GENERAL GUIDELINES FOR MANAGEMENT PLANNING OF SNOW LEOPARD LANDSCAPES

GLOBAL SNOW LEOPARD AND ECOSYSTEM PROTECTION PROGRAM

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FOREWORD

The Global Snow Leopard Ecosystem Protection (GSLEP) program brings together all snow leopard range countries to conserve the rare snow leopard and its ecosystem through collaboration, community-based conservation, and greater protection. The stated goal of securing '20 landscapes by 2020' got an overwhelming response and our 12 governments proposed more than 20 landscapes totalling over a quarter of the snow leopard's global range, to be prioritized for conservation. Our respective national efforts, along with a few global support components such as enhanced transboundary cooperation, combating illegal wildlife trade, capacity building and engaging with industry, will help secure snow leopards and ensure the welfare of local people living in snow leopard habitats.

The key to *securing* the landscapes is based on clear delineation of landscape, identification of threats and opportunities, and taking conservation action outlined in scientifically prepared, participatory management plans for each GSLEP landscape. GSLEP landscapes are large, multiple use areas, typically much larger than most wildlife protected areas (PA). Normally, a GSLEP landscape encompasses one or more PA, as well as habitats under various other land tenures. The management plans therefore require credible information on biodiversity, human society, threats and institutions, and also identify means to develop sustainable partnerships and governance structures with local communities and other stakeholders.

Understanding the specialised needs for preparing the management plans, our GSLEP National Focal Points, assisted by specialists, created and adopted a set of management planning guidelines during a workshop in 2014 in Issyk-Kul, Kyrgyzstan. Over the last four years, these guidelines were used in developing management plans in at least five landscapes. Through these exercises, we have learnt much. Based on these experiences and learning, the earlier guidelines have been updated and revised, and a set of eight Advice Documents have been prepared for further assisting the planners. The present, revised version of the GSLEP Management Planning Guidelines has incorporated user feedback to balance various components of management planning and also provides additional guidance for each subject/chapter. The relevant sections of the Advice Documents or Addenda have been cited in the Guidelines to improve the usage of the document.

I am thankful to all the National Focal Points who provided their inputs during the revision. Special thanks are also due to UNDP-GEF for their support for this effort, and to the GSLEP Secretariat, Snow Leopard Trust, World Wildlife Fund and USAID for coordinating it and helping bring out this document.

It is my sincere hope that using these guidelines, countries will be able to complete management planning of all GSLEP landscapes well before 2020.

Shakti Bahadur Basnet
Minister, Forest and Environment, Nepal
Chair, GSLEP Steering Committee

Contents

List of Abbreviations:

Biofin: The Biodiversity Finance Initiative (led by UNDP)
GCF: Green Climate Fund
GEF: Global Environment Facility
GSLEP: Global Snow Leopard Ecosystem Protection
INGO: International Non Government Organisation
IUCN: International Union for Conservation of Nature and Natural Resources
NGO: Non-Government Organisation
NSLEP: National Snow Leopard Ecosystem Priorities
PA: Protected Area
PES: Payment for Ecosystem Services (also called Payment for Environmental Services)
SDG: Sustainable Development Goals
SLT: Snow Leopard Trust
UNDP: United Nations Development Program
WWF: World Wildlife Fund (Worldwide Fund for Nature)

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1. Background of GSLEP

The goal of the **Global Snow Leopard & Ecosystem Protection Program** (GSLEP) is for the 12 range countries, with support from partner organizations, to identify and **secure** 20 snow leopard landscapes across the snow leopard's range by 2020, or, in shorthand—"Secure 20 by 2020." These snow leopard populations and landscapes to be secured under GSLEP are relatively large (range: 5,000 to 92,000 km^2), and many of them share borders with neighbouring countries.

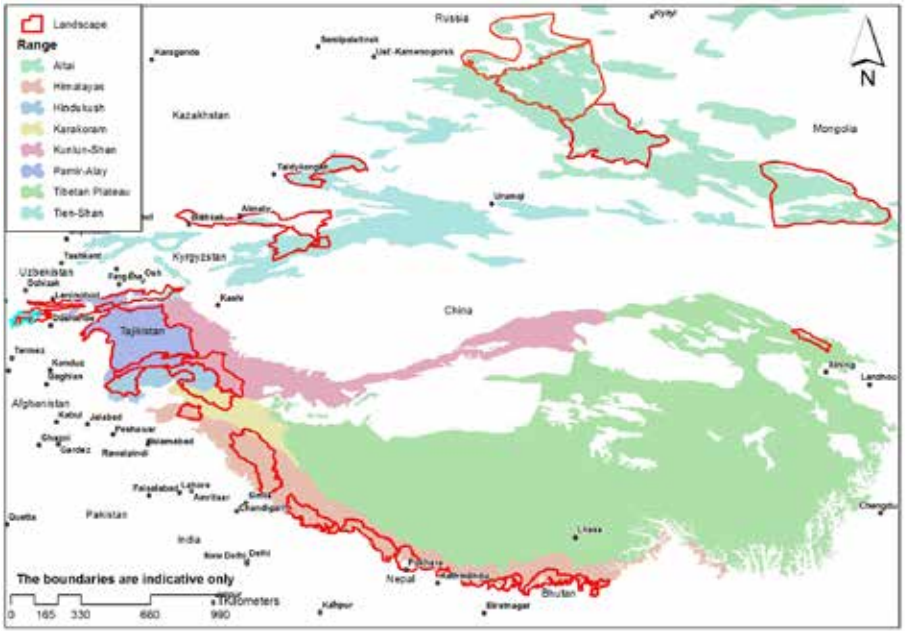

Fig 1. The 23 snow leopard landscapes identified to be secured by 2020 under the GSLEP program

Range countries developed their respective National Snow Leopard Ecosystem Priorities (NSLEP) where priority actions were identified. As the next step, each range country identified and proposed landscapes to be brought under enhanced protection. The key step to *securing* these landscapes is through preparing and implementing systematic, scientific management plans. These updated guidelines are meant to assist country teams in preparing management plans for GSLEP landscapes.

1.1. Characteristics of Snow Leopard Landscapes

Snow leopard landscapes are characterized by several unique features that require the development of customised management plans for effective and integrative conservation and economic development:

The landscapes include **Protected Areas (PA) as well as** large tracts of habitat that lie **outside PA**s in multiple-use zones.
Snow leopards are landscape species, with very large home ranges, and their populations will not be effectively conserved unless **conservation efforts take place beyond PA boundaries**.
Snow leopard landscapes provide **essential ecosystem services**, including **clean water for a third of world's human population** from the rivers that originate here and therefore, conservation efforts cannot be restricted to within PA boundaries. Furthermore, these essential services are under a growing threat from climate change and habitat degradation, making their conservation even more critical in the coming decades.
Snow leopards and associated biodiversity continue to **co-exist with local human communities** who have rich and unique pastoral cultures and ways of life.
Apart from local communities, snow leopard landscapes also tend to have government and non-government stakeholders working in sectors such as human welfare, economic development, business and industry and conservation sectors

[Img1] Snow leopard landscapes extend beyond Protected Areas

[Img2] High altitude ecosystems provide water to a third of the world's human population

Due to such a large interface between people and snow leopards, these landscapes need to be managed as Fragile Ecological Zones with suitable zonation for more focussed effective management:

Important wildlife habitats and corridors in the landscape are identified based on current distribution and future projections of climate change, and designated as **'Priority Wildlife Areas' (Core Zones)** within which ecologically damaging land use is minimized.

In the remaining **'Multiple Use Areas'**, sustainable and climate-smart economic growth programs and **green infrastructure** models are implemented.

Management plans provide the official frameworks needed for supporting and sustaining policies and activities for improved and integrated conservation and sustainable development of snow leopard landscapes.

Key differences between management of Wildlife Protected Areas (PA) and GSLEP landscapes:

Wildlife Protected Area	GSLEP Landscape
Has clear legal status for conservation under country's conservation laws	Only parts of the landscape may have legal status for conservation (PEG) but the entire landscape has a recognition as a conservation unit by the government
Usually small, rarely more than 5,000 km^2	Very large. Starting at 5,000 km^2, but going up to > 90,000km^2
Most of the land usually owned by government conservation agency with some rights and dependence of local communities.	Landscape may include PAs 'owned' by government conservation agency, but includes numerous other stakeholders
Conservation approaches may include participatory work with communities, protection and habitat improvement	Conservation approaches need to be similar for a PA, but also include a major component of collaborations with other stakeholders (from welfare, production sectors) who may have a major mandate and stake in the area
Zonation can be simpler in the form of inviolate core, multiple use, including for tourism, etc.	Zonation will include inviolate cores, but possibly a mosaic of small and large ones that include some PAs, hunting concessions (in certain countries), other conservation areas, and multiple-use zones that may include areas open for extraction, tourism and intense use pasturelands.

2. Broad Steps of Management Planning

There are three broad parts in the management plan. (A) A thorough **situation analysis** pertaining to the past and present biological, social and institutional issues and threats. (B) Management, that articulates the **vision, goals, objectives** and **activities** for conservation in the landscape. (C) Annexures, with relevant materials that have value as reference material, and include checklists, data tables, government notifications, etc.

2.1. Outline of Management Plans

Typical Management Plans will consist of various sections including but not restricted to the following:

PART A: Situation Analyses
1.Broad **goals** of the GSLEP and NSLEP
2.**Mapping and delineation** of landscape boundaries, geographical setting, description of landscape identification criteria and process
3.Description of **legal status and land tenure** of the landscape and its constituent areas
4.**Baseline knowledge** (physiography, water resources, flora, fauna (especially snow leopard and prey), human habitations, populations and activities, ecosystem services, livestock composition and population, developmental activities)
5.**Climate change** (current trends and future projected changes in temperature, precipitation, and extreme weather) and it's potential impacts on the landscape, including communities, wildlife, and the larger economy
6.Current and future **threats** to biodiversity (traditional/upcoming) in the landscape/Priority Wildlife Areas/ Multiple Use Areas, and how they might change in the future, especially as temperatures warm, precipitation patterns change.
7.Description of **stakeholders**, their mandates, capacity, and their actual and potential influence on conservation, local livelihoods and governance

PART-B: Management
8.Management Plan **Vision, Goal, Objectives**
9.**Zonation** (identification and delineation of Priority Wildlife Areas, Multiple Use Areas, others)
10. Framework for **multi-sectorial cooperation** and information sharing
11. Framework for **coordination** with relevant and key business and industry groups
12. **Governance mechanism** at various levels (National/ Landscape/Provincial/Community levels)
13. **Addressing Threats** – Best Practices (for core, buffer, multiple resource use area, others) ideally using strategic planning tools
14. Activity, Responsibility, performance criteria, funding, monitoring of **outputs/outcomes**
15. Research gaps, needs and priorities
16. **Funding** Mechanisms

Part-C: Summary / References / Appendices

2.2. Advice Documents and revision of the GSLEP Management Planning Guidelines

Practical information on several sections of the management planning guidelines such as threat assessments, climate smarting, stakeholder consultation and engagement, ensuring better integrated conservation, and fund raising was added to the management planning guidelines in the form of eight advice documents. These were prepared based on a need expressed by countries in 2016.

The advice documents cover several themes including systematic, strategic planning to identify threats and issues, understand the root causes and suggest actions (Addendum 1) using best practices for conservation

(Addendum 5). Participation (Addendum 2) is another theme outlining the basis for engagement with local communities and working with other stakeholders. Since many government and non-government stakeholders can have both positive and negative impacts on conservation, it is important to understand their mandates and stakes in the landscape (Addendum 3) and determine robust mechanisms of working together (Addendum 4). Spatial analysis is crucial to setting baselines as well as a planning tool (Addendum 7). The snow leopard range is considered to be highly vulnerable to climate change and understanding its relevance in the landscape, and ways to adapt are explored in Addendum 6. Development of the remote and often marginalised communities is vital for each country and green development options are often the best way forward. These are explored in Addendum 8.

2.3. Working Group or Core Group

The Working Group team should be led by the agency responsible for conservation management in the country, but it should partner with other relevant agencies that play a role in conservation and livelihood in the project landscape. This five to six member team will coordinate the data gathering, interviews, analysis, conducting workshops and writing up of the management plan. They also will be jointly responsible for approvals of the management plan document by stakeholders and government. Suggested members include:

1. Members from key government department mandated for conservation (Forestry department)
2. Lead scientific agency (Government academy and/or NGOs dealing with conservation and livelihoods)
3. Collaborating scientific and technical agencies (including from Agriculture, Tourism, District administration, Provincial administration, etc.)
4. Community leaders (can be invited for specific meetings)
5. Research scholars

Further, the Working Group will need to engage field teams comprising of forest rangers, other departmental staff, students from universities and volunteers to collect data thorugh the socio-ecological and institutional surveys.

It is strongly encouraged that Working Groups include women team members to ensure that women are equally and fairly represented in the management plan development process.

2.4. Broad GSLEP Goals and NSLEP

A brief section highlighting the management plan being a product of the country's NSLEP and consequently, a part of the GSLEP initiative for securing 20 landscapes by 2020 will help put it in proper national and global contexts. Details about the GSLEP are available in http://www.globalsnowleopard.org/ (relevant for Chapter 1 of management plan).

2.5. Delineating the Landscape

As a part of the NSLEP process each country has already identified their respective landscapes that add to 23 GSLEP landscapes to be 'secured' by 2020. In selecting these landscapes, the countries had agreed to consider three qualifying characteristics for each landscape:

(a) That they could support a population of at least 100 breeding age snow leopards.

(b) They would support adequate and secure wild prey populations.

(c) They would have connectivity to other snow leopard populations.

The management planning team may need to engage with the local communities and local administration to finalise the boundaries and the settlements included in the identified landscape. They should describe its geog raphical setting and final delineation (relevant for Chapter 2 of management plan).

2.6. General Work Plan For Management Plan Data Collection

2.6.1. Information on Wildlife, Human Society, Threats and Local Institutions

Information on biodiversity, local communities, stakeholders, threats and institutional aspects of the landscape are crucial part of the Situation Analysis, which is a key step in preparing the management plan. This can be done through literature review, field surveys and preparing relevant maps.

Literature Review:

A thorough **literature review** is not only important for the planning of the survey but also to extract existing data. Some of the important **sources of information on the snow leopard landscape** are (relevant for Chapter 4):

- **Scientific reports/papers:** Scientific papers are an important source for information on the distribution of flora and fauna, geology, climate, and socio-economics of the region.
- **Previous survey reports:** Such reports could provide historic data and first hand information of the practical aspects of planning a survey, logistical difficulties and access to the region. Historical surveys are often the only information available for remote areas and could also help in creating a baseline for current and projected climate related scenarios.
- **Mountaineering expedition reports:** These reports could be very helpful in providing information on access to remote areas and occasionally, information on wildlife and threats.
- **Land use and economic development plans, reports by multilateral agencies, climate adaptation plans, gazetteers, and existing protected area management plans** provide valuable information, including reasonable data and analyses in the forestry, livelihoods and development sectors.
- **Climate vulnerability, trends and projections**: Reports on climate vulnerabilities and trends in temperature and precipitation are key to determining risks to people and wildlife and potential actions to address them.

2.6.2. Field Data Collection:

Scale of data collection:

The information collected for these surveys will be limited to **two spatial scales**:

- **Grid cell**: These are 100-500km^2 cells primarily used to coarsely map species distributions and ecological variables. See the next section for details.
- **Administrative regions**: These are the existing borders of administration such as counties or districts or village administration. Data on habitation, infrastructure, land use, weather station data and climate trends, land tenure and threats can mainly be collected at this scale. This is also an important scale as many of the conservation interventions, especially community-based efforts, are expected to be implemented at this scale.

Snow leopard and prey distribution and status (relevant for Chapters 4, 5, 6 and 9. Addenda 6 & 7 provide further information):

The primary objective of these surveys is to **identify the *distribution (and not abundance) of snow leopards and their prey***, *and Priority Wildlife Habitats and corridors.* Depending on data availability and capacity, prediction of future distributions based on projected changes in climate would be useful. Suggested steps are:

- **Setting-up survey grids:** Snow leopard and prey distribution could be best assessed using a **grid-based sampling design** (fig. 2b) that allows the effort to be spread out almost equally in the entire landscape and not get limited to known or easily accessible areas.

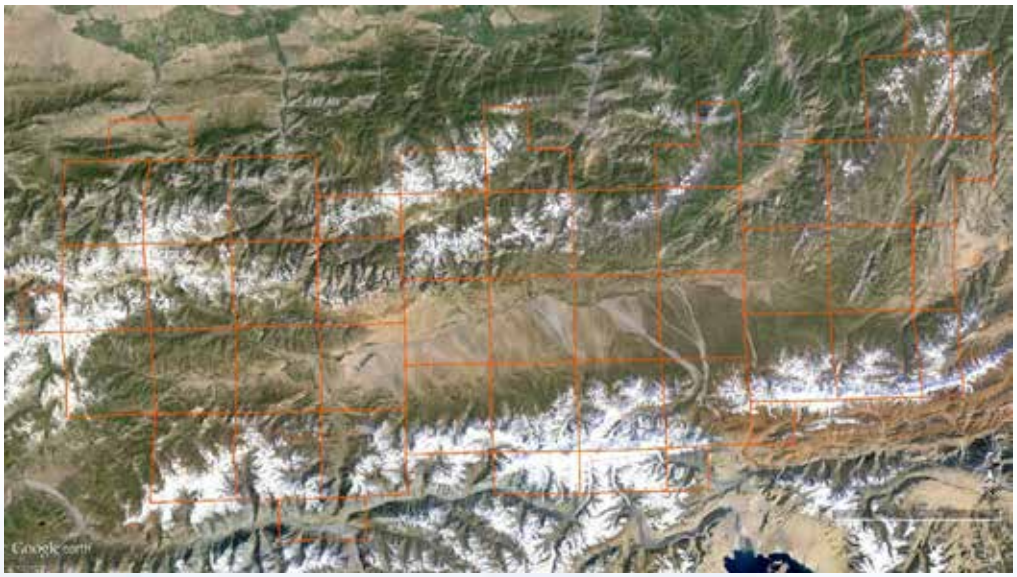

Fig. 2a Example of a grid based sampling design

Alternately, **relief based watersheds can be identified and blocks used as sampling units** (fig. 2b) if access to most of the grids becomes difficult. Depending on the details of the data available, the investigators are flexible in analysing the data as simple presence maps, or indicate grids with relative densities, or probability of site use covariate modelling to predict distribution in un-surveyed areas, as long as the surveyed sites are representative.

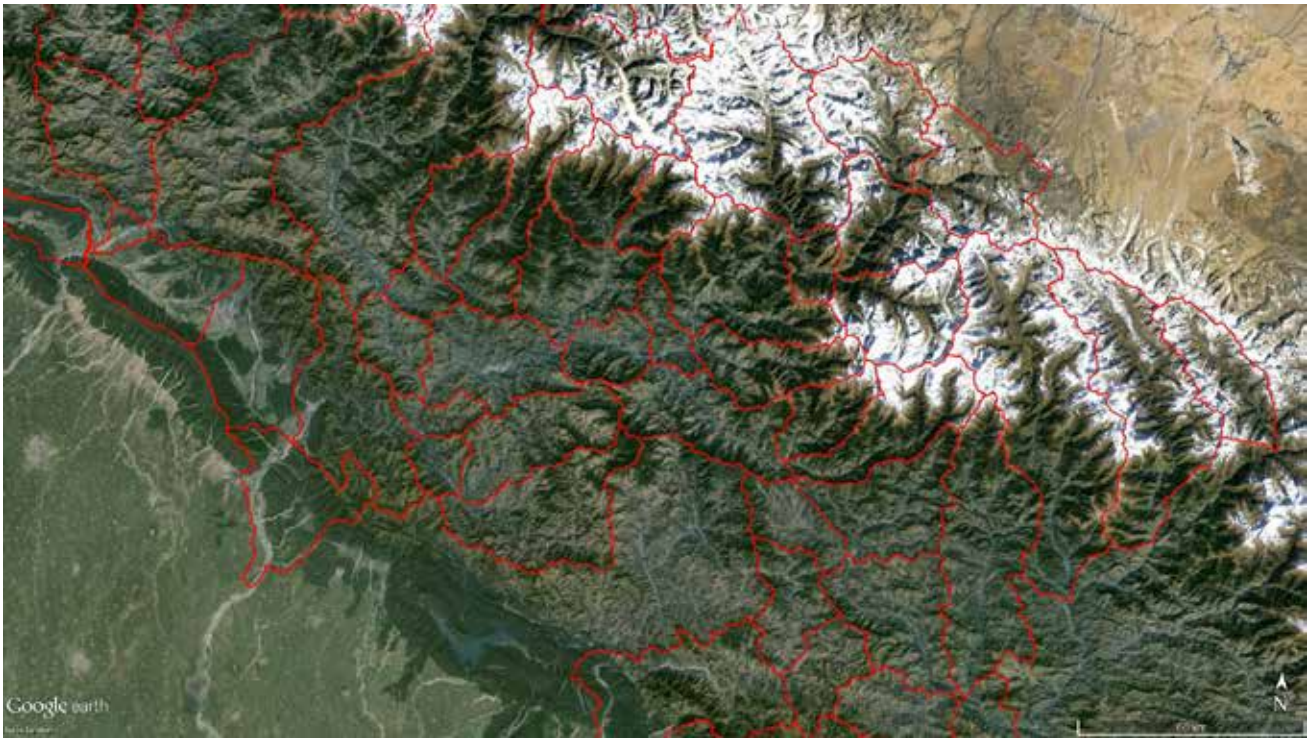

Fig. 2b Example of a watershed based sampling design

Surveys are best targeted towards an occupancy framework, which can later be scaled down if the data cannot be collected at the necessary resolution.

- *Size of the survey grids*: **The size of the survey should be chosen based on the home-range size of the snow leopard**, logistic feasibility of surveying areas of a particular size, topography of the region and the total area to be surveyed. Snow leopards on average can range over areas from 100-1,200 km^2.

Preferably the total area needs to be divided into >50 grid cells, though the dimensions may be decided based on total area, average size of administrative or ecological (e.g. sub-catchment) units. As an example, if the landscape is spread over 15,000km^2, fifty grids measuring 300 km^2 can be used (each c. 22.5km X 22.5km).

These grids could be laid out as uniform square grids (Fig. 2a) or depending on the topology of the landscape, landscape features such as watersheds, ridgelines, rivers and gorges (Fig. 2b) could be used to demarcate the sampling units. **It is preferable that all the cells are surveyed.**

- **Surveying the grids**: The grids could be surveyed using vehicles, on horse-back and/or on foot for snow leopard prey. **Snow leopard presence in each grid can be confirmed based on interviewing knowledgeable people, by walking along landform edges to document signs such as pug-marks and scrape-marks.** Scats are not recommended to confirm snow leopard presence. Snow leopards are often the only large felid in a landscape (unless the area in consideration overlaps with common leopard and/or tiger distributions) and the pug-marks and scrape-marks can usually be correctly attributed to them.

In the limited time available for most of these surveys it may be most feasible to rely on **secondary information** from local, informed persons who can provide information about species presence in specific locations, at different times, and the threats they face. These may include hunters, herders, researchers and other regular visitors in the area.

[Img3] Snow leopard pugmarks in snow

Scats are not recommended as signs to confirm snow leopard presence because it is often very difficult in the field to distinguish between the scats of snow leopard, wolves, red fox and dogs. On the other hand, **suspected snow leopard scats may be collected for possible DNA-based screening analyses.**

[Img4] Snow leopard scrape

Presence of snow leopard prey could be recorded through direct sightings. Signs of prey species may be used if the signs are unique and distinguishable from livestock and other ungulate signs. The total survey distance may be conditional on the size of the grid cell. A survey of 15-50 km per grid cell may be adequate.

[Img5] Snow leopard cub captured on a camera trap

Occupancy framework needs **2 or more replicates of the survey in each grid** for estimating the detection probability. The number of replicates should be greater in areas where the probability of detection of evidence is lower. These replicates could be temporal or spatial. Spatial replicates could be achieved by conducting two or more spatially separated surveys of 5-15 km each. The survey distances provided here are indicative only.

- **Abundance surveys**: Abundance of snow leopard and prey species can be attempted in some parts of the landscape if tools and skills for these are already available. As such, it is extremely difficult to conduct these specialised and time consuming studies during the management-planning phase. It is recommended that these be made an important part of the management plan implementation phase where the landscape can be stratified based on habitat quality or land use and sampled using camera trapping, molecular tools for snow leopards, and double observer or equivalent method for wild prey. Methods proposed by the new GSLEP initiative called Population Assessment of the World's Snow Leopards (PAWS) should be followed while designing and implementing abundance studies. The PAWS manual will be available on the GSLEP Website beginning August 2018
- **Composition of the survey team:**
  The **survey team could range between 10-20 members** including field experts, ecological survey team, climate expert(s), village interview team, and government and private stakeholder data collection team and a GIS expert.
  - The survey team will need to be **experienced in navigating difficult mountain terrain**, experienced in identifying snow leopard signs and prey sightings, use of GPS and maps (topographic sheets). The survey team is expected to survey at least one grid per day. Workshops may need to be held for training the team in different skills.
  - The team may need support of experts in climate vulnerability to guide assessments of climate risk
  - The government and private stakeholder data collection team will need to include **people with an understanding of the administrative structure of the region** who are capable of collecting required information from the relevant departments of the administrative hierarchy.
  - The village and key-informant interview team is expected to have an **understanding of the local culture and socio-economics of the region**. Ideally the team will benefit from a basic understanding of **methods in social sciences, including assessing community vulnerability to climate change**.
  - The team should have **adequate transport support** to cover large areas rapidly
  - The team should ideally include at least 2-3 persons at different hierarchical levels who would continue to work in the area through out the management planning and implementation phases.
  - The team should consist of both male and female members.

2.6.3. Land-use and infrastructure distribution in the landscape

(Relevant for Chapter 3 & 4. Also Chapters 13 and 14)

Mapping land-use and infrastructure (more details in Addendum 7): Lo**cation of all the villages and settlements in the landscape could be a starting point for the mapping** of land-use and infrastructure. Location of all the villages is often available in existing maps of the region and can also be obtained from government census documents or even Google Maps. These can be ground-truthed and improved as a part of this exercise.

In case of unavailability of these data with the relevant sources and departments, villages can be visited and their GPS locations recorded. Mapping of the roads could be conducted simultaneously, though roads and railway data can also be obtained from online resources of ArcMap online database, Open street map etc.

- *Village interviews and key informant surveys*: **Group interviews and key-informant surveys** could be conducted in each village to map the land-use of each of the villages (Resource mapping) to document dependencies and pressure areas. Local people can easily point out surrounding area that they use for livestock grazing, fodder collection etc. on a pre-printed map or self-made schematic map. These areas should have clear reference points (drainage, places, passes, etc.) that can later be digitized indicating local land-use system. Some countries may have existing maps prepared by their cadastre or pasture departments that show land-use and these could be used as a base map for the field ground-truthing.

Local people could be encouraged to indicate the finest details of local land-use, including how .they have changed over time in response to drivers of change like climate or economic opportunity. The village interviews and interviews with key-informants such as village elders, local herders and hunters, could be used to gather other information such as the total livestock holding of the village/ settlement, causes of livestock mortality (including extent of livestock predation by large carnivores such as snow leopards, wolves, bears and lynx), crop losses (including by wild herbivores) and changes in climate patterns in their lifetimes.

Important wildlife areas such as ungulate wintering grounds, patches of medicinal and rare plants, *Cordyceps* harvest area etc. should be recorded. **Villages and key informants could also be encouraged to list their perceptions of threats to their own livelihood and to wildlife in the surrounding area, including those associated with climate change**. Interviewees should consist of both men and women and represent different age groups in the village. Important local institutions and stakeholders, including religious and cultural centres should be identified. The following is an indicative list of information that could be sourced from villages and key-informant interviews:

- Local land-use such as pastures, biomass extraction area, other local land uses, how and why it has been changing in recent decades
- Local grazing system i.e. grazing rotation policies, grazing land lease, supervised/ unsupervised grazing practices etc., changes in recent decades due to potential changes in climate, markets or other socioeconomic causes
- Changes over time in livestock population by species
- Attitudes and perception towards snow leopards and other carnivores
- Extent of livestock predation by carnivores, now and in the past. It is best not to ask direct questions on losses but included in a larger question on causes of mortality of livestock.
- Important wildlife areas such as ungulate wintering and rutting areas, patches of medicinal and rare plant, areas of *Cordyceps* harvest, and information on whether these are changing
- Threats to own livelihood and wildlife, in the past and in more recent decades or years
- Any other information regarding land-use
- Local institutions and stakeholders, their roles in their livelihoods, welfare and development
- Any available information on infrastructure and other projects available with local people

[Img6] Interviewing key informants

- *Interviews and data collection with government and semi-government and private stakeholders*: **Interview surveys need to be conducted with stakeholders** such as officials of the roads department, hydro-power and electricity department, department of meteorology and hydrology, mining department, army/other border security organizations, local police and administration to obtain information on existing and planned infrastructure, and trends in climate and extreme weather. These help the planning process in multiple ways, which includes credible information on mandates, schemes and activities where there can be cooperation (convergence) with conservation agencies of the area, or where there can be a conflict of mandates (divergence with conservation). Importantly, it also allows the stakeholders to understand the management planning process and clarify any apprehensions, and for the team to develop networking with future partners (Chapter 7, 10,11,12, Addendum 3, 4).

Each type of infrastructure should be recorded and mapped as existing and planned infrastructure separately. The offices of most such departments are often clustered together in the administration centre so it is less time intensive but conditional on their relations with the lead conservation organizations.

This information will ultimately assist in the identification of threats as well as assist in zonation.
Such information could also be collected directly through the government documents available on Websites and reports or via laws for the access to information (such laws are present in some countries e.g. Right to information). Some of the important departments from the welfare, production and conservation sectors are:

- Forest and wildlife department
- Road and rail
- Mining
- Local administration (provincial, district, sub-district or village cluster levels)
- Agriculture and irrigation
- Animal husbandry, veterinary, pasture use
- Hydro-power and electricity
- Alternate energy
- Meteorology and hydrology
- Livestock husbandry and veterinary care
- Armed forces and local police
- Local monastery, mosque and temple administration
- Education
- Tourism
- Culture
- Statistical records
- Cooperatives, micro-finance, small scale industry

The survey team should make a keen effort to identify, list and survey all relevant stakeholders that may go beyond the indicative list above.

Government data can also be valuable in determining trends in matters of interest that include changes in population, weather, income, etc.

Similarly, NGOs, INGOs and multilateral agencies may have useful data and programs related to conservation, development and livelihood support in the area and their mandates, schemes and activities should be documented.

[Img7] Consultation with stakeholders

1. Threat assessment: **Ranking of threats can be undertaken based on their intensity, area impacted and urgency** (Addendum 1)**.**
   It is preferable that eventually, such threat tables be generated for all the administrative regions within the landscape, and for all Priority Wildlife Areas, and Multiple Use Areas. This is important as threats are expected to vary in their intensity and urgency across the different areas within the landscape (e.g. Mining could be a serious threat in one part of the landscape but not other). When ranking climate change, it is important to list out its related hazards, e.g. increasing drought or extreme rainfall, rather than "climate change" as a general threat.

   Such threat tables could also be developed for grid cells to **indicate the distribution of threats along with snow leopard and prey distribution** in the landscape.

2.6.4. Mapping for the management plan

Mapping is an important planning tool and a separate Addendum 7 explains further details. Mapping is useful for understanding baselines (Chapter 4), delineating the landscape boundaries (Chapter 2), mapping threats (Chapter 6) and visualising climate change scenarios (Chapter 5) of Situation Analysis. It is further a key aspect of zonation of the landscape (Chapter 9) that will govern the management inputs. Some of these are discussed below:

- Map of snow leopard and prey species distribution: The primary information on the spatial distribution of the snow leopard and prey species will be the **grid-based surveys** (direct or based on secondary information)**.**
  A map depicting the probability of site use or relative abundance can be prepared indicating the grids with higher probability of site use or higher relative density of the snow leopard and prey species. This map can be improved based on secondary information from the key-informant and village interviews and literature survey. Map layers should also include trends in these important areas; i.e. how have they changed recently in comparison to the past. When possible, maps should also be prepared projecting how distribution, particularly based on changes in prey base and key vegetation, may change due to future changes in climate. This will help determine areas vulnerable or resilient to climate change; resilient areas, or "refugia" are particularly important for species, as they will provide refuge against more severe climate change impacts across the landscape.

These will be qualitative maps highlighting important areas for the snow leopard and prey species as indicated by the different sources of information (Key-informant, literature review

etc.). **Use of satellite imagery is encouraged** using Normalized Differential Vegetation Index, digital elevation model, temperature regimes, glaciers, etc., to map pasture distribution, and the use of these pastures by wild and domestic ungulates. Ideally, these models should incorporate climate data as well, through spatial projections of future climatic scenarios based on best available data sources.

- Map of other flora and fauna: A similar qualitative map of the **distribution of other flora and fauna** can be prepared using the secondary information from key informants and literature review. If possible, maps should indicate areas where distribution of flora and fauna may have changed significantly in the recent decades.

- Map of land-use and infrastructure: A primary map of the **intensity of land-use and infrastructure** can be prepared by indicating these parameters on the grid-based map used for mapping snow leopard and prey distribution. Such a map helps visualize the interface of wildlife and human use of the various grids. A map of pasture use intensity is an important output that can help assess the level of threat from this key livelihood in the landscape.

  Various maps, each indicating the intensity of one form of land-use can also be prepared to **visualize the distribution of each land-use and infrastructure** across the landscape in relation to wildlife. These should then be overlaid with maps of projected climate change scenarios.
- Map of distribution of threats: **The various threats are expected to vary in their presence and intensity across the landscape**. A primary map indicating intensity of the threat on the grid-based map will help visualize the interface of snow leopard and threat distribution across the landscape.

Another important visualization is the distribution of the intensity of the threat along the administrative borders within the landscape (e.g. Indicate intensity of threats across the borders of the various districts). Such a map assists in planning the mitigation of the threats as interventions are expected to be implemented at the scale of administrative regions.

3. Management of the Landscape

A few notes on the chapters dealing with the Part B of the management plan are provided here. Further details are available in the Addenda.

3.1. Management Plan Vision, Goal, Objectives

(Chapter 8)

Vision (the big picture of what the plan wants to achieve keeping in mind the GSLEP goal of securing the landscape with at least 100 breeding snow leopards), **goals** (general statements of what needs to be accomplished to achieve the vision), **objectives** (measurable milestones with specific timelines for achieving the goal(s)). These are often possible with **action plans** where specific implementation plans are prepared with finer level activities, responsibilities, timelines, indicators etc. All these can be expressed through strategic tools such as the Open Standards analysis or as log frames (Addendum 1).

3.2. Zonation

(Chapter 9)

The GSLEP management plan should recognise existing land use categories including wildlife-protected areas, which have legal protection under the country's laws. Apart from these, other zones can be identified for specific management purposes. These may include zones for tourism, pasture use, other multiple use areas, and areas where destructive land uses such as mining or ecologically damaging infrastructure could take place. A key first step is to identify the best areas for snow leopard and other wildlife in the landscape where damage must be avoided or minimized. This can be carried out through surveys mentioned above (Section 2.6) that can be followed with probabilistic species distribution modelling to identify about two to three habitat suitability categories. This layer of information, along with that on local community and departmental stakes, can be used to delineate different management zones.

3.3. Framework for multi-sectorial cooperation and information sharing

(Chapter 10, more information in Addendums 3 & 4)

As explained above (Section 2.6.3), apart from local communities, various government departments, developmental and conservation agencies also have their mandates and roles in the landscape, which may conflict or complement conservation of the region. It is useful for the core team to identify such important stakeholders and co-opt them in the Working Group itself. Further, engagement with them at national, provincial and local levels is important to understand their mandates and activities as well as forge a working partnership with them. Cooperative activities with these agencies can help in mainstreaming their developmental agenda with conservation, save resources by avoiding duplication of work between agencies and also avoid divergent activities to the degree possible. These activities should find place in the action plan or log frame.

3.4. Framework for coordination with relevant and key business and industry groups

(Chapter 11)

Businesses can play an important role in conservation through investments in sustainable livelihoods for local communities, green growth (Addendum 8) and also providing resources for management planning and its implementation. The key businesses with an interest in the landscape and its surroundings can be identified and meetings can be held with them to understand their mandates and proposed activities. The team can work with them and other experts to enable a green and resilient economy.

3.5. Governance mechanism at various levels

(National/ Landscape/Provincial/Community levels, Chapter 12, Addendum 4)

Community participation and collaboration with other agencies, including businesses, has been stressed above for holistic and integrated management of GSLEP landscapes. This, along with the other activities to mitigate conservation threats (Chapter 13, 14) essentially constitutes the crux of the GSLEP management plans. The innovative programs may need considerable funding that may come from different agencies (see Chapter 16 below). In order to enable suitable planning, implementation and fund utilisation, the existing mechanisms of insular sectoral works may not deliver. It is thus key to work on alternative governance structures that allows the lead agency to work effectively with collaborators and for them to utilise funds from varied sources for integrated work in the landscape under the management plan. One such body is a registered 'foundation' or 'society' that has representation of government, non-government, academicians and community members both men and women that can oversee annual plan preparations, monitoring and fund management.

3.6. Addressing Threats – Best Practices

(for core, zones such as buffer, multiple resource use area, Chapter 13, Addendum 1)

Identifying and ranking threats has been covered in Section 2.6.3 above. Threats invariably have a root cause and related group of people who may be causing the threat. Based on brainstorming sessions with key informants, researchers and experts, the causes, patterns and people responsible for the threat should be identified. Simultaneously the Working Group can study local, national and international case studies and reports to document the best practices for mitigating any threats (examples and approach provided in Addendum 5) to develop a set of approaches that can be used for this landscape. This chapter can form a quick reference kit for implementing teams to understand and select their approach to mitigate a threat.

It may be noted that unlike for smaller wildlife PAs, the activities for threat mitigation may not be very specific to begin with. For example, if people-snow leopard conflict resolution is a need for the landscape, it may not be clear at the outset about which villages are affected, how serious is the issue, what are the conditions under which livestock are lost (in pastures or in corrals), which are vulnerable seasons, and so on. Hence, specific prescription on prevention activities (corrals, better herding) or compensation (livestock insurance) may not be clear until village meetings are held for resolving the issue. What may however be clear is a certain number of villages where multi-pronged conflict management needs to be targeted each year. Like stated above, with a compilation of best practices relevant to the landscape presented in this chapter, the implementing teams can decide on the best approach when they are dealing with any specific case. A brief sample of such a compilation is presented in the table below:

Table: A sample of threats commonly encountered in snow leopard range along with possible actions that may be followed to mitigate them. More specific best practices are available in Addendum 5. Management plans can ideally identify and list such actions for the various parts of the landscape

Threat	**Broad approach**
Conflicts over livestock depredation by snow leopards and other carnivores.	• Understand patterns and drivers of conflict (where, when, why, how much), and hotspots that require priority action • Develop multi-pronged strategy for prevention (e.g. better herding, predator-proof corrals), sharing economic losses (e.g. community based livestock insurance), improving attitudes through alternative livelihood support (e.g. wildlife based tourism, other local, remunerative enterprises), and awareness generation among the affected group • Similar strategies can be used for crop depredation by wild herbivores
Excessive livestock pressures leading to degradation, competition with wild herbivores and disease transmission	• Understand spatiotemporal patterns of livestock use, pressures and the herders dependencies • Explore community-based options for reducing livestock numbers, rotational grazing, or dispersing pressures in areas with lesser importance to wildlife. • Establishing community managed reserves with regulated and reduced livestock grazing • Prioritizing alternative livelihood options for affected communities. These can include remunerative cash crops, arts and crafts and regulated wildlife based tourism • Engage with government departments and local pasture regulating authorities to develop short and long term strategies to balance needs of pastoralism and wildlife conservation
Development pressures (linear infrastructure, mining, dams, etc.)	• Partnerships developed with infrastructure agencies as a part of the management plan that can help influencing changes and alternatives in potentially damaging activities in the planning stage itself (e.g. Realignment of roads, change in magnitude of infrastructure) • Inclusion of 'green' activities in infrastructure (eg. movement corridors (under or over passes), traffic regulation, improved effluent treatment, etc.)
Poaching of snow leopard, prey and other wildlife (including endangered plants)	• Understand poaching trends, poachers and drivers of poaching • Develop incentive programs for local stewardship for wildlife protection • Use local religious institutions to influence communities to stop poaching • Better staff capacity in apprehending poachers, crime scene investigation, prosecuting poaching cases. • Better enforcement mechanisms (check posts, patrolling, etc.)
Biomass extraction	• Encourage solar efficient housing (e.g. solar-passive housing, glass houses), to reduce fuel extraction (collaboration with specialized government and private organizations specializing in renewable energy can greatly benefit these initiatives) • Import of construction material so that local extraction of plants is reduced • Develop pastures in degraded sites near settlements using approaches such as seeding native plants, irrigation, etc.

Threat	Broad approach
Poverty and few available livelihood options	• Improving livelihood opportunities for local communities is a crosscutting theme to mitigate most threats • Opportunities often are available in value addition and innovations in the agriculture (cash crops, food processing), livestock husbandry (cheese, cashmere, wool based) and tourism (especially wildlife based) sectors • Local government departments, NGOs and international agencies may specialize in such initiatives and they can be co-opted based on convergence-based partnerships to strengthen such components in the management plan

3.7. Activity, Responsibility, performance criteria, funding, monitoring of outputs/ outcomes

(Chapter 14, Addendum 1)

This chapter emerges from the previous one with the addition that in this chapter more specific 'results chains' or log frame should be prepared that spell out objective-wise activities to be carried out, responsibility of the agency, indicators of success, amount and sources of funding and timelines.

3.8. Research gaps, needs and priorities

(Chapter 15)

The management planning exercise for the large GSLEP landscapes are to be conducted in relatively short period of time. It is possible that quantified information on aspects such as - species occurrences, status, stakeholder dependencies, threats, especially the emerging threats, may not be documented sufficiently. It will thus be useful to identify such gaps in information and encourage researchers to take up these studies on priority. It is also advisable to institute a small grant program under the management plan for academic institutions that can support student projects on these issues. Once completed, these studies can be used to update the management plan under an adaptive framework.

3.9. Funding Mechanisms

(Chapter 16)

Funds will typically include existing government resources for wildlife conservation, especially for the protected areas, funds specifically raised from national and international donors, funds from offset schemes, and departmental resources. Funding opportunities under 'Payment of Ecosystem Services' (PES) and 'Biofin' (UNDP) should be explored. It is crucial to understand that in most cases pooling these funds for tasks on the ground can help carry out activities effectively. It is also crucial that there is a statutory or registered body to manage these funds, like mentioned in the Chapter 12 on governance mechanisms (Section 3.5).

3.9.1. SDGs and the GSLEP Management Plans

The **Sustainable Development Goals** (**SDGs**) are a collection of 17 global goals agreed by the United Nations in 2015 as a follow up of the Millennium Development Goals that ended in 2015. The formal name for the SDGs is "Transforming our World: the 2030 Agenda for Sustainable Development," shortened to '**2030 Agenda'**. The goals are broad and slightly interdependent, and each has a separate list of targets to achieve, totalling to 169 targets. Achieving as many of these as is possible would contribute to accomplishing the 17 goals and would be a national achievement. The SDGs cover social and economic development issues including poverty, hunger, health, education, climate change, gender equality, water, sanitation, energy, urbanization, environment and social justice. It is notable that most GSLEP management plans are likely to work on at least 14 of the 17 goals to varying degrees (Goal 1: No Poverty, Goal 3: Good Health and Well-Being for People, Goal 4: Quality Education, Goal 5: Gender Equality, Goal 6: Clean Water and Sanitation, Goal 7: Affordable and Clean Energy, Goal 8: Decent Work and Economic Growth, Goal 9: Industry, Innovation, and Infrastructure, Goal 10: Reducing Inequalities, Goal 11: Sustainable Cities and Communities, Goal 12: Responsible Consumption and Production, Goal 13: Climate Action, Goal 15: Life on Land and Goal 16: Peace, Justice and Strong Institutions). Linking and aligning the GSLEP management plans to the SDGs can enhance funding opportunities, help with fulfilling national obligations, and strengthen conservation. Addressing climate change impacts and adaptation of communities is also a crosscutting theme in most management plans. The Green Climate Fund (https://www.greenclimate.fund/) can also provide an important contribution for funding work under the management plan.

3.10. Management Plan writing, stakeholder workshop, approvals and implementation

The management plan should be written by the multi-party Working Group based on these guidelines. This consultative document should then be presented to the stakeholders for their inputs. The highest possible government authority should approve the Plan to ensure convergences and partnerships between agencies. Funding commitments should be obtained and the various structures (eg. Foundation), especially at the landscape level should be formed for implementation of the management plan.

4. Time lines

The proposed surveys are designed to get a coarse-scale understanding of the current situation within about six months (24 weeks) time period for the GSLEP Landscapes (assuming that skilled manpower is already available, or can be put together quickly with an early training component). The following is an ideal time-line to achieve this target. However, investigators are encouraged to be flexible and responsive to the local conditions.

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Grid-based survey for animal distribution						
Village and key-informant interviews*						
Interviews and data collection with government and semi-government and private stakeholders^						
Mapping & other analyses						
Developing collaborations and partnerships						
Reporting						
Stakeholder workshop						
Approvals & Funding						

**Expected to be conducted in parallel with animal distribution surveys by dedicated members of the field team*
**Expected to be collected by a dedicated team of people capable of working with the officials of these departments*

The eight Advice Documents (http://www.globalsnowleopard.org/our-work/a-toolkit-for-management-planning/) and their relevant chapter numbers (Section 2.1) are

Addendum 1: Strategic Management Planning in Snow Leopard Landscapes:
(useful for Chapters 4, 6, 13 & 14)
Addendum 2: Participation in Conservation: (Chapters 2, 4, 6, 7)
Addendum 3: Stakeholder Analysis in Snow Leopard Landscape Management Planning:
(Chapters 7)
Addendum 4: Integrated Management and Governance of GSLEP Landscapes: (Chapters 7, 10, 11, 12)
Addendum 5: Best Practices in Snow Leopard Conservation: (Chapters 13, 14)
Addendum 6: Incorporating Climate Change in Snow Leopard Landscape Management Planning:
(Chapters 6,13, 14)
Addendum 7: Mapping to Support Snow Leopard Landscape Management Planning:
(Chapters 2,3,4,5,9,13, 14)
Addendum 8: Green Resilient Economic Development in Snow Leopard Landscape Management Planning: (Chapters 13, 14, 16)