Best Practices in Snow Leopard Conservation

Advice Document Addendum to the General Guidelines for Climate Smart Snow Leopard Landscape Management Planning

Lead Author: Chris Czarnecki (chris@snowleopard.org), Snow Leopard Trust 4649 Sunnyside Ave N #325, Seattle, WA 98103; Yash Veer Bhatnagar, PhD, (yash@ncf-india.org), Nature Conservation Foundation/Snow Leopard Trust, WWF, 3076/5 IV Cross, Gokulam Park, Mysuru, 570020, India.
Contributing Editors: Nilanga Jayasinghe (nilanga.jayasinghe@wwfus.org)

1. Background

The goal of GSLEP (Global Snow Leopard & Ecosystem Protection Program) is for the 12 snow leopard range countries, with support from partner organizations, to work together to identify and secure 20 snow leopard landscapes across the big cat's range by 2020, or, in shorthand – "Secure 20 by 2020".

"Secure" snow leopard landscapes are defined as those that:

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

"Secure 20 by 2020" serves as the foundation of the ultimate goal of ensuring that snow leopards remain the living icon of Asia's mountains for generations to come.

2. Conservation Activities

"Secure 20 by 2020" will be achieved through concrete project activities that can be grouped under broad themes corresponding to the commitments of the Bishkek Declaration [http://www.worldbank.org/content/dam/Worldbank/document/eca/Bishkek-Declaration-on-the-Conservation-of-Snow-Leopards.pdf]. These activities include:

1. Engaging local communities in conservation, including promoting sustainable livelihoods, and addressing human-wildlife conflict;
2. Managing habitat and prey based upon monitoring and evaluation of populations and range areas;
3. Combatting poaching and illegal trade;
4. Transboundary management and enforcement;
5. Engaging industry;
6. Building capacity and enhancing conservation policies and institutions;
7. Research and monitoring; and
8. Building awareness

The first five activities are direct impact activities, those whose successful completion will increase or maintain snow leopard and prey numbers (or other appropriate measures such as density or occupancy) and/or protect or restore habitat and connectivity among populations.

The last three activities are enabling activities, those that create the conditions for successfully performing or improving the performance of the direct impact activities. For example, building capacity enables improved efforts to combat poaching, while building awareness enables stronger public, political, and financial support for all direct impact activities.

3. Best Practices

Practices that have proven successful in one or more range countries are being scaled up in those countries and emulated in others. For example, programs to increase community participation in conservation, improve livelihoods, and address human-wildlife conflict have been tested in several countries with very promising results including reductions in poaching of snow leopards and increased willingness to co-exist with the predators. Creation of anti-poaching teams and stiff penalties for poaching have also proven effective. Effective scientific monitoring programs are being conducted in several countries and their methods can be readily applied, with adaptation as necessary, in others. Regarding other conservation activities, such as engaging industry, capacity building, policy enhancement and awareness building, successful models are available from other parts of the developing and developed world.

Photo 1. A young snow leopard shows off its camouflage coat in an arid landscape in India's Spiti Valley. Photo Credit: Nature Conservation Foundation / Snow Leopard Trust

We have compiled a list of activities from across the snow leopard's range that serve as good practices that can be adapted and incorporated into your landscape management plans. These best practices are organized by the conservation activities listed above.

3.1 Engaging local communities and addressing human-wildlife conflict

Enhance the role of local communities in snow leopard conservation efforts by adopting and implementing policies and laws that favor **community involvement in conservation**, promoting environmentally sustainable economic activities that directly **benefit local livelihoods**, and supporting community-based programs to **mitigate human-wildlife conflict**.

Reducing and offsetting economic losses due to human-wildlife conflict and making wildlife conservation beneficial for local communities is a core principle of snow leopard conservation. Among the specific

activities by which many countries plan to address this principle are livestock insurance schemes to provide **compensation for losses**, improved **predator-proof livestock corrals** and **improved herding practices**. These practices and others such as **livestock vaccinations** can be emulated and scaled up.

Engaging local communities and addressing human-wildlife conflict		
Country	**Good Practices**	**Brief Results**
Afghanistan	Formation of the community-based Wakhan Pamir Association (WPA) to oversee sustainable natural resource management and economic development. Activities include a patrolling program (65 community rangers plus 10 government rangers) and a comprehensive Environmental Education Program that reaches all 15 schools in Wakhan and has a focus on snow leopard conservation initiatives.	Patrolling program led to few instances of unreported wildlife crime
China	Most of community conservation projects are undertaken by nature reserves, including public education events, establishment of hotline for collection of information from local people, employing local people to participate in field patrols and investigations, meeting with representatives to address existing conflicts, and research on eco-friendly livelihoods for local communities. Also, local wildlife authorities undertake compensation for losses caused by snow leopards.	Significantly improved law-enforcement effectiveness with more information coming from local people and decreased revenge killing of snow leopards when local people tend to report to local wildlife authorities their losses caused by 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	Communally-managed daytime shepherding of vulnerable livestock in Khunjerab NP. Herders invest shared resources through fixed-fee payment or household rotation system.	Communal herding better allows for pastures to be rotated, thus helping reduce predation risk and lower grazing impacts.
Pakistan	Vaccination and livestock insurance. 15 villages, 30,000 heads of livestock vaccinated in 2013.	Controlled the outbreak of pox in two project valleys, reducing mortality rate to zero from pox.
Pakistan	In Baltistan, communally-managed and co-financed livestock insurance scheme. Funds for compensation contributed on 50:50 basis by villagers (through per animal fees) and sponsoring NGO (conditional grant).	Greatly increased tolerance of snow leopards, especially if complemented by income-generating initiative such as markhor trophy hunting program or tourism initiative
Russia	Western Tuva – protecting livestock corrals from snow leopards in Ubsunurskay Kotlovina NR. More than 70 herders in Tuva Republic were trained in the simplest means of strengthening corrals with the use of	Since then there has not been a single case of a snow leopard gaining access to a corral in western Tuva (before this 56% of all livestock killed by snow leopards in western Tuva died in corrals). As a result of this project, the

metal mesh, and more than 40 corrals were protected from snow leopards in Mongun-Taiga and Bai-Taiga districts of Tyva Republic (about 1,500-2,000 km^2).	number of snow leopards south-western Tuva increased from 10-12 up to 15-20 individuals.

3.2 Managing habitat and prey

Intensify conservation efforts within large landscapes by identifying and **designating critical habitats** of key snow leopard populations as no-go areas for destructive land uses, maintaining their connectivity through **natural corridors**, and strengthening their **on-the-ground protection**. A landscape-level approach to snow leopard conservation that includes PAs and non-protected lands as well as transboundary landscapes is vital.

Specific activities for managing habitat and prey include developing management plans for model landscapes, creating new PAs and identifying corridors that link habitat and PAs. For example, returning grazing land to natural grassland has led to grassland recovery and prey increases in the snow leopard range in China, while new PAs in Kazakhstan have reduced human pressure on habitat, created local jobs and reduced poaching.

Photo 2. The Ukok Plateau Natural Park, Republic of Altai, a part of the UNESCO World Heritage Site. It provides critical habitat for the snow leopard and many other endangered species © Denis Bogomolov / WWF-Russia

Managing habitat and prey		
Country	**Good Practices**	**Brief Results**
Bhutan	Country-wide system of biological corridors connecting PAs	Contiguous snow leopard habitat of as much as 10,000 km^2.

China	26 nature reserves established covering about 50% of range areas of snow leopard populations; large-scale program to return grazing areas to natural grasslands implemented around range areas of snow leopard populations; research on measures to minimize negative impacts for connecting fragmented habitats started.	Most of the core areas for snow leopards have been under legal and actually effective protection while recovery of natural grassland ecosystems and increase of prey resources occurred in many former grazing areas.
Kazakhstan	Forest and Hunting Committee established six national parks in snow leopard habitat.	Additional jobs for locals were created, poaching has considerably decreased, and anthropogenic pressure on landscapes has decreased; security of snow leopard ecosystems has improved.
Mongolia	The Tost Local PA in Mongolia covers about 6,500 km2 - a quarter of which is good snow leopard habitat. Since 1990s many new PAs were established in potential snow leopard habitats.	Basis for protection of critical snow leopard landscapes from destructive land uses such as mining, dams, and other large-scale development projects. Today, 20 state PAs, which cover key habitats in Mongolia, harbor snow leopards.
Russia	Sailugemsky National Park (800 km^2) was established in 2010 in key snow leopard habitats in Argut River Watershed, Altai Republic.	Protection of snow leopard habitats; fighting snare poaching in key snow leopard habitats in Argut area.
Tajikistan	Establishing and/or supporting model community and private wildlife management and hunting areas.	Doubling of ibex numbers within four years and regular records of snow leopards; increase of markhor (in total 2012 directly observed >1,000), regular snow leopard observations, stabilization and local increase of Marco Polo sheep numbers; camera trapping has shown higher snow leopard abundance in managed hunting concession than in unassigned areas despite formal hunting ban in these.
India	Maintain community-managed reserves that rely on 'social fencing' to limit or exclude local use of the area based on a positive incentive program.	Tried in Spiti (3 sites) and Ladakh (2 sites) where recovery of prey (bharal and ibex in Spiti; argali and bharal in Ladakh) has been observed. Similar community-managed reserves have also been successful in Arunachal Pradesh in Tawang. The MoEF's Project Snow Leopard suggests a mosaic of such areas as an important approach to achieving landscape-level conservation.
India	Inaccessible and naturally well protected small PAs with negligible or no human use and well regulated, low intensity community-based ecotourism in small portions of the PA since 1983.	Tried in Nanda Devi and Valley of Flowers National Parks that brought remarkable improvement in the status of wildlife and their habitats. These two NPs act as control sites for long-term monitoring including climate change impacts.
India	Conflict mitigation and reducing antagonism and retaliatory killing of snow leopard. Corral Improvement: ca. 4,250 livestock; Insurance: over 180 households with ca. 600	Corral Improvement: Almost total elimination of losses. Insurance: Reduction in losses. Monetary compensation of losses: Slight

livestock, overall area of over 1,000 km2. Compensation: direct compensation for livestock lost at 10% of the market price of the animal.	improvement seen in attitudes of people in about 10 years.

3.3 Combatting poaching and illegal trade

Combat poaching, illegal trade, and other wildlife crimes by **strengthening law enforcement**, **collaboration** among countries and international agreements/networks, and developing effective mechanisms for eliminating the illicit demand for illegal wildlife products.

Specific activities include building law-enforcement capacity through training and equipment, building community anti-poaching networks, and strengthening legislation and education to reduce illicit demand. Several good practices show how increased law enforcement and strong penalties for poaching and community anti-poaching networks and other means of engaging local communities can reduce poaching.

Combatting poaching and illegal trade		
Country	**Good Practices**	**Brief Results**
Afghanistan	Outreach, education, community governance building, and training and deployment of 55 community rangers across 11,000 km2 to monitor snow leopards 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; declines in poaching of snow leopards and prey; over 20 corrals built and no livestock loss in 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.
China	Chinese laws list snow leopard as a species under national key protection at first level and prohibit hunting of the species except for purposes of scientific research, public education, public security. Utilization of snow leopards must be approved with special permits while no permits are now issued for commercial purposes. Severe punishments from high penalties (10 times income) up to life in prison have been set by laws and regulations on illegal activities including poaching, illegal trade, etc. Authorities of forestry, public security, customs, commercial and industry	Currently in China, no evidence indicates the existence of organized poaching that targets snow leopard products. Also, there are no legal industries using snow leopard fur or bone for commercial purposes. Cases of poaching and illegal trade occur occasionally and arrested offenders have been sentenced and punished. Especially since 2011, illegal activities concerning snow leopards have clearly decreased.

	administration are legally responsible for legal investigation and law enforcement on the above illegal activities. Mechanism for governmental agencies to coordinate law enforcement established in 2011.	
Kazakhstan	Reducing poaching through substantial increase of penalties. Penalties for poaching a snow leopard (US$22,724) and all 5 subspecies of mountain rams (US$17,043). Total ban on their hunting.	Poaching of snow leopards and other rare species. has decreased. 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 km2 ,and in Issyk-Kul region, 25,000 km2 , 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.
Mongolia	Two inter-agency irbis (snow leopard) 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.
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 of diseases in wildlife.
Russia	Inter-agency anti-poaching brigades and regular snare removal campaigns in key snow leopard habitats. Two brigades were established in Altai and Sayan Mountains. They regularly patrol 1,500 km2 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 zero 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 leopard habitats as alternative to snare poaching. Two districts of Altai Republic: Kosh-Agach and Ulagan Districts, including parts of Onguday and Ust-Koksa districts (total area about 20,000 km2). 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 biodiversityfriendly business. More than 200 new jobs for local communities were established.
Russia	Altai and Tuva Republics – 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.

3.4 Transboundary management and enforcement

Increase **bilateral and regional cooperation** for snow leopard conservation in transboundary landscapes. This is a core principle of snow leopard conservation given the extent to which snow leopard habitat abuts national borders and the importance of maintaining large landscapes.

Many transboundary initiatives among snow leopard countries are in various stages of implementation already. Moreover, compendia of good practices in transboundary cooperation, especially management of transboundary PAs, are available; some snow leopard countries have also been pursuing transboundary management and enforcement for tiger landscapes, which can potentially be scaled up for snow leopard conservation.

Photo 3. WWF snow leopard anti-poaching unit in the Altan Khokki range, Khar Us Nuur National Park, Mongolian Altai, Mongolia © Hartmut Jungius / WWF

3.5 Engaging industry

Ensure that industry, infrastructure, and rural development programs and projects are fully sensitive to the conservation needs of snow leopards and their ecosystems, do not adversely affect or fragment key populations or critical habitats, and employ wildlife-friendly design and mitigation.

Engaging industry		
Country	Good Practices	Brief Results
Mongolia	The Nature Conservancy assessed mining impact for the southern Mongolian ecoregion, using indicator species.	Recommended areas for better protection.

3.6 Building capacity and enhancing conservation policies and institutions

Significantly strengthen the capacity of policy-makers, front-line managers, community leaders, and civil society for community-based conservation, effective law enforcement, and landscape management through supporting **knowledge exchange**, **communities of practice**, and **cooperation** among stakeholders.

Many specific capacity building activities are related to strengthening conservation-related legislation and policies through building awareness among government leaders and conservation department staff.

Building capacity and enhancing conservation policies and institutions		
Country	**Good Practices**	**Brief Results**
China	Snow leopard has been listed as a priority species for salvation in the National 12th Five Year Plan of Forestry Development and National Program for Wildlife Conservation and Nature Reserve Development while a special plan for protection of snow leopard populations and their habitats is underway for publication and implementation.	Investment in snow leopard conservation has been increased gradually and obvious growth can be expected in the not too distant future. Also, more attention has been paid to the species at concerned, different levels.
India	Initiated state-federal partnership Project Snow Leopard (PSL). Project Snow Leopard effectively covers five states, ca. 130,000 km2, innumerable villages and households. The Upper Spiti Landscape Management Plan under the PSL covers ca. 4,000 km2, ca. 40 villages, and ca. 7,000 people.	Positive numeric changes in wildlife numbers and people's attitudes in a few years' time are expected.

3.7 Research and monitoring

Evaluate and map current status of key snow leopard habitats and populations, **set baselines** against which to assess future change, conduct **economic valuation** of snow leopard habitats, and intensify **scientific research and monitoring** to inform future policy and action.

All snow leopard countries currently have at least some level of research and monitoring taking place, most importantly to set baselines against which to measure conservation progress and to adapt conservation planning and management as needed. Topics of planned research activities include but are not limited to movement ecology of snow leopards and prey, climate change impacts, population dynamics, and disease.

Photo 4. Snow leopard scratch traces in Yamaat valley in Turgen Mountains Strictly Protected Area.Uvs Province, Mongolia © Anton Vorauer / WWF

Research and monitoring		
Country	**Good Practices**	**Brief Results**
Afghanistan	Wakhan Corridor – ongoing camera-trap surveys of snow leopards; study of snow leopard prey; depredation survey; tracking of snow leopards using GPS collars, coupled with camera trapping.	Better understanding of snow leopard movement, habitat use, home range, and eventually population estimation.
China	Central wildlife authority arranged funding especially for monitoring and research on snow leopards, and appointed a chief expert to lead the project who holds training courses for local staff to undertake field monitoring or convenes meetings to collect information, analyze existing problems, and discuss activities for next steps each year.	Help wildlife authority to better understand the situation of snow leopard populations, habitats, and existing threats.
India	Understand snow leopard abundance along a gradient of prey biomass (Spiti). Understanding snow leopard diets along a gradient of domestic and wild prey ratios (Spiti).	Questions such as 'does increasing prey biomass lead to higher snow leopard abundance?'; 'does increasing livestock biomass lead to increased snow leopard abundance or is it the opposite?'; 'will conflicts increase with increasing livestock abundance?' will be answered. These studies, that use camera-trap based and molecular tools, are providing estimates of snow leopard assessments over large landscapes (ca. 2,000 km2). Estimated abundance in Spiti averages 0.64/100 km2.

India	Numerous studies to understand patterns of conflicts between local communities and snow leopards in different parts of the range.	These studies provide patterns of conflicts, including amount of losses, vulnerable livestock, vulnerable age classes, vulnerable pastures, etc. Ultimately they help in developing sound mitigation strategies.
India	Camera trapping studies in Ladakh, Uttarakhand, and Sikkim.	Density estimates for snow leopard and prey species.
Kazakhstan	State research program: the Committee on Science has started to finance the program of studying snow leopards at the Zoology Institute in Almaty, which was confirmed by the Ministry of Education and Science in 2012. Now the deep sectoral analysis of the economy for working out the final project of the "Green Economy" Strategy is being carried out.	Increased understanding of snow leopard populations and their habitats.
Mongolia	Threat reduction-based planning and monitoring protocol to monitor effectiveness of conservation programs. All villages in the landscape are included and all key areas of biological significance: snow leopard habitat, prey breeding and calving areas, and corridors.	Ability to establish better baseline data for snow leopards including population abundance, density, and life history parameters; emerging or unaddressed threats to snow leopards; evaluation of the ability of our programs to address/reduce/manage existing and ongoing threats.
Russia	Monitoring of key snow leopard population. Annual monitoring of key snow leopard metapopulations in Argut River Watershed, Chikhachev, Tsagan-Shibetu and Western Sayan Ridges on total area of about 1,500 km2 m. Since 2012, started snow leopard monitoring in Eastern Sayan Mountains: Tunkinsky Ridge (about 500 km^2).	Information on snow leopard distribution and abundance is annually collected for 4 key snow leopard populations in Russia to support conservation actions.

3.8 Building awareness

Communicate to citizens and various stakeholders, including local communities, youth, different branches and arms of the government, civil society, and the private sector about the value of snow leopards and their ecosystem. Each year, **awareness events** can be held around International Snow Leopard Day which takes place on October 23rd.

Building awareness		
Country	**Good Practices**	**Brief Results**
China	Snow leopard has been listed as a priority species for salvation in National 12th-5 Year's Plan of Forestry Development and National Program for Wildlife Conservation and Nature Reserve Development while a special plan for protection of snow leopard populations and their habitats is underway for publication and implementation.	Investment in snow leopard conservation has been increased gradually and obvious growth can be expected in the not too distant future. Also, more attention has been paid to the species at concerned, different levels.

India	Initiated state-federal partnership Project Snow Leopard (PSL). Project Snow Leopard effectively covers five states, ca. 130,000 km2, innumerable villages and households. The Upper Spiti Landscape Management Plan under the PSL covers ca. 4,000 km2 , ca. 40 villages, and ca. 7,000 people.	Numeric changes in wildlife numbers and people's attitudes in a few years' time are expected.

Photo 5. Children preparing for the Snow Leopard Festival in Ak-Shyrak, Kyrgyzstan © Andy Isaacson / WWF-US

4. Summary

Many good conservation activities and practices are being implemented across snow leopard range; however, these activities cover only a small percentage of the snow leopard's massive total range. Major opportunities exist for growth and scalability. One of the primary challenges and opportunities for the snow leopard conservation community moving forward will be to gain a better understanding of which conservation activities and combinations of conservation activities are most effective and thus most worth growing and scaling up.

As you develop your landscape management plan, try to learn as much as you can about the various conservation activities taking place in other parts of snow leopard range and see which activities might also be beneficial in your landscape. The conservation activities listed in this document are a good place to start but it is suggested that you do further research as there are many other snow leopard conservation activities taking place that are not listed here.