence of Central Government is mandatory under the Forest (Conservation) Act 1980, for which, an expert Forest Advisory Committee considers the proposals and makes independent recommendations to the Central Government for decision. If location of such projects is within a wildlife reserve (Protected Area) or immediate vicinity thereof, prior recommendation of the National Board for Wild Life is mandatory under the Wildlife (Protection) Act 1986. These instruments attempt to work out reasonable balance for sustainable development and environmental integrity.

While the empowerment of the communities for co-management of wildlife and the support mechanism for building community organizations have been facilitated in the legal and institutional framework, the system does face several operational challenges. The success of community-based conservation in the snow leopard areas have to be seen in the background of the locational circumstances as the areas of habitations adjoining snow leopard habitats are generally in remote locations, official presence in such areas is meager and contexts for strong initiatives seldom exist.

Cause of snow leopard conservation may provide this context, by effective communication of urgency by dedicated scientific and social institutional efforts for justifying the momentum for conservation.

The challenge of capacity building is faced by the Forest Department too, especially in countering illegal wildlife trade in wild species, which pose a significant threat. Species such as the tiger, leopard, rhinoceros, elephant, bear and even snow leopard are in demand in the international market, though there is little internal demand.[26] The threats emanating from often overseas sources of demands of contrabands can only be dealt in close cooperation of agencies such as the Border Security Force, which guards the borders and border trade vigilance intelligence agencies like Customs that can check trans-boundary wildlife trade. Thus, capacity building, at various levels and on various subjects is probably the greatest need in improving the success of conservation initiatives. The issue of cooperation among the neighbouring countries for dealing with trans-boundary crimes is an important area to be considered.

With regard to the snow leopard, the Wildlife (Protection) Act, 1972 classifies it along with other flagship species like tiger under Schedule I, thus ensuring the highest level of protection. However, recognizing the urgent need to further reinforce protection of this enigmatic felid and the unique high altitude landscape that houses it, **Project Snow Leopard** was initiated by Government of India with a species specific focus. The project extends across important landscapes in all the range states and aims to *safeguard and conserve India's unique natural heritage of high altitude wildlife populations and their habitats by promoting conservation through participatory policies and actions*.[33] So while this region has probably been one of the least accessible regions of the country with limited wildlife research being carried out, the initiation of this project has triggered focus and interest in regular and long term monitoring of species in several states.

For implementation and management, Project Snow Leopard advocates a landscape-level approach that calls for identification of biologically important landscapes (mostly >1,000 km^2) and the development of scientific, participatory and landscape based management plans for such identified landscapes by

---

[26] *Illegal Wildlife Trade in India*: World Wildlife Fund – India website

[33] PSL.Same as # 2.

respective Forest Departments. Operation and monitoring for the implementation is at four distinct levels:

- National level: For interstate coordination, resource mobilization, dealing with issues of transboundary implications and overall monitoring.
- State level: Landscape level Management planning and coordination among the management units, forging partnerships with neighbouring states, expert scientific, social and other agencies for coordinated action in field.
- Management unit level: Interaction and activities led by field officers of the forest department, in collaboration with the related sectors of the district administrations, local community-based democratic organizations and expert scientific, social and cultural groups active in the management unit areas.
- Village and village cluster level: Interaction and participation in local planning and participation in implementation by the community based organization representatives along with front line staff of Forest Departments.

Research & capacity: research and training

The key research and training priorities are:

- Snow leopard and prey distribution and abundance in identified landscapes and monitoring changes in population over time
- Identification of threats at different scales and monitoring
- Snow leopard ranging, movements and prey-predator relationships
- Habitat monitoring and experimental research on restoration of degraded landscapes
- Snow leopard and other large carnivore – human conflict monitoring and mitigation

The Key capacity enhancement priorities are:

- Management planning
- Participatory engagement with communities
- Wildlife monitoring for Forest frontline staff and selected local members of the village level committees
- Enforcement and control of illegal wildlife trade for forest, police and armed forces
- Implementation of protocols for monitoring and restoration of habitats

It is important to understand where snow leopard and their prey occur, their status, changes that have taken place and the threats responsible for it. Hierarchically identifying suitable landscapes and potential 'core units' within these, are important. Further, there are numerous aspects of research that include prey ecology, predator ecology, prey-predator relationships, movement of wildlife in landscape with high human interface, understanding threats, local dependence, local policies, etc., which need to be encouraged. There is a growing, but still small body of research studies from agencies such as NCF-SLT, WII and WWF regarding these issues but the spatial spread of these is relatively small.

Owing to provisioned field presence, the Forest Dept. staff can be useful in collecting information and data after some sustained training and development of simple protocols. They can bring in a remarkable scaling up of the area that can be covered by monitoring studies. Scientists need to be available to analyze these large volumes of information. In recent years India has had a tremendous experience of such multi-scale, multi-party exercises such as the All India tiger population estimation and monitoring by the National Tiger Conservation Authority (NTCA), WII and other partners. In case of snow leopard NCF has embarked on a similar approach in the State of Himachal Pradesh, North Sikkim and Arunachal Pradesh while WII & WWF are working in Uttarakhand, West Sikkim and Jammu & Kashmir. These experiences need to be tested and replicated in other parts of the snow leopard range in the country to get robust national estimates of abundance and threats at a scale where action will be more meaningful for conservation of populations. An enabling environment exists for such collaborative action and can be pursued effectively.

Coordination and cooperation among Government and other agencies in conservation landscapes is crucial so that they can encourage convergences and mainstreaming of biodiversity concerns in development, while having dialogue to avoid divergences or find solutions to it.

Strategy, program and costs

It is recognized that the conservation strategy must be multipronged, with simultaneous action on the identified threats and also on recognition of the species survival as the indicator of the ecological integrity of the SL landscape and habitat. Accordingly the action can be on two broad aspects. One deals with setting up enabling processes for effective knowledge generation, coordination, capacity and planning, and second, for actually carrying out the conservation action by people with the right capacity. The strategy therefore will be to take simultaneous action on several fronts as outlined below. Proposed activities and year wise costs for each component of the strategy are provided in the Annexure.

- **Initiate a robust regime for knowledge generation:** To primarily include inventory and assessment of the status of habitat and the species, including the factors including anthropogenic ones, which will determine main focus of activities for conservation. This component also includes baseline studies for future monitoring of the flagship species and its habitat. Tentative cost for the period 2014 – 2020 is $ 3.45 m.
- **Policy Actions or Institutional Strengthening Actions:** In this component, actions will include training and capacity building regime for stakeholder partners for snow leopard conservation including forest staff, community institutions, security and intelligence agencies for dealing with illegal trade, civil society organizations etc. committed for conservation of snow leopard.
- **Forging an effective communication strategy for other stakeholders** like border security agencies, infrastructure development partners, people's representatives of every level of democratic institutions and development sectors will be a part of this component. It will also include building up community or social institutions for a participatory campaign for conservation of snow leopard. Projected cost for the period till 2020 is $ 2.46 m.
- **Identify One Representative Landscape in Each State and Prepare Management Plan:** In this component, a priority landscape in will be identified in each range state based on the inventory as given in component I above, and management plan will be prepared for it with expert assistance One management unit in each of the five range states will be entrusted the task of taking up the conservation actions in identified priority landscapes for snow leopard conservation. Estimated cost for this component for the projected period is $ 0.59m.
- **Conservation Actions (Using best practices with participatory approach & improved capacity):** This component includes use of existing information and experience on best practices for evolving and implementing measures for threat mitigation, livelihood support for local communities, conflict mitigation actions reducing antagonism and retaliatory killing of snow leopard and long term habitat improvement programs. These activities will be jointly taken by Forest/Wildlife Dept., Village Committees and all other agencies involved in the project. This component is expected to cover the cost of $2.45 m till the year 2020.
- **Trans Boundary Actions:** This component includes working on the information on triggers of illegal trade on the products derived from the habitats of snow leopard, and seeking inter-governmental cooperation mechanisms available for control of illegal trade (eg. SAWEN and Interpol), and developing coordinated habitat management with neighbouring snow leopard countries. Nepal, China, Bhutan and Pakistan will be the prominent partners in this effort. This component will need $ 0.38 m.

Monitoring progress and evaluating results

Monitoring of the conservation status and that of the action based on the NSLEP strategy are two different but interlinked parts of strategy itself. Following actions are envisaged in these areas for the action plan period.

- Scientific monitoring of SL, habitat, and threats: The first component of the knowledge generation and its use contains as its intrinsic part, action on monitoring of the SL in its different aspects. The component includes generation of baseline information, collection of data by

inventory and other means, and analysis thereof for assessing the trend and impact of action over the plan period. This information will be vital for mid-term appraisal and mid-course correction of the strategy, as and when required. Assessment of population, indicators of habitat and threats will be repeated periodically.

- Monitoring implementation progress through Key Indicators: The proposed 4 tier mechanism for conservation action at various levels also includes coordination at national and state level. This coordination task will also include monitoring of the progress of tasks defined and implemented. In the individual annual action plans of the range states, clear actions, deliverables, indices and indicators of success will be provided against which the progress will be monitored.
- The PSL includes Monitoring & Evaluation of management plan implementation by qualified agencies.

The cost of this aspect, covering part b and c above is estimated as $ 0.75 m for the plan period. A mid-term appraisal with evaluation will take place in year 5 wherein the strategy will be reviewed based on the outcomes of actions of first 4 years.

Summary of costs and financing possibilities

Based on the activities listed above and likely trend of the costs including the efforts necessary in terms of personnel, investment and training/ communication requirements, costs for a seven years programme have been worked out as provided in the Annexure. A total of US $ 10.08 million have been projected as the requirement for undertaking the conservation programme on a legitimate efforts level.

As the present strategy indicates actions based on knowledge and information gathered from the assessments and analysis envisaged in the plan itself, resource mobilization part and sources thereof are not yet definitely decided. Thus the projected financial resources can be partially borne by the Central Government, state governments and all other partners in the conservation efforts. The projected amount is relatively on higher side from the allocations provided at present, but can be borne for the tasks provided, from several existing sources. Global efforts for contribution for conservation from interested donors would go in long way for recovery of this species from brink of extinction.

Overall approximate proportion of the projected outlays will be as follows.

- support to the states for activities on the snow leopard conservation (60%)
- capacity enhancement and knowledge generation (30%)
- general coordination and transboundary efforts at the Centre (10%)

Model of assistance to the management units from federal budget already exists in form of the Centrally Sponsored Scheme format programme. While about 50% of the projected requirements can be met from this programme, participation of the research institutions, civil society and corporate adaptation of the habitats is possible. Communication strategy will incorporate the outreach to the corporate world for participation in conservation by contributing to the programme. Evolution of a workable participatory model for management and convergence of the assistance thus available will be a part of the programme.

Kazakhstan

National Snow Leopard Ecosystem Protection Priority in Kazakhstan (NSLEP)

Snow Leopard or Irbis (Uncia uncia or Panthera uncia) is one of the most endangered animals in Kazakhstan, the estimated number of which in the country is no more than 100 - 110 animals on the habitat area of about 50,000 km ².

Goals and objectives of NSLEP in Kazakhstan

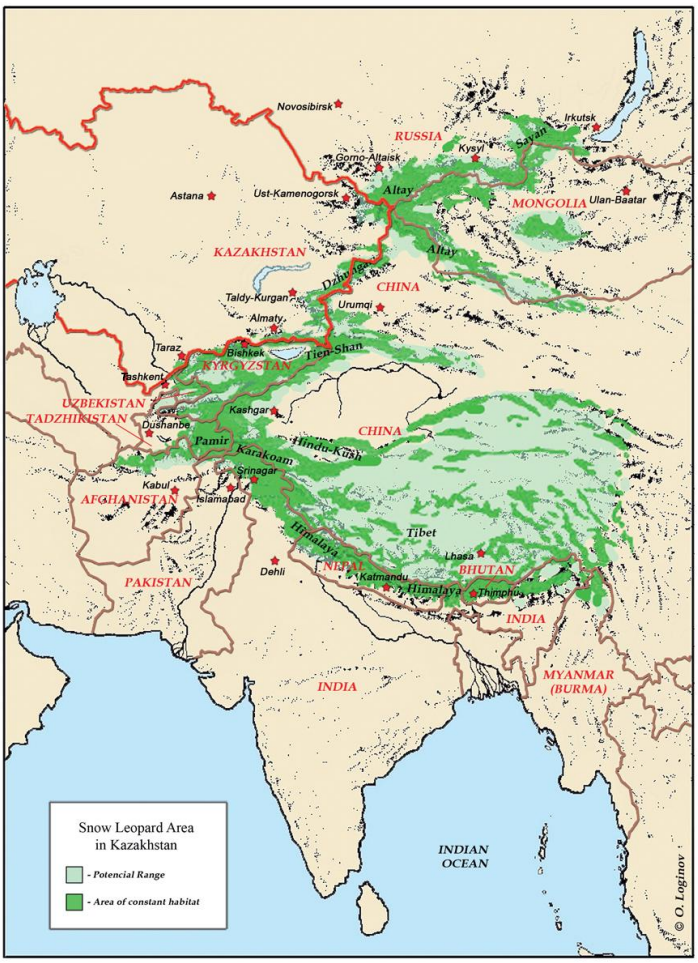
Goal

Save the snow leopard population in the long term on the territory of Kazakhstan.

Objectives

Address the main threats that reduce number of snow leopards.

Minimize the negative impact of factors leading to the degradation of its ecosystems



Map 1: Distribution of snow leopard in Kazakhstan

The peripheral northwestern part of the dissemination of the snow leopard is located in Kazakhstan. Natural habitat of species in Kazakhstan is highly fragmented, as it is in the main cross-border locations, almost anywhere entering the country for no more than 100 kilometers. Species habitat area is only about 2.7% of the total area of its distribution in the world, but this area is very important as a natural bridge to save the snow leopard within the species natural habitat.

1. The Snow Leopard Ecosystem Assessment and its role in the economy, biodiversity, spirituality / culture, expressed in quantitative terms

1.1. Symbol of Kazakhstan. Snow leopard is an official symbol of Kazakhstan, which was a suggestion of President Nursultan Nazarbayev. Thus, the symbolism of this species is an important argument and an incentive in the goal to save it for posterity. Numerous organizations, sports and tourism clubs, products and brands in Kazakhstan are using an image of a snow leopard. "Irby" was an official mascot of the Asian Winter Games "Asiada-2011", held in Almaty and Astana.

1.2. Indicator of status of mountain ecosystems.Virtually all of the major rivers of Kazakhstan and their numerous tributaries originate from the glaciers in snow leopard habitat within the country limits or in the neighboring countries: China (Ili, Irtysh), Russia (Bukhtarma, Katun) and Kyrgyzstan (Naryn-Syr Darya, Talas, Chu) and others. All in all, there are 2724 glaciers in the mountains of the Republic with an

area of 2033 km². The total volume of ice includes 100 km³ of fresh water, which is about twice as much as an annual river flow formed within Kazakhstan. Rivers feed and make fertile valleys, where half of the population is located. Agricultural land and intense industrial activity is carried out in the East Kazakhstan, Almaty, Zhambyl and South Kazakhstan regions.

One of the largest lakes in the country - Balkhash exists because of Dzhungar rivers and river Ili, flowing from China. All this is another argument in favor of maintaining the habitat of snow leopards.

1.3. Mountain's biodiversity. All the habitat areas of snow leopard in Kazakhstan are on dividing ranges, where fauna and flora of different regions are mixed, strengthening each other and forming region's exceptionally rich biodiversity, compared with arid lowland areas. These areas comprise about 75% of biodiversity in Kazakhstan. Rocky landscapes with their thin soil cover make the most fragile alpine ecosystems in comparison with other landscapes and require more attention in terms of conservation. Despite the thin soil layer, alpine meadows have a high variability and richness of flora and fauna. The majority of species included in the Red Book of Kazakhstan are in snow leopard's ecosystem, as well as important hunted animals, many of which are the prey for this predator.

1.4. Eco-tourism. Beauty and the preservation of wild, pristine nature places in snow leopard habitat attract more tourists, mountaineers and explorers from around the world every year. Further development of eco-tourism in mountain areas will increase an employment of local residents; whose work will involve monitoring of leopards and thus will contribute to its preservation. Alpine meadows, despite the harsh climate and a large diurnal temperature range fluctuations have a higher biodiversity than the neighboring semi-arid areas, and mountain landscapes of the Tien Shan, Altai and Dzhungarian Alatau and are considered to be the most beautiful, not only in Kazakhstan but also in Central Asia.

All six national parks and four reserves in the area of the snow leopard habitat in Kazakhstan have developed and are actively cultivating tourism routes through their territories. The total length of 75 routes in the protected area is about 2000 kilometers. Unfortunately, we have no data is available on the financial side and the profitability of tourism in protected areas. Many private travel companies are also developing ecotourism, as well as hunting grounds. Undoubtedly, the development of tourism is an important and promising avenue to improve an economic situation of mountain areas, involvement of local residents in business as guides, maintenance personnel, as well as in sales of traditional handicrafts, organic food for tourists etc.

1.5. Trans-boundary value of conservation of Irbis. There are important areas of snow leopard habitat on a territory of Kazakhstan, which are - Altai, Saur, Junggar Alatau and Tien Shan, which carry international importance, as regions of high biodiversity and which are important in shaping the environment. Junggar Alatau has the greatest geographical importance and uniqueness of biodiversity. This natural mountain range is extremely distinctive in this respect. There are very high levels of biodiversity and endemism of flora (180 - Kazakh endemics and 76 - Dzungarian) and fauna (Ranodon sibiricus). There are more than 2,000 plant species in Dzhungar, about 30 of them are included in the Red Book of Kazakhstan and more than 100 are included in the pharmacopoeia. The two species of amphibians, several species of nesting birds and six species of mammals are listed in the Red Book out of the more than 300 species of fauna found here.

2. Dissemination of information about the value of snow leopard ecosystems and mobilization of support for its conservation

2.2. Past activities. People living in close proximity to the snow leopard habitat, who use the gifts of nature, grazing and are engaged in hunting, are more likely to meet with a rare predator. There is a need to constantly provide people with accurate information about snow leopard as an animal, which plays an important role in nature and, thus, is not dangerous to humans. The image of the beautiful and majestic and mysterious snow leopard, "Lord of the Celestial Mountains" is the most relevant and attractive. People need to realize the importance of its preservation not only as the "Red Book" and the rare animal,

but also as a symbol of the country, national pride. In this context, souvenirs: badges, cards, posters and calendars in various formats, CD and affordable illustrated brochures and books play a very important role in Kazakhstan.

Additional environmental educational programs, which are held as extra-curricular activities in some schools and universities, have been developed and are being implemented in Kazakhstan. Regional programs for mandatory environmental training regarding the snow leopard and its role in nature are being gradually developed in schools and universities, located in Almaty, Zhambyl, South Kazakhstan and East Kazakhstan regions which are aligned with provincial and district departments of public education.

Since 1993 up (the Club IRBIS) to present time - "Snow Leopard Fund" carried out the most significant work to promote conservation of the snow leopard and its habitat, the development of public education programs and monitoring of the species. SLF published several books about snow leopard, "Snow Leopard. Symbol of Celestial Mountains "in 2009 and" Irbis - The Snow Leopard " in English in 2011 (both books were published with the financial support of the UNDP / GEF-Kazakhstan, "Spirits of the Sacred Mountains "- fairytale coloring books by Irina Loginova in 2011 in Novosibirsk (Russia), and the 2013 album - "Irbis - Snow Leopard." There were also many publications in the periodical press (an average of 20 articles per year).

2.3. Future opportunities. Environmental education programs for the population living in the vicinity of leopard habitat are particularly relevant. The following topics should be included in task-based projects to disseminate information and establish environmental consciousness:

- 1) formation of understanding of population of the role of Kazakhstan in the preservation of the world's population of snow leopards;
- 2) Formation of a positive attitude of the local people to irbis as a predator, which does not pose a serious danger to the public and understanding of a need for its conservation;
- 3) development and dissemination of "Rules of Conduct for leopard habitat " among the population;
- 4) development and implementation of targeted promotional campaigns for various social groups from leopard habitat to create a positive image of the snow leopard as a symbol of Kazakhstan;
- 5) improvement of an educational level of managerial staff and experts in the field of natural resource management, including managers and specialists for hunting grounds;
- 6) widespread promotion of exemplary biodiversity of protected areas and hunting enterprises that manage ungulate populations in the interests of snow leopards;
- 7) preservation of spiritual culture and national customs, promotion of traditional knowledge, customs and practices aimed at preservation and respect for the snow leopard,
- 8) formation of public understanding of the leading role of national reserves and national parks in preserving a unique mountain ecosystems
- 9) promotion of sustainable patterns of natural resources, preserving habitat of this predator and its prey;
- 10) formation of the population's intolerance for poaching.

3. Threat assessment, both traditional and new, coming from infrastructure development, market demand, tourism and climate change

The major threats to the snow leopard in Kazakhstan:

3.1. Poaching

This is the main threat to the existence of an extremely rare animal in Kazakhstan. Taking away even 2-3 animals from nature can lead to the disappearance of the local animal population groups. Separate Altai and Saur groups of snow leopards found in East Kazakhstan region are most scanty in Kazakhstan.

Together they make up no more than a dozen species of snow leopard. The sighting or traces of these species are not happening each year in East Kazakhstan region.

Despite an increased security measures by the state in recent years, the creation of new protected areas and a significant increase in fines for illegal hunting of leopard, poaching is not yet eradicated. It has become even more secretive.

The absence of work for local population also leads too many of them engaging in illegal hunting, including of species included in the Red Book of the Republic of Kazakhstan, as well as of animals who are pray of a leopard.

There are unintentional killings of a leopard when hunting its main prey animals or through traps or loops placed for other predators, which for obvious reasons are carefully concealed.

3.2. Conflict with livestock breeders

Cattle grazing in the snow leopard habitat can cause conflicts when a predator attacks livestock. This, traditional in all parts of the habitat threat to the leopard in Kazakhstan is also common, and in fact intertwined with poaching. Unfortunately, the shepherds and ranchers but not hunters are involved in majority cases of poaching, especially wintering shepherds; almost 100% of them have available weapons and traps.

Most often, snow leopard attacks on livestock occur when animals are grazed directly in snow leopard habitat. Other causes of this big cat attacks on livestock are unsupervised grazing and unprotected paddocks and sheep yards.

As a main measure, it is necessary to develop a procedure for financial compensation for the damage to the livestock caused by this predator, if the facts of attack on cattle are proven and cannot be questioned. It is also necessary to assist shepherds in the construction of sheltered sheepfolds and pens, closed at the top and with a solid mesh on windows, and to explain the need for oversight of grazing herds, preferably with a dog in the daytime.

3.3. Reducing the number of pray of the snow leopard

In first years following the collapse of the Soviet Union, nature conservation efforts in all post-Soviet countries have deteriorated significantly, which affected not only numbers of rare species, but also those on which hunting is permitted. Many ungulates, such as mountain sheep (in Kazakhstan 6 subspecies) and mountain goats of different subspecies, which are pray of the snow leopards, still not regained their former numbers.

In many areas, the number of not even rare ungulates has decreased markedly in the last 20-30 years. The number of animals remains stable and their safety is guaranteed only in the nature reserves and national parks, where hunting is prohibited.

There are around 700 hunting enterprises in Kazakhstan. Some ridges are almost completely covered by private hunting areas, such as ridge Ketmen (or Uzynkara), where snow leopards have been spotted before. The activities of hunting enterprises affect the conservation and reproduction of rare animals.

3.4. Degradation and fragmentation of key habitats

Habitat degradation has also influenced a decline in the number of snow leopards. Area of this species is fragmented within Kazakhstan, and despite the fact that its dwells mostly in remote areas, economic activity in some places have influenced the state of the mountain biocoenosis. Grazing cattle too much can lead and in some places has led to the degradation of the sub-alpine and alpine meadows and displacement of wild ungulates from their native habitats. This is recorded in all mountain ranges where there are no protected areas.

Many middle-altitude areas have largely been transformed over the past 30 years. Snow leopards were spotted in these areas during its migrations, both in winter and in other seasons. These are the areas of intermountain valleys, with abundant agricultural land, roads and railway tracks, as well as industrial sites of cities and towns. Thus, here the possibility of a conflict got repeatedly increased in a case of snow

leopard being near human settlements when making transitions from one area of habitat (population groups) into the other.

4. Countering threats to snow leopard

Kazakhstan has accumulated some experience in controlling and reducing main threats to the snow leopard. Some achievements are preserved from the Soviet era; many were developed in independent Kazakhstan. Very effective Soviet legal framework, which was taken as a basis for the protection of wildlife, has been improved.

Higher penalties for poaching on snow leopard were set at 2000 units of monthly index - 3.42 million tenge ($ 22,724), and all five subspecies of wild sheep (Ovis ammon ssp.) - 1500 units of monthly index - 2,565,000 tenge ($ 17 043), hunting of which was universally banned.

However, there are still a number of issues that should be solved without delay:

4.1. Strengthen measures to combat poaching. Law enforcement agencies, border patrol, hunter service of hunting enterprises, service for guarding protected areas should be more involved in protection activities concerning snow leopards.

It is important to expand the research program to study this predator in Kazakhstan, their population dynamics and distribution within the Kazakhstan habitat in five of its population groupings - 1-Altai, 2-Saur-Tarbagatai, 3-Junggar, 4-North Tien Shan and 5 - West Tien Shan. It is important to study the existence of threats to the species, to develop measures to counteract them and to create a system for constant monitoring of the state of the snow leopard populations.

4.2.A procedure for financial compensation for the damage to the population caused by this predator, if the facts attacks on cattle proven and cannot be questioned needs to be developed as a main measure to reduce conflicts with livestock. It is also necessary to assist in the construction of the shepherds sheltered sheepfolds and pens, closed at the top and with a solid mesh on the windows, and to explain the need for oversight of grazing herds, preferably with a dog in the daytime.

4.3. Take measures to increase population of species of hoofed animals, which are prey of leopards in the areas of hunting enterprises in protected areas. Establish the rules and regulations of livestock grazing in the subalpine and alpine zones of the mountains in order to save the snow leopard prey. Develop new forms of traditional land usage, which will provide a mutually beneficial combination of social and economic development for the people and conservation of the snow leopard and its habitat.

It is necessary to interest or oblige owners of hunting enterprises to participate in monitoring programs, as well as in preservation and restoration of snow leopards and their prey in order to reduce the negative impact of fixed hunting enterprises on preserving this species. It is necessary to develop and establish new rules governing the minimum and maximum population density of ungulates for each hunting enterprise.

Optimization of hunting enterprise management in order to improve the capacity of habitats. An adoption and implementation of programs to restore the population of wild ungulates is needed in order to save the snow leopard prey. There is a need to develop and implement a flexible system of regulation of hunting for wild ungulates, which would mandate the allocation of reproduction sites. In the case of force majeure, changes in the rules of hunting (extreme cold and snowy winter, and epizootic diseases, etc.), strengthening of measures against those who breach the hunting rules need to be implemented.

4.4. Take measures to reduce a negative impact of existing and being built industrial facilities and highways on mountain ecosystems. These objects should be more closely monitored by the governmental environmental control, not only as sources of environmental pollution and the destruction of landscapes, but also as places where people who can engage in illegal hunting for wild ungulates, marmots, etc., and can also get involved in poaching of the snow leopard.

4.5. Make arrangements for the protection of nature reserves and increase protected areas in the territory of Kazakhstan, to save snow leopards. At present time, the Criminal Code of the Republic of

Kazakhstan, the Law “On protection, reproduction and use of wildlife, and On Specially Protected Natural Areas regulate the protection of the snow leopard in Kazakhstan." Compliance with these laws is done throughout the country, but in practice enforcement is very difficult, so it is most effective when only in protected areas (PAs).

There were only 3 nature reserves and 5 in Kazakhstan during Soviet Union times covering snow leopard habitat. 12 state national natural parks (SNNP), half of them – 6 in the area of snow leopard habitat and one reserve - Karatausky (for the protection of the Karatau mountain sheep and unique ecosystems of that range - the spur of the Western Tien Shan) were established during the years after independence. Sightings of leopards are regularly reported in 4 nature reserves and 6 national parks on Kazakhstan part of the species range.

Thus, a key measure of protection of leopards as rare species is a system of protected areas (PAs), which can most effectively provide protection of all the key areas of leopard’s habitat. About 30% of the area of snow leopard’s habitat in the country is under their protection. In many protected areas, government inspectors and other staff are poorly paid and often lack the equipment, such as a modern means of communication, all-terrain vehicles, etc. This is especially true in sanctuaries of Kazakhstan, where the snow leopard could be found - Almaty, Toktin, Verhnekoksuy and Lepsinsk areas, which are located in the Zailiisky Alatau and Dzhungar mountain ranges. The protected areas (PAs) must be not less than 75% to ensure the complete safety of the snow leopard in the nature within Kazakhstan.

Organization of Tarbagatajsky National Park is underway, where snow leopard might cross. There are no protected areas in Saur, where there is a high level of biodiversity, and its a habitat of rare species of animals such as snow leopard, mountain sheep of Kazakhstan, Himalayan snow cock (a rare bird found only on the Saur region of East Kazakhstan area) and others. NGOs "Eco-Altai" (Ust-Kamenogorsk) developed a preliminary draft of the reserve's creation at Saur. Consideration should be given to the establishment of protected areas for the conservation of this important snow leopard habitat. It is also desirable to consider an establishment of protected areas in the Kirgiz Alatau in the upper reaches of the rivers Aspara, Merke and Karakystak. It is necessary to strengthen cross-border cooperation between Kazakhstan and the Kyrgyz Republic in the northern Tien Shan - between SNNP "Kolsai-Kolderi", Almaty reserve, the Ile-Alatau SNNP and Chon-Kemin National Park in Kyrgyzstan.

The optimal solution would be an establishment of ecological corridors between existing protected areas of Dzhungar mountain ranges:

- Between Toktin, Lepsinsk sanctuaries and Zhongar-Alatau SNNP, Verhnekoksuy reserve and Altyn-Emel SNNP.

Other potential areas within the range of the snow leopard in Kazakhstan for the creation of ecological corridors, reserves and sanctuaries in Almaty, Zhambyl, South Kazakhstan and East Kazakhstan regions should also be explored.

5. Organization and management of conservation program

Unfortunately, in many areas of snow leopard habitat in Kazakhstan, the local population remains in the dark about environmental laws and carried out conventions and ongoing projects. The need and motivation to preserve such a large predator, which attacks their livestock, and thus inflicts damage often not explained to local people. If there is no reserve or a national park in the vicinity of settlements in the mountains, the environmental education of the population is either absent or is at a very low level. This threat is inextricably linked with the tradition and motives to gain valuable furs in the absence of proper promotion and protection measures. Thus, in most parts of the snow leopard habitat in Kazakhstan, despite the existence of several laws and policies, inaccessible mountains best protect leopards. It's only a matter of time when there will be another fatal encounter with a man, armed with firearms, traps or loops.

6. The main activities to be included in leopard conservation program are:

№	Priority activities	Expected results
1	The deployment of monitoring system of the five population groups of the snow leopard and its prey animals with the participation of leading experts and locals	Determining the true population will help to formulate the scientific basis for conservation activities in the long term
2	Study of the influence of natural and anthropogenic factors on the population dynamics and the conversion or degradation of habitat of the snow leopard	The findings will become the basis for planning conservation measures
3	Expansion of international cross-border cooperation to improve security measures of species and its habitat	Improving security in key habitats, located directly on the state border
4	Development of ENO and feasibility studies required to address the expansion of existing areas and creation of new protected areas to protect the snow leopard	After increasing protected areas they can better protect the snow leopard population groups and ecosystems
5	Improving security measures of all kinds of animals which are prey to snow leopard outside of protected areas	Provide an increase in the number of ungulate species and other species of animals which are prey for leopards in hunting enterprises' areas and protected areas
6	The development of eco-tourism in the mountains and other forms of local employment	The development of mountain areas will be another measure of preventing people from carrying out illegal forms of exploitation of natural resources
7	Environmental education of population, promotion and dissemination of information through the media	This will help to generate both the environmental awareness of residents and a positive attitude to the snow leopards
8	Compensation Program for livestock breeders and support of the construction of secure pens for cattle	decreased number of conflicts between herders and snow leopards

7. The implementation of programs for the snow leopard conservation in Kazakhstan

Financing activities of snow leopard conservation program will be implemented through the budget in accordance with the budget legislation of the Republic of Kazakhstan. Public funds may be established in accordance with the laws of the Republic of Kazakhstan to finance leopard conservation activities as well as other sources not prohibited by laws of the Republic of Kazakhstan.

Funding of priority activities for conservation of the snow leopard in Kazakhstan

(governmentand local budget only)

№	Priority projects	AmountUS $	Expected results/resources
1	- The deployment of monitoring system of the five population groups of the snow leopard and its prey animals with the participation of leading experts and locals.	**2014 r. – 20,000** **2015 r. – 33,500** **2016 r. – 33,500** **2017 r. – 33,500** **2018 r. – 33,500** **2019 r. – 33,500**	Getting missing information and scientific facts about the snow leopard, its behavior, nutrition,etc. in its habitat that will be the basis for planning of security measures and scientific expeditions / Public funding from 2015 / International financial institutions and funds of

№	Priority projects	AmountUS $	Expected results/resources
2	- Study of the influence of natural and anthropogenic factors on the population dynamics and the conversion or degradation of habitat of the snow leopard	**2014 r. – 20,000** **2015 r. – 33,500** **2016 r. – 33,500** **2017 r. – 33,500** **2018 r. – 33,500** **2019 r. – 33,500**	Kazakhstan
3	Expansion of international cross-border cooperation to improve security measures of species and its habitat	**2015 r. – 6,667** **2016 r. – 6,667** **2017 r. – 6,667** **2018 r. – 6,667** **2019 r. – 6,667**	Improving the security of cross-border population groups and key habitats, located directly on the border Public funding from 2015 / International financial institutions and funds of Kazakhstan
4	Development of ENO and feasibility studies required to address the expansion of existing areas and creation of new protected areas to protect the snow leopard	**2017 r. – 33,500** **2018 r. – 33,500** **2019 r. – 33,500**	After increasing protected areas they can better protect the snow leopard population groups and ecosystems at the level of at least 75% Public funding from 2015
5	Improving security measures of the snow leopard prey animals outside of protected areas	**2017 r. – 33,500** **2018 r. – 33,500** **2019 r. – 33,500**	Public funding from 2015 / International financial institutions and funds of Kazakhstan
6	The development of eco-tourism in the mountains and other forms of local employment	**2016 r. – 40,000** **2017 r. – 53,500** **2018 r. – 53,500** **2019 r. – 53,500**	The development of various forms of employment for people living near snow leopard habitats, such as the production of souvenirs, food, participation in tourism activities will reduce the burden on natural systems and will be another measure of the environmental awareness of local residents. Public funding from 2015 / International financial institutions and funds of Kazakhstan
7	Environmental education of population, promotion and dissemination of information through the media	**2015 r. – 20,000** **2016 r. – 20,000** **2017 r. – 20,000** **2018 r. – 20,000** **2019 r. – 20,000**	This will help to generate both a positive attitude towards the snow leopard as to an animal which plays an important role as an indicator of mountain ecosystems. Public funding from 2015 / International financial institutions and funds of Kazakhstan
8	Compensation Program for livestock breeders and support of the construction of secure pens for cattle	**2015 r. – 20,000** **2016 r. – 20,000** **2017 r. – 20,000** **2018 r. – 20,000** **2019 r. – 20,000**	Decreased number of conflicts between herders and snow leopards public funding from 2015 / International financial institutions and funds of Kazakhstan
	Total - $ US:	**1,009,835**	

Specific activities and funds for financing will be determined during development of sectorial programs for 2014-2019 on conservation of biological resources in RK

Implementing a set of measures aimed at the preservation of animals and its prey, as well as the environment in general, at the ecosystem level can help save the snow leopard in Kazakhstan. It is

necessary to take into account biological characteristics of the species, the nature of its spatial distribution and fragmentation of habitat. The main objective of the snow leopard conservation should be an elimination of the causes that reduce its numbers, and minimization of the negative impact of the factors leading to the degradation of suitable habitat. It is important to have an active and coordinated cooperation of regional territorial forestry and hunting inspections with the local population and with local authorities in order to convey the need to save the snow leopard habitats in the region.

Because the most important measure of protection of rare species and their ecosystems is an establishment of protected areas (PAs), in order to ensure the conservation of leopard groups in Kazakhstan in the long term, there is a need for additional protected areas. If you take look at the map of various protected areas on the territory of Kazakhstan, you can see that they are not covering many very important areas characterized by a rich biodiversity of wildlife. Sanctuaries in its protective functions are significantly inferior to nature reserves and national parks. There are no other types of protected areas such as nature reserves and ecological corridors within the habitat of the snow leopard in Kazakhstan. Functionally, the most effective type of protected natural areas is a state reserve. It corresponds to the highest category (Ia - Strict Nature Reserve: protected area managed mainly for science based on the international classification IUCN) and has a good scientific base and the most effective security functions. Ecological corridors in the situation with snow leopard and protection of its habitats in most of the areas can be a good and inexpensive solution to improve its protection.

8. Control over the implementation and results of monitoring

The laboratory of theriology of the Institute of Zoology initiated studies in the northern Tien Shan using photo-traps. In September, they received first pictures of various animals, including a snow leopard in Almatinsky reserve. Extensive research in Dzhungar mountain range and other important habitats of snow leopards in Kazakhstan is scheduled to commence.

Snow Leopard Fund began work on the monitoring of the snow leopard in the Katon-Karagai SNNP using photo-traps in October of 2012 with the support of the international agency Snow Leopard Conservancy. Research is carried out by experienced zoologists, national park rangers and volunteers, and local experts.

Monitoring of implementation using key indicators: the creation of a functional system:

1) expansion of protected areas to 75% coverage of snow leopard within Kazakhstan;
2) stabilization of population of species and its growth to the optimum of about 150 individuals;
3) development of tourism and other recreational infrastructure in mountainous areas;
4) minimization of conflicts related to predator attacks on livestock;
5) reduction of poaching to a minimum.

9. Cross-border cooperation with neighboring countries in snow leopard habitat

Snow Leopard is a "flagship" of the rarest animals in Kazakhstan, which promoted unity among professionals and large organizations tasked with high level planning to implement projects for the conservation of these unique species. A good example is the cross-border joint project of the Government of the RK / UNDP / GEF "Conservation and Sustainable Use of Globally Significant Biodiversity in Kazakhstan in the area of Altai-Sayan Eco-region", where the snow leopard and the Altai mountain sheep (Argali) are most important species.

In September 2011, an agreement was signed between the governments of Kazakhstan and the Russian Federation at the forum of inter-regional co-operation on an establishment of protected area "Altai", which covers the most mountainous part of the Altai with a mount Belukha, which is of great culturalsignificance to the people in the region. Important snow leopard habitat areas in Altai areincluded here.

Map 2: Distribution of protected areas and the snow leopard in East Kazakhstan (Altai and Saur-Tarbagatai)

The experience of organizing such trans-boundary protected areas needs to be carefully studied and used in the creation of similar projects in other territories. There is an urgent need to strengthen cross-border cooperation with China and Kyrgyzstan by means of carrying out joint projects and programs for the snow leopard conservation.

The most important areas for the snow leopard conservation at the border with China are: Saur + Tarbagatay, Dzhungar Alatau + Borohoro, Bayankol - Khan-Tengri + Tumor Feng (see maps of protected areas and the spread of the snow leopard in Kazakhstan).

Map 3: Distribution of protected areas and the snow leopard in the Northern and Central Tien-Shan

The most important areas for the establishment of trans-boundary protected areas and snow leopard conservation at the border with Kyrgyzstan (and China)

Khan-Tengri (Sary Jaz range in Kyrgyzstan + Bayankol river valley (Kazakhstan), where there is now a private hunting ground "Bayankol", belonging to LP " Shindal San". There is a discussion by Kyrgyzstan of creation of the national park on the slopes of Khan-Tengri peak, adjacent to the territory of Kazakhstan and China. From China part there is a protected area “Tumor Feng (Tomur).”

Map 3: Distribution of protected areas and the snow leopard in Dzhungar mountain range

PAs and promising areas for the development of cross-border cooperation at the border with Kyrgyzstan:

- Kungei ridge+ Zaili Alatau ("Chon-Kemin National Park in Kyrgyzstan + SNNP" Kolsay Kolderi "+ Ile-Alatau SNNP + Almaty reserve in Kazakhstan"

Map 4: Distribution of protected areas and the snow leopard in the Western Tien Shan

- Kyrgyz Alatau mountain range - the most important part for the snow leopard ecosystems conservation is of the high mountain range in the areas of the gorges of the rivers: Merke and its tributaries, Aspara (border with Kyrgyzstan) and the Natural Park Ala-Archa in Kyrgyzstan. There are no large protected areas such as nature reserves at this ridge of the Northern Tien Shan - just a small park Ala-Archa near Bishkek and two small reserves - Ak-Suu and Jarly Kaiyndy in Kyrgyzstan. Meanwhile, Kyrgyz Range was the main supplier of live snow leopards to zoos around the world. Animals were caught by order of Moscow zoo

complex. Vasilyi Smolin himself caught 54 leopards in the middle of this range. There are no PAs yet in Kazakhstan part of Kyrgyz Alatau. There is a need to speed up creation of a planned a few years ago National Park "Merke" in the Kazakh part of the ridge.

In the Western Tien Shan on the ridges: Talas Alatau and Sairam, Ugamsky and Karzhantau there are two protected areas - the oldest nature reserve in Kazakhstan organized in 1926 - Aksu-Zhabagly state reserve (128,118 ha.), and Sairam-Ugam SNNP (150,000 ha.). It is very important ecosystems reserves in order to protect snow leopards. They cover the far area of north-western boundary of this species habitat. This protected mountainous area is located at an altitude of 1300 to 4030 meters above sea level. These protected areas border Besh-Aral reserve on the Kyrgyz side, and Chatkal Reserve and Chatkal-Ugam National Park from Uzbekistan's side.

Western Tien Shan is a region of high biodiversity and was nominated for inclusion in the UNESCO list of natural heritage places, so it is very important to strengthen the development of trans-boundary protected areas to 100% to cover all of the snow leopard habitat in the region. Also, Western Tien Shan is important area for the conservation of such endangered species as the groundhog marmot (Marmota Menzbiri), Tien Shan or white-claw brown bear (Ursus arctos isabellinus), Central Asian lynx (Lynx lynx isabellina), Paradise Flycatcher (Terpsiphone paradisi), and many others animals and plants.

Table: Cross-border protected areas of Kazakhstan, where snow leopard ecosystems are protected:

№	Name of protected area (PA)/ Region	Type of PA (IUCN category)	Area (ra)
	Western Tien Shan		
1	Aksu-Zhabagly	SNR **(Ia)**	**128 118**
2	Sairam-Ugam	SNNP **(II)**	**150 000**
	Northern Tien Shan		
3	Almaty	SNR **(Ia)**	**71 700**
4	Ile-Alatau	SNNP **(II)**	**199 292**
5	Kolsai Kolderi	SNNP **(II)**	**161 045**
	Dzhungarian Alatau		
6	Zhongar-Alatau	SNNP **(II)**	**356 022**
	Saur-Tarbagataj		
7	PAs do not		
	Altai		
8	Katonkaragay	SNNP **(II)**	**643 41~~7~~7**
9	Markakolski	SNR **(Ia)**	**103 000**
10	West Altay	SNR **(Ia)**	**56 078**
	Total:	50 000 km ² of snow leopard habitat includes 4 reserves and 6 SNNP	**1 868 732** ra.

10. The strategy of cooperation

The following organizations will work on implementing leopard conservation program:

- Committee for Forestry and Hunting of the Ministry of Environment of the Republic of Kazakhstan.
- Committee of Science under Ministry of Education and Science of the Republic of Kazakhstan.
- Institute of Zoology of the Science Committee under the Ministry of Education and Science of the Republic of Kazakhstan.
- The regional territorial departments of leopard habitat of Forestry and Hunting Committee under the Ministry of Environment of the Republic of Kazakhstan.
- Protected areas of leopard habitat of Forestry and Hunting Committee under the Ministry of Environment of the Republic of Kazakhstan.
- Biodiversity Conservation Fund of Kazakhstan (BCFK).
- Snow Leopard Fund (SLF) and other environmental non-governmental organizations in Kazakhstan tasked with conservation of the snow leopard habitat.

- Various other international conventions, foundations and nature protection organizations.

Information sources and credits

Strategy for the conservation of the snow leopard in Kazakhstan. Kazakhstan Zoological Yearbook "Seleviniya", Almaty, 2011, pp. 7-29

- http://moxnpn.ru/kazakhstan/82-oxrana-prirody-i-racionalnoe-ispolzovanie-prirodnyx-resursov-- kazaxstana.html
- http://www.epravo.kz/urist/detail.php?ELEMENT_ID=6200
- http://ru.government.kz/docs/253.htm
- http://www.moxnpn.ru/kazakhstan/65-ledniki-kazaxstana-mnogoletnyaya-merzlota.html

Photo on page 1 - Snow Leopard, taken from 1.5 m in Dzhungar mountain range on January 11, 2010

Photo by Renat Minibaev, Tekeli, Almaty region, Kazakhstan.

Maps – O. Loginov

The text of draft NSLEP Kazakhstan in Russian author - Oleg V. Loginov,

Director of SNOW LEOPARD FUND,

Kazakhstan, Ust-Kamenogorsk,

tel: 8-72331-39347, mobile: 8-705-4616016

snow.leopard.fund @ gmail.com

irbisslc@yandex.ru

http://www.slf.kz

Kyrgyz Republic

National Snow Leopard Ecosystem Protection Priorities (NSLEP)Kyrgyz Republic(2013 –2023)

Bishkek 2013

Chapter 1.Assessment Of The Snow Leopard Ecosystem And Its Role In The Economy, Biodiversity, Spirituality/Culture, Indicated In Quantitative Data

For community

There are about 2% of world species of flora and more than 3% of the species of the world faunain the Kyrgyz Republic. Taking into account that the country occupies 0.03% of the area of the planet or 0.13% of the terrestrial parts of the world it is quite a lot. [1]

Locality of snow leopard covers quite a large area of Central Asia. In the Kyrgyz Republic snow leopard covers all parts of the country, i.e. in the Tien Shan Mountains and the northern ranges of the Pamir-Alay (Alay, Trans Alay and Turkestan ranges).

The total area of suitable for the location of the snow leopard in the country is estimated at 54,000 square km, which is more than ¼ of the country. The total area of the country is198.5 thousand square km,and more than60% of which are dissected by mountains rising from 500 m to more than 7000 m above sea level. About 40% of the total land area occupied by glaciers, permanent snow, rocks, scree, alpine desert detritus, etc. Consideringthat 90% of the country lies at an altitude of over 1.500 meters above sea level, it is clear that the essential role of ecosystems of the snow leopard in the Kyrgyz Republic in its socio-economic status. [2]

A significant part of the mountain ecosystems areas is used as summer pastures in livestock, playing a significant role in the economy of the country. Some high-mountain areas, located in the lee, protected from heavy rainfall, areas of relief, are used as wintering, where part of the cattle are wintered. The diversity of natural conditions determines the development of various types of grassland ecosystems. Middle-altitude steppe and savannoids (6367 ha), are prevailed among themand have a high economic value. There are alsoalpine and sub-alpine meadows (3,363 and 1,773 hectares), and low-altitude steppe savannoids (1956 hectares), with a corresponding economic capacity [2]. In general, the area of natural pastures of the country is estimated to 8.9 million hectares, occupying 45% of the total territory. Gross margin of pasture forage by year ranges from 2.0 to 2.4 million tons of feed units [3].

352.5 thousand tons of meat (live weight) were produced in 2012.Mainly, the increase of meat production related to an increase in the number of livestock – 300.6 thousand heads [4]. In many mountain areas livestock is the main or even the only source of income for the local population. Livestock gives meat, wool and dairy products. Sheep and cattle are the most developed areas of animal husbandry. Horse breeding is not too developed relatively to sheep and cattle breeding, recently yak breeding is being developed.

Highland and middle pasture provides forage not only for livestock, but also for wild animals such as argali, ibex, marmots and many other species.

For the country

The Kyrgyz Republic is an agrarian-industrial country. Agriculture and industry are profiling sectors of the economy. The share of agriculture for 2012 was 17.5% of GDP, the share of industry in the same period – 16.8% [5].

Exceptionally beautiful landscapes and peaks of the country attract climbers and tourists from all over the world. There are the world famous mountain peaks –VictoryPeak(7439 m above sea level), Lenin Peak (7134 m above sea level), KhanTengriPeak(6995 m above sea level) etc. The territory of the Tien Shan Mountains, which forms the several branches of the Great Silk Road, attracts a large number of tourists. Most of historical and architectural heritages, preserved in different parts of the country, are a special cultural value. In 2012 the number of tourists, who visited Kyrgyzstan has exceeded 1.6 million. Tourism is one of the important sectors of the modern economy.

The license for trophy and sport hunting, brings to the country's treasury about half a million dollars a year. With a proper organization, hunting can actually be a sustainable source of income for the country and local communities.

In the recent past, the country exported marmot skins. Currently, this species of mammals are used for commercial trapping in limited restrictedly. The local population uses fat of the marmot in traditional medicine and for the production of skin headdresses.

High mountain ecosystems are rich in wild plants that have a certain economic value. There are more than 4,200 species of higher plants in the republic, about 10% of which are endemic and subendemics. Among them – 1.600 of cumulative species, which include food plants – 400 species, medicinal – 200, honey – 300, decorative – 250, essential oil – 60, food – 60, tanning – 30, dyeing – 20, resiniferous – 15 and others[2].

High-mountain ecosystems, which are the main areas of snow leopard habitat, play an important role in the accumulation of precipitation, the formation of the slope and runoff, their regulation within the year, and it is closely related to the provision of water to the population of the country and the region as a whole. At the same time, the rivers are the source of enormous hydroelectric capacity. A number of hydroelectric power stations (HEP), built in Soviet times on the Naryn River, provide electricity not only to the Kyrgyz Republic, but also they cover the needs of neighboring countries. HEPs produce more than 90% of the country's electricity. Present time according to some estimates the energy capacity of the country has adopted only by 10%.

Cultural value

The Kyrgyz peopled has a rich cultural heritage, which has been developed over the centuries. The nomadic culture of the hill tribes that have passed from generation to generation is still preserved fragments, which characterize the attitude of this ancient people to the animate and inanimate nature. This clearly evidences in regard to the snow leopard, which the local Kyrgyz name –Ilbirs. It is also called “AkIlbirs”, which means “white leopard”. Only Kyrgyz people names the snow leopard as Ilbirs, while the majority of the nations of post-Soviet countries names it - “Irbis”.

The people kept the legend about the Kyrgyz hero, collector of people– Barsbek. It was hero, who lived in the 7th century AD andjoined the Kyrgyz people and preserved their independence, standing against external enemies. Present time the snow leopard has lost its sacred value. He is depicted as a symbol on the flag and municipal arms of the city of Bishkek.

In the last work of the world known Kyrgyz writer –AitmatovChyngyz“When Mountains Fall or eternal bride”heclearly describes the tragic fate of the snow leopard and the hunter for him. “A descendant of white leopard” film producedbyTolomushOkeev calls for respect for nature, preservation of balance among the components of the natural environment.

In the folk legends and fairy tales, ethnic and religious ceremonies and rituals moral motives, mobilizing people to respect for nature are also preserved.

Thus, the snow leopard lives in the vast territory across the country, wheredifferenteconomic activities are being developed. This is facilitated by the existing rich hydro capacity in the high parts of the rivers, which are planned to be used, deploying large-scale construction of HEP. In other words, the need for further economic use of natural capacityof the leopard habitathasno doubt.Considering that the state of the ecosystems of these areas determines the capabilities of this type in the future, requires the development and introduction of measures to preserve the optimal number of the snow leopards in Kyrgyzstan.

For the planet

The Kyrgyz Republic is located in the heart of Eurasia,itsarea is 198.5 thousand km ² and has borders with Kazakhstan, China, Uzbekistan and Tajikistan. Kyrgyzstan is surrounded by arid and extraaridplains of Central Asia. Its natural environment is experiencing harsh impact of the desert zone, which extends to the eastern hemisphere, from the Sahara to the Gobi. The distance from the nearest ocean (about 3 thousand km) determines the overall aridity and continental climate [6].

The rivers of Kyrgyzstan belong to the Central Asian draining basins: Aral, Tarim, Issyk-Kul, Balkhash. From the north and south they border with vast deserts. Total annual runoff is about 50 km^3, and the amplitude of the heights at which they formed and consumed items, ranging from 401 to 7.439 m above sea level. The well-being of the peoples of Central Asia are almost entirely depends on the rivers

originating in the high mountains, and ecological well-being of rivers is totally depends on the preservation of natural ecosystems in the zones of runoffs' formation.

Glaciers and snowfields on the mountain tops are significantly important for the water provision and regulating the climate of the region have. Within Kyrgyzstan, there are 8,200 glaciers with a total area of 8169, 4 km², occupying 4.2% of the country. The water capacity of glaciers in Kyrgyzstan is estimated at 650 km [7].

They are very important in forming the climate of the region, the country's economy, and in the preservation of biodiversity. Glaciers are also reservoirs and sources of fresh water and indicators of the environment.

The reservoirs of the country play a major role in providing water not only for our country's hydroelectric power plants, but also the agricultural lands of the Republic of Uzbekistan and the Republic of Kazakhstan, accumulating runoff and supplying fresh water during the irrigation season.

Thestreamhead beginning of the Syr Darya –oneof the two tributaries of the Aral Sea is the Naryn River. The heads of the Naryn River are on the slopes of the mountain ranges of the Inner TienShan. The river flows from Kyrgyzstan into the Fergana Valley, and then, to the territory of the Republic of Uzbekistan merges with the Kara-Daryariver, forming Syr Darya. These rivers provide irrigation water for cotton, rice and tobacco plantations in neighboring countries before reaching the Aral Sea. It should be noted that the growth of imports of cotton and tobacco is an important part of the economy of Uzbekistan. The Chu river, which heads are located in the highlands of the Inner Tien Shan, provides irrigation water for agricultural lands of the Republic of Kazakhstan.

The Sary-Zhazriver belongs to the Tarim Basin. It springs from the blanks of the Central Tien Shan mountain ranges. The entire flow of the river goes to the Chinese People's Republic.

The territory of Kyrgyzstan is a natural barrier between the flora and fauna of Kazakhstan, Uzbekistan and China, belonging to different biogeographic provinces. On the other side, the Tien Shan and Alay are the bridge between the fauna and flora of the Himalayas through the Pamir and Hindu Kush to the biota of Siberia, and in JunggarAla Tau and Altay –withbiotaof Mongolia. These two factors determine theextraordinaryand unique combination of elements of different floras and faunas, thereby defining the particular importance of biodiversity of Kyrgyzstan, and the necessity to conserve is obvious [8].

The Tien Shan and Pamir-Alay are included into the list of two hundred priority ecoregions of the planet. The highest concentration of species diversity, bothplants and animals, is here [9]. Thus, the number of species of vascular plants amounts up to 2-3 thousand on the area of 10 thousand km ². This highest concentration of species and communities is a characteristic of high-systems, not only in the relatively low, but in the mid-latitudes [10].

The wealth of biodiversity of the Tien-Shan-Alay mountain system is much higher than the wealth of biodiversity of the surrounding plains.

Rare and endemic species and subspecies of animals are presented here, among which the mainis leopard (*Unciauncia*), white-clawed bear (*Ursusarctos*), marmot (*Marmotamenzbieri*), relict ground squirrel (*Spermophilusrelictus*), Tien Shan birch mouse (*Sicistatianshanica*) etc.

There are a lot of plant communities and species, endemic and subendemicinmountain ecosystems of Tien Shan and Altay, which have a global significance. The western Tien Shan and South Prifergane are parts of the ancient Central Asian botanical and geographical center of cultivated plants origin. The specific populations of hexaploid wheat, small-seeded forms of pea (*Picum*) and chickpea (*Cicer*) are appeared here. White and yellow carrots varietal (*Daucus*), onion and garlic (*Allium cepa and A. sativum*), alfalfa (*Medicago sativa*), tulips (*Tulipa*) have been domesticated and primary arised. The Southern Kyrgyzstan is the center of diversity of the ancestral forms of fruit crops such as apple (*Malus*), pear (*Pyrus*), plum (*Prunus*), pistachio (*Pistacia*). There were cultivated apricot (*Armeniaca vulgaris*), almonds (*Amygdaluscommunis*), pistachio (*Pistaciavera*), walnut (*Juglansregia*), which form diversity, and at the present time a valuable raw material for plant breeding and the creation of new productive resistant to pests and diseases cultivars [2].

Terrain and natural resources, as well as the living natural communities, maintain the ecological balance define the natural wealth of the Kyrgyz Republic. The effect on the purity of water and air, soil

conservation and erosion protection, the production of oxygen, absorption and neutralization of repugnant substance, and accumulation of precipitation and uniform flow distribution, recycling of dead organic matter –numerous species of living organisms perform all these necessary functions.

Chapter 2.Raising awareness on the value of the ecosystems of the snow leopard and the mobilization of support for their conservation

Pastactivities

In order to revive the traditional knowledge of the harmonious coexistence of man and nature, which were important in the past and contributes to the sustainable development of the nomadic Kyrgyz people since 1999 the inventory and distribution of the learned traditions and skills are being carried out. The pastures use system can be an example, i.e. traditionally, Kyrgyz people shared pastures used for seasons to outrun summer, winter village pastures and spring-autumn intense. At the same time, much attention is given to the study of the habits and seasonal characteristics of biodiversity, and even the hunting of wild animals was regulated by the seasonality of their biology (hunting is strictly prohibitedat the time of reproduction and breeding.)

With the aim of environmental education of future generations the school clubs such as “Friends of WWF”, “AkIlbirs” were established and developed. Regular meetings and competitions for school clubs, as well organization of summer environmental camp, based on SarychatEertash Reserve, where children from different parts of the country share knowledge and skills of respect for nature are being conducted. Thus, regular environmental festival “Land of Snow Leopard” with participation of local communities of the Central Tien Shan is initiated and holds.

Futureopportunities

As the issue of snow leopard conservation in Kyrgyzstan has gained high interest of many donors and international organizations, there is an opportunity of a raising awareness of ideas, even at the level of sub-national ideology. Taking into account the forthcoming global summit on the snow leopard conservation on the Earth, to be held in August 2013 in Kyrgyzstan, there is great hope that it will provide an additional opportunity to attract attention to the issue of global importance of the specie of the world community and the local population.

There is a chance to develop a program to raise awareness about the importance of conservation of the snow leopard in the framework of the development of new programs for the conservation and study of the snow leopard.

The activities on promotion of a network of conservation of the speciescan involve the State Agency on Environment Protection and Forestry under the Government of the Kyrgyz Republic (SAEPF), non-governmental environmental organizations in the Kyrgyz Republic, representatives of international environmental organizations, such as: NABU (Nature Protection Union of Germany) SLT (Snow Leopard Trust, an organization for the protection of snow leopards), WWF (World Wildlife Fund), FFI (Fauna and Flora International), UNDP and others.

Chapter 3.Threat assessment, both traditional and new, coming from infrastructure development, market demand, tourism and climate change for:

Snowleopard

For humans, the snow leopard is not only a symbol of wildlife, but also the product of income, which leads to direct threats to the existence of a snow leopard:

- direct destruction of the snow leopard forskins and other derivatives;
- changes in prey due to uncontrolled hunting, increasing the number of hunting industry with capital structures for rest and overnight of hunters are a constant factor of concern;
- conflict with the interests of pastoralists when the traps snapped the leopards instead of wolfs, dogs are in flocks contribute to finding a leopard, the mere presence of dogs act as a factor of concern;
- habitat destruction and fragmentation of habitats.

Kyrgyzstan held the hunting tours for foreign hunters, mostly for Pamir argali subspecies (Marco Polo sheep) and Siberian mountain goat.

It should be noted that for the successful conservation of the leopard it is necessary to save not only large hoofed animals, but also a sufficient number of marmots, hares and birds, which serve as additional feed.

The Governments strengthen their national borders, which in many cases go in high-altitude areas, covering leopard habitat. This increases the number of border posts and the number of employees at the borders, who are also involved in illegal hunting. In some cases, the strengthening of borders is achieved by installing anti barbed wire to prevent the migration of wild animals.

Ecosystems (mainly the Himalayas and Karakoram mountain ranges of Central Asia, the Tien-Shan, Pamir-Altay, Altay-Sayan, Gobi, Eastern Himalayas, Tibetan Plateau)

The main cause of degradation of mountain ecosystems isexcessive overgrazing.Growth in the number of livestock leads to overgrazing and degradation of pastures, and to the growth of the conflict between man and predator, the transmission and distribution of diseases. Overgrazing has led to the degradation of pastures, competitive displacement of ungulates, whose numbers declined dramatically. Following the reduction in the population of wild ungulates sharply reduced the number of leopards, vultures and other birds of prey in the Red Data Book.

Since the 50's of the past century, in Kyrgyzstan the number of cattle has increased to 10-12 million head, the grazing culture was broken. Exceeding grazing standards increased by 3-8 times in the summer pastures and by 13 times on winter pastures. As a result, there are a degeneration of pastures and development of erosion processes everywhere. After a sharp decline in the number of livestock in the early 90s its numbers began to grow again and now exceeds 5 million heads [4]. Over the past twenty years distant pastures have not recovered to its original condition, and neighboring pastures were further exposed to grazing.

Currently the average productivity of pastures goes down to 40% of the norm, and of the middle pastures – to10-20%. The structure and species composition of herds doesn't contribute to the rational use of pastures. The procedure established pasture lease when remote pastures are managed by the regional authorities, the intensive use of pastures – run by the district, and direct holders of cattle are only village pastures, destroys the system of transhumance, allowing more steady use of various pastures categories and more relevant the fodder and seasonal characteristics rangeland ecosystems.

Kyrgyzstan is rich in mineral resources and has a developed mining industry. Most of the resources are located at a relatively high altitude (including copper and gold mines) and pose a direct threat to vulnerable mountain ecosystems, destroying the habitats of animals and plants, polluting streams and groundwater. Open mining's destroy the vegetation cover and blasting operations are a factor of concern of many animals.

The increase in value of mining is a potential threat to the ecosystem of the snow leopard. It is a threat to the integrity of the protected areas. For the development of the mining industry and the profit the Government started the practice of exclusion of the SPNAs in favor of mining. As an amendment to the Land Code of the country a new category of "land for the use of mineral resources" is included.This includes lands of protected areas, where explored mineral deposits. The appearance of this new category of land is not conducive to the preservation of ecosystems of the snow leopard, but rather creates great conditions for their destruction.

The development of the mining industry is accompanied by the construction of roads, power lines, bridges, etc. All this leads to an increase in fragmentation of wildlife habitats and to the growth of human

disturbance. The development of the mining industry in the country leads to the development of infrastructure in remote areas. The most of private companies build new roads, bridges, power lines and improve old ones to carry out mining and geological survey. The private hunting reserves, tourism companies are also interested.

For the economic development of the country it is planned to build a railway connecting China, Kyrgyzstan and Uzbekistan. The railway will pass through the critical habitat of mountain ungulates. At the same areas the Government plans to build several large-scale hydropower: Kambarata-1 (1900 MW) and Upper-Naryn cascade hydropower plant (101 MW) [11].

The most of the planned projects will be carried out in remote mountainous areas of the country, which have an adverse impact on the alpine ecosystem.

While natural ecosystems preserve the composition and structure similar to the original, they can respond flexibly to the heterogeneity of the mountain environment and climate variability. According to the prognosis of experts in the climate change sphere, it is expected an increase of annual temperature in the range 2,5-3,0 º C and an increase in annual precipitation by 10-15% in comparison with their values in 1961-1990 in Kyrgyzstan by 2100 [12] .

The vegetation is the most vulnerable to the global climate change, i.e. plant species and communities that have small ecological amplitude – the species included into the Red Book, rare, endemic, with a shrinking habitat. According to the scenario assessments of climate change, developed byL.I.Titova (2002) on the territory of Kyrgyzstan, apparently, there will be a significant shift of the boundaries of natural belts due to expansion of desert and steppe ecosystems, including steppe meadow ecosystems.

Catastrophic changes in species composition of the biota will happen. Increase of temperatures will be offset by an increase in humidity and mountainous terrain. Many species of plantsand dominants have a wide ecological area and in the course of evolution they have adapted to life with a minimal atmospheric moisture and high temperature contrasts. Almost all kinds of animals are characterized by natural, developed in the course of evolution adaptive capabilities, allowing them to either migrate to places with more favorable conditions, or change the terms of the daily or seasonal activity [13].

The Publiccommunity

Construction of new roads will improve the living conditions of the local population, but it can have a negative impact on the environment. They can reduce the period of delivery of local products (agricultural products) to the central markets, improve the economy of local communities, but they also can contribute to the intensive penetration of hunters, shepherds and tourists deep into the mountain.Disturbanceof animals will increase. Improvement of infrastructure in remote areas will give an impetus to the growth of the population of high mountains. Population growth may be accompanied by an increase in the number of livestock, pasture expansion of the boundaries, the spread of disease, etc. Growth in the number of cattle may lead to increase of conflict between humans and predators, livestock and wild ungulates.

Chapter 4. Review of the above threats

Application of generally accepted best practices (mainly for traditional threats)

In order to ensure the conservation of the unique biodiversity of the region and does not conflict with the objectives of socio-economic development of the country, it is necessary to increase the number of protected areas and to create a unified ecological network, the main components of which will not withdraw from nature, and combine the functions of nature protection and economic development. To solve this problem in the framework of GEF-UNEP-WWF “Econet-Central Asia” (2003 to 2006) GAP analysis was conducted and the scheme "Econet" for the countries of Central Asia and the Kyrgyz Republic was designed, which is at the regional level was approved in 2007 during the meeting of the Intergovernmental Commission on Sustainable Development (ICSD).

For the first time as part of the GEF / UNDP “Sustainable Pasture Management in Suusamyr Valley” Project a plan of grazing was developed. It takes into account migratory corridors of wild animals.

The Snow Leopard Enterprises Programme, which started in the villages Enilchek and Ak-Shyyrakgenerated income to the local population and, at the same time, played a positive role in the conservation of the snow leopard. Participants of the program from the local population signed a contract and receive environmental material remuneration subject to the terms of the contract. The country began the study with the use of camera traps leopard and genetic methods. The monitoring with use of the international methodology SLIMS is conducted.

An inventory of hunting lands is conducted, the introduction of GIS data management monitoring in the framework of the GIZ project on sustainable management of mountain ungulates in the Kyrgyz Republic.

Such traditional threats as overgrazing, illegal hunting of ungulates and predators can be reduced through the implementation of programs aimed at work with local communities. The implementation of such incentive programs as pasture rotation, where local shepherds and people are rewarded for compliance with the terms of use of certain pastures and for compliance with the established limit on the number of livestock, can help to solve problems. Environmental programs such as the “local protected area” can be successfully and easily implemented with the support of the public or private donors. In order to reduce the negative attitude of the local population to the leopard associated with poor socio-economic development of the territory, it is necessary to make arrangements for its development. Thesemeasuresshouldhelptoreducepoaching.

Development, new responses (for new threats), where necessary,including pilot projects

The adoption of the law on SPNA, including migration corridors and transboundary protected areas, land transformation of SPNA in other categories. The Law on Protected Areas says that changing the status of protected land can be upward to conservation status, and there no way can be changed to the downside. Expanding the network of protected areas from 4% in 2005 reached 6% - in 2013.

In order to implement the signed agreement of intent on cross-border implementation of Econet, since 2009 WWF launched a model of creating an ecological network in the Syrtecosystemsof the Central TienShan.Under the design of Econet in Kyrgyzstan 8 significant natural landscapes and have been determined and approved at the national level.As the priority one of the most important eco-regions of Kyrgyzstan "SyrtyofCentral TienShan” was determined [2]. As part of this WWF / USAID project supports initiatives to protect the snow leopard and its prey in the Central Tien Shan. This support will continue until 2017, and its aim is to increase the capacity of protected areas and biodiversity monitoring, development and implementation of a mechanism for sustainable development of protected areas that support local communities in the development of environmentally-oriented income-generating activities, environmental education, and anti-poaching activities.

The project of creation of an ecological network of WWF in Central Tien Shan has been integrated into the mid-size project to improve the coverage of protected areas in the central Tien Shan, approved by the GEF. This project will be implemented by the UNDP. The project is expected to support the creation of the Khan-Tengri natural park, improvement of management of protected areas of the Central TienShan and application of methodology for assessing management effectiveness (METT), a regime of migration corridors between them. Moreover, except of the above objectives, the project will draw attention to the improvement of the social situation of the population of nearby areas to protected areas.

With the support of FFI, a management plan of Sary-Eertash public reserve and National Strategy for conservation of the snow leopard for 2013-2023 was developed.

Local communities in the framework of implementation of the above projects are actively involved in decision-making, especially when it comes to actions related to the places of their residence.

Cross-border cooperation (the countries of involved areas). Parts to enable the corresponding NPCSL)

The Kyrgyz Republic pays a special attention to issues of international cooperation aimed at effective cooperation with neighboring countries in the implementation of multilateral and bilateral agreements to address cross-border issues in the field of environmental protection and rational use of natural resources.

In 2007, an agreement of intent between the ICSD and the Central Asian Programme of the WWF's "Econet" in the region was signed (Decision of the ICSD number 3 from 16 November 2007, Bishkek). At present, in the framework of the WWF model projects in Central Asia, an ecological network that will include protected areas in the landscape of the region is being established. At the same time, the possibility of combining environmental concerns and the needs of economic development with the help of ecological corridors and the creation of areas with sustainable and environmentally friendly alternative of natural resources beyond the current system of protected areas is created.

In order to implement the Decision of the Parliament Committees of the Kyrgyz Republic [13] the last convocation of Issyk-Kul Oblast State Administration decided to organize the "Khan Tengri" natural park in szyrts of the Issyk-Kul area on more than 187.0 thousand hectares, which directly borders with the Republic of Kazakhstan and the People's Republic of China [14].

With the assistance of the Government of the Federal Republic of Germany (FRG) and the German Society for Nature Conservation (NABU) trnsborder project - protection of biodiversity "Mountains of Northern Tien Shan" for the period of 2013-2016 was developed and going to be launched. In the framework of this project it is planned to organize trans-border protected area at the junction of the existing state parks:"Chon-Kemin" (Kyrgyz Republic), the National Park "Chew-Or" and the Almaty Reserve (Republic of Kazakhstan).

The organization of the above-mentioned trans-border protected areas, as the main habitat of the snow leopard, have been included in the Programmes of intergovernmental cooperation between the Kyrgyz Republic and the Republic of Kazakhstan, toconserve the biodiversity.

Chapter 5. Organization, empowerment and support

National institutions involved in activities on the Snow Leopard conservation: the advantages and disadvantages to be eliminated

State Agency on Environment Protection and Forestry under the Government of the Kyrgyz Republic and the SPNA.

Advantages

According to the Regulation on the State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic, adopted by the Governmental Decree on February 20, 2012 No. 123, the State Agency on Environment Protection and Forestry under the Government of the Kyrgyz Republic is a state executive body for the implementation of the policy and regulation of relations in the field of environmental protection, environmental safety and environmental management.

SAEPF under the Government of the KR is an acting Administrative Authority of CITES, in accordance with Article IX (1) a) of CITES. This administrative authority has the responsibility for issuing permits, correspondence with the CITES Secretariat and other Parties to CITES compliance and reporting requirements. According to the provided information, the capacity of the authorized body is actually weak due to the lack of sufficient staff and poor command of foreign languages.

In addition, the Department of hunting of the SAEPF regulates the use of hunting resources and control over hunting. The Department maintains issues of all kinds of hunting permits and monitors compliance with both legal hunting and poaching prevention.

Disadvantages

The current status of the State Agency (under the Government) does not meet the requirements of international organizations and foreign partners - foreign donors to prioritize environmental issues in

government policy, which may lead to reduction in investment grants for environment protection of the Republic.

Considering that environmental security is a strategic component of national security, as well as to strengthen coordination mechanisms for the integration of environmental aspects in cross-sectoral policies, observance of the ecosystem approach, it is recommended to give the State Agency for Environmental Protection and Forestry under the Government of the KR - the status of the State Committee for Environmental Protection and Forests Development.

State Inspectorate for Environmental and Technical Safety of the Government of the KyrgyzRepublic

Advantages

According to the provisions of the State Inspectorate for Environmental and Technical Safety of the Government of the Kyrgyz Republic, approved by the Government of the Kyrgyz Republic of February 20, 2012 No. 136, the objective of the Inspectorate is to implement public monitoring to ensure compliance with the standards and requirements of safety of life and health of people, animals and plants, the environment and the prevention of negative impacts.

Implementsthecontrolover:

Conservation, reproduction and restoration of flora and fauna, including the securities, as well as endangered and listed in the Red Book of the KyrgyzRepublic;

Fulfillment of commitments under the Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES (CITES), in terms of import and export in (for) the limits of the KyrgyzRepublic;

Identification, termination and preventionof violations of the rules, terms and methods of hunting, hunting products and the use of other illegal activities detrimental to the fauna and flora.

Disadvantages

Lack of inspectors and weak material and technical base;

Corruption in law enforcement agencies, which are passed acts to arrest poaching;

Weak environmental monitoring by the inspection.

Biology and Soil Institute of the NationalAcademy of Sciences of the KyrgyzRepublic

Advantages

A large information base on wildlife species and their characteristics;

Quick exchange of information with the structural departments of SAEPF.

Disadvantages

The outflow of skilled game managers and zoologists due to lack of funding;

Lack of proper attention from the Government to the problems of environmental protection;

Lack of laws coordinating inter-institutional action services.

The legal framework for the protection of the snow leopard and its habitat

Advantages

The Constitution of the Kyrgyz Republic is the basis for all the environmental legislation of the Republic, according to which the land, its subsoil, air, water, forests are used in order to maintain a single ecological system as the foundation of the life and work of the people of Kyrgyzstan, and are under the special protection of the Government.

The KyrgyzRepublic joined to 13 international environmental conventions, which fulfillment predetermines the review of national legislation and, in general, policies in the field of protection the environment and natural resource management.

Relations in the field of protection of the snow leopard and the rational use of natural resources are administrated by the laws of the Kyrgyz Republic "On Environmental Protection" (1999), "On Specially Protected Natural Areas" (2011), "On Environmental Impact Assessment", "On fauna ", "On the Protection and Use of Flora", "The Biosphere Territories in the Kyrgyz Republic","On the rates of payment for use of animal and plant life" (2008) and other related and regulations of the Kyrgyz Republic.

Disadvantages

Environmental legislation requires continuous improvement in order to stabilize and create an enabling legal and institutional environment for its compliance with the international commitments.

In the framework of existing laws and regulations in the country there is no clarity in the legal relations in the field of conservation of the snow leopard, which often hinders the full implementation of environmental activities.

In accordance with Article 42 of the Law of the Kyrgyz Republic as of August 9, 2012 No. 160 "On Subsoil".

Organization of specially protected natural areas within the boundaries of the State Fund of mineral resources and the State Reserve lands mineral deposits, without the consent of the authorized state body for the implementation of the state policy on subsoil use is not allowed.

In accordance with paragraphs 4 and 5 of Article 28 of the Land Code of the Kyrgyz Republic, in the case if on the land mineral reserves will be found, the Government of the Kyrgyz Republic on the proposal of the authorized state agencyon the implementation of the state policy on subsoil use, decides about the transfer of these lands to the category of land of government reserve of mineral deposits. If the land on which a mineral deposit is found,and it is owned or used by the third parties, the Government in case of a decision on their mining and land withdrawal has to compensate the owner or land losses or give other equivalent land.

Compliance with the law on the protection of wildlife and combating to violations: current activities and areas requiring improvement.

The situation with the decreasing number of the snow leopards related to illegal hunting, and today considered as critical. While the population is still able to largely compensate the damage done by poachers, but its reproductive potential is fully spent on keeping the number at current level. Illegal hunting of ungulates, in the habitat of the snow leopard, dramatically reduces their forage supply. Due to the lack of inspectors and weak material and technical base of anti-poaching activities of State Inspectorate on environmental and technical safety in this field is weak.

Department of hunting under the State Agency of Environment and Forestry, on average per year identifies 550 breaches of environmental legislation n the sum of more than one million Kyrgyz soms, and exempts 35 hunting weapons [15].

In Naryn and Issyk-Kul regions the public mobile anti-poaching “Bars” NABU and “WWF” teams function, they supported by international environmental organizations. Due to the corruption of law enforcement, not all cases are identified and disclosed poaching, illegal possession; sale and trafficking are brought to court.

The most effective way to combat poaching and the prevention of smuggling of biological resources is the establishment, jointly with representatives of international environmental organizations and representatives of local communities, of specialized mobile anti-poaching teams in 7 regions of the country. First of all, the established anti-poaching teams have to protect those habitats of the leopard, where there poaching mostly. The objectives of such an inspection should include not only the inspection activities, but also the involvement and coordination of the police, customs, special services, prosecution, involving civil society organizations and local communities. Considering that the most part of the area of the snow leopard in the territory of a special border regime, a special attention of the anti-poaching teams has to be concentrated jointly with the border guards. All cases of identified and disclosed poaching, illegal possession, sale and trafficking need to be brought to court and the results of trials should be informed through the media resources.

The legal framework for the empowerment of local communities on joint management of wildlife and habitats; current activities and areas requiring improvement

Empowering local communities to joint management of wildlife and habitats are reflected in the decisions of committees of the Parliament of the Kyrgyz Republic: "On Agriculture and Ecology," "On regional development of local self-government" as of June 23, 2009 and in the draft law "On Hunting" which provides:

- Reinforcing the hunting areas on the basis of a local state administration in consultation with the local authorities

- In order to develop the structure of hunting with the involvement of the local population and its economic interest, the distribution of funds received from the hunting the following: 30% to the public budget, 20% to local governments at the place of hunting tours, 35% for conducting biotech and conservation measures by the hunting areas users, 15% to the Republican Fund for Nature and the development of forest ecosystems (RFN) to support the protected areas.

Local communities living in remote mountain areas should be aware of the environmental and socio-economic importance of living of rare animals, including the snow leopard.

Public employees of environmental organizations are obliged to work for the protection of these animals, to raise awareness among local administrations, local authorities, communities, entrepreneurs, businessmen, farmers, local non-governmental organizations and, especially, shepherds and hunters.

The Kyrgyz Republic actively cooperates with the Global Environmental Facility (GEF) at the expansion priorities and joint management of wildlife. Through the implementing agencies (UNDP, UNEP and the World Bank) there is an exchange of information and recommendations for changes to the regulatory framework of the Kyrgyz Republic and their changes as a whole. But the main function of the Global Environmental Fund is to support government initiatives aimed at the development and management of wildlife through the allocation of grant funds and co-financing of projects in the field of environment.

Support mechanism for the construction of public organizations: current activities and the need of their strengthening

In Kyrgyzstan, there is a system of public organizations working in the field of nature protection, protection of rare and endangered species of plants, including the protection of the snow leopard.

Current activities of these organizations are primarily concerned at the work of the local population, their training and environmental education. Thus, it is very important to conduct public awareness activities among local communities living near the habitat of the snow leopard.

To enhance the role of NGOs in the protection of the snow leopard, there is a need to create a network of environmental organizations, whose main objective will be coordination of the work of NGOs in the field of the snow leopard conservation, preservation of the quality of its habitat and forage resources. Moreover, there is a need to increase the capacity of civil society organizations in the field of protection of the snow leopard.

Thus, the consolidation of the efforts of the public in protection of the snow leopard is possible via:

- consolidation of the efforts of non-governmental organizations for the protection of the snow leopard, the territories of their habitat and forage resources through the creation of the network;
- contribution to national and international policy on the protection of the snow leopards and other species included in the Red Book of Kyrgyzstan;
- distributebest experiences on protection of thesnow leopards and other species included in the Red Book of Kyrgyzstan.

Chapter 6.Research and training of personnel

Development and implementation of programs for scientific and technical education and training on measures for the identification, conservation and sustainable use of ecosystems, their components and support in education and training to meet the specific needs of the snow leopard

The Kyrgyz Republic has 52 institutions of higher education, 31 of them are public and 21 - private. Universities such as the KNU named after Zh.Balasagyna, BHU named after K. Karasaeva, KRSU, KSU named after Sh. Arabaev, KNAU named after Skryabin and others prepare specialists in the field of environment and natural resources and related fields. In addition to government and commercial institutions, international and non-profit organizations contribute to the training of personnel in the field of biodiversity and nature conservation.

In the framework of this education students gain knowledge in the field of environmental management, protection of ecosystems, protection of rare and endangered species, including the snow leopard. Despite this there is a shortage of qualified staff in the public environmental and forestry institutions and its regional offices. The system of training of more specific profile, directly to areas of nature conservation in Kyrgyzstan is weak.

As part of a national strategy for the conservation of the snow leopard, one of the priorities is to train specialists in the field of "Management of Protected Areas" aimed at sustainable development and conservation of the unique biodiversity of protected areas.

Cooperation in the use of scientific results, obtained during the research

The National Academy of Sciences of the Kyrgyz Republic is the leading scientific organization in the country, which institutes are engaged in the protection of the environment. On the initiative of the National Academy of Sciences the Council for Co-operation in the basic sciences of the CIS countries id established. Council helps to create the conditions for the legal, organizational and financial support of basic research and the effective implementation of any innovative research projects, regardless of their development [16]. Different universities, industrial research institutes, NGOs, and international organizations, projects also conduct studies and researches.

Scientific magazines published in the country are distributed to libraries, local and foreign subscribers. Scientific articles are mostly published in Russian and Kyrgyz languages. Unfortunately, scientific articles, which were published before the 2000, do not have electronic versions and were not preserved by certain databases. Until today, the country lacked an electronic library. Electronic Library, which is in the process of creation, has a small amount of data. The data stored in the electronic library of the country are mostly in Russian. Many reports of research projects carried out since the 2000 by international donors are written in English. But unfortunately they are in limited edition and most of them are not available in many libraries in the country.

Most of international organizations and NGOs that are engaged in research have web pages that post their reports. Also, some of them engage in e-mailing the information to interested subscribers.

A huge database of literature on the snow leopard of the Snow Leopard Network (SLN) is available to all interested parties, but because of its lack in Russian language it is visited only by Russian-speaking readers. The Snow Leopard Network, where registered members receive a newsletter of published research materials on a leopard has only 4-5 active members of Kyrgyzstan.

Scientific cooperation includes the following types of interaction:

- Extensive use of computer technology in the field of environmental protection;
- Exchange of experiences between the participants of the Regional Environmental Centre for Central Asia and its partners (UNDP, Asian Development Bank, European Bank for Reconstruction and Development, the World Wildlife Fund, etc.)
- The most accurate evaluation of the results of cooperation
- Optimization of information processes
- An analysis of the results
- Creation of a unified electronic database for the assessment of natural resources, based on the available scientific results
- Creation of web-site of the snow leopard (which will reflect the data of the various activities for the conservation the Leopard) [17]

Equipping video observation technique of environmental positions that will operate on-line.

Chapter 7.Multi-stage implementation plan associated with understanding and protection

Snow leopard population and / landscapes, which conservation is a priority

At present time population of the species has good quantitative indicators in the Central and Inner Tien Shan to compare with other parts of the country. Studies conducted in the Sary-Ertash Reserve revealed dense enough population figures. Survey data also give good results in other districts of the Central Tien Shan. The population of the snow leopard in the TeskeyAla Too has more or less satisfactory condition, while KyungeyAla Too population status remains unknown. Perhaps, there we have an isolated local population that has lost contact with the rest population of the rest populations. KyungeyAla Too has a relationship with the population of Kazakhstan Trans-Ili Alatau. To evaluate its relationship with the Central Tien Shan population or to the population of the Kyrgyz range it is necessary to study in the eastern part of the Northern Tien Shan and between KyungeyAla Too and the Kyrgyz range.

According to survey data, the population of the species in the Kyrgyz range also has good quantitative indicators. It seems that the population of the snow leopard of the Kyrgyz range has a relationship with the West Tien Shan population through TalasAla Too. Data from several Western Tien Shan SPNAs indicate the existence of a viable population of the leopard in the western Tien Shan.

For a more complete assessment of the number of population of the species it is necessary to conduct research in the Pamir-Alay, Ferghana, Chatkal, Chandalash, Talas Turkestan, Alay and Trans-Alay Range, as well as in the Inner Tien Shan.

Ecosystems of the snow leopard

Ecosystem diversity is distributed unevenly across the country. It is represented mostly in the Western Tien Shan and the Central Tien Shan biogeographic regions, 16 out of 20 classes of ecosystems, or 72.7% of all their diversity. Among them the poorest are Fergana and South Kazakhstan regions, which represent only 3-5 classes of ecosystems, which is 22.7%. There are 13 classes of ecosystems - 59.1% in Alay, the North Tien Shan, Issyk-Kul and the Central Tien Shan regions have on 10 classes of ecosystems - 45.4%.

The snow leopard is a typical representative of the alpine fauna associated with the alpine and subalpine zones of the mountains of Central Asia. Ranges, where there are animals are characterized by the steepness of the slopes, deep gorges and rock outcrops. The Snow Leopard may occur on more relief areas, where there are convenient ways of movement along the ranges with shrubs and rock slides. Usually, the snow leopards remain above the timberline, but in the winter they may be found in the forests.

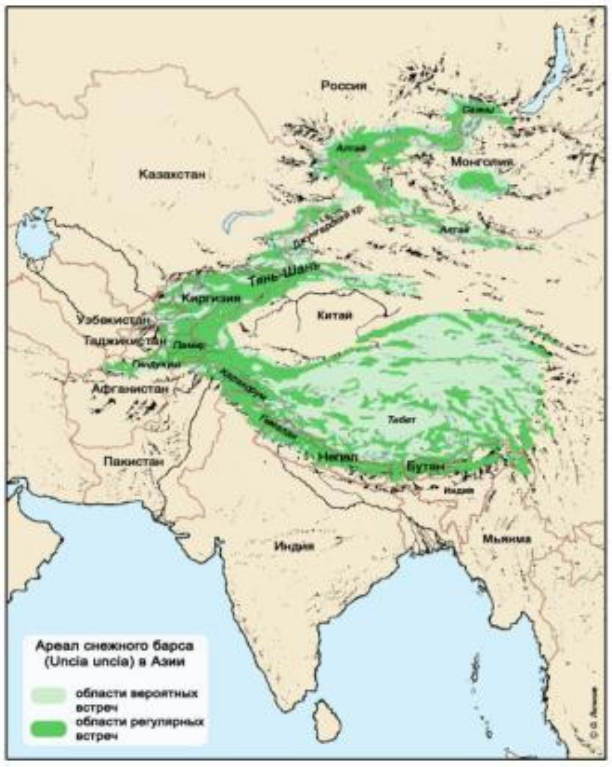
Table1.Table of the snow leopard population in the world [17]

Title	Year	Number thousands	Source
Worldwide data on the snow leopard	1992	4510-7350	D.L. Fox 1994
	1999	4500-7500	P.Djekson1999
	2003	4500-7350	T.M. Mccartney, and G.Chaparon 2003
Kyrgyzstan	1989	600-700	Koshkarev E.P.
	2000	150	Koshkarev E.P.

Community

In recent years, the efforts of communities, who live in the habitat of the snow leopard, in the field of protection of the environment and biodiversity have increased significantly. As an example, it can be mentioned thecommunitiesofInner and Central Tien Shan, which created the Councils on the ecology and delegated them the authorities to control protect environment. In particular, the control is carried out over the companiesorganizing the trophy hunt and other hunting routs. They justify that they are the direct owners of these resources and have expressed interest in their preservation.

Map of habitat of the snow leopard [18]



Communication

Communication – it is one of the most important factors of development of humans' ecological awareness. It appears through the following actions aimed at humans' optimistically function and wild life. One such action is ecological education and increasing of public awareness of local population.

In order to realize of communication conducted trainings and circle tables for next representatives:

-Representatives of ecological NGO

-Activists of local population

-Local government's staff

Supporting of "NABU" will plan the production of a documentary film about snow leopard in Kyrgyz Republic, with foreign camera operators on highland landscapes. Realization of information awareness of local population through Mass Media (Internet, TV and radio broadcasting, publishing of newspapers and journals). The Groupof "snow leopards friends" will be created, that conducted the educational actions in regions and make attention to the problems of local population on snow leopard conservation. It's planned to carry out the performances in preschool.

Besides with supporting of Ministry of education and science integrated the course of «Extinction species protection» in standard of natural faculties of universities of Kyrgyz Republic. Conducting of thematic exhibitions in large cities and frontiers on snow leopard conservation. In the bevel of Global Forum instituted official site - www.akilbirs.com. Site demonstrated all necessary information:

-Conducting of Global Forum

-Problems on snow leopard conservation and its ecosystems

-Actions, that dedicated to snow leopard

Jointly with Ministry of transport and communication and National Academy of Science of Kyrgyz Republic, and also supporting of international organizations (FFI, WWF, NABU) plans to distribute booklets, postcards and stamps for propaganda on rare species of wild life protection in Kyrgyz Republic.

International Young Conference "Snow leopard conservation – it is approach to sustainable development" organized June 6, 2013. In International Young Conference took a part the students of universities of Kyrgyz Republic. Sessions conducted on the different thematic ways that pointed not only problems on snow leopard conservation, but the problems of ecology and nature management.

Summary record of International Young Conference made conceptual document - Young peopleRecommendationsontheConservationofSnowLeopards andTheirHigh-MountainEcosystems.RealizationofYouthConferencetookapartgovernmentserviceSAEPF that directedtoestablishandsupportofcommunicativepolicy of population.

JointlySAEPFandinternationalorganizationstoconductecological actions:

-MarchingofParks 2013 – demonstrationof Nature Reserves problems and their supporting

-Festivalof "Snowleopardsland" invillageofEnilchek–pay attention of population of Issyk-Kyli to extinction of snow

Implementation of public actions to set up cooperation projects, increasing of awareness of local NGOs, supporting of interaction with local governments. This is done to develop propaganda programs aimed toward snow leopard conservation and impacting the ecological consciousness of community.

Chapter 8.Monitoring of the implementation and results of monitoring

Scientific monitoring of the snow leopard, its habitats and the threats to its existence: current activities and areas requiring improvement

Monitoring of the snow leopard population in the country covers only a small part of the total area. Annual data of SPNAs and hunters of country give an indication of occurrence of the species in different parts of the range. Unfortunately, these data do not provide reliable data on the population structure, abundance, habitat, etc. There is no uniform system for collecting information on the leopard. Collection of information is necessary to cover the key areas of distribution leopard. Thus it is necessary to develop a system of survey and data collection, identifying the data collection period, the area covered by the district, etc. It is necessary to establish a system to collect information and to connect it to all potential parties (students, graduate students, hunters, the committee pastures, shepherds, media, etc.).

It is important to start studies using new technologies such as camera traps, genetic research, radio telemetry, habitat mapping and database in GIS, etc. It is necessary to start work on the threats assessment. Unfortunately, the country has not yet assessed the threats.

According to the National Strategy for the Conservation of the snow leopard for 2013-2023 it is required to solve a number of problems in the field of scientific monitoring, including monitoring of the snow leopard:

- Train scientific staff of all SPNA and hunting areas located in the area of the snow leopard to the method of determining signs of habitat types. It is essential that all trained a single form used for logging;
- Establish a network for the survey to determine the presence of the species, the level of conflict between predator and a man of poaching against the leopard;
- Identify areas for questioning and to involve to survey students, teachers, pupils, chairmen of pasture committees and others;
- Identify key areas to conduct periodic studies on the snow leopard and its forage species;
- Develop a monitoring system supporting ecosystems;

- Launch study on the state of alpine pastures as supporting ecosystems;
- Identify key areas that serve as corridors and connecting the local population, and to restrict or prohibit the use of supportive resources (hunting, grazing, mining activities);
- Determine the minimum size of the hunting area. Reduce the number of private hunting leases by combining existing ones, determine the quiet zoneon their territories, the timing and seasons visit and hunting;
- Involve independent experts in the activities on registration in hunting farms.

Monitoring implementation using key indicators: the establishment of a functional system

The main agency responsible for the implementation of the National Strategy for the Conservation of the snow leopard in the Kyrgyz Republic for the period of 2013-2023is the State Agency of Environment and Forestry, and the first objective of the agency is to consolidate and coordinate the efforts of all governmental, non-governmental and international organizations involved in conservation of the snow leopard. The Action Plan for the conservation of the snow leopard will be adjusted as performance, taking into account changes in the environmental and socio-economic situation in the country, funding opportunities for proposed projects, the emergence of new, more advanced technologies and approaches.

Evaluation of the results of the Strategy will be implemented in the course of its implementation and after completion of activities and projects based on the following criteria:

- indicators of the qualitative and quantitative changes in the state of the snow leopard
- changes of legislation and economics, concepts and technologies for the use of natural resources, affecting the condition of the snow leopard
- reducing the level of poaching in regard to the snow leopard and its forage resources;
- reducing the negative impact of mining on the environment
- dissemination of information on the conservation of the snow leopard
- development of study and monitoring programs of the status of the snow leopard and the creation of a common database on biodiversity in the country
- expansion of the network and optimization of protected areas (hereinafter - SPNAs) for reliable protection of the snow leopard
- ensure adequate protection of the snow leopard in the period of his breeding and migration

Chapter 9.Summary ofexpenditures and funding opportunities

Capital expenditure on the components distributed over a 7-year term

According to the Law "On state budget of the Kyrgyz Republic for 2012 and forecast for 2013-2014"in 2012 were provided in the amount of 419.0 million somswere budgeted for Environment Protection (44.8 million soms or 9 , 7% lower than the revised budget in 2011), accounting for 0.1% of GDP or 0.4% of total expenditures of the republican budget.

Formation and use of environmental funds and the development of the forestry sector are carried out in accordance with the annual estimates of income and expenditure of funds approved by the board and approved by the Ministry of Finance of the Kyrgyz Republic. In recent years the income of the Conservation and Development of Forest Sector Fundsincreased by more than 2 times. There is an increase in funding of environmental activities: in 2006 allocated 19,525.6 thousand soms, in 2011 it was allocated t 55,477.2 thousand soms or by 3.8 times higher (see Table 2.).

Table 2.Funding of environmental measures, thousands of soms

Measures	2006	2007	2008	2009	2010	2011
Protection and management of water resources	5189,9	9556,1	10119,6	9806,4	10639,3	4416,8
Protection of flora and fauna	1571,4	1007,3	2923,2	-	88,7	2990,4

Measures	2006	2007	2008	2009	2010	2011
Biodiversity conservation, development of SPNAs	2444,6	3986,1	4625,0	21252,4	19393,8	17175,2
Increase the capacity of environmental management	-	-	-	1282,8	6356,7	8642,4
The monitoring of the environment and the capacity building of regional environmental authorities	1972,2	3688,7	7298,3	2730,7	2287,9	1210,7
Scientific-research works	-	-	102,5	-	225,0	-
Promotion of careful attitude and rational use of natural resources, education, and the harmonization of the legal regulations	2437,8	3068,2	3138,3	2359,3	889,3	3069,0

Potential national and external sources of funding

Traditional (budgets / grants / loans)

The main sources of funding for environmental activities are funded by international donors and the governmental and local environmental funds and the development of the forestry.Being a Party of 13international environmental conventions, Kyrgyzstan joined the global process of environmental performance and became a full member of the world community, and receives technical and financial assistance from international donor organizations and developed countries (see table 3.).

Table 3.Environmental projects, implemented in the Kyrgyz Republic

Title	Dates of implementation	The implementing agency	Donor
UNDP Environment Protection for Sustainable Development Programme	01.01.2007 - 31.10.201	SAEPF	United Nations Development Programme (UNDP)
Sustainable Pastures Management in Suusamyr Valley, Kyrgyzstan	01.01.2008 - 31.12.2013	Ministry of agriculture	Global Environmental Facility (GEF),/United Nations Development Programme (UNDP)
WWFProgramme «Creation of Ecological Network in Central Tien Shan"	2009-2017	World Wildlife Fund (WWF)	Central Asian Programme of WWFandUSAID
Programme "SnowLeopardEnterpises" in AkShyirak and Enelchek villages	2003-2013 and further	Snow Leopard Trust & Snow Leopard Foundation in Kyrgyzstan	Snow Leopard Trust
Flora and Fauna International (FFI)	2004 to present	Division of FFI	Fauna and Flora International (FFI)

Innovative mechanisms (payment of compensation, payment for environmental services (PES, markings)

Taking into account that the population, living close to the habitat of the snow leopard does not have access to cheap credits, initiated by the government (10%), it is proposed to create a local development funds using funds of donors and that will make loans under the scheme adapted to local conditions with the corresponding percentages (5-7%). Administration of this fund shall be elected by a special body, which should include representatives of different sectors of the population (young people, women,

members of protected areas, local government, etc.). Income from lending by the decision of the administration may be directed to increase the revolving fund, or to address social needs of the population. The decision to support such funds has already been taken by UNDP and WWF.

An example of the success of such a fund is in Toguz-Bulak AO of Tyup district, which was created with the support of the UNDP Democratic Governance and starting with a budget of U.S. $ 10 000 for 5 years, today it amounts the sum of 30,000 U.S. dollars.

The major gaps in funding

Despite the fact that the volume of financing of current expenditure on environmental protection (including the costs of business entities) increases annually, they are not enough to meet all the necessary environmental measures. For the preservation of natural systems and environmental safety it must be adequately funded. Existing financing of environmental activities in the Kyrgyz Republic is a residual.

Information Sources and Credits

[1] National Report on the State of Environment of the KR for 2006-2011

[2] The forth National Report on Biodiversity of the KR for 2008.

[3] Dialogue at local and national levels – contribution to the sustainable development. Bishkek,2006.

[4] http://www.agroprod.kg/modules.php?name=Pages&page=736

[5] **Informationonresults of socio-economic development of the KR 2012.** http://www.mineconom.kg/index.php?option=com_content&view=category&layout=blog&id=66&Itemid=159&lang=ru

[6] Atlas of the Kyrgyz SSR. Nature and resources.–T.1. – M.:ГУГК, 1987.

[7] AlamanovS.K. nd others. «ClimatechangeandwaterproblemsinCentralAsia», UNEP, WWF Russia, Moscow 2006.

[8] ShukurovЭ.Д., BalbakovaF.N. SPNAs of Kyrgyzstan and biodiversity conservation of Tien Shan Alay range. // Collection of materials of environmental conferences. Bishkek, 2002.C. 43-41.

[9] Barthlott, W., w. Lauer, A.Placke. Global Biodiversity: Species Numbers of Vascular Plants (Map) //Mountains of the World. A Global Priority. New York – London, 1997.

[10]Jenik, J. The diversity of mountain life.// Mountains of the World. A Global Priority.New York – London, 1997.

[11] The Law of the Kyrgyz Republic as of February 25, 2013 № 31 "On ratification of the Agreement between the Government of the Kyrgyz Republic and the Government of the Russian Federation on the construction and operation of the Upper-Naryn cascade hydropower stations and the Agreement between the Government of the Kyrgyz Republic and the Government of the Russian Federation on the construction and operation of Kambarata-1 signed September 20, 2012 in Bishkek"

[12] TitovaL.I. Climatechangeconsequencesfor regions.Bishkek, 1997; Modern Kyrgyzstan, 2002.

[13] First National Communication under UNFCCC. Bishkek, 2003.

[14] Decisions of the committees of Issyk-Kul oblast with changes and amendments from 30 Septemeber2009 , №250; with changes and amendments as of 14 June 2010, №75.

[15] www.nature.kgAnnual year of the Department of Hunting from 2008 till 2012.

[16] http://www.nas.aknet.kg/index.php?menu=0

[17] http://www.animalinfo.org/species/carnivor/unciunci.htm

[18] http://bigcats.ru/index.php?bcif=irbises.shtml

[19] The national strategy for the conservation of the snow leopard in the Kyrgyz Republic for 2013-2023 has been approved by the Government of the Kyrgyz Republic dated 19 .10. 2012 N 732.

Mongolia

Ministry of Environment and Green Development of Mongolia

NATIONAL SNOW LEOPARD ECOSYSTEM PROTECTION PRIORITIES (NSLEP) MONGOLIA (2014-2021)

Ulaanbaatar, May 2013

Importance of Snow Leopard Conservation and Snow Leopard Ecosystem

The Mongolian snow leopard (Panthera uncia) population is 2nd largest in the world and has an about 1000 individuals, is distributed in Mongolian Altai, Gobi Altai, Khangai mountain ranges, Harhiraa and Turgen mountains, near oasis, in low elevation mountains and hills of Trans-Altai Gobi and southern edge of Sayan Mountain. The total area occupied by snow leopards in Mongolia is approximately 103,000 km^2 (Map 1). The species is included in the Mongolian Red Data Book (1987, 1997, 2013) and protected as very rare by Mongolian Law of Wildlife (2012).

The habitats of snow leopards in Mongolia represent a set of different ecosystems in the elevation range from 600 and 4200 m above sea level. Optimal snow leopard habitat in Mongolia is located within very broken and moderately broken terrains in the mountains with clearly defined ridge lines and massive cliffs. Siberian ibex inhabits these areas as well as other ungulates – the snow leopard's main prey. In addition to traversing open slopes, snow leopards travel and hunt in the edge scarce forests for roe deer, wild boar, hare etc. Marmots and snow cock are important prey of snow leopards in high mountains.

Since it is a top predator of the mountain ecosystem of Mongolia and Central Asia, it is an umbrella species for conservation of other species and habitats in mountain-steppe, mountain-tundra and mountain-forest-steppes, including livestock husbandry, cultivated here since ancient times and that are vital to the survival of nomadic herders. These habitats have been used for livestock pasture for thousands of years and income from livestock products is the main source of income of nomadic herders in Mongolia. Money from sale of 4.5 tons of cashmere provides herders of 21 provinces with about 205 million USD each year; 1/3 of this cashmere is collected in areas with snow leopards.

Until the 1990s, the areas were also rich in hunting resources, unfortunately during the decade after the collapse of socialism in Mongolia when the border with China was opened, many species of wildlife were hunted without any management and illegally exported for use in eastern medicine. Springs started in these mountains form the biggest rivers and lakes in Mongolia and Russia, go to northern ice ocean. Glaciers play an important role in regional climate regulation and water balance of mountainrivers. Also snow leopard habitats represent excellent recreation areas and potential for tourism development, including ecotourism, rafting, trekking, horseriding and climbing.

For many Asian people the snow leopard is a symbol of strength, nobility, and power. The preservation of Mongolian population of snow leopards is an important component of efforts to save and recover Russian population of the species in the northern edge and maintain gene flow with Chinese snow leopard populations in the south.

Map 1. Distribution of snow leopards in Mongolia

This document was prepared by B. Munkhtsog, Institute of Biology, Mongolian Academy of Sciences/Irbis Mongolia and edited by the team of experts from different organizations; Mr. David Mallon, Ministry of Environment and Green Development of Mongolia, WWF Mongolian Program Office, Snow Leopard Conservation Foundation/SLT Mongolia, UNDP Country Office Mongolia, World Bank, Snow Leopard Conservancy.

Disseminating Information on the Value of the Snow Leopard Ecosystem and Generating Support for Conservation

The snow leopard conservation is ongoing actively in Mongolia for last 20 years. The activities were included, but not limited to:

- Research and monitoring of the snow leopard and the prey species
- Community outreach programs
- Environmental education programs in the snow leopard distribution range
- Workshops and seminars for the community leaders, stakeholders and local governmental authorities
- Public awareness about the Environment Law
- Environmental social awareness campaigns wildlife posters, dramas, and brushers
- Establishing and Engaging local conservation communities and strengthening governance in the snow leopard range areas
- Employment of anti-poaching team, volunteer rangers who regularly patrol wildlife protection areas
- Training border police and customs officers in how to recognize, prevent smuggling of snow leopards and wildlife parts out of the country
- Education of spiritual and religious leaders on the importance of snow leopard and its ecosystem so that they can influence and promote conservation in their local communities
- Establishment of state protected for snow leopard conservation
- Raising public awareness through numerous national and international media outlets including TV, radio, newspaper and magazines
- Projects and Public Events - Monthly, bimonthly program on national public radio of Mongolia “Do not disturb endangered snow leopards (1994-2007)

Goals of the National Snow Leopard Ecosystem Protection Priorities (NSLEP)

The primary goal of the NSLEP is to save stable snow leopard and prey population through initiatives at national and regional level in the protection and conservation of mountain and snow leopard ecosystems in Mongolia, decreasing negative threats, benefiting local communities and preserving nomadic culture, religious and economic importance of snow leopard and snow leopard ecosystem for future generations.

Vision: *“The long-term survival and conservation of the Snow leopard and high mountain ecosystem provides freshwater services in an inexhaustible manner, as well as benefits to local communities”*

Goal: Maintain a stable population of snow leopardsin the territory of Mongolia.

Objectives:

1. Address the main threats that reduce number of snow leopards.

2. Monitor regularly the threats to snow leopards, minimize the negative impact factors leading to the degradation of snow leopard habitat, improving attitude of local people for Snow leopard value and high mountain ecosystem.

Major Threats: Traditional and Emerging, in terms of Area Covered, Severity, Urgency, and Impact on Snow Leopards and their Ecosystems

A variety of natural and anthropogenic factors influence the snow leopard populations. The main threats to snow leopards in Mongolia are loss of prey base due to competition with livestock for pasture and open water sources, loss of habitat related to increasing number of livestock and intensive development of mining and transportation infrastructure, deaths caused by poachers.

The traditional pastoral production system dates back at least 4,000 years, but since the 1990s when the livestock were privatized number of livestock increased rapidly, reached more than 40 million, which became the main of reason of pasture degradation due to overgrazing. Number of herder families also increased rapidly and all suitable pasture land used under the pasture fragmenting snow leopard habitats, pushing out the wild ungulates, prey of snow leopard. Single herder family could live well with 400 head of sheep and goats, but many families has more than 1000 of them, some of them even up to 4000 livestock. Unmanaged and illegal hunting is reason for conflicts between snow leopard and herders, decreased number of wild preys (e.g. Mongolian marmot, siberian ibex, argali sheep, and snow cock) lead to snow leopard attacks on domestic livestock and snow leopards are killed by herders in retribution.

Mining sector is becoming a major and increasing contributor to the Mongolia's economy. Over the past five years, there has been a rapid rise in mineral exploration, the Oyu Tolgoi copper/gold deposit and many other coal mines were discovered, minerals are exported to China via several parallel field and packed road to China, which cut in sections populations of endangered wildlife and unique habitats. In November 2010, the Parliament of Mongolia passed "State policy on railroad transportation" and construction of 1,766 km long railroad network to link Mongolia's major coal and copper mines with China is underway.

Poverty remains widespread in the country especially in rural areas despite the growing GDP. The 2011 NHDR estimated that in 2010, 39.2 per cent of Mongolians were consideredpoor, this figure was 32.2 per cent for urban residents but 47.8 per cent for rural residents. It is clear that poverty is direct related to environment.

Snow leopard body parts are often used in traditional eastern medicine in China as a substitute for tiger parts, and the animal's fur is of great value for luxury seekers. Snow leopard skins are open confiscated at Mongolian customs and by Irbis anti-poaching team during the inspection.

The table below indicates the major threats to snow leopard in terms of area, intensity, urgency and impact on snow leopard ecosystems.

Table 1. Key threats for snow leopard in Mongolia

Threat	Area	Intensity	Urgency	Total Ranking	Comment
Category 1: Habitat & Prey Related					
Habitat Degradation	3	2	2	7	
Habitat Fragmentation	2	1	5	8	
Prey Reduction due to Illegal Hunting	4	3	4	11	
Prey Reduction due to Competition with Livestock	4	5	5	14	
Prey Reduction due to Legal Hunting	2	1	2	5	
Prey Reduction due to Disease	1	2	3	6	Not enough data
Category 2: Direct Killing or Removal					

Threat	Area	Intensity	Urgency	Total Ranking	Comment
of Snow Leopards					
In Retribution for Livestock Depredation	3	4	4	11	
Poaching for Trade in Hides or Bones	2	2	2	6	
Traditional Hunting of Snow Leopards	1	1	2	4	
Secondary Poisoning and Trapping of Snow Leopards	2	3	2	7	
Diseases of Snow Leopards	1	2	2	5	no data
Potential threat from legal hunting of snow leopards	1	2	3	6	
Category 3: Policy and awareness issues affecting conservation of snow leopards, prey and habitat					
Lack of Appropriate Policy	1	2	3	6	
Lack of Effective Enforcement	4	4	5	13	
Lack of Trans-boundary Cooperation	2	3	4	9	
Lack of Institutional Capacity	4	4	4	12	
Lack of Awareness Among Local People	4	5	5	14	
Lack of Awareness Among Policy Makers	4	4	4	12	
Category 4: Other Issues					
Human Population Growth (rapid) / Poverty (indirect threat)	2	2	2	6	
Feral dogs attacking snow leopards and prey	1	1	1	3	
General Poaching and Wildlife trade by migrant workers	1	1	1	3	
General poaching by military personnel	1	1	1	3	
Emerging Threats					
Climate Change	4	4	4	12	
Growing Livestock Populations & Intensifying Human-Wildlife Conflict	4	4	5	13	
Large-scale Development Projects -	2	4	4	10	
Direct & indirect impacts due to mineral exploration & mining (local)	2	4	4	10	
Impacts due to hydroelectric projects	1	1	3	5	
Impacts due to roads or railroads	3	4	4	11	

Threat Values: 0 or 1 = no & low threats; 2 or 3 = intermediate threat level; 4 or 5 = high threat level

AREA: Rank each threat according to how wide-spread it is (where 5 indicates it occurs across most or all snow leopard range within country; and where 1 indicates it is extremely limited in areal extent)

INTENSITY: Threats ranked from 5 = the most destructive impact to 1 = the least negative impact

URGENCY: Rank each threat identifying if it needs immediate & urgent attention (very time sensitive) (value = 5) to being of least concern or urgency (value = 1)

Snow leopard killing due to poaching

Mid 1990s was the most difficult time for the snow leopard population in Mongolia, trapped in leg-hole traps, shoot with fire arms presented the greatest danger to this predator and it is commonly used throughout almost the entire species' range in Mongolia. Since it has a predictable behavior – snow leopards follow the same trails and paths along ridges and cliff bottoms – the cats were easily targeted by

poachers and entrapped in leg-hole traps set at saddles of mountain ridges and narrow trails along valley bottoms next to cliffs or boulders. They were hunted for their pelts mostly, sometimes scull was prepared illegally together with pelt for stuffing. Skins were illegally exported to Russia and China, no information that other derivatives were sent abroad. For single field survey and patrolling several leg-hole traps were discovered and confiscated in South Gobi province, where snow leopards were traditionally hunted long time and where hunted 2 snow leopards by trophy hunters in early 1990s. The WWF Mongolian anti-poaching teams "Irbis 1" and "Irbis 2" discovered 12 cases of snow leopard illegal hunting and trade since 2001, including confiscation of 4 snow leopard skins for one inspection, from Bayan-Olgii province 15 snow leopard skins were illegally transported to Altai krai, Russia and was confiscated by inspectors.

Local residents, mainly herders and hunters who overwinter in snow leopard habitat, were the main poachers, but they were asked by people from cities for snow leopard skins, who wanted to sell them abroad, but locals getting only up to $200 per skin. High prices for citizens were offered by Chinese traders for derivatives of snow leopards, musk deer, and other species were the main reason for the trapping, it was one of the very few income sources for local residents during difficult transition time to market economy, law enforcement was almost non-existent during that period.

Snow leopard killing in retribution of livestock depredation

Persecution of snow leopards by herders due to attacks on livestock is a serious threat, resulting from a combination of increased livestock numbers, decrease in wild prey population and lax guarding practices. While these threats are relevant in all snow leopard range in Mongolia, most complaints come from southern and western Mongolia, where livestock and herders spend winter months in snow leopard habitat. Attacks occur mostly in late winter, early spring months, when the small prey of snow leopards like marmot are hibernating or wild ungulates leave the area looking for better pasture and less snow covered areas. In most cases sheep and goats are killed by snow leopards in the morning just before they ate let to pasture or when returning home in the evening and left to forage near the camp (500m) before to enter into the protective coral. Also, many animals especially sheep and goats if left at night in the pasture for some reason. Free roaming yaks and horses appear to be considered "almost like natural food" to snow leopards. Snow leopards will attack supervised livestock in some pastures and livestock corrals where cover allows the predator to approach undetected. For example, the northern wall of some corrals are provided by a 10-20 m high cliff; while inaccessible to humans, snow leopards are can come easily enter and kill the contained goat or sheep.

Increasing numbers of livestock (total livestock numbers in Mongolia reached 41.6 million by Dec of 2012) and presence of herder families in snow leopard habitat will lead not only to increased conflicts with herders, but also to the crowding out of wild ungulates which constitute the natural prey of snow leopards.

Decreases in snow leopard prey base populations

A predator's population size depends directly on the population status of its prey species, for instance 100-150 ibex are need for sustaining a single snow leopard. Thus, decreased numbers of ungulates– the snow leopard's main prey – are one of the most important factors that lead to decrease in snow leopard populations.

In 1990s and early 2000s this is also related to poaching, for example, in western most of snow leopard ranges in Mongolia the main reason for frequent snow leopard attacks on livestock is believed to be a sharp drop in wild ungulate populations in the mountains due to intensive hunting for ibex. Since 2005 the situation improved, numbers of mountain ungulates remain relatively stable or are increasing throughout their range. Trapping of wildlife almost stopped, every herder's family has 200-1500 livestock, so making a living on income from livestock husbandry and illegal hunting has decreased since the penalty for hunting of animals has increased, hunting equipment and transport will be confiscated.

Development of economic infrastructure and habitat fragmentation and destruction

Road construction in snow leopard habitat significantly increases the potential for disturbance through reduction of prey items, increasing accessibility of the habitat and increasing conflicts between cats and

herders. One example of this is the construction of a road between Khoshoot coal mine in Khovd province and China's border, for the exportation of coal to China.

Construction of a highway and planned railway from the Jinst coal mine in Bayankhongor province to China through the Tost mountain range would divide both the habitat and population of snow leopards and their prey in the area into two. Given the snow leopard's need for a large home range, resident animals may have a hard time finding sufficient wild prey food and would thus be expected to turn to livestock.

Mining can also lead to the localized destruction of key snow leopard habitat. The details of mining impact in Mongolia is not researched yet, indeed there is not much impact yet, but the mining license map shows that extensive fragmentation may occur within snow leopard habitat. Development of mining infrastructure is linked not only to habitat destruction for snow leopards but also to increased disturbance and increased poaching of ungulates and even the snow leopard itself.

Mitigating the Snow Leopard Threats

- Expansion of the state and local protected area network, establish managed recourse protected areas, improve capacity of protected area administration and staff
- Increase scientific research on the snow leopard and its prey species, develop effective short and long term conservation recommendations
- Reduce the pasture and open water source competition between livestock and wild ungulates improving grazing and pasture management in important snow leopard areas
- Improve corrals in the snow leopard-livestock conflict areas to make predator-proof (move the corals from cliff, where snow leopard easily come in) to mitigate the depredation events, which will eventually reduce killing for livestock depredation
- Conduct environmental education programs and public awareness in the mountainous areas where snow leopards exist to improve attitude of the local communities towards this elusive cat
- Increase local knowledge about the status, distribution, ecology and behavior of the snow leopard and its prey species involving in monitoring activities, encourage local communities' responsibilities to oversee and utilize natural resources in their community responsible areas within the snow leopard habitat
- Enhancement of law enforcement
- Control illegal hunting of snow leopard prey species
- Generation of income through natural resource management for the local communities to reduce poaching in the snow leopard range areas
- Support sustainable community development projects for alternative income generation for natural resource use in key snow leopard habitats
- Design of community based climate change adaptation projects for the communities in the snow leopard range areas with co-benefits in resilience to the impact of climate change and bio-diversity protection
- Make an assessment on mining impacts for snow leopard population and ecosystem
- Prevent negative impacts of mining and development/ infrastructure, encourage greater responsibility from mining industry
- Increase conservation awareness highlighting importance of the species through regular nationwide media which includes different programs as documentary film, TV debates and campaign, public forums, educational materials etc.

Snow Leopard Conservation Management

In 1994 (Mongolian Association for Conservation of Nature MACNE) started first ever snow leopard conservation project in Mongolia to involve local herders in snow leopard conservation partnering with International Snow Leopard Trust (SLT). In 1997 WWF Mongolia, consulted by snow leopard researchers, developed and started implementation of snow leopard conservation project in western Mongolia. Within UNDP/GEF funded projects in Mongolia conservation of snow leopards and its habitat were most concerned components.

The following conservation plans, for protection of snow leopards in Mongolia were developed and implemented:

- Management plan of Gobi Gurvansaikhan National Park, 1997.
- National Biodiversity conservation policy of Mongolia
- Snow leopard conservation management plan of Mongolia, 1999.
- Snow leopard conservation management plan of Uvs province, western Mongolia, 2000.
- Management plan of Uvs lake strictly protected areas, western Mongolia, 2002.
- Snow leopard conservation policy of Mongolia, 2005.
- Snow leopard conservation policy of Uvs province, western Mongolia, 2011.
- Conservation program of rare and very rare wildlife species of Mongolia, 2011

Replicating known good practices

Great majority of projects aimed for snow leopard and its ecosystem conservation in Mongolia in 1993-2013 was funded by International and National NGOs like WWF-Mongolia, Snow leopard trust, Snow leopard conservancy, Mongolian Association for conservation of nature and environment, Irbis Mongolia, Snow leopard conservation fund and several UNDP/GEF funded environment projects.

Successful practices for conservation of snow leopard in Mongolia are the following:

- Landscape-based Conservation Strategies approved and implemented at the province level (Khuvsgol and Khovd, Bayan-Olgii and Uvs provinces, through UNDP Altay Sayan Project)
- Summarized information on the population and conservation recommendations, made in number of PhD, master, bachelor thesis, completed by international and national scientists, students
- Since 1990s many new protected areas were established in potential snow leopard habitats in Mongolia, nowdays 20 state protected areas harbor snow leopards, which covers key snow habitats in Mongolia.
- Two Transboundary Nature Reserves (TNRs) were established in important snow leopard habitats at the border of Russia and Mongolia (Uvs lake SPA and Siilhem NP).
- Two inter-agency Irbis anti-poaching teams were established in western Mongolia to conduct regular patrolling in snow leopard habitat. As a result, the number of poaching incidents in 5 western provinces, in key snow leopard habitats decreased rapidly
- Initial Snow leopard monitoring program including advanced techniques (camera-trapping, genetic analysis) were done with support of WWF Mongolia and Institute of Biology/Irbis Mongolian Center to monitor key snow leopard populations in Tsagaan shuvuut, Turgen, Siilhem B, Jargalant, Munkhkhairkhan state protected areas and Altan khokhii, Baga Bogd mountains.
- School children from Bayan-Olgii province were involved in Land of Snow Leopard Festival in Altai Republic.
- More than 400 families of local herders living in the snow leopard habitats in 7 provinces of Mongolia are participating in the Snow Leopard Enterprises handicrafts project generating

sustainable income sources with the commitment to a non-poaching contract, local conservation communities are active with support of WWF Mongolia

- Micro credit scheme has been introduced to support handicraft production with more than 100 rural households involved since 2009.
- Since 2008 a Small Grant Program has supported more than 30 local conservation initiatives.
- WWF-Mongolia pioneered the Ecoregion Conservation approach and played a convening role for biodiversity conservation by bringing together partners around common goals. The expertise expands from community based natural resources management to wildlife management, creating ecological network of protected areas, integrated river basin management and policy advocacy, etc.
- WWF Mongolia undertaken livestock insurance program titled “Buy Goat” in three model sites in western Mongolia and within the territory of Bumbat Khairkhan the Buy a Goat program delivered 21 sheep to the herders who had lost livestock to snow leopard predation last year. There were many herders interested in becoming involved with a compensation program, therefore additional surveys should be undertaken to identify suitable mechanism for conflict resolution.
- Long term snow leopard study is ongoing in Tost local protected area, local protected area was established.
- Livestock insurance program is introduced in lower scale in Tost Mountain of South Gobi Province since 2009 involving more than 30 households to mitigate human-wildlife conflict in the area.
- The nature conservancy did assess mining impact for southern Mongolian ecoregion, using indicator species and recommended areas for better protection

Policy and Legislation

Snow leopard is prohibited to hunt in Mongolia since 1972, trophy hunting was stopped in 1993, was registered in the Mongolian Red Data Book (1987, 1997, 2013) and listed in the Category very rare by Mongolian law of Wildlife (2012). In Mongolia, the key regulations concerning the conservation and use of wildlife, including snow leopards, and their habitats are contained in conservation laws, key acts, most of which were updated and endorsed by Mongolian parliament in 2012. The national program on conservation of very rare and rare wildlife species was approved by Government order in 2011. The State law of wildlife Law of protected areas is the primary legislation in this arena. It regulates relationships between enforcement and use of the wildlife overall, as well as in the framework of habitat conservation and restoration for the purposes of ensuring biological diversity, sustainable use of all components, establishing conditions for wildlife sustainability, conservation of the genetic fund for wildlife, and other protections for wildlife as an intrinsic part of the natural environment.

To a significant degree, numerous sub-legislative and agency-level regulatory acts are the working legal foundation of management and law enforcement agencies in conservation activities, regulate the use of rare and threatened species, protect habitat, and provide a regulatory mechanism with reasonably well-defined jurisdiction and distinctions between federal and regional government agencies.

However, the effectiveness of this working system for regulatory management is significantly reduced both by the absence of a sufficiently effective enforcement policy and the presence of regulatory, legal, and methodological loopholes in the system in a number of areas.

Wildlife-related Environmental impact assessments are only mandated for protected areas. Development and large-scale infrastructure projects outside of protected areas do not require the government to prepare an environmental impact report, and there is no legal basis forbidding such activity, even if it has the potential to negative impact to endangered species such as snow leopards and their habitat.

Transboundary Cooperation

The preservation of transboundary parts of the snow leopard's range at the intersection of Russia, Mongolia and China is of particular importance to conservation of snow leopard population in its northern edge of world distribution. The for-border area connects populations in western Mongolia and northwestern China to the remnant snow leopard population in Russia.

Mongolia and Russia has excellent collaboration on snow leopard conservation in Mongolia, the transboundary Uvs lake world heritage site is established, MoU for implementation of co-management is signed at Government level, research teams are working together at both side of border of countries, the cooperation activates are discussed and agreed. The first order of priority is on sustaining populations of snow leopard along the Russia-Mongolian border at Tsagaan shuvuut and Siilhem B-Chihachev ridges. Continued assessments are needed to determine the importance of other potential transboundary snow leopard corridors for supporting the recovery of the Russian populations, with the first surveys made in/around Tavan Bogd uul area. Potential corridors along the boundaries of Russia, Mongolia, China, and Kazakhstan are Tavan-Bogd uul Ridge, Southern Altai Ridge, and the mountain ridges to the north of Khuvsgol Lake.

Specific actions include:

- Develop and adopt a snow leopard conservation action plan for the Russian-Mongolian transboundary zone as well as Mongolian-Chinese border
- Develop and expand coverage of international transboundary protected areas along the Russian-Mongolian border, including the Siilhem B, Chihachev, Tsagaan shuvuut, and Tunkinsky Ridges and mountains north of Khuvsgol Lake
- Expand the “Golden Mountains of Altai” UNESCO World Heritage site to encompass all contiguous transboundary Altai mountain range in Russia, Mongolia, China, and Kazakhstan
- Coordinated actions between these four countries to interdict the movement and illegal sale of snow leopard and other rare species furs and other body derivatives. This collaboration should involve coordination and information exchange among the concerned countries’ customs agencies regarding trade of wildlife parts, including monitoring and sharing of information exchange between corresponding governments and international structures like CITES and INTERPOL;
- Coordinate of research programs and development of collaborations among specialists of Russia, Mongolia, China, and Kazakhstan on snow leopard its prey. Develop joint programs for snow leopard population monitoring in the Russia-Mongolian transboundary areas is very important.
- Develop transboundary ecotourism in the habitats of snow leopards and other rare species focused to create alternative income source for local communities in Russia and Mongolia. The first step in this direction was made by WWF and the UNDP/GEF “Biodiversity Conservation in the Russian Altai-Sayan Ecoregion”: the “Land of the Snow Leopard” project to develop ecotourism in local communities in snow leopard habitat in Altai, Tuva, and western Mongolia began in 2010.

Research and Training Activities

After A.G.Bannikov, who first summarized information on the status, distribution of snow leopards of Mongolia, scientists from Institute of Biology, Mongolian Academy of Sciences were studying snow leopards since 1970s, the publication was made by Dr. A. Bold in 1976, mapping snow leopard distribution in southern Mongolia, assessing the population and recommending ways to solve livestock depredation by snow leopards. In 1980s G.Amarsanaa studied the species and published couple of articles on its biology and ecology. Modern snow leopard research and conservation in Mongolia initiated

in 1990s by Mongolian Association for Conservation of Nature and the Environment (MACNE), bring to Mongolia world level technology partnering with researchers like Schaller and McCarthy, assisted by B.Munkhtsog. Snow leopard long term surveys funded by Snow leopard conservation foundation/SLT Mongolia is ongoing in southern Mongolia, WWF Mongolian program office is conducting snow leopard study in western Mongolia, Institute of Biology/Irbis Mongolia has survey and monitoring plots in Tsagaan shuvuut, Baga Bogd mountains. A lot of information was collected and results are published.

Snow leopard long term comprehensive research center named after J.Tserendeleg is functioning in Tost local protected area since 2007, where were captured, collared 18 snow leopards, tracked with telemetry and population have been monitored. The field camp is providing a lot of training for field biologists, rangers, and students, along with Jargalant field research camp in western Mongolia within snow leopard research project funded by WWF Mongolian Country Office. In recent future from this camp could be made another long term comprehensive research center in western Mongolia to study and monitor endangered species, including the snow leopard. At the Institute of Biology PhD, master, bachelor students are join the scientists in the field for several years to learn, collect data, analyze it and compile for their thesis.

Within the ongoing research, we still need to:

- Review and update current distribution, density of Mongolian snow leopard population, generate improved range map
- Expand long term snow leopard comprehensive research in Tost to surrounding mountains, including Gobi Gurvansaikhan national park
- Establish another long-term snow leopard comprehensive research station in Jargalant mountain, western Mongolia, supported by the modern methodologies, facilities, equipment, staff and provide with necessary operational funding
- Study and Identify key sites for snow leopard conservation in Khovd province within Mongolian Altai range
- Study genetic relationships, gene flow and the degree of genetic isolation/similarity of various snow leopard subpopulations in Mongolia
- Identify potential migration corridors between snow leopard populations in Russia and recommend transboundary conservation action.
- Assess the prey base distribution and its population dynamics in various parts of snow leopard range, and prepare recommendations for conservation
- Feasibility study for restoration of snow leopard in its previous range in Khuvsgol province on the border of Russia and Mongolia
- Particular attention must be paid to applied science for the development and implementation of conservation actions aimed at preserving viable snow leopard populations in intensive developing regions of Mongolia. Need to establish science and monitoring division at administration of state protected areas to study, monitor and recommend actions for conservation of bio-diversity, rare and endangered species such as snow leopard.

Scientific monitoring of snow leopard, habitat, and threats

Beginning in 1997, monitoring of key snow leopard populations in the western Mongolia has been done by staff from Uvs lake SPA, Altai Tavan Bogd and Khar us lake NP with the support of WWF Mongolia and UNDP/GEF. Park biologists were trained in 1998, 2004, 2006 on monitoring methodology. Software “Biosan” to accumulate data collected by park rangers, staff was developed by WWF Mongolian Program Office and was endorsed by Ministry of Environment and Green Development in 2007.

In monitoring of Mongolian snow leopard population, we aim to:

- Select and monitor snow leopard monitoring at sites in 4 key snow leopard areas

- Assess snow leopard and other wildlife population trends in the PAs and in selected key snow leopard habitats every 4 year
- Prepare conservation recommendations for use of decision makers, including habitat condition (both positive & negative factors).

National institutions for snow leopard conservation

To deal with current and future threats to snow leopard and its habitats different stakeholders are working together. National institutions for snow leopard conservation in Mongolia are represented by Ministry of Environment and Green Development, Province' Environment Agency, State Protected Areas, Local Protected Areas, Mongolian Academy of Sciences, International Organizations (WWF, UNDP/GEF, TNC, WCS), Regional and Local Conservation NGOs, Local Communities and others. Strengths and weaknesses of these stakeholders are explained in the Table 2.

Table 2. National institutions for SL conservation in Mongolia: strengths and weaknesses

Organization	Strengths	Weaknesses
A. Ministry of Environment and Green Development	• Real political power and direct dialog on behalf/with Government • Development of appropriate conservation policies and legislation • Establishing of new Protected Areas	• Lack of planning process • Quick rotation of government employees • Greater attention to resource exploitation • Low capacity of State protected areas
B. Province' Environment Agency	• Real rights to fight poaching in snow leopard habitats on large areas	• Lack of appropriate funding • Lack of equipment and vehicles • Only one wildlife specialist in province department and single inspectors at sum level
C. State Protected Areas	• Professional staff for protection and monitoring of snow leopard • More or less sustainable funding from central budget • Developed environmental education programs	• Limited area under protection • No Rights for inspection • No/very limited funding for snow leopard conservation and monitoring
D. Local Protected Areas	• Appropriate location and area for snow leopard conservation • Support of local people and community • Good knowledge of snow leopard distribution	• No/Lack of sustainable funding • Lack of professional staff • No/Very limited staff • No rights to stop poachers/law violation
E. Mongolian Academy of Science	• Professional research team • Advanced students for research • Long term data base • Professional equipment for advanced research programs on snow leopard	• Lack of permanent funding for research, equipment, laboratory • Low conservation implication of research programs • Limited funds for field work
F. International Organizations (WWF, UNDP/GEF), TNC	• Highly professional conservation experts • Long-term conservation programs • Transboundary cooperation in conservation • Support of local conservation communities • Good public awareness activities	• Lack of permanent funding for snow leopard conservation • Lack of fundamental scientific research of snow leopard ecology
G. National and Local Conservation NGOs	• Professional team of conservationists and researches • Good knowledge of key snow leopard and habitat • Cooperation with local government organizations	• Small number of professional experts • Lack of sustainable funding • Lack of long-term conservation programs for endangered species • Local outreach limited by accessibility & high cost field travel
H. Local Conservation Communities	• Live directly in the habitats of snow leopard • Traditional knowledge and lifestyle • Excellent knowledge of snow leopard distribution in limited areas	• Use of natural resources as a source of income • Poverty and unemployment • Lack of conservation knowledge of snow leopard • Lack of local governmental support • Lack of capacity and funding • Insufficient incentives for reducing livestock herd size • Inadequate guarding practices

Wildlife law enforcement and combating crime

Between 1997 and 2013 there were number of cases prosecuting poachers for killing snow leopards and 19 cases (in Bayankhongor province -2, Gobi-Altai -4, South Gobi -1, Khovd 7, Bayan-Olgii 4, Ulaanbaatar-1) of illegal hunting and trade of skin of snow leopards were discovered by state inspectors. The guilty parties were sentenced up to 1.6 years. Between 2000 and 2011 there were a number of instances when snow leopard pelts were smuggled to Russia (Altai Republic) from Mongolia and the violators were prosecuted.

Currently state and local nature protection agencies and inspectors have very limited or no funding, staff or equipment for effectively patrolling or monitoring border posts, local residents are known to possess a significant number of illegal and unregistered weapons used for illegal hunting. It is necessary to ensure effective work by state and provincial nature protection agencies in the fight against poaching in snow leopard habitat by allocating additional funding from the central budget. Is it also necessary to devote more attention to the fight against illegal trade in products and derivatives of endangered species. Cooperation between conservation and enforcement agencies is urgently needed to address illegal trade in snow leopards and other rare species, along with game species. WWF's extensive experience in creating and supporting interagency anti-poaching brigades can be used to advance such initiatives.

Snow leopard conservation enforcement is insufficient in most of protected and unprotected areas. A number of these require changes in status, land optimization, and strengthened enforcement regimes. Need to build up patrolling in transboundary areas in cooperation between Russian and Mongolian protected areas and border patrol institutions. Expanding of Local protected areas, establishment of resource managed protected areas in snow leopard ecosystem should be elevated with management plans financed by the local government and central budget. Otherwise these areas will remain as paper protected areas.

Legal framework for empowerment of community for co-management of wildlife and habitat

The project "Nature Conservation and Sustainable Management of Natural resources, Gobi component" funded by GTZ (1999-2006), formed Herder Communities for the purpose of increasing herders' livelihoods through collaborative community-based natural resources management. After 2001 the number of donor-supported development projects in Mongolia, especially in the countryside, increased considerably. And based on the success story in the Gobi, almost every development project has encouraged and supported herders in establishing herder associations to deliver interventions, promote pasture management and livestock production, promote income generating activities such as value added processing of livestock products or livelihood diversification into non-livestock related activities, or for arranging joint marketing of like milk and dairy products. The Mongolian government legalized "Community" as an officially recognized rural institution through the amendment of the Environmental Protection Law (2006). Under this concept, the Herder Community Organizations are allowed todesignate Community Responsible Areas for managing natural resources within their responsible territories.

In order to increase the effectiveness of snow leopard, its prey protection and ensure conservation of its habitat by local communities it is advisable to:

- Develop strategies and plans to develop community managed, resource used local protected areas, improve conditions for economic development attracting additional funding to develop tourism, small businesses, service related alternative employment, including investments and other extra-budgetary funds
- Develop sustainable pasture use management and accounts for the needs of wild ungulate species in snow leopard habitat
- Improving of corrals from snow leopards to reduce conflict with herders leading to retributive killing of snow leopards

- Minimize unguarded pasturing of livestock in snow leopard habitat
- Expand Snow Leopard Enterprises to offer incentives and help compensate herders for loss of livestock by snow leopards, educate local herders on protected status of snow leopards and the penalties for illegal hunting of this endangered species
- Create and implement community-based inspection teams to patrol and protect rare species by engaging those local residents who reside in snow leopard habitat.
- Communities enabled receiving visitor/tourists for snow leopard watch, its habitat and sign, providing them with guide, accommodation, transport, food etc.,

Priority should be given to programs and projects with minimal impact on the environment and especially snow leopard ecosystem.

Time-phased implementation program, budget, and indicators for snow leopard conservation in 2014-2021

Implementation Bodies involved in the Snow Leopard Conservation Programs in Mongolia

- Ministry of Environment and Green Development of Mongolia (MEGD)
- Department of Environment of Provinces
- Administrations of State protected areas
- Administrations of local community managed areas
- International counterparts such as Snow leopard trust, UNDP, WWF, SLC,TNC
- National NGOs Irbis Mongolia, snow leopard conservation foundation
- Local conservation communities
- Government's focal points for the International Conventions
- Institute of Biology, Mongolian Academy of Sciences
- Universities

The Department of Environment and Natural Resources, MEGD will act as leading and coordinating body for the implementation and monitoring of the NSLEP in Mongolia. However, the NSLEP working group is consisted of the representatives of the different organizations including Institute of Biology, Mongolian Academy of Sciences, WWF Mongolian Program Office, Snow Leopard Conservation Foundation/SLT Mongolia.

Priority Activities and Costs for the implementation of the Snow Leopard Conservation Actions

Cost Structure of the Snow leopard Conservation Management in the recent past

Table 2: Cost Structure of Snow Leopard Conservation Management in Mongolia

#	Donor organization	Implementation organization	Duration of the project	Total in USD	Comments
1	Ministry of Environment and Green Development (from Central budget)	State protected areas	1993-2013	800,000	$40,000/year per protected area, average
2	International donors	MACNE	1993-1997	$100,000	T.M. McCarthy's PhD study

3	Mongolian Academy of Sciences (from Central budget)	Institute of Biology	1993-2013	300,000	$15,000/year for work space, salary of scientists, field surveys
4	International donors	WWF Mongolian Program Office	1997-2013	420,000	$30,000/year average, for development of conservation plans, research, training, snow leopard enterprises project, local community support, conservation, etc.
5	UNDP/GEF and other donors	UNDP Country office in Mongolia	1997-2013	340,000	$20,000/year for capacity building, training, conservation in State protected areas, support of communities
6	German cooperation agency	MEGD	1997-2002	$250,000	Establishment of Gobi Gurvansaikhan national park, support of communities
7	International Snow leopard trust	MACNE	1994-2001	$35,000	Field surveys, snow leopard enterprises project
8	International Snow leopard trust	Irbis Mongolia	2001-2007	$240,000	$30/year, average for field surveys, snow leopard enterprises
9	Snow leopard trust/Panthera	Snow leopard conservation foundation	2007-2013	$720,000	$120,000/year average, Snow leopard long term comprehensive study in Tost, snow leopard enterprises
10	Snow leopard conservancy	Irbis Mongolia	2008-2013	$60,000	$10,000/year average, Camera trap surveys, equipment
Total expenditure				$3,265,000 in USD	
Average per year $3,265,000/ 20year = $163,250					

Table 3: Cost Structure of the Snow leopard Conservation Management in the future

First 3-year Action Plan (2014-16)

????

Table 4: Necessary funding for snow leopard research and conservation in Mongolia for 2014-2021

Major Funding Gaps

As seen from the Table 4, the total funding gap between current and needed funds for snow leopard conservation in Mongolia is $458,750/year. Need to fill out this gap in cooperation with key stakeholders at international, national, and local levels. Possible solutions and sources of funding will be explored.

Monitoring implementation progress through Key Indicators

The NSLEP working group will have at least two meetings per year and will be assessing the NSLEP implementation progress using the following key indicators, and will be reporting to Ministry consul meeting every _ years.

The key indicators for the evaluation of NSLEP successful implementation are:

- Overlapping of pasture of livestock and wild ungulates are decreasing year to year

- Assessed, by camera trapping and genetic analysis, number of snow leopards at selected monitoring sites in key snow leopard habitat will be not less than 1.5 individuals per 100 km^2
- 80% of females with cubs detected by camera traps during the monitoring in key snow leopard areas have 3 cubs, shown good growth of the population
- Number and population density of key wild prey species (Siberian ibex, argali sheep, Mongolian marmot, snow cock and others) are increased
- Number of herder families, NGOs, conservation communities responsible for snow leopard conservation, those are aware on ethical and economic value of snow leopard, its conservation and involved in its protection
- Funding spent on snow leopard conservation is increased along with families, communities involved in conservation and % of positive attitude regarding the snow leopard.

Information sources

Jan E. Janecka, Bariushaa Munkhtsog, Rodney M. Jackson, Galsandorj Naranbaatar, David P. Mallon, and William J. Murphy, 2011. Comparison of noninvasive genetic and camera trapping techniques for surveying snow leopards. Journal of Mammalogy, 92(4):771-783.

E. Janečka, R. Jackson, Z. Yuquang, L. Diqiang, B. Munkhtsog, V. Buckley-Beason, W. J. Murphy, 2008. Population monitoring of snow leopards using noninvasive collection of scat samples: a pilot study. Animal Conservation: Vol 11(5): pp 401-411.

Munkhtsog, 2006.Biology, ecology and conservation of snow leopards in Mongolia.PhD thesis. Ulaanbaatar. in Mongolian with summary in Russian.

McCarthy, Thomas. M., Todd Fuller, and B. Munkhtsog. 2005. Movements and Activities of Snow Leopards in Southwestern Mongolia. Biological Conservation 124 (2005) 527–537.

McCarthy T.M, 2000.Ecology and conservation of snow leopards, Gobi brown bears, and wild bactrian camels in Mongolia. PhD thesis. University of Massachusetts Amherst, USA

Thomas M. McCarthy & B. Munkhtsog, 1995.Preliminary assessment of Snow Leopard Sign survey in Mongolia.in: Proceedings of the 8th International Snow Leopard Symposium. pp. 57-65. International Snow Leopard Trust, Seattle. WA, USA and WWF Pakistan, Islamabad, Pakistan.

Sukhbat, Kh., B. Munkhtsog. 1995. Density and distribution of Ibex and Argali sheep in Mongolia. Proceedings of the 8th International Snow Leopard Symposium. pp. 121-123. International Snow Leopard Trust, Seattle. WA, USA and WWF Pakistan, Islamabad, Pakistan.

Schaller.J., J.Tserendeleg, and G. Amarsana. 1994. Observations on snow leopards in Mongolia. Pages 33-42 *in* J. Fox and Du Jizeng, editors Proceedings of the Seventh International Snow Leopard Symposium, Xining, China. International Snow Leopard Trust, Seattle, Washington.1994

Yo.Onon, E.Shinetsetseg, 2004. Snow leopard cub is looked for help. 19pp. in Mongolian

Yo.Onon, L.Altantsetseg, S.Bayarkhuu, 2006. Wildlife Bulletin: Snow leopard (Uncia uncia),

Four national reports to the *UN Convention on Biodiversity*

Tulgazana, 2008.Snow leopards in Noyen uul. 31pp. in Mongolian

Buuveibaatar, G.Naranbaatar, and B.Chmeddorj, 2009.Methodology for collection and compiling of data on snow leopards.in Mongolian

Chimeddorj, M.Tserennadmid, G.Selenge, 2010. Wonder of high mountains. 35pp in Mongolian

U.Sanjaagonchig, 2011.Spotted friend. Ulaanbaatar. 32pp. in Mongolian

M.Tserennadmid, 2011. Snow leopards in snow mountains. 20pp. in Mongolian

The monthly bulletin “Altai Sayan” published by WWF Mongolia

Quarterly information bulletin published by Irbis Mongolia (1997-2007)

Quarterly information bulletin, published by Snow leopard Conservation Foundation (since 2007)

mongolia.panda.org; econet.mn; snowleopard.mn

Nepal

National Snow Leopard Ecosystem Protection Priorities (NSLEPs)Nepal

Government of Nepal
2013

Executive Summary

Snow leopard (*Panthera uncia*) is a critically endangered species listed under International Union for Conservation of Nature (IUCN) Red Data Book and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix-I. It is also a protected species under the National Parks and Wildlife Conservation Act 1973 in Nepal. The species is largely but patchily distributed throughout the Himalayan Ranges of Central Asia and South Asia. Globally, snow leopards are found only in the 12 countries in the Himalayan region including Nepal.

In Nepal, snow leopards are found in the Kangchenjunga Conservation Area (KCA) in the east to Api-Nampa Conservation Area (ANCA) in the west. Potential snow leopard habitat is estimated around 13,000-km2, which is largely located in the Himalayan range from east to west. The area can be broadly classified into three large conservation complexes namely eastern, central and western complexes. The eastern complex extends from KCA in the east to Langtang National Park (LNP) in the west covering Makalu Barun National Park (MBNP), Sagarmatha National Park (SNP) and Gaurishankar Conservation Area (GCA). Similarly, the central complex extends from Manaslu Conservation Area (MCA) in the east to western part of Annapurna Conservation Area (ACA) in the west. The western complex extends from Tscharka pass in the east to ANCA in the west covering Dhorpatan Hunting Reserve (DHR), Shy Phoksundo National Park (SPNP), Rara National Park (RNP) and Khaptad National Park (KNP). Besides protected area system, adjoining national and community forests, rangelands, where prey-base is sufficiently available are the suitable habitats to snow leopards.

The population estimate, based on linear relationships between genetic analysis and scrape encounter rates, which have been cross-verified with predator-prey relationship is 301-400 individuals in Nepal. The population density ranges from 1.5 to 3.2 animals/100 km^2, with the highest density found in western complex. However, to verify this figure required more systematic and rigorous study in near future. The generated information on snow leopard, its prey base and habitat, which are scanty and outdated such as VHF radio telemetry date backed to 90s, require refined. Available advanced technologies on research methodology such as fecal DNA, camera trap and GPS satellite collard should be internalized to formulate science-based conservation plan of this species.

Snow leopard is an apex animal to the Himalayan Ecosystem. Blue sheep and Himalayan tahr are the major wild prey-base to the species. However, snow leopards often kill the livestock both at individual and groups. Snow leopard is being threatened mainly because of retaliatory killings due to livestock depredation, poaching for illegal trade of its body parts, loss of prey base and habitat loss. Poachers and wildlife criminals kill the animal for skin and bones that have higher demand with higher prices in the international markets. Retaliatory killing of snow leopard is quite common in Nepal. There are evidences that this species is competing with common leopard for shelter and food, as the common leopard is climbing upward especially in SNP, KCA and ACA possibly in the context of climate changing scenarios.

The government of Nepal has strong legal provisions to control wildlife crimes particularly for protected animals such as snow leopard. The provisions include imprisonment of 5 to 15 years or penalty of NPR 50,000 to 100,000 or both. Effective law enforcement is crucial to control poaching and illegal trade of snow leopard.

Community based snow leopard conservation and monitoring is practiced in Nepal involving citizen scientists and local communities. Establishment of community-based snow leopard monitoring system, community-managed livestock insurance scheme, awareness campaigns, corral improvements, improve herding system are some of the examples that have been carried out to date for the conservation of the snow leopards.

Efforts should be made at local, national and regional levels in order to protect this charismatic species. Strengthened community based snow leopard conservation initiatives, establishment of sustainable institutional and financial arrangements, effective implementation of national conservation action plan, and transboundary and regional cooperation are important for the conservation of snow leopards.

Valuing the snow leopard ecosystem and its economic, biodiversity, and spiritual/cultural services, quantified as much as possible

To the community

Nepal is a land-locked and mountainous country with a diverse biology and culture. People living in the Himalayan ranges are belongs to various ethnic groups. The major ethnic groups are Sherpa, Bhutia, Rai, Limbu, Tamang, Gurung, Magar, Lama, Thakali, and Managi. The livelihoods of these communities largely depend on agro-pastoral. They used to migrate to the lowland in the winter and back to the upland in the summer. In many instances, the local communities of the mountain region used to sale their local products particularly Non-Timber Forest Products (NTFP) and carpets, which are the main sources of income. However, tourism is becoming a growing attraction nowadays for their livelihoods. The major tourism activities local people involved are hotel and restaurant works, porters and nature guides. Among the various ethnic groups, Sherpa is popular for trekking, mountaineering and climbing whereas Thakali are popular for preparing delicious foods.

Snow leopard in Nepal is popularly known as Queen of Mountain. The habitats of snow leopard have also enormous effects to generate income and employment opportunities to local communities. Besides, Himalayan region of Nepal which extended from Mt. Kanchenjunga in the east to Mt. Api-Nampa in the west, is the source of perennial water flowing from north to south and consequently source for hydroelectricity, irrigation and drinking water and eventually overall development of the country. Since those perennial sources are result of conservation efforts of local communities, it is essential to assess and evaluate conservation efforts made by the up-stream communities of snow leopard habitats and payback them for their efforts from the down-stream communities who get benefits from the resources. Environmental Impact Assessment (EIA) and Initial Environment Examination (IEE) may ensure such mechanism of payment for environmental services to local communities. Environmental Services evaluation assessed by ICIMOD in the Himalayan Region might be useful to evaluate snow leopard habitats as well.

To the nation

Nepal shares the important parts the Himalayan region. The highest peak of the world Mt. Everest (8848m) is located in Nepal along with other seven peaks having elevation more than 8000m including Mt. Kanchenjunga, Mt. Makalu, Mt. Lhotse, Mt. Manaslu, Mt. Cho Oyu, Mt. Annapurna, Mt. Dhaulagiri more than 8000m. The foothills of these mountains are the main habitats of snow leopard and a unique assemblage of rare and endangered species including Tibetan argali (*Ovisammon hodgsonii*), Tibetan gazelle (*Procapra picticaudata*), wild ass (*Equus kiang*), and blue sheep (*Pseudois nayaur*), lynx (*Lynx lynx isabellinus*), grey wolf (*Canis lupus*), Himalayan black bear (*Selenarctos thibetanus*).

The Himalayan region has a huge contribution to national economy through producing water resources, tourism, NTFPs and aromatic and medicinal plants (MAP). The major river systems of Nepal namely Koshi, Gandaki and Karnali are originated from the Himalayan region and provide perennial water for drinking water, irrigation and hydroelectricity. . The landscape beauty, cultural diversity, and natural and cultural heritage sites are the main tourist attractions. Mountaineering, climbing, trekking, and hiking are major tourism activities carried out in the region. The Himalayan range produces high value NTFPs and MAPs which are the sources of medicines for indigenous use and for pharmaceuticals as well.

To the planet

The mountainous regions of Nepal is largely extended and expanded along with Tibetan Pluto.However, the Kanchenjinga region in the east and Apri-nampa region in the west is adjoining with India. Therefore, it is crucial to conserve and protect the snow leopard together neighbor countries in collaboration. Realizing the fact, the Government of Nepal has signed a Memorandum of Understanding (MoU) with the Government of China in 2010 Moreover, annual base resolution has been made between India and Nepal on regular basis. In many instances, Nepal, India and China have been carried out collaborative efforts in wildlife conservation such as regular national and local level transboundary meeting. It has huge

possibility in snow leopard conservation as well. The snow leopard habitats are also regarded as the third pole of the earth and matter of concern to environmentalists and conservationist worldwide. Besides, recent technological advances and financial support from various countries is being instrumental for the conservation of this globally endangered species.

Disseminating information on the value of the snow leopard ecosystem and generating support for conservation

Past efforts

Various efforts have been made by the government of Nepal to conserve snow leopards and their habitats. The inclusion of snow leopard as the protected species in the National Parks and wildlife Conservation Act 1973 revealed that Nepal has more than four decade long history of snow leopard conservation efforts at government level. However, the conservation effort made by the local communities in the mountainous region is much larger, as the life of snow leopard and livelihood are correlated. Besides, various efforts have also been made by non-state partners to conserve snow leopard. The common efforts carried out by various organizations are habitat conservation and management, research and monitoringpoaching and illegal trade control, human-snow leopard conflict management, and trans-boundary cooperation. Besides, awareness and education to local communities and promotion of tourism in the snow leopard habitats mainly in LNP, SNP and KCA are important efforts.

The Government of Nepal prepared the Snow Leopard Conservation Action Plan for Nepal in 2005, which has been revised in 2012 based on the experience in the field and results of various researches. Moreover, activities of genetic studies and issues of climate change are incorporated in the revised action plan. This action plans aims to maintain a viable population of snow leopards with enrichment of local communities in terms of cultural and ecotourism aspects, and local livelihoods. The plan is currently implementing by the Department of National Parks and Wildlife Conservation (DNPWC) in close partnership with the Department of Forests (DoF) and conservation partners including WWF Nepal and National Trust for Nature Conservation (NTNC). WWF Nepal contributed to snow leopard conservation in the Sacred Himalayan Landscape (SHL) (KCA in the east to LNP in the west) and SPNP while NTNC contributed in ACAP, MCAP and GCAP areas.

The major conservation interventions made by state and non-state partners are:

- Habitat conservation in and around the snow leopard bearing protected areas
- Livelihood improvement activities of local communities through community development and income generating activities to reduce human-snow leopard conflict
- Research and monitoring of snow leopards,
    - Regional level (Eastern Himalaya-wide) analysis of the impacts of climate change on snow leopard habitat
    - Non-invasive genomic analysis of snow leopards;
    - Camera traps survey for snow leopard monitoring
- Promotion of ecotourism based on snow leopard conservation
- Human-snow leopard conflict mitigation through community-managed livestock insurance scheme in KCA, SNP, LNP, ACA, SPNP; and
- Community-based snow leopard conservation and monitoring system in several sites

In addition, the Government of Nepal established two protected areas *viz*. GCA and ANCA in 2010 considering the prime habitat of snow leopards. GCA and ANCA have an estimated area of 217,900 ha and 190,300 ha respectively. Declaration of these two protected areas is one of the milestones of snow leopard conservation. Similarly, the government endorsed the SHL Strategic Plan (2006-2016) in 2006 and the SHL Interim Implementation Plan (2010-2014) in 2010, which provided opportunities to implement snow leopard conservation initiatives at the landscape level. Establishment of the national level Wildlife Crime Control Bureau (WCCB) under the chairmanship of the Director General of DNPWC and its district cells in selected districts under the chairmanship of protected Area Manager and District Forest Officer has contributed towards controlling poaching and illegal trade of wildlife including the endangered snow

leopards. Moreover, signing of the MoU between China and Nepal in 2010 and a resolution between India and Nepal on annual basis are important steps towards trans-boundary and regional level collaboration for conservation. The Government of Nepal has recently been increased the compensation amount incase snow leopard kill the people in 2013. Similarly, the government decided to compensate NRs. 50000 and 10000, if the snow leopard makes serious and normal injury to human respectively.

Future possibilities

Recent advances in wildlife techniques, such as non-invasive genetic analysis (Janecka *et al*., 2008; Lovari *et al*., 2009; Karmacharya et al, 2011; Wegge *et al*., 2012), camera-trap surveys (Karanth & Nichols, 1998; Jackson *et al*., 2006), and GPS-satellite telemetry (McCarthy *et al*., 2005; McCarthy *et al*., 2008) offer possibilities for better and more rigorous studies on the ecology and behavior of snow leopards. Genetic analysis of fecal DNA shows potential to develop an index of snow leopard abundance and population structure, including information on sex and genetic relationships between different populations. Inclusion and address of climate change issues is equally important to conserve the snow leopard in the following years.

Snow leopards are a wide-ranging species that require landscape level conservation efforts. The large part of snow leopard habitat falls outside the protected area system in Nepal and it is also essential to coordinate and collaborate while protected snow leopard to various conservation partners in one side and local communities on the other. Maintained contiguity and connectivity of the protected areas and habitats is important for landscape level conservation. This will require strengthened coordination between the government agencies, conservation partners and other stakeholders.

Conservation of snow leopards will largely be decided by the active participation of local communities living in and around the snow leopard habitats. Local communities have been experiencing economic crisis due to livestock depredation by snow leopards. Being a charismatic species, there is a high potential to generate income through promoting nature-based ecotourism featuring landscape beauty of snow leopard habitats. This opportunity will not only enhance the livelihoods of local communities but will also raise awareness on snow leopard conservation for long-term sustainability.

Snow Leopard Conservation Action Plan for Nepal envisions three snow leopard conservation complexes viz. western, central and eastern in Nepal for long-term management of the minimum viable populations (MVP) of at least 50 breeding snow leopards. The MVP will be maintained in the western conservation complex (from Darchula district to Tscharka pass, the border of Dolpa and Mustang) and Annapurna-Manaslu conservation complex (from Tscharka pass to Rasuwagadhi in the east-central region of Nepal), which is contiguous habitat of this wide ranging species. However, in the Eastern conservation complex (from Rasuwagadhi to eastern part of KCA) is fragmented, need to be linked by implementing various corridor and connectivity activities. In the eastern and western corners along with Indian and Chinese borders are concurrently shared by snow leopard. It also reveals a need of joint snow leopard conservation efforts by the range countries beyond the border. The joint conservation efforts among the adjoining snow leopard range countries are also equally important for sharing best practices.

Assessing threats, both traditional and new ones from infrastructure development, market demand, tourism, and climate change to:

The snow leopard

The snow leopard faces a number of threats in Nepal. The traditional threats are over-grazing and retaliatory killing as the mountainous communities are largely based on livestock based livelihoods. Besides, poaching and illegal trade of snow leopard organs, development infrastructure and habitat degradation, and climate change are major threats to snow leopard conservation in Nepal. Despite the efforts made by government and non-government partners, these threats remain constant and some of them are eternal nature. Poaching of snow leopards for illegal trade of skins and bones is a widespread threat to snow leopard conservation else where in the world, and Nepal is not exceptional from it. Open

borders with neighbor countries are also threatening to this species. Loss of prey-base in some protected areas such as SNP (Lovari *et al.,* 2009, Ale *et al.,* 2010) and outside the protected areas (Kattel, 1995) is another threat to snow leopard survival. Habitat degradation due to unsustainable grazing, and over collection and exploitation of NTFP and MAPs for commercial trade are additional threats to snow leopard conservation.

The ecosystem (key being Himalaya-Karakorum; mountains of central Asia; Altai-Sayan; Gobi; Eastern Himalaya, Tibetan Plateau)

Impacts of climate change have emerged as unavoidable threats to snow leopards and their habitats. Models based on global climate change trajectories suggest that Nepal will lose about 40% of alpine habitat due to upslope habitat shifts (Forrest *et al.,* 2012). The projected consequences will be the loss, degradation and fragmentation of snow leopard habitats, isolating populations within smaller habitat patches, and compromising their demographics, which include their ecological and even genetic viability. Habitat shifts may cause overlapping of snow leopard habitat with other cats resulting in increased competition.

The human community

Many of the traditional pastoralist systems are currently in the process of substantial change due to external influences related to modern development effects (Miller, 1987) that could significantly influence the alpine predator-prey system. Rapid spreading of village and district roads throughout the country is leading to the loss of snow leopard habitats. Construction of highways and rural roads could also result in habitat fragmentation (Thapa, 2005) and increased wildlife crimes in Mustang and Rasuwagadhi. Unregulated high volume tourism could result in increased stress and other negative impacts on snow leopard habitats and snow leopard populations in SNP and ACA.

Dealing with above threats

Replicating known good practices (mainly for traditional threats)

The government field level offices together with conservation partners including national and international conservation organizations have been implementing both preventive and remedial mitigation measures in order to reduce the threats related to snow leopard conservation. NTNC manages ACA, MCA and GCA and local communities through Kangchenjunga Conservation Area Management Council (KCAMC) manages KCA in order to safeguard the species from various threats. In many instances, these protected areas have also been able to build community stewardship for snow leopard conservation. A community-managed livestock insurance scheme has been successfully piloted in the Ghunsa valley of KCA (Gurung *et al.,* 2011) and has now been introduced in LNP and SPNP. This insurance scheme is largely self-sustaining and is locally managed and administered. Even though the scale and amount is small, the payments of livestock depreciation managed by the local communities are exemplary works. Most importantly, it has recently been demonstrated as a more rational approach in conserving snow leopards compared to other remedial measures (Gurung *et al.,* 2011; Wegge *et al.*, 2012). The results from above mentioned protected areas have been highly promising and may give synergetic effects if we can replicate these best practices to other protected areas of snow leopard bearing. Other innovative solutions such as the construction of predator-proof corrals, conservation awareness campaigns to guard livestock by herders, and veterinary services will be initiated to reduce both depredation and retaliation.

Developing new counter measures (for new threats) including pilots where needed

Climate change scenario projections indicated a northward shift of forests and snow leopard habitat due to global warming and moisture conditions (IPCC, 2007; Rupa et *al.,* 2006). Since forest habitats do not

generally constitute good snow leopard habitats, this shift has resulted in significant loss and fragmentation of snow leopard habitats. It is projected that Nepal will lose about 40% of the current alpine areas (Forrest *et al.,* 2012). Consequently, snow leopards can become isolated in smaller fragments, compromising their demographics and its ecological and genetic variability.

Studies and action research need to be conducted to predict climate change impacts on snow leopard and its habitats. The results further need to be integrated with the information from hardcore research (using GPS satellite collar and fecal DNA research) to develop a climate-integrated conservation plan for Nepal which in turn will identify climate resilient core areas and dispersal linkages, across the Himalayas and within the Trans-Himalayan region. The conservation plan will also consider the role of snow leopards as an apex species in the high Himalayan ecosystems, and as an indicator of the impacts of climate change and other local anthropogenic activities on the ecological integrity on sensitive habitats.

Trans-boundary collaboration

Nepal shares a long border with China that is prime habitat of snow leopard. Similarly, Nepal shares two segments of snow leopard habitats KCA in the east and ANCA in the west. Snow leopards are poached in the border areas for their pelt, which is in high demand in the international markets. Since snow leopard habitats are located in the high mountains, in close proximity to the international market in the Tibet Autonomous Region (TAR) of China and India, the species is always is vulnerable to poaching and trade. Strengthening capacity of enforcement agencies and mobilization of local communities are crucial to control poaching and illegal trade. Likewise, effective trans-border collaboration amongst the governments of Nepal, China and India is urgently required. Regional cooperation is also important for landscape level conservation of snow leopards. It is also very important to mobilize local enforcement authorities to uproot the illegal trans-boundary trade nexus. The MoU signed between the governments of Nepal and China in 2010 will be instrumental in boosting coordination and cooperation to curb illegal trade of wildlife parts and products across the international border.

Organization, empowerment, and support

National institutions for SL conservation: strengths and weakness to be remedied

At the policy level, a National Snow Leopard Conservation Committee (NSLCC) has been formed under the chairmanship of the joint Secretary, Environment Division, Ministry of Forests and Soil Conservation (MFSC). An Advisory Committee under the chairmanship of Director General, Department of National Parks and Wildlife Conservation and a Technical Committee under the chairmanship of Ecologist has been formed. The advisory committee guides at overall level while technical committee is crucial to carry out research and wildlife monitoring including snow leopards.

Local level snow leopard conservation committees have been formed at district level, however they are very seasonal. The KCA and LNP have formed community based anti-poaching operation teams in order to control the snow leopard poaching. Similarly, Snow Leopard Conservation Committees (SLCC) are also formed for snow leopard monitoring and implement livestock insurance scheme. Community based institutions are also formed for community development, income generation, ecotourism promotion, awareness on snow leopards. Local institutions like community forestry user groups need to be incorporate into snow leopard conservation activities which are largely missing in the past. Similarly, it is equally important to incorporate the institutions related to ecotourism activities in the mountainous ecosystem.

Legal framework for protecting SL and habitat; strengths and weakness to be overcome

The government of Nepal has been strong law enforcement provisions to snow leopard hunters and illegal traders of the species. According to the provision, the poacher can sent to the jail from 5 to 15

years and/or can be sanction from Rs. 50,000 to Rs. 100,000 or both. Snow leopard bearing protected areas and District Forest Officers are the judiciaries to combat the wildlife crimes in Nepal. Snow leopard are protected under international and national law, including the CITES, which lists the snow leopard as among the most endangered species threatened with extinction, (CITES 2012). It is also a protected species under National Parks and Wildlife Conservation Act of Nepal 1973. Even though the protected areas are serious and committed to take legal action, it is rarely realized such seriousness outside the protected area system, where the government need to be focus on.

Wildlife law enforcement and combating crime: current practice and areas for improvement

The Snow leopard cases are a very few. It does not mean that there are no snow leopard crimes in Nepal. But most of the crimes are often occur in the remote areas where there is no government presence. Therefore, enhance and promoting of law enforcement agencies and motivation to local communities is essential to combat the snow leopard crimes in Nepal.

Legal framework for empowerment of community for co-management of wildlife and habitat; current practice and areas for improvement

Buffer Zone User Committees at MBNP, SNP, SPNP, RNP and KNP are very supportive to law enforcement. KCAMC and other community-based institution at KCA, which is fully managed by community based council system, is also an example of co-wildlife management and very supportive institution to law enforcement agencies. Similarly, local community conservation committees are other examples in ACA, MCA and GCA.. Besides, KCA has formed four snow leopard conservation committees at local level. Similarly, LNP has two snow leopard conservation committees while SPNP and ACA have been formed three and seven snow leopard conservation committees respectively. Local level snow leopard and prey base monitoring, patrolling and insurance scheme have also been managed in KCA.

Support mechanism for building community organizations: current practice and needed strengthening

In order to gain the trust of local communities, to retain their active involvement in snow leopard conservation activities, a local level fund has been created in selected protected areas. Such fund has been instrumental to create and maintain the trust between park authorities and local communities during the human-wildlife incidents. As of beginning of 2013, KCA has created a fund amounted US$ 16000. It has very effective roles to compensate the wildlife victims. Similarly, LNP and SPNP have created a fund amounted US$ 10000 and US$ 3000 respectively. Besides, government and conservation partners have been provided technical support (training for wildlife monitoring technique), equipment: GPS, Spotting scope, binocular, compass and field gears: Sleeping bag, tent, mattresses, kitchen utensils, trekking bag, down jacket, trekking shoes to the frontline staff. These supports are very crucial to motivate the frontline staffs and keep them in snow leopard conservation activities. Even though there is no practice to include local governing bodies for example Village Development Committee (VDC) in snow leopard and other conservation activities directly, but it is highly crucial to consider them for landscape level conservation and generate the conservation fund at local level.

Research and training

Development and implementation of programs for scientific and technical education and training for identification, conservation and sustainable use of ecosystems, their component and support for education and training to meet the specific needs of the habitat of the snow leopard is an important objective of snow leopard conservation action plan (2005-2015). It is highly crucial to train more than 100 citizen scientists and deliver the training to snow leopard conservation committee at local level in the snow leopard bearing protected areas across the Himalayan region. The snow leopard habitats are located in terrain and remote areas and therefore the research and monitoring activities are always time and money consuming. In order to reduce the costs and to get the real time base data, involvement of

local communities through community based institutions are highly crucial. Establishment of permanent sign transects and regular snow leopard monitoring, education to livestock herder is equally important.

Cooperation in the application of results of scientific research

The Government of Nepal together with its non-state partners for NTNC, WWF Nepal, National Academy of Science and Technology and Center for Molecular Dynamics, Nepal have been carried out a number of research works on snow leopard ecology, its behavior and human-snow leopard conflicts. Some of the example researchers are fecal DNA (Karmacharya et al. 2011) for snow leopard abundance and sex, prey base monitoring and snow leopard food habit (Oli et al. 1991, Thapa 2010). Besides, some of the individual scientists have also carried out various aspects of research on snow leopard. However, these researches are fragmented on issues and need to be analyzed for policy and planning transformation.

Time-phased implementation program (i.e. priority activities, their costs, and anticipated outcomes. Activities start when ready and after suitable piloting) – related to understanding and protecting:

SN	Major Area of intervention	Estimated Budget (US$ 1000)
1	Updating and revising policies	40
2	Managing Habitat & Prey	1400
3	Controlling Poaching of Snow Leopards & Prey	800
4	Engaging Local Communities and Reducing Human-Wildlife Conflict	1400
5	Trans-boundary Management and Enforcement	350
6	Strengthening Capacity of National and Local Institutions	300
7	Researching and Monitoring	800
	Total	5090

Note: These costs are only program costs in addition to existing planning and budgeting system

Tracking implementation progress and monitoring results

The progress and monitoring results will be compatible with portfolio activities.

Scientific monitoring of SL, habitat, and threats: current practices and areas for improvement

Being the focal organization for wildlife conservation, DNPWC will lead and coordinate a joint monitoring and evaluation team with the support of partner organizations. Participatory monitoring will be done annually to measure the progress of outlined activities. MIS at DNPWC and its field offices particularly snow leopard protected areas will be strengthened for effective monitoring. In order to measure the effectiveness of conservation efforts and their impacts and sustainability, mid-term and final evaluations will be conducted after implementation of the action plan during a three- and five-year period.

Monitoring implementation progress through key indicators: setting up a robust system

- Periodic monitoring of snow leopard population to all snow leopard bearing protected areas will be institutionalized
- Ecological and non-invasive research will be promoted and continued

- Radio telemetry monitoring and calculation of carrying capacity will initiated based on the need and capacity of DNPWC
- Prey base population, density and reproductive rate using direct count method will be systematized, with regular monitoring.

Summary of costs and financing possibilities

Capital and operating costs by component, phased over seven years

In order to implement the national snow leopard ecosystem protection priority activities, both internal and external sources need to be assessed and secured. The internal sources are regular government budget, which plan and release through snow leopard bearing protected areas, district forest offices, district development committees and village development committees. In addition to that the buffer zone budget of snow leopard bearing protected areas will be utilized to implement the priority activities. It is expected that out of proposed NSLEP costs, around 25% will be beard from the government revenue. Besides, the contribution of national level non-government organization like national trust for Nature Conservation is equally important.

Similarly, in order to implement the NSLEP priority activities, the contribution of both bilateral and multi-lateral donor agencies including international non-governmental organizations like WWF is essential. Besides, the government of Nepal will give a proper space to other donor agencies based on the mutual discussion. It is expected that around 75% costs of NSLEP will be beard from the external sources particularly donor agencies and international non-government organizations. Besides, new source of funding like payment for environmental services of snow leopard habitats, ecotourism promotion and carbon offsets will be identified. These resources may have extra efforts to implement the in the standard manner.

Major funding Gaps

Around US$ 5 million is necessary in order to implement the NSLEP of Nepal. Out of total budget estimation, around 25% budget will be bear by the Government of Nepal while remaining part will be beard from donor agencies and conservation partners. Pilot project for Climate Resilience (PPCR) component five will be implemented in the prime habitat of snow leopard particularly SPNP and DHR. In order to reduce the gap and secure the sufficient fund, a conducive environment from government side to non-state partners is essential. However, transparency in budget planning and implementation from non-state partners is equally crucial.

Pakistan

PAKISTAN NATIONAL SNOW LEOPARD ECOSYSTEM PROTECTION PRIORITIES

GLOBAL SNOW LEOPARD ECOSYSTEM PROTECTION (GSLEP) PROGRAMME

Second Draft

June 28, 2013

Climate Change Division
Government of Pakistan

Valuing the Snow Leopard Ecosystem

The snow leopard is an iconic flagship species of the mountains of central Asia. The best estimate of global snow leopard population is 4,000–6,500 individuals (McCarthy and Chapron, 2003) and the species is categorized as "endangered" in the International Union for the Conservation of Nature (IUCN) Red List, and listed in Appendix I of the Convention on International Trade in Endangered Species (CITES) (IUCN, 2012).

An estimated 200–420 snow leopards exist in Pakistan's northern mountains across Khyber Pakhtunkhwa (KPK), Gilgit-Baltistan (GB), and Azad Jammu and Kashmir (AJK). A national-level assessment deemed the species "critically endangered" (Sheikh and Molur, 2004) within the country. While small, Pakistan's snow leopard population represents the world's third largest by size, tied with India, highlighting the country's importance for conserving the species worldwide.

Within Pakistan, the GB province contains the largest proportion (> 60%) of the country's snow leopard population (Hussain, 2003) which is largely concentrated in the province's two largest and adjoining national parks, Khunjerab National Park (KNP) and Central Karakoram National Park (CKNP). To the north, KNP and CKNP border important snow leopard habitat in China, home to the largest population of the cats throughout its 12-country range. Given the large home ranges of individual cats—studies show that snow leopards can have a home range of up to 1,000 km^2 and travel up to 200 km in a single foray (McCarthy, 2000; McCarthy et. al., 2010; Sharma et al., 2010)—it is fair to assume that the Karakoram range in Pakistan helps form a large wildlife corridor important for the overall genetic flow between snow leopards in Pakistan, China, and India.

The total snow leopard habitat available in Pakistan is about 80,000 km^2 (Fox, 1989) and encompasses four high mountainous systems, namely the Hindu Kush, the Pamirs, the Karakorams, and the Himalayas (**Figure 1.1**). These majestic ranges are home to some of the world's most fascinating and endangered wild species, including the markhor (*Capra falconeri*), Marco Polo sheep (*Ovis ammon polii*), musk deer (*Moschus chrysogaster*), Himalayan lynx (*Lynx lynx*), blue sheep (*Pseudois nayaur*), brown bear (*Ursus arctos*), Indian wolf (*Canis lupus*), Himalayan ibex (*Capra sibirica*), and the snow leopard, which is taken as an indicator of this mountainous ecosystem.

Apart from this unique assemblage of fauna, these mountainous systems have supported socially secluded and diverse human culture dwellings in the valleys for centuries. Thus, the high mountain ecosystems are vital for the co-existence of both human tribes and wildlife. The following factors further highlight the importance of these mountainous ecosystems:

Generally, snow leopard habitat is a hub of unique biodiversity and ecosystem functions and services, due to its remoteness and comparatively little development. Functions and services include watershed function, genetic resources, wild cultivars of agriculture, traditional knowledge, customary laws, and spiritual and cultural values;

The prominent flora found in snow leopard habitat include Picea smithiana, Pinus willachiana, Cedrus deodara, Quercus balloot, Taxus baccata, Betula utilis and Juniperus communis. In addition, around 78 species of medicinal and aromatic plants occurring in its habitat form the active trade and serve as major means of livelihood for local communities sharing habitat with snow leopards;

Approximately 80% of the GB population is engaged in subsistence agriculture although agricultural production is constrained by many factors; paucity of cultivable land remains the limiting factor besides harsh climate in winter other factors include poor storage and processing. Cultivation is dominated by cereals production,fruits, vegetables, and fodders, and plays a pivotal role in the local economy;

Rangelands occupy over 22% of the mountainous areas of the Gilgit Baltistan (GoP and IUCN, 2003), and similar expanse of rangelands is expected in parts of the snow leopard range. They provide critical grazing areas for livestock, protect water catchments, and support a rich diversity of flora and fauna;

Livestock is central to the local agricultural economy and plays a vital role in the region's food security. It accounts for more than 40% of household farm incomes and each household maintains a herd ranging from four to 20 individual goats and sheep. An estimated livestock population of 4.56 million is dependent on alpine pastures (GoP and IUCN, 2003);

The Forestry Sector Master Plan estimates that there are some 381,200 hectares (ha) of scrub forests in GB. The natural forests play a vital role in protecting the Indus River watershed, supporting a rich diversity of flora and fauna, serving as an important source of forage and pasture for livestock populations timber and firewood, supplying an important array of non-timber forest products (NTFPs), including medicinal plants, spices, honey, and mushrooms, and have tremendous potential for recreation and the development of ecotourism (GoP and IUCN, 2003);

Forests and agriculture in these mountains provide subsistence for more than nine million people. Sixty percent of mountainous communities are directly dependent on natural resources;

Hydropower generation lies in mighty Indus and its tributaries that flows throughout the snow leopard habitat. Despite the high potential for hydropower generation, only a fraction is utilized. The total capacity amounts to 31,000 megawatts (17,000 MW, 5,000 MW, and 9,000 MW in GB, Chitral, and Swat, respectively). With an extreme shortage of power there is a high demand for construction of more hydropower projects and most of them are likely to be located inside the SL habitat

Cultural diversity in the range is immense and abode for one of the world's oldest known civilization that still survives in the Kelash valleys of Bamburet, Barir, etc. Ecotourism potential is immense, however very little is tapped currently. Domestic tourism is an important source of livelihood for local people;

Besides aesthetic and cultural values, these mountains have intrinsic spiritual and religious values;

In short, humans and snow leopards share a habitat that provides a life support system both directly and indirectly for the local population. For the national economy this habitat provides off-season vegetables and fruits while remains a net importer of cereals. The trade in medicinal plants is huge but authentic figures are not available. it is believed that a huge quantity is traded illegally.

Trophy hunting is Pakistan is a success story that is widely acknowledged globally and more than seventy percent of trophy hunting quota in the country is allocated to the snow leopard range. Local communities benefit directly from the 80-90 percent share of the legal hunting of snow leopard prey species—markhor, ibex, blue sheep—which delivers an annual cash income of at least USD I m $ million in permit fees with a multiplier effect that has not been qualified so far. . This can be considered a cash injection into the national economy, as well. National and international tourism is the main business of communities in snow leopard habitat.

The species also serves as a link with the international community and possesses potential for trans-boundary agreements and means of commitment though compliance with multilateral environmental agreements (MEAs). Pakistan like other range states is a party to a number of MEAs; CMS deals specifically on migratory species across international borders. Transboundary issues related to biodiversity are gaining wider acceptance including the creation of trans-boundary protected area systems. Snow leopard is a flagship species that cannot be conserved without international cooperation

The apparent benefits in addition to the ecosystem services, appreciation value, satisfaction value, and biodiversity value are given in **Table 1.1**.

Table 0.1: Generic Quantification of Ecosystem Services in Snow Leopard Habitat

	Value	Generic Quantification	Source
1.	Medicinal and aromatic herbs currently collected and marketed by local communities	Annual income of approximately USD 4 million from 78 medicinal and aromatic plants species	Value chain development of medicinal and aromatic plants, NRSP-HDOD December 2013
2.	Tourism including hotels, facilities, services, and guiding in and around snow leopard habitat	Approximately USD 0.5 million, annually (335 hotels, guiding, and services)	Data from Chamber of Commerce, major hotels, and discussions with tour operators

	Value	Generic Quantification	Source
3.	Power generation supply	Direct power supply to approximately four million people	February 2001 - Hydropower resources of Pakistan, Private Power Infrastructure Board, Ministry of Water and Power, Government of Pakistan
4.	Cash income from trophy hunting of prey species	USD 1 million from sport hunting of markhor, ibex, and blue sheep	Annual report 2011, Program for Mountain Areas Conservation (PMAC)
5.	Services	Water, fuel wood, meat, wool, and wild fruits for 0.9 million people	Based on population dataanalysis

Figure 0.1: Snow Leopard Distribution Map

Awareness and Outreach

Environmental education (EE) was defined in the Tbilisi Declaration as: "...a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action." [34] Prior to this definition, the IUCN described EE as: "...the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among men, his culture, and his biophysical surroundings. EE also entails practice in decision-making and self-formulation of a code of behavior about issues concerning environmental quality." [35]

Education and awareness, particularly at the local level, are critical factors in generating support among local communities for conservation and management initiatives. In a natural environment, the quality of

[34] UNESCO, Tbilisi Declaration 1978.

[35] Neal P. and Palmer J. Editors, 1990: 2. http://www.glocom.org/special_topics/colloquium/20030723_iguchi_environmental3/.

local communities is dependent upon the resource generating ability of natural systems. The long- and short-term consumption choices of local communities can either enhance or compromise the ability of natural systems to meet their needs, the needs of their neighbors, and the needs of future generations. Education and awareness efforts can assist local communities in safeguarding existing resources, improving the ecology, and mitigating the hardships caused by the lack of awareness and knowhow.

Past Efforts in Snow Leopard Range

The environmental education background paper prepared by the IUCN (Abbas, 2003) for GB indicates that there is plenty of basic information on the environment in the existing curriculum of schools. This includes information on forests, agriculture, and industries. However, the link between the environment and the impact of its degradation on human life is not clearly defined. Curriculum development is a federal responsibility in Pakistan. However, due to growing awareness of the linkages between poverty and environmental degradation, the Education Department of GB redeveloped the primary-level curriculum by incorporating environmental issues under the Northern Areas Education Project (NAEP) funded by the Department for International Development (DFID)-UK and implemented by the British Council. The study also showed that numerous intergovernmental organizations or non-government organizations (NGOs) such as the Aga Khan Education Service (AKES), the World Wide Fund for Nature-Pakistan (WWF-P), and IUCN, are involved in the sector. However, the existing EE initiatives taken by various formal and non-formal sectors are activity based and there is a lack of coordination among the organizations and government departments undertaking these initiatives. Thus, the paper drew upon the roles and responsibilities of key development actors regarding the implementation of the development strategy.

Future Possibilities

In order to be effective, it is essential that the awareness and education plan target diverse population groups that have different interests and stakes in the snow leopard range. Four target audiences have been identified:

- Wildlife staff: Staff involved in the management of the wildlife and protected areas (PAs), including game watchers, rangers, game inspectors, and field officers;
- Local communities: Sedentary and migratory communities, i.e., communities permanently and periodically dependent on the resources of the snow leopard range;
- Visitors: National and international visitors to the snow leopard range;
- The general public: Potential visitors, armchair travelers, schoolchildren, and religious groups;
- Business interests: Local and outside, who have an impact on the snow leopard range.

Since members of the general public are potential visitors, the general public and visitor categories will be grouped together during the initial implementation of the awareness and education strategy.

Another potential group is the corporate sector, including national and multinational companies. Funding conservation and development initiatives can benefit both the snow leopard and the corporate sector; the conservation cause will gain access to additional funds and corporations can earn public goodwill.

The most suitable tools to educate each population group about conservation in general and the snow leopard in particular, are given in the following sections.

The Wildlife Staff

It is essential to utilize and build the human capital of the management organization of natural resources to effectively fulfill the short- and long-term goals of conservation. Various mechanisms have been defined below to enhance the capacity of field- and office-based wildlife staff.

Networking

WWF-P has pioneered EE in the mountainous areas of KPK and GB where fragile ecosystems are under stress due to population increases and the opening-up of the region after the construction of the Karakoram Highway (KKH). Similarly, a number of conservation education initiatives have been undertaken by organizations such as the Karakoram Area Development Organization (KADO), the Snow Leopard Trust (SLT), the Hunza Education Resource Project (HERP), the Himalayan Wildlife Foundation (HWF), the Aga Khan Rural Support program (AKRSP), AKES, and IUCN.[36] Networking and coordination will help ensure cooperation, introduce wildlife department staff to a cumulative learning process, and avoid duplication of efforts.

The relevant wildlife authorities will liaise with other organizations and departments involved in conservation activities in exchange for information and research findings.

Annual Training Workshops

A variety of training courses will be conducted to enhance the capacity of local staff. Training will cover the following topics:

- Issues related to conservation of the snow leopard and its habitat;
- Significant features of the snow leopard ecosystem, including the area's geology and geomorphology, the faunal and floral complex, ecological systems, and historic background;
- Species management and biodiversity conservation;
- Community participation and sustainable development;
- Sustainable development and poverty alleviation;
- Visitor and tourism management;
- Understanding and responding to climate change impacts;
- Field investigation techniques;
- Monitoring.

Additional subject areas may be considered based on available budgets and need for training. Visual and verbal aids will be used as supporting materials during lectures since a large proportion of the lower field staff is likely to possess lower educational qualifications. Teaching aids such as guidebooks, posters, and flip charts have been developed under various projects and should be utilized for wildlife stafftraining. Annual training workshops will be conducted for field staff in joint or divisional sessions based on logistical requirements and limitations.

A minimum of one training workshop in a year will be organized for field staff.

Preparation of Manuals

Awareness and education manuals for field staff and teachers will be developed in the long term (after year 3). Training manuals may cover the following areas:

- Improved monitoring and evaluation
- Enhancing community participation
- Data collection techniques.

Existing manuals from various sources (the Nature Conservancy, SLT, WWF-P, IUCN, etc.) will be collected, archived, and adapted for use where applicable. The preparation of awareness and education manuals requires great care and effort; the material may be culturally inappropriate or even socially unacceptable if developed out of the context of local social practices and knowledge. The material must convey the message in a clear and unambiguous manner, and should be suitable for wide distribution.

Local Communities

As already stated, local communities include both sedentary and migratory communities living within snow leopard range. The awareness and education status of local communities will be improved using the tools described below.

[36] For further details regarding EE initiatives undertaken in the northern areas, see the background paper titled *Environmental Education* published by IUCN in 2003.

Teacher Training Workshops

It is necessary for teachers to be adequately trained in conservation and environmental values. To this end, training workshops will be conducted for school teachers. Teacher training will include material for improving teachers' knowledge base and assist them in teaching students in a more effective manner. Training teachers is one of the ways of ensuring that conservation education becomes part of the classroom teaching process and is integrated into the local school system. Gaining the support of schoolteachers and their students will help change the outlook of future community members and provide a focus for the more immediate spread of information.

The training will cover snow leopards and their conservation issues, the faunal and floral complex of the area, human culture and historical background, natural resource exploitation, and possible mitigation measures. As stated earlier, teachers will also receive training regarding the involvement of students in conservation activities; students will be encouraged to plant trees and form nature clubs. Special emphasis will be given to involving female teachers in the conservancies so that female students can also get involved in environmental activities such as nature study expeditions and tree planting.

The aim is for trained teachers to conduct school awareness and education programs by imparting information regarding the fauna, flora, cultural heritage, historical features, and major environmental issues. Lectures will be delivered using the following tools:

- Slide shows
- Posters and postcards
- Field visits

Lectures will also touch upon how major environmental issues can be addressed at a local level. Thematic posters will be used to decorate the walls of classrooms.

Educators and teachers in mountainous areas are rarely exposed to short-term refresher or tailor-made courses. However, a few exceptions do exist: the AKES arranges short-term courses for its teachers and teacher training educational aids have been developed by WWF-P under the Mountain Areas Conservancy Project (MACP) through which 1,100 teachers were trained in EE methods.

School Activities

Schoolteachers will organize annual debates, drawing competitions, and environmental conservation examinations on various aspects of biodiversity conservation. Nature clubs are another tool that may be used.

Community Outreach

All community outreach activities will be carried out in cooperation with existing decision-making structures, such as village councils, village organizations (VOs), or valley conservation committees (VCCs), as appropriate. Various community outreach activities are described below.

Trained program staff and teachers will jointly conduct informal awareness and education programs for communities. Awareness programs will be organized at a time when migratory communities are in the snow leopard range, to maximize participation. Mobile film shows and slideshows may be held in villages in local schools or other socially acceptable venue. Topics for discussions may be as varied as growing vegetables using household wastewater, environmental conservation and poverty alleviation, fruit orchards, farm forestry, growing off-season vegetables, and social organization. Brochures and pamphlets on natural resources management will be prepared in Urdu as well as English. Separate sessions will be organized for men and women where required. The assistance of local community members, including female teachers (if available) will be sought.

Based on the background paper prepared by IUCN, there is a need to initiate linkages with the religious clergy of each sect. In the snow leopard range, every sect has its own system of religious education and these institutions are present in the remotest villages in the mountains. MACP has prepared a publication illustrating the need for environmental conservation and its link with the teachings of Islam titled *Islam and Conservation*. The book has already been translated into Urdu and is publicly available. Attempts will be made to establish links with the religious clergy in order to encourage them to address local environmental issues in their sermons.

Another effective method of community outreach is demonstration projects. By using concrete examples, trainers will demonstrate initiatives that have a positive impact on the environment, to the local people. Under the NDO's conservation project, 50 households in Minapin village constructed pit latrines following the success of the initiative in the Rakaposhi base camp where the need and functionality of the project was demonstrated to the villagers.

Visitors and General Public

Awareness and education tools for the general public and visitors to the mountainous area and national parks will include the items described below.

Brochures

Brochures containing information on snow leopards and the importance of their ecosystem and general biodiversity in their range will be prepared for distribution to visitors at check posts, information centers, tourism agencies (PTDC and various private tour organizers), hotels, airlines, and car rental services in Pakistan.

Website

A dedicated website will be developed for the snow leopard program. It will provide information on the program, its ongoing activities, snow leopard ecology, and conservation issues.

Mass Media Coverage

The snow leopard program will be introduced to the general public in radio and television shows and in newspaper articles and advertisements. Detailed advertisements will be placed in two major national newspapers and in two international magazines one month prior to the peak tourist season.

Video CDs

Video CDs covering the topics of natural history and culture and history will be dubbed in both Urdu and English. Professional organizations or individuals will be hired to prepare the CDs which will be available for sale at information centers, the Northern Areas Forestry, Parks, and Wildlife Department(NAFWD) offices in Skardu and Gilgit, and the Lok Virsa office in Islamabad. These CDs will also be utilized as one of the tools for the awareness and education of field staff and local communities.

Thematic Posters

Thematic posters depicting specific ideas will be designed, produced, and displayed. Posters could be designed either by students/amateur artists in a poster competition, or by professionals. In the case of a poster competition, all entries will be displayed at an exhibition and the winning entries mass-produced for display at information centers and schools. Posters will also be available for sale at information centers and other relevant outlets.

Threats to Snow Leopards

The strategic plan for snow leopard conservation in Pakistan (Khan, 2008) acknowledges the principle that the right of the snow leopard and its prey to survive is more generously guaranteed if the right of pastoral communities to optimize their economy, is accepted and supported. Over nine million people in the snow leopard range predominantly exercise agro-pastoral livelihood systems with a heavy dependence on livestock. Annual predation pressure on livestock in the snow leopard range is estimated to be 1.3 (range = 0.7–3.3) animals per family, which is about 30% of the cash income that communities gain through livestock marketing (Snow Leopard Foundation [SLF], unpublished data). This predation equates to an estimated annual economic loss of USD 119 (PKR 11,400) per household which is more than one household's monthly income. This level of predation has serious economic repercussions and grades Chitral among the highest human-snow leopard conflict zones in Pakistan. The average income of pastoral communities is estimated to be PKR 4,000–6,000 which is far below the national average for Pakistan (PKR 9,170 PKR, Ehlers and Kreutzmann, 2000). Over 50% of families live below the poverty line

and this percentage has increased in recent decades. Economic hardship is one of the root causes prompting herders to kill snow leopards to protect their livestock. In addition (although considered a lesser threat), to compensate for livestock losses and supplement their incomes, herders in the region have also historically poached snow leopards for their pelts and body parts to sell on the black market. There was a pelt market in Peshawar that used to trade pelts of snow leopards and other wildlife; this market has been shut down by the Wildlife Department. However, wildlife officials believe snow leopard poaching still exists, but on a relatively smaller scale. The exact magnitude of this problem is difficult to assess, however, two snow leopards were trapped in separate events in the first quarter of 2011 and one died.

Local communities continue to threaten snow leopard prey populations in various ways. Prior to the establishment of PAs and trophy hunting programs in the area, communities supplemented their agricultural income by poaching ungulates. Conservation initiatives by various conservation organizations are helping reduce this problem through the promotion of regulated, fee-based sport trophy hunting. These programs have helped wild ungulate populations grow in certain valleys and have also increased snow leopard acceptance. However, other threats to wild ungulates persist. Recently, over ten markhor in Toshi Game Reserve, Chitral died due to a disease that is likely to be transmitted from livestock. Livestock disease is prevalent in the entire snow leopard range. Disease can account for tens to hundreds of livestock mortality in a given year, according surveys conducted in certain villages. The annual average loss to disease in Chitral district was estimated to be 7.1% of livestock holdings, ranging between 3.7%–11% in different valleys (SLF, unpublished data).

The transmission of contagious diseases from domestic to wild ungulates is well documented (Foreyt and Jessup, 1982; Frölich et al., 2002; Hudson et al., 2002). This transmission is known to threaten snow leopards and their prey (Dagleish et al., 2007; Ostrowski et al., 2012), though further study is required to explore its actual prevalence and significance. For example, Shimshali yak herders in GB have reported several hundred blue sheep (*Pseudois nayaur*) carcasses with skin lesions since 1996. Dagleish et al. (2007) identified the disease as sarcoptic mange, a highly contagious disease caused by *Sarcoptes scabiei*. An outbreak of pneumonia in 2010 claimed about 20% of markhor populations in Tajikistan (Ostrowski et al., 2012). The study reported *Mycoplasma capricolum* as the sole infectious agent. Similarly, about 12 young markhor were found dead in the Tooshi Game Reserve, Chitral in March 2012. A postmortem of an infected animal carried out at the Veterinary Research Institute, Peshawar, suggested a mixed infection of contagious caprine pleuropneumonia (CCPP) and enterotoxaemia. This situation is a serious threat to snow leopards as it can cause infectionsand prey depletion.

There are over 20 PAs of different sizes and categories within the snow leopard range (**Figure 3.1**). However, in most cases, their efficiency is compromised by the lack of management infrastructure, management plans, and baseline information on biological and other natural resources. These factors make them ineffective in protecting snow leopards and their habitat. These PAs are generally not large enough to protect the home ranges of individual cats. Their landscape-level movements require multiple measures including the demarcation and creation of additional PAs, linking existing PAs, and cross-border cooperation for trans-boundary protection.

Finally, education and awareness, particularly at the local level, are critical factors for generating support among local communities for conservation and management initiatives. Education and awareness efforts can assist local communities in safeguarding their livestock by teaching them measures that can reduce predation incidence. Awareness regarding the snow leopard and its significance may also enhance the acceptance of the species and mitigate potential conflict with local communities.

Although threats differ substantially across snow leopard range, an overall ranking of the threats based on their area of influence, intensity of threat, and the urgency to address them, is given in**Table 3.1**. Major threats identified for snow leopards, their habitat, and prey include:

- Habitat loss and degradation;
- Livestock-based livelihood impacting prey base;
- Retaliatory killing of snow leopards;
- Weak institutional capacity;
- Poor enforcement;

- Wildlife diseases;
- Lack of awareness;
- Climate change.

It is also noted here that threats are not static and have been and will change with time. Therefore, understanding these patterns of threats is important.

Figure 0.2: Protected Areas in Snow Leopard Range in Pakistan

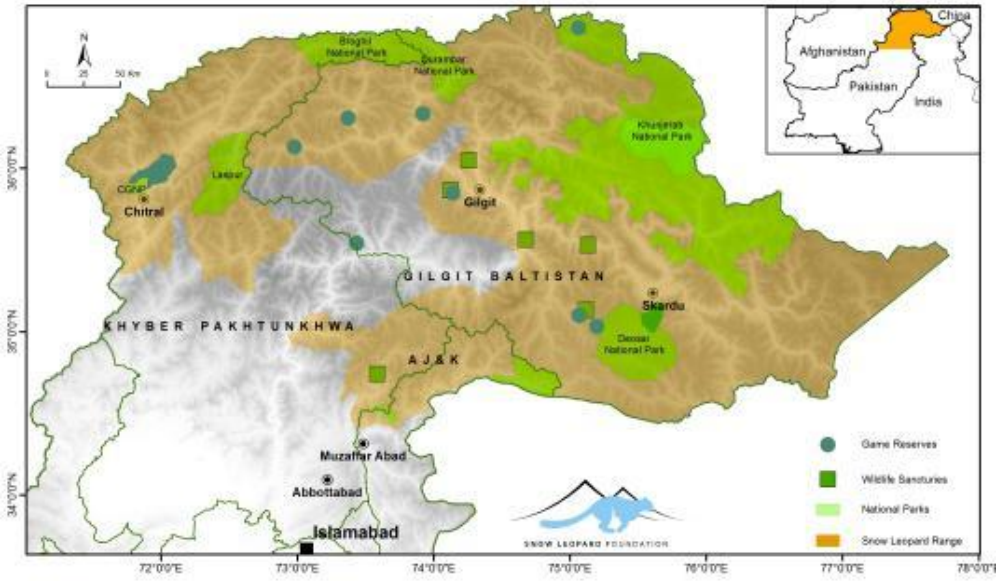


Table 0.2: The Snow Leopard Threat Ranking Prepared for the SLSS (2011–13) Process

Threat	Area	Intensity	Urgency	Total Ranking
Category 1: Habitat and Prey-Related				
Habitat degradation	4	4	3	11
Habitat fragmentation	3	4	3	10
Prey reduction due to illegal hunting	5	5	5	15
Prey reduction due to competition with livestock	4	5	4	13
Prey reduction due to legal hunting	2	1	0	3
Prey reduction due to disease	3	4	5	12
Fencing that disrupts movements/natural migration	1	1	1	3
Category 2: Direct Killing or Removal of Snow Leopards				
In retribution for livestock depredation	5	4	5	14
Poaching for trade in hides/bones	4	3	5	12
Zoo and museum collection of live animals	0	0	0	0
Traditional hunting of snow leopards	0	0	0	0
Secondary poisoning and trapping of snow leopards	1	2	3	6
Diseases of snow leopards	5	2	4	11
Potential threat from legal hunting of snow leopards	3	1	1	5
Category 3: Policy and Awareness Issues Affecting the Conservation of Snow Leopards, prey, and habitat				
Lack of appropriate policy	5	2	2	9
Lack of effective enforcement	5	4	4	13
Lack of trans-boundary cooperation	5	2	2	9
Lack of institutional capacity	5	4	4	13
Lack of awareness among local people	5	4	4	13
Lack of awareness among policymakers	5	3	3	11
Category 4: Other Issues				
War and related military activities	5	3	1	9

Threat	Area	Intensity	Urgency	Total Ranking
Human population growth (rapid)/poverty (indirect threat)	5	4	1	10
Feral dogs attacking snow leopards and prey	5	1	1	7
General poaching and wildlife trade by migrant workers	5	3	3	11
General poaching by military personnel	5	2	2	9
Emerging threats				
Climate change	5	3	3	11
Growing livestock populations and intensifying human-wildlife conflict	5	5	5	15
Large-scale development projects	4	3	3	10
Direct and indirect impacts due to mineral exploration and mining (local)	3	3	3	9
Impacts due to hydroelectric projects	3	3	3	9
Impacts due to roads or railroads	3	3	3	9
Disturbance related to Cordyceps collection	0	0	0	0
Other: (write below and add rank values)				

Threat values

0 or 1 = no and low threats; 2 or 3 = intermediate threat level; 4 or 5 = high threat level

Area

Rank each threat according to how widespread it is (where 5 indicates that it occurs across most or all snow leopard range within the country and where 1 indicates that it is extremely limited in areal extent)

Intensity

Threats ranked from 5 = the most destructive impact to 1 = the least negative impact

Urgency

Rank each threat identifying if it needs immediate and urgent attention (very time sensitive) (value = 5) to being of least concern or urgency (value = 1)

Dealing with Threats

Pakistan's snow leopard range remains a major focus of conservation efforts by the government and leading conservation organizations like IUCN, WWF-P, HWF, the Snow Leopard Trust (SLT), and the Wildlife Conservation Society (WCS). Although the snow leopard was not the prime focus in the majority of large projects undertaken in northern Pakistan in the past, they have contributed to the cause of snow leopard conservation in various ways ranging from enhancing awareness to improving habitat quality and prey base.

IUCN has had a longstanding presence in the snow leopard range and has managed various projects with impacts on the landscape level. Noteworthy projects include the Pakistan Protected Areas Management Project (PAMP), the Hindu Kush-Karakoram-Himalaya (HKKH) Partnership Project,[37] the Program for Mountain Areas Conservation (PMAC), and MACP.

WWF-P has also worked extensively in the area and many its programs are relevant to snow leopard conservation. Initiatives under the "Saving Wetlands Sky High Program" include livestock vaccination campaigns, corral improvement, breed improvement programs, fodder cultivation on barren lands, and afforestation schemes. WWF-P is carrying out community mobilization, education and awareness, scientific research on snow leopard populations, and protection of snow leopards and their prey against poaching, through the US Agency for International Development (USAID)-funded project, "Community-Based Conservation of Snow Leopards and Improved Watershed Management." The Pakistan Wetlands Program executed by WWF-P also contributed to snow leopard conservation by collecting scientific information on snow leopard habitat and enhancing awareness about conservation issues.

[37] Institutional consolidation for the coordinated and integrated monitoring of natural resources towards sustainable development and environmental conservation in the HKKH mountain complex

WCS works with 65 communities across four districts in GB and has helped select, train, and equip over 100 community wildlife rangers to monitor wildlife such as snow leopards and key prey species such as markhor and ibex. This work has seen protection put in place across all program communities, and populations of markhor, urial, and other species are already experiencing significant increases. WCS also has done significant trans-boundary work in the region, including a large conservation program across the border in the Wakhan of Afghanistan where it has been camera trapping, collaring, and studying snow leopards since 2007. WCS's strong experience in community-based conservation places it in a strong position to deliver on national snow leopard strategy implementation efforts in GB.

HWF focuses on the protection and enhancement of wildlife and natural resources to support community livelihoods and on preserving them for the benefit of future generations. HWF supports governments by helping them rationalize their policy and legislative frameworks and building their capacities for sustainable development. Examples of HWF activities include the establishment and development of Deosai National Park in GB to protect the threatened Himalayan brown bear, and Musk Deer National Park and Poonch River National Park in AJK to protect the threatened Mahseer fish. It also supports the Capital Development Authority (CDA) in managing the Margallah Hills National Park in Islamabad. HWF was also instrumental in a landmark revision of AJK wildlife legislation to provide for the sustainable management of wildlife in the state.

A dedicated program for snow leopard conservation was initiated by SLT in partnership with WWF-P and the KPK Wildlife department, in the late 1990s. The program started exploring the status of the cat in Pakistan and introduced community-based conservation programs in Chitral district, KPK. A major breakthrough in this direction was the inception of SLF in 2008 which was set up as a dedicated institution to scale up snow leopard conservation work in Pakistan. SLF started implementing the snow leopard conservation strategy through three-year planning cycles and expanded the conservation program geographically and thematically. Focusing on three thematic areas (science and research, community-based conservation, and awareness and education) Pakistan's snow leopard program has achieved the following milestones:

- About 20% of the snow leopard range in Pakistan has been explored using state-of-the-art research tools—camera trapping, genetics, occupancy modeling, and global positioning system (GPS) telemetry—to assess the status, distribution, abundance, and threats to the snow leopard and its prey base;
- Innovative community-based conservation programs to enhance tolerance for snow leopards have been implemented in 21 priority sites in the Hindu Kush and Karakoram mountain ranges;
- Various local and national-level trainings have been conducted to build the capacity of government organizations and NGOs in snow leopard research;
- Relevant departments at local universities have been engaged in snow leopard research and about 20 graduate and postgraduate student research projects have been facilitated through the snow leopard conservation program in the last five years.

Past and ongoing community-based conservation programs are considered vital but inadequate considering snow leopard range size and the magnitude of the problem. The scaling up of such conservation efforts from limited villages and valleys to a wider landscape is highly desirable. However, efforts are constrained by the resource requirements for achieving such an objective.

Based on the conservation experiences of various stakeholders, some known good practices relevant to snow leopard conservation are described below and could be considered for replication.

Trophy hunting

Pakistan is a pioneer in the application of community-based trophy hunting programs to the conservation of biodiversity in mountain ecosystems. The program's primary objective is the conservation of large mammals such as Caprinae and their habitats. This is achieved through a system that benefits local communities by providing incentives to conserve their wildlife resources. The annual income from one trophy hunt in snow leopard range is approximately USD 1 million.

While trophy hunting seems to be a promising approach, Pakistan aims to develop and maintain an effective trophy hunting program as part of its overall biodiversity strategy. However, the link between these programs and predator conservation is still debated. Improvements are warranted in the design

and implementation of the program so that it contributes to the protection of entire ecosystems (including predators) rather than benefiting just wild ungulates. Nevertheless, the program has great potential in changing public attitudes towards wildlife.

Livestock vaccination

Herders kill snow leopards in retaliation for livestock lost to predation and have a general intolerance towards predators. However, it was found that 3–5 animals die of disease for every one killed by a wild predator. This led to a discussion on possible conservation-based incentives with local communities where it was discovered that herders were more willing to tolerate occasional losses to wild predators if fewer domestic animals were lost to disease. Thus, the idea of a 'Snow Leopard Friendly Livestock Vaccination Program' was born. Most families in northern Pakistan cannot afford vaccines and herd protection (which is managed and pastured communally). In addition, trained vaccinators are limited, making delivery inefficient. To overcome these obstacles, the Snow Leopard Friendly Livestock Vaccination Program makes vaccines readily available to rural communities and trains local vaccinators. In return, communities agree to refrain from killing snow leopards and their primary prey and pledge to limit herd sizes through signed conservation agreements so that livestock do not compete with wild snow leopard prey. SLF is managing this program in 12 communities in Chitral district and six valleys in GB. WWF-P has initiated livestock insurance schemes in the adjacent valleys of Khunjerab, Deosai, Qurumbar, and Central Karakoram National Park in GB under the Saving Wetlands Sky High Program and the Social Economic and Environmental Development (SEED) project for CKNP.

Predator proofing corrals

Goats and sheep are kept in walled pens when not grazing. When snow leopards attack, livestock cannot escape, resulting in catastrophic losses. This is reduced considerably by proofing the corral from all sides with wire mesh on the roof, a single/strong wooden door, and by reinforcing walls with stones/cement. SLF is building predator-proof corrals in four communities in Chitral with USAID support. The Snow Leopard Conservancy has also supported similar initiatives in GB.

Livestock insurance scheme

It is a great economic and emotional loss to families when they lose livestock to predators (estimated annual loss of 0.7–3.3 animals per family). A lack of safety nets and workable strategies to protect livelihoods and/or compensate for damages exacerbates the root causes of human-carnivore conflict in the area. Communities often claim compensation for predation, hold protests, and try to influence political and administrative leadership in resolving carnivore conflicts.

A deep conservation engagement is necessary to reduce negative sentiment and provide families with the economic and emotional tools necessary to tolerate predators. The livestock insurance scheme is one such tool where a community-managed insurance fund is established. It is equivalent to the average annual economic loss to predation per community and allows families to file claims right away. Our experience has shown this to be the most expedient way to jumpstart the program, build trust among families, and encourage premium payments. Our projections show that the insurance fund can become self-sustaining within one year, given the following conditions: 1) 50% or more of households from each community participate; 2) all participating households successfully pay their membership fees and premiums; 3) in the first year, losses are compensated at a rate of 25% of agreed market value up to a total of no more than 50% of the insurance fund; and 4) there are no catastrophic losses of livestock. SLF is managing this program in six communities in Chitral and GB and the project (supported by the Snow Leopard Conservancy) has also implemented livestock insurance schemes in Baltistan.

Snow leopard enterprise

The program is based on the premise that people provided benefits of wilderness will protect wildlife. In this program, local skills in handicrafts are enhanced and products are marketed to improve livelihoods. A contract specifying the number and type of products to be made, the price of each product, and conditions relevant to environmental protection, is signed with participating communities. Twenty percent of the total product price is provided as a bonus if there are no cases of poaching of snow

leopards or their prey. A snow leopard conservation fund of ten percent of the total product price goes to nature conservation activities. This program is being managed in two communities in Chitral and products are marketed in the USA by the SLT. There is great potential to expand this program by linking it with the local market.

One of the major lessons learnt during the past implementation of several conservation initiatives in the country was that of valuing the local perspective. Most wildlife conservation and natural resource management programs implemented in the mountain environment traditionally ignored local perspectives. Biologists, foresters, and wildlife and park managers are not trained in sociology and anthropology and do not always realize that the social dimension is equally important.

Efforts in the field sometimes ignore this issue and desired outputs are not realized. The urgency lies in thorough exploration of local perspectives directly involving primary stakeholders, including herders, pastoralists, nomads, and traditional transhumance practitioners.

Organization, Empowerment, and Supportof National institutions for conservation: strengths and weaknesses

Several types of institutions in Pakistan are directly or indirectly involved in conservation. These include the Office of the Inspector General of Forests Climate Change Division, Provincial Wildlife Departments, IUCN-The World Conservation Union, World Wide Fund for Nature, Snow Leopard Foundation, Wildlife Conservation Society, Himalayan Wildlife Foundation, Zoological Survey Department, academia, Pakistan Science Foundation, Aga Khan Rural Support Program, Planning commission, FPA and MACF Fund for Protected Areas and Mountain Areas conservation Fund and local community institutions.

These institutions are evaluated below, based on their strength and weakness:

Organization	Strengths	Weaknesses
Climate Change Division, Government of Pakistan	• One of the most directly relevant institutions for coordination • Facilitate development of policies and legislation • Mobilize funds	• Resource deficient both human and financial • Lack of backup support of scientific institutions except for ZSD that is again resource deficient like scientific, quarantine, technical groups etc
Planning Commission	• Resourceful government institution • Centrally placed at both the federal and provincial level	• No experience of ground implementation • No access to communities in remote locations
Provincial wildlife departments	• Operate within the habitat and are accessible by local communities	• Lack of trained human resources and equipment • Limited financial resources
Pakistan Science Foundation	• Access to financial resources • Institutional sustainability	• Limited capacity in snow leopard conservation • Poor access to remote areas
Quaid-I-Azam University (QAU)	• Best institute in the country in human resource development and capacity building • Best capacity for research in the natural and social sciences • Human resource availability	• No experience in community-based project management
Zoological Survey department	• Mandated for assessing the status of flora and fauna, nationwide • Attached department of the Climate Change Division	• Lack of resources and capacity • Poor access to remote areas
Pakistan Museum of Natural History	• Trained manpower in surveying and preserving flora and fauna	• No experience in community-based project management
IUCN	• Access and influence in the national and international community • Strength in developing legislation	• Limited experience in snow leopard conservation

Organization	Strengths	Weaknesses
WWF-P	• Experienced in awareness and conservation programs • Access to remote communities	• Limited capacity, especially in policy formulation and research
SLF	• Networking with snow leopard range communities • Experience in snow leopard conservation and research • Well-trained staff	• Limited resources
AKRSP	• Rural development • Participatory management • High acceptance in the mountain regions	• Poor experience with conservation • Work with interest groups rather than resource rights holders
WCS	• Long association with communities • Experienced in trophy hunting and forest conservation • WCS's experience and contacts in Afghanistan and Tajikistan put it in a position to assist Pakistan in building an effective trans-boundary coalition for snow leopard conservation across the region	• Limited resources
HWF	• Long experience in nature conservation and parks management	• Limited experience in snow leopard conservation

Developing collaborations and strong partnerships between the organizations mentioned above can lead to an effective arrangement for snow leopard conservation in the country, as it would bring together the strengths of each while compensating for their weaknesses.

Proposed Implementation Design for the program

Effective project implementation will necessitate the mobilization of a diverse range of skills outside the traditional conservation sector. Many of these skills will be provided by cooperative partner agencies, including public sector institutes, line departments, and conservation organizations. Execution and implementation arrangements proposed for the project are based on the model tested in several community-based conservation projects implemented by the Climate Change Division in the past.

Execution Arrangements

The project will be nationally executed by the Government of Pakistan with overall responsibilities vested with the Climate Change Division (CCD). The CCD will collaborate closely with the governments of GB, KPK, and AJK and with public institutions such as Quaid-e-Azam University (QAU), the Pakistan Museum of Natural History, and the Zoological Survey of Pakistan. The CCD will create a **Snow Leopard Ecosystem Cell** within the forestry wing to coordinate the project.

Within the provinces, the program will be implemented by the Forest, Parks, and Wildlife department of GB, the Wildlife department of KPK, and the Wildlife and Fisheries department of AJK in collaboration with relevant stakeholders.

Program Steering Committee

A program steering committee (PSC) will be established to provide policy guidance to the program and monitor progress and performance. The PSC will facilitate the interagency coordination of the program at the national level, provide avenues for maintaining interprovincial linkages, and ensure that the lessons learned from implementation are integrated into Pakistan's overall conservation program. The following will be involved:

- Secretary, Climate Change Division (Chair, PSC);
- Chief, Environment, Planning, and Development Division, Government of Pakistan;

- A representative of the World Bank;
- National Focal Person;
- National Program Coordinator (Secretary, PSC);
- The heads of the respective wildlife departments (AJK, GB, and KPK);
- Joint Secretary, Economic Affairs Division;
- A representative from QAU;
- Director, Zoological Sciences Division, PMNH, Pakistan Science Foundation;
- Chief Executive Officer, SLF.
- Country Representative, IUCN;
- Chief Executive Officer, WWF-P;

The National Program Coordinator/PSC Secretary will be responsible for organizing meetings, recording minutes, and ensuring that directions are implemented.

The frequency of PSC meetings will be decided by the Chair, but the committee will be convened at least once a year following the preparation of an annual program report (APR). The PSC will be responsible for the following activities:

- Program review and coordination;
- Coordination of government actions and provision of policy guidance;
- Facilitation of policy and legislative reform to support community management of wild resources for sustainable use;
- Monitoring efforts to establish financial mechanisms;
- Ensuring adherence to World Bank guidelines for the administration of program funds.

Program Management Committees

Program Management Committees (PMCs) will be formed in AJK, GB, and KPK to supervise program implementation, ensure that program targets are met, and monitor on-ground impacts.

In KPK, the PMC will comprise the Chief Conservator of Wildlife (Chair), the Conservator of Wildlife, Northern Circle, representatives of SLF, IUCN, and WWF-P, the National Program Coordinator, representatives of conservancy management committees, and the Regional Program Coordinator (Secretary).

In GB, membership will include the Chief Conservator of Forests and Wildlife (Chair), the Director of Planning and Development, the Conservator of Wildlife, the Program Manager, representatives of SLF, WCS, and WWF-P, the National Program Coordinator, representatives of conservancy management committees, and the Regional Program Coordinator (Secretary).

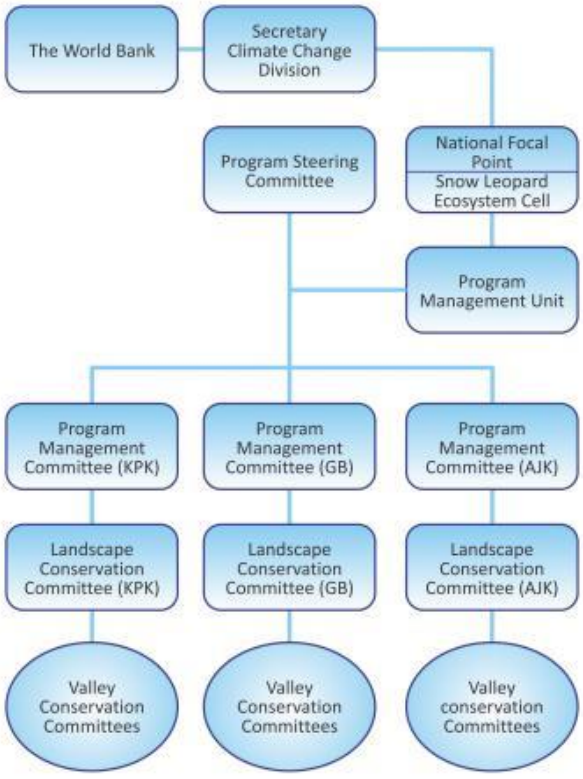
The AJK PMC will comprise the Director General of Wildlife and Fisheries (Chair), the Director of Planning and Development, the Divisional Forest Officer of Wildlife, the National Program Coordinator, representatives of HWF, SLF, and WWF-P, representatives of conservancy management committees, and the Regional Program Coordinator (Secretary).

The PMCs will be responsible for:

- Monitoring the results of efforts to strengthen community-based organizations at program sites;
- Coordinating institutional arrangements;
- Coordinating policy and legislative development to provide support to conservancies for conservation efforts;
- Overseeing awareness and education activities;
- Ensuring that partner agency programs are fully integrated into the program framework;
- Monitoring the results of demonstration projects for sustainable use and supporting their integration into wider development programs within the conservancies;
- Monitoring technical assistance provided by the contracting agencies, including all institutional strengthening services provided to local communities and government bodies;
- Monitoring all training activities.

Ground implementation will lie with the respective wildlife departments in each province with support from other public and conservation organizations. In view of the nature of skills required to implement the program, the expertise needed in participatory learning and planning methodologies, institutional strengthening, conservation awareness, technical disciplines related to sustainable use, and financial mechanisms for conservation, SLF will play a lead role in implementing activities in close coordination with the Snow Leopard Ecosystem Cell. SLF will be accountable to the PSC and PMCs for operation and performance, including accounting and funds management, field personnel for work in program sites, developing MoUs with partner agencies for joint implementation, managing technical equipment, and reporting to the World Bank and the government on the progress of implementation.

Figure 0.3: Program Organogram



LEGAL FRAMEWORK FOR EMPOWERMENT OF COMMUNITY FOR CO-MANAGEMENT

Extant legislative and regulatory frameworks were instituted in the early 1970s. They were based on management concepts assuming that community and wildlife areas are distinct from one other, and on the premise that conflicts between wildlife and communities do not exist. The fact that the notifications of a large number of PAs in the country (including in the snow leopard range) completely ignore the presence of a large resident and migratory human community that has formal and usufruct rights, has received little attention from managers and policymakers. Experience gained in conservation and participatory management has led to a rethinking of policies and basic changes in the legislative frameworks for biodiversity management.

This learning has led to the recognition of community members' role as co-managers in new legislation (provincial Model Wildlife Law). AJK has approved the Model Wildlife Law while GB and KPK are heading

in the same direction. This law facilitates empowerment and benefit sharing of community organizations through the following steps:

- It recognizes community representative organization(s) in an area as management partner(s) for the management of biological diversity and accords recognition and legal status
- It recognizes the sharing of benefits accrued from the sustainable commercial use of elements of biodiversity in an area equitably among the community and the government
- Allows declaring any landscape, which supports or has the potential to support significant biodiversity for sustainable multiple use management, including biodiversity conservation in collaboration with the local communities and Government, as a "Conservancy." A conservancy may include one or more protected areas and accommodates all such uses that enhance biodiversity conservation

It allows the establishment of a conservancy management committee for each conservancy as a co-management partner for the sustainable (multiple) use of biological diversity which comprises community representatives, select civil society organizations, and relevant government departments, and may be assigned such roles, functions, and financial management system as deemed appropriate.

The strengths and weaknesses of the Model Wildlife Law are summarized below:

Strength	Weaknesses	Opportunities
• The main legislative framework of the Law is prepared through a participatory process involving all relevant stakeholders	• A lack of awareness at the broader level	• Periodic events for raising awareness at all levels • Translation of the law into the national language (Urdu) for greater understating and clarity
• Recognition of local communities as co-management partners	• Poor capacity of local community groups	• Capacity building opportunities for field staff of wildlife/forest departments and local community members
• Acceptance of the government to amendments pertaining to greater community participation in the legal framework	• Delayed approval process of the framework at the higher levels	• Sensitization of the policymaker on participatory management legislation
• Workable partnership for all stakeholders	• Limited clarity among the relevant departments and local community groups on resource use	• Consensus building process among all stakeholders
• Delegation of powers to community guides and guards for arresting persons involved in illegal hunting practices	• Poor enforcement and implementation of penalties	• Coordination among the judiciary and wildlife management authorities for the effective and efficient implementation of penalties
• Provisions of the conservancy category as a resource management area	• A lack of rules for further resource use within the conservancies	• Develop rules and zoning systems governing individual resources within a conservancy like forests, hunting procedures, land development, pasture management, community use zones, recovery zones, etc.
• Provisions of killing predators in lieu of self-defense and damages	• Manipulation of the self-defense provision for retaliatory killing and trade of animal pelts and other parts	• Clarification of self-defence
• Broader provisions for private game reserves and community-controlled hunting areas	• Poor monitoring and limited evaluation of the areas designated as private game reserves and controlled hunting areas	• Developing biological criteria for declaring private game reserves and controlled hunting areas with periodic evaluation of the resources

Research and Training

Traditional wildlife management in Pakistan was based on policing by employing staff without relevant education and training in scientific wildlife management. The limitations of this approach were exposed when small populations of some highly valuable species became extinct despite extensive protection efforts. This led to the realization that the reasons for the extinction of small populations are highly complex and can only be explored through scientific data. Subsequently, a new approach, the "small population paradigm" (Caughley and Gunn, 1996), came under consideration that stipulated concrete research in wildlife management. This has motivated scientists to undertake management-oriented research and has generated an interest in research among wildlife managers looking for effective management interventions backed by sound science.

- Research contributes to science-based management by
- Providing baseline conditions of natural resources
- Improving understanding of ecosystem function and dynamics
- Quantifying the impact of management interventions
- Providing necessary materials for education and training programs

It is now clear that the management of threatened species and ecosystems does not rest solely on biological data; it is also an intensely human endeavor that is profoundly influenced by how society values these areas and how it perceives its role in sustaining ecosystems now and in the future. By ignoring or marginalizing the human dimension, we risk causing prolonged and counterproductive user conflicts, legal challenges, procedural delays, and ineffective outcomes for both the ecosystems and the human users they support. Recognizing this, it is important now to actively develop the social science foundation needed to ensure that policy- and operational-level decisions are sound, science-based, equitable, and effective in order to meet the conservation and management objectives set for the conservation program.

Research Priorities

The snow leopard is an elusive species, lives in low densities, and roams across wide landscapes. For example, the home range of a snow leopard collared by SLT in Chitral in 2006 was calculated as 1,600 km^2. The vastness of the area coupled with extreme ruggedness and poor accessibility implies that any field-based research is logistically expensive and physically demanding. Therefore, considerable financial resources and trained manpower are required to explore the entire range systematically to achieve a thorough understanding of snow leopard ecology. Consequently, snow leopards and their ecosystem remains one of least studied subjects in the world.

Major information gaps relevant to conservation are:

- A lack of reliable snow leopard population estimates for their range in Pakistan. Current estimates are based on anecdotal information and extrapolations from limited data
- Limited and outdated information on snow leopard distribution in Pakistan; there is no clear understanding of delineation of populations, sub-populations, and the connectivity between them
- No information available on the genetic health of snow leopard populations, which confines the understanding of genetic limitations that snow leopard populations might be facing due to presumed small sizes
- Gene flow among populations does not only ensure connectivity among populations, but also maintains the genetic health of small populations. There is currently no information available on this aspect
- A lack of a comprehensive understanding of the ecological and sociological aspects of human-snow leopard conflicts which precludes the development of a multi-faceted strategy needed to effectively mitigate threats to snow leopards

- A lack of information on snow leopard prey dynamics. This limits our understanding of the minimum natural prey biomass needed to support a viable population of snow leopards
- An inability to monitor snow leopard population trends which in turn limits our ability to assess the effectiveness of interventions
- An inability to monitor changes in threats to snow leopard populations which limits our ability to assess the effectiveness of interventions
- A lack of information on competition between livestock and natural prey and its impact on snow leopard depredation rates. This limits our ability to recommend appropriate conservation strategies
- A lack of information on vital rates which precludes an assessment of population viability or an evaluation of the impact of threats
- A lack of information on snow leopard social structure and behavior, which limits our understanding of snow leopard population dynamics
- A lack of information on movements and dispersal patterns, which limits our understanding of snow leopard meta-population dynamics and habitat protection needs
- A lack of information on snow leopard habitat use which limits our ability to develop predictive models of snow leopard presence/absence and precludes a priori prioritization of survey areas and conservation efforts
- A lack of information on the role of livestock husbandry practices in reducing snow leopard depredation
- An inability to accurately identify snow leopard scats in the field which reduces the effectiveness of presence/absence surveys based on scats and limits the usefulness of raw data based on scats for assessing relative abundance or assessing snow leopard diet
- Limited information on disease prevalence in snow leopard habitat which limits our ability to understand threats to snow leopards and their prey and ecosystem
- As a key component of the snow leopard program, a comprehensive research program will be initiated to address the aforementioned gaps in information by employing the latest research techniques, including molecular genetics, camera trapping, and telemetry

Training Program

The total snow leopard habitat available in Pakistan is about 80,000 km^2, which is not only home to some of the world's most fascinating and endangered wild species, but has supported socially secluded and diverse human culture dwellings in the valleys for centuries. Thus, the high mountain ecosystems are vital for the coexistence of humans and wildlife. Understanding and maintaining a delicate link between the competing interests of conservation and rural economy is essential to sustain this coexistence. A step in this direction is the development of capacity of community activists/workers and relevant government agencies in understanding the natural and social/political dynamics of ecosystems and managing emerging conflicts. Unfortunately, the majority of conservation workers from the mountainous areas and wildlife and forest department staff do not qualify for regular degree programs despite the fact that they are actual players on the ground. Acknowledging the importance of these professionals and a need for their capacity building, a certificate/diploma program in nature conservation will be initiated at QAU, Islamabad, a highly ranked university already running graduate and postgraduate programs in the natural, social, and environmental sciences. The proposed diploma course will be open to all, however scholarships will be provided to wildlife department staff members, local community members, and conservation organization staff working in the snow leopard range, to encourage their participation.

The staff of the wildlife departments, local communities, and other stakeholders identified in Section 5 will be afforded maximum participation in research and conservation to help build their capacities. In

addition to facilitating their participation in diploma and graduate/post-graduate programs through scholarships, short trainings targeting specific skills will also be organized.

Time-phased Implementation Program

In view of the major threats and opportunities identified in the previous sections, the Snow Leopard Program in Pakistan (2014–2020) will focus on the following major goals and activities:

1. **The promotion of a landscape-level approach to snow leopard conservation**
    a. Identifying model landscapes in each province based on snow leopard population, conflicts, and strategic importance;
    b. Developing conservation plans for each model landscape through a consultative process involving communities and other stakeholders.
2. **The initiation of participatory conservation to enhance tolerance and build support for snow leopards**
    a. Implementing community-based conservation programs to reduce predation-related economic burden on communities (LIS);
    b. Implementing measures to reduce predation losses (predator-proof corrals);
    c. Implementing programs to reduce mortalities in livestock and wildlife by improving ecosystem health (livestock vaccination);
    d. Implementing awareness and outreach programs targeting all stakeholders.
3. **The enhancement of scientific knowledge on snow leopards, prey species, and habitat**
    a. Assessing snow leopard populations using robust and modern techniques such as molecular tools and camera trapping for individual identification;
    b. Assessing the genetic limitations of snow leopard populations, connectivity among populations, and gene flow across landscapes;
    c. Assessing resource selection by snow leopards and exploring requirements for their survival (satellite collaring);
    d. Implementing robust estimation and monitoring prey abundance, human and rangeland ecology studies, and monitoring systems for identifying and addressing key threats;
    e. Assessing disease prevalence in snow leopard habitat and its risks to wildlife.
4. **The expansion and improvement of the management of the PA network in Pakistan**
    a. Constructing habitat suitability for snow leopards in Pakistan, and identifying connectivity corridors;
    b. Assessing existing PAs for their adequacy to protect snow leopards and identifying candidate sites for additional PAs;
    c. Reviewing the efficiency of PAs in snow leopard range and identifying shortcomings;
    d. Conducting baseline environmental studies in PAs and developing management plans;
    e. Strengthening the functionality of PAs by training and facilitating wildlife staff.
5. **Institutional strengthening and capacity building**
    a. Establishing a Snow Leopard Ecosystem Cell at the federal Level;
    b. Establishing program management units (PMUs) at the federal level;

c. Establishing program implementation units (PIUs) at the provincial level;

d. Establishing community participatory structures for each model landscape;

e. Initiating short trainings to build capacity of relevant departments and community members;

f. Initiating a diploma/certificate course in nature conservation that focuses on staff of relevant departments, conservation organizations, and communities of the snow leopard range;

g. Providing scholarships to snow leopard range communities for pursuing higher education in nature conservation.

6. Trans-boundary actions

a. Exploring possibilities of coordinated management of snow leopard habitat with neighboring countries;

b. Operationalizing intergovernmental agreements available for the control of illegal trade (SEWAN, Interpol);

c. Cooperating in research on gene flow, connectivity of snow leopard populations, and landscape-level movements.

The potential areas for trans-boundary cooperation in Pakistan are; i) KNP (6,150 km^2) and the CKNP (9,738 km^2), which are adjacent to China's Taxkorgan National Park (15,863 km^2), ii) The Chitral Gol National Park (77 km^2) which is close to Agam Besti WS (267 km^2) at the Afghanistan border, iii) The Kilik-Mintaka WS (650 km^2) which is situated on the China-Afghanistan border (Jackson 2013)[38]. In this context, the Climate Change Division, Pakistan has initiated discussions with its Chinese counterparts for bilateral cooperation in research, conservation, and PA management in the snow leopard range. The Chinese are also positive and it is expected that a clear framework for cooperation will be developed over the next few months.

Monitoring

Monitoring parameters need to be linked to program goals to keep track of progress and determine which conservation strategy or research tool has been successful. Thus, the implementation process keeps on evaluating the program and provides useful feedback to authorities on the effectiveness of strategies adopted and resources allocated. A simple system of indicators to track key parameters on an annual basis can be a very powerful tool, or a system of serial mapping can be developed in order to evaluate periodic progress on indicators.

In the context of the snow leopard program, the following indicators will be monitored:

Ecological Sustainability

- Population or occupancy of snow leopards in model landscapes;
- Population of prey species in model landscapes;
- Number of livestock dependent on rangelands;
- Biomass productivity at selected locations.

Financial Sustainability

- Expenditure as percentage of allocated budget.

Institutional Sustainability

- Number of meetings of the governing bodies (PSC, PMC, LMC) in a year;
- Total number of operational staff.

[38]Jackson, R. 2013. Transboundary Cooperation for Protected Areas and Biodiversity Conservation. Snow Leopard Network SLSS Update – Draft - 10 May, 2013.

Program Indicators

- Promoting a landscape-level approach to snow leopard conservation
    - Three landscapes brought under management plans
    - All habitats surveyed and 20% is protected

- Initiating participatory conservation to enhance tolerance and build support for snow leopards
    - One hundred percent of communities in model landscape participating
    - At least 50% livestock insured/vaccinated in model landscapes
    - At least 50% reduction in predation and mortality
    - No killing of snow leopards and their prey.

- Enhancing scientific knowledge on snow leopards, prey species, and habitat
    - Reliable estimates of snow leopard population size available
    - Genetic limitations and landscape-level gene flows understood
    - Snow leopard home ranges and landscape-level movement understood
    - Estimates available for prey populations in model landscapes;

- Nature and magnitude of prevalent diseases known in snow leopard habitat
    - Expanding and improving the management of the PA network in Pakistan
    - Gap analyses of PAs with reference to snow leopards done
    - Sixty percent of snow leopard range covered under Pas
    - Baseline information available from all PAs in snow leopard range;

- Watch and ward enhanced in Pas
    - Institutional strengthening and capacity building
    - Proposed institutional arrangements in place and required staff hired
    - One hundred people trained through diploma courses in nature conservation
    - Five hundred people trained through short trainings
    - Ten persons from snow leopard ranges are supported in higher education in nature conservation

Summary of Costs and Financing Possibilities

No.	Theme	Project Title	Total (million USD)
1.	Managing habitat and prey	Promoting a landscape-level approach to snow leopard conservation	0.080
2.	Engaging local communities and reducing human-wildlife conflict	Initiating participatory conservation to enhance tolerance and building support for snow leopards	8.200
3.	Research	Enhancing scientific knowledge on snow leopards, prey species, and habitat	5.450
4.	Managing habitat and prey	Expanding and improving the management of the PA network in Pakistan	1.700
5.	Strengthening capacity of national and local institutions	Institutional strengthening and capacity building	2.620
6.	Trans-boundary actions	Operationalizing intergovernmental cooperation mechanisms available for the control of illegal trade	0.380
7.	Monitoring	Scientific monitoring of snow leopards, habitat, and threats: current practices and areas for improvement.	1.350
		Total	**19.780**

Information Sources and References

Abbas, G. 2003. NASSD Background Paper: Environmental Education. IUCN Northern Areas Progamme, Gilgit.x+27 pp.

Caughley, D. and Gunn, A. 1996.Conservation Biology in Theory and Practice. Oxford: Blackwell.

Dagleish, M. P., Ali, Q., Powell, R. K., Butz, D. and Woodford, M. H. 2007.Fatal Sarcoptes scabiei infestation of blue sheep (Pseudois nayaur) in Pakistan. Journal of Wildlife Disease, 43: 512-517.

Ehlers, E. and Kreutzmann, H. (eds) 2000. High Mountain Pastoralism in Northern Pakistan. Stuttgart.

Foreyt, W. J. and Jessup, D. A. 1982.Fatal pneumonia of bighorn sheep following association with domestic sheep. Journal of Wildlife Diseases, 18: 163-168.

Fox, J. L. 1989. A Review of The Status and Ecology of the Snow Leopard (Panthera uncia).Unpublished Report. International Snow Leopard Trust, Seattle, Washington, pp. 40.

Frölich, K., Thiede, S., Kozikowski, T. and Jakob, W. 2002. A review of mutual transmission of important infectious diseases between livestock and wildlife in Europe. Annals of the New York Academy of Sciences, 969: 4-13.

GoP, IUCN. 2003. Northern Areas Strategy for Sustainable Development. IUCN Pakistan, Karachi.

Hudson, P. J., Rizzoli, A., Grenfell, B. T., Heesterbeek, H. and Dobson, A. P. 2002. The Ecology of Wildlife Diseases: Oxford University Press.

Hussain, S. 2003. The status of the snow leopard in Pakistan and its conflict with local farmers. Oryx, 37: 26–33.

IUCN 2012.IUCN Red List of Threatened Species.Version 2012.2.<www.iucnredlist.org>. Downloaded on 27 June 2013.

Khan, A. A. 2008. Draft Strategic Plan, Snow Leopard Conservation in Pakistan. Ministry of Environment, Pakistan.

McCarthy, J. L., McCarthy, K. P., Fuller, T. K., and McCarthy, T. M. 2010.Assessing variation in wildlife biodiversity in the Tien Shan Mountains of Kyrgyzstan using ancillary camera-trap photos. Mountain Research and Development, 30: 295-301.

McCarthy, T. M. 2000. Ecology and Conservation of Snow Leopards, Gobi Brown Bears and Wild Bactrian Camels in Mongolia.Ph.D. Dissertation, University of Massachusetts, Amherst, pp.133.

McCarthy, T. M. and Chapron, G. 2003.Snow Leopard Survival Strategy. Snow Leopard Trust, Seattle.

Ostrowski S, Yacub T, Zahler P. 2012. Transboundary ecosystem health in the Pamirs. Wildlife Conservation Society, USA

Sharma, K., McCarthy, T., Johannson, O., Jaffar Ud Din, and Bayarjargal, A. 2010. Snow leopards and telemetry: experiences and challenges. In: Sivakumar, K. and Habib, B. (Eds.). 2010. Telemetry in Wildlife Sciences. ENVIS Bulletin: Wildlife and Protected Areas. Vol. 13, No. 1.Wildlife Institute of India, Dehradun – 248001, India.

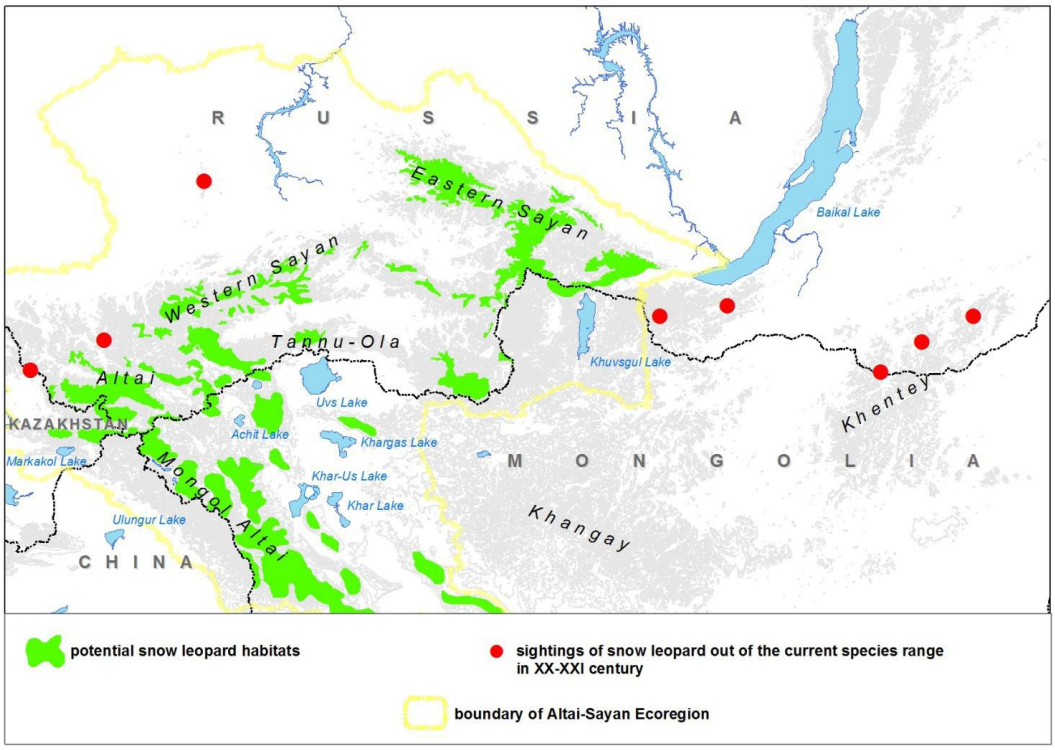
Sheikh, K. M. and Molur, S. (Eds.). 2004. Status and Red List of Pakistan's Mammals. Based on the Conservation Assessment and Management Plan Workshop: IUCN Pakistan.

Russian Federation

Executive Summary

In Russia the snow leopard is at the northern edge of its modern range and has only a few sustainable populations of animals in optimal habitat areas – the mountains of the Altai-SayanEcoregion. Russia's population of snow leopards comprises just 1-2% of the total species population. The total area of potential snow leopard habitat in Russia is approximately 60,000 km^2 (Map1).

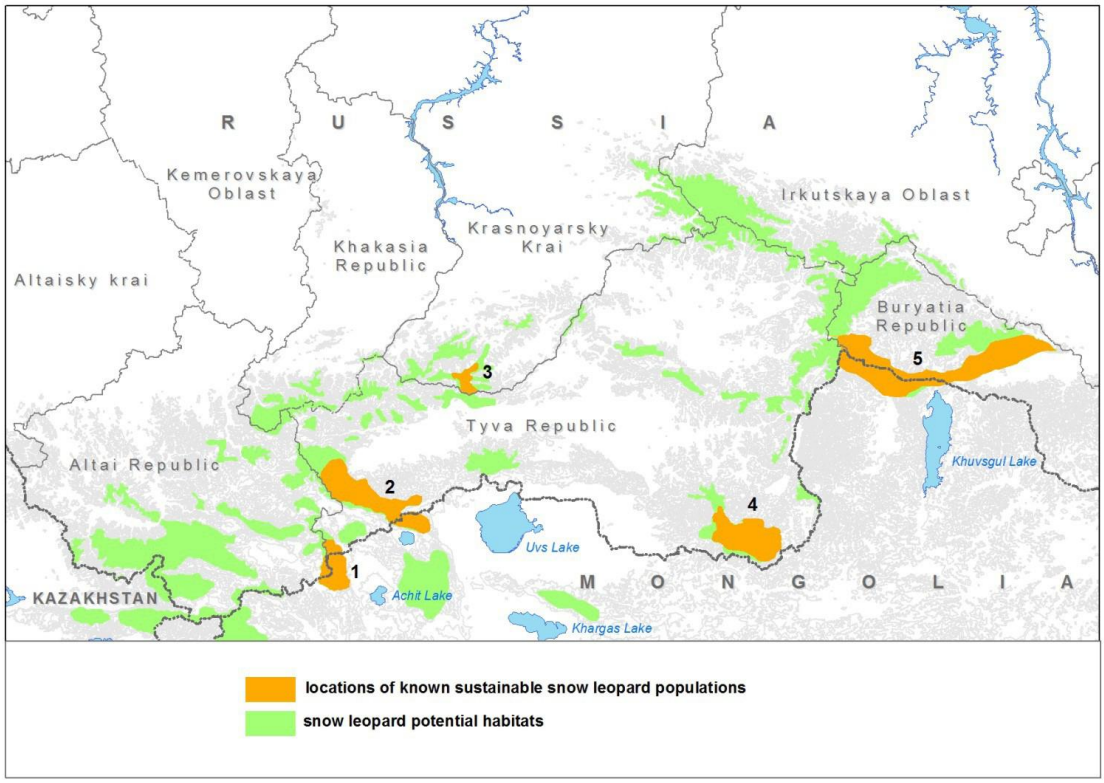
Map 1. Potential snow leopard habitat in Russia and in adjoining areas of Mongolia, China, and Kazakhstan (Strategy for Snow Leopard Conservation in Russia, 2002; Munkhtsog (unpublished) and our additions)



However, the areas regularly inhabited (no or little snow cover in winter months and adequate prey species populations) by snow leopards are much smaller, do not exceed 20,000-30,000 km^2, and are home to, in all probability, no more than 70-90 snow leopards. The habitat area for known stable populations of snow leopards in Russia is no more than 12,000 km^2, and that area is home to no more than 50-65 snow leopards (Map 2).

Snow leopard survival in Russia depends to a significant degree on the preservation of spatial and genetic connections between Russian populations and the main population nucleus in western Mongolia and perhaps northwestern China. As in the other countries in its modern range, the main threats to snow leopards in Russia are deaths caused by poachers and herders, loss of prey base, and in some cases, loss of habitat related to the development of mining and transportation infrastructure. Snow leopard body parts are often used in traditional eastern medicine as a substitute for tiger parts, and the animal's fur is of great value for luxury seekers. The significant popularity of snow leopard products in illegal trade is a serious concern for the species' future. The preservation of this northernmost population of snow leopards living in Russia – animals that are well adapted to hostile environmental factors at the edge of the species' range – is an important component of efforts to protect this species and its genetic diversity in Central Asia.

Map 2. Locations of known snow leopard populations in Russia



1 — Chikhachev Ridge

2 — Tsagan-Shibetu Ridge, southern part of Shapshal Ridge and western part of Western Tannu-Ola Ridge

3 — Sayano-Shushensky Nature Reserve and its buffer zone

4 — Sengelen Ridge

5 — Okinsky and Tunkinsky Ridges

This document was prepared by the team of expert from different organizations: Mikhail Paltsyn (compiler) and Ekaterina Lukonina, WWF-Russia; Sergei Spitsyn, Altaisky Nature Reserve; Alexander Kuksin, Ubsunurskayakotlovina Nature Reserve; Sergei Istomov, Sayano-Shushensky Nature Reserve; Svetlana Kozlova, WWF consultant on conservation planning in Altai-SayanEcoregion; Viatcheslav V. Rozhnov, Russian academy of science; Andrey Poyarkov, Russian academy of science.

Valuing the snow leopard ecosystem and its economic, biodiversity, and spiritual/cultural services to the community, to the nation, and to the planet

The habitats of snow leopard in South Siberia represent a set of different ecosystems in the elevation range from 540 and 4000 m above sea level. As a rule, optimal snow leopard habitat in the Russian part of the range is high-relief mountains with clearly defined rocky ridges and deep gorges, cliff massifs, and steep boulder fields. All good snow leopard habitats are distinguished by the absence or minimal presence of snow cover during the winter months. Such habitat is advantageous for Siberian ibex as well as other ungulates – the snow leopard's main prey. In addition to traversing open slopes, snow leopards pass through islands of forest cover.

Potential snow leopard habitats in Russia take about 60,000 sq. km of mountain ranges in South Siberia. The snow leopard is at the top of the ecological pyramid in South Siberia and Central Asia's mountain ecosystem. For this reason, sustainable populations of snow leopard are directly connected to the conservation of mountain-steppe, mountain-tundra and mountain-forest-steppe biomes, areas that have been inhabited by humans since ancient times and that are vital to the survival of South Siberia's nomadic peoples.

Optimal snow leopard habitat is also well suited for pasturing livestock, a fact that often results in conflicts between herders and this predator. In the best habitats, snow leopards form sustainable populations whose presence can be readily determined by noticeable evidence of marking activity. In the Russian portion of the range, such habitats are quite limited and comprise no more than 10-20% of the total potential habitat for this species. The irregular character of this habitat distribution determines the island-like nature of Russia's snow leopard population.

Until now general part of snow leopard habitats in Siberia is used **as traditional pastures for livestock and hunting areas of indigenous people.** These **highlands are also homes for valuable medicine plants and mountain ungulates** (popular game species). **Glaciers play important role in regional climate regulation** and water balance of mountain rivers (upper reaches of great Siberian Rivers like Ob and Yenisei). Also **snow leopard habitats represent excellent recreation areas and potential for tourism development,** including ecotourism, rafting, trekking, horse riding and climbing. For many Asian peoples **the snow leopard is a symbol of strength, nobility, and power**. Its image can be seen on the coats of arms of a number of different Siberian and Central Asian cities.

Table 1 below describes the biodiversity and economic values of snow leopard habitats in Russia.

Table 1.Biodiversity and economic values of snow leopard habitats in Russia

Value	Approximate assessment
1. BIODIVERSITY AND ECOSYSTEMS	
1. Number of vascular plant species	About 2000
2. Number of vertebrate animal species	About 500
3. Number of endangered species of plant and animals	About 100
4. Total number of wild ungulates	15,000-20,000
5. Water supply in glaciers	About 40 cubic km
6. Water supply in mountain rivers and lakes	About 150 cubic km
B. ECONOMIC	
1. Number of people living in the snow leopard habitats and around them	About 300,000 (95% of them are indigenous people)
2. Total number of livestock	About 200,000
3. Total area of mountain pastures	About 40,000 sq.km
4. Annual number of tourists	About 1,000,000
5. Total supply of game resources	????
6. Total supply of medicine herbs	50,000-80,000 tons
7. Total potential for hydropower	About 150,000 billion Kwt/hours
8. Total supply of mineral deposits	????

Disseminating information on the value of the snow leopard ecosystem and generating support for conservation

Past efforts

Educating Russians about the status of snow leopards as a national asset and unique animal of global importance and the importance of consciously biding by recommendations and limitations and encouraging individuals to get personally involved in conservation activities are of the utmost important for snow leopard conservation in Russia.

Effective public outreach can be assessed by measuring public opinion on snow leopard conservation and a willingness to support such activities. Results such as reduced snow leopard poaching, growth in the number of people involved in volunteer conservation activities, public support for protected areas, and improved compliance with limitations on resource use affecting snow leopards all are a testament to effective public outreach.

To disseminate information on the value of the snow leopard and its habitats in Russia following means were used in 1998-2012:

Publications

- Conservation Strategy for Snow Leopard in Russia (2002)http://wwf.ru/resources/publ/book/eng/7
- Conservation of Snow Leopard in Russia (2012) http://wwf.ru/resources/publ/book/eng/599
- **Assessment Report: Climate change and its impact on ecosystems, population and economy of the Russian portion of the Altai-Sayan Ecoregion (2011). Moscow: WWF-Russia** http://wwf.ru/resources/publ/book/eng/486
- Protection of livestock corrals from snow leopard. Manual for herders in Tuva Republic. UNDP-GEF Project (2008)
- Using electric fences to protect livestock from snow leopard. Manual for herders in Tuva Republic (2009) http://www.altai-sayan.com/about/publ/izgorodi.pdf
- WWF Altai-Sayan Bulletin
- Book of Meindert Brouwer (editor) “The Ecosystem Promise” (2012)http://www.ecosystempromise.net/
- Press-releases in Mass Media and web-sites of Russian organizations:
- WWFwww.wwf.ru(at least 30 press-releases per year)
- UNDP-GEF Project “Biodiversity Conservation in the Russian Portion of Altai-Sayan Ecoregion” http://altai-sayan.com/(already closed)
- Russian Geographic Society http://int.rgo.ru/
- Russian Academy of Science http://www.sevin.ru/
- http://www.sevin-expedition.ru/
- Federal Mass Media: at least 3 articles in printed media per year http://expert.ru/siberia/2003/05/05si-ipovest5_68986/; at least 1-2 TV shotsper year http://www.1tv.ru/news/social/192622; at least 50 news on web-portals per yearhttp://ria.ru/eco/20130128/920115080.html)
- Regional mass media: at least 1-2 articles in printed media per monthhttp://zvezdaltaya.ru/novosti/v-ongudayskom-rayone-otmetili-den-snezhnogo-barsa-07-08-2012.html; at least 1 TV-shot per 1-2 monthshttp://www.elaltay.ru/index.php?option=com_content&view=article&id=300:2012-09-17-12-15-28&catid=34:gtrk-gorny-altay-novosti-dnja-kat; at least 15 news on web portals per month http://www.gorno-altaisk.info/?s=%D1%81%D0%BD%D0%B5%D0%B6%D0%BD%D1%8B%D0%B9+%D0%B1%D0%B0%D1%80%D1%81&x=0&y=0
- Ministry of Nature Resources of Russiahttp://www.mnr.gov.ru/

Projects and Public Events:

- Land of Snow Leopard Festival in Altai Republichttp://wwf.ru/resources/news/article/9977; http://wwf.ru/resources/news/article/10148
- Land of Snow Leopard Festival in Tyva Republichttp://wwf.ru/resources/news/article/9533 ; http://wwf.ru/resources/news/article/9776
- Land of Snow Leopard Homestay Program. WWF and CITI Foundation 2011-2012http://wwf.ru/resources/news/article/9098
- Land of Snow Leopard Ecotourist Route. WWF and UNDP/GEF Project http://wwf.ru/resources/news/article/7196
- TosErtine (Nine treasures of Tuva): Snow Leopard is Tuvian treasure Number 1 http://wwf.ru/resources/news/article/6638
- TuvianKamby-Lama helps to save snow leopardshttp://wwf.ru/resources/news/article/5070

Future possibilities

Effective long-term snow leopard conservation in Russia requires the following strategies:

A. Encourage people living within the snow leopard's range in Altai,Tuva and Buryatia Republics, as well as in southern Krasnoyarsk Krai to relate to the cat as a part of their natural and cultural heritage and to understand the necessity of its preservation as ecological, economic and cultural value. It could be done in several ways:

- work with regional media to ensure regular coverage in the local press about the value and importance of snow leopard conservation;
- develop and implement targeted information campaigns with the goal of establishing a positive image of the animal as a symbol of Altai and Sayan. One such campaign could be the annual Snow Leopard Day festival, organized with support from WWF in Altai and Tuva Republics;
- active engagement of Buddhist leaders and other respected public figures in snow leopard conservation outreach among local residents;
- Engage local people in monitoring and conservation of snow leopard populations through economic incentives, such as ecotourism and souvenir production development in snow leopard habitats, and development of mutual cooperation between local communities and private and corporate donors for snow leopard protection.

B. Facilitate increased professional expertise among decision-makers and resource management experts for sustainable use of snow leopard habitats as important resource for recreational activities, livestock grazing and wildlife management. It can be done through development of special courses and programs for managers and decision-makers at national universities.

C. Facilitate nationwide public understanding of the need to conserve and sustainably use mountain ecosystems for snow leopard conservation as well as the leading role of protected areas in protecting this and other unique species and creating societal intolerance for poaching. This strategy can be implemented via national TV campaigns for fair hunting, ecological tourism and support of Protected Areas, as well as via popularization of recent scientific research on snow leopard *eco*logy.

D. carrying out of scientific researches with the use of modern methods of analysis such as molecular-genetic, physiological status, tagging satellite transmitters, modeling of habitats with use of GIS technologies, automatic came traps, the study of disease etc.

Assessing threats, both traditional and the new ones from infrastructure development, market demand, tourism, and climate change to snow leopard and its habitats

A variety of natural and anthropogenic factors influence the condition of snow leopard populations. Limiting factors that influence snow leopards can be divided into 2 main groups: direct and indirect impacts (Map 3 and the Table 2).

Table 2.Key threats for snow leopard in Russia

Threat	Area	Intensity	Urgency	Total Ranking
Category 1: Habitat & Prey Related				
1. Prey Reduction due to Illegal Hunting	5	3	3	11
Category 2: Direct Killing or Removal of Snow Leopards				
1. In Retribution for Livestock Depredation	2	4	3	9
2. Poaching for Trade in Hides or Bones	5	3	3	11

Threat	Area	Intensity	Urgency	Total Ranking
3. Secondary Poisoning and Trapping of Snow Leopards	4	5	5	14
Category 3: Policy and awareness issues affecting conservation of snow leopards, prey and habitat				
1. Lack of Appropriate Policy	5	4	4	13
2. Lack of Effective Enforcement	5	4	5	14
3. Lack of Awareness Among Local People	4	4	4	12
Category 5: Emerging Threats				
1. Direct & indirect threats due to mineral exploration & mining (local)	1	5	5	11

On Ranking Threat Values

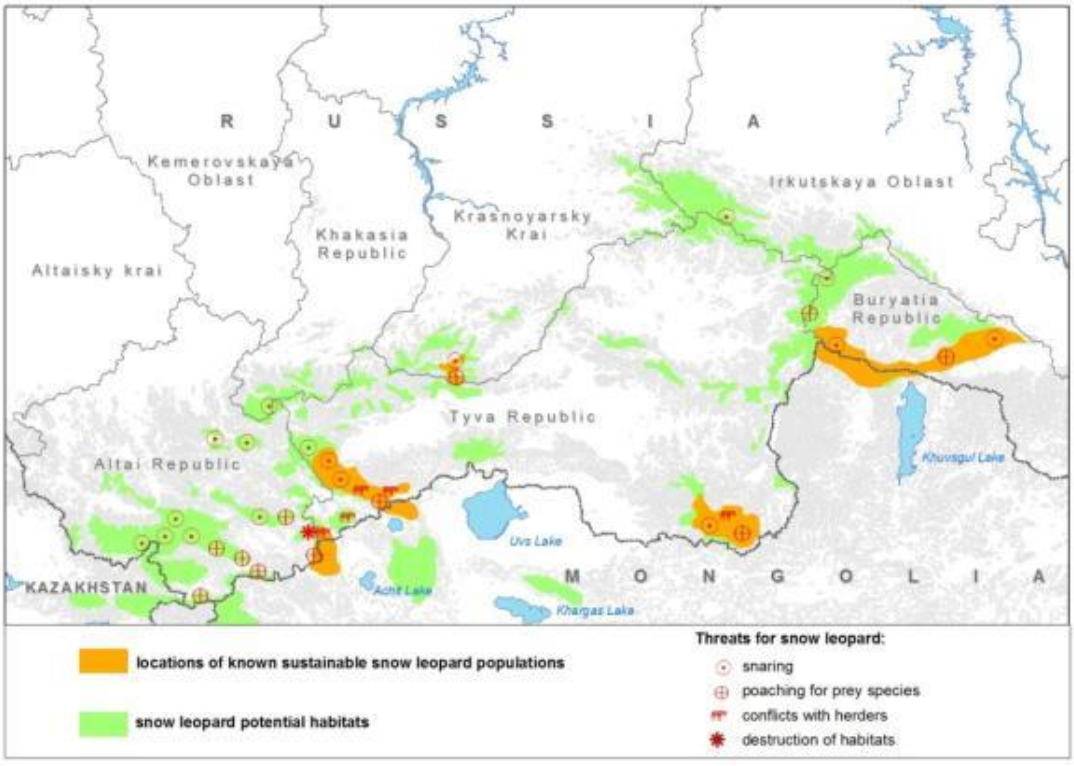
0 or 1 = no or low threat; 2 or 3 = intermediate threat level; 4 or 5 = high threat level

AREA: Rank each threat according to how wide-spread it is (where 5 indicates it occurs across most or all snow leopard range within country; and where 1 indicates it is extremely limited in areal extent)

INTENSITY: Threats ranked from 5 = the most destructive impact to 1 = the least negative impact

URGENCY: Rank each threat identifying if it needs immediate & urgent attention (very time sensitive) (value = 5) to being of least concern or urgency (value = 1)

Map 3. Key threats for snow leopard in Russia



The most important direct threats include the killing of snow leopards as a result of poaching or protecting livestock from this predator. **Indirect threats** having the greatest influence on reducing snow leopard populations are decreased prey base, and future habitat destruction due to mining development.

Direct threats

Snow leopard killing due to poaching

This is perhaps the most serious threat to the continued existence of snow leopards in Russia and other countries. Snare-hunting presents the greatest danger to this predator and it is commonly used throughout almost the entire species' range in Russia. Thanks to predictable behavior – snow leopards haunt the same trails and paths along ridges – the cats can easily identifications by poachers and entrapped in snares set along mountain ridges and narrow trails. Snares are often set so densely that snow leopards have almost no chance of escaping alive. They can be hunted for their valuable pelts and other derivatives, but more often than not, they are just victims of snare-hunting targeting musk deer and other species.

Local residents, mainly herders and hunters who overwinter in snow leopard habitat, are the main poachers, killing big cats and other species in snares. High prices for derivatives of snow leopards, musk deer, and other species are the main reason for the mountain snaring industry and animal parts are one of the very few income sources for local residents living in snow leopard habitat in the Altai-Sayan Ecoregion. As a rule, enforcement agencies only very rarely notice snare poachers who work in difficult-to-reach snow leopard habitat. Give the high intensity of snare poaching, key groupings of snow leopard in Russia could be wiped out in just 10-15 years.

Snow leopard deaths due to livestock attacks

Persecution of snow leopards by herders due to attacks on livestock is a serious threat to the existence of snow leopards as well. In Russia, the problemis particularly relevant in western Tuva and to a much lesser degree on the Sengelen Ridge (southeastern Tuva). As a rule, attacks occur when livestock are pastured directly in the big cat's habitat and/or the population of wild ungulates (the snow leopard's main prey base) is noticeably reduced due to poaching. Other reasons for snow leopard attacks on livestock include supervised livestock grazing and corrals that are poorly protected from predators.

Snow leopards may attack both small (goats and sheep) and larger animals – yaks and horses – attacking in pastures or in corrals where livestock are kept overnight. While a snow leopard will only kill 1-3 animals in a single attack in open landscape, in a corral the predator is capable of killing or wounding dozens of panicking animals (up to 80 head), resulting in tremendous losses for the herder. In turn, corrals become traps for the snow leopard itself, which is not always sable to jump out again through the corral roof from among panicked sheep and goats. Increasing numbers of livestock in snow leopard habitat will lead not only to increased conflicts with herders, but also to crowding out wild ungulates that form the natural prey base of snow leopards in mountain pastures.

Indirect threats

Decreases in snow leopard prey base populations

It is well known that predator population numbers depend directly on the population status of the species upon which it preys. As a result, a decreased numbers of ungulates– the snow leopard's main prey – are one of the most important factors that determine a decrease in snow leopard populations.

In most cases, this is also related to poaching. For example, in western Tuva the main reason for frequent snow leopard attacks on livestock is believed to be a sharp drop in wild ungulate populations in the mountains as a result of intensive hunting. Numbers of mountain ungulates remain relatively low in relatively accessible parts of snow leopard habitat. Snare poaching for musk deer is very common in snow leopard habitat and severely reduces not just one of the snow leopard's prey species, but also presents an extreme risk for the predator as well.

In addition, decreases in wild ungulate populations facilitate the development of free-range livestock farming in snow leopard habitat. As a rule, livestock pasturing results in noticeable disturbances and crowds wild ungulates out of grazing habitat.

Development of economic infrastructure and habitat destruction

Road construction in snow leopard habitat significantly increases access for poachers and herders, which generally results in decreased numbers of snow leopard prey and increased conflict between the cat and herders. One example of this is the construction of a road between Mugur-Aksy and Sagly by way of Tsagan-Shibetu Ridge that resulted in decreased numbers of Siberian ibex.

Construction of a natural gas pipeline and road across Russia's Ukok Platea uinto China could also have a negative impact on snow leopard populations in the Argut River basin and Tabyn-Bogdo-Ola Ridge due to the potential disruption in wildlife corridors for this species between Russia, western Mongolia, and China.

Mining can also lead to the destruction of key snow leopard habitat in certain areas. Currently, there is a threat on the central Chikhachev Ridge where there are several polymetallic deposits planned for wide-scale development in immediate proximity to transboundary snow leopard habitat. Development of these deposits is linked not only to habitat destruction for snow leopards but also to increased disturbance factors and increased poaching with regard to ungulates and the snow leopard itself.

Dealing with above threats

Replicating known good practices (mainly for traditional threats)

Great majority of the special projects aimed to snow leopard conservation in Russia in 2002-2012 was funded by WWF-Russia and UNDP/GEF Project "Biodiversity conservation in the Russian portion of Altai-SayanEcoregion"(2006-2011). Since 2010 Russian Academy of Science started snow leopard research and monitoring program in South Siberia under supervision of the President of Russian Federation Vladimir Putin. In 2011 initiative of Sayano-Shushensky Zapovednik to protect snow leopard population in Western Sayan Mountains was supported by the Russian Geographical Society.

In 2002-2012 some projects devoted to snow leopard monitoring and conservation were implemented by protected areas and regional conservation NGOs in Altai Republic, Tuva Republic and southern part of Krasnoyarsky krai with the support of national and international foundations and organizations (Strana Zapovednaya Foundation, Sibirskoe Zdorovie Corporation, Citi Foundation, Panthera, US Fish and Wildlife Service, Snow Leopard Conservancy, Weeden Foundation, Altai Project and others).

Successful practices for conservation of snow leopard in Russiaarethe following:

A. More than **900,000 ha of new protected areas were established** in potential snow leopard habitats in Russia. Currently, an assortment of protected areas covers 23% of potential snow leopard habitat in the Russian part of the species' range. However, just 16% of known sustainable snow leopard populations habitat in Russia falls within a protected area. Establishing of Protected Areas (especially Zapovedniks and national Parks) is one of the most effective ways to protect snow leopard populations and habitats. Protected areas deal with a whole complex of direct and indirect threats to snow leopards (eliminate poaching and prevent habitat destruction and degradation due to unsustainable economic development). At least 400,000 ha more of protected areas should be established in Russia to protect sustainable snow leopard populations in Altai, Tuva and Buryatia Republics, as well as southern part of Krasnoyarsky kray.

B. **Three inter-agency anti-poaching brigades were established in Altai Republic, Tyva Republic and southern part of Krasnoyarskykrai** for regular patrolling of snow leopard habitats. Due to regular patrolling the number of poacher's snares in two key snow leopard habitats (Argut River Watershed and Sayano-Shushensky Biosphere Zapovednik) decreased 3.5 times. Anti-poaching brigades can effectively eliminate poaching (especially snaring) for snow leopards and their prey species. This practice can be replicated in Buryatia Republic and Western Tuva.

C. In 2007-2008 as part of the UNDP/GEF and WWF program**, more than 70 herders in Tuva Republic were trained in the simplest means of strengthening corrals** with the use of metal mesh, and more than 40 corrals were protected from snow leopard attack on Chikhachev Ridge, Mongun-Taiga Massif, Tsagan-Shibetu and Shapshalsky Ridges. Since then there has not been a single case of a snow leopard gaining access to a corral in western Tuva (prior to this 56% of all livestock killed by snow leopards in western Tuva died in corrals). In result of this project number of snow leopard south-western Tuva increased from 10-12 up to 15-20 individuals. Corral improvement can be replicated in Argut River Watershed, Altai Republic, as a measure to prevent snow leopard attacks on livestock after successful restoration of local snow leopard population.

D. **More than 70 families of local people living in the snow leopard habitats in Altai Republic were provided with micro-loans and grants** and started to develop legal small business as alternative to poaching (WWF and Citi Foundation project).In result of the project level of poaching in snow leopard habitats in Altai decreased since 2010 by 10-15%. This measure in complex with anti-poaching can effectively affect poaching and can be successfully replicated in Western Tuva, Buryatia Republic and southern part of Krasnoyarsky kray.

Developing new counter measures (for new threats) including pilots where needed

New arising threat for snow leopard populations in Russia is development of mining industry and linear infrastructure in the mountain regions of South Siberia and adjacent areas of Western Mongolia, North-eastern China and Eastern Kazakhstan. This kind of economic development is linked not only to habitat destruction for snow leopards but also to increased disturbance factors and increased poaching with regard to ungulates and the snow leopard itself.It is especially dangerous when occurs in the habitats of transboundary snow leopard populations at the border of Russia, Mongolia, China and Kazakhstan. The preservation of transboundary parts of the snow leopard's range at the intersection of Russia, Mongolia, Kazakhstan, and China is of particular importance to overall snow leopard conservation in the animal's northernmost range. These areas connect large populations of the species in western Mongolia and northwestern China with sparse groups of snow leopards in Russia.

Another threat that can directly and indirectly affect snow leopards, their habitats and prey species is consequences of global climate change. In the context of global climate change impacts on ecosystems and particular species (including snow leopard), dramatic changes in pasture conditions, availability of water sources, snow cover distribution and high frequency of catastrophic events (harsh winters and droughts) are of primary concern. Results of climate change assessment in Russian and Mongolian part of Altai-SayanEcoregion indicate that warming is taking place: the average rate of warming during 1976 and 2008 in the Russian part of the ASER was 1.85 degrees C, which is judged quite significant (Kokorin et al. 2011). Additionally, forecasts predict the increase of the annual maximum temperatures to continue with another 3.4 degrees C during the next 20-30 years, with regional variations (Kokorin et al. 2011). Aside from temperature increase, the ASER will likely be impacted by increased period of droughts, reduced precipitation, permafrost degradation, earlier dates of river ice break, decreased thickness of ice cover, changes in annual precipitation leading to changes in water run-off and increased probability of dangerous floods, increase of evaporation, and acidification of lakes.

The counter measures to deal with these threats should involve a complex of following national and transboundary activities:

A. In federal law of Russia #174 “On the environmental impact assessment report”, change and amend the text to require project documentation of any mining and capital construction projects occurring in the habitat of snow leopards and other Red Book-listed species to undergo a government environmental impact report (expertiza)

B. Develop and approve a program of actions for snow leopard conservation in the Russia-Mongolia transboundary zone, as well as in Russia and Kazakhstan

C. Develop and expand international transboundary Russian-Mongolian protected areas for the protection of snow leopards and other rare species on Chikhachev, Tsagan-Shibetu, Sailyugem, and Tunkinsky Ridges and the mountains around Khuvsgul Lake

D. Expand the "Golden Mountains of Altai" UNESCO World Heritage site in the transboundary area of Russia, Mongolia, China, and Kazakhstan

E. Coordination of science programs and development of collaborations among specialists in Russia, Mongolia, China, and Kazakhstan to study global climate change impact on ecosystems and endangered species of Altai-SayanEcoregion. The results of these research and climate driven habitat change modeling should be used for development of climate-smart international strategies for conservation of endangered species and sustainable development of local communities of the Ecoregion.

Organization, empowerment, and support

National institutions for SL conservation: strengths and weaknesses to be remedied

To deal with current and future threats to snow leopard and its habitats different stakeholders should work together. National institutions for SL conservation in Russia are represented by Ministry of Nature Resources, Regional Wildlife Protection Agencies, Federal Protected Areas, Regional Protected Areas, Russian Academy of Science, International Organizations (WWF), Regional Conservation NGOs, and Local Communities. Strengths and weaknesses of these stakeholders are explained in the Table 3.

Table 3.National institutions for SL conservation in Russia: strengths and weaknesses

Organization	Strengths	Weaknesses
I. Ministry of Nature Resources	• Real political power and direct dialog with Government • Development of appropriate conservation policies and legislation • Establishing of new Protected Areas	• Lack of professional species experts • Quick rotation of government employees • Greater attention to resource exploitation than biodiversity conservation
J. Regional Wildlife Protection Agencies	• Real rights to fight poaching in snow leopard habitats on large areas	• Lack of appropriate funding • Lack of equipment and vehicles • Low number of professional inspectors
K. Federal Protected Areas	• Professional staff for protection and monitoring of snow leopard • More or less sustainable funding • Developed environmental education programs	• Limited area under protection • Rights to stop poachers only inside Protected Area • Restricted funding for snow leopard conservation and monitoring
L. Regional Protected Areas	• Appropriate location and area for snow leopard conservation • Local staff and good knowledge of snow leopard distribution	• Lack of sustainable funding • Lack of professional staff • Very limited staff • No rights to stop poachers
M. Russian Academy of Science	• Highly professional research team • Professional equipment for advanced research programs on snow leopard	• Lack of permanent funding for research • Low conservation implication of research programs
N. International Organizations (WWF)	• Highly professional conservation experts • Long-term conservation programs • Transboundary cooperation in conservation	• Lack of permanent and sufficient funding for snow leopard conservation • Lack of fundamental scientific research of snow leopard ecology
O. Regional	• Professional team of local conservationists and researches	• Small number of professional experts • Lack of sustainable funding

Organization	Strengths	Weaknesses
Conservation NGOs	• Good knowledge of key snow leopard habitats • Cooperation with local and regional government organizations	• Lack of long-term conservation programs for endangered species
P. Local Communities	• Live directly in the habitats of snow leopard • Traditional knowledge and lifestyle • Excellent knowledge of snow leopard distribution in limited areas	• Dependence on poaching as a source of income • Poverty and unemployment • Low interest in conservation of snow leopard

One of the most effective ways to overcome the above weaknesses of different stakeholders involved in conservation of snow leopard, its habitats and prey species is **development of strong conservation collaborations and partnerships between all of them**.

Legal framework for protecting SL and habitat: strengths and weaknesses to be overcome

Red Books

Snow leopards are still inscribed in the Russian Federation Red Book and are members of Category I – threatened with extinction at the periphery of the species' habitat. Snow leopards are listed in the Red Books of 7 Russian Federation subjects–the Republics of Altai, Tuva, Khakasia, and Buryatia, Irkutsk Oblast, and Krasnoyarsk and Zabaikalsky Krais.

Legal and other regulatory acts in the Russia Federation

In Russia, the key regulations concerning the conservation and use of animals, including snow leopards, and their habitats are contained in conservation laws, including these key acts:

- Federal law FZ #7 "On environmental protection" (dated 10 January 2002)
- Federal law FZ #52 "On the animal world" (dated 24 April 1995)
- Federal law FZ #33 "On protected areas" (dated 14 March 1995)
- Other legislative acts, federal decrees, and departmental regulatory acts, and regulatory acts in other legal branches (civil, criminal, administrative laws).

The federal law "On the animal world" is the primary legislation in this arena. It regulates relationships between enforcement and use of the animal world overall, as well as in the framework of habitat conservation and restoration for the purposes of ensuring biological diversity, sustainable use of all components, establishing conditions for wildlife sustainability, conservation of the genetic fund for wildlife, and other protections for wildlife as an intrinsic part of the natural environment.

In order to ensure enforcement and use of wildlife and habitat conservation and restoration, the law presumes requirements to conduct government surveys of wildlife and their use and a government cadaster of wildlife, to conduct government wildlife monitoring, and to implement government conservation programs for wildlife and wildlife habitat. In addition, the law requires the government to protect wildlife by demanding a government environmental impact report (*expertiza*) to precede any economic decision with the potential to impact animals and their habitat.

To a significant degree, numerous sub-legislative and agency-level regulatory acts are the working legal foundation of management and law enforcement agencies in conservation activities, regulate the use of rare and threatened species, protect habitat, and provide a regulatory mechanism with reasonably well-defined jurisdiction and distinctions between federal and regional government agencies.

However, the effectiveness of this working system for regulatory management is significantly reduced both by the absence of a sufficiently effective enforcement policy and the presence of regulatory, legal, and methodological loopholes in the system in a number of areas.

Article 20 of the federal law "On the animal world" establishes the government environmental impact assessment (*expertiza*) as a mandatory measure to protect wildlife. The assessment must precede finalizing any economic decisions with the potential to impact animals and their habitat. However, in the event that economic activity resulting in environmental impact stakes place outside a protected areas, then the government environmental impact report is not required, nor is there a legal basis forbidding the activity, even if it has the potential to negatively impact snow leopard habitat.

Wildlife law enforcement and combating crime: current practice and areas for improvement

Between 2000 and 2011 there were almost no cases prosecuting poachers for killing snow leopards and during that entire period only 2 cases of illegal hunting of snow leopards were discovered. The guilty parties managed to escape culpability in both cases. Between 2000 and 2011 there were a number of instances when contraband snow leopard pelts entered Russia (Altai Republic) from Mongolia. All violators were prosecuted for criminal smuggling.

Currently regional wildlife protection agencies in South Siberia have very limited or no funding, staff and equipment for effective conservation of snow leopard and other endangered species. In Altai and Tuva Republics and southern Krasnoyarsk Krai, hunting is today the primary occupation (second to livestock farming) of many residents left unemployed after the collapse of Soviet collective farms and other enterprises. Many villages depend to a significant degree on hunting and gathering in the mountains and taiga forest. Local residents have significant numbers of illegal and unregistered weapons, a fact that is affirmed by the confiscation of dozens of such weapons every year.

It is very necessary to ensure effective work by regional wildlife protection agencies in the fight against poaching in snow leopard habitat by allocating additional funding from the federal budget. In doing so, enforcement staff must first and foremost be focused on the fight against illegal snare-hunting in snow leopard habitat. Is it also necessary to devote more attention to the fight against illegal trade in products and derivatives of musk deer and other hunting species. Development of cooperation with conservation and enforcement agencies to fight illegal trade in snow leopards and other rare species, as well as hunting species is very urgent. WWF and UNDP/GEF's extensive experience in creating and supporting interagency anti-poaching brigades can be used to advance this work.

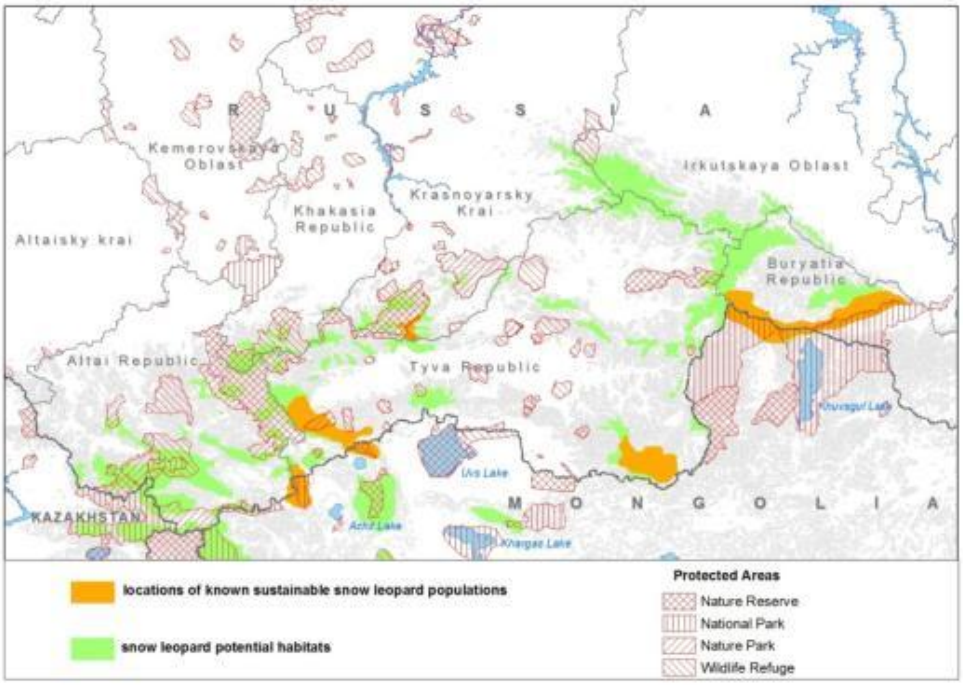
Currently, an assortment of protected areas cover 23% of potential snow leopard habitat in the Russian part of the species' range (Map 4). However, just 16% of known sustainable snow leopard populations habitat in Russia falls within a protected area.

It should also be noted that in many of these protected areas, snow leopard conservation enforcement is insufficient. A number of protected areas require a change in status, optimization of the lands, and a strengthened enforcement regime. Transboundary cooperation between Russian and Mongolian protected areas requires urgent improvements for the preservation of transboundary snow leopard populations.

Suggestions for improvement:

- Provide regional wildlife protection agencies in South Siberia with sufficient funding, transportations and equipment, and trained professional staff
- Develop legal regulations for prosecuting individuals advertising in the media and on the internet for the sale of pelts and other snow leopard derivatives, for acquiring personal property of products produced by illegal hunting for that species, as well as prosecuting the people lodging those advertisements
- Strengthen the administrative and criminal responsibility for poaching, illegal transportation and trade of snow leopards and other species listed in the Russian Federation Red Book
- Completely prohibit harvesting of musk-deer in the habitats of sustainable snow leopard populations
- Develop and approve Rules for trade in products derived from hunting species and species listed in the Russian Federation Red Book

Map 4. Protected Areas in snow leopard habitats in Russia



Legal framework for empowerment of community for co-management of wildlife and habitat; current practice and areas for improvement

Considerable improvement of legal framework in Russia is necessary to provide local communities in the habitats of snow leopard with the rights and funds to manage their resources for the long-term. Now such nature resources as game, forest, medicine plants, and considerable part of pastures are government property. Thus, local community have very limited or no rights at all to manage these important resources in the areas where they live. People do not feel ownership of these resources and are often involved in illegal consumption of the resources including poaching. Nonetheless local communities have legal rights to rent hunting lands and establish non-government organizations of hunters and manage wildlife. Also, local communities can build pasture land management groups and use grazing resources in sustainable manner. In reality communities in South Siberia have very limited capacities, professional staff and financial resources to develop game or pasture community based management systems in the habitats of snow leopard. Special focus on actions is required to make local communities in and around habitats of snow leopard aware of their ecological and legal rights. The assumption is that with increased awareness and encouragement, the communities will also feel increased ownership and will actively participate in conservation activities for snow leopard and mountain ecosystems, like planning, management and enforcement and will practice sustainable management principles for their natural resources.

In order to increase the effectiveness of snow leopard protection and ensure conservation of its habitat by local communities it is advisable to:

- Develop strategies and plans to develop community managed hunting lands in Altai and Tuva Republics, as well as in southern Krasnoyarsk Krai
- Improve conditions for economic development of community managed hunting lands in which snow leopards are present, including attracting investments and other extra-budgetary funds

- Track the condition of livestock corrals in snow leopard habitat and strengthen and improve them in timely fashion to prevent large losses of livestock due to predator attack. Protection of corrals from snow leopards is an extremely effective measure for reducing conflicts between herders and snow leopards
- Develop and implement a system to encourage herders to protect snow leopards
- Attract additional funding to develop tourism, small business, manufacturing, and jobs creation with the goal of ensuring local employment and providing alternatives to poaching

In preparing socio-economic development programs, priority should be given to programs and projects that have minimal impact on the environment and snow leopard habitats. Such projects and programs include development programs for ecological and rural tourism, the implementation of which directly depend on the degree to which mountain ecosystems remain intact and accessible for viewing large animals such as Siberian ibex, argali, and red deer. Implementation of multiyear ecotourism programs in snow leopard habitats permits the active engagement of local residents in servicing tourists and volunteers traveling to the region to learn about snow leopards. In this way, snow leopards can become a building block of the herding community's local economy living in this predator's habitat.

Support mechanism for building community organizations: current practice and needed strengthening

Currently more than a 100 community NGOs exist in the habitats of snow leopard in South Siberia. Great majority of them are represented by indigenous organizations devoted to protect traditional lifestyle of nomadic and semi-nomadic people, and support sustainable development of local indigenous communities. Being heavily dependent on renewable natural resources such as game species, pastures and non-timber forest products, still not many people within the community organizations are aware of how to use procedural, judicial and informational mechanisms (such as public hearings and public Environmental Impact Assessments which are legally granted by Constitution of Russian Federation) to defend their rights to a clean environment and nature resources management. These grassroots NGOs are very weak in terms of a number of qualified experts, resources and expert capacities to be able to tackle resource-management issues independently. There is a crucial necessity to create new groups of activists which could act on a permanent basis as environmental watchdogs on behalf of interests of particular local communities in key settlements located in snow leopard habitats in South Siberia. Community organizations have very limited access to funding and currently do not play any considerable roles in conservation and nature resource management.

To increase capacities of community organizations in conservation of snow leopard and sustainable management of nature resources it is necessary to:

- Provide local communities and community organizations with real legal rights to protect and manage nature resources in the areas of their traditional land use
- Organize capacity building programs for community organizations to increase their knowledge and skills in leadership, management, and use of procedural, judicial and informational mechanisms to defend rights of indigenous communities to a clean environment and community-based nature resources management
- Provide access for local community organizations to national and international sources of funding to support their conservation, nature resource management and sustainable development activities in the mountain regions of South Siberia

Research and training

Development and implementation of programs for education and training

The conservation of biological diversity including that of rare and threatened species requires current basic science and analysis. Today, there is only very limited data has been gathered about snow leopard biology and ecology. **In**

developing a phased program for the scientific study of snow leopards in Russia, the following areas should be considered:

- Study the snow leopard's current range, populations, and other dynamics, and create improved maps of the species' habitat distribution; study the roles of natural and anthropogenic factors in population dynamics and changes in snow leopard habitat; identify key sites for snow leopard reproduction.
- Clarify snow leopard population structure by using genetic analysis and other advanced techniques; study genetic relationships and the degree of genetic isolation of various snow leopard populations; identify potential migration corridors between snow leopard populations in Russia and western Mongolia, evaluate their significance for species conservation in Russia.
- Zoological and veterinary research on snow leopards in various populations.
- Develop programs for the restoration of snow leopard groupings or reintroduction of this species in habitats where poachers previously eradicated the cat.
- Particular attention must be paid to applied science for the development and implementation of measures aimed at preserving viable snow leopard populations in conditions of regional socio-economic development and context of global climate change. The study of snow leopards and other rare species should be priority topics in nature reserve programs and in higher education.

Cooperation in the application of results of scientific research

International partnerships (particularly between Russia and Mongolia) should form the basis for effective application of the scientific research results. This will ensure the exchange of scientific ideas and the most current international experience, joint scientific research efforts, data sharing, and a certain degree of financial support.

For each research conclusion the key stakeholders in the Altai-Sayn should agree on and adapt the research results in their conservation strategies and action plans at local, national, and at the transboundary level. To do so, national and international facilitators for snow leopard conservation may organize annual meetings of key stakeholders including governmental agencies, scientific institutions, NGOs, and individual researchers. In these meetings stakeholders may share their research results and propose actions to the governments on how to adapt their current and future conservation efforts.

Time-phased implementation program, budget, and indicators for snow leopard conservation in 2013-2022

Program impact:mountain ecosystems representing key snow leopard habitats sustain unique biodiversity and benefit to local communities and sustainable regional development.

Ten year National Goal:restore the total population of Snow Leopard in the Russian Federation from current 70-90 up to 110-120 individuals by 2022.

Five year National Goal:increase the number of at least 6 key snow leopard populations in the Russian Federation on 15-20% by 2017 (from current 45-55 to 65-70 individuals) (Map 5).

Program outcomes:

A. By 2017 have at least six sustainable snow leopard populations with total number 65-70 individuals in Russia
B. By 2022 have total population of Snow Leopard in the Russian Federation up to 110-120 individuals

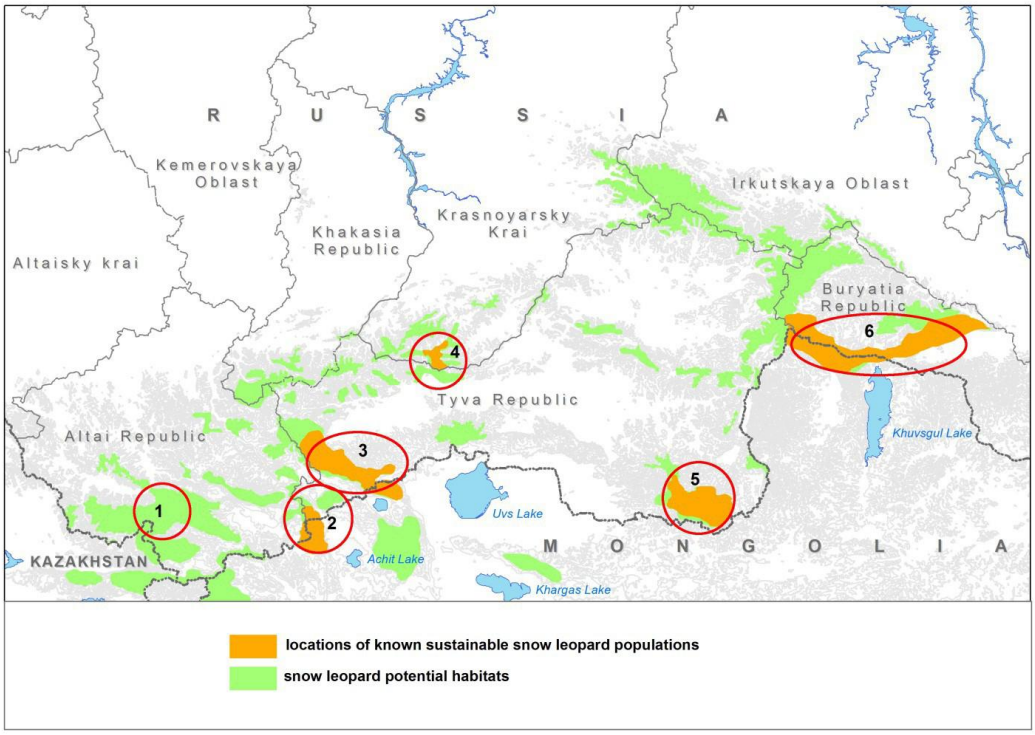
Program result indicators:

A. Number of snow leopards on model monitoring areas identified by camera trapping and DNA analysis

B. Number and population density of key wild prey species (Siberian ibex, maral deer, roe deer, musk deer, argali, marmot, and others)
C. Number of herders families those are aware on economic importance of snow leopard conservation and involved in its protection

General actions to implement these Goals are presented in the Excel Tables(Appendix 1).

Map 5. High priority areas for snow leopard conservation in Russia in 2013-2022



2. **Argut River Watershed**
3. **Southern part of Chikhachev Ridge and Mongun-Taiga Massif**
4. **Tsagan-Shibetu Ridge, southern part of Shapshal Ridge and western part of Western Tannu-Ola Ridge**
5. **Sayano-Shushensky Nature Reserve and adjacent area of Khemchiksky and Kurtushubinsky Ridges**
6. **Sengelen Ridge**
7. **Okinsky and Tunkinsky Ridges**

Tracking implementation progress and monitoring results

Scientific monitoring of SL, habitat, and threats: current practice and areas for improvement

Effectively, beginning in 2004, monitoring of the status of key snow leopard populations in the Altai-SayanEcoregion has been done by staff from Altaisky, Sayano-Shushensky, and Ubsunurskaya Kotlovina Nature Reserves, with support from WWF and UNDP/GEF (“Conservation of Biodiversity in the Russian Altai-SayanEcoregion”).

In 2009, the “Snow Leopard Monitoring Program in the Russian Federation” was published using data from these studies (Spitsyn et al., 2009).

The goal of the Monitoring Program was to ensure the annual collection of accurate information on the condition of key populations of the species in Russia as the basis for developing practical measures for long-term conservation.

The Monitoring Program’s Objectives were as follows:

- Annual calculation of populations and dynamics of key populations of snow leopards

- Data collection on structure and changes in the species' habitat, spatial, sex, and age structures of populations, reproduction and mortality levels, condition of habitat, and anthropogenic factors.

Snow leopard Monitoring Program Activities included:

- Annual winter surveys on fixed transects within key habitats (to seek out tracks in the snow on fixed routes)
- Camera-trapping on model monitoring areas (since 2010)
- Year-round collection of reports of human encounters with snow leopards in the Altai-SayanEcoregion and outside its borders

Program of study and monitoring the snow leopard in South Siberia of Russian Academy of science was approved by the President of the Russian Academy of Sciences and realize with the financial support of the Russian geographical society and under the patronage of the President of the Russian Federation. The program was started in 2010. The main block of this programs is:

- Study of the spatial structure of populations with the use of modern and traditional methods (satellite tagging, automatic came traps,, tracing, etc.).
- Study of the modern range of the snow leopard (field work and modeling potential habitat).
- Molecular-genetically research.
- Study of hormonal status, and stress level
- Monitoring diseases and parasites
- Prey predator system
- Relationships with competitors and role in ecosystems

Monitoring implementation progress through Key Indicators: setting up a robust system

Implementation of National Snow Leopard Conservation Program in Russia requires a set of progress indicators based on the key planned Program outputs. We suggest the following set of progress indicators for our country:

- Number of amended and approved legislation acts directed to protection of snow leopard and its habitats;
- Total Area and annual funding of Protected Areas in the habitats of sustainable snow leopard populations;
- Annual funding, number of staff, and number of anti-poaching raids of regional wildlife protection agencies in the key habitats of snow leopards;
- Number of local herders and donors involved in incentives programs for conservation of snow leopard;
- Number of international transboundary programs for conservation and monitoring of snow leopard developed by Russia, Mongolia, China and Kazakhstan;
- Number and total area of transboundary PAs established for protection of transboundary snow leopard populations;
- Number of big industrial companies involved in protection of snow leopard and its habitats, and amount of funding these companies provide annually for conservation programs.

Summary of costs and financing possibilities

Capital and operating costs by component, phased over seven years

Annual expenses for snow leopard conservation and monitoring in Russia include such items as follows:

- Improvements in the legal and regulatory sphere aimed to effective protection of snow leopard and its key habitats
- Development and support of a network of protected areas in the key habitats of snow leopard
- Increasing the effectiveness of snow leopard protection outside of protected areas
- Scientific research directed to better understanding of snow leopard distribution, population structure, prey base, habitats, migration corridors, and survival rates
- Monitoring the status of key snow leopard populations

- Outreach and education activities to establish positive image of snow leopard as a symbol of Altai and Sayan Mountains and engage local communities in the species monitoring and conservation

These activities in 2016-2012 years were implemented due to funding from different sources described in the Table 5. Priority actions and their costs for snow leopard conservation in Russia in 2013-2022 are explained in the Tables 6.

Table 5.Average annual expenses for snow leopard conservation and monitoring in Russia for 2006-2012

Sources of funding	**Average annual sum, USD (2006-2012)**
Ministry of Nature Resources	2,500,000
Russian Academy of Science	180,000
WWF-Russia	150,000
UNDP/GEF Project (2006-2010)	40,000
Other international organizations	20,000
TOTAL	**$2,790,000 per year**

Table 6.Necessary funding for snow leopard conservation in Russia for 2013-2022

	Priority Actions	**Required Budget, USD**
A.	Improvements in the legal and regulatory sphere aimed to effective protection of snow leopard and its key habitats	70,000
B.	Development and support of a network of protected areas in the key habitats of snow leopard	30,000,000
C.	Increasing the effectiveness of snow leopard protection outside of protected areas	40,000,000
D.	Scientific research directed to better understanding of snow leopard distribution, population structure, prey base, habitats, migration corridors, and survival rates	1,600,000
E.	Monitoring the status of key snow leopard populations	1,800,000
F.	Outreach and education activities to establish positive image of snow leopard as a symbol of Altai and Sayan Mountains and engage local communities in the species monitoring and conservation	2,000,000
Total budget for ten years		**$75,470,000**
Annual budget		$7,547,000
Available according to the average annual expenses (2006-2012)		$2,790,000
Annual funding gap		$4,757,000

Major Funding Gaps

As seen from the Table 6 total funding gap between current and needed funds for snow leopard conservation in Russia is $4,757,000/year. Measures to fill out this gap are needed to be developed by key stakeholders at international, national, and at the regional levels.

Tajikistan

National Snow Leopard Ecosystem Protection Priorities (NSLEP)

Tajikistan(2014 – 2020)

Dushanbe 2013

Executive Summary

Snow leopards (*Panthera uncia)* are one of the world's most enigmatic wild cats. They live and travel in solitude over vast distances of isolated and rugged mountain range in central Asia, and are supremely adapted to thrive in some of the harshest conditions on the planet. Seldom observed in the wild, snow leopards have appropriately earned the title "Ghost of the mountains."

Despite having protected status in the 12 countries where they occur, snow leopard numbers continue to decline throughout their range. Tajikistan contains approximately 250-280 snow leopards primarily within the Pamir Mountain range. Illegal trade, conflict with humans, lack of conservation capacity, and loss of prey have been identified as threats to this endangered species within Tajikistan. Loss of key prey species, in particular Marco Polo sheep, markhor, urial and ibex, is thought to be responsible for increasing instances of depredation by snow leopards on domestic animals, leading to an alarming increase in retaliatory killing of snow leopards. Those animals killed due to such conflict often enter the illegal trade for their bones, pelts and other body parts.

The goal of conserving the snow leopard in Tajikistan is to maintain its current range and restore its population across its historical range wherever possible. To accomplish that, Tajikistan plans to implement a series of activities to address the threats identified in this document. They include:

- Conserve the snow leopard and its prey by engaging in wildlife management traditional hunters and the local communities they live in
- Address degradation and fragmentation of habitats by developing sound management plans for protected areas which mainstream snow leopard conservation concerns
- Regulate livestock grazing and pasture use to increase prey availability
- Implement effective measures to reduce the reliance on teresken plant especially for fuel wood
- Use Environmental Impact Assessments (EIAs) to understand impacts of potential future exploration and mining activities
- Combat illegal trade in snow leopards and their parts, through international cooperation and training of border and customs officers to better detect the size of the illegal trade and prevent it
- Reduce conflicts between farmers and snow leopards through the use of measures such as predator-proof corrals and livestock guard dogs
- Address the inadequate implementation of legislative provisions for the conservation of the snow leopard, its prey and ecosystem through capacity-building trainings and establishing community-based wildlife management and hunting conservancies
- Promote greater awareness among decision-makers on the importance of the snow leopard by presenting good practices from Tajikistan and abroad
- Address climate change impacts, through a combination of mitigation and adaptation measures
- Use transboundary cooperation and collaboration to curb poaching and combat illegal trade, as well as boost joint monitoring of migratory populations of mountain ungulates, including Marco Polo sheep.

Priority policy actions include: Approval of the National Action Plan for the conservation of the snow leopard (*Panthera uncia*) in Tajikistan for the period 2013-2018; development and implementation of laws and regulation for the conservation of the snow leopard; and appointment of a national focal point and establishment of a working group on snow leopard conservation.

Priority conservation actions include: Reducinghuman-snow leopard conflicts, through the use of predator-proof corrals, livestock guard dogs and improved husbandry practices; addressing the threats to the key snow leopard prey (Marco Polo sheep, ibex and markhor) caused by habitat degradation (especially the loss of teresken for Marco Polo sheep and more generally competition with livestock) and poaching; strengthen the capacity of protected areas in the conservation of the snow leopard; developing incentives for local communities to conserve snow leopards and their prey; strengthening research and monitoring of snow leopards in Tajikistan; promoting

public awareness through the media and educational programs drawing on local knowledge; strengthening the capacity of key ministries (security and customs) and their staff in tracking and combating illegal trade in snow leopards and their parts; and providing technical support on tracking illegal trade through trainings to border and customs agents.

Priority transboundary actions include: Support of cross-border cooperation with Kyrgyzstan, Afghanistan and China.

Valuing the snow leopard ecosystem and its economic, biodiversity, and spiritual/cultural services, quantified as much as possible

The mountain ecosystem in Tajikistan is of great importance for the survival of the snow leopard (*Panthera uncia*). The presence of snow leopards and their wild prey are indicators of a healthy mountain ecosystem of unique ecological, economic, aesthetic and spiritual significance. The snow leopard and the mountain ecosystems it occupies has environmental, economic, and cultural values for the country and the world. This ecosystem is vulnerable to human disturbance and climate change. Thus, conserving the snow leopard can ensure into the future the protection of all the functions of the ecosystem, for the benefit of local people, the region and the world.

Tajikistan is located in the center of the snow leopard range. Tajikistan's mountains are a key part of the snow leopard range in Central Asia. The total habitat of the snow leopard in Tajikistan is about 85,700 km ², which represents 60% of the total territory of the country and about 2.8% of the current global range of the species. According to local experts, there are currently 250-280 snow leopards in Tajikistan. The Pamir and Pamir-Alai are the main link between the south-eastern part of the global range of the species (particularly the Hindu Kush mountain range, the Karakoram, Tibet and Gimilaev) and the northern part of its range (including the Tien Shan, Altai and Sayan systems).

In Tajikistan, the snow leopard can be found in the following ranges: Turkestan, Zeravshanskiy, Hissar, Karateghin, Hazratishoh, Vakhsh, Darvaz, Academy of Sciences, Peter the Great, Vanj, Yazgulem, Rushan, Shakhdarinsky, Pshart, Muzkulskogo, Sarykol, South Alichur, North Alichur, Wakhan and the Trans-Alay. Of great importance for the snow leopard is the territory of the Pamirs and Badakhshan (GBAO), where almost 70% of the distribution of snow leopards in Tajikistan occurs.

The optimal habitat of the snow leopard in almost all parts of the area is located at an altitude of 2000-4000 meters above sea level. However, in some areas the terrain and the availability of prey drives snow leopards to lower elevations, as far down as 1000 meter above sea level. The snow leopard inhabits alpine and subalpine zones, characterized by a rough relief with steep slopes and deep gorges. The snow leopard usually prefers rugged slopes with an elevation angle greater than 40°. In the Eastern Pamirs, where the terrain is more leveled, the snow leopard has a preference for alpine meadows with rocky formations.

As a top predator, the snow leopard is at the top of the food chain and is a good indicator for health of the high-mountain ecosystem of Central Asia. The high mountain ecosystem inhabited by snow leopards is one of the most fragile and vulnerable ecosystems on earth. The well-being snow leopards reflects the well-being and proper functioning of the alpine ecosystem in general. The mountain ecosystem is home to a variety of other animal species, including the main prey of the snow leopard; the Siberian ibex (*Capra sibirica*), Marco Polo sheep (*Ovis ammon polii*), markhor (*Capra falconeri*), urial (*Ovis vignei*), marmot (*Marmota caudata*), tolai hare (*Lepus tolai*), pika (*Ochotona roylei*), chukar partridge (*Alectoris kakelik*) and Himalayan snow cock (*Tetraogallus himalayensis*).

Of these species, ibex and Marco Polo sheep are hunted, and the markhor and urial may be hunted in the future. Sustainable use, through hunting tourism, can be an incentive to conserve these species, thus ensuring the availability of prey for the snow leopard and the integrity of the ecosystem and promoting socio-economic development of local communities living in the snow leopard range. Sustainable management of trophy hunting of Marco Polo in the snow leopard ecosystem brings more than USD 2 million/year in revenues for the government as well as in the form of employment and benefits for hunting concessions and local communities involved.

Mountain landscapes also have ecotourism potential, as long as they are properly protected. Opportunities to observe and photograph wildlife can generate income for local communities providing services for tourists (through

guiding, homestays, etc.). Currently, revenues from ecotourism are in the range of USD 2 million but there is a great potential to increase such revenues. Tajik National Park, which is home to a large percentage of the snow leopard population in Tajikistan, was recognized on June 21, 2013 as a UNESCO World Heritage site. This recognition is considered to bring greater attention to the region and thus help boost its ecotourism untapped potential. The snow leopard ecosystem is also important to local communities as it provides pastures for livestock, provides water and protects against erosion and landslides. Wood and plants are also collected.

The goal of conserving the snow leopard in Tajikistan is by 2020: to stabilize the population or increase it wherever possible across its current and historic range; and reduce or eliminate threats to the snow leopards, its prey and habitat.

Disseminating information on the value of the snow leopard ecosystem and generating support for conservation

The key legislation on environmental education, information management and public participation in the Republic of Tajikistan consists of: the Articles of the Constitution of the Republic of Tajikistan on environmental education and protection.

The main legislation on environmental education, information management and public participation include:

- The Law of the Republic of Tajikistan "On Environmental Protection" from August 2, 2011, №760;
- The Law of the Republic of Tajikistan "On special Natural Protected Areas" from December 26, 2011, №788;
- The Law of the Republic of Tajikistan "On the wild Animals", from January 5, 2008, №534;
- The Law of the Republic of Tajikistan "On Environmental Impact Assessments", from 2010, №12;
- The Law of the Republic of Tajikistan "On biological security", from March 1, 2005, №88; and
- The Law of the Republic of Tajikistan "On ecological monitoring", from March 25, 2011, №707.

In 1996, the Government developed and approved the "State Programme on Environmental Education of the Republic of Tajikistan until 2000 and until 2010» (№ 93 February 23, 1996). This program is the foundation of the state policy in the field of environmental education, aimed at creating an environmental conscience among citizens and promoting environmental stewardship among them. The State Programme on Environmental Education provides the basis for long-term and comprehensive environmental education in Tajikistan. It calls for environmental education, including education in preschools and schools, training on environmental issues in secondary and higher education institutions, training courses for officials and awareness campaigns among the media and the general public.

In the wake of the completion of the State programme, the Government adopted the new Law of the Republic of Tajikistan "On environmental awareness" on December 29, 2010 (№ 673). This law defines the legal, financial and economic policy of the Republic of Tajikistan in the field of environmental awareness.

On February 27, 2009, the Government also approved the "National Environmental Programme of the Republic of Tajikistan for 2009-2019"(№ 123). This programme provides the mandate to determine how to develop a stable society, maintain a balance between natural resource use and conservation, the organization and coordination between use of natural resources and the healthy development of society. It also promotes sustainable use of natural resources, and ways to restore damaged ecological resources.

Currently Tajikistan does not have a separate program to raise awareness on the value of snow leopard ecosystem to mobilize all stakeholders including local communities. In the future we plan to address this gap by developing a sound communication strategy which would provide for the following:

- An information campaign on the role of communities in Tajikistan in the conservation of snow leopards
- Community outreach to help local people understand that snow leopards are not a threat to their livelihoods
- Targeted campaigns (depending on the social group and region) to help promote the snow leopard as a flagship species

- Information on the importance of protected areas for the conservation of biodiversity, including snow leopards
- Capacity-building for experts, managers of protected areas as well as hunting areas staff
- Outreach on measures to reduce poaching and illegal trade in snow leopard parts

Assessing threats, both traditional and the new ones from infrastructure development, market demand, tourism, and climate change

Threat	Area	Intensity	Urgency	Overall result
Category 1: Habitat & Prey Related				
Habitat Degradation	2	2	2	6
Habitat Fragmentation	2	1	1	4
Prey Reduction due to Illegal Hunting	5	4	5	14
Prey Reduction due to Competition with Livestock	4	4	4	12
Prey Reduction due to Legal Hunting	0	0	0	0
Prey Reduction due to Disease	3	2	2	7
Fencing that Disrupts Movements / Natural Migration	2	2	2	6
Decrease in the prey base because of collection of teresken plant for fuel wood	4	4	4	12
Decrease in the prey base because of grazing of livestock on teresken plant	4	4	3	11
Category 2: Direct Killing or Removal of Snow Leopards				
In Retribution for Livestock Depredation	3	2	3	8
Poaching for Trade in Hides or Bones	4	3	4	11
Zoo and Museum Collection of Live Animals	1	1	1	3
Traditional Hunting of Snow Leopards	1	1	1	3
Secondary Poisoning and Trapping of Snow Leopards	1	1	2	4
Diseases of Snow Leopards	1	1	0	2
Potential threat from legal hunting of snow leopards	0	0	0	0
Illegal trophy hunting on snow leopards	1	0	0	1
Trade in live snow leopard cubs	2	2	2	6
Category 3: Policy and awareness issues affecting conservation of snow leopards, prey and habitat				
Lack of Appropriate Policy	4	4	4	12
Lack of Effective Enforcement	4	4	4	12
Lack of Trans-boundary Cooperation	4	4	4	12
Lack of Institutional Capacity	4	4	4	12
Lack of Awareness Among Local People	4	4	4	12
Lack of Awareness Among Policy Makers	4	4	4	12
Perception that snow leopards are a threat	2	2	2	6
Category 4: Other Issues				
War and Related Military Activities	0	0	1	1

Threat	Area	Intensity	Urgency	Overall result
Human Population Growth (rapid) / Poverty (indirect threat)	3	3	4	10
Feral dogs attacking snow leopards and prey	0	0	1	1
General Poaching and Wildlife trade by migrant workers	0	1	1	2
General poaching by military personnel (incl. police, border guards)	3	3	3	9
Herding dogs acting as a disturbance for the ungulate prey of the snow leopard	1	1	0	2
Category 5: Emerging Threats				
Climate Change	5	5	5	15
Growing Livestock Populations & Intensifying Human-Wildlife Conflict	5	5	5	15
Large-scale Development Projects -	3	2	2	7
Direct & indirect impacts due to mineral exploration & mining (local)	2	2	2	6
Impacts due to hydroelectric projects	1	1	1	3
Threats from road development	1	1	1	3
On Ranking Threat Values: 0 or 1 = no or low threat; 2 or 3 = intermediate threat level; 4 or 5 = high threat level				
AREA: Rank each threat according to how wide-spread it is (where 5 indicates it occurs across most or all snow leopard range within country; and where 1 indicates it is extremely limited in areal extent)				
INTENSITY: Threats ranked from 5 = the most destructive impact to 1 = the least negative impact				
URGENCY: Rank each threat identifying if it needs immediate & urgent attention (very time sensitive) (value = 5) to being of least concern or urgency (value = 1)				
OVERALL RESULT: 11-15 = HIGH THREAT LEVEL; 5-10 = INTERMEDIATE THREAT LEVEL; 0-4 = NO OR LOW THREAT				

Decline in snow leopard prey

This occurs mainly because of poaching, which is the main limiting factor in the number of snow leopards. According to research in Tajikistan from the mid 80's, a single snow leopard requires at least 75 mountain ungulates to survive per year. Therefore, the reduction in populations of mountain ungulates in many parts of the range in the country has dramatically affected the population of snow leopards. Already during Soviet Union times, in the 60s the population of Marco Polo sheep decreased to 70,000 animals, and to 25,000 animals in the early 80's, due to intensive hunting and poaching, including from members of geological expeditions working each year in the Pamirs. This was followed by a sharp decline in the population of mountain ungulates (ibex, markhor, urial, Marco Polo sheep) during the civil war (1992-1997), given the general availability of weapons. In 2002, a study estimated the Marco Polo sheep to be around 10.8- 12,000. In recent years, poaching has decreased in some places thanks to protected areas and hunting concessions actively interested in the conservation and sustainable use of Marco Polo sheep and ibex. This has led to a partial recovery in the populations of argali and ibex. According to a survey conducted in 2009, 23,700 Marco Polo sheep were counted, which has translated into positive effects on the snow leopard.

However, still in many places poaching prevents the recovery of mountain ungulates, leading to a further reduction in the number, range and distribution of the different ungulate species. The urial sheep, after the death of the last known specimen in 2013, has likely disappeared from the Tajik Wakhan and Badakhshan; populations in other parts of the country continue to decline and thus have little nutritional value for the snow leopard. Ibex have also witnessed a decline in many parts of Badakshan, but in some parts of the Pamir far away from human settlements the population is stable. Markhor are found in the south-westernmost part of the of Pamir range, in Darvaz and across the Hazratishoh range along the border with Afghanistan.

Degradation and fragmentation of habitats

The last 20 years have witnessed increasing human pressure on mountain ecosystems and biodiversity in Tajikistan. Overgrazing, intensive use of mountain land for farming, construction of new settlements and growth of existing mountain villages, construction of roads and new power lines, increased erosion of mountain slopes create the preconditions for the degradation and fragmentation of snow leopard habitat, including that of its prey.

Reduction in the prey base as a result of competition with livestock

The reduction in the prey is also due to competition with livestock, as the number of domestic herds and lands allocated to pasture use increase. This is particularly the case for Marco Polo sheep and urial. Over-grazing and haying on the alpine meadows deprive Marco Polo sheep and ibex from access to grazing grounds, especially in the winter and significantly reduce their survival and reproduction.

Decrease in prey availability for the snow leopard as a result of collection of wild plants for fuel

The main natural resource used by local people in the Pamirs is teresken (*Ceratoides papposa*). It is widely used as fuelwood. Intensive uprooting of teresken year after year degrades the high steppe ecosystem and pastures, and has a direct negative impact on the status of Marco Polo sheep. It causes shortage of winter forage and general land degradation. The most affected areas seem to be those where argali are already absent due to poaching and grazing, but as easy accessible teresken stands are already overused the pressure increases in areas that overlap with argali and ibex habitats.

Direct and indirect effects of exploration and mining

Currently only local mining represents a threat, however because of the potential for exploitation of mineral reserves in Tajikistan and interest in from International companies, large-scale mining might be expected in future a negative impacts. In this connection, the construction of new roads across the mountains in Tajikistan, year by year, represents a possible disturbance for the snow leopard.

Poaching in connection with illegal trade in snow leopard skins, bones and derivatives in Tajikistan

Snow leopard skin is a valuable commodity and in great demand. Specialized local poachers use traps and rifles to kill snow leopards for their skin and derivatives. Often attacks on livestock are used as excuse for illegally selling snow leopard parts. According to survey data, each year 4 to 5 snow leopards are killed for their skin and other parts. Demand for snow leopard bones is coming in particular from abroad countries and with increasing trade relationships between foreign countries and Tajikistan, border patrols have no necessary capacity to address the illegal trade of snow leopard parts going from Tajikistan to abroad countries.Retaliatory killing as a result of attacks on livestock: Attacks and retaliatory killings are more frequently observed in Badakhshan and the Pamirs. Almost 80% of the snow leopard attacks occur in winter, especially when snowy. In most cases, the attacking snow leopard enters the corral from an opening in the roof and cannot get out. The snow leopard then kills all the animals in the corral and in response the farmer kills the cat and tries to sell the skis. Snow leopard attacks on livestock are also related to a decrease in availability of wild ungulate prey.

Poor implementation of legislative provisions for the protection of the snow leopard, its prey and ecosystem

The huge size of the snow leopard range and inaccessibility coupled with the lack of staff, of technical equipment and financial resources, including low wages and absence of effective incentives significantly complicate the implementation of environmental legislation.

Lack of sufficient awareness among decision makers on why it is important to conserve snow leopards

There is a general lack of awareness on the importance of conserving high mountain ecosystems and the need to regulate livestock numbers and pasture use. Generally, the importance of wildlife is underestimated and knowledge of successful international approaches to wildlife management and management of natural resources is unknown.

Lack of sufficient awareness among the local population there

Despite the protected status under the Tajikistan Red Book and the long-term engagement of government and non-governmental organizations, many local people still consider snow leopards as a pest, are not aware of their conservation status, the possibility of reducing conflict, and the need for their conservation.

Growing number of livestock in snow leopard habitat and intensified conflicts between pastoralists and snow leopards

This represents one of the highest threats to the survival of snow leopards, and other large carnivores, in Tajikistan. After a temporary contraction in the number of livestock during the first years of independence, since there has been a gradual increase in the number of domestic animals, with resulting pressure on the pastures and the development of new or temporarily unused pastures. Populations of wild mountain ungulates have as a result declined because of poaching and habitat degradation. The increase in livestock leads to increased conflicts with snow leopards.

Climate Change

The World Bank considers Tajikistan as the country in Central Asia which will be most impacted by climate change. The glaciers in the Pamir have since 1930 decreased by 30%. The glaciers present in the snow leopard habitat below 4400 m above sea level are at particular risk if the expected increase in mean annual temperature by 3 degrees by 2050, and by 5 degrees to 2080 becomes true. Melting glaciers are likely to affect water availability by quickly melting water reservoirs and increasing the risk of drought. Changes in water availability and temperature can affect pasture production and impact the diet and reproduction of wild mountain ungulates and thus affect the snow leopard. The availability of pastures for domestic livestock would also be impaired.

Dealing with the above threats

Halting the decline in the availability of snow leopard prey as a result of poaching through prohibitions and anti-poaching work of state bodies is difficult given the current financial constraints. Enforcement of laws and measures is impossible. A complementary and successful approach is to engage in wildlife management traditional hunters and the local communities they live in. This approach has been successfully implemented in neighboring Pakistan since the 1980s, and since 2008 a GIZ funded project is testing this approach in pilot areas across Tajikistan with notable success. In two pilot conservancies, "Parcham" in Bartang valley and "Yokuti Darshay" in Wakhan valley, the number of ibex has doubled in four years (currently both conservancies have more than 400 animals each), thanks to the buy in of traditional hunters from within the local communities. The population of snow leopards has also benefited indirectly from this approach.

In the early 60's, the number of markhor in Tajikistan was estimated at 700 individuals, and through the efforts of local people, NGO “Saiod”, NGO “Markhor” and protected areas now there are more than 1,000 individuals. In the case of Marco Polo sheep, the trophy hunting concessions play a special role in their conservation. Only few trophy sized males are shot each by international hunters without impacts to the population, but with tangible financial benefits in return for their conservation. The state receives significant amounts of money from the sale of permits: it is necessary to ensure that a significant portion of these funds are used for the socio-economic development of local communities, and that local residents are informed of the sources and uses of these funds, as an incentive for them to help in the conservation of argali and other mountain ungulates, including their habitat.

Degradation and fragmentation of habitats have different causes. In Tajikistan, there is a network of specially protected areas (PAs), which provides a certain degree of protection for natural ecosystems and biodiversity. There are 4 strict protected areas, 13 nature reserves, one national park and two nature parks, which are located in different parts of the country and cover the main types of natural ecosystems. The total area of protected areas is 3.1 million hectares, accounting for about 22% of the total territory of Tajikistan. Tajik National Park is home to about 140 snow leopards, accounting for 64% of the total number in Tajikistan. PAs must develop a management plan that ensures the integrity of the protected ecosystem and mainstreams snow leopard conservation concerns in land use planning, as well as infrastructure projects.

To address the reduction in prey availability due to competition with livestock, it is necessary to determine pasture use at the community level and create incentives for reducing the number of livestock. Grazing regulation should be implemented in PAs or temporal and quantitative restrictions, depending on the zoning in the PA. Of note is that herders use as summer pastures for their livestock, areas that are of particular importance as winter habitat for mountain ungulates. It is also important to consider prohibiting or severely restricting hay making in subalpine and alpine meadows used as winter pastures by wild ungulates.

The ban on the use of teresken has been in place for 20 years but has not stopped illegal use. More effective measures are needed, which include supporting the increase of energy efficiency programs (promoting insulation of buildings, use of efficient stoves) and use of alternative fuel material by local households to reduce the collection of fuel wood, which contributes to pasture degradation.

Direct and indirect effects of exploration and mining must be mitigated through environmental impact assessments (EIA) in accordance with the strict requirements of the Law on EIAs.

Poaching for the sale of snow leopard skin, bones and other parts must be addressed by tracking all stages of the illegal activity and people involved. This latter requires international cooperation. A total ban on the use of hunting traps helps in the fight against "accidental" captures of snow leopards. When information is available on the illegal killing of snow leopards, skin and bones have to be confiscated promptly, so they do not fall into the black market.

If snow leopards are killed in retaliation for attacks on livestock it is necessary to prevent conflicts through the widespread use of measures to reduce such conflicts (predator-proof corrals and livestock guard dogs). If the number of livestock losses reaches a critical level, it may be necessary to consider establishing insurance funds at the community level.

To address the inadequate implementation of legislative provisions for the conservation of the snow leopard, its prey and ecosystem, there is a need to motivate staff and enforcement personnel through capacity-building trainings. Establishing community-based wildlife management and hunting conservancies can also be an effective tool to reduce wildlife crime.

Promoting awareness among decision-makers on the importance of the snow leopard, its ecosystem and prey, can be achieved by presenting good practices from Tajikistan and abroad. Awareness of the local population through the use of modern means of communication (the Internet, documentaries), and raising the profile of the snow leopard as a symbol, such as "national animal of Tajikistan".

Addressing climate change impacts, since they cannot be prevented, requires a combination of mitigation and adaptation measures to ensure the stability of the mountain ecosystem as much as possible as well as some degree of flexibility.

Transboundary cooperation and collaboration is an important approach to curb poaching and combat illegal trade, as well as to boost joint monitoring of migratory populations of mountain ungulates, including Marco Polo sheep. Several proposals have been introduced on the establishment of transboundary protected areas. One is the Pamir-Alai transboundary protected area between Kyrgyzstan and Tajikistan, for the protection of the unique mountain ecosystem and biodiversity of the Pamir-Alai. This area includes the 77% of TNP. The second is focused on the conservation of the snow leopard and Marco Polo sheep between Tajikistan, Afghanistan, Pakistan and China.

Organization, empowerment, and support

National institutions for snow leopard conservation: strengths and weaknesses to be remedied. Many snow leopards inhabit the territory of TNP, three strict protected areas (Zorkul, Romit and Dashtidzhum), two natural parks (Shirkent, Sarikhosor), eight reserves (Muzkulskogo, Sangvorskogo, Kamarob, Dashtidzhum, Almasinsk, Nurek, and Iskandarkul Kusavlisaysk). All protected areas fall under the jurisdiction of the Committee on Environmental Protection under the Government of the Republic of Tajikistan. Strict protected areas are under control of the State Agency on Protected Areas, and the reserves are under the control of the State Agency for Forestry and Hunting.

Many snow leopards also occur outside of protected areas, in areas currently protected and managed by local conservancies. Many others occur in areas where there is no form of protection.

To ensure the conservation of snow leopards it is critical that government agencies responsible for the management of protected areas work closely and collaboratively with local conservancies and communities and as needed draw on the support of local and international NGOs.

Below is a table describing the organizations involved, their strengths as well asweaknesses.

Organization	Strengths	Weaknesses
Committee on Environmental Protection	Supervise and control policies for the protection of the environment	Lack of research capacity
Academy of Sciences of Tajikistan	Strong research experience	Lack of fund for conducting of research
International Organizations	Provide capacity-building trainings and funding for monitoring and conflict mitigation interventions	Projects are often short-term as continuity in funding is not obtained; lack of coordination; replication of approaches
National Conservation NGOs		
Local Communities		

Legal framework for protecting the snow leopard and its habitat: strengths and weaknesses to be overcome

Much of the current legal framework was developed on the basis of laws and regulations adopted during the Soviet times. Some of the legislation has since been amended in compliance with new obligations under relevant UN conventions and regional agreements that Tajikistan has signed.

The conservation and use of rare and endangered species of flora and fauna included in the Red Book is regulated under the laws on “Environmental Protection” (1993), “Animal World” (2007), “Protected Areas” (2012) and relevant regulations. According to the law on “State control over environmental protection and use of natural resources” (1994), the Committee on Environmental Protection is designated as the state authority in charge of environmental protection and sustainable use of natural resources. According to law on “the procedure of obtaining permission on the taking of migrating, rare and endangered species” (2003), permissions for hunting of species, included in the Red book are issued only for research and other designated purposes. Illegal hunting of snow leopard is punished with a penalty of at least 4000 somoni (approximately 1,000 USD) up to 240,000 somoni (approximately 50,000 USD).

In 1997, Tajikistan ratified the UN Convention on Biological Diversity (CBD). A National Strategy and Action plan on the conservation and rational use of biological diversity (2003) was developed as a result. In 2000 Tajikistan also ratified the Conventions on the Conservation of Migratory Species of Wild Animals and on Wetlands of International Importance.

Currently Tajikistan is not yet a member of the Convention on International Trade in endangered species of fauna and flora (CITES) till present date, but the process of accession is ongoing. The ratification of CITES will allow Tajikistan to become part of the decision-making mechanism of the Convention.

Snow Leopards have been included in the Red Book of Tajikistan as “a rare species, decreasing in number” but the assessment requires updating and its reconciliation with the global assessment of the species under The IUCN Red List.

Wildlife law enforcement and combating crime: current practice and areas for improvement

Effective implementation of anti-poaching initiatives often requires inter-institutional cooperation including the local, regional, and international levels; governments and nongovernmental organizations; and individual stakeholders. However, in Tajikistan, like in many other countries, there are severe constraints in efficiently ensuring

effective cooperative compliance and enforcement initiatives. Enforcement challenges include: limited financial and technical resources; failure to engage key stakeholders; and social and political factors.

Wildlife crime is highly associated with corruption at local, regional, and international levels

Limited budgetary provisions to address illegal trafficking, in addition to poor staffing and training of relevant personnel make it difficult to detect illegal trade. Customs services often play a key role in facilitating the illegal trade. Engaging and providing training for customs officers is thus important. Likewise there is a need to improve institutional capacity to mobilize and link activities effectively within and between sectors through coordination between national law enforcement and wildlife law enforcement agencies.

Legal framework for empowerment of community for co-management of wildlife and habitat: current practice and areas for improvement

Local communities are key partners in the conservation of snow leopards. Poor socio-economic conditions are some of the drivers of poaching of markhor, ibex and Marco Polo sheep, key snow leopard prey. Illegal subsistence and trophy hunting have in some areas significantly reduced the availability of some of these species. This as a result is likely to have had negative impacts on the status of snow leopards. The demand for snow leopard skin and bones as well as conflict with livestock is also another incentive for local people to kill snow leopards. Therefore creating counter incentives for local people to protect and sustainably use markhor, ibex and Marco Polo sheep is very important. This can be achieved by supporting local communities in their desire to form local conservancies for the conservation and sustainable use of ungulate species like ibex, Marco Polo sheep and markhor. Drawing on the successful examples from the markhor conservancies in Pakistan, local conservancies in Tajikistan could use the proceeds from international trophy hunting for the monitoring and conservation of snow leopards and they prey as well as invest resources in the socio-economic development in the villages where the conservancies are set up.

Support mechanism for building community organizations: current practice and needed strengthening

The overarching vision behind creating a community-based organization that has the opportunity to sustainably use of the key snow leopard's preys is to give benefits and create jobs through consumptive and non-consumptive uses of wildlife, like hunting and tourism. It is important that the people involved in the setting up of a conservancy have a sense of ownership of the process and that they can rely on a legal framework that is clear and stable. Therefore is critical that the necessary legal reforms are carried out to enable a transparent method for the assignment of the conservancy/hunting grounds as well as allocation of hunting quota and clear definition of what percentage of the price of the permit is supposed to go back to the communities. Local conservancies should also have clear management plans that provide for monitoring of the prey base as well as snow leopards.

Research and training

Development of effective measures to protect the snow leopard requires constant monitoring to assess the status of its population and to identify the main threats. Monitoring should involve trained staff of the Committee on Environmental Protection under the Government of the Republic of Tajikistan and its subordinate agencies on the ground and other stakeholders such as Tajik Academy of Science. In PAs and hunting concessions, rangers should conduct observations daily. However, given the current level of knowledge of the personnel and the limited logistical support available to in the strict protected areas, wildlife cannot be monitored appropriately. Hence, it is necessary to hold trainings, seminars and short-courses, including through exchanges of experiences with other countries with support from international environmental organizations, to improve the skills of PA staff and rangers.

Development and implementation of programs for scientific and technical education and training for identification, conservation and sustainable use of ecosystems, their components and support for education and training to meet the specific needs of the habitat of the snow leopard. This can be achieved by developing a documentary film on

snow leopards in Tajikistan as well as increasing cooperation in the application of scientific results obtained during the research.

Time-phased implementation program

The following stakeholders will be involved in different steps in the implementation of the programme for the conservation of snow leopards in Tajikistan:

- The Committee for Environmental Protection under the Government of Tajikistan and its affiliated agencies.
- The Academy of Sciences (Institute of Zoology and Parasitology and Pamir Biological Institute).
- Ministry of Agriculture of the Republic of Tajikistan.
- Ministry of Energy and Industry.
- Ministry of Security of the Republic of Tajikistan.
- Ministry of internal affair of the Republic of Tajikistan.
- Ministry foreign affair of the Republic of Tajikistan.
- Committee on Youth, Sports and Tourism of the Government of the Republic of Tajikistan.
- State Committee for Land Management, Geodesy and Cartography.
- Customs Committee.
- Non-governmental environmental organizations.
- Hunting concessions and community-based organizations involved in wildlife management.
- Local government agencies.
- International environmental organizations.
- The Secretariats of international conventions (CBD, CMS, CCD, CITES) and their working groups.

The State Agency for Protected Areas will be acting as the coordinating body for the NSLEP. In order to monitor the implementation of the planned activities, the Coordinating Council, which includes representatives of the Committee for Environmental Protection under the Government of the Republic of Tajikistan, the scientists of the Academy of Sciences, and representatives of public organizations, will assess progress at its annual meeting.

In Tajikistan, there are more than three hundred NGOs with an environmental focus, most of which are located in Dushanbe and in regional centers. However, many of them work in isolation from local communities. Involvement of NGOs in the implementation of the Snow Leopard National Action Plan for the conservation of the snow leopard is key for involving local people and other marginalized groups in raising public awareness, addressing conflict and sensitizing young people. This may lead to greater support for snow leopard conservation at the community level and promote the sustainable use of natural resources, especially in the mountain regions of the country.

Priority **policy** actions include:

- Approval of the National Action Plan for the conservation of the snow leopard (Panthera uncia) in Tajikistan for the period 2014-2020
- Development and implementation of laws and regulations for the conservation of the snow leopard
- Appointment of a national focal point and establishment of a working group on snow leopard conservation.

Priority **conservation actions** include:

- Reduce human-snow leopard conflicts, through the use of predator-proof corrals, livestock guard dogs and improved husbandry practices
- Address the threats to the key snow leopard prey (marco polo sheep, ibex and markhor) caused by habitat degradation (especially the loss of teresken for marco polo sheep and more generally competition with livestock) and poaching
- Strengthen the capacity of protected areas in the conservation of the snow leopard
- Develop incentives for local communities to conserve snow leopards and their prey
- Strengthen research and monitoring of snow leopards in Tajikistan
- Promote public awareness through the media and educational programs drawing on local knowledge

- Strengthen the capacity of key ministries (security and customs) and their staff in tracking and combating illegal trade in snow leopards and their parts
- Provide technical support on tracking illegal trade through trainings to border and customs agents

Priority **transboundary** actions include:

- Support of cross-border cooperation with Kyrgyzstan, Afghanistan and China.

Tracking implementation progress and monitoring results

The proposed indicators for the successful implementation of the priorities include:

- Project management and the role of government: The Coordination Committee has the necessary tools to monitor the implementation of the actions under the NSLEP
- The adoption of laws, including: adoption of the Law "On hunting and farming", accession of Tajikistan to CITES and the adoption of appropriate management plans for PAs
- Increased public awareness on the conservation of the snow leopard and its ecosystems are estimated from survey data
- The involvement of local communities documented by reducing conflicts and increasing the number of the prey of the snow leopard
- New scientific findings are published: snow leopard habitat characteristics, hone range and movements are documented serving as a basis for improving the effectiveness of conservation of snow leopards and the PA system
- Distribution map of the snow leopard in Tajikistan
- Electronic database on the distribution and abundance of snow leopards in Tajikistan
- Active implementation of measures against poaching, including the activities of at least two mobile anti-poaching brigades
- Improved interaction with hunting companies
- Completed projects enhancing cross-border cooperation and identifying ecological corridors in the framework of the national action plans of Tajikistan, Kyrgyzstan, Afghanistan and China
- Capacity of security and customs ministries strengthened as evidenced by greater number of seizures
- Trainings of border and customs agents provided in collaboration with OSCE, CITES and TRAFFIC.

Summary of costs and financing possibilities

For the successful implementation of the National Action Plan for the conservation of the snow leopard in the period 2014-2020, Tajikistan estimates the need for at least USD 1,200,000 (for detail project outlines please see the attached NSLEP Portfolio in the excel sheet). This will support:

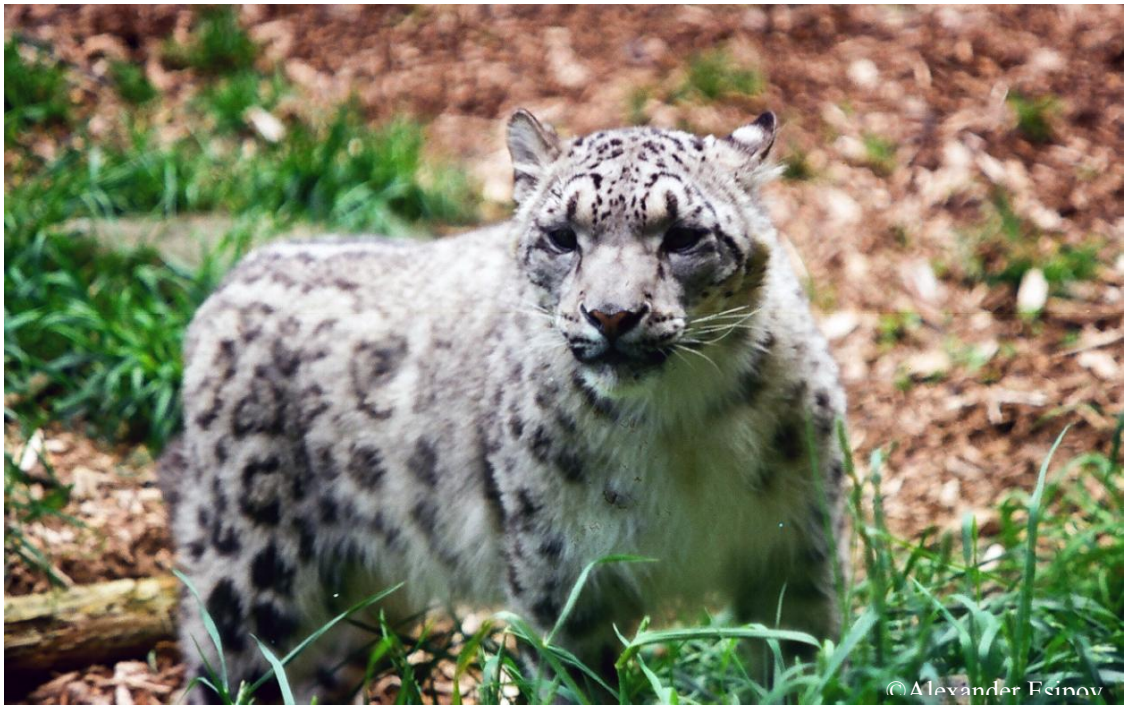
- The development and approval of a new Hunting Law and acts, and regulations (USD 15,000)
- Strengthening the existing network of Protected Areas for Snow Leopards (USD 200,000)
- Conservation of snow leopards by understanding linkages in illegal trade and building capacity of Border and Customs officials (USD 300,000)
- Development of incentives for local communities to conserve snow leopards and their prey (USD 220,000)
- Improvement of transboundary conservation and collaboration (USD 110,000)
- Use of the Snow Leopard Coordination Committee as a vehicle to strengthen the institutional capacity to address snow leopard conservation issues (USD 100,000)
- Identification of practices to reduce consumption of teresken plant for fuel wood (USD 115,000)
- Monitoring of snow leopards and their prey (USD 140,000)

The Committee on Environmental Protection will contribute 20% to the aforementioned activities. We welcome the support from the remaining 80% from donors such as the Global Environment Facility (GEF), USAID, World Bank, Asian Development Bank (ADB), NABU, WWF, Panthera and others (see attached Table for further details).

Uzbekistan

National Snow Leopard Ecosystem Protection Priorities (NSLEP)

Uzbekistan(2014 – 2020)Tashkent 2013



EXECUTIVE SUMMARY

Snow Leopard (*Uncia uncia* Shreber, 1775) is included in the IUCN Red List with the status Endangered (EN). Snow Leopard is also included in many national Red Books of the range countries. In the Red book of Uzbekistan (2009) Snow Leopard was assessed as Critically Endangered (CR) (species with declining numbers and narrow range close to extinct). Major factors in the global population decline of this cat is the wide development of mountain areas by human communities and associated poaching, resulting from the high demand for the skin, parts of the body and derivates used in Chinese medicine; deterioration of food base and degradation of mountain habitats. Snow Leopard is also included in an Application 1 of CITES (Convention of International Trade in Endangered Species of Wild fauna and Flora) and Appendix 1 of CMS (Convention on Conservation of Migratory Species of Wild Animals). In Uzbekistan the edge of the species range is represented by boundary areas of two independent, unconnected groups – Tien-Shan and Pamir-Alai. Both populations occupy territories, which are developed as the result of extensive economic activity (Western Tien-Shan) and are under the control of frontier troops creating a new destabilizing factor.

World range of Snow Leopard encompasses Mongolian and Gobi Altai, Hangai, Tibet, Himalaya, Hindu Kush, Pamir, Tien-Shan, Djungarian Alatau, Tarbagatai, Saur, Southern Altai. These mountain areas include partsof the territories of 12 states: China, India, Pakistan, Nepal, Afghanistan, Mongolia, Bhutan, Russia, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. Under pressure of negative anthropogenic factors the Snow Leopard has vanished from many parts of its primal range. The area of the world range of the species was reduced from 3 million sq.km to 1.8 million and became fragmented in separate regions. In Central Asian region Snow Leopards are extinct in the mountains of Karatau range (Southern Kazakhstan) and the western extremity of Zeravshan range (Uzbekistan). Its number has been sharply reduced in Western Tien-Shan and in southwest of Pamir-Alai mountains.

The range in Uzbekistan represents the extreme western boundary of the Snow Leopard's area of occurrence, and the state of its core Tien-Shan and Pamir populations depends also on the status of boundary areas. The satisfactory status of the species in the peripheral parts of the range can be considered as indicator of well-being of population as a whole. At the same time, the peripheral nature of Snow Leopard distribution in Uzbekistan, as well as the influence of some negative factors cause a high degree of species vulnerability and dictate the necessity of taking urgent protective measures. Tasks of national strategy on Snow Leopard conservation is the clarification of problems of species survival in modern conditions and development of main principles for resolving questions of species conservation, constructing of information network for gathering and sharing data on the status of populations of threatened species, and creation of a base for the permanent cooperation among all interested stakeholders at regional, national and international levels.

Priority policy actions include: Update of the Strategy and National Action Plan for the conservation of the snow leopard (*Uncia uncia*) in Uzbekistan for the period 2014-2020; development and implementation of laws and regulation for the conservation of the snow leopard; and appointment of a national focal point and establishment of a working group on snow leopard conservation.

Priority conservation actions include*:* Reducinghuman-snow leopard conflicts, through the use of predator-proof corrals, livestock guard dogs and improved husbandry practices; addressing the threats to the key snow leopard prey (ibex and marmots) caused by habitat degradation due to competition with livestock and increasing human settlements and poaching; strengthen the capacity of protected areas in the conservation of the snow leopard; developing incentives for local communities to conserve snow leopards and their prey; strengthening research and monitoring of snow leopards in Uzbekistan; promoting public awareness through the media and educational programs drawing on local knowledge; strengthening the capacity of key ministries (security and customs) and their staff in tracking and combating illegal trade in snow leopards and their parts; and providing technical support on tracking illegal trade through trainings to border and customs agents.

Priority transboundary actions include: Support of cross-border cooperation with Kazakhstan, Kyrgyzstan and Tajikistan.

Valuing the snow leopard ecosystem and its economic, biodiversity, and spiritual/cultural services, quantified as much as possible

In Uzbekistan the irbis occurs on Ugam, Pskem and Chatkal ranges of the Western Tien-Shan, and on Turkestan, Zeravshan and Hissar ranges of Pamir-Alai system. The area of occurrence of Snow Leopard in Uzbekistan is about 10 thousand km2 that represents no more than 0.5 % of the area of world range (Fig.1).

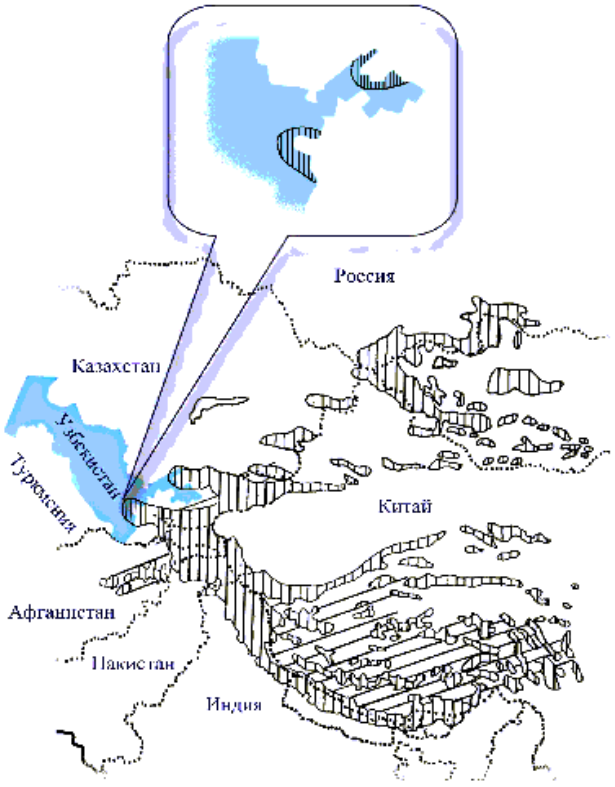


Figure 1. World range of Snow Leopard – interpretation of picture with accent on Uzbekistan on Distribution of the snow leopard (*U. uncia*) (K.Nowell, P.Jackson, Wild Cats, 1996)

The data on the density of the Uzbekistan population is absent. In adjoining Kazakhstan the density of irbis was defined at 0.8 – 4.7 individuals per 100 km^2 (Koshkarev 1989 in Wild Cats 1996). In Uzbekistan the number of irbis by different estimations ranges from 30 up to 50 individuals, i.e. ***less than 1 % of the world population***. In Western Tien-Shan by expert estimations it comprises 10-15 individuals, in Hissar-Alai – 20-30 individuals of Snow Leopard. The number of this predator varies seasonally, in connection with natural transboundary migrations.

The natural preys of Snow Leopard are mountain ungulates, and less often rodents. *In Uzbekistan the basis of Snow Leopard food is* ***made up of Siberian Ibex*** *(Capra sibirica* Pallas, 1776). Less often the diet includes Wild Boar (*Sus scropha* L. 1758), and Siberian Roe (*Capreolus pygargus* (Pallas, 1771). In summer time irbis hunts the Menzbier's Marmot (*Marmota menzbieri* (Kaschkarov, 1925) and Red or Long-tailed Marmot (*Marmota caudata* (Geoffroy, 1844)., Red Pika (*Ochotona rutila* (Severtzov, 1873) and tolai hare (*Lepus capensis* L., 1758). Chukar (*Alectoris chukar* (J.E. Gray, 1830) and Himalayan Snow Cock (*Tetraogallus himalayensis* G.R.Gray, 1843) also make up part of the diet of Snow Leopard.

Irbis as a rule attacks from shelter, quietly creeping up to prey. Snow Leopards make regular vertical movements following wild ungulates – during summer in the subalpine and alpine mountain belts, during winter – in the forest belt of mountains.

As numbers of natural prey fall, the Snow Leopard is forced to feed on domestic livestock – sheep, goats, less often foals and young large-horned cattle. In exceptional cases it attacks large livestock: adult horses, cows, donkeys. The attacks on domestic animals often take place in winter. The basic food competitors of Snow Leopard are the wolf and lynx.

Disseminating information on the value of the snow leopard ecosystem and generating support for conservation

Inclusion of Snow Leopard in the Red Book of the Republic of Uzbekistan (2009) enabled special measures for the conservation of this species to be taken at the national level. The environmental laws provide the legal basis for protection of threatened species included in the national Red Book (see Table 1).

Table 1: Uzbekistan's Related Wildlife Legislation

No.	Name Legislation	Year Enacted	Relevant Clauses
	Law on Use and Conservation of Fauna	Dec. 9, 1992, amended 1997	all
	Rules on Hunting and Fishing	May 1, 1997	all
	Appendix No. 2 to Cabinet Minister Decree No. 508	Oct. 28, 2004	all
	Law on Protected Areas	2005	all
	On Nature Conservation	1992	
	Regulation on Reinforcement of the Conservation of Rare and Endangered Species of Plants and Animals	1993	
	Cabinet Minister Decree Reinforcement of the Conservation of Rare and Endangered Species of Plants and Animals and regulating of their Use	1993	
	Law on Ecological Examination		
	Law on Agricultural Cooperatives		
	Law on Land Lease	Nov. 19, 1991	§§3, 5, 12
	Law on Farming		

At present, the fine for poaching of Snow Leopard is 500 minimum salaries or 2 years imprisonment. However, cases of arrest of poachers are practically unknown, as a result of lack of enforcement of conservation measures and insufficient financing of ranger staff and protected areas wardens. It is necessary to improve not only legislation, but its implementation through economic and legal mechanisms.

In 2004 the Strategy for Snow Leopard Conservation in Uzbekistan has been developed in cooperation with Academy of Science of Republic Uzbekistan, State Committee for the Nature Protection of Uzbekistan and the International Snow Leopard Trust (ISLT) for support of actions directed on protection and study of Snow Leopard in Uzbekistan.

Assessing threats, both traditional and the new ones from infrastructure development, market demand, tourism, and climate change

Threat	Area	Intensity	Urgency	Overall result
Category 1: Habitat & Prey Related				
Habitat Degradation	5	3	3	11
Habitat Fragmentation	3	3	1	7
Prey Reduction due to Illegal Hunting	5	4	5	14
Prey Reduction due to Competition with Livestock	5	5	4	14
Prey Reduction due to Legal Hunting	0	0	0	0
Prey Reduction due to Disease	3	3	1	7
Fencing that Disrupts Movements / Natural Migration	0	0	0	0
Category 2: Direct Killing or Removal of Snow Leopards				
In Retribution for Livestock Depredation	4	4	4	8
Poaching for Trade in Hides or Bones	3	3	3	9
Zoo and Museum Collection of Live Animals	2	2	1	5
Traditional Hunting of Snow Leopards	3	3	3	9
Secondary Poisoning and Trapping of Snow Leopards	0	0	0	0
Diseases of Snow Leopards	1	1	0	2
Potential threat from legal hunting of snow leopards	0	0	0	0
Illegal trophy hunting on snow leopards	3	3	3	9
Trade in live snow leopard cubs	2	2	2	6
Category 3: Policy and awareness issues affecting conservation of snow leopards, prey and habitat				
Lack of Appropriate Policy	4	4	4	12
Lack of Effective Enforcement	4	4	4	12
Lack of Trans-boundary Cooperation	4	4	4	12
Lack of Institutional Capacity	4	4	4	12
Lack of Awareness Among Local People	4	4	4	12
Lack of Awareness Among Policy Makers	4	4	4	12
Perception that snow leopards are a threat	2	2	2	6
Category 4: Other Issues				
War and Related Military Activities	0	0	0	0
Human Population Growth (rapid) / Poverty (indirect threat)	3	4	4	11
Feral dogs attacking snow leopards and prey (marmots)	2	3	2	7
General Poaching and Wildlife trade by migrant workers	0	0	0	0
General poaching by military personnel (incl. police, border guards)	3	3	3	9
Herding dogs acting as a disturbance for the prey (marmots) of the snow leopard	2	3	2	7
Category 5: Emerging Threats				
Climate Change	5	5	5	15
Growing Livestock Populations & Intensifying Human-Wildlife Conflict	5	5	5	15
Large-scale Development Projects -	0	0	0	0
Direct & indirect impacts due to mineral exploration & mining (local)	0	0	0	0
Impacts due to hydroelectric projects	0	0	0	0
Threats from road development	0	0	0	0

On Ranking Threat Values: 0 or 1 = no or low threat; 2 or 3 = intermediate threat level; 4 or 5 = high threat level

AREA: Rank each threat according to how wide-spread it is (where 5 indicates it occurs across most or all snow leopard range within country; and where 1 indicates it is extremely limited in areal extent)

INTENSITY: Threats ranked from 5 = the most destructive impact to 1 = the least negative impact

URGENCY: Rank each threat identifying if it needs immediate & urgent attention (very time sensitive) (value = 5) to being of least concern or urgency (value = 1)
OVERALL RESULT: 11-15 = HIGH THREAT LEVEL; 5-10 = INTERMEDIATE THREAT LEVEL; 0-4 = NO OR LOW THREAT

Factors of direct impact

Illegal hunting

By an expert estimation not less than 10 individuals of Snow Leopard are killed annually in Uzbekistan.

- ***Illegal hunting for selling of skin and other parts of the body of Snow Leopard.***The skin of snow leopard has demand, both on local, and in the international market. Its cost can range from 1000 to 3000 US dollars. The experts note that the world market of furs in recent years was strongly reduced because of measures taken to regulate trade in skins and promoting the rights of animals. At the same time demand for the body parts of the snow leopard, sustained by the markets of China and countries of Southeast Asia remains high. In traditional oriental medicine the parts of the body of large predators are utilized widely as raw materials for preparation of medical products.
- ***Live Capture.*** In the Soviet period the greatest number of snow leopards for the keeping in captivity (for zoos) was taken from territory of Kyrgyzstan and Tajikistan. In Uzbekistan in connection with low number of this animal, its capture for this purpose did not take place. Now, in the republic snow leopard adults and cubs are illegally captured for sale and kept in private menageries.
- ***Traditional hunting of Snow Leopard.*** For a long time, in mountain regions the Snow Leopard is killed for the sake of its beautiful warm fur, and as the honorable trophy showing the prowess of the hunter. In the past the skin of Snow Leopard was prepared as a valuable fur. The prohibition on hunting of Snow Leopard and its inclusion in the Red data book of Uzbekistan was essential (indispensable), but insufficient to completely eliminate hunting of this predator. At present cases are known where the animal (irbis) was shot (killed) for the sake of sport and prestige of the hunter.
- ***Killing by local people in revenge for the attacks of domestic livestock.***The belief that Snow Leopard strongly reduces the number of domestic cattle existed for a long time. In reality this belief is considerably exaggerated. Irbis attacks the domestic livestock, more often on medium-sized animals – goats and sheep, sometimes on large animals – horses, cows and donkeys. The majority of these cases, as a rule, are connected with the decline of wild ungulate numbers as a result of epidemics, overhunting, etc., that force the predator to choose other kinds of prey. Cases of attacks on livestock are more often in winter, when high snow cover makes hunting mountain ungulates more difficult. Many cases are known of herders killing snow leopards with sticks when defending livestock. ***Thus, the main cause of attacks of Snow Leopard on domestic animals is the decline of wild ungulate numbers. Very often such cases end in the killing of a predator (snow leopard).***

Decreasing of Snow Leopard numbers owing to diseases

- This theme is not studied in Uzbekistan. In Mongolia cases of snow leopard illness by mange (rash) have been described (2003 Snow Leopard Survival Strategy). In Kazakhstan there was a case of a Snow Leopard with rabies (hydrophobia) (Heptner, Naumov, 1972).

Factors of indirect impact

Deterioration of food base

Perhaps more serious threat for the species survival is the decline of prey species, and first of all, the decrease in wild ungulate numbers – the main source of snow leopard food. The causes of species-prey decline of Snow Leopard are:

- ***Decreasing numbers of prey species as a result of illegal hunting.*** Poaching of mountain ungulates, marmots and other species is one of the causes of Snow Leopard population decline. Administration of limits for visiting boundary mountain areas, and prohibition on keeping and carrying rifled guns by civil citizens provide preconditions for stabilization and increase of wild ungulate numbers. However, the continuing lowering of living standards in mountain villages leads to the poaching by local inhabitants who hunt mountain ungulates for skins and meat, and marmots for fur, meat and healing fat.
- ***Decreasing of numbers of prey species as a result of overhunting.***There are known some cases, when the main causes of the decline of wild animal populations were overhunting. For example, in the end of 1980s in Western Tien-Shan the sharp increase in hunting of wild boar led to the decline of the numbers reproducing and a considerable decrease in its numbers. To the present, the Tien-Shan isolated population of wild boar has not been restored to the previous level. And although this species is a not a main prey for Snow Leopard, but the decline of this ecologically plastic species has shown that in the conditions of wrong management any species can be easily declining due to over-exploitation.
- ***Decreasing of numbers of prey species in the result of diseases.***Periodically the populations of wild ungulates are stressed by transmissible diseases. For example, one of the reasons for a sharp decline in Siberian Ibex numbers, begun in 1970, was an epizootic of mange (rush) or sarcoptoze. Now this epizootic has finished.
- ***Decreasing of numbers of prey species as a result of competition with domestic livestock for pastures.*** Competition with domestic livestock for pastures leads to decreasing of numbers of wild ungulates, which are natural prey species of Snow Leopard. The consequence of this can be a decline in the number of Snow Leopards and a change of its food from wild animals to domestic livestock. The last fact leads to the conflict between the interests of local human populations in the mountains and irbis as wild predator. Often the solution to such conflicts is the killing of the snow leopard. In Uzbekistan the high-alpine meadows are utilized as seasonal pastures for cattle and livestock. At past up until the beginning of 1990 the mountain pastures were exploited by local herders, as well as shepherds from neighboring republics. At present owing to a worsened economic situation the number of domestic livestock on pastures has decreased. And only inhabitants (citizens) of Uzbekistan can use the pastures with special permits (card for pasture of cattle) which can be received from local forestry offices. On the card is shown the name of shepherd, type and number of grazed cattle and number of accompanying dogs.

Others

To other factors are such causes which influence on snow leopard directly or indirectly through influence on its prey species or habitats.

Degradation of habitats

Snow Leopards inhabit a rather narrow range of high-mountain ecosystems: subalpine and alpine meadows, rocks, snow places and glaciers. The state of irbis populations is connected closely with state of its habitats. Negative changes of the environmental conditions reflect on the survival of this predator and its prey. Worsening of quality and fragmentation of natural habitats are connected with development of mountain regions and the degree of use of the high-mountain ecosystems. Construction of new villages and expansion of existing mountain villages, paving roads, electrification, development of mountain slopes by agriculture (fruit trees, walnut, cereals, potatoes, tobaccos, etc.), and deforestation lead to a considerable degree to decline and decrease of the areas of natural habitats of wild animals, and make the preconditions for erosion of mountain slopes. Overgrazing of high-mountain meadows under pastures reduces the productivity of meadows substantially.

At present, in most areas of Snow Leopard occurrence this tendency still exists. However, in recent years in some places the influence of urbanization is reducing, because the inhabitants of some villages located closely to Snow Leopard habitats in boundary zones were moved to plains areas (close to Zaamin nature reserve and Hissar nature reserve, in the basin of Tupalang River), and anthropogenic disturbance has decreased in these regions.

Factors of disturbance

In the past the factors of disturbance were created by high number of visits to high-mountain areas by shepherds, collectors of medical plants, walnuts and fruits, hunters, tourists and pilgrims. At present, the factors of disturbance have declined as a result of the establishment of a frontier regime in the boundary mountain areas and a rise in prices of transport (automobiles, helicopters). However, the blasting operations conducted for discovering minerals create a high level of disturbance for wild animals (for example, the extraction of barium ore 2 km from Chatkal nature reserve, suspended in 2002). The military maneuvers, periodically conducted in some mountain regions (for instance, in Kashkadarya and Surkhandarya regions mountain areas) present a source of disturbance for wild animals and prevent the movements of wild animals by traditional migratory routes.

Influence of frontier-military regime on the populations of wild animals

Establishment of a frontier-military regime within Snow Leopard habitats, on one hand, creates favorable conditions for survival of populations of this predator and its prey through control and protection of the mountain areas. Toughening of control on keeping and using unregistered fire-arms led to a sharp decrease in their use. On other hand, the permanent presence in the mountain regions of military forces in itself causes disturbance to wild animals.

Human Population Growth and Decline in Living Standards

About 10% of the population of Central Asia lives in the mountain regions. Growth of the human population in the region is extremely high and exceeds the rate of such growth in Europe by 2-3 times. As a consequence of an unfavorable economic situation in many mountain regions and escalating poverty the migration of inhabitants of mountain villages to towns and cities on the plains is observed. The human population of the mountain regions in Republic comes across many problems connected with survival in the period of the economy in transition, for example, such as remoteness, fragility of environmental resources, complicated climatic conditions. In the mountain regions the economic activity is limited. The growth of human population leads to the increase of permanent influence on the vulnerable ecosystems of high-mountains. The average family in a typical mountain village consists of 6-8 persons. The majority of people have a low subsistence wage. Besides that, in the mountain villages the level of unemployment is much higher than in the plains regions, especially among young people, therefore many villagers survive by exploiting natural resources and wildlife, first of all, collecting fire-wood, different kind of plants (medical, food, decorative – mostly for selling) and hunting and capture of wild animals.

Climate Change

The global warming of climate can lead to irreversible changes in the vulnerable mountain ecosystems, including areas of Snow Leopard habitats. In the Central Asian region the area of glaciers decreased by 19% during the last 30-35 years. Further decrease in the area of glaciers and eternal snows can result in the loss of some parts of Snow Leopard habitats.

Development of Tourism and Recreational Activity in the Mountains

Recreational activity in Uzbekistan is mostly concentrated in the mountain regions, where the numerous rest-houses and zones, sanatoria, forest cottages, scout camps and other campsites are located. Most well-known tourist activities of different categories of complexity are also represented in the mountain regions. Sport mountaineering and mountain climbing, mountain ski sport and orienteering, hang-gliding and para-gliding are present very widely in Tien-Shan and Pamir-Alai mountains. Water sports (rafting, canoeing) are also developing in mountain areas of the region. Recreational pressure on mountain regions continues to grow as a result of human population growth in cities and towns located nearby in the plain regions.

Dealing with the above threats

Reinforcement of environmental legislation

In spite of the fact, that laws regulated protection of threatened species, including Snow Leopard, have been taken in the Republic of Uzbekistan, their realization meets with some difficulties. First of all, it is necessary to strengthen the enforcement of existing environmental legislation, including the improvement of economic stimulus for workers of environmental services and wildlife protection inspectorate. Also it is desirable to modify existing environmental legislation in accordance with requirements of international conventions (CITES, CMS). Taking into account that distribution of Snow Leopard in Uzbekistan is confined to mountain frontier regions, it is necessary to create the legislative mechanism of interactions between environmental inspections and military-frontier services.

Development of Protected Areas network

At present the total territory of special protected areas in Uzbekistan is insufficient for the conservation of such large species as Snow Leopard. As a rule, the protected areas cover parts of the habitats of separate individuals or families of Snow Leopard, but do not protect local groups as a whole. Despite the fact, that the area of Ugam-Chatkal national park covers significant areas, the weak conservation regime of this authority does not ensure the necessary defense for Snow Leopard. In the National Strategy of Biodiversity Conservation of Uzbekistan (1998) one of the first and main principles is defined as improvement of protected areas network and its increase to 10% of the area of the Republic. Now some projects include proposals for the development of the protected areas network. In Uzbekistan the degree of Snow Leopard habitats covered by protected areas is 65%, however, only 5.8% of the area is presented by strict protected areas or “zapovedniks”. Therefore, for the improvement of territorial protection of local groups of Snow Leopard, it is necessary to recommend the following:

- *Reinforcement of the conservation function in existing reserves, especially in frontier regions.*
- *Optimization of relations between the administration of strict nature reserves and other adjacent land tenures.*
  - Establishment of buffer zones in Hissar, Zaamin and Chatkal strict nature reserves.
- *Enlargement of existing protected areas:*
  - Enlargement of Chatkal biosphere reserve by addition of territories of Shavasay River basin (e.g. rehabilitation of the reserve to the boundaries that existed until 1952); and all basin of the Akbulak River.
  - Widening of Zaamin nature reserve and Zaamin national park through addition of the adjacent northern slopes of Turkestan range.
  - Smoothing of Hissar strict nature reserve through addition the territory around Chapukh village (where the inhabitants were moved to the plain areas), located in the lower part of nature reserve in basin of Tankhas-Darya River.
- *Establishment of new protected areas:*
  - Creation of Pskem reserve in the upper parts of Pskem River.
  - Establishment of new reserve on the southern slopes of Chatkal range, close to Maidantal part of Chatkal Reserve, and adjacent area of Angren Plateau in Namangan region of Uzbekistan.
  - Establishment of the new strict nature reserve in the upper parts of Tupalang and Sangardak rivers (Surkhandarya region of Uzbekistan) on the adjacent areas of Hissar nature reserve.
- *Creation of ecological corridors between protected areas of neighboring countries:*
  - To propose the initiative on the enlargement of the territory of Aksu-Jabagly strict nature reserve in Kazakhstan to the boundaries of Uzbekistan (Ugam-Chatkal national park current boundaries)
- *Establishment of a transboundary park, included the existing nature reserves and proposed protected areas:*

- Transboundary park which will cover Pskem, Ugam and Maidantal ranges (Kazakhstan, Kyrgyzstan, Uzbekistan).

- *Allocation of territories with regime of limited economic use:*
  - Creation and development of hunting managements with the aim of conservation of habitats, rehabilitation and maintenance of the wild animals numbers, which will allow strongly regulated trophy hunting of ungulates to be conducted within special parts of such managements. The selection of such areas requires the special study and consultations with competent experts.

Restriction of illegal hunting

Improvement of the work of inspection staff through raising their professional skills, training and material incentives. Involvement of local communities in species protection through interactions with local environmental inspections. In current conditions the interactions between nature conservation agencies and local military-frontier services are effective methods of combating poaching and smuggling of biological resources, therefore it is necessary to promote such cooperation. It is necessary to suppress through approved court orders and widely clarify in mass media all cases of poaching (illegal hunting).

Resolution of conflicts with local herders

Because some cases of attacks on domestic livestock by Snow Leopard are known, it is necessary to recommend the compensation for domestic animals killed through a special expert commission. Compensation should be given as services or food products following the example of practice applied in Mongolia and some other countries of Snow Leopard range. Also it is necessary to develop the interaction of the workers (administrations) of protected areas and local communities raising public awareness and publicity. In some cases it may be useful to use the experience of other countries of Snow Leopard range (Mongolia, India, Pakistan, Kyrgyzstan, Nepal) to resolve conflicts with herders through assistance in building of safe corrals on summer pastures and improving control of livestock.

Public awareness for Snow Leopard Conservation

Mountains of the region have an important significance for the cultural and esthetic education of the younger generations and the development of human communities, providing human societies with the basis for cultural growth and recreation. Distribution of information and public awareness among local human populations on the questions of nature protection was undertaken during implementation of several projects supported by international organizations such as ISAR, SEN, ISLT and some others. Experience of work with local communities has shown that distribution of information and educational materials has an important impact, especially on the younger generation. First of all, such measures as distribution of leaflets, booklets, posters and other popular editions in local languages play a significant role. Organization of competitions in the schools of rural regions and Days of Parks have shown that local communities react with understanding to the problems of wild animal conservation. So, it is necessary to support the practice of public awareness and popularization of ideas of wildlife protection on a permanent basis.

Involving local communities in protection activity

At present the practice of cooperation between nature conservation services, staff of nature reserves and local communities is just beginning to be developed. First attempts to involve the inhabitants of territories adjacent to protected areas in resolving biodiversity conservation problems were undertaken within the framework of TACIS project on Western Tien-Shan (2001-2003). The TACIS project enabled the participation of local communities through realization of a small grants program, supporting initiatives sympathetic to saving biological diversity. In particular, attraction of local inhabitants to the protection of biological resources through the development of small business, tourism, etc. In neighboring countries of the range (Kyrgyzstan, Mongolia, India, Pakistan) ISLT has assisted in the development of projects for the support of traditional handicrafts using natural native products (woolen

manufacture, carpet production, ceramics, felt, etc.). Such practice serves as a good alternative and gives local communities the opportunity to develop without a negative influence on wildlife. Probably, in Uzbekistan it is also possible to study and apply such positive experience on the assessment of local market and forming of the scheme of sustainable use of environmental products.

Population monitoring and conducting of scientific researches

In Uzbekistan, as it was shown above, a good basis for the development of monitoring of Snow Leopard populations already exists, and, first of all, in mountain strict nature reserves (Chatkal, Hissar, Zaamin). Positive results of such investigations were received in the course of implementation of GEF Western Tien-Shan transboundary project. However, the scientific investigations were conducted only on the area of Chatkal nature reserve within Uzbekistan and have a short-term character. Therefore it is possible to recommend the involvement of the staff of all nature reserves, covered by the range of Snow Leopard, and researchers to conduct monitoring of Snow Leopards in Uzbekistan on a permanent basis (development of scientific themes in strict nature reserves on study of Snow Leopard and its prey). For this it is necessary to train the personnel conducting monitoring and introduce the use of standard international methods in the practice of survey and study of Snow Leopard in the Republic. The first step in realizing these actions should be preparation and publishing of the methodological guides and training for staff of protected areas in their use (scientific workers and rangers) and experts from scientific institutions. The necessary precondition for the practical realization of such program should be the creation and support of the information network for collection and analysis of data on Snow Leopard, its prey species and habitats in Uzbekistan and its integration into existing international SLN- Snow Leopard Network.

Integration and regional collaboration

The experience of practical cooperation in the field of biological diversity conservation at the regional and international levels has shown that the most significant results in the area of species protection can be reached under coordinated actions. Snow Leopard is the species for which the coordinated actions and regional cooperation is most significant owing to its distribution on the territories of many states and occurrence within transboundary areas. In this connection, a special value should be given to coordination of activity at the regional level through joint conservation actions. Using of international conventions such as CITES and CMS it is possible to find real solutions for effective protection of Snow Leopards in the range countries. Besides that, it is necessary to develop regional cooperation – multilateral and bilateral – with neighboring countries to reinforce anti-poaching efforts and suppress the illegal trade in wild animals.

Climate change impact

As it cannot be prevented, requires a combination of mitigation and adaptation measures to ensure the stability of the mountain ecosystem as much as possible as well as some degree of flexibility.

Organization, empowerment, and support

In Uzbekistan, the Snow Leopard is protected on the territories of three strict nature reserves: Chatkal, Hissar and Zaamin, and two national parks: Ugam-Chatkal and Zaamin. All these protected areas cover approximately 65% of the total area of Snow Leopard occurrence in Uzbekistan. However, more probably, just within protected areas the density of snow leopard settlements is close to optimal and its numbers here are higher than on adjacent areas.

Unfortunately, the protected areas can secure the survival of only a small part of the Snow Leopard population, because they are not large and they are spatially isolated from each other. Therefore it is necessary to improve and to enlarge the mountain protected areas in Snow Leopard range.

To ensure the conservation of snow leopards it is critical that government agencies responsible for the management of protected areas work closely and collaboratively with local conservancies and communities and as needed draw on the support of local and international NGOs.

Below is a table describing the organizations involved, their strengths as well as their weaknesses.

Organization	Strengths	Weaknesses
State Committee for the Nature Protection of Uzbekistan	Supervise and control policies for the protection of the environment	Lack of research capacity
Academy of Sciences of Uzbekistan	Strong research experience	Lack of fund for conducting of research
Protected areas	Strong experience on field investigation and territorial protection, strong links with local communities	Lack capacity and funds, absence links with international network
International Organizations*	N/A	N/A
National Conservation NGOs	N/A	N/A
Local Communities	N/A	N/A

*** International organizations stopped to support any SL activity in Uzbekistan since 2005**

Listing of Snow Leopard in the Red Book of Uzbekistan (2009) and the IUCN Red List provided the basis for the development of a conservation strategy and action plan for the protection of this species. Nowell & Jackson (1996) identified priority projects concerned with conservation of Snow Leopard in the wild. Snow Leopards have not been well studied as a result of its biological peculiarities such as secretiveness and caution, and also the remoteness and inaccessibility of its habitats. Insufficient knowledge of the species biology in Uzbekistan creates difficulties in conducting special protection measures. Primary assessments of the population status in the region were conducted more that 10 years ago. Their results have shown the necessity of urgent measures for protection of Snow Leopard in the countries of the region that is still actual for Uzbekistan where two sub-populations of Snow Leopard, Tien-Shan and Hissar-Alai, are located on the edge of the range, and the species itself is close to extinction unless special conservation measures are undertaken. Therefore all received data of expertise require the formulation and reinforcement of the actions on the species protection.

Uzbekistan Republic joined the Convention on Conservation of Biological Diversity (CBD) in 1995. Ratification of this Convention stimulated the elaboration and approval of the National Strategy and Action Plan of the Conservation of Biological Diversity (1998). Snow Leopard is included in Appendix 1 of CITES since 1975 that means the prohibition on the international trade of this species, the parts of its body, derivatives and their productions. Uzbekistan was the first country of the region to sign this Convention (CITES) in 1997. So, all questions connected with import and export of Snow Leopard in Republic are regulated by the responsible CITES Authority. Since 1985 the Snow Leopard has been included in Appendix 1 of CMS or Bonn Convention. Uzbekistan joined this convention in 1998. At the Meeting of Parties (September 2002) the representatives of Uzbekistan encouraged the initiative proposed by this Convention on the decision of Snow Leopard as a species requiring coordinated conservation actions in range countries.

Research and training

Development of effective measures to protect the snow leopard requires constant monitoring to assess the status of its population and to identify the main threats. Monitoring should involve trained staff of the State Committee for the Nature Protection of Uzbekistan and other stakeholders such as Uzbek Academy of Science. In PAs and hunting concessions, rangers should conduct observations daily. However, given the current level of knowledge of the personnel and the limited logistical support available to in the strict protected areas, wildlife cannot be monitored appropriately. Hence, it is necessary to hold trainings, seminars and short-courses, including through exchanges of experiences with other countries with support from international environmental organizations, to improve the skills of PA staff and rangers.

Development and implementation of programs for scientific and technical education and training for identification, conservation and sustainable use of ecosystems, their components and support for education and training to meet the specific needs of the habitat of the snow leopard. This can be achieved by developing a documentary on snow leopards in Uzbekistan as well as increasing cooperation in the application of scientific results obtained during the research.

Time-phased implementation program (i.e. priority activities, their costs, and anticipated outcomes. Activities start when ready and after suitable piloting)

The following stakeholders will be involved in different steps in the implementation of the programme for the conservation of snow leopards in Uzbekistan:

- The State Committee for the Nature Protection of Uzbekistan
- The State Inspection for the Protection of Wildlife and Plants (Gosbiokontrol)
- Institute of the Gene pool of plants and animals Academy of Science of Uzbekistan
- Administration of Tashkent Province
- Ministry of Agriculture of the Republic of Uzbekistan
- State Committee of border protection of Uzbekistan
- State Committee on Custom services of Uzbekistan
- Ministry of internal affair of the Republic of Uzbekistan
- Ministry foreign affair of the Republic of Uzbekistan
- Non-governmental environmental organizations
- Local government agencies
- International environmental organizations
- The Secretariats of international conventions (CBD, CMS, CCD, CITES) and their working groups.

PRIORITY POLICY ACTIONS INCLUDE:

- Development of the National Action Plan for the conservation of the snow leopard (Uncia uncia) in Uzbekistan for the period 2014-2020
- Development and implementation of laws and regulations for the conservation of the snow leopard and its preys
- Appointment of a national focal point and establishment of a working group on snow leopard conservation.

PRIORITY CONSERVATION ACTIONS INCLUDE:

- Reduce human-snow leopard conflicts, through the use of predator-proof corrals, livestock guard dogs and improved husbandry practices
- Address the threats to the key snow leopard prey (ibex and marmots) caused by habitat degradation and poaching
- Strengthen the capacity of protected areas in the conservation of the snow leopard
- Develop incentives for local communities to conserve snow leopards and their prey
- Strengthen research and monitoring of snow leopards in Uzbekistan
- Promote public awareness through the media and educational programs drawing on local knowledge
- Strengthen the capacity of key ministries (security and customs) and their staff in tracking and combating illegal trade in snow leopards and their parts
- Provide technical support on tracking illegal trade through trainings to border and customs agents

PRIORITY TRANSBOUNDARY ACTIONS INCLUDE:

- Support of cross-border cooperation with Kazakhstan, Kyrgyzstan and Tajikistan

Tracking implementation progress and monitoring results

The proposed indicators for the successful implementation of the priorities include:

- Project management and the role of government: The Coordination Committee has the necessary tools to monitor the implementation of the actions under the NSLEP
- Improvement of existing network of Protected Areas for Snow Leopard
- Increased public awareness on the conservation of the snow leopard and its ecosystems are estimated from survey data
- The involvement of local communities documented by reducing conflicts and increasing the number of the prey of the snow leopard
- New scientific findings are published: snow leopard habitat characteristics, hone range and movements are documented serving as a basis for improving the effectiveness of conservation of snow leopards and the PA system
- Distribution map of the snow leopard in Uzbekistan
- Electronic database on the distribution and abundance of snow leopards in Tajikistan
- Active implementation of measures against poaching, including the activities of at least two mobile anti-poaching brigades
- Completed projects enhancing cross-border cooperation and identifying ecological corridors in the framework of the national action plans of Kazakhstan, Kyrgyzstan and Tajikistan
- Capacity of security and customs ministries strengthened as evidenced by greater number of seizures; and
- Trainings of border and customs agents provided in collaboration with OSCE, CITES and TRAFFIC.

Summary of costs and financing possibilities

For the successful implementation of the National Action Plan for the conservation of the snow leopard in the period 2014-2020, Uzbekistan estimates the need for at least USD 1,200,000 (for detail project outlines please see the attached NSLEP Portfolio in the excel sheet). This will support:

- Strengthening the existing network of Protected Areas for Snow Leopards (USD 200,000);
- Conservation of snow leopards by understanding linkages in illegal trade and building capacity of Border and Customs officials (USD 300,000);
- Socio-economic investigation Snow Leopard attitude by local communities (USD 45,000)
- Development of incentives for local communities to conserve snow leopards and their prey (USD 220,000);
- Improvement of transboundary conservation and collaboration (USD 110,000);
- Use of the Snow Leopard Coordination Committee as a vehicle to strengthen the institutional capacity to address snow leopard conservation issues (USD 100,000);
- Monitoring of snow leopards and their prey (USD 280,000);
- Public awareness campaign (USD 200,000)

The State Committee for the Nature Protection of Uzbekistan and Gosbiocontrol will contribute ???? % to the aforementioned activities. We welcome the support from the remaining 80% from donors such as the Global Environment Facility (GEF), USAID, World Bank, Asian Development Bank (ADB), NABU, WWF, Panthera and others (see attached Table for further details).

Global Support Components

A – Law Enforcement

Introduction

This document provides a platform and framework for national and international collaborative actions for snow leopard conservation through three sub-components: Strengthening National Legislation, Strengthening Law Enforcement, and Awareness Raising.

With increased political will, snow leopard range countries recognize the need for urgent collective action to conserve snow leopards and their fragile habitat. For this, countries, through appropriate governmental agencies, need to commit to firm action to stop poaching of and illegal trade in snow leopards and other wildlife by adopting comprehensive legislation; strengthening national law-enforcement systems; enhancing national, sub-regional, regional, and international collaboration; and developing effective mechanisms to eliminate the illegal demand for snow leopard and other wildlife products. It is equally important to strengthen community-based conservation, law enforcement, and ecosystem management, by supporting knowledge exchange, communication, and cooperation among governmental agencies and intergovernmental organizations, with support from non-governmental stakeholders.

Several international resolutions and decisions have been generated in recent years that provide a platform for countries to implement national laws and legislations. Compliance with and enforcement of wildlife laws is the responsibility of national agencies such as police, customs, environmental, and wildlife agencies, which are mandated with the power of arrest and which have the ability to undertake investigations.

The identification of the criminal networks involved in wildlife and snow leopard crime requires a law enforcement response that includes fully exploring the transnational links that extend beyond the state where the offence occurred.

Opportunities exist for improved coordination and information exchange and for investigation coordination between countries in relation to snow leopard and other Asian big cat crime. The ability for intelligence-led targeting to be used to identify criminal networks operating across borders would assist agencies in combating wildlife crime as well as other crime types.

Context

Snow leopards are killed and traded for their fur and other body parts, including teeth, claws, and bones and this criminal element complements the other threats posed to the species survival. Illegally traded snow leopard parts may come from revenge killing, cats caught in snaresset for other wildlife, and poaching specifically targeting snow leopard parts. Illicit demand for snow leopard products and other wildlife exists at national and international levels and is enabled by opportunistic poachers and also by organized groups and international criminal networks.

The impact of wildlife crime, and the ability of law enforcement to address this issue, is as critical to global stability and security as all other forms of organized crime. Criminal networks exploit the vulnerabilities in the law enforcement response capacity in some states to commit wildlife crimes. This further undermines the social, economic and political security of the country, while progressing the criminals agenda of financial gain or prolonging conflict.

Currently there is an inconsistent approach to investigation and enforcement of wildlife-related crime and the recognition of the connection between wildlife crime and international security. This is exacerbated by the fact that information currently collected is inadequate to conduct intelligence analysis and intelligence-led targeting or to identify tangible links between wildlife crime and other crime types.

In September 2013, INTERPOL Secretary General, Mr. Noble aligned environmental crime with serious and organized crimes. “Whether it be illicit trafficking in wildlife, human beings, small arms, drugs, counterfeit medicines or the challenges of combating maritime piracy, the role of regional and international police cooperation is fundamental to

deter crime in Africa," said Secretary General Noble at one of the organization's regional meetings. All snow leopard range countries are INTERPOL member countries.

Addressing and curbing the illegal snow leopard trade requires a series of actions taken at international, regional, and national levels. The Conference of the Parties to CITES adopted a number of Resolutions and Decisions in this regard, and fully implementing these is essential. Snow leopard range countries should review their implementation of these Resolutions and Decisions as appropriate.

For further information on the background of documented poaching of and illegal trade in snow leopard items and derivatives, please refer to Appendices section.

Purpose

The Global Support Component focused on law enforcement is providing a platform to look for opportunities to enhance the participation and collaboration of law enforcement entities of the range countries with each other, to identify the realistic conditions and conflicts that may exist, and to explore avenues to improve those conditions, through a set of proposed actions. Political will, good governance, and setting national priorities in support of wildlife and environmental compliance and enforcement is a prerequisite for the effective conservation and survival of snow leopards and other endangered species.

Through this Global Support Component, the international community assists snow leopard range countries, when relevant, through tailored activities aimed at combatting wildlife crime.

Synthesis of the Issues and Needs at the National Levelidentified by Snow Leopard Range Countries (SLRCs)

Through active dialogue with range countries, the Global Snow Leopard and Ecosystem Protection Program acknowledges the current state of weak wildlife law enforcement, including weak laws and low levels of prosecution even when offenders are apprehended, and underfunding of the wildlife sector. Moreover, the size, remoteness, and harshness of snow leopard habitat, plus the fact that most of it lies outside of protected areas, makes law enforcement challenging. Porous borders that reduce traffickers' risks of detection also create challenges. The increasing value of wildlife products of all kinds has brought the involvement of organized crime. International efforts are needed to reduce demand for endangered wildlife in markets around the world and increase capacity for global law enforcement action against organized syndicates. Within countries, cooperation and communication among the agencies involved or potentially involved in combatting wildlife crime should be fostered and encouraged by the international community.

Discussion needs to be generated around multi-disciplinary approaches for national standards through seminars and task force structures. These multi-disciplinary and multi-agency structures should include enforcement agencies such as police, customs, and wildlife agencies, and where national security is threatened, the army may also be involved. In addition, other relevant national agencies that could bring value to the overall mission of the task force should be identified and invited to participate. It is recognized that collaboration between national agencies sometimes fails to reach a common denominator.Thus, addressing and curbing the poaching of and illegal trade of snow leopard needs a series of actions taken at national and at international level.

Furthermore, it has also been identified that in most range countries, conservation-related laws, policies, and institutions are weak as well. In large part, this is due to insufficient country budgets for snow leopard conservation and conservation in general.

Proposed Actions

Sub-Component*	Performance Indicators	Outputs/Activities	Key Organizations	Estimated Cost (USD)
1. Strengthening National Legislation	To be determined in consultation with range countries.	• Accession process to CITES for range countries that are not yet members. • Reviewing and strengthening national legislation on wildlife protection: ***Directed to the Parties*****,** especially Appendix-I Asian big cat range States 16.68 All Parties, particularly Appendix-I Asian big cat range States, are encouraged to: a) support the activities to be conducted in compliance with Decision 16.70, paragraph c), to enable the Secretariat to prepare a report with findings and recommendations, including reporting on the implementation of Resolution Conf. 12.5 (Rev. CoP16) (Conservation of and trade in tigers and other Appendix-I Asian big cat species), at the 65th meeting of the Standing Committee; and b) provide information on incidents of poaching of and illegal trade in all Asian big cat species, including their parts and derivatives, which will enable the compilation of a report for the law enforcement community, in compliance with Decision 16.70, paragraph d). ***Directed to the Standing Committee*** 16.69 The Standing Committee shall review the conservation of and trade in Appendix-I Asian big cat species at its 65th and 66th meetings, and determine any actions deemed necessary to combat illegal trade in Asian big cats. ***Directed to the Secretariat*** 16.70 The Secretariat shall, subject to the availability of external funds, in cooperation with partner organizations in the International Consortium on Combating Wildlife Crime and, as appropriate, other experts and organizations: a) arrange national seminars in Appendix-I Asian big cat range States, involving all relevant enforcement agencies, to promote a multi-disciplinary approach that will facilitate improved coordination and cooperation in the detection, investigation and prosecution of wildlife crime offences; b) develop a leaflet containing simple illustrations and guidance, to increase awareness of illegal trade in Asian big cats and the endangered status of the species amongst front-line law enforcement staff and border control staff; c) in consultation with Appendix-I Asian big cat range and consumer States, conduct a review of implementation of Resolution Conf. 12.5 (Rev. CoP16) in relation to all Asian big cats and prepare a report providing its findings and recommendations for the 65th meeting of the Standing Committee; and d) gather information on incidents of poaching of and illegal trade in all Asian big cats since the beginning of 2010, undertake an analysis of the information, and prepare a report for the law enforcement community to be circulated in a restricted fashion to relevant enforcement agencies and range States.	National Authorities CITES	To be determined in consultation with range countries.
2. Strengthening Law	To be determined in consultation	• ***National Seminars*** INTERPOL recommends National Environmental Security Seminars (NESS), with the first focus on critically endangered species. The Seminar brings together experts and decision makers from national authorities with responsibilities for environmental compliance and enforcement. The objective of the seminar is to identify	National Enforcement	To be determined in consultation with range

Enforcement	with range countries.	priorities and develop strategies for combating environmental and wildlife crime at the national level.Each agency involved will have its own unique skills, capabilities and experiences, rendering their participation invaluable. The national seminar can be the first step towards forming a task force and provides a unique opportunity to raise awareness of environmental issues at the national level. • ***National Task Forces*** A task force is a firmly established multi-disciplinary team of experts from various national agencies including police, customs, environmental and other specialized agencies, but also from the prosecutor's office, agencies which work together to maintain national environmental security. These structures can be derived from or contributed to other task forces which already exist in the country. INTERPOL has developed a guide to assist member countries in setting up a National Environmental Security Task Force (NEST). Assistance is provided in developing a strategy for the formation on such a structure, based on requests in target countries. It is also recommended to involve prosecutors in the early stages of investigations facilitated by the task forces. Existent specialized anti-poaching teams, should be driven by intelligence in their actions and reassessing their structure or reinforcing collaboration between the agencies forming the teams should be encouraged. The evolution of such anti-poaching type units is recommended. Non-government organizations could provide support for these units and task forces to become well resourced. • ***Memorandums of Understanding*** Encourage specific agreements to snow leopards and/or broader and more general agreements that demonstrate commitment to the protection of natural resources and/or biodiversity, between national agencies, and with international organizations. • ***Joint Threat Assessments*** In order to capture the extent of wildlife crime with a special emphasis on snow leopard crime, it is recommended that the wildlife agency and the police agency in each range country, work collaboratively on a national threat assessment on wildlife crime and its implications on the country's economy and security. Such an intelligence product should provide recommendations with regards to the (re)allocation of government resources where gaps have been identified. It would also clarify and give impetus for national and international law enforcement actions. • ***Transnational Investigative Group*** It is suggested that aTransnational Investigative Group is formed by investigators from all participating snow leopard range countries. Cluster investigative groups (2 or 3 countries) shall be formed if a specific case calls for a particular collaboration in an investigation. It is necessary for this activity to establish regular investigative group meetings and conference calls, and enable the formation of task groups and sub teams that can carry out specific actions to enhance the interdiction of poaching and illegal trade in snow leopards. The groups would be responsible to generate information exchange through mandated secure communication channels. Use of policing tools such as the International System of Notices to identify, locate, arrest and if necessary extradite, high profile wildlife crime offenders is highly recommended. • ***National Priorities*** Highlight the need to incorporate snow leopard/wildlife crime into the priorities of the competent police authorities or customs agencies in each country, including the INTERPOL National Central Bureau. Coordinate priorities and action plans and encourage actions that facilitate partnerships and collaboration at multiple levels	Authorities INTERPOL WCO UNODC SAWEN	countries.

		within a country and in the in international community. • ***Capacity Development*** Specific law enforcement training should be given by the international community in a "Train-the-Trainer" format. It is of paramount importance to identify key individuals that could be trained as trainers that would have a more perpetual presence in their respective countries. Guides and manuals should be offered by the international community to the national law enforcement academies. • ***Community Based Reporting*** Consideration should be given to existent opportunities for rural communities to be able to report crimes anonymously. Buffer programmes between communities and law enforcement/government agencies should be assessed and potentially involved in the reporting mechanisms. Examples are Crime Stoppers International or other relevant or internationally recognized "informant networks." • ***Wildlife and Forest Crime Analytic Toolkit*** Use of the Wildlife and Forest Crime Analytic Toolkit produced by UNODC in collaboration with ICCWC partners, to conduct an assessment of the current opportunities and obstacles in national government responses to wildlife crime.		
3. Awareness Raising	To be determined in consultation with range countries.	• ***Participation in Conferences and Events*** Joint participation of wildlife agencies, police and customs representatives in snow leopard related conferences and events, especially for discussion and planning around multi-agency targeted enforcement activities. (e.g. Countries-led workshops and events, Snow Leopard Forum, CITES CoP and CITES Standing Committee, INTERPOL General Assemblies, INTERPOL Environmental Compliance and Enforcement Steering Committee (ECEC), INTERPOL Wildlife Crime Working Group, World Customs Organization and UNODC Conferences and meetings, but also targeted workshops organized by or in collaboration with non-governmental organizations. • ***Awareness Campaigns*** Non-government organizations' targeted communication strategy and campaigns on the plight of snow leopards and solution to deter illicit activities affecting wild populations. Governmental and intergovernmental organizations need support in advocacy and campaigning for their actions on the ground, and at a strategic level.	Wildlife Conservation Society (WCS) Panthera Snow Leopard Conservancy	

***** However, those sub-components are all inter-linked and cannot always be addressed separately**.**

Appendix 1 – Background

Snow leopards are killed and traded for their fur and other body parts, including teeth, claws, and bones and this criminal element complements the other threats posed to the species survival. Illegally traded snow leopard parts may come from revenge killing, cats caught in snaresset for other wildlife, and poaching specifically targeting snow leopard parts. Although snow leopards have full legal protection in all range countries and were listed on Appendix 1 of CITES in 1975, illegal trade persists and llicit demand for snow leopard products exists at national and international levels. Snow leopard fur is used for clothing, hats, and furnishings and one instance of snow leopard meat available in a restaurant has been reported. Recent evidence indicates that trade is now moving towards rugs, luxury décor and taxidermy. Pelts have been traditionally used in some range countries as decorative wall mountings, but this practice is less evident currently since it is illegal.

In Mongolia five different trade chains were identified: (1) hunters to domestic end users; (2) hunters to domestic markets; (3) hunters to domestic processors; (4) hunters to cross-border markets; and (5) hunters to the international trade chain.Domestic markets can intersect with international markets, for example when hunters bring snow leopard pelts to domestic markets, which then target international tourists, aid or development workers and military personnel who then transport them across borders as souvenirs.

Given the value of a snow leopard pelt, chances are high that pelts from kills by local herders in retaliation for livestock depredation also end up in one of the market chains.Secondary killing of snow leopards ('by-catch') may also occur. For example, snares set for musk deer in the Argut River basin of Russia's Altai Republic to procure highly valued musk for trading across nearby borders also pose a severe threat to the area's significantly depleted snow leopard population. In the last two years, field researchers have seized hundreds of snares laid densely along narrow ridges and migration routes, leaving snow leopards and other species few chances of escape.

Until relatively recently, snow leopard skins could be seen on sale in markets and fur shops in several places, but the open market has declined over the last 10-15 years and the trade has become more clandestine almost everywhere, with some exceptions. Although very few traders engage openly in tiger and leopard trade, the rare animal skin business is many times more lucrative than sheepskin and leather.

The government of China has taken a series of steps to counter illegal wildlife trade. The Forest Police have full legal powers to enforce all laws on wildlife and forest protection, arrest and prosecute offenders, and safeguard public security in forestry areas. In 2011, Forest Police arrested 26,000 offenders and seized 77,000 items of wildlife. The laws on wildlife were amended in 1997 and set out severe penalties for unlawful capture, killing, and trade of the snow leopard and other protected species. Penalties can result in a prison sentence of more than 10 years, a fine and the confiscation of property. The Chinese government has committed additional funds to combat fight wildlife trade and as part of a strategic crackdown on illegal wildlife trade.

In Afghanistan it was estimated that 50-80 snow leopard skins were sold annually in the 1970s (Rodenburg 1977) and recent visits to fur markets of Kabul indicate that snow leopard pelts are still available, with foreigners, aid workers and members of the international military forces reportedly among the main buyers (Mishra and Fitzherbert 2004, Manati 2008, Kretser et al. 2012). In response, Afghanistan has listed the snow leopard as a fully protected species (Kanderian et al. 2011), and the Wildlife Conservation Society (WCS) has mounted awareness and training programs targeting foreignconsumer groups. These programs have been expanded to military base training in the United States of America before soldiers are deployed overseas. WCS has also mounted an outreach and education campaign in all schools and communities across Wakhan, the main part of snow leopard range in the country, and has helped train and deploy over 60 community rangers to monitor snow leopards and enforce the hunting ban (Simms et al. 2011).

A study by TRAFFIC (2008) reviewed the economic and social drivers of wildlife trade and emphasized the need to i) improve available data and knowledge of wildlife trade ii) design wildlife trade interventions taking into account the broader conditions and trends that drive illegal wildlife trade iii) implement and enforce laws and regulations

iv) address wider issues of governance v) make better use of non-regulatory approaches, e.g. market based interventions and support for improvements in resource management v) target the specific audience for awareness and evaluate its impact, and vi) increase policy action and attention to address the illegal trade as a priority.

Interestingly the study also found that efforts to reduce poverty, increase income and diversify livelihoods amongst rural communities were believed to have relatively low impact on illegal harvesting of wildlife. People involved in the illegal wildlife trade were not necessarily poor, and the poor who were involved did not necessarily drive the trade, whereas rising affluence and increasing disposable incomes in consumer countries were major drivers of demand and trade (TRAFFIC 2008).

Changes in governance and social and political upheaval may also drive an increase in poaching and trade. For example, poaching of snow leopards increased following the breakup of the former USSR (Koshkarev 1994, Loginov 1995), when an abrupt change to a market economy and associated economic crisis caused many people to rely heavily on natural resources, while the simultaneous collapse in protection systems and opening of international borders has facilitated illegal trade in wildlife products including those of snow leopards.

The true volume of the illegal trade is impossible to assess due to difficulties in monitoring a secretive activity. There is no central database containing official data on seizures, trade or killing of snow leopards and significant information gaps exist.

In Mongolia, customs authorities confiscated 67 skins over the 10 years 1993–2002. In 2005 a researcher found 13 fresh Mongolian snow leopard skins in a border town in northwestern

China at the same time that Russian border guards confiscated 15 skins coming from Mongolia's Altai region (Wingard & Zahler2006).

All range countries except Tajikistan are Parties to CITES, though some do not implement the convention fully. Encourage Tajikistan as, the only snow leopard range state not a Party to CITES, should be encouraged to join the Convention as a matter of urgency. Lack of enforcement and underfunding of the wildlife sector are chronic problems across snow leopard range. Some anti-poaching efforts have been initiated by NGOs, for example NABU's 'Gruppa Bars' in Kyrgyzstan and the community-based Irbis-1 and Ibis-2 anti-poaching teams supported by WWF and UNDP/GEF in Western Mongolia. These teams have uncovered 12 cases of illegal snow leopard hunting and trade since 2001, including confiscation of 4 snow leopard skins at one time, and seizure of 15 snow leopard skins illegally transported to Russia. Between 1997 and 2012, 18 cases of illegal snow leopard hunting and trade were uncovered, resulting in several successful prosecutions. WCS has trained and deployed community rangers in Afghanistan and Pakistan and WCS also recently facilitated the creation of a six-agency enforcement team in Mongolia. In Tajikistan, a snow leopard skin was confiscated in the spring of the 2013 (the cat was killed as a result of a depredation and the affected farmer tried to sell the skin for the equivalent of USD 800); shortly before a snow leopard skin was also found in a shop in Dushanbe offered for USD 15,000. There are also unconfirmed reports in the country of illegal trophy hunting on snow leopards.

Regional NGOs may play a significant role in assisting governments to monitor illegal wildlife trade and help bring offenders to trial. For example, the Wildlife Protection Society of India (WPSI) has a long history in this field, including preparation of handbooks for use by customs and other officials (e.g. Menon and Kumar 1998).

Appendix 2 - Good practices in Addressing Poaching, Trade, Demand

Addressing Poaching, Trade, Demand

Afghanistan – outreach, education, community governance building, and training and deployment of 55 community rangers across 11,000 km^2 to monitor snow leopard and other wildlife, enforce anti-poaching regulations; building of predator-proof corrals to minimize conflict and retaliatory killing.	Snow leopard education intiatives in 14 of 15 schools in Wakhan; over 5,000 camera trap photos taken by community rangers; five snow leopards captured, collared, and monitored with community involvement; poaching declines on snow leopards and prey; over 20 corrals built and no livestock loss for families using them.

Afghanistan – survey identified international commmunity (development and military) as driver of trade; focused outreach aimed at development community; training at military bases on illegality of trade; government staff trained in CITES regulations and the processing of CITES permits; training in environmental laws, wildlife trade and protected species given to 19 police stations in and around Kabul.	Removal of illegal trade items from base bazaars; training expanded to military bases and academies in US to educate military before deployment.
India - Conflict mitigation and reducing antagonism and retaliatory killing of snow leopard.Corral Improvement: c. 4,250 livestock; Insurance: over 180 households with c. 600 livestock, overall area of over 1,000 km^2. Compensation: direct compensation for livestock lost at 10% of the market price of the animal.	Corral Improvement: Almost total elimination of losses. Insurance: Reduction in losses. Monetary compensation of losses: Slight improvement seen in attitudes of people in about 10 years.
Kazakhstan – Reducing poaching through substantial increase of penalties. Penalties for poaching on a snow leopard - $22,724, and all 5 subspecies of mountain rams - $17,043. Total ban on their hunting.	Poaching has decreased on a snow leopards and other rare species, no cases of snow leopards poaching in Kazakhstan reported since.
Kyrgyz Republic Gruppa Bars (brigade) for anti-poaching.Raids against poachers in all regions of the Kyrgyz Republic, especially in the north. In Naryn region 35,000 km^2 and in Issyk-Kul region 25,000 km^2 are covered by the team together with State inspection.	Reducing the official notice on the sale of skins of snow leopards, etc. At the moment, the Rehabilitation Center has only five snow leopards.
Nepal, India (Ladakh), Pakistan, Russia - Corral predator-proofing. Predator-proof most vulnerable communally-utilized corrals that serve 10-30+ households; 2-5 structures per settlement in proven depredation hotspots. Ensure wire-mesh over roof, secure wooden door, barred windows.	Depredation losses from within corrals eliminated, resulting in improved perceptions by livestock owners and protection of 5 + snow leopards from risks of retributive poisoning or trapping. Notably increased willingness of community to co-exist with snow leopards.
Pakistan - Reduce poaching through livestock vaccination programs.3-5 livestock die of disease for every one killed by a wild predator, i.e. the economic loss to disease is much larger than to predation. More than 90,000 livestock vaccinated in 2012.	70-100% reduction in livestock mortalities. Increased cash income by selling more livestock. Increased meat consumption in the community. Increased tolerance for snow leopard. Reduced risks for diseases in wildlife.
Russia - Inter-agency anti-poaching brigades and regular snare removal campaigns in key snow leopard habitats. 2 brigades were established in Altai and Sayan Mountains. They regularly patrol 1,500 km^2 of key snow leopard habitats in Argut River Watershed, Altai Republic, and Sayano-Shushensky NR and its buffer zone, Krasnoyarsky Kray.	Number of poacher snares in key snow leopard habitats in Sayano-Shushensky NR decreased from 800-900 to 0 between 2008 and 2013. In Argut area, number of snares in key snow leopard habitats decreased from 500-800 (2008) to 50-100 (2013).
Russia - Development of small business program for local communities in snow leopards habitats as alternative to snare poaching.2 districts of Altai Republic – Kosh-Agach and Ulagan Districts, include parts of Onguday and Ust-Koksa districts (total area about 20,000 km^2). Annually 500-700 people are involved in the program.	Number of poaching cases in the area of activities decreased by at least 20% in comparison with 2010. Over 1,200 low-income people trained, over 70 people obtained micro-loans and grants and started their own biodiversity-friendly business. More than 200 new jobs for local communities were established.
Altai and Tuva Republics, Russia - Land of Snow Leopard Festivals.Schools of 5 districts in Altai Republic and 4 districts of Tuva Republic (1,500-2,000 people) annually are involved in these festivals.	Number of festival participants increased from 70 in 2010 to 2,000 in 2012. Festival became traditional event in Altai and Tyva Republics and involves many kids living in snow leopard habitats to learn more about value of snow leopards.

Appendix III – National Portfolios

Country	Objective	Key Activities
Kazakhstan	Enhancing protection and enforcement: Enhance protection of prey species outside the protected areas	
Mongolia		Improvements in the legal and regulatory sphere aimed to effective protection of snow leopards and its key habitats .
Nepal	Halting threats to snow leopard and its prey base: Control poaching of snow leopard and its prey and trade of their body parts	(i) Capacitate and engage border and customs officials to improve the detection of illegal trade ion snow leopard parts; (ii) Develop anti-poaching networks in Pas and mobilize community base anti-poaching units to collect information from the ground on poaching and illegal trade; (iii) Dissemination of information through outreach campaigns and materials on the importance of conserving snow leopards and combatting illegal trade; (iv) Greater awareness among the public on the importance of snow leopards and the threats they are facing; (v) Establish national and local database system.
Russia	Protection of snow leopards: Ensure effective work of regional wildlife protection agencies to protect snow leopards Ban musk-deer harvesting in snow leopard habitats: Completely ban musk-deer harvesting in the habitats of snow leopard	(i) Providing sufficient funding for regional wildlife protection agencies; (ii) Hiring and training extra staff; (iii) Procuring mobility, communications, and office equipment; (iv) Conducting regular enforcement operations. (a) Developing the amendments to regional harvesting regulations; (b) Launching awareness campaigns in the regions; (c) Enacting the new policy.
Tajikistan	Conservation of snow leopards: Increase effectiveness of snow leopard protection measures inside and outside of protected areas	(i) Engage with border and customs officials through trainings and technical support with the goal of improving the detection of illegal trade in snow leopard parts; (ii) Develop anti-poaching networks in PAs and in local communities to collect information on poaching and illegal trade. (iii) Dissemination of information through outreach campaigns and materials on the importance of conserving snow leopards and combating illegal trade.
Uzbekistan	Border and customs control	Conservation of snow leopards by understanding linkages in illegal trade and building capacity of border and customs officials.

Appendix IV – INTERPOL 79th General Assembly Resolution

The ICPO-INTERPOL General Assembly, meeting in Doha, Qatar, from 8 to 11 November 2010

DEEPLY CONCERNED about the impact that environmental crime can have on the planet, the environment, biodiversity and human life,

TROUBLED by the influence that environmental crime has on the global economy and security,

RECOGNIZING that environmental crime is not restricted by borders and involves organized crime which engage in other crime types including murder, corruption, fraud and theft,

BEARING IN MIND the long-standing commitment by INTERPOL to fighting environmental crime,evidenced by AGN/61/RES/12 recommending that INTERPOL form the Environmental Crime Committee,

ACKNOWLEDGING that environmental law enforcement is not always the responsibility of one national agency, but rather, is multi-disciplinary in nature due to the complexity and diversity of the crime type which can encompass disciplines such as wildlife, pollution, fisheries, forestry, natural resources and climate change, with reaching effect into other areas of crime,

TAKING INTO ACCOUNT that there is a vital need for a global response to combating environmental crime and that INTERPOL, as the largest international police organization, should play a leading role in supporting the international enforcement efforts,

CONSIDERING that not one national agency is responsible for enforcing environmental laws, that there is a need for these responsible agencies to be connected with INTERPOL and the National Central Bureaus and that these agencies contribute to the enforcement efforts alongside the international police community,

URGES the member countries and partner organizations of INTERPOL to support the Organization by making voluntary financial contributions or, in the case of member countries, by seconding specialized personnel in support of the INTERPOL Environmental Crime Programme;

URGES the National Central Bureaus to support the Environmental Crime Programme by connecting with the responsible national agencies and encouraging their involvement and support.

B. Knowledge Sharing for Institutional Capacity and Leadership Development

The shared goal of the NSLEPs is conserving snow leopards and their fragile habitats by mapping the protected areas, consolidating them and maintaining the integrity of the habitats. This will be achieved through the baseline survey of population and implementation of the integrated management of the protected areas and connecting/surrounding landscapes. Strengthening of the NSLEP entails supporting institutional and individual capacity building and leadership development through knowledge sharing for snow leopard and ecosystem protection in the range countries by connecting multi-sectoral partners at the global, regional and national levels.

Strengthening knowledge sharing and communities of practice for capacity and leadership development are at the core of the successful conservation of snow leopards and their fragile habitats as identified by the Snow Leopard Range Countries (SLRCs). It is critical to significantly increase the awareness of policy makers and other influential people such as habitat impacting sector executives and religious leaders, for them to be able to create conducive environments and provide direct support for snow leopard conservation and habitat management. It is also critical to enhance the capacity of protected area and wildlife managers, front line managers, community leaders, and civil society through facilitating knowledge exchange and communities of practice, communication and cooperation among stakeholders for Snow Leopard conservation, in a range of fields. These include conservation area management, community based conservation, effective law enforcement, wildlife and ecosystem management and monitoring.

The Global Support Component (GSC) is a partnership with SLRCs that complements the NSLEP's efforts for national institutional capacity building for conservation of snow leopards and their fragile habitats. The GSC objective is to provide universal support to the SLRCs to implement their respective national activities relevant to the GSCs in a cost effective and coordinated manner. This component has been built upon the initial needs assessment and analysis of the portfolio of national activities and establishes the connection of the GSC to the national level activities. This component will establish mechanisms for knowledge exchange and community of practice to facilitate institutional capacity and leadership development for species and habitat management. Three inter-connected sub components have been proposed with the United Nations Development Programme (UNDP) as the lead coordinating agency in collaboration with partner organisations. The proposed sub-components have their own specific activities with objectives, brief description, costs, and performance indicators.

Synthesis of Institutional Capacity Building Needs at National Level identified by SLRCs

The analysis of the NSLEPs indicates that there are a number of major challenges at the management and operational levels in Snow Leopard protected areas

- Lack of adequate knowledge base for effective scientific research and monitoring resulting in poor management interventions and inadequate cross-sector collaboration.
- Lack of awareness and knowledge among front-line managers, community leaders, local people and policy maker regarding snow leopard and its prey species population limits better management of the species/PAs based on the available monitoring data.

- Lack of institutionalized capacity building activities for frontline staff in monitoring prey base and their habitats
- Lack of adequate and well equipped staff limits the capacity of the institutions to plan and effectively implement landscape approach to habitat conservation and effective participatory conservation programmes and their ability to respond to the conservation needs.
- The resource constraints have also been a major factor for limited studies on the value of ecosystem services to local communities and the nation despite the mandates of the Environment protection agencies in carrying out research and studies. Lack of funding has also been the reason for not being able to provide incentives to the skilled managers/zoologists to retain them.

Analysis of the portfolio of national conservation activities was used to synthesize the following four directions in which SLRCs have planned to develop their capacity:

A. Strengthening Policies and Institutional Capacity (1. Drafting laws/regulations, reviewing policies 2. Improving Management Plan 3. Enhancing institutional arrangements and training)

B. Building Awareness and Communication

C. Engaging Local Communities and Reducing Human Wildlife Conflict

D. Addressing Knowledge Gaps through Research and Monitoring

Institutional capacity building needs identified by the selected snow leopard range countries

	A. Strengthening Policies and Institutional capacity			**B. Building Awareness and Communication**	**C. Engaging Local communities & Reducing Human Wildlife Conflict**	**D. Addressing Knowledge Gaps through Research & Monitoring**
SLRCs	**A.1. Drafting Law/Regulations & Reviewing policies**	**A.2. Improving Management Planning**	**A.3.Enhancing Institutional Arrangements &Training needs**			
Afghanistan	**X**	**X**	**X**	**X**	**X**	**X**
Bhutan	**X**		**X**	**X**	**X**	**X**
India		**X**	**X**	**X**		**X**
Kyrgyzstan	**X**		**X**	**X**		**X**
Nepal	**X**	**X**	**X**	**X**	**X**	
Pakistan			**X**			**X**
Russia	**X**		**X**	**X**	**X**	
Tajikistan	**X**	**X**	**X**	**X**	**X**	**X**
Count	**6**	**4**	**8**	**7**	**5**	**6**

Proposed GSC Actions

In order to address the identified challenges and to support institutional capacity and leadership development in the context of the NSLEPs, this GCS component will focus on knowledge sharing which can

catalyse necessary changes in SLRCs. For the component to be focused and effective, it is essential for the SLRCs to define capacity and leadership development in clear operational terms. Therefore this GSC is focused on supporting knowledge exchange for catalyzing policy and institutional change and operational investments with emphasis on: (i) leadership development of key officials and stakeholders; (ii) building cross-sectoral collaboration; (iii) strengthening the wildlife management institutions and enforcement task forces; and (iv) opening doors to innovation. This will entail establishment of knowledge sharing networks, introduction of new technologies, methods, and knowledge, combining executive dialogues, exchange visits, technical training and enhancing transparency and accountability.

There are three sub-components in this GSC.

Sub-Component 1: Knowledge sharing and networking

This sub-component will be the foundation and vehicle for this GSC to deliver results envisaged under sub-component 2 and 3. It will support enhancing knowledge exchange by creating a knowledge network and by providing space for learning, building on existing snow leopard related networks.A regional network will be formed comprising the UNDP regional teams, UNDP Country Offices in SLRCs, partner civil society organizations and key government actors that are working on snow leopard and habitat management, as well as the non-conservation actors who have positive or negative influences on snow leopard landscape management. The network will also involve training and research institutes which can help shape new research and knowledge on this issue and help build and anchor capacities in the region.

The overall approach for this sub-component is:

Exchanging: experiences among practitioners and partner organizations to share relevant lessons learned and innovative practices across the region on the issue of strengthening snow leopard conservation and landscape management.

Collaborating: on developing knowledge products and tools: e.g. on snow leopard population census and monitoring, protected area and landscape management, law enforcement, conflict management, training programmes, enabling legal and institutional setup, which engage and benefit network members.

Connecting: practitioners to one another, to relevant resources and with on-going projects and initiatives, so that they can also be more engaged in the delivery of priorities aligned with NSLEPs and the GSLEP. The network should also connect the conservation community with biodiversity impacting production sectors, including infrastructure, extractives, agriculture, tourism etc., in order to address snow leopard and habitat protection in the context of national development challenges for faster, more effective attainment of national and global priorities for action.

Sub-Component 2: Systemic and Institutional Capacity Development

Through the regional network established under sub-component 1, sub-component 2 will provide cost effective support to the SLRCs in developing systemic and institutional capacity for snow leopard and habitat management. This could entail, reviewing existing policies, upgrading law enforcement and making it more effective, and implementation of effective protected area and landscape management. This will be done through:creation of an enabling environment to promote protected area landscape management; capacity building of organisations including community based organisations responsible for snow leopard conservation; and development of mechanisms for sustainable use of wildlife resources considering the livelihood of local communities.

The overall approach for this sub-component is:

***Identifying gaps*:** Specific capacity deficits and needs of government institutions, civil society and grassroots organisations will be assessed for implementation of the NSLEPs. These will include knowledge and information gaps.

Adding value: Training institutes and organizations already working in the area of wildlife conservation, law enforcement, protected area and landscape management will be engaged in planning and implementation for capacity development actions. Their collaboration will be actively sought.

Strengthening and transferring capacities: Based on the training needs, a series of training eventswill be provided on areas where capacity is lacking across the SLRCs. Trainer sessions will be organized to further strengthen the capacities of partner organizations in the network. The GSC will encourage and support the UNDP Country Offices and partner organizations in their respective countries to subsequently deliver the training to other grassroots organisations in the region.

Sub-Component 3: Leadership Development, Advocacy and Awareness

The knowledge network will help create a regional advocacy agenda to support stronger participation of government policy makers, company executives and religious leaders in the effort for snow leopard conservation and habitat management. The Collaborative Leadership for development approach will be employed to mobilise resources and people to achieve the GSLEP in a harmonious manner. The objective is to inspire, to connect and to empower leadership teams (emerging and current leaders) so that they will be able to catalyse necessary resources in their respective countries. This requires both leadership skills and technical knowledge of what works to achieve those results. The GSC will assist the range countries to achieve this objective by implementing the following activities:

The overall approach for this sub-component is:

Leadership for catalysing changes: Based on the institutional context analysis related to GSLEP/NSLEPs implementation, the GSC will support formation of a leadership group for catalysing changes.

Network as a vehicle: The network will help create a regional advocacy agenda to support active participation of a multitude of stakeholders in implementation of the GSLEP and NSLEPs.

Advocacy and awareness at all levels: The network will also be used to raise awareness about the importance of species conservation and protected area landscape management among the people who have significant influence in decision making that affects implementation of the GSLEP and NSLEPs. By simplifying them and making information more comprehensive, practical and accessible, advocacy and awareness will also be targeted at organizations and communities working on the ground.

INDICATIVE RESULTS FRAMEWORK (6 years)

Sub-Component	Performance Indicators	Outputs/Activities	Key Organisations	Estimated Cost (USD)[39]
1. Knowledge sharing and networking	▪ Evidence of improved dialogue between government, NGOs, academics and non-conservation partners ▪ Evidence of active role of non-conservation partners in implementation of NSLEs ▪ Improved technical capabilities and knowledge sharing skills of conservation practitioners, front line managers, community leaders, local people and policy makers ▪ Adequate database available for effective scientific research and monitoring ▪ Number of Sub-Component's activities actually fully implemented	**1.Connecting Global Knowledge**: Connecting global knowledge through strong networks and exchange where the global and regional conservation institutions on SL management link with national institutions and protected areas in the SL range countries **2. Mechanism for the exchange of available data:**Support the range countries in establishing an effective mechanism for the exchange of available data on the Snow Leopard throughout the species range **3. Community of Practic (CoP)**: Establish or strengthen facilitated CoP that will enhance knowledge exchange and help bridge knowledge gaps in SL conservation among all stakeholders. Structure and operational modality of the CoP will be based on thorough assessment of demands. Objectives, scope, membership, issues to be dealt with will be clearly defined. In addition, the strategy for ensuring active involvement of different stakeholders (including biodiversity impacting stakeholders) will be devised. **4. South-South exchange**: Global support to enrich the analysis and understanding of the range countries' own circumstances, opportunities and constraints which will help improve stakeholder buy-in and create an enabling environment for designing and implementing development initiatives and reforms	UNDP WCS Snow Leopard Trust (TBC) Snow Leopard Conservancy (TBC) Snow Leopard Network (TBC)	2,000,000
2. Systemic and Institutional Capacity Development	▪ Action Plans developed with respect to country driven Institutional Capacity building needs ▪ Institutions identified and committed either in country/neighboring countries or globally to providing	**1. Capacity and needs assessment:** Provide uniform support for the SLRCs in assessing existing systemic, institutional and individual capacity gaps, including knowledge gaps and identify training needs of staff/officials for SL management (including total number of staff to be trained, availability of resources and types	UNDP WCS Smithsonian Conservation Biology Institute (TBC)	4,000,000

[39] The costs are indicative and currently there is no secured funding. Financial resources need to be mobilized to fund these actions.

Sub-Component	Performance Indicators	Outputs/Activities	Key Organisations	Estimated Cost (USD)[39]
	training on Snow Leopard management ▪ The commitment from the SLRCsis reflected in terms of Policy and institutional change and operational investment through sensitization and mainstreaming of Snow Leopard conservation in Law, regulations and stakeholders with adequate budget allocation and a set of common indicators. ▪ Countries implementing the/parts of the ICCWC Wildlife and Forest Crime Analytic Toolkit for evidence-based capacity building programming. ▪ Number of Sub-Component's activities actually fully implemented	of training for staff/officials dedicated to the SL and habitat management and details on dedicated conservation institutions). Conservation institutions and their staff structure and training programmes will also be assessed. The ICCWC Wildlife and Forest Crime Analytic Toolkit will be used to guide capacity and needs analysis of national criminal justice and crime prevention systems (legislation, law enforcement, judiciary and prosecution, prevention and/or data & analysis). On the basis of the analysis, evidence-based capacity building programmes will be designed. **2.Developing country specific Action plan:**Develop country specific action plan for their systemic and institutional capacity building needs and to complement country led training programmes. **3.Building regional training nodes:**To ensure cost effectiveness, facilitate creating clusters among the SLRCs around the existing institutions (For example: creating clusters around Academy of Sciences for Scientific Research and monitoring needs for the capacity building and the members are: Afghanistan, Tajikistan, Kyrgyzstan, Kazakhstan, Uzbekistan, India, Nepal, Pakistan, China, Mongolia and Russia). A series of cost effective training modules will be delivered through the nodes. **4.Enhancing policy and institutions**: Provide coordinated support for drafting laws/regulations & policies such as endangered species protection, protected area and land use planning laws, improving management plans and institutional arrangements & Executive training events based on the needs identified in the NSLEP.	Wildlife Institute of India (TBC) Wildlife Trust of India (TBC) NABU (TBC) UNODC	
3. Leadership Development, Advocacy and Awareness	▪ Executive level policy and decision makers connected to each other for peer-to-peer learning and collective vision forged with others towards achieving the shared goal of conserving Snow Leopard and	**1.Institutional Context Analysis (ICA):** ICA will be conducted to analyse political, economic and institutional factors that affect snow leopard conservation and habitat/landscape management. ICA focuses on how a society's actors, who face varying incentives and constraints, shape the likelihood of programme	World Bank Institute UNDP WCS Smithsonian Conservation	4,000,000

Sub-Component	Performance Indicators	Outputs/Activities	Key Organisations	Estimated Cost (USD)[39]
	their fragile habitats. ▪ Executive Leaders Forum conducted enabling policy and decision makers an opportunity to share knowledge and experiences and resource mobilized to achieve the shared goal of conserving SL and their fragile habitats. ▪ Number of Sub-Component's activities actually fully implemented	success. In analyzing these factors, it is possible to identify the best target institutions and individuals for leadership development, advocacy and awareness. **2.Connecting executive- level policy and decision makers:**Executive- level policy and decision makers to be connected for peer-to-peer learning and to forge a collective vision with others to make change happen. **3. Executive Leaders Forum:**Implement yearly platforms like the Executive Leaders Forum to enable policy and decision makers the opportunity to share knowledge and experiences and mobilize resources to achieve the common goal of conserving snow leopard and their fragile habitats. The executives will include business and religious leaders. **4. Snow Leopard Challenge:** Snow Leopard Challenge is designed to incentivisegovernment's field office, civil society organizations and businesses to jointly devise and implement solutions to challenges the local snow leopard population is facing. The winners of the award will be provided with grants to realize the plan and the results will be widely publicized.	Biology Institute (TBC)	

C. Transboundary Cooperation

Executive Summary

Snow leopards are top predators that live in environments with relatively low productivity and have large home range sizes (up to 500-800 km^2). Single sites, including most protected areas (PAs), are too small to harbor large numbers of snow leopards. It is therefore essential to design and implement conservation strategies at landscape scales to ensure the long-term persistence of viable populations of snow leopards and their prey.

Political borders rarely coincide with entire ecosystems, and this is particularly true of mountain regions where national boundaries commonly follow ridgelines, where snow leopards and mountain ungulates range on both sides. The need for transboundary cooperation in these cases, and in wider ecosystem initiatives, has always been clear. However, political considerations may inhibit or prevent cooperation from being realized in specific cases.

The shared goal of the NSLEPs is to strengthen transboundary collaboration for the conservation of snow leopards in some cases through the establishment of landscape-level transboundary conservation areas; the promotion of study exchanges between PAs of both adjacent and regionally linked range states; and addressing knowledge gaps through joint research and monitoring.

This GSC is a partnership with Snow Leopard Range Countries (SLRCs) that complements the NSLEPs' activities for enabling the transboundary conservation of snow leopards and their habitats. **Its wider objective is to facilitate SLRCs efforts in the implementation of their respective national activities relevant to this GSC in a coordinated manner.** This includes providing a forum for countries to agree on and implement inter-governmental agreements and partnerships. Another focus will be the strengthening of good working relationships and a trustful environment that enables an open exchange of information, experience, and knowledge especially regarding monitoring data as well as poaching and illegal trade incidents. Support in designating and managing transboundary conservation areas will also be an important part of the global support component as well as developing coordinated management (planning) between neighbouring countries that share habitats of snow leopard.

Four inter-connected sub components have been proposed. However, those sub-components are all inter-linked and cannot be addressed separately. Many of the proposed and existing regional and international initiatives to strengthen transboundary conservation capture different levels of area protection, collaboration on illegal wildlife trade and joint monitoring. Therefore, different supporting initiatives were identified, underway or proposed, that capture all these elements and that require priority consideration. These proposed initiatives will be led by a variety of agencies, including the Convention on the Conservation of Migratory Species of Wild Animals (CMS), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), INTERPOL, the UN Office on Drugs and Crime (UNODC), WWF, and the Wildlife Conservation Society (WCS) in collaboration with partner organizations.

Introduction

Snow leopards are top predators that live in environments with relatively low productivity and have large home range sizes (up to 500-800 km^2). Single sites, including most PAs, are too small to harbor large numbers of snow leopards. It is therefore essential to design and implement conservation strategies at landscape scales to ensure the long-term persistence of viable populations of snow leopards and their prey. Larger populations are inherently more likely to persist, retain greater genetic variation, and are less vulnerable to the principal stochastic factors influencing population size and dynamics. Landscape-scale planning for isolated populations safeguards dispersal corridors between core populations, maintains genetic variation, and incorporates resilience to climate change.

Participants to international snow leopard conferences held over the past decade or more have advocated for transboundary collaboration, including the establishment of Transboundary Protected Areas (TPAs).

It has been estimated that up to a third of the snow leopard's known or potential range is located within less than 50-100 km of the international borders of the 12 range countries. Even in 1997, over 31% of the PAs within snow leopard range, totaling 276,123 $km^{2,}$ was classified as existing or potential TPAs. Sandwith et al (2001) published a "Best Practices" manual on PA collaboration currently under revision, while Singh and Jackson (1999) examined the role of transfrontier PAs for creating opportunities for conservation and peace under the snow leopard's banner. The species and its ecosystem features significantly in transboundary initiatives currently underway in Central Asia.

There are many types of legal instruments that can play a role in promoting transboundary cooperation. These vary in their level of formality and range from multilateral treaties (CITES and CMS), bilateral agreements to Memoranda of Understanding (MoUs). Informal agreements can promote co-operative, friendly relations where the situation is not yet favourable to more formal arrangements. Formal agreements however provide the strongest legal basis for long-term transboundary cooperation. The conclusion of a formal treaty maybe necessary if detailed rights and obligations are to be laid down. However, given the generally more complex procedures required for establishing formal agreements, the importance of informal agreements needs to be acknowledged because informal exchanges at all levels often lead to more formal arrangements.

Transboundary collaboration involving an iconic species such as the snow leopard offers a number of advantages to host countries, including: larger, contiguous areas offer safeguards for biodiversity by better protecting more habitats, ecosystems, providing for maintenance of minimum viable populations of many species, and to allow migration, particularly of large carnivores and ungulates; where populations of flora or fauna cross a political or administrative boundary, transboundary cooperation promotes ecosystem or bioregional management; poaching and illegal trade across boundaries are more effectively combatted by transboundary cooperation, including joint patrols, information and intelligence sharing, and border inspections for illegal wildlife; improved capacity of government agencies to deliver benefits and provide ecosystem services to local residents as well as downstream populations; environmental security; and enhanced political and economic collaboration.

Recent Transboundary Initiatives and Current Status of Transboundary Protected Areas

Several ecosystem-level projects within snow leopard range have been initiated.

The GEF West Tien Shan project aimed to improve and increase cooperation between five PAs, all of which hold snow leopards: Chatkal Nature Reserve (NR) (Uzbekistan), Sary-Chelek and Besh-Aral NRs (Kyrgyzstan) and Aksu-Djebagly (Kazakhstan). Objectives also included strengthening institutional capacity and national policies, supporting regional cooperation, and enhancing income generation within the PAs.

The Tien Shan Ecosystem Development Project, also funded by GEF, was launched in 2009 to support management of PAs and sustainable development in Kazakhstan and Kyrgyzstan. The Pamir-Alai Transboundary Conservation Area project (PATCA) was funded by the EU and examined the option of creating a TPA across the border between Kyrgyzstan and Tajikistan and a biological database assembled, but no further action was taken, though proposals to establish a TPA still exist.

The Altai Sayan Ecoregion Project, which began in 2007, aimed to enhance cooperation on biodiversity conservation between NW Mongolia and Russia in that ecoregion and the snow leopard was one of the critical species. Subsequently, the governments of Russia and Mongolia and Russia and Kazakhstan prepared and signed agreements to establish the Uvs-Nuur and Altai Transboundary Nature Reserves in 2011-2012, with WWF-Russia, WWF-Mongolia, and the UNDP-GEF Project "Biodiversity Conservation in Altai-Sayan Ecoregion providing a coordinating role. The Altai Transboundary complex consist of the Katunskiy Biosphere Reserve (Zapovednik) (1,516. 4 km^2) in the Altai Republic, Russia, and the Katon-Karagaysky National Park (NP) (6,435 km^2) of the Eastern Kazakhstan Region, Kazakhstan. The Uvs-Nuur complex includes the Ubsunurskay Kotlovina Biosphere Reserve (Zapovednik) (3,232 km^2) of the Tuva Republic of Russia and 8 PAs in Mongolia (Tsagaan Shuvuut Uul Strict Protected Area, Uvs Nuur Strict Protected Area, Tesiin gol Nature Reserve, Altan Els Strict Protected Area, Khankhokhii NP, Khyargas Nuur NP and Turgen Uul Strict Protected Area, totaling some 14,000 km^2 in Uvs Aimag. A threats assessment was been completed in 2012, along with the drafting of the Altai-Sayan Ecoregion Conservation Strategy (WWF, 2012). A further goal is the development of institutional partnerships within China for this region as an initial step towards further transboundary agreements.

The Pamir International Protected Area has been suggested in the eastern Pamirs where the borders of Afghanistan, Pakistan, Tajikistan, and China meet. This would encompass eight reserves, including one in China, two in Pakistan, two in Tajikistan, and three (in development) in Afghanistan, totaling 35,870 km^2. The most

significant PAs containing snow leopards are Zorkul NR (870 km^2) in Tajikistan; Pamir-i-Buzurg (Big Pamir provisional WR) NR (679 km^2) in Afghanistan; Taxkorgan NR (15,863 km^2) in China and Khunjerab NR (6,150 km^2) in Pakistan. More recent activities include a meeting on transboundary conservation in Dushanbe, Tajikistan, a transboundary health initiative looking at livestock diseases that may be transmitted to wild snow leopard prey in the Pamirs of Tajikistan, Pakistan, and Afghanistan, and a USFS-WCS three-country transboundary meeting on climate change in the Pamirs scheduled for Dushanbe in the spring of 2014.

Nepal has signed agreements with China and India to facilitate biodiversity and forest management, encompassing six border protected areas under the initiative known as the *Sacred Himalayan Landscape*. This effort covers about 39,021km^2 in the eastern and central Himalaya, with 74% located in Nepal, 24% in Sikkim and Darjeeling areas of India, and the remaining 2% in Bhutan. The large Qomolangma NR (34,000 km^2) is located on the Chinese side and is the focus for ongoing population monitoring and research for snow leopard.

The Kailash Sacred Landscape (KSL) Conservation Initiative is a collaborative effort of ICIMOD, UNEP, and regional partners from China, India, and Nepal. It represents a sacred landscape significant to hundreds of millions of people in Asia and around the globe, as well as the source of four large rivers (Indus, Brahmaputra, Karnali, and the Sutlej), which serve as lifelines for large parts of Asia and the Indian subcontinent.

Existing collaborations between institutions in China and Bhutan are focusing research and conservation effort for snow leopards in the transboundary region in the vicinity of the Jigme Dorji NP in Bhutan.

Bilateral initiatives exist in the Kangchendzonga landscape between Bhutan and Nepal and India and Nepal. Potential for transboundary cooperation also exists in the Central and Inner Tien Shan, where Naryn and Sarychat-Ertash NRs in Kyrgyzstan could be connected to Tomur Reserve in China if the proposed Sary-Jaz conservation area in eastern Kyrgyzstan is realized. One example of cross-border cooperation on the ground is represented by a joint survey of the Kyrgyz Range on the border between Kazakhstan and Kyrgyzstan by scientists from both counties.

The “Mountains of Northern Tien Shan” project has been developed for the period 2013-2016 with the assistance of GIZ (German International Cooperation) and the German Society for Nature Conservation (NABU). Within this project,a TPA is planned encompassing three existing PAs: Chon-Kemin Reserve (Kyrgyz Republic), Chu-Or NP and Almaty Reserve (Republic of Kazakhstan).

A new project to strengthen conservation in the Central and Inner Tien Shan of Kyrgyzstan is supported by UNDP and the State Agency on Environmental Protection and Forestry. Among its aims are the establishment of Khan Tengri Natural Park (more than 1870 km^2) in the east of the country. This PA will border the Republic of Kazakhstan and link Sarychat-Ertash reserve in Kyrgyzstan with Tomur Reserve in Xinjiang, China.

In 2010, an MoU was signed between Xinjiang Uygur Autonomous Regional Forestry Department (XUARFD) and the Gilgit- Baltistan Forest, Wildlife Parks and Environment Department, Pakistan. The agreement was for the conservation of wildlife species in the Pakistan-China border area with regards to generating and sharing knowledge about wildlife species and their habitats and developing a joint management plan addressing the issues of wildlife species and their habitats together with suggestive measures for minimizing negative anthropogenic influences on the environment and helping socioeconomic development of the local communities. Following that, in 2011, Chinese institutions participated in a consultation facilitated by ICIMOD, aimed at providing a platform to share the progress made towards the conservation of the ecologically contiguous landscape between China and Pakistan and to develop a common strategic framework of action for the landscape. (ICIMOD Working Paper 2012). Existing research and monitoring in Taxkurgan will contribute towards future transboundary conservation for snow leopards in this region.

International Support

The list of PAs identified in Appendix I that are located along international boundaries can serve as a basis for range states to identify and evaluate potential areas for the purpose of restoring or sustaining a globally and/or regionally significant snow leopard population. Provide financial backup and support capacity building for transboundary protected area management in designated PA “clusters” which are known to (or are considered capable of) support regionally and/or globally important snow leopard and prey populations).

This GSC can also assist range countries with transboundary conservation in the following ways:

- Facilitating development of transboundary cooperation and collaboration through international institutions: IUCN World Commission on Protected Areas Transboundary Conservation Specialist Group

(IUCN, WCPA, TBC, SG), CMS (snow leopard is listed on Appendix 1) and the UN Convention on Biological Diversity (CBD) with the support of IUCN, SLN, INGOs, universities, and institutions such as ICIMOD.

- Funding for landscape-level transboundary projects (World Bank, GEF, UNDP).
- Supporting study exchanges between PAs of both adjacent and regionally linked range states, their managers, and communities.
- Establishing and maintaining a website featuring key transboundary areas and projects and highlighting the value of regional and international collaboration.

Synthesis of the Issues and Needs at the National Level

Table 1. Issues and needs identified in the NSLEPs.

SLRCs	A. Strengthening partnerships and inter-governmental agreements	B. Landscape-level transboundary conservation areas	C. Study exchanges between PAs	D. Addressing knowledge gaps through joint research & monitoring
Afghanistan	Sign a formal transboundary cooperation agreement with the neighboring countries in the snow leopard range on joint conservation issues; Develop and implement regional programs that generate benefits for snow leopard ecosystem protection and conservation, climate change adaptation and mitigation, and biodiversity conservation exploring related MEAs financial mechanisms.	Development of the International Transboundary Protected Area in the area between Afghanistan, China, Pakistan and Tajikistan (as defined and agreed upon at the 2006 Urumqi Conference).		Establish an effective mechanism for the exchange of available data on the snow leopard throughout the species' range by creating a database to improve data sharing on monitoring, scientific research, poaching, and smuggling of snow leopard and it prey species. Agreement on regional standardized monitoring methods for the species.
Bhutan	Establish a transboundary collaboration initiative to protect the snow leopard habitat (with China) on both sides of the boundary.			
China	In the first instance, develop institutional transboundary collaborations as a step towards engaging higher authorities	Pamir-Karakorum region, with Pakistan, Afghanistan and Tajikistan; Altai-Sayan regnion with Mongolia, Russia and Kazakhstan; Tienshan Region, with Kazakhstan and Kyrgyzstan Himalaya with Bhutan and Nepal Gobi Connectivity Region with Mongolia.		Institutional agreements for joint research with institutions in Bhutan, Nepal, Pakistan, Afghanistan, Tajikistan, Kyrgyzstan, Kazakhstan, Russia, and Mongolia. Research to include assessment of movement and corridors; snow leopard population demography; range distribution; ecosystem management and standardized assessment methodologies.
India	Work on the information on triggers of illegal trade on the products derived from the habitats of snow leopard, and seek inter-governmental cooperation mechanisms available for control of illegal trade (e.g. SAWEN and Interpol).	Develop coordinated habitat management with neighboring snow leopard countries. Nepal, China, Bhutan, and Pakistan will be the prominent partners in this effort.		
Kazakhstan	Strengthen transboundary collaboration on joint conservation issues with Russian Federation, China and Kyrgyzstan.			
Kyrgyzstan		Develop transboundary		

SLRCs	A. Strengthening partnerships and inter-governmental agreements	B. Landscape-level transboundary conservation areas	C. Study exchanges between PAs	D. Addressing knowledge gaps through joint research & monitoring
		protected area between "Chon-Kemin" and the National Park "Chew-Or" and the Almaty Reserve in Kazakhstan.		
Nepal	Develop effective transboundary collaboration with China and India for improved landscape level conservation and to address illegal transboundary trade in snow leopard parts.			
Pakistan	Explore possibilities for coordinated management of snow leopard habitat with neighboring countries. Operationalize intergovernmental cooperation mechanisms available for the control of illegal trade. Strengthen bilateral cooperation in research, conservation, and protected area management with China.			Cooperating in research on gene flow, connectivity of snow leopard populations, and landscape-level movements.
Russia	Develop and approve a program of actions for snow leopard conservation in the Russia-Mongolia transboundary zone, as well as in Russia and Kazakhstan.	Develop and expand international transboundary Russian-Mongolian protected areas for the protection of snow leopards and other rare species on Chikhachev, Tsagan-Shibetu, Sailyugem, and Tunkinsky Ridges and the mountains around Khuvsgul Lake. Expand the "Golden Mountains of Altai" UNESCO World Heritage site in the transboundary area of Russia, Mongolia, China, and Kazakhstan.		Coordinate science programs and development of collaborations among specialists in Russia, Mongolia, China, and Kazakhstan to study global climate change impact on ecosystems and endangered species of the Altai-Sayan Ecoregion.
Tajikistan	Develop mechanisms for transboundary cooperation with Afghanistan, Pakistan and China to curb poaching and combat illegal trade. Develop bilateral cooperation agreements with Uzbekistan (addressing the impact of mines in Uzbekistan on snow leopards and other species on the border with Tajikistan) and Kyrgyzstan (in the context of the Pamir-Alai initiative).		Organize exposure visits between countries, to share lessons learned and experiences in PA management and community based wildlife management.	Develop mechanisms for cooperation with Afghanistan, China, and Kyrgyzstan for joint monitoring of migratory populations of mountain ungulates, including Marco Polo sheep;.
Uzbekistan	Support cross-border cooperation with Kazakhstan, Kyrgyzstan and Tajikistan on the conservation of snow leopards.	Create ecological corridors between protected areas of neighboring countries.		

Proposed GSC Sub-Components

Analysis of the NSLEPs and the portfolio of national conservation activities helped to distinguish between the following **four sub-components**:

1. Strengthening of existing agreements and partnerships, including enhanced collaboration through international institutions;
2. Support to designation and management of landscape-level transboundary conservation areas and projects;
3. Supporting study exchanges between PAs of both adjacent and regionally linked range states, their managers, and communities;
4. Support to coordinated habitat management (planning), joint research and monitoring as well as facilitation of exchange of knowledge and data.

However, those sub-components are all inter-linked and cannot be addressed separately. Many of the proposed and existing regional and international initiatives to strengthen transboundary conservation capture different levels of area protection, collaboration on illegal wildlife trade, and joint monitoring. Therefore, different supporting initiatives were identified, underway or proposed, that capture all these elements and that require priority consideration. Table 2 outlines to which sub-component the initiative/activity contributes, the lead agency, indicator, and estimated budget.

Proposed GSC Actions under the 4 Sub-Components

Sl. No	Short name of activity	Brief Description	Cost, $	Relevant sub-component	Lead agency	Performance indicator
Afghanistan, Tajikistan, Pakistan, and China	"Pamir Transboundary Conservation Initiative"	A 4-country framework for transboundary collaboration for the conservation of the snow leopard and the argali sheep.		1, 2, 3, and 4	WCS	4 Country agreement signed
Tajikistan, Kazakhstan, Kyrgyzstan, Russian Federation, Uzbekistan	Central Asia Wildlife Enforcement Network	Develop regional inter-agency and inter-governmental initiative to counter the illegal cross-border trade in endangered flora and fauna.		1 and 4	CITES, INTERPOL, UNODC, WCO	Network established
Afghanistan, China, India, Nepal, Kazakhstan, Kyrgyzstan, Pakistan, Russian Federation, Tajikistan, Uzbekistan	CMS Argali MoU and Action Plan	A framework for the conservation of argali sheep, key snow leopard prey, across its range.		1, 2, 3, and 4	CMS	MoU signed and Action Plan adopted
Argali and SLCs	CMS Central Asian Initiative for the conservation of migratory mammals	A dialogue process and framework for regional cooperation for enhanced transboundary conservation of migratory mammals and their habitat, including the development of a gaps and needs analysis, a joint programme of work, and the organization of a stakeholder meeting in 2014.		1, 2, 3, and 4	CMS	Dialogue initiated
Argali and SLCs	Altai Sayan Ecoregion Project	Transboundary activities on the conservation of the Altai-Sayan region are ongoing since many years. UNDP in collaboration with WWF over the years implemented GEF financed projects on biodiversity conservation in Kazakhstan, Mongolia, and China.		1,2, 3, and 4	WWF, UNDP	

Appendix I. List of Protected Areas Occurring Along International Borders

The following section lists PAs for all range countries that are located on or within approximately 10-30 km of an international boundary. These areas, as well as all other documented non-transboundary protected areas are shown in Figure 1. This information was compiled from the World Conservation Monitoring Centre's Protected Areas Data Unit (PADU) GIS dataset, supplemented by listings published by country protected area agencies, NGOs, and INGOs. Experts were contacted where information was known to be contradictory, out of date or lacked recently proposed or established PAs (e. g., Afghanistan, Kazakhstan, and Russia). In any event, there is an urgent need to both validate and update the database on PAs within snow leopard range on a country-by-country basis.

Afghanistan: Three PAs are under development in the Wakhan Corridor abutting Tajikistan, Pakistan and China: Big Pamir Wildlife Reserve (577 km2); Teggermansu Wildlife Reserve (248 km2); and the Wakhan Conservation Area (11,457 km2).

Bhutan: Four PAs abut the northern border with China: Jigme Dorji NP (4316 km2); Wangchuk Centennial Park (4,914 km2), Bomdeling WS (1,186 km2), and the Sakteng WS (750 km2). There are no known nearby PAs on the Chinese side.

China: In the east, The Yaluzangbudaxiagu NR (8,982 km2) borders India. The Qomolangma National NR (34,000 km2) is located along the Nepal border; Taxkorgan NR (15,863 km2) along the Pakistan and Afghanistan borders;omur (Tuomeurfeng) NR (2,299 km2) at the juncture of the Kazakhstan and Kyrgyzstan border; Kanas (Hamasi) NR (2,500 km2) at the intersection of Kazakhstan, Russia, and Mongolia; and the Buersenheli NR (88 km2) on the border with Mongolia.

India: Changtang WS (+4,000 km2) of Ladakh (J&K State) and the Dibang WS (767 km2) with Arunachal Pradesh state in the east. In Sikkim the Khanchendzonga NP (1,794 km2) adjoins with Nepal's Conservation Area of the same name.

Kazakhstan: In the Altai Mountains: Katon-Karagajsky NP (6,434 km2) connects with Russia's Katunsky Reserve (XXX ? km2) and China's Kanas (Lake) NR (2,500 km2). Further south, the Zhongar-Alatausky NP (3,560 km2) is located on the Dzhunarsky ridge along the country's border with China. The Tarbagataisky NP is situated on the Tarbagatai ridge, which stretches into China.

In the Central Tien Shan region, the Ile-Alatau NP (1,993 km2) and the Almatinsky SR (which also merges with the Almaty WR) abut Kyrgyzstan's Chon-Kemin Park (??? km2), located north of Lake Issykul. Kazakhstan's proposed Kolsai-Kolderi NP (1,610 km2) is located along the same ridge, with its boundary touching Kyrgyzstan's Keng Suu WS (???km2).

In the Western Tien Shan of Kazakhstan, the Aksu-Jabagly (Aksu-Zhabaglinsky) SR (1,218 km2) boundary touches the border of both Kyrgyzstan and Uzbekistan. Another potential transboundary PA in this region is the Kungej - Zailijsky Alatau (verify) shared by Kazakhstan and Kyrgyzstan. The Sairam-Ugamsky NP (1,500 km2) in Kazakhstan also joins with the Aksu-Jabagly NR, which in turn touches the Manas WR of Kyrgyzstan. These reserves are situated along the mountain ridges of Sairamsky, Ugamsky, and Talassky Alatau that define the international border between these countries. Also, Uzbekistan's Ugamsko-Chatkalsky NP is adjacent to the Sairam-Ugamsky NP.

Kyrgyzstan: The Besh-Aral NR (632 km2) which is almost contiguous with Uzbekistan's Chatkal NR (??? km2) and Udam-Chatkal NP (5,746 km2). The Wildlife Sanctuaries of Sandalash and Manas abut Kyrgyzstan's northern border with Kazakhstan. The proposed new Khan Tengri Natural Park (1870 km2) lies close to Tomur NR in China.

Mongolia: The Altai-Tavan Bogd NP (6,361 km2) adjoins China's Kanas NR. The Sillkhem Mountain A (781 km2) & B (696 km2) NP's are located along the border with the Altai Republic, as is the Tsagaan Shuvuut Mountain SPA (339 km2). The Altai-Tavan Bogd NP (6,361 km2) adjoins both the Altai Republic and Chinese borders. The Great Gobi (Gobi A) SPA (53,000 km2) is situated along the Chinese border. The Tsagaan Shuvuut Uul SPA, Uvs Nuur SPA, Tesiin gol NR, Altan Els SPA, Khankhokhii NP, Khyargas Nuur NP, and Turgen Uul SPA adjoin the Ubsunurskaye Kotlovina NR of the Tuva Republic, Russia. The Uuvs Lake SPA (4,423 km2) is located along the border with Russian Republic of Buryatia's Tunkinskiy NP (11,836 km2).

Nepal: Six PAs are contiguous with the border of China (Tibet Autonomous Region): Sagarmatha (Mt. Everest) NP (1,148 km2), Gaurishankar CA (2,179 km2), Langtang NP (1,710 km2), Annapurna CA (7 629 km2), Manaslu CA (1,663 km2), and the Shey-Phoksundo NP (3,555 km2). All but the last area abut with China's Qomolangma National NR (34,000 km2), which is one of the largest PAs supporting snow leopards. In the east, the Kanchenjunga CA (2,035 km2) adjoins the Khangchendzonga NP in Sikkim (India). In the far west the Api Nampa CA (1,903 km2) abuts India and China

Pakistan: The Khunjerab NP (6,150 km2) abuts China's Taxkorgan NR (15,863 km2), as does the Central Karakorum or K2 NP (9,738 km2). The Chitral Gol NP (77 km2) and Agam Besti WS (267 km2) are located close to the Afghanistan border, while the Kilik-Mintaka WS (650 km2) is situated on the China-Afghanistan border.

Russia: In the Altai Republic, the Katunskiy NR (Zapovednik) (1,516. 4 km2) abuts Kazakhstan's Katon-Karagajsky NP (6,435 km2). The Katunskiy NR is contiguous with 3 other PAs in the Altai Republic, namely the Belukha NaP (1,313 km2), Argut NaP (205 km2) and the Sailyugem NP (1,184 km2), and the Shavla Refuge (3,288 km2). The Ukok Plateau NaP (2,542 km2) abuts China's Kanas (Lake) NR 4,554 km2.

In the **Tuva Republic**, Ubsunurskaye Kotlovina NR (3,232 km2) adjoins eight PAs in Mongolia (Tsagaan Shuvuut Uul Strict Protected Area, Uvs Nuur Strict Protected Area, Tesiin gol NR, Altan Els Strict Protected Area, Khankhokhii NP, Khyargas Nuur NP and Turgen Uul Strict Protected Area (total area 14,000 km2). In the Buryatia Republic of Russia, the Tunkinskiy NP (11,836 km2) is contiguous with Mongolia's Khuvsgul Lake NP (11,844 km2).

Tajikistan: The Zorkul Strict NR (870 km2) is located along the border with Afghanistan, with the 2,200 km2 Tajik NP also situated in at the junction of the western and eastern Pamir Range. The Raminsky NP abuts the Kyrgyzstan border to the north. The option of extending this PA to create the Pamir-Alai Transboundary Conservancy Area (PATCA) along the Kyrgyzstan border were examined under a grant from the European Union, and a biological database assembled but no further action was taken.

Uzbekistan: The Ugam-Chatkal NP (5,746 km2) and Chatkal NR are relatively close to the Kyrgyzstan's Besh-Aral NR (632 km2) (see West Tien Shan Project above).

D. Research, Monitoring, and Evaluation

The ability to measure and assess performance through monitoring and evaluation is essential to any conservation program. This GSC sets out a minimum set of agreeable and tractable indicators to be monitored, suggests meaningful periodicities of monitoring activities, and consistent methodologies. It furthermore establishes frameworks for data sharing and evaluation of the monitoring process. The required programme of workshops and training necessary to be undertaken is outlined. Underpinning these monitoring and evaluation activities should lay a bedrock of scientific research that enables greater understanding, efficient interpretation, and continuous improvement through adaptive management and review in light of emerging new knowledge.

This Global Support Component (GSC) is designed to assist the range countries as well as the Secretariat in enabling close monitoring and evaluation of GSLF. Monitoring is a key area for support for the NSLEPs.

Monitoring is a hierarchical and continuous exercise, implemented from the local field level to national and global levels. For an international program such as the GSLEP, monitoring will be most effective and informative when undertaken in a coordinated manner, with range countries leading within country efforts, and the Secretariat coordinating and integrating information at the global level. An effective monitoring program would constantly evaluate program performance from the ground to the global levels, scrutinize the nature and intensity of the dynamic threats to snow leopards and their habitats, assess program performance and help improve the program adaptively, bring in transparency, and make the program details available for evaluation and audit.

The choice of indicators to be monitored requires careful collaboration between all interested parties, to ensure they are relevant to the specified actions of interest, tractable, and cost-effective. When designing monitoring surveys it is important to ensure adequate effort necessary to be able detect trends and other impacts of action. It is often not possible to directly monitor desirable indicators, in which case surrogates need to be identified and their interpretation clearly understood. Specifically, the GSLEP monitoring program, at the local and national levels, should be able to help assess the trends in the conservation status of snow leopards and their habitat (e.g. changes in abundance or occupancy, habitat quality, prey abundance, intensity and nature of threats, etc.). Understanding the changes in conservation status effected by program actions will allow an assessment of how suitable the program actions are in addressing the key threats, and enable improvements and course-corrections. Similarly, in addition to the actual on-ground impact, monitoring the quality of program implementation will allow the range countries to assess the implementation areas needing improvement. Sharing of such information across the range countries will facilitate cross-fertilization of ideas and experiences.

Typically, a good monitoring program will have at least three kinds of indicators, with two sets being field-based and reflecting conservation status, and the third being a set of program process indicators.Threats indicators help understand and monitor the dynamic threats to snow leopard populations and habitats,while impact (biological) indicators help assess the actual impact of the conservation actions taken (e.g. changes in abundance or status of snow leopards, their habitat, number of poaching instances, recovery of prey populations, extent of threat reduction, etc.).Process indicators help assess how well the program actions are being implemented at every level (e.g. number and proportion of local families involved in conservation or conflict management programs, extent of livelihood enhancement, number of officials sensitized or managers trained, robustness of program implementation structures and bodies at the national or landscape level, extent of funding mobilized for the program, etc.)

A good monitoring program would rely on a variety of impact and process indicators. Different indicators, such as snow leopard and prey populations, number of cases of livestock depredation, compensation amounts paid, poaching records, etc., provide different kinds of information, and their information content, utility, and robustness can vary (e.g. biological indicators by themselves tend to have greater natural variation, and their response times can be long, making them more difficult to interpret on their own). Table 1 sets out example indicators that might be appropriate for key actions within the global snow leopard program, along with associated means of measurement, relative cost, and dependencies. Monitoring programs that are solely performed by professionals will be most costly, whereas those using local people trained as parabiologists offer

more cost-effectiveness, and are simultaneously more inclusive, bringing further benefits through improved attitudes toward snow leopard and the authorities managing their conservation.

The techniques to quantify and monitor the various indicators vary, as do the periodicity and spatial extent over which each indicator needs to be quantified. For instance, quantifying snow leopard abundance in key conservation landscapes once in 2-3 years may be desirable and feasible, while prey abundance monitoring in representative parts of this landscape may be possible to undertake once in two years or even annually. On the other hand, some program indicators such as number of local livestock insured, or extent of livelihood generation supported are best monitored at least on an annual basis.

The GSC, through inputs of the range countries, aims to arrive at agreeable and consistent methods, indicators, and periodicity of monitoring, and establishing mechanisms for data collation and sharing with the Secretariat, and a periodic joint evaluation.

Proposed GSC Actions

This GSC is focused on enabling consistent monitoring of program implementation, threats to snow leopards, and conservation status of snow leopards in key landscapes across the range countries. This will require (1) identification and agreement on key indicators to be monitored, (2) agreement on monitoring methods and periodicity, (3) training and knowledge exchange among range countries in monitoring methods, (4) providing need-based support in data analyses and compilation, and (5) establishing a mechanism for periodic data sharing with the GSLEP Secretariat and evaluation.(Table 2)

Table 1. Cost estimates

Component	Indicators	Activities	Organisations	Budget US$
Identifying indicators for consistent monitoring of the program worldwide. Establishing a mechanism for data sharing with Secretariat.	Range countries agree to a set of indicators to be monitored and reported. Range countries develop a common framework and mechanism for data sharing with the Secretariat.	Workshop with key officials and their deputed range country experts. Follow-up workshops for evaluation and improvements in monitoring systems.	Secretariat assisted by SLT and GTI	$225,000 $150,000
Following consistent monitoring methods.	Range countries agree to a minimum and consistent level of monitoring. Range countries review and adopt a specifically developed monitoring manual.	Workshop with field managers and deputed range country experts to finalize methodology. Drafting of a specifically designed manual for monitoring.	SLT, GTI, SLC (tbc)	$225,000 $25,000
Capacity enhancement in monitoring methods	Field managers trained in key monitoring methods.	Classroom and field training for senior field managers and partner organizations identified by range countries.	SLT, WCS, and appropriate range country organizations	$960,000
Monitoring data analysis and compilation	Raw data analyzed and information centrally compiled.	Data analyzed and compiled if received in raw form.	Secretariat assisted by SLT and GTI	$50,000/yr $350,000
Data sharing.	Timely data obtained from range countries, compiled and shared by the Secretariat.	Follow up through official communication channels with country focal points.	Secretariat and GTI	$30,000/yr $210,000
Evaluation.	Range countries collectively with the Secretariat decide on level	High-level program evaluation meetings.	Secretariat and GTI assisted by SLT	$250,000

	and periodicity of program evaluation.			

Table 2. Examples of indicators for actions in response to snow leopard threats identified in other GSC components. Relative cost scores are given as an indicative index, not an actual relative value. Dependencies specified are those primary conditions necessary to achieve sufficient precision from each indicator and should align with other activities within the GSLEP, such as capacity building.

Action	Indicators	Potential Methods	Relative Cost	Dependencies
Livestock compensation scheme	Number of claims per annum	Official records	+	Complete and accurate records kept
	Amount of money provided	Official records	+	Complete and accurate records kept
		Claimant interviews	++	Appropriate surveyors
	Attitudes towards SL	Local interviews	++	Representative samples
	Reported incidents of killing of SL	Official records	+	Complete and accurate records kept
		Claimant interviews	++	Appropriate surveyors
		Intelligence	++	Adequate sources available
	Changes in SL occupancy in landscape	Local interviews	++	Representative samples
		Local parabiologist sign surveys	++	Training
		Professional sign surveys	++++	Adequate survey scope
		Local parabiologist camera trap surveys	+++	Training and equipment
		Professional camera trap surveys	++++++++	Adequate survey scope; appropriate models
	Change in SL abundance	Local parabiologist camera trap surveys	++++++	Training, equipment and adequate survey scope
		Professional camera trap surveys	++++++++	Adequate survey scope; appropriate models
	Changes in SL demography	Professional camera trap surveys	++++++++	Adequate survey scope; appropriate models
		Professional live capture of SL	++++++++++	Adequate survey scope; appropriate models
Livestock grazing limitation	Livestock distribution and abundance	Local parabiologist surveys	++	Training
		Professional surveys	++++	Adequate survey scope; appropriate models
	Habitat quality (biodiversity, cover, etc.)	Professional surveys	++++++	Adequate survey scope; appropriate models
	Prey species distribution and abundance	Local parabiologist surveys	+++	Training
		Professional surveys	+++++	Adequate survey scope; appropriate models
	Prey species demography	Professional surveys	+++++	Adequate survey scope; appropriate models

Action	Indicators	Potential Methods	Relative Cost	Dependencies
	Changes in SL occupancy in landscape	As above		
	Change in SL abundance	As above		
	Changes in SL demography	As above		
Increased anti-poaching effort	Reported incidents of killing of SL	As above		
	Changes in SL occupancy in landscape	As above		
	Change in SL abundance	As above		
	Changes in SL demography	As above		
Reduce hunting pressure on prey species	Habitat quality (biodiversity, cover, etc.)	As above		
	Prey species distribution and abundance	As above		
	Prey species demography	As above		
	Changes in SL occupancy in landscape	As above		
	Change in SL abundance	As above		
	Changes in SL demography	As above		

E - Large-scale Infrastructure Development: Awareness and Coalition Building among the Large-Scale Infrastructure Development Sectors

This Global Support Component (GSC) is a partnership with snow leopard range countries that complements the NSLEPs' ability to support the awareness and coalition building with large-scale infrastructure development themes for conservation of snow leopards and their fragile habitats in cost-effective and coordinated manner. The GSC objective is to assist the range countries to implement their own national activities relevant to maintaining habitat connectivity and engaging industry in large-scale infrastructure development. This component has been built upon the needs assessment and analysis of the portfolio of national activities and establishes the connection of the GSC to the national-level activities. Two sub-components have been proposed with lead implementing agency and partners. The proposed sub-components have their own specific activities with objectives and description, costs, outcomes, and performance indicators.

Major infrastructure facilities are either planned or under construction in different parts of the snow leopard's range. These include development projects spurred by mineral exploration and extraction, the need for major road and rail transportation networks, new gas and oil pipelines, and hydro-electric power facilities that may be associated with large or medium-sized dams. As water shortages increase in the densely populated lowlands of South and East Asia, so the need for upstream water-storage facilities are expected to grow significantly.

While large-scale infrastructure development provides developing countries like the snow leopard range countries with considerable opportunities for economic development, there is a risk they may have negative socio-economic and environmental impacts unless attention is paid to social and environmental considerations and to good governance and transparency. At present, however, the scientific regulation of development projects is not yet in place in most countries, and construction is not yet prohibited in core areas of snow leopard habitat. There is also not widespread awareness or implementation of available methods (described below), such as conducting Environmental and Social Impact Assessments (ESIA) and applying the principles of smart green infrastructure (SGI) that minimize negative impacts, which include disturbing the natural behavior of snow leopards and their prey, fragmenting habitats, degrading grasslands, and opening up previously inaccessible areas to poachers.

Analysis of National Needs for Awareness and Coalition Building among the Large-Scale Infrastructure Development Sectors

The snow leopard range countries identified large-scale infrastructure development as one of the key threats to snow leopards and their habitats. Table 1 presents an overview of these threats.

Table 1: Industry-related threats leading to fragmentation and loss of habitat and access to previously inaccessible core areas.

Range country	Direct and indirect impacts due to mineral exploration and mining	Impacts due to hydroelectric projects	Impacts due to highways, railways, and roads development	Natural gas pipelines
Afghanistan				
Bhutan		X		

Range country	**Direct and indirect impacts due to mineral exploration and mining**	**Impacts due to hydroelectric projects**	**Impacts due to highways, railways, and roads development**	**Natural gas pipelines**
China	X		X	
India		X	X	
Kazakhstan				
Kyrgyz	X	X	X	
Mongolia	X	X	X	
Nepal			X	
Pakistan	X	X	X	
Russia	X	X	X	X
Tajikistan	X	X	X	

Fewer countries identified actions to address these threats, Table 2. These actions related to strengthening policies, enhancing institutions, building cross-sectoral and public awareness, and engaging private and corporate sectors.

Table 2 : Action proposed by the snow leopard range countries to mitigate the industry-related threats.

	Cross-Sectoral Awareness Building at Executive Level	**Technical Solutions**
China	Specific notification by wildlife authorities to those industrial bodies that plan construction or projects in concerned areas.	Official planning to set restrictionson industries in protected areas and legal requirements for environmental impact assessment.
India	Forging an effective communication strategy for stakeholders like Infrastructure development partners and people representatives of every level of development sector.	
Kyrgyz		Strengthening legal framework.
Mongolia	Increase conservation awareness highlighting importance of the species through regular nationwide media which includes different programs as documentary film, TV debates and campaign, public forums, educational materials etc.	i) Make an assessment of mining impacts on snow leopard habitat in Mongolia. ii) Ensure environmental impact assessment as a mandatory measure to protect wildlife. iii) Include more habitat of snow leopards into National Protected Area System and make sure that National Parks enforce the system and corridors for wildlife.
Russia		i) Develop amendments to federal law of Russia #174. ii). Approval of developed amendments by government. ii) Enact new amendments. iii) Involve big industrial companies in conservation of snow leopards and support of PAs via development of corporate social responsibilities and ecosystem services payment.
Tajikistan		Engage Industry: Ensure that industry development does not hinder snow leopards and their prey.

The above examples and analysis of the portfolio of national conservation activities shows that a few countries recognize and plan actions to address industry-related threats, therefore more awareness is needed both at cross-sectoral executive and technical levels, as well as among the public and private/corporate sectors. Accordingly, the following two sub-components have been identified and developed to assisting the range countries in mitigating these threats:

I) Cross-Sectoral Awareness Building at Executive Level

II) Technical Solutions

Proposed Sub-Components

The proposed sub-components will focus on creating cross-sectoral awareness at the executive level and provide technical solutions to encourage meaningful participation of industry and the private sector in snow leopard conservation efforts to create awareness and coalition building with large-scale infrastructure development. The GSC will help the snow leopard range countries to engage the private sector and build environmentally friendly coalitions that recognize snow leopard management as a high corporates priority and implement smart green infrastructure initiatives. This can be addressed by mainstreaming conservation into development through the eyes of the snow leopard.

Sub-Component I. Cross Sectoral Awareness at the Executive Level

Implementing Agency/Partners: World Bank

The objective of this sub-component is enhancing individual competence among high-level policy- and decision-makers by creating awareness and as a result, the executive levels will be aware that snow leopard conservation is a cross-sectoral issue and ensure all sectors mainstream environmental issues in all their polices, plans, programs, and projects.

In order to carry out the cross-sectoral awareness at the executive level, the GSC will assist in implementing two Executive Leadership Forums (ELFs) in two clusters of countries (to be confirmed). High-level decision makers from government agencies, non-government, and the private/corporate sectors dealing with large-scale infrastructure growth, natural resource and land management issues, finance and planning, and law enforcement will be invited to the ELFs. This forum will provide these individuals with opportunities to share good practices, brainstorm, and share common concerns and mitigation tools for emerging threats from large-scale infrastructure development across the sectors. Forum activities may include workshops, symposia, study tours, print and multi-media material, and a web-based discussion platform. The ELF will help the executive leaders to analyze potential mitigation strategies for the negative impacts large-scale infrastructural development projects on snow leopard habitat.

Table 3. Activities to be implemented under Sub-Component I.

Short name of activity	Brief Description	Outcomes	Estimated cost, $	Tentative Schedule
Executive Leadership Forum (ELF)	Implement two ELFs in two clusters of countries to provide high-level policy- and decision-makers an opportunity to brainstorm and share common concerns and mitigation tools for emerging threats from large-scale infrastructure development.	Political will is created. Effective partnerships are created across sectors. Good practices shared.	150,000 each	Tajikistan or Russia May 2014 China or India October 2014

Performance indicators

- Number of participants in the ELF followed by an assessment of activities.
- The commitment of the executive leaders of snow leopard range countries to mainstreaming snow leopard conservation in infrastructure-related laws, regulations, and policies, with adequate budget allocations and a set of common indicators.

Sub-Component II. Technical Solutions

Implementing Agency/Partners: World Bank

Environmental and Social Impact Assessments (ESIA), which is a statutory requirement at the planning stage of major developments in most snow leopard range countries, are not always carried out rigorously.

The proposed sub-component will assist and encourage meaningful participation of industry and private sector in snow leopard conservation through technical workshops to share the best professional and international standards and practices in terms of ESIAs and smart green infrastructure (SGI), which will help industry to minimize adverse effects on snow leopards, their prey, and habitats, as well as other critical elements of biodiversity.

Both the public and private sector will play a role in integrating smart green infrastructure principles into large-scale infrastructure and mining projects in snow leopard range countries. The integration will be displayed through a commitment embedded in policies and project plans so as to avoid "net loss" and preferably achieve "net positive impact" to protect biodiversity in the areas of their operation.

For instance, the multinational leading the huge Oyu Tolgoi copper mine and associated infrastructure development, which lies within snow leopard habitat in Mongolia, has a stated company commitment to achieve net positive impact (NPI). Promoting NPI as a central part of accepted international good practice and encouraging all governments to make this an essential requirement of the permitting process would go a long way toward minimizing the adverse effects of major developments on biodiversity.

Table 4. Activities implemented under Sub-Component II.

Short name of activity	**Brief Description**	**Outcome**	**Estimated cost, $**	**Tentative Schedule**
Technical workshop	Conduct technical workshops to share and put in place the highest professional and international standards and practices in terms of ESIAs and SGI which are important step in minimizing adverse effects on snow leopards, their prey, and habitat, as well as other critical elements of biodiversity.	Good practices replicated. Current situation analysis is done and gaps identified.	150,000 each	Sept 2014, TBC Feb 2015, TBC

The GSC will assist implement technical workshop comprised of technical staff from government agencies, non-government, and private/corporate sector, communities and civil society dealing with large scale infrastructure growth, natural resource and land management issues, finance and planning and law enforcement. The purpose of these workshops will be to replicate good practice from other RCs and carry out current situation analysis to identify and address the gaps with each participants contributing to the best of their capabilities.

Performance indicators

- Number of technical workshops conducted, number of participants, followed by feedback/assessment of the activities
- Number of Sub-Component's activities actually fully implemented.
- Number of projects that applied the SGI principles.

Potential Mitigation Strategies for Large-scale Infrastructural Development Projects

Environmental Impact Assessment with Off-site Mitigation

Large-scale infrastructure development projects represent both a challenge and an opportunity for better ensuring the long-term conservation of the area's biodiversity. Thus, biodiversity offsets may provide a mechanism for maintaining or enhancing environmental values in situations where development is sought despite detrimental environmental impacts. An emerging approach seeks to ensure that unavoidable negative environmental impacts of development are balanced by environmental gains, with the overall (and ideal) aim of achieving a net neutral or positive outcome.

An Environmental and Social Impact Assessment (ESIA) is a statutory requirement at the planning stage of major developments in most snow leopard range countries, but these assessments are not always carried out rigorously. Ensuring that ESIAS are conducted according to the highest professional and international standards is an important step in minimizing adverse effects on snow leopards, their prey and habitat, as well as other critical elements of biodiversity. In developments where finance is provided by major multilateral donors or lenders, such as the World Bank, European Bank for Reconstruction and Development, or the Asian Development Bank, required compliance with the International Finance Corporation's Performance Standard 6, that covers biodiversity, provides a further safeguard.

Positive initiatives may originate within companies themselves. For example, the multinational leading the huge Oyu Tolgoi copper mine and associated infrastructure development, which lies within snow leopard habitat in Mongolia, has a stated company commitment to achieve net positive impact (NPI). Promoting NPI as a central part of accepted international good practice and encouraging all governments to make this an essential requirement of the permitting process would move a long way towards minimizing the adverse effects of major developments on biodiversity.

Mitigation of impacts from large-scale infrastructure can also be achieved very effectively through encouraging developers to better fund protected areas, for example. In order to achieve effective offsets, a diverse spectrum of partners will need to be engaged, along with input from scientists and decision-makers for a wide-ranging assessment.

Engaging Private Sector and Building Environmentally Friendly Coalitions

Agenda 21, Chapter 30 of the United Nation's Conference on Environment and Development (1992) highlighted the crucial role that business and industry, including transnational corporations, could play in the social and economic development of a country. Businesses are increasingly involved in achievement of local development objectives and the Millennium Development Goals (MDGs). Stable policy regimes encourage and enable business and industry to operate more responsibly, efficiently and to implement longer term trading, employment and livelihood opportunities.

By adopting more efficient production processes, preventive strategies, cleaner production technologies and other procedures across the product's life cycle, and governed by business or industrial policies, wasteful practices are minimized or avoided, and associated environmental or resource destruction reduced. Technological innovations, development, applications, transfer and the more comprehensive aspects of partnership and cooperation are to a very large extent within the province of business and industry.

Agenda 21 called on business and industry to recognize environmental management as among the highest corporate priorities and a key determinant to sustainable development. Enlightened leaders of such enterprises and transnational corporations best act by implementing product-based stewardship policies and programmes, along with fostering openness and dialogue with their employees and the public while concurrently carrying out environmental audits and assessments of compliance. The strengthening of regulatory mechanisms is a priority in most if not all snow leopard range countries. This can be achieved by ensuring positive contributions toward sustainable development through such economic instruments as free market mechanisms in which prices of goods and services more closely reflect the environmental cost associated with their production, use, recycling and disposal.

Where snow leopard habitat is impacted, so the responsible industry should provide sufficient funding and technical support needed to offset its negative effects, thereby enabling range states to protect snow leopards, habitat and the associated mountain biodiversity.

A coalition is a temporary alliance or partnering of groups in order to achieve a common purpose or to engage in joint activity. Coalition building is the process by which parties (individuals, organizations, or nations) come

together to form a coalition. Forming coalitions with other groups of similar values, interests, and goals allows members to combine their resources and become more powerful than when they each acted alone. Coalition-building between private businesses and embracing governments could include the following actions by each of the parties:

- Encourage the concept of stewardship in the management and utilization of natural resources by entrepreneurs.
- Report annually on the sector's environmental record, as well as on the extraction or use of energy and natural resources.
- Adopt "Best Business Codes of Conduct" such as the Business Charter on Sustainable Development of the International Chamber of Commerce (ICC) and the World Business Council for Sustainable Development (WBCSD), a Geneva-based coalition of 170 international companies.
- Promote technological know-how and cooperation between enterprises including the identification, assessment, research and development, management marketing and application of cleaner production procedures.
- Industry should incorporate cleaner production policies in its operations and investments, taking also into account its influence on suppliers and consumers.
- Encourage individual companies to undertake programmes for improved environmental awareness, performance and responsibility at all levels, and based on internationally accepted practices.

Entrepreneurship is one of the most important driving forces for innovation, increasing market efficiencies and responding to economic and environmental challenges and opportunities. Small and medium sized entrepreneurs, in particular, can play a very important role in a country's social and economic development. Often, they are the major means for rural development, increasing off-farm employment and providing the transitional means for improving the livelihoods of women. Responsible entrepreneurship can play a major role in improving the efficiency of resource use, reducing risks and hazards, minimizing wastes and safeguarding environmental qualities.

Government and the private sector should strive to increase the number of entrepreneurs engaged in enterprises that subscribe to and implement sustainable development policies. Government can assist in this goal by enacting a mix of regulatory measures, economic incentives and through streamlining administrative and permitting procedures along with cooperating with the private sector to establish venture capital funds for sustainable development projects and programmes.

International Cooperation

Key areas where the international community can and will assist snow leopard range countries:

- Establish standards for application of ESIAs (Environmental and Social Impact Assessments) for major developments in accordance with international best practice
- Assist compliance with IFC Performance Standards on biodiversity and protected areas for all major developments funded by multilateral donors
- Work with governments, industry representatives and companies to attain Net Positive Impact for all development projects affecting snow leopard range
- Establish protocols for use of *biodiversityoffsets* and *Payments for Conserving Ecosystem Services* (PES) for all major projects affecting snow leopards, their prey and habitats
- Encourage the establishment of business associations and/or coalitions between multinational corporations, range state governments and local communities (for example, under Agenda 21, Chapter 30 of the United Nation's Conference on Environment and Development, 1992)
- Adopt "Best Business Codes of Conduct" such as the Business Charter on Sustainable Development of the International Chamber of Commerce (ICC) and the World Business Council for Sustainable Development (WBCSD)
- Develop global 'alert maps' highlighting core snow leopard sites to be avoided by major development projects

This document was endorsed at the Global Snow Leopard Conservation Forum, Bishkek, Kyrgyz Republic, October 23, 2013

www.akilbirs.com

www.facebook.com/TimeToSaveTheSnowLeopard

Twitter: @SnowLeopardLair

The Global Snow Leopard and Ecosystem Protection Program
is prepared and printed by:
Global Tiger Initiative Secretariat
The World Bank
1818 H St., NW, MSN MC-5-503
Washington, D.C. 20433, U.S.A.

www.GlobalTigerInitiative.org
secretariat@globaltigerinitiative.org