



BACKGROUND PAPERS FOR SNOW LEOPARD AND ECOSYSTEM CONSERVATION FORUM POLICY RECOMMENDATIONS

KEY CONTRIBUTORS (in alphabetic order) Andrew Zakharenka, Anupam Joshi, Anurag Danda, Ashley Brooks, Avinash Baskar, B. Munkhtsog, Babar Khan, Belinda Wright, BMS Rathore, Charudutt Mishra, Chen Difei, Debbie Banks, Doley Tshering, DVS Khati, Ghana Gurung, Hari Sankaran, Irina Fominykh, James Compton, Jayeeta Kar, K. Chumakaev, Kate Newman, Keshav Varma, Koustubh Sharma, Maheshwar Dhakal, Marc Foggin, Michael Despines, Nurlan Jumaev, Nakul Chettri, Nasir Mehmood, Olga Pereladova, Pradeep Bhattarai, Rajesh Gopal, Richard Paley, Richard Paley, Rishi Sharma, Rizwan Mehboob, Ruchi Pant, Ryan Bartlett, S.P. Yadav, Shekhar Kumar Niraj, Shi Kun, Sonam Wangchuk, Soumitra Dasgupta, Stefanos Xenarios, Stephane Ostrowski, Steve Redpath, Suri Venkatachalam, Tanya Rosen, Tilotama Verma, Wali Modaqiq, Yash Veer Bhatnagar and Zafar Makhmudov

AUGUST 2017



BACKGROUND PAPERS FOR SNOW LEOPARD AND ECOSYSTEM CONSERVATION FORUM POLICY RECOMMENDATIONS

KEY CONTRIBUTORS (in alphabetic order)

Andrew Zakharenka, Anupam Joshi, Anurag Danda, Ashley Brooks, Avinash Baskar, B. Munkhtsog, , Babar Khan, Belinda Wright, BMS Rathore, Charudutt Mishra, Chen Difei, Debbie Banks, Doley Tshering, DVS Khati, Ghana Gurung, Hari Sankaran, Irina Fominykh, James Compton, Jayeeta Kar, K. Chumakaev, Kate Newman, Keshav Varma, Koustubh Sharma, Maheshwar Dhakal, Marc Foggin, Michael Despines, Nurlan Jumaev, Nakul Chettri, Nasir Mehmood, Olga Pereladova, Pradeep Bhattarai, Rajesh Gopal, Richard Paley, Richard Paley, Rishi Sharma, Rizwan Mehboob, Ruchi Pant, Ryan Bartlett, S.P. Yadav, Shekhar Kumar Niraj, Shi Kun, Sonam Wangchuk, Soumitra Dasgupta, Stefanos Xenarios, Stephane Ostrowski, Steve Redpath, Suri Venkatachalam, Tanya Rosen, Tilotama Verma, Wali Modaqiq, Yash Veer Bhatnagar and Zafar Makhmudov

AUGUST 2017

Thematic Recommendations

The GSLEP Program is at the mid-point of its implementation in 2017. The Kyrgyz President has invited his counterparts to the International Snow Leopard and Ecosystem Conservation Forum in Bishkek. The goal of the Forum is to provide a strong impetus to conservation efforts, and to ensure tangible investments and conservation outputs.

The second Steering Committee Meeting of the GSLEP program was held in Kathmandu, Nepal in January 2017. During the meeting, it was agreed that policy recommendations be made on the multiple themes relevant to snow leopard conservation. Working groups were created for each theme to prepare background papers for policy recommendations under each theme. This document summarizes the key policy recommendations and background papers on the following themes:

1 Illegal Wildlife Trade

- 1 Deterrence from poaching via coverage of traps and snares under national laws to allow for effective enforcement action against poaching.
- 2 Closure of open markets selling snow leopard parts and derivatives.
- 3 Capacity building for law enforcement agencies in the following themes:
 - a. Increasing law enforcement capacity against illegal Snow Leopard trade needs to be prioritized. Enhanced capacity can be addressed across multiple agencies, through implementation of training modules to improve prevention of poaching and trafficking through efficient patrolling and intelligence gathering, effective wildlife crime investigation, and identification of parts for Customs and relevant government agencies.
 - b. Initiate an institutionalised system for delivering regular training to frontline enforcement officials in range states.
 - c. Intelligence gathering by law enforcement agencies may include collation of nominal information on known and suspected traders, with profiles of how these individuals operate and connect to herders as well as their international counterparts.
 - d. In all range countries there is the need for greater information sharing between provincial and national agencies responsible for enforcing wildlife laws and other branches of government, including protected areas, wildlife divisions, Customs, Border, Police, and the Judiciary. Multi-agency teams can be incentivized for performance and anticorruption, and be provided with the latest technical tools (SMART, Zero Poaching). Mobile response teams can respond quickly to remote enforcement needs identified by informants.
 - e. Creation of national databases of spot-pattern profiles based on camera trapped images which can be cross-referenced against seized skins, and DNA profiles which can help in forensic identification of Snow Leopard parts and derivatives.
- 4 Fulfil CITES recommendations (Res. Conf. 12.5, Rev. CoP17) on demand reduction by working with traditional medicine communities and industries to develop strategies

for gradually reducing, and eventually eliminating the use of snow leopard parts and derivatives. The strategies could include education and awareness campaigns.

5

7

Creation of national crime databases and sharing of information about wildlife crime in snow leopard and related species. Additional databases to include nominal information on known and suspected traders, along with profiles of their operations and connections with local and international counterparts.

- 6 Increase trans-boundary law enforcement cooperation.
 - a. Bilateral and multi-lateral cooperation (through bilateral and multi-lateral agreements) and effective use of existing networks to improve sharing of intelligence and coordination of law-enforcement efforts is suggested to implement greater control over illegal wildlife trade between Snow Leopard range countries.
 - b. Illegal trade in Snow Leopards is largely international, with poached Snow Leopards being moved across borders. More support should be given to the newly created Central Asian Snow Leopard and Wildlife Enforcement Network (SLAWEN) (GSLEP, 2015), as well as the operationalization of the South Asia Wildlife Enforcement Network (SAWEN), to focus the attention of all range countries on illegal Snow Leopard trade, and increase the professional capacity of participating governments to conduct intelligence-led antipoaching and trade seizures (Beale and Botezatu, 2016). Regular trans-boundary meetings between environment enforcement, Customs and border officials are essential.
 - c. International law enforcement networks such as INTERPOL and the World Customs Organizations may be used to enhance transnational collaboration and cooperation on investigations, particularly with countries outside the range states.
 - d. Encourage the training and use of wildlife detection dogs for Customs and Border control to facilitate detection of illegally traded Snow Leopards and their parts.
 - Prioritization of legislative shortcomings to amend legislation as envisioned in the NSLEP elements of the GSLEP, and harmonize legislation amongst range states to ensure similar stringency in laws for effective trans-national impact.
 - a. National and provincial laws, as the basis for enforcement to clearly assign administrative responsibility for illegal taking, storage, transportation, collection, ownership, acquisition, and the sale or consignment of Snow Leopards and their products, parts, or derivatives (as has recently been accomplished in Russia).
 - b. Legislation needs to be amended to remove the exemption allowing the killing or capture of snow leopards in defence of human life and property.
 - c. Adopt China's "Zero Tolerance" approach to online advertising for protected species products, working closely with major e-commerce trading site companies and nongovernmental organizations. China's ban on auctions (without permission) of pre-Convention/pre-national trade ban items derived from protected species (SFA, 2012) and India's practice of absolutely no sale and no acquisition of any snow leopard parts and derivatives except through inheritance are also recommended as best practice law enforcement.
 - d. Kazakhstan, Kyrgyzstan and Russia, as members of the Eurasian Customs Union (ECU), to ensure that their legal protections for Snow Leopards are harmonized under the (ECU) to ensure that illegal trade cannot be facilitated by open borders.

- 8 Improving detection and conviction rates by using appropriate measures such as:
 - a. Creation of specialized enforcement units for wildlife crime
 - b. Appointment of dedicated prosecutors for wildlife crime
 - c. Designation of special courts for wildlife crime at local and national levels
- 9 Prioritize funding for snow leopard conservation in range countries, in particular to assist the implementation of GSLEP as well as effectively implement CITES Resolution Conf. 12.5 (Rev. CoP17).

2 Research and Monitoring

- 1 Resources (~\$10 million) raised to support snow leopard surveys, equipment, data managers, lab technicians and research associates to manage and implement the surveys in the next 5 years.
- 2 Government support for capacity building, coordination and field data collection to improve the understanding about the status of the snow leopard.
- 3 Detailed resource material are prepared based on latest scientific advancements in population ecology and identifying future climate refugia, including Spatial Capture Recapture modelling, Site Occupancy analysis, Bayesian methods for estimating populations, and habitat suitability analyses, from multiple sources.
- 4 A multilingual field-training training module is developed and adopted across range countries to conduct snow leopard surveys.
- 5 A dynamic panel with international snow leopard experts, climate change and biodiversity experts, and population ecologists is formed to provide technical support to global snow leopard population assessments, and update the guidelines and training module every 5 years.

3 Community-based conservation

- 1 Develop and institutionalize an applied training program in community-based conservation with broad, inter-disciplinary collaborations between conservationists and development practitioners, social scientists, and community partners to share foundational principles while also providing opportunity to develop locally relevant and viable solutions for conservation.
- 2 Develop local institutions within and around snow leopard habitats (e.g. formation of user committee and user groups in Nepal that receive 50% of the protected area revenue).

- 3 Insurance of livestock, relief fund for crops depredation by wildlife and promotion of ecotourism activities could be the alternative options to attract the local communities to snow leopard conservation.
- 4 Develop new avenues to enhance engagement and interaction between selected industries, business sectors, government and local communities to provide new opportunities for alternate livelihoods.
- 5 Enable cross-sectoral communication and engagement for operationalizing the conservation strategies developed as part of the management plans of the 23 snow leopard landscapes.
- 6 Train at least 500 leaders and field staff from protected areas and NGOs, and community champions in conservation practices such as the PARTNERS Principles for community-based conservation.
- 7 Initiate comprehensive education and awareness programs to foster awareness about key conservation issues, socio-ecological interactions, conservation values and benefits among mountain communities.
- 8 Raise resources to support travel and training for protection staff and local communities, including exposure and learning trips to successful initiatives within and between range countries.

4 Business and Industry

- 1 Institutionalize wildlife business councils in each range country, consisting of industry leaders, conservation agencies, and international financial institutions (IFIs).
- 2 Setting up a private sector trust fund for conservation of snow leopard and its habitat to provide sustenance to national, regional and global conservation efforts.
- 3 Align conservation financing to market based instruments, such as green equity and green/climate bonds.
- 4 Provide state of the art, research and development facilities support technical enhancement of the frontline staff as well as other stakeholders.
- 5 Connecting corporates and communities Enhance support to forest communities through innovative business models, that increase profitability, provide quality assurance and create an effective marketing mechanism for products derived from sustainable forestry practices.
- 6 Provide financial and tax incentives for private sector investment in green growth, climate adaptation and biodiversity conservation.

5 Resource Mobilization

1 Range countries commit to at least double the allocation of National resources to snow leopard conservation through government budget appropriations and other

means (e.g. Nepal allocated \$3.15 million USD to implement climate smart management plans for up to 300 snow leopards in Nepal).

- 2 Secure support to access global environmental finance (GEF 7, GCF etc.) for snow leopard and ecosystem conservation projects across range countries building on past initiatives and lessons (e.g. under GEF 6 at least US\$ 40 million of GEF funding was mobilized).
- 3 Range countries should explore the establishment of a Regional Snow Leopard Ecosystem Trust Fund to mobilize resources from multiple sources including donors, private companies, national governments, revolving sources of funding such as mining or water revenues, other payments for ecosystem services, and more. Such multicountry Conservation Trust Funds (CTF) have been implemented previously in the Caribbean, Central Africa, and the Pacific and can bring together shared interests to create the scale and experience needed to create significant interest and impact.
- 4 Range countries should also explore the establishment of a sustainable development investment fund or funds to complement the CTFs. Sustainable business investment in areas such as ecotourism, sustainable animal husbandry, agriculture, forestry, micro-hydro, solar power, etc. can support the ecosystem management plans by providing ecologically and economically viable livelihoods for people living and working in the target ecosystems. One concept for such a fund is that it would act as a revolving fund, making concessional loans to sustainable companies and using the reimbursements to finance future loans. The fund can be established as an impact investment venture providing investors with both a financial and environmental return on investment.

6 Infrastructure

- 1 Identify environmentally-sensitive and vulnerable areas, especially those essential for snow leopard habitat, ecosystem services, and climate change resilience - building on existing data and globally established priorities, such as 'Key Biodiversity Areas'.
- 2 Collate data and information on the movement dynamics of snow leopards and other threatened wildlife, particularly species most likely cause road accidents and loss of human life.
- 3 Agree on and officially map, through cross-ministerial coordination, Priority Areas for snow leopard habitat, resilience and ecosystem services, including those outside GSLEP landscapes.
- 4 Undertake participatory integrated Strategic Environmental Assessments of Priority Areas utilizing all available data on wildlife movements to delineate areas to 'avoid' or 'go with care'.
- 5 To best ensure resilience and sustainability, undertake integrated planning at the system, not project level at landscape, watershed, national and transboundary scales.

- 6 Optimize future productivity of the nation's natural assets by respecting agreed 'avoid' or 'go-with-care' zones in development planning and sector master plans.
- 7 Promote evidence-based, integrated decision making by requiring use of spatial data on natural capital and biodiversity, particularly in and around agreed Priority Areas.
- 8 Enact regulations requiring Priority Area restrictions to be reflected in the tendering, planning, design, environmental impact assessments (EIA) and construction of all infrastructure projects.
- 9 Require transparency and accountability in project development, approval and project cycles through multi-stakeholder (e.g. finance sector and communities) consultation processes.
- 10 Require free prior informed consent of local and indigenous communities in infrastructure plans.
- 11 Develop evidence-based policies supported by decision support tools and mitigation guidelines.
- 12 Follow and enforce international standards for sustainable infrastructure and publish clear local guidelines in user-friendly language.
- 13 Update, enforce and build capacity for delivering strong, clear and transparent Environmental and Social Impact Assessment (ESIA) laws.
- 14 Consider the full scope of impacts from infrastructure projects across the whole project lifecycle, undertaking comprehensive risk analysis (climate, disaster, and other finance related risks) using the widest range of tools and methods (EIA, SEA etc.).
- 15 Develop mechanisms to quantify environmental risks and highlight the full environmental cost of proposed infrastructure projects to help bridge the science and finance worlds, working closely with the insurance sector on risk determination.
- 16 Plan a bankable pipeline of sustainability-certified projects with completed environmental and social de-risking assessments to attract green infrastructure bonds and public-private partnerships (PPP).
- 17 Develop a public-private partnership (PPP) checklist for the sustainable development goals (SDGs).
- 18 Apply best practice principles in design to ensure that that it has (i) avoided important snow leopard and prey habitats or significant natural areas; (ii) where unavoidable, minimised the amount of habitat to be cleared or degraded; (iii) installed sufficient and adequately-sized wildlife crossing structures and fencing; (iv) installed measures to reduce noise and light pollution into adjacent habitats; (v) implemented comprehensive maintenance programs; and (vi) undertaken monitoring and evaluation to test effectiveness.
- 19 Take into account ecosystem services that will enhance the viability of the infrastructure through natural/green infrastructure or bioengineering approaches.
- 20 Draw on local knowledge and conditions for design solutions and use local materials and local labor wherever possible.

21 Integrate infrastructure planning with disaster risk management and environmental planning and include awareness raising on disaster preparedness for communities in the process.

7 Climate Change

- 1 Enhance data collection, monitoring, and scientific research across the range on climate change and its impacts on people and wildlife through new funds for capacity building and training programs, hydro-meteorological data networks, and scientific research, relying on existing regional institutions and platforms where appropriate and creating new ones where necessary.
- 2 Support and promote integrated approaches to landscape management that addresses climate change risks and conserve ecosystem services as part of all sustainable development and conservation planning, policies, and implementation.
- 3 Develop new programs and projects to harness the power of ecosystems to help species and people adapt to climate change, increase resilience to current shocks and stressors and reduce disaster risks, and plan for longer term change through ecosystem-based adaptation (EBA) as well as ecosystem-centered adaptation.
- 4 Develop and enhance mechanisms for formal community consultation to prioritize adaptation actions that are mutually beneficial for local and regional sustainable economic development and snow leopard conservation.
- 5 Incorporate snow leopard protected areas and their management in strategies for meeting country Sustainable Development Goals (SDGs) and adaptation commitments under the 2015 Paris Agreement.
- 6 Develop and promote new financial mechanisms that provide incentives to build climate resilience through ecosystem-based adaptation approaches, e.g. payments for ecosystem services (PES) between hydropower developers to incentivize upstream best management practices, green bonds to incentivize nature-based approaches to infrastructure development, or other examples.

8 Management Planning

1. Support applied research: With barely 3% of the snow leopard range covered by research there are huge gaps in understanding basic ecology and threats, which in turn are serious limitations to effective management. There is thus a strong need to support research, especially related to establishing snow leopard and prey abundance baselines and subsequent monitoring using robust methods, understanding snow leopard and prey ecology, competition with livestock, and understanding other extant and potential threats to conservation, its trends and impacts.

Recommendation: While all countries may allow research, the suggestion here is for governments to engage with academia and NGOs to actively set priorities and to ensure that quality research takes place on these priority areas.

2. Provide appropriate legal status to core landscape units (CLUs): The GSLEP management planning guidelines suggests establishment of a network of core landscape units (or 'quiet zones' or 'core zones' or 'priority areas') that are afforded better protection and that can act as 'source' populations for the landscape. These landscape units needn't always be large areas and can be even as small as a valley of 20 km². These are also areas that need to be established with consent from community and ideally co-managed with them. Without any clear legal protection however, these areas can be vulnerable to damaging large infrastructure projects.

Recommendation: Some existing legal categories (such as national parks or other legal inviolate zones) can be included in this zonation but it will be useful to explore new categories that regulate local use but prohibit larger exploitation including mining and large roads, dams or other infrastructure projects.

3. Integrated management and governance: Management at the scales GSLEP expects (mostly greater than 10,000 km²) essentially goes far beyond managing wildlife on land owned by the forestry department or any other agency responsible for conservation in most countries. With numerous stakeholders apart from local community, implementation works under the plan will need to be multi-dimensional and multi-sectoral. This will require coordination, cooperation, convergence and partnership between stakeholders and the lead implementing agency. It will also need sourcing funds from various, government, non-government sources, national and international donors or other revenue generating mechanisms, while utilising these funds through various departmental works and through approved works by partners.

Recommendation: It will be important to explore setting up new structures under the country's laws to allow for such integrated governance and fund management. This may require some policy interventions, especially in case such provisions are not possible at present. Ideally an intersectoral, participatory, Foundation or Society may need to be created and will need to have the authority to receive and disburse funds from diverse national and international sources. This aspect can be key to the success of any management plan and needs due care and importance in each country.

4. Capacity enhancement: Conservation of species over such large landscapes is mostly unprecedented in the snow leopard range countries. For its effective implementation it will require constant training of numerous staff and partners in aspects such as wildlife monitoring, participatory conservation planning and implementation and cooperative cross-sectoral functioning. These skills are often lacking but there is some expertise and experience available in certain countries.

Recommendation: It may be useful to thus establish a new national institution to impart such training or include such curricula in existing ones. Such institutions may be national or regional, which may require policy approval in the country.

9 Capacity Building

- 1. Need to engage with local universities and provide a framework to be able to systematically estimate and monetize ecosystem services.
- 2. Limited capacity to monitor and understand climate change and it's specific regional and local impacts, including deteriorated or insufficient hydro-meteorological networks and other ageing infrastructure.
- 3. Build capacity to support data collection on climate change by local stakeholders
- 4. Increasing law enforcement capacity against illegal Snow Leopard trade. May include institutionalised system for delivering regular training to frontline enforcement officials in range states on:
 - a. Intelligence gathering by law enforcement agencies
 - b. Intelligence Networking & Forensics
 - c. Wildlife Crime Investigation
 - d. Identification of parts for customs and relevant government agencies
 - e. Knowledge of local and international laws
- 5. Build capacity to conduct field surveys across large landscapes, data preparation and analyses.
- 6. Comprehensive training programs in community-based conservation with broad, interdisciplinary collaborations between conservationists and development practitioners, social scientists, and community partners – to share foundational principles while also providing opportunity to develop locally relevant and viable solutions for conservation.
- 7. Need for multiple agencies to have joint training in adopting participatory approaches for conservation and sustainable development, and for enforcement.
- 8. The private sector, with its research and development facilities and institutions can support, accelerate and improve technical skills of the frontline staff as well as other stakeholders to enable professionalization and imparting multi-dimensional knowledge of management, protection and land use planning for landscape conservation.
- 9. Update, enforce and build capacity for delivering strong, clear and transparent Environmental and Social Impact Assessments.

1. Poaching and Illegal Trade of Snow Leopards

Background

The Snow Leopard (*Panthera uncia*) is a flagship species for the alpine ecosystems of Central and South Asia, found in the following 12 countries: Afghanistan, Bhutan, China, India, Kyrgyzstan, Kazakhstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan. While exact numbers are unknown, there may be as few as 3,920 and probably no more than 6,390 Snow Leopards remaining in the wild (Snow Leopard Network 2014). The Snow Leopard has been listed as endangered by the International Union for Conservation of Nature (IUCN) since 1972 (Goodwin and Holloway, 1972), and included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1975. The population trend is considered 'declining,' although data on population trends are lacking.

Reducing poaching and trade is recognized as a high priority for securing Snow Leopard survival in the Global Snow Leopard and Ecosystem Protection Program (GSLEP), a unified global strategy endorsed by all Snow Leopard range countries.

Under the GSLEP objectives, range countries are determined to combat poaching, illegal trade, and other wildlife crimes, and have identified a portfolio of activities to do so. This includes strengthening national systems of law enforcement, strengthening legislation and collaboration among countries and within international agreements and networks, developing effective mechanisms for eliminating the illicit demand for illegal wildlife products, and education to reduce illicit demand (see www.globalsnowleopard.org). In 2017, Snow Leopard poaching and trafficking - referred to herein as Snow Leopard crime – was assessed comprehensively in the TRAFFIC range-wide synthesis report, An Ounce of Prevention (Nowell et al, 2016). This report addressed a major information gap concerning the linkage between retaliatory killing for livestock depredation and poaching for trade, and the scale at which both are taking place in the 12 Snow Leopard range countries: Afghanistan, Bhutan, China, India, Kazakhstan, the Kyrgyz Republic, Mongolia, Nepal, Pakistan, Russia, Tajikistan and Uzbekistan. There is little information about illegal trade in Snow Leopards outside these countries.

Nowell et al, 2016 analysed records of seizures (legal actions taken by government authorities) and observations (reports of Snow Leopard killing, capture or trade, including market surveys), focused on the period 2003-2015. This data set was augmented by a sample survey of 42 Snow Leopard experts across all 12 range countries (the expert survey).

This thematic document will discuss a) poaching of Snow Leopards; b) illegal trade in Snow Leopard parts and derivatives; c) demand and consumption of Snow Leopard parts and derivatives; d) the gathering and analysis of Snow Leopard crime data; e) international treaties and cooperation; e) national laws on Snow Leopards; and end with recommendations to address the threat of poaching and illegal trade to Snow Leopards.

Poaching of Snow Leopards

Poaching for the exquisite fur and highly valued bones has been a major threat to Snow Leopards rangewide (Snow Leopard Network 2014). In recent assessments, in Pakistan, Kyrgyzstan, Kazakhstan and Tajikistan, poaching for trade emerged as a high intensity threat to Snow Leopards (Snow Leopard Network 2014). The other range countries report it as a medium intensity threat to Snow Leopards (no country considers it a low intensity threat) (Snow Leopard Network 2014).

Based on the average number of cases known to experts over the average of nine years spent working in their geographic areas of knowledge, 221-450 Snow Leopards were estimated to have been poached annually since 2008. With the average rate of poaching detection estimated by experts at less than 38%, these numbers could be substantially higher. Of these, 55% were killed in retaliation for livestock depredation, 21% killed for trade and 18% taken by non-targeted methods such as snares. The number of poached Snow Leopards seized also doubled from 31 to 60 from the period 2003-2009 to 2010-2016 (Nowell et al, 2016).

It is important to note that while retaliatory killings may account for almost half of poaching incidents, on average experts estimate that 60% of retaliatory and non-targeted killings result in an attempt to sell (Nowell et al, 2016). This causes a difficulty in clearly distinguishing motives behind targeted poaching for trade and retaliatory and non-targeted killings. What seems clear though is that in addition to measures to address illicit demand and poaching for trade, measures to reduce retaliatory and non-targeted killings must form an important part of Snow Leopard range state strategy.

Illegal trade in Snow Leopard parts and derivatives

Illegal trade continues to be an important threat to Snow Leopard survival. The expert survey reported incountry illegal trade in Afghanistan, China, India, Nepal, Pakistan, Russia and Uzbekistan. Most experts described trafficking routes which led to other countries, with only experts from China not reporting that destinations for poached Snow Leopards lay outside national borders (Nowell et al, 2016).

Although China recorded the highest seizures and observations (309 Snow Leopards from 2003-2016) and annual poaching estimates (102-236), its share of Snow Leopard crime was not disproportionate to its large Snow Leopard range (at least 60%). Afghanistan and Russia have been flagged as having disproportionate levels of Snow Leopard crime (in the form of seizures and observations) relative to their Snow Leopard range. In Afghanistan the skin trade is relatively open despite being illegal, while Russia has conducted intensive anti-poaching efforts from 2005-2014 (Paltsyn *et al.*, 2016). Since Russia and Afghanistan have relatively low estimated poaching rates (1-4 per year), there is a likelihood that many of the trade observations in these countries involve Snow Leopards poached elsewhere. Nepal and Pakistan have also been flagged for having disproportionate levels of Snow Leopard crime (in the form of annual poaching and trade estimates) relative to their Snow Leopard range (Nowell et al, 2016).

Large seizures (more than three animals), which are indicative of organized trafficking as well as law enforcement effort, have been recorded in equal numbers (5 each) in the periods 2003-2009 and 2010-2016. However, the average number of Snow Leopards in large seizures dropped from 12 in the period 2003-2009 to 4.8 in the period 2010-2016. The majority of large seizures have been recorded in China (Nowell et al, 2016).

There are many gaps in knowledge about the illegal trade of Snow Leopard parts and derivatives which need to be focussed on. For example, the links between herders and illegal traders and smugglers need to be understood better so they can be acted upon. Another aspect that requires better understanding is the links if any between the illegal Snow Leopard trade and the illegal trade in other big cats and wildlife – to what extent is there an overlap and are there common players involved? In terms of illegal markets and trafficking routes, the information from the survey of experts in Nowell et al, 2016, needs to be built upon.

Demand and consumption of Snow Leopard parts and derivatives

Skins are the main Snow Leopard product type in trade. The primary motive for buyers appears to be for display, with some observations of skins hanging on walls in homes and restaurants, as well as stuffed taxidermy specimens. *Bones* are used like those of the Tiger for traditional medicine, although the skull is generally treated as an object for display or ceremony. A recent study has established the presence of Snow Leopard DNA in traditional medicine (Coghlan et al. 2015). Carcasses largely represent animals which had not yet been butchered for their most valuable parts - skin and bones - but use of meat and other fleshy body parts has been reported (Ma, 2012; Nawaz, 2012). *Live animals* (often cubs) were the least common in trade, and known destinations for live wild animals included zoos (Deutsche Presse, 2016), circuses (Theile, 2003), the homes of private citizens (Paltsyn *et al.*, 2012) and, reportedly, illegal trophy hunts (Saidov *et al.*, 2016). *Teeth and claws* were also observed in trade, including online trade. Teeth and claws (as well as the tongue of the Snow Leopard) were reported from one respondent in the expert survey as traded from India through the Shipkila Pass into the Tibet Autonomous Region.

According to the expert survey, China (most frequently) and Russia (from Mongolia, primarily, as well as from the Central Asian republics) were the most commonly identified destinations for Snow Leopards from other countries (Nowell et al, 2016). The demand for rugs, luxury décor, and taxidermy, especially from China and Eastern Europe, is reported to be on the increase (EIA 2012). In China, the most important Snow Leopard range country harbouring about 60% of total Snow Leopard habitat, illicit trade in Snow Leopard parts prior to 2010 was reported only from major cities lying within the country's Snow Leopard range provinces (Li and Lu 2014). More recently, trade has also emerged in wealthy coastal cities (Li and Lu 2014; Li et al. 2016).

Illegal recreational hunting by politically powerful individuals has been described as a growing problem in Russia (Braden, 2015). The potential demand for Snow Leopard trophy hunting is also illustrated by the Mongolian Government's 2011 initiative to make permits for legal Snow Leopard hunting available to foreign citizens, an initiative which was cancelled due to public disapproval (Roddis, 2011).

Gathering and analysis of Snow Leopard crime data

Wildlife crime is difficult to estimate. Existing systems to collate and centralize information are inadequate, making it difficult to understand the quantum and trends in trafficking. Furthermore, a rise in the number of incidences of poaching and trafficking may represent either an increase in occurrence or an indication of better crime detection. With only naïve detection rates, it is difficult to estimate the actual quantum of poaching and the efficiency of enforcement. Typically, the rate of detection of poaching and illegal wildlife trafficking is unknown and usually considered to be the tip of the iceberg. Customs officers generally opine that capabilities for seizing illegal wildlife contraband are about 10%. Large datasets analyzed using probabilistic frameworks can improve our understanding of the quantum and trends in

wildlife tracking (e.g. Sharma et al. 2014). Systems of real time data collation can also facilitate better surveillance systems. Systematic and real time collation and sharing of information on illegal wildlife trade with Governments and enforcement agencies is an important step in strengthening the global battle against wildlife trafficking.

Unfortunately, these types of large, robust datasets are missing for Snow Leopards. Information on trafficking is mostly scattered in media and agency reports, and what data are collected are largely not accessible to enforcement agencies. While it is increasingly possible to filter and condense such scattered data into useful and actionable information (e.g. Li and Lu 2014), few agencies are operating across Snow Leopard range and there's no current mechanism to compile and share pan-national data. The lack of such a mechanism for sharing data with governments and enforcement agencies severely limits the ability to curb national and cross-border wildlife trafficking across the Snow Leopard range.

International Treaties and Cooperation

Snow Leopards are listed on Appendix I of CITES and are also governed by the recommendations in CITES Conference Resolution 12.5 (Rev. CoP17) on Asian big cats, as well as other decisions of the Parties. CITES Res. Conf. 12.5 (Rev. CoP17) contains a number of recommendations which are of relevance to addressing the poaching and trade of Snow Leopards including:

- that range and consumer states of Snow Leopards adopt comprehensive legislation and enforcement controls which clearly define the administrative responsibilities of the various government agencies responsible for regulating trade within and outside of protected areas and in outlets for parts and derivatives such as wildlife markets and shops;
- ii) that parties adopt legislation with adequate penalties to deter illegal international trade in Snow Leopards;
- iii) that range and consumer states of Snow Leopards strengthen enforcement efforts in key border regions, develop and improve implementation of regional enforcement networks, and implement systems for recording of information relating to illegal trade and share this information as appropriate to ensure coordinated investigations and enforcement;
- that enforcement units receive relevant and effective support for anti-poaching operations, the gathering and use of intelligence, targeting offenders, wildlife crime investigative techniques, collecting evidence, inter-agency liaison and cooperation, and preparing cases for prosecution;
- v) that adequate management measures and practices are in place to ensure that Snow Leopard parts and derivatives do not enter illegal trade from captive breeding facilities, and that stockpiles of parts and derivatives are consolidated, controlled, and where possible destroyed; and
- vi) that consumer states of Snow Leopards work with traditional medicine communities and industries to develop and implement strategies for gradually reducing and eventually eliminating the use of Snow Leopard parts and derivatives, and carry out appropriate education and awareness campaigns to eliminate illegal trade in and use of Snow Leopard skins as trophies, ornaments and items of clothing or for the production of other materials.

The implementation of Res. Conf. 12.5 has been under a process of review since 2013, and this process is set to continue over the coming years. One of the problems that this review has faced is a lack of responses from range states to the information sought by the CITES Secretariat. The GSLEP could promote awareness

of this process amongst the Snow Leopard range states and encourage them to participate and respond to the notifications of the CITES Secretariat.

In addition to CITES, the UN Convention against Transnational Organized Crime (UNTOC) may be utilized by Snow Leopard range states to act against transnational Snow Leopard crime. In order for UNTOC to be applicable to Snow Leopard crime: i) the states in which it occurs would have to be signatories to UNTOC; ii) the national laws of the respective range states would have to set a maximum penalty of 4 years imprisonment or more for the crime; iii) the crime would have to be transnational in nature according to the definition set out in paragraph 2 of Article 3 of UNTOC. Domestic law may also require an organized criminal group, i.e., a structured group of 3 or more persons acting in concert to be involved. Where Snow Leopard crime meets with the requirements of UNTOC to become applicable, there is a mechanism for mutual legal assistance between states, particularly in the investigation, prosecution, and seizure of assets.

National Laws on Snow Leopards

All Snow Leopard range states are Party to CITES and hunting and trade has been prohibited domestically in all Asian range states for decades (chapters in McCarthy and Mallon 2016). However, national laws differ from range state to range state. Some of the National Snow Leopard Ecosystem Programmes such as that of Mongolia identify the existence of loopholes in national legislation. The expert survey indicated that an average of 23% of known cases were investigated by authorities, and only 14% prosecuted (Nowell et al, 2016). Conviction rates are also thought to be relatively low.

Ideally, there needs to be a degree of uniformity in range state legislations such that they at least fulfill the requirements of deterring Snow Leopard crime, give enforcement authorities the requisite powers to detect, investigate and prosecute crimes, and that they do not have significant loopholes that allow perpetrators to escape punishment. A full analysis of range state legislations has not yet been undertaken, and this is a project that the GSLEP Secretariat with the consent of, and in consultation with the range states, may want to commission.

Recommendations

The following recommendations for action are aligned with existing recommendations and planned actions, including CITES recommendations, Decisions and consultant's reports around implementation of Resolution Conf. 12.5 (Rev. CoP17) (CITES 2015, 2016, 2017; Nowell and Pervushina, 2014); the Global Snow Leopard and Ecosystem Protection Program (GSLEP, 2013, 2015, n.d.); the SLN's Snow Leopard Survival Strategy (SLN, 2014); and WWF's Snow Leopard Species Action Plan (WWF, 2015 and Sharma, 2016).

1. Recommendations to governments of Snow Leopard range countries

1.1 Recommendations on poaching of Snow Leopards

1.1.1 Support efforts to mitigate retaliatory killing of Snow Leopards

Killing/Human-wildlife conflict is the leading cause of Snow Leopard poaching, which feeds into illegal trade. It is important for governments to support and expand the approaches developed by the Snow Leopard conservation community to address this issue. Mishra *et al.* (2016) propose a three-pronged

strategy: 1) reduce livestock losses (e.g., through the construction of predator-proof corrals [Mohammad *et al.*, 2016; Paltsyn *et al.*, 2016] and promotion of improved herding practices [Nawaz *et al.*, 2016a]); 2) offset livestock losses (e.g., through community livestock insurance [Kunkel *et al.*, 2016] and government compensation programs [e.g., Chen *et al.*, 2016], and 3) improve the social carrying capacity for Snow Leopards (e.g., through education [Hillard *et al.*, 2016] as well supporting conservation-linked initiatives to strengthen local livelihoods [Agvaantseren *et al.*, 2016; Namgail *et al.*, 2016]). Governments may also create trained Human Wildlife Conflict (HWC) rapid response teams, and protect the Snow Leopard's wild ungulate prey base (Lovari and Mishra, 2016), through conventional and innovative approaches (Nawaz *et al.*, 2016; Reading and Amgalanbaatar, 2016; Michel and Rosen, 2016).

1.1.2 Deterrence from poaching

While working with local communities to reduce retaliatory killings is essential, according to the expert survey retaliatory and non-targeted killings may account for up to 73% of Snow Leopard's poached. It is therefore important that deterrence also plays a part in the strategy used to address Snow Leopard poaching. There are few effective deterrents to poaching through snares and traps. National laws must ideally cover the use of traps and snares and allow for effective enforcement action against poaching through snares and traps.

1.2 Recommendations on illegal trade in Snow Leopard parts and derivatives

1.2.1 Closure of open markets

There are a few markets where parts and derivatives of endangered species are openly sold in some Snow Leopard range states. Skins have been reported to be seen openly for sale as recently as 2014 in Kabul's Chicken Street fur markets (Moheb and Paley, 2016), while there have been no known trade seizures in Afghanistan. While there have been less Snow Leopard skins seen openly for sale in China, seizures indicate that illegal trade continues in a less public fashion (Nowell et al, 2016). Ideally, the Snow Leopard range states can commit to the closure of shops and enforcement action against traders in markets where Snow Leopard parts and derivatives (and those of other protected species) have been seen openly for sale.

1.2.2 Capacity building for law enforcement agencies

- Increasing law enforcement capacity against illegal Snow Leopard trade needs to be prioritized. Enhanced capacity can be addressed across multiple agencies, through implementation of training modules to improve prevention of poaching and trafficking through efficient patrolling and intelligence gathering, effective wildlife crime investigation, and identification of parts for Customs and relevant government agencies.
- 2. Initiate an institutionalised system for delivering regular training to frontline enforcement officials in range states.
- 3. Intelligence gathering by law enforcement agencies may include collation of nominal information on known and suspected traders, with profiles of how these individuals operate and connect to herders as well as their international counterparts.
- 4. In all range countries, there is the need for greater information sharing between provincial and national agencies responsible for enforcing wildlife laws and other branches of government, including protected areas, wildlife divisions, Customs, Border, Police, and the Judiciary. Multi-agency teams can

be incentivized for performance and anti-corruption, and be provided with the latest technical tools (SMART, Zero Poaching). Mobile response teams can respond quickly to remote enforcement needs identified by informants.

5. Consider creating national databases of spot-pattern profiles based on camera trapped images which can be cross-referenced against seized skins, and DNA profiles which can help in forensic identification of Snow Leopard parts and derivatives.

1.3 Recommendations on demand and consumption of Snow Leopard parts and derivatives

1.3.1 Study Reasons for demand and factors stimulating it

More information is needed to better understand why consumers are motivated to illegally purchase Snow Leopard products, and how they find them. Consumer states of Snow Leopards can conduct studies themselves, or allow the conduct of studies by experts on the drivers of demand for Snow Leopard parts and derivatives, and the various factors including any legal trade in snow leopards, that may affect demand for such parts and derivatives.

1.3.2 Fulfill CITES recommendations on demand reduction

In accordance with CITES Res. Conf. 12.5 (Rev. CoP17), consumer states of Snow Leopards need to work with traditional medicine communities and industries to develop and implement strategies for gradually reducing and eventually eliminating the use of Snow Leopard parts and derivatives, and carry out appropriate education and awareness campaigns to eliminate illegal trade in and use of Snow Leopard skins as trophies, ornaments and items of clothing or for the production of other materials.

1.4 Recommendations on Snow Leopard crime data

1.4.1 Creation of national crime databases and sharing of information

Snow Leopard range states to create databases on poaching and illegal wildlife trade involving Snow Leopards and related species. Additional databases can include nominal information on known and suspected traders, with profiles of how these individuals operate and connect to herders as well as their international counterparts. Range states can facilitate mutual sharing of this data, including through international law enforcement networks, to enhance and enable cross-border enforcement action.

1.5 Recommendations on International Treaties and Co-operation

1.5.1 Increase trans-boundary law enforcement cooperation

- a) Bilateral and multi-lateral cooperation (through bilateral and multi-lateral agreements) and effective use of existing networks to improve sharing of intelligence and coordination of law-enforcement efforts is suggested to implement greater control over illegal wildlife trade between Snow Leopard range countries.
- b) Illegal trade in Snow Leopards is largely international, with poached Snow Leopards being moved across borders. More support should be given to the newly created Central Asian Snow Leopard and Wildlife Enforcement Network (SLAWEN) (GSLEP, 2015), as well as the operationalization of the South Asia Wildlife Enforcement Network (SAWEN), to focus the attention of all range countries on illegal Snow Leopard trade, and increase the professional capacity of participating governments to conduct

intelligence-led anti-poaching and trade seizures (Beale and Botezatu, 2016). Regular trans-boundary meetings between environment enforcement, Customs and border officials are essential.

- c) International law enforcement networks such as INTERPOL and the World Customs Organizations may be used to enhance transnational collaboration and cooperation on investigations, particularly with countries outside the range states.
- d) Encourage the training and use of wildlife detection dogs for Customs and Border control to facilitate detection of illegally traded Snow Leopards and their parts.

1.5.2 Reporting to CITES

Range states can be encouraged to participate in the ongoing review of the implementation of CITES Res. Conf. 12.5 (Rev. CoP17) (on Asian big cats) and provide the information which is requested by the CITES Secretariat in relation to the review.

1.5.3 Periodic reporting on illegal trade

Range states may consider publishing periodic reports on the status of illegal wildlife trade and actions taken in terms of confiscations, convictions and instances of illegal poaching and wildlife trade.

1.6 Recommendations on National Laws

1.6.1 Prioritise legislative shortcomings and recommendations

- a) Countries may need to amend legislation as envisioned in National Snow Leopard and Ecosystem Program (NSLEP) elements of the GSLEP.
- b) National and provincial laws, as the basis for enforcement, should clearly assign administrative responsibility for illegal taking, storage, transportation, collection, ownership, acquisition, and the sale or consignment of Snow Leopards and their products, parts, or derivatives (as has recently been accomplished in Russia).
- c) Legislation needs to be amended to remove the exemption allowing the killing or capture of snow leopards in defence of human life and property.
- d) Other range country governments are encouraged to adopt China's "Zero Tolerance" approach to online advertising for protected species products, working closely with major e-commerce trading site companies and nongovernmental organizations. China's ban on auctions (without permission) of pre-Convention/pre-national trade ban items derived from protected species (SFA, 2012) and India's practice of absolutely no sale and no acquisition of any snow leopard parts and derivatives except through inheritance are also recommended as best practice law enforcement.
- e) Kazakhstan, Kyrgyzstan and Russia, as members of the Eurasian Customs Union (ECU), need to ensure that their legal protections for Snow Leopards are harmonized under the (ECU) to ensure that illegal trade cannot be facilitated by open borders.

1.6.2 Harmonize legislation amongst range states

Harmonization of laws across regions and countries is important to ensure similar stringency in laws for effective trans-national impact. Ideally, there needs to be a degree of uniformity in range state legislations such that they at least fulfill the requirements of deterring snow leopard crime, give enforcement authorities the requisite powers to detect, investigate and prosecute crimes, and that they do not have significant loopholes that allow perpetrators to escape punishment. A full analysis of range state

legislations has not yet been undertaken, and this is a project that the GSLEP Secretariat with the consent of, and in consultation with the range states, may want to commission.

1.6.3 Improving detection and conviction rates

Each range state may, taking into account its own spatial, administrative, and legal requirements consider measures such as: a) creating specialized enforcement units for wildlife crime; b) appointing dedicated prosecutors for wildlife crime; and c) designating special courts for wildlife crime at local and national levels; and other appropriate measures with a view to improving detection and conviction rates for snow leopard crime.

3. Recommendations to conservation organizations and Snow Leopard experts

3.1. Snow Leopard crime database

To facilitate inputs from expert observations and reports on the poaching and trade of Snow Leopards followed by appropriate analysis and vetting, a suitable platform can be created to easily input observations from the field into a cumulative database. This could be designed in the form of a simple mobile app (e.g. Viber, WeChat) which would allow rapid uploading of Snow Leopard poaching reports and spatial information. This would aid both monitoring and analysis, as well as serve as an important means of rapid communication with law enforcement authorities, preferably through a trained database focal point to liaise through the GSLEP Secretariat.

3.2. DNA and photographic databases

Snow Leopard experts and their community and government partners frequently collect Snow Leopard scat for DNA analysis and camera trap photos. This information is usually kept in separate research groups for publication in the academic and conservation literature. The Snow Leopard Network could explore creation of a centralized digital database repository for genetic and photographic information as an aid to law enforcement in seizure cases.

3.3. Market monitoring

Observation of trends and patterns of seizures indicate that Snow Leopards are sometimes trafficked or sold with other high mountain wildlife products in medicinal and fur markets. Markets dealing in such products can be monitored regularly for potential illegal trade in Snow Leopards. Priorities are markets in cities and large towns in all Snow Leopard range countries. In addition, systematic online surveys can be linked with Snow Leopard trade databases and undertaken in all range countries, especially since social media and web advertisements are increasingly being used in the illegal wildlife trade. Documentation of illegal trade should be provided to relevant government authorities as soon as practicable.

3.4. Expert study of demand for Snow Leopards

More information is needed to better understand why consumers are motivated to illegally purchase Snow Leopard products, and how they find them. This may be most effectively approached through interand intra-government cooperation, allowing interviews of people who have been arrested buying or selling Snow Leopard products.

4. Recommendation to International donors

International donors can be encouraged to prioritize funding for Snow Leopard conservation in range countries, and in particular to assist in implementation of the GSLEP. As noted by the CITES Standing Committee, range country governments require financial and technical assistance to build additional capacity and resources to effectively implement CITES Resolution Conf. 12.5 (Rev. CoP17).

2. Research and Monitoring

Background

A good understanding of biology, behavior and ecology of the snow leopard and its prey is crucial for effective conservation measures. The field of population ecology has undergone tremendous development in the past decade, with sophisticated tools becoming available to estimate populations of rare and elusive species, such as the snow leopard that live in difficult-to-access habitats. It is noteworthy here that despite much attention, less than 2% of the global snow leopard range has ever been sampled using scientifically robust and acceptable methods such as camera trapping and/or genetics¹. Recognizing this, the Kathmandu Resolution 2017, endorsed by the high-level Steering Committee of the Global Snow Leopard and Ecosystem Protection Program (GSLEP) comprised of Environment Ministers of 12 snow leopard range countries emphasized the need for better and more expansive scientific monitoring of snow leopard populations. Moreover, given that the primary premise of the GSLEP program is to secure 20 landscapes by 2020, where each landscape is defined by the **presence of 100 or more breeding snow leopards**, it is essential that snow leopard population be monitored using reliable and replicable methods. Monitoring the performance of GSLEP, *inter alia*, must be evaluated in terms of the snow leopard population and its trends, i.e., whether the populations are stable, increasing, or in decline.

Developing and implementing a robust monitoring approach for snow leopard population across large landscapes is a major undertaking that would include rigorous sampling across a representative gradient of the snow leopard habitat, and a significant mobilization of financial resources, equipment, and human resources. Additionally, it will require collaborations at multiple levels to help design robust surveys, collect reliable data from the field, and estimate and report populations using robust analytical tools.

With the growing threats to snow leopards, including substantial changes already underway due to climate change, the need for information about snow leopard populations is now becoming a necessity. This data will provide a population baseline, which can be referenced for the years to come. This baseline will allow scientists to track snow leopard population trends that are essential in assessing its conservation status. The ability to monitor population trends is even more important than knowing the absolute population figure to evaluate the impact of conservation actions in the context of growing threats like poaching, poorly planned infrastructure, mining and climate change.

Bottlenecks

- 1 Lack of sufficient financial resources and equipment to conduct and analyze large scale surveys, including camera trapping data collection and management, analysis of genetic data (network of DNA labs and lab technicians), and supporting field work and time of biostatisticians and population experts.
- 2 Inadequate capacity to conduct field surveys across large landscapes, data preparation and analyses.
- 3 Lack of capacity to evaluate population trends in relation to large scale changes across the range driven by warming temperatures and changing precipitation patterns.

¹ Snow Leopard Survival Strategy (2014)

- 4 Lack of weather station data to understand links between weather changes and population dynamics.
- 5 Remoteness and security issues across parts of the distribution range.
- 6 Complicated procedures involved in receiving permits to use innovative research techniques (e.g. telemetry) that can improve the parameterization of sophisticated population estimation models.

Recommendations

- 1 Resources (\$10 million) raised to support snow leopard surveys, equipment, data managers, lab technicians and research associates to manage and implement the surveys in the next 5 years.
- 2 Government support for capacity building, coordination and field data collection, including understanding and monitoring trends driven by climate change.
- 3 A general advice document on snow leopard monitoring is prepared.
- 4 Detailed technical manual based on latest scientific advancements in population ecology and identifying future climate refugia, including Spatial Capture Recapture modeling, Site Occupancy analysis, Bayesian methods for estimating populations, and habitat suitability analyses, from multiple sources.
- 5 A multilingual field-training training module is developed and adopted across range countries to conduct snow leopard surveys.
- 6 A dynamic panel with international snow leopard experts, climate change and biodiversity experts, and population ecologists is formed to provide technical support to global snow leopard population assessments, and update the guidelines and training module every 5 years.

3. Community-based conservation

Background

Snow leopards live in high mountain ecosystems across Asia. Snow leopards share their habitat with local people and communities who use the multiple-use landscape for habitation, agriculture, and, importantly, livestock grazing. People and wildlife have co-existed for centuries, yet there are also hardships incurred—and resultant conservation conflicts for people—as snow leopards occasionally prey on livestock.

Long-term solutions for snow leopard conservation lie in strengthening peaceful coexistence between people and wildlife, rather than promoting their separation through strict protectionism. This is essential, as a majority of the existing protected areas are too small to effectively conserve viable populations of wide-ranging species such as the snow leopard. In fact, 40% of all protected areas in the snow leopard's range cannot support even a single adult male. Moreover, mountain communities with limited cultivable land are highly dependent on livestock herding for their livelihoods, where climate change has further complicated the spatial and socio-ecological interactions of the species with its dependant human communities. Therefore, for the snow leopard to survive, it must peacefully co-exist with the human populations.

To strengthen the coexistence of people and snow leopard in Asia's high mountains and ensure its conservation, local communities need to be fully aware and informed (of its socio-ecological worth) and empowered. Engagement of local communities in snow leopard conservation activities are prerequisites to reduce human-snow leopard conflicts in particular and human-wildlife conflict in general. Interventions need to be adapted to local conditions and situation analysis from each landscape. This can be achieved by improving local people's livelihood options (possibly through development and diversification of non-consumptive practices), assisting in conflict management (livestock insurance, ecotourism, crop depredation relief fund, additional livelihood options, corral improvement, livestock vaccination and breed improvement etc.), and providing them opportunities to play a lead role in conservation. Simply imposing policies and legislation on local communities without due consideration of their well-being or their involvement in governance processes will not be effective.

Bottlenecks

- Historically, most approaches to conservation have been top-down, providing inadequate opportunity and space for communities to become integrally involved in decision making.
- Even today, many formal protection staff and conservationists remain inadequately trained to engage effectively with communities and their concerns and inexperienced in community mobilization skills.
- Due to insufficient collaboration among natural and social scientists, conservationists, development practitioners, and members of local and indigenous communities, in many situations comprehensive training programs in community-based conservation have been limited or even absent in most parts of the snow leopard range.
- There is a lack of adequate benefit sharing mechanism for local communities, especially for livestock herders who often bear the brunt of livestock depredation by wildlife.

• Lack/weak understanding of the social aspects of conservation among relevant stakeholders, from conservationists to managers, herders and local communities.



Recommendations

- Develop and institutionalize an applied training program in community-based conservation with broad, inter-disciplinary collaborations between conservationists and development practitioners, social scientists, and community partners – to share foundational principles while also providing opportunity to develop locally relevant and viable solutions for conservation.
- Develop local institutions within and around snow leopard habitats (e.g. formation of user committee and user groups in Nepal that receive 50% of the protected area revenue)
- Insurance of livestock, relief fund for crops depredation by wildlife, and promotion of ecotourism activities could be the alternative options to attract the local communities to snow leopard conservation
- Develop new avenues to enhance engagement and interaction between selected industries, business sectors, government and local communities to provide new opportunities for alternate livelihoods.
- Enable cross-sectoral communication and engagement for operationalizing the conservation strategies developed as part of the management plans of the 23 snow leopard landscapes.
- Train at least 500 leaders and field staff from protected areas and NGOs, and community champions in conservation practices such as the PARTNERS Principles² for community-based conservation (Figure 1, above).
- Initiate comprehensive education and awareness programs to foster awareness about key conservation issues, socio-ecological interactions, conservation values and benefits among mountain communities.
- Raise resources to support travel and training for protection of staff and local communities, including exposure and learning trips to successful initiatives within and between range countries.

² https://www.snowleopard.org/our-work/conservation-programs/partners-principles/

4. Business and Industry

Introduction

As the Asian economy grows, its infrastructure will expand manifold. This expansion will put severe pressure on habitats and wildlife. Such pressures are endangering several species, many of which are being pushed towards extinction.

There is recognition within industry circles that industrial growth and expansion will continue to require natural resources (water, fuel, food, fiber and other raw materials). Often this requirement is met in unsustainable ways which is subjecting natural capital and biodiversity to stress, as evidenced by reducing natural habitats, loss of species, pollution of rivers etc. Inadequate natural resources and limited access to these is counterproductive to industrialization.

Industry's footprint on natural assets and biodiversity makes it an important stakeholder and there is a need to internally recognize this fact. There is an urgency and a need for industry to enter this space through a formal and structured engagement in the form of partnerships or coalitions that can bring mutual win-wins for all. This coalition or partnerships will pave the way for a new beginning in which conservation does not oppose development and that development can happen without impairing conservation.

Trends	Risks	Opportunities	Implication
Natural resource depletion – Supply of raw material	Reduced and more costly access	Early adapters may gain competitive advantage	Accounting for potential resource scarcity
Improved scientific understanding of ecological data	Increased scrutiny by external stakeholders	Improved ecological information to set up projects	Robust evidence of how companies are dependent on BES, prioritise BES
Increasingly stringent environmental regulations	Unforeseen regulatory change, compliance costs and taxes	Mitigation of BES impacts may make mitigation of impacts more flexible and costly.	Businesses aiming to identify, control, monitor and report their environmental performance

The Economics of Ecosystems and Biodiversity (TEEB) for business identified risks of current unsustainable trends and opportunities in conservation for business groups:

Spread of disease and	Health of consumer	Participation in	Businesses can
climate change	and employees, loss of	emerging	integrate climate
	natural assets –	markets for bio-carbon	change impacts
	agricultural yields	offsets (including	into long-term
		Reducing Emissions	planning
		from Deforestations	
		and Forest	
		Degradation-REDD+).	

With this as the context, business and industry across the snow leopard range countries, should strive to build partnership models, such as country level Wildlife Business Councils (WBCs).

Role of Country level Wildlife Business Councils

WBCs should be tasked to strategize, recognize and catalyze implementation of a series of deliverables with "Wildlife in general and Snow Leopard in particular" as the focus.

The following guides the WBC approach:

- To raise awareness of corporate leaders of the importance of biodiversity conservation for the long-term survival of businesses;
- To champion with national and global policy-makers, biodiversity inclusive and friendly business policies.
- Enhance conservation financing through contemporary methods, such as CSRs and trust funds, as well as develop market-oriented models, such as green/climate bonds.
- Identify mechanisms for collaboration between the industry and conservationists resulting in the launch of an organized and more structured partnership with them. This could include creating working groups to define and scope the win-win potential of this partnership.
- For the conservationists, facilitate access to technical, managerial and planning skills available within the industrial sector. For the industry, create sustainable business practices and approaches (e.g. greening the supply chain), improved coordination for locating industries (zoning issues), defining the nature and scope of industrial support for conservation including livelihood/job opportunities and improving the corporate image.

Within each country, the WBC can be institutionalized within or as a consortium, consisting of industry heads, conservation agencies, and international financial institutions (IFIs). The WBCs can lead and support actions across several themes, including:

Conservation leadership and Advocacy

Business and industry, having a significant stake in economy, can undertake both internal and external advocacy. Internally, it can evolve standards on the lines on reducing ecological footprints, such as infrastructure companies aligning their practices towards smart green infrastructure and minimizing impacts on eco-sensitive habitats. Extractive industries can come together, and implement green operating standards. Several corporates across the globe have assessed their Environmental Profit & Loss

account (EP&L), which allows a business to measure its true environmental footprint, and understand environmental impact throughout its value chain. It gives a clear idea on where to take actions to decrease the footprint.

Externally, industry champions can initiate a dialogue with government for adopting principles of smart green infrastructure, in state and country level public policies. A similar dialogue needs to be conducted with IFIs to prioritize SGI in their lending programmes. Some suggested wildlife friendly infrastructure options, under SGI include:

- Avoidance Completely avoid impacts on biodiversity, careful temporal and spatial placement for infrastructure, i.e. critical wildlife corridors, endemic hotspots.
- Minimization Reduce the duration, intensity or extent of impacts.
- Rehabilitation/Restoration Rehabilitate degraded landscapes or restoration of cleared ecosystems following unavoidable impacts.
- Offsets compensate for residual significant impacts that cannot be avoided, can take place as positive management interventions such as restoration of degraded habitat, protecting sensitive ecological zones.

The Government on the other hand, should provide financial and tax incentives for private sector investment in green growth, climate adaptation and biodiversity conservation.

Conservation Finance

A report published in 2014 by Lincoln Institute of Land Policy, in collaboration with the GroundTruth Project, estimated that around US\$50 billion was spent on habitat and nature conservation, around the globe, with about 80% resources coming from government budgets and philanthropy. "Even if public and philanthropic investment levels were to more than double to \$100 million per year, the level of investment by the private sector would still have to increase by a factor of 20-30 in order to meet the estimated total annual need of \$300 billion to \$400 billion"

The private sector will have a major role to play in order to achieve holistic conservation goals. There is an urgent need to develop an innovative financial architecture, on the lines of existing market models. The investments for wildlife conservation under CSR need to be enhanced, and this can be achieved by targeting landscapes, instead of specific habitats, in order to address varying land use dynamics, societal development and conservation of natural resources.

A private sector trust fund for conservation of snow leopard and its habitat, can provide sustenance to national, regional and global conservation efforts. The Conservation Finance Alliance in 2008 defined conservation trust funds as *"private, legally independent grant-making institutions that provide sustainable financing for biodiversity conservation and often finance part of the long-term management costs of a country's protected area (PA) system. They can serve as an effective means for mobilizing large amounts of additional funding for biodiversity conservation from international donors, national governments and the private sector." The formation of WBCs, consisting of like-minded business groups, should establish conservation trust funds, that support conservation in fragile ecosystems, as instruments for strengthening civil society and for improving transparency, accountability and effectiveness of national level conservation efforts.*

Apart from trust funds and CSR, there is a need to align conservation financing to market based instruments, such as green equity and green/climate bonds. Green bonds, as described by the World Bank, *"are fixed income, liquid financial instruments that are used to raise funds dedicated to climate-mitigation, adaptation, and other environment-friendly projects."* The Climate Bonds initiative in 2016 estimated an investment of \$694 billion in climate aligned bonds globally. Although a majority of the bonds are invested in energy, sustainable transport and infrastructure, there is ample scope for diversifying the market to involve biodiversity conservation, habitat protection and carbon sequestration. Revenue flow from snow leopard landscapes, as in the case of tourism can create a public private sector model to float green bonds. This may involve state/provincial government guarantee, as well as tax exemption for investments in these bonds.

Certain conservation projects suit well to bond funding. If implemented with a marketable vision, green bonds can produce steady cash flows. This can be readily achieved by income contracts for the sale of sustainably harvested forest produce, and payments for ecosystem services through economic valuation and monetization of resources.

Capacity Enhancement

Landscape conservation needs professionalization and multi-dimensional knowledge to address various challenges, in terms of management, protection and land use planning. The private sector, with its state of the art research and development facilities can support technical enhancement of the frontline staff as well as other stakeholders.

Business groups can improve and accelerate training programmes through their specialized country level and global institutions. Technology, although being used by the forest officials and conservationists, is still not been adequately integrated. Research and Development (R&D) in technological solutions for various management objectives are increasingly in place, but it is not optimally utilized. There are many advantages of integrating advanced technologies in wildlife management. Of the many, (1) it significantly enhances the quality of management by bringing in professionals who are techno-savvy, (2) it off-sets the lack of manpower in many countries equipping the small pool of officials, (3) it enables detection and early warning of crime occurrence, (4) it helps in preventive strategies and help early response actions, (5) it presents options for human-wildlife conflict resolution strategies, (6) it can improve the intelligence network and communication strategy both within and outside the protected area systems and also transboundaries, and (7) it can overhaul the current strategy with modernization in the decision-making process and field functions. The knowledge sharing and exchange between conservation and development sectors can lead to evolution of cost effective technology to support various facets of ecological conservation and habitat/wildlife protection.



Connecting corporate and communities

It is well known, that long term conservation of species, including snow leopard and its habitat, is only possible through participatory and sustainable economic models for primary human stakeholders, i.e. local communities. Through the platform of the WBCs, industries can prioritize their investments to support inclusive livelihood programmes. Snow Leopard/Wildlife habitats are also a repository of non-timber forest produce (NTFP), that have been utilized since time immemorial.

Corporate houses can accentuate business models, that increase profitability, provide quality assurance and create an effective marketing mechanism for products derived from sustainable forestry practices.

There are many advantages of a corporate-community model:

- Provides access to jobs and livelihood Promoting self-reliance and alternative sources of income
- Enhances community living and environment quality clean and sustainable tourism practices, increasing energy efficiency, and improving quality of life, in terms of health and education
- Increased focus and investments on infrastructure and facilities to fulfil local needs

5. Resources

Background

The funding needed to support the conservation of snow leopards and their habitat across their range over the seven-year GSLEP program was estimated by the 12 snow leopard range countries to total about US\$190 million for the period of 2014 to 2020. However, this estimate still needs to be fine-tuned as the program evolves and as further inputs are received from agencies and sectors, such as customs, education, and infrastructure, whose costs may not yet be reflected originally. Estimates may also have to be normalized among countries to ensure that each is counting the same factors; direct versus indirect costs, for example, may be included in some countries' estimates but not others. The largest share of the total estimate is for managing habitat and prey, controlling poaching of snow leopards and their prey, and addressing knowledge gaps through research and monitoring.

Work done so far

- Resources raised through GEF for National and Regional goals
 - o Afghanistan: \$2,692,370
 - o China: \$5,354,545
 - o India: \$11,544,192
 - o Kazakhstan: \$8,069,178
 - Kyrgyzstan: \$3,988,575
 - o Pakistan: \$4,644,521
 - o Tajikistan: \$4,181,370
 - o Uzbekistan: \$6,209,863
 - Regional (Central Asia): \$1,400,000
- Resources from USAID via Asia High Mountains project are being used to assist with GSLEP operations, climate smart management planning in up to 6 countries, and organization of meetings and workshops.
- Resources earmarked by range countries from National budgets.
 - \$3.15 million earmarked by Government of Nepal to implement climate smart management plans for up to 300 snow leopards in Nepal
 - Government of India earmarked 3% of the National budget of the Wildlife Department for Project Snow Leopard that aligns with the GSLEP Program.

Priority Resource needs

- **National**: Out of the total projected budget of US\$190 million to implement the NSLEPs, approximately US\$40 million has been raised by 7 of the 12 countries through GEF.
- **Global**: Out of the total projected budget of US\$17.2 million for GSLEP program coordination and implementation of the Global Support Components, US\$1 million has been allocated by GEF via a Medium Sized Grant. Smaller in-kind support has been provided by partner organizations,

USAID and GEF small Grant Programs totaling to nearly US\$500,000. Approximately US\$16 million needs to be raised for implementation of the Global Support Components.

- Capacity needs and Institutional Development have been identified by most range countries. The themes for capacity building requirements include community-based conservation, law-enforcement support (patrolling, wildlife crime databases, intelligence networks and forensics), landscape level wildlife and ecosystem management (land-use planning, wildlife management, and coordination and communication), research and wildlife population monitoring (ecological research, population monitoring, economics of ecosystems, and rangeland research) and climate change adaptation.
- Knowledge gaps need to be addressed about the snow leopard ecology. With only 1.5% of the snow leopard range sampled for snow leopard abundance using scientifically robust methods, estimating and monitoring the global population of snow leopards in the wild is fraught with uncertainty. To develop a robust estimate of the snow leopard population rigorous sampling of approximately 20% of the snow leopard range is needed, along with significant mobilization of financial resources, equipment, and human resources to conduct surveys in multiple countries.
- Green Growth models need to be promoted for GSLEP landscapes including infrastructure projects that are planned in an environmentally sensitive manner. Such green growth is needed to eradicate poverty while combating climate change and avoiding irreversible damage to regional and global environment and biodiversity. This requires investments to build environmentally responsible infrastructure, industry and livelihood opportunities. Range countries are willing to develop green growth models for communities residing in GSLEP landscapes, but are short of capacity and finances to implement these.
- Need to curb Illegal Wildlife Trade in snow leopards and other mountain biodiversity. This remains an important threat to snow leopards. There is lack of adequate documentation, coordination, capacity and knowledge about status and extent of illegal wildlife trade in snow leopards and other mountain biodiversity. A system for information collation, management and sharing is much needed, which in turn requires resources and national/regional data coordinators.
- Addressing Climate Change, which has emerged as a key threat to humans and biodiversity. Climate models project the snow leopard habitat among the most vulnerable from climate change where human response to climate change is anticipated to be the most destructive element. Building climate resilience and climate adaptation strategies for local communities and wildlife can help reduce the damage to the ecosystem that supplies fresh water to a large proportion of humanity. This, however, needs concerted effort and resources.

Action items

- Commitments by countries to allocate National resources to snow leopard conservation to be doubled (e.g. Nepal allocated US\$3.15 million to implement climate smart management plans for up to 300 snow leopards in Nepal)
- 2. Series of Projects based on the needs identified for snow leopard and ecosystem conservation across range countries

- To commit resources under GEF 7 national allocations for snow leopard and ecosystem conservation (e.g. Afghanistan, China, India, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan and Uzbekistan have raised c. US\$40 million via GEF 6 STAR allocations).
- Write project proposals to seek GCF funding for climate adaptation based on landscape management plans
- Write projects under other bilateral agreements
- 3. The idea of a Regional Snow Leopard Ecosystem Trust Fund will be explored and developed during the Forum. Such multi-country Conservation Trust Funds (CTF) have been implemented previously in the Caribbean, Central Africa, and the Pacific and can bring together shared interests to create the scale and experience needed to create significant interest and impact. The Trust Fund can be created as a charity to assure the capacity for tax benefits for private or corporate donors and managed through a Board of Trustees with representatives from the partner SL countries including a mix of private sector, civil society, local communities and governments. Country based or regional advisory groups can be used to assure input and responsiveness to local issues and needs.
- 4. Some regional CTF work through national CTFs to disburse financing for targeted conservation and sustainable development projects and others provide financing directly. The CTF could be established to receive funds from a variety of sources including bilateral and multilateral donors, private companies, national governments, revolving sources of funding such as mining or water revenues, other payments for ecosystem services, and more. Projects targeted for funding would be those identified and prioritized in the landscape management plans for the 20 SL ecosystems. Beneficiaries could include local community groups, local and international NGOs, social businesses, and others. The design and development of such a Regional Snow Leopard Ecosystem Trust Fund and related National Funds will require engagement and interest from potential donors and partners to launch the multi-year effort.
- 5. The establishment of a sustainable development investment fund or funds to complement the CTFs can also be explored during the Global Forum as sustainable business is increasingly seen as an essential complement to traditional conservation actions. Sustainable business investment in areas such as ecotourism, sustainable animal husbandry, agriculture, forestry, micro-hydro, solar power, etc. can support the ecosystem management plans by providing ecologically and economically viable livelihoods for people living and working in the target ecosystems. One concept for such a fund is that it would act as a revolving fund, making concessional loans to sustainable companies and using the reimbursements to finance future loans. The fund can be established as an impact investment venture providing investors with both a financial and environmental return on investment.

6. Infrastructure

Background

The pace of global infrastructure investment is accelerating dramatically. In Asia it has not yet reached the rate needed to meet its development ambitions, but tremendous expansion is on the horizon and major infrastructure investments will soon reach snow leopard range states. India, for example, recently established the National Investment and Infrastructure Fund expected to reach \$6 billion. The Asian Development Bank (ADB) is scaling up its operations to more than \$20 billion by 2020, with 70% slated for infrastructure investment. The objective of the new Asian Infrastructure Investment Bank is to finance road, rail, port, and other infrastructure construction projects with a projected \$100 billion in capital to invest. Extending across Asia and beyond, China has proposed the Belt and Road Initiative, estimated to reach \$5 trillion in infrastructure spending and span 60-plus countries in the coming decades.

Though the high-altitude perch of the snow leopard has shielded it somewhat from the economic development threatening other wildlife, trade connectivity demands, population expansion, technological advances, and shifting land use caused by climate change will soon drive infrastructure into its domain - directly impacting this fragile, sheltered world. Infrastructure projects are planned or underway for local mountain community access, mineral exploration and extraction, major road and rail transportation networks, new gas and oil pipelines, hydro-electric power facilities, and water-storage facilities for alleviating increasing shortages in the lowlands of South and East Asia. Resulting habitat degradation and fragmentation pose serious threats to local farming and herding livelihoods in mountainous areas as well as the prey base and genetic connectivity of snow leopard populations – and the new roads, railways and pipelines will ease access by poachers to these relatively remote landscapes.

Asia currently invests about \$881 billion per year on infrastructure, but to maintain its growth momentum, eradicate poverty and respond to climate change, Asia will need to double investments to over \$1.7 trillion per year over the next 15 years, according to the ADB. The private sector is expected to play a large role in filling this investment gap, but it would have to increase investments from about \$63 billion today to \$250 billion per year through 2020 to meet expectations – an unprecedented escalation.

Can Asia's aspiration to double infrastructure investment be met without damaging its biological heritage and iconic species like the snow leopard or the ecosystem services at the foundation of its economies? At the same time, can Asia ensure that the quality and viability of this infrastructure is secure over the long term – not undermined by the costly natural hazards increasingly caused by climate change?

Through a range of global commitments, snow leopard range nations have agreed on the need for resilient, 'low carbon' and ecologically sensitive infrastructure that will not erode the welfare of current and future generations, or the productivity and stability of the planet's natural systems. They have voiced their agreement through the targets of the Sustainable Development Goals (SDGs), Paris Agreement on Climate Change, Convention on Biological Diversity (CBD), Sendai Framework for Disaster Risk Reduction, and in particular, the Global Snow Leopard and Ecosystems Program (GSLEP).

Taken together, these agreements are beginning to drive markets and investors to develop practical approaches for sustainable infrastructure. Implementation, however, remains a challenge and fresh attention is needed to enhance data-informed upstream planning while providing innovations in project preparation and design, supported by policies and financing mechanisms that drive sustainability.

Bottlenecks:

Factors constraining sustainable infrastructure development across snow leopard range areas include:

- **Inadequate data** and understanding of the resilience capacity and value of natural capital in landscapes the information needed for evidence-based decision making.
- **Insufficient information** on snow leopard populations and behavior to enable sustainable infrastructure master planning and adequate project-level impact assessments.
- Wildlife movement dynamics **information usually not considered** during infrastructure planning, resulting in failure to fully capitalize on opportunities for smart infrastructure design.
- Lack of 'upstream' integrated planning drives project-level decision making isolated from the broader context and other priorities leading to increased environmental and social costs.
- **Investment decisions focused on short-term returns** rather than 'whole-life' returns and costs resulting in 'lock-in' effect potentially irreversible, detrimental impacts over the long term.
- **Policy instruments and incentives are not consistent**, predictable, evidence based, enforced or transparent enough to build investor confidence and attract sustainable infrastructure financing.
- Government and corporate safeguard policies, such as environmental impact assessments, are often outdated and inadequate, coupled with low capacity or incentives to implement and enforce them.
- A communication gulf between the engineering and environmental management fields leading to inadequate consideration of ecological factors early in the design phase.
- **Absence of stakeholder participation** in all phases, especially 'pre-project' planning and project design, fosters higher risks of social conflict and environmental degradation, increasing costs.
- Lack of global standards and national guidelines for sustainable infrastructure. (Exception: the sustainable hydropower assessment protocol.)
- **Best practices are not widely practiced or understood,** such as smart green infrastructure, which minimizes negative impacts on biodiversity and costly human/wildlife conflicts.

The widely accepted general principles of sustainability in development projects are embodied in the 'mitigation hierarchy', below. This is 'what' needs to be done to ensure sustainability at the project level, but 'how' that is achieved starts well before any single project is even proposed. Responding to the 'avoid' assessment stage, for example – requires environmental and social information on where and where not to go, what social and ecosystem service priorities have been established by communities and government, and what the trade-offs might be.

The earlier steps can be undertaken to address sustainability the more influence they will have over results over time. Waiting until an EIA is performed to consider environment issues is most often too late. Mitigation costs at this point may be prohibitive and thus minimized, leading to negative ecological consequences that could have been avoided putting in place policies that require comprehensive sector master-planning or integrated, participatory spatial planning.



Recommendations

A. Foundation

A solid foundation of information, planning and policies will enable decision makers to apply the mitigation hierarchy with confidence in the tendering, planning and design of any project. This enabling environment will help protect snow leopards and their habitat and decrease levels of social and environmental risk, fostering investor confidence.

1) Information and Education:

- a) **Identify environmentally-sensitive and vulnerable areas**, especially those essential for snow leopard habitat, ecosystem services, and climate change resilience building on existing data and globally established priorities, such as 'Key Biodiversity Areas'.
- b) Collate data and information on the movement dynamics of snow leopards and other threatened wildlife, particularly species most likely cause road accidents and loss of human life.
- c) Agree on and officially map, through cross-ministerial coordination, Priority Areas for snow leopard habitat, resilience and ecosystem services, including those outside GSLEP landscapes.
- d) Undertake participatory integrated Strategic Environmental Assessments of Priority Areas utilizing all available data on wildlife movements to delineate areas to 'avoid' or 'go with care'.
- e) Educate engineers, designers, planners, communities and politicians on the principles and practices of ecologically sound, resilient and inclusive infrastructure.

2) Planning:

- a) To best ensure resilience and sustainability, **undertake integrated planning** at the system, not project level at landscape, watershed, national and transboundary scales.
- b) **Optimize future productivity of the nation's natural assets** by respecting agreed 'avoid' or 'go-with-care' zones in development planning and sector masterplans.
- c) **Promote evidence-based, integrated decision making** by requiring use of spatial data on natural capital and biodiversity, particularly in and around agreed Priority Areas.

3) Policies and governance:

- a) **Enact regulations requiring Priority Area restrictions to be reflected** in the tendering, planning, design, environmental impact assessments (EIA) and construction of all infrastructure projects.
- b) **Require transparency and accountability** in project development, approval and project cycles through multi-stakeholder (e.g. finance sector and communities) consultation processes.
- c) Require free prior informed consent of local and indigenous communities in infrastructure plans.
- d) **Develop evidence-based policies** supported by decision support tools and mitigation guidelines.
- e) Follow and enforce international standards for sustainable infrastructure and publish clear local guidelines in user-friendly language.
- f) Update, enforce and build capacity for delivering strong, clear and transparent **Environmental** and Social Impact Assessment (ESIA) laws.

B. Finance

Closing the global infrastructure gap sustainably will require a combination of public and private sector funding. Following the global economic downturn, however, private investors have become more risk-averse and apprehensive about the next potential financial shock. At the same time, the currently low-interest environment pushes investors to seeking greater returns than they can get from traditional fixed-income products such as government bonds. By designing infrastructure for long-term resilience, whole-life cost efficiency, and with embedded environmental, social and governance (ESG) best practice, projects can be substantially de-risked.

- a) **Consider the full scope of impacts** from infrastructure projects across the whole project lifecycle, undertaking comprehensive risk analysis (climate, disaster, and other finance related risks) using the widest range of tools and methods (EIA, SEA etc.),
- b) Develop mechanisms to quantify environmental risks and highlight the full environmental cost of proposed infrastructure projects to help bridge the science and finance worlds, working closely with the insurance sector on risk determination.
- c) Plan a bankable pipeline of sustainability-certified projects with completed environmental and social de-risking assessments to attract green infrastructure bonds and public-private partnerships (PPP)
- d) **Develop a public-private partnership (PPP) checklist** for the sustainable development goals (SDGs).

C. Form

Ecological best-practice in the planning, design, construction and operation of infrastructure focuses on avoiding, minimising or mitigating their ecological impacts. While it is never too late in the planning or construction cycle to add certain mitigation measures, such as crossing structures and fencing, it becomes

logistically more difficult and costly to add them as the project advances. Early planning and best practice design based on sound data, clear conservation and social priorities, agreed standards, and a participatory approach ensure lower risk and lower cost in construction and operations.

- a) Apply best practice principles in design to ensure that that it has (i) avoided important snow leopard and prey habitats or significant natural areas; (ii) where unavoidable, minimized the amount of habitat to be cleared or degraded; (iii) installed sufficient and adequately-sized wildlife crossing structures and fencing; (iv) installed measures to reduce water, dust, noise and light pollution into adjacent habitats; (v) implemented comprehensive maintenance programs; and (vi) undertaken monitoring and evaluation to test effectiveness.
- b) **Take into account ecosystem services** that will enhance the viability of the infrastructure through natural/green infrastructure or bioengineering approaches.
- c) **Draw on local knowledge and conditions** for design solutions and use local materials and local labor wherever possible.
- d) **Integrate infrastructure planning with disaster risk management** and environmental planning and include awareness raising on disaster preparedness for communities in the process.
- e) **Invest in complete habitat restoration** once infrastructure is in place or has been decommissioned, as with dams and mines.

Addressing Climate Change in Climate-Smart Landscape Management Planning Across the Snow Leopard Range

Background

The mountains of high Asia are some of the most vulnerable in the world to climate change. From rapid warming melting glaciers and destabilizing permafrost to increasingly frequent and intense storms and resulting hazards like landslides and floods to droughts and seasonal shifts in rainfall, its effects have already begun to impact local communities, livelihoods, and ecosystems. These ecosystems provide numerous benefits for local communities and larger economies downstream—known as "ecosystem services"—including water provision, grasslands for grazing livestock and wildlife, (eco/hunting) tourism, habitat for abundant biodiversity, and carbon sequestration, among many others. As temperatures rise and precipitation patterns shift, the mountains of high Asia are undergoing profound change, compromising these services and threatening the long-term viability of both human settlements and wildlife populations, including the snow leopard, the high altitude guardian of the headwaters of the major rivers of Asia.

No resource in high Asia is more affected than water, as glaciers and permafrost melt rapidly, snow and rainfall patterns change, and extreme events like droughts, landslides, and floods increase in frequency and intensity, impacting communities and wildlife alike. As these impacts worsen over the coming decades, community livelihoods will be increasingly threatened, risking even greater pressures on surrounding ecosystems and wildlife as people try to cope, including the snow leopard and its prey. This is especially true for so many isolated, economically poor communities across high Asia that lack access to basic services and infrastructure. Livestock grazing in some parts of Central Asia has increased in duration and shifted to higher elevations due to climate change, increasing interactions between herders and wildlife. Longer dry seasons and less water for irrigation, combined with a growing human population, are already negatively impacting agricultural productivity, increasing pressure on protected areas as people search for more productive lands. This leads to more disturbance and impacts on behavior of species and ranging patterns and increased human-wildlife conflict.

As wildlife itself adapts to these changes, seeking new suitable habitats and food sources, it will face additional pressures from increased economic development, including large energy and transport infrastructure and other smaller human barriers like roads and fences. Mountain species like the iconic snow leopard adapt to a changing climate by changing their movement patterns to follow preferred habitats and prey, for example by migrating across the landscape or to higher elevations, which may render existing protected areas and ecological corridors ineffective and expose animals to new threats, creating new challenges for conservation efforts in the coming decades.

It is therefore critical to address these current impacts and future risks to both communities and wildlife as a critical component of conserving snow leopards across their vast range in high Asia. Snow leopard conservation across the GSLEP landscapes must be "climate-smart," with the explicit consideration of climate change impacts as part of both management plans and implementation activities, to reduce risks for both people and wildlife.

Accomplishing this will, however, be challenging for a number of important reasons, some of which are unique to high Asia: extreme topography across vast landscapes that make management interventions costly and difficult; limited capacity to monitor and understand climate change and it's specific regional and local impacts, including deteriorated or insufficient hydro-meteorological networks and other ageing infrastructure; and limited or insufficient funding for research and monitoring across the range to assess how climate change and other factors are affecting both people and wildlife.

To address these challenges, this document proposes the following recommendations for both policy makers and technical staff to facilitate climate-smart snow leopard conservation across high Asia.

Recommendations for Policymakers

- 1. Enhance data collection, monitoring, and scientific research across the range on climate change and its impacts on people and wildlife through new funds for capacity building and training programs, hydro-meteorological data networks, and scientific research, relying on existing regional institutions and platforms where appropriate and creating new ones where necessary.
- 2. Support and promote integrated approaches to landscape management that addresses climate change risks and conserve ecosystem services as part of all sustainable development and conservation planning, policies, and implementation.
- 3. Develop new programs and projects to harness the power of ecosystems to help species and people adapt to climate change, increase resilience to current shocks and stressors and reduce disaster risks, and plan for longer term change through ecosystem-based adaptation (EBA) as well as ecosystem-centered adaptation.
- 4. **Develop and enhance mechanisms for formal community consultation to prioritize adaptation** actions that are mutually beneficial for local and regional sustainable economic development and snow leopard conservation.
- Incorporate snow leopard protected areas and their management in strategies for meeting country Sustainable Development Goals (SDGs) and adaptation commitments under the 2015 Paris Agreement.
- 6. Develop and promote new financial mechanisms that provide incentives to build climate resilience through ecosystem-based adaptation approaches, e.g. payments for ecosystem services (PES) between hydropower developers to incentivize upstream best management practices, green bonds to incentivize nature-based approaches to infrastructure development, or other examples.

Technical Recommendations

1. Ensure that snow leopards have continued access to their natural prey base, particularly as human-driven activities may begin shifting to higher elevations and encroaching on snow leopard habitat as people adapt to shifting climates.

- 2. Increase research efforts on understanding snow leopard ecology and behavior (including predation and competition) and their prey to fill information gaps on questions such as susceptibility to disease and genetic makeup. Under a changing climate, exposure to disease may increase. Increased knowledge of snow leopard genetics will give us a better understanding of their adaptive capacity and how best to manage populations.
- 3. **Increase monitoring** of population range shifts, changes in phenology, changes in population abundance, changes in behavior and the correlation of any of these with changes in weather and climate.
- 4. **Identify critical ecosystem services throughout the snow leopard range** for both current and future climates to prioritize areas most important for both snow leopard conservation and community livelihoods.
- 5. **Increase the permeability of landscapes** for the snow leopard by ensuring habitat connectivity (should not be limited to PAs), e.g. by eliminating or avoiding physical and other barriers for migration and ensuring continued protection and conservation outside of PA borders.
- 6. Increase the extent of protected areas and complement government managed protected areas by community-managed areas (taking into account future climate change induces habitat change of SL and prey) to include stepping stones, movement corridors and climate refugia.
- 7. Integrate consideration of climate risks in all protected area management plans and activities through appropriate tools and approaches, including assessing historical change, current impacts, and future projected change. Adopt and facilitate scenario planning approaches to plan for uncertainty in future climate change, depending on emissions scenarios.
- 8. **Reduce pressures from other threats, many of which are likely to be exacerbated by climate change**, through increasing the capacity of humans to manage the effects of climate change
- 9. Limit and prevent further the encroachment of livestock grazing on snow leopard habitat to reduce human wildlife conflict.
- 10. Create local ownership and responsibility for wildlife, including the snow leopard and its prey.
- 11. Enhance snow leopard landscape connectivity by either increasing protected areas or conservation efforts in buffer zones, including developing corridors, to help wildlife access new territory as habitats shift with climate change.
- 12. Avoid, minimize or compensate habitat loss and fragmentation caused by poor land use, development, infrastructure development, etc., on unprotected land, especially in key corridors used by snow leopards and their prey.
- 13. **Monitor trends** (such as an increase in poaching) that might indicate that communities facing increased hardships due to climate change are turning to methods of earning income that adversely affect snow leopards and other wildlife.
- 14. Empowerment of communities (including designation of rights and responsibilities on management of ecosystems and wildlife) and help people adapt to the changing climate by promoting alternative livelihoods (carefully examined) that conserve ecosystem services and do not negatively impact snow leopards.
- 15. Follow Convention on Migratory Species (CMS) resolution 11.26 to "develop general guidelines for mitigation and human adaptation projects to ensure that they are not harmful to migratory species" and "ensure that an environmental impact assessment is conducted prior to undertaking major adaptation and mitigation projects.

Research, Development and	Policy-Making Initiatives		
Monitoring and	Processes and hazards	Vulnerability and	Governance and
assessment		capacity	Economy
Glacier monitoring through	Downscale climate	Vulnerability	Natural resource
direct measurements,	scenarios, uncertainty	assessment at various	governance and
remote sensing, modeling	analysis	spatial levels	community role in
			decision
			processes/community
			empowerment
Hydro-meteorological	Hydrological modelling and	Climate vs non-climate	Review programs and
stations in high altitudes	precipitation amounts,	drivers and	policies for CCA and
(>3,000m asl), denser	forms, energy inputs	institutional analysis	DRR
network of stations			
Technical upgrade of	Climate-glacier-water-land	Traditional knowledge	Communication
existent observing	interactions and hazards	on CCA and climate-	approaches for
networks		related DRR	science-policy-
			practice interface
Capacity building to	Risk and hazard mapping	Climate smart	Economic and finance
support data collection by	under different CC	agriculture and	tools in promoting
local stakeholders	scenarios	livestock-pastureland,	CCA and DRR
		wildlife management	
Inventory of glacier	Community-based early	Farming and pastoral	Economic
features (e.g. topography,	warning and	market knowledge	mechanisms and
gradient, ELA)	communication systems		value chain
			knowledge
Data-sharing framework		High-impact market	
through web and other		interventions,	
l media		multipurpose projects	

Suggested interventions for Improving Climate Change Adaptation in High Asia

bD
•—
\Box
•
\mathbf{O}
_
\geq
.는
\cup
aC
oac
apac
Capac
Capac
. Capac

Recommendations

S No	Theme	Sp	pecific	n L	country Institutions with expertise	Current status
						(no. of people being trained per vear)
1	Economics of	•	Need to engage with local universities	•	Afghanistan:	None
	Ecosystems		and provide a framework to be able to	٠	Bhutan: Royal Thimpu College or	
			systematically estimate and monetize		Business college	
			ecosystem services	•	China:	
				•	India: Indian Institute of Forest	
					Management; Nature	
					Conservation Foundation	
				•	Kazakhstan:	
				•	Kyrgyzstan: University of Central	
					Asia	
				•	Mongolia: Snow Leopard	
					Conservation Foundation	
				•	Nepal:	
				٠	Pakistan: Snow Leopard	
					Foundation	
				•	Russia:	
				•	Tajikistan:	
				•	Uzbekistan:	
2	Climate Change	•	Limited capacity to monitor and	•	Afghanistan:	None
			understand climate change and it's	•	Bhutan: UWICE	

	ī	•	5			
S No	Theme	sp	Decitic		ountry Institutions with expertise	Current status
						(no. of people being trained per year)
			specific regional and local impacts,	•	China:	
			including deteriorated or insufficient	•	India: Indian Institute of Forest	
			hydro-meteorological networks and		Management; Nature	
			other ageing infrastructure		Conservation Foundation	
		•	Capacity building to support data	•	Kazakhstan:	
			collection by local stakeholders	•	Kyrgyzstan: University of Central	
					Asia	
				•	Mongolia: WWF, Snow Leopard	
					Conservation Foundation	
				•	Nepal:	
				•	Pakistan: xx	
				•	Russia:	
				•	Tajikistan:	
				•	Uzbekistan:	
3	Illegal wildlife	•	Increasing law enforcement capacity	•	Afghanistan:	Moderate
	trade and poaching		against illegal Snow Leopard trade.	•	Bhutan:	
			May include:	•	China:	
			delivering regular training to	•	India:	
			frontline enforcement officials in	•	Kazakhstan:	
			range states on:	•	Kyrgyzstan:	
				•	Mongolia:	
			 Intelligence gathering by law 	•	Nepal:	
			enforcement agencies	•	Pakistan:	
			 Intelligence Networking & . 	•	Russia:	
			Forensics	•	Tajikistan:	
				•	Uzbekistan:	

S No	Theme	Specific	In count	try Institutions with expertise	Current status (no. of people being trained per year)
		 Identification of parts for customs 			
		and relevant government agencies			
		 Knowledge of local and 			
		international laws			
4	Snow leopard	 Inadequate capacity to conduct field 	• Afgh	ianistan:	
	population	surveys across large landscapes, data	• Bhu	tan:	
	monitoring	preparation and analyses	 Chin 	ia: Wildlife Institute	
			• Indi	a: Nature Conservation	
			Four	ndation	
			 Kaza 	akhstan:	
			• Kyrg	syzstan: American University of	
			Cen	tral Asia	
			• Mor	ngolia: National University of	
			Mor	ngolia	
			• Nep	al:	
			 Paki 	stan: Qaid-E-Azam University	
			• Russ	sia: WWF	
			 Tajik 	kistan:	
			• Uzb	ekistan:	
			 Inte 	rnational: University of St.	
			And	rews	
5	Community-based	Comprehensive training programs in	• Afgh	ianistan:	
	conservation	community-based conservation with	• Bhu	tan:	
		broad, inter-disciplinary collaborations	 Chin 	la:	
		between conservationists and	• Indi	a:	
		scientists, and community partners –	• Kaza	akhstan:	

eme	Specific	In country Institutions with expertise	Current status
			(no. of people being trained per year)
	to share foundational principles while	 Kyrgyzstan: 	
	also providing opportunity to develop	 Mongolia: 	
	for constructions	Nepal:	
		 Pakistan: 	
		Russia:	
		 Tajikistan: 	
		Uzbekistan:	
		 Afghanistan: 	
		Bhutan:	
		China:	
		India:	
		 Kazakhstan: 	
		 Kyrgyzstan: 	
		 Mongolia: 	
		Nepal:	
		 Pakistan: 	
		Russia:	
		 Tajikistan: 	
		 Uzbekistan: 	
	 Need for multiple agencies to have 	 Afghanistan: 	
t	joint training in adopting participatory	Bhutan:	
	approaches for conservation and	China:	
	sustantable development, and rot enforcement.	India:	
		 Kazakhstan: 	
		 Kyrgyzstan: 	
		 Mongolia: 	

rheme	Specific	In country Institutions with expertise	Current status (no. of people being trained per year)
		Nepal:	
		 Pakistan: 	
		Russia:	
		 Tajikistan: 	
		 Uzbekistan: 	
a		Afghanistan:	
ation		Bhutan:	
		China:	
		India:	
		 Kazakhstan: 	
		 Kyrgyzstan: 	
		 Mongolia: 	
		Nepal:	
		 Pakistan: 	
		Russia:	
		 Tajikistan: 	
		 Uzbekistan: 	
s and		 Afghanistan: 	
~		Bhutan:	
		China:	
		India:	
		 Kazakhstan: 	
		 Kyrgyzstan: 	
		 Mongolia: 	
		Nepal:	
		 Pakistan: 	

Theme	Specific	In country Institutions with expertise	Current status (no. of people being trained per year)
		Russia:	
		 Tajikistan: 	
		 Uzbekistan: 	