

PAWS process

Global Snow Leopard and Ecosystem Protection Program
www.globalsnowleopard.org



Snow leopards are the icon of high mountains of Asia and represent habitats that provide water to large parts of Asia. Their ecosystem services benefit more than a billion people, and sustain unique high-altitude cultures. The species is threatened by poaching and illegal trade, retribution killing by local people due to predation on livestock, climate change, mining, and large-scale infrastructure development. Robust population estimates about the species are available only from 2% of their entire distribution range, which too is biased as in most cases only best habitats have been sampled so far. This makes projections about their populations unreliable.

Governments from the snow leopard range countries identified the need for more robust and expansive monitoring of snow leopard populations. This was reflected in the Bishkek Declaration 2017, Kathmandu Resolution 2017, Issykkul Statement 2018 and Shenzhen Consensus 2018 related to the [Global Snow Leopard and Ecosystem Protection Program \(GSLEP\)](#).

The International Snow Leopard and Ecosystem Conservation Forum 2017 (SL Forum 2017) in Bishkek set the goal of developing a robust estimate of the global snow leopard population. At a high-level meeting of officials, range country governments decided that this effort to end the uncertainty surrounding the size of the world's snow leopard population was to be given high priority by the GSLEP program.

Taking into account the amount of effort and resources that are already being invested in estimating snow leopard populations at local sites where various national and international conservation organizations are operating, and the need to maintain a statistical rigor, follow up meetings have been conducted with participation of scientists and conservationists from over 20 organizations and different countries. PAWS or Population Assessment of the World's Snow Leopards, may take up to five years to be completed. The process is envisaged to generate additional benefits than just population estimates. These include the most reliable ever distribution map of snow leopards, spatial mapping of threats faced by the species across different parts of its range, capacity building of young conservationists and local champions, and identification of potential refugia for snow leopards in response to various climate change projections.

To estimate reliable snow leopard population estimates, a two stage process has been identified by the technical and oversight panel that was set up by the GSLEP Steering Committee, represented by Environment Ministers of the 12 snow leopard range countries. These two stages involve various activities including training and capacity building workshops, periodic interaction with specialists supervising the effort, fundraising, procurement of equipment, field surveys, analysis of data, and setting up of national and regional leads and partner organizations.

The PAWS Scientific Advisory Panel has provided guidance on the optimal sampling design for distribution and abundance surveys using interviews, primary surveys, camera trapping and genetic sampling that will soon be made available on the GSLEP website. A continuous review and feedback mechanism is built to facilitate course correction and adaptive improvement of sampling coverage.

The primary two stages, as identified by the technical oversight panel are:

1 Assessing snow leopard distribution as a function of one or more habitat covariates

- a. Method(s): Site occupancy modeling
- b. Data required: Interview, sign survey and camera trapping
- c. Sampling unit: 225 sq km grid cells (15km x 15 km) that can potentially be represented through a specific sampling effort
- d. Workshop needs: Up to five workshops focused on planning, designing, field training, pilot surveys feedback, and analysis
- e. HR needs: Field teams to collect data in the field, research support to coordinate and monitor design, implementation and analysis
- f. Indicative Timelines: For each survey, 1 month for planning and logistics, 1 month for pilot data collection, 15 days for pilot data analysis, 1-2 months for main data collection, 1-2 months for analysis across a study area covering 10,000-50,000 sq km
- g. Outcomes: A surface denoting probability of site use by snow leopards

2 Estimating abundance as a function of heterogeneous density across space

- a. Method(s): Spatial Capture Recapture modeling
- b. Data required: Camera trapping or genetic sampling
- c. Sampling unit: 500-5000 sq km of a coverage with clusters of camera traps or genetic sampling transects

- d. Workshop needs: Up to six workshops focused on planning, field training, data collection and organization, analysis, feedback and course correction, and stratification and selection of sites
- e. HR needs: Field teams to install cameras or collect genetic data in the field, research support to coordinate and monitor design, implementation and analysis
- f. Indicative Timelines: For each survey, 1 month for planning and logistics, 1 month for setting up cameras or collect genetic data, 2 months for data collection and organization (after at least 3 3 months of field data collection in case of camera traps), and 2 months for analysis. The intensive sampling may need to be repeated in several sites depending on the stratification (stage1), representation and desired level of precision
- g. Outcomes: Snow leopard density and abundance estimates

The stage 1 (occupancy) surveys will help develop a surface that provides probabilistic maps of survey units used by snow leopards. These probabilistic maps will then be used to stratify and identify sites for intensive sampling (stage 2) using Halton's Iterative Partitioning made available through a macro-site selection application. Specific guidance on where to set up camera traps within a site selected for intensive sampling will be provided via a micro-site selection application.

It is important to note that completion of stage 1 is not mandatory to initiate stage 2 sampling, as the latter can be initiated using appropriate selection of sites based on available knowledge. Each intensively surveyed location will eventually contribute to the spatial representation of the snow leopard abundance at regional, national and global scales.

Specific applications, guidelines and manuals to help on-ground implementation, training workshops, and interactive tools are slowly being made available via the GSLEP website's exclusive page on PAWS.

The panel is co-chaired by Prof. David Borchers, University of St. Andrews, UK and Prof. Lu Zhi, Peking University, China. Other members include Mr. Ashiq Ahmad Khan (Pakistan), Dr. Charudutt Mishra (India), Dr. Chris Sutherland (USA), Dr. James Nichols (USA), Prof. Sandro Lovari (Italy), Dr. Som Ale (Nepal), Dr. Thomas McCarthy (USA), Mr. Wali Modaqiq (Afghanistan) and Dr. Darryl Mackenzie (New Zealand). The panel is being coordinated by GSLEP Secretariat, and its members can be reached out for comments, questions or suggestions via the GSLEP program (secretariat@globalsnowleopard.org).

PAWS Work-flow

