Snow Leopard (*Panthera uncia*) Status in Russian Federation

CONTRIBUTORS:

Alexander Karnaukhov[1]*

1 Institute of Ecology and Evolution, Russian Academy of Sciences

* Email: a.s.karnaukhov@gmail.com

1. Distribution

The snow leopard's (*Panthera uncia*) distribution in Russia is concentrated in the Altai-Sayan region, where the species lives in the Altai, Western and Eastern Sayan mountain ranges, as well as the mountain massifs of Tyva and Buryatia. The total area of the key snow leopard habitat in the Russian Federation is about 37,350 km^2 (Strategy on Conservation of Snow leopards in the Russian Federation, 2014; Paltsyn et al., 2016; Karnaukhov et al., 2024).

In the Altai Republic, snow leopard habitat is located within Central, Southeastern and Eastern Altai, and includes the Katunsky Ridge, Northern and Southern Chuisky Ridges, Tabyn-Bogdo-Ola and Sailyugem Ridges, Kuraisky Ridge, southern Shapshal Ridge, the Chulyshman Highlands, and Chikhachev Ridge. The total area of the key snow leopard habitat in the Altai Republic is about 13,500 km^2.

In the Tyva Republic, resident snow leopard populations are found on the eastern slopes of Chikhachev Ridge, Mongun-Taiga Massif, Tsagan-Shibetu and Shapshal Ridges, the western side of Western Tannu-Ola Ridge, and Sangilen Ridge. Snow leopards have also been documented in the Alashsky, Khemchiksky, Eastern Tannu-Ola, Akademik Obruchev, Ergak-Targak-Taiga, and Udinsky Ridges (Poyarkov et al., 2019). The total area of the key snow leopard habitat in the Tyva Republic is about 14,000 km^2.

In Krasnoyarsky Krai, a resident population of snow leopards inhabits the periphery of the Sayano-Shushensky

Reservoir within the Sayano-Shushensky State Biosphere Reserve and its buffer zone (specifically in the Khemchiksky and Kurtushubinsky Ridges). The total area of the key snow leopard habitat in Krasnoyarsky Krai is about 1,600 km^2 (Korablev et al., 2021).

In the Buryatia Republic, the best habitat for snow leopards is located on the Bolshoy Sayan Ridge (Karnaukhov et al., 2018). The species has an ongoing presence on the slopes of Okinsky, Tunkinsky, and Kropotkinsky Ridges. The total area of the key snow leopard habitat in the Buryatia Republic is about 8,300 km^2.

The distribution map in Figure 1 is based on MaxEnt model of snow leopard habitat (Kalashnikova et al., 2019; Karnaukhov et al., 2020). For this modeling we used 2,866 points of snow leopard sightings collected in Russia in 2000-2016. All variables for the habitat modeling were converted to Alber's Equal-area conic projection for the Northern Asia and spatial resolution of 1000 m. The modeling area encompassed all areas of potential snow leopard presence from Western Altai to Zabaikalsky Krai.

The following 10 variables were used for the modelling:

- Elevation. Source of data: CGIAR-CSI SRTM website http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1
- Slope. Was built as derivative of Elevation variable
- Ruggedness. Was built as derivative of Elevation variable
- Aspect (with 4 categorical parameters: north, east, west, and south). Was built as derivative of Elevation variable
- Sum of precipitations in November-March. Source of data: Global Climate Data (WorldClim) modern period http://www.worldclim.org/
- Averaged fraction of snow cover in November-March. Source of data: MODIS/Terra Snow Cover Monthly L3 Global 0.05Deg CMG datasets http://dx.doi.org/10.5067/IPPLURB6RPCN (Hall, Salomonson and Riggs 2006)
- Fraction of snow cover in July (proxy of glaciers and permanent snowfields). Source of data: MODIS/Terra Snow Cover Monthly L3 Global 0.05Deg CMG
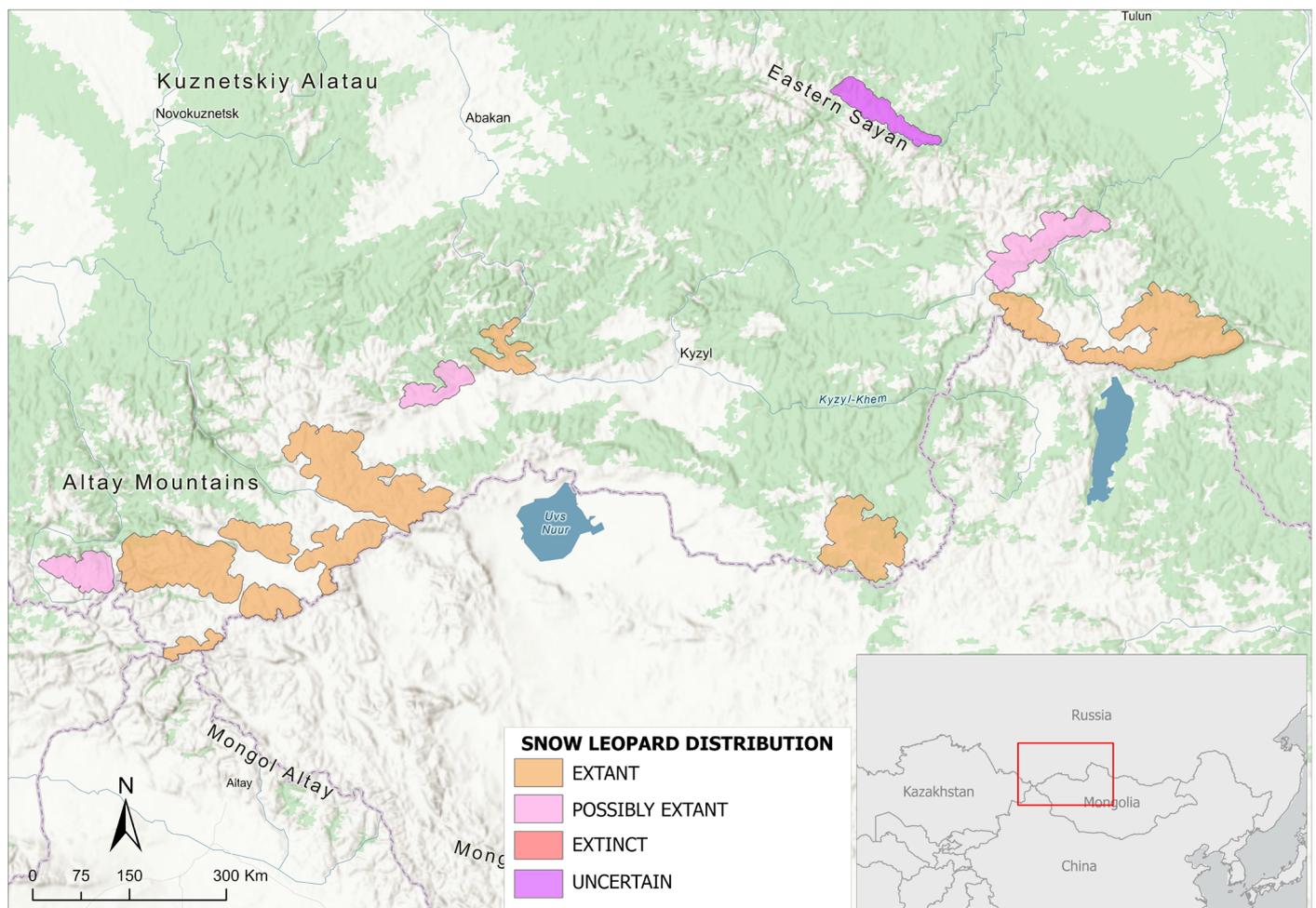

Figure 1. *Snow leopard distribution in Russia mapped based on collated data sources (see below), showing areas classified as extant, possibly extant, and possibly extinct according to IUCN Red List standards.*

datasets http://dx.doi.org/10.5067/IPPLURB6RPCN (Hall, Salomonson and Riggs 2006)

- Fraction of bare ground area (cliffs, screes, high mountain deserts). Source of data: MODIS Vegetation Continuous Fields (VCF) http://glcf.umd.edu/data/vcf/
- Fraction of tree cover. Source of data: MODIS Vegetation Continuous Fields (VCF) http://glcf.umd.edu/data/vcf/
- Fraction of grass and shrub cover. Source of data: MODIS Vegetation Continuous Fields (VCF) http://glcf.umd.edu/data/vcf/ .

The modeling exercise was implemented in MaxEnt (Version 3.3.3k). A logistic type of MaxEnt modeling output (probability surface of species habitat) was used to interpret our results more intuitively, ten model replicates using the cross-validation function and a maximum of 5,000 iterations. For all other parameters default options were used. For evaluation of the model's ability to predict snow leopard habitat, two tools integrated in MaxEnt were used: (1) test omission rate and predicted area as a function of the cumulative threshold for 10 model replicates; (2) area under receiver operating characteristic curve (AUC) for 10 model replicates. Contribution of each variable in the habitat model was assessed using table for variables generated by MaxEnt. For classification of habitat types, only the averaged probability surface from 10 replicates was used. 10 percentile training presence logistic threshold was used as a threshold for extraction of all snow leopard

potential habitat from the probability surface. This value was 0.278. All pixels with a probability higher than 0.5 were classified as optimal snow leopard habitat.

The resulting raster model was digitized using standard QGIS tools. A 5-kilometer buffer was placed around the vector polygons and all openings inside the polygons were cut out. In addition, all random outcrops outside the historical range of the species were removed.

2. Population

The Katunsky, North and South Chuisky Ridges System (in the Altai Republic) is one of the largest areas of snow leopard habitat in the Russian part of the species' range, covering a total area of 6,000-8,000 km². Research conducted in this area in 2022 estimates the total snow leopard population at 23-24 adult animals (15-16 adult individuals in Argut river basin and 8 adult individuals in South and North Chuya Ranges), or 32-33 individuals including subadults and cubs. Camera traps confirmed these estimates, with each individual identified.

The Tabyn-Bogdo-Ola Ridge (in the Altai Republic) provides 800 km² of potential snow leopard habitat in the Russian portion of this ridge. Evidence suggests 3-4 snow leopards occupy the western part of the ridge, along the border with Kazakhstan and China. The total population

Table 1: *Estimated Adult Snow Leopard Population by Region in Russia (2022– 2023)*

Province	Ridge/Area	Number Estimated (Adults)	Method Estimated	Year
Altai Republic	Katunsky, North and South Chuisky Ridges	23–24	Camera Traps	2022
	Tabyn-Bogdo-Ola Ridge	3–4	Camera Traps	2022
	Sailyugem Ridge	5	Camera Traps	2022
	Chikhachev Ridge with Talduair Massif	10–12	Surveys, Camera Traps	2022-2023
	Chulyshman Highlands	1–2	Surveys	2022
	Kuraisky Ridge	4–5	Camera Traps	2022
Tyva Republic	Mongun-Taiga Massif	2–4	Camera Traps	2023
	Tsagan-Shibetu, Shapshal, Western Tannu-Ola Ridges	11–12	Camera Traps	2022
	Sangilen Ridge	5–6	Surveys, Camera Traps	2023
Krasnoyarsky Krai	Sayano-Shushensky State Biosphere Reserve, Khemchiksky, Kurtushubinsky Ridges	5	Camera Traps	2022-2023
Buryatia Republic	Okinsky and Tunkinsky Ridges	7	Camera Traps	2022
Total for Russia		**75–86**		

of snow leopards on Tabyn-Bogdo-Ola Ridge is low, and the area is more likely used by snow leopards as a migration corridor to reach Altai Tavan Bogd, Sailyugem, Southern Altai, and Southern Chuisky Ridges.

Sailugem Ridge (in the Altai Republic) has suitable snow leopard habitat on its western and central parts (covering a total area of 1,700 km^2). Historically, the area supported a stable snow leopard population, but it was destroyed in the beginning of 1990s. The region is now naturally recovering following the establishment of Sailugemsky National Park. In 2022, 5 adult snow leopards were identified through camera trapping, along with 3 cubs (confirming that the population is reproducing).

The Chikhachev Ridge with Talduair Massif (within the Altai and Tyva Republics) spans an estimated 2,800-3,000 km^2 of transboundary snow leopard habitat between Altai Republic, Tyva Republic, and Mongolia. The snow leopard population on the Altaian side of Chikhachev Ridge is estimated at 10-12 individuals, with 7 adult snow leopards identified in the Altaian portion and 3 individuals in Tuvinian part during 2022- 2023.

The Chulyshman Highlands (in the Altai Republic) contains approximately 500 km^2 of potential snow leopard habitat, primarily in the southeastern part of this mountain range where the species is occasionally observed. Currently, no more than 1-2 snow leopards continuously occupy this area, with sporadic sightings captured by camera traps, typically once per year in Altaisky Nature Reserve.

The Kuraisky Ridge (in the Altai Republic) encompasses 2,000 km^2 of snow leopard habitat. Ongoing camera trapping has recorded at least 4-5 adult snow leopards in the area, but monitoring remains challenging due to limited staff capacity and availability in Ak-Cholushpa Nature Park.

The Mongun-Taiga Massif (in the Tyva Republic) has approximately 500 km^2 of potential snow leopard habitat. The snow leopard population in this area is estimated at 2–4 individuals.

The Tsagan-Shibetu, Shapshal and Western Tannu-Ola Ridges (in the Tyva Republic) span approximately 7-8,000 km^2 of snow leopard habitat. This area forms a single habitat for one of the largest snow leopard populations in Russia. Key habitat in Shapshal Ridge is located in the southern part, where the Khemchik and Shui rivers headwaters intersect with Tsagan-Shibetu Ridge. In 2022, 11-12 adult snow leopards were recorded during a nationwide snow leopard census.

Another potential snow leopard habitat is situated at the intersection of Western and Eastern Tannu-Ola Ridges (covering approximately 1,300 km^2). Currently it remains unclear whether snow leopards occupy this region continuously or only temporarily, as no confirmed snow leopard records have been made in the last decade.

The Sayano-Shushensky State Biosphere Reserve and the adjoining Khemchiksky and Kurtushubinsky Ridges (in the Krasnoyarsky Krai) encompass 1,500-2,000 km^2 of potential snow leopard habitat located at the intersection of Krasnoyarsky Krai and Tyva Republic. Snow leopards are typically found at elevations of 540-1,000 meters above sea level, only rarely climbing higher. Snow leopards are continuously present in this large area within the Sayano-Shushensky State Biosphere Reserve (covering an area of 130-150 km^2). Since 2008, staff from Sayano-Shushensky State Biosphere Reserve have been engaged in a long-term camera trap monitoring project, collecting detailed data on the population's composition, number, and sex-age structure. After the decimation of this population by illegal hunting in 2014-2015, 2 snow leopards were translocated from Tajikistan to the Reserve in 2018. The population is now stable, with 5 adult individuals.

The Sangilen Ridge (in the Tyva Republic) spans approxi-mately 4,700 km^2 of potential snow leopard habitat. Surveys conducted in 2004, 2009, 2012, 2017, and 2023 have found evidence of snow leopard activity in the Balyktyg-Khem River valley, in the valley and along the watershed that divides the Solbeldir River, at the headwaters of the Chokhyrtai River, near Mount Ulin-Khan, on the watershed divides of the Munguruk and Zhin-Khem Rivers, and at the headwaters of the Chokhyrtai and its tributary Munguruk. The snow leopard population in this area (Sangilen Ridge) is estimated at 5-6 adult individuals. It seems likely that the snow leopard population is heavily impacted by illegal hunting pressure, leading to a decline.

The Okinsky and Tunkinsky Ridges (in the Buryatiya Republic) intersect with Tyva Republic and Mongolia, encompassing approximately 8,000-8,500 km^2 of potential snow leopard habitat. In 2022, camera traps identified 7 adult snow leopards in this region.

According to data collected in 2022-2023, the total popu-lation of snow leopards in Russia is estimated to be no more than 70-90 adult individuals (Karnaukhov et al., 2024).

3. Threats

A number of natural and anthropogenic factors influence the status of snow leopards. All limiting factors affecting

snow leopards can be categorized into two main groups: direct and indirect threats.

Direct threats include the killing of snow leopards due to illegal hunting and retaliation for livestock attacks, live captures for captivity, and infectious disease.

Indirect threats primarily involve reductions in prey species population, economic infrastructure development within the snow leopard's range, and the loss of suitable habitat.

Illegal hunting

The level of illegal hunting has decreased in snow leopard habitat in Russia over the past decade. Currently, direct illegal hunting cases (with guns) are rare, with fewer than one case reported per year. However, snare-based hunting remains a serious threat to the species, and the practice is widespread throughout the snow leopard range in Russia, including within protected areas. Due to the snow leopard's use of habitual routes (reusing the same paths and routes to travel along ridges), it is easily caught in snares set along ridgelines and narrow mountain trails. Snow leopards are targeted for their valuable pelts and other body part derivatives but are also captured as bycatch in illegal snares set out for musk deer (*Moschus moschiferus*) and other ungulates (Strategy on Conservation of Snow Leopards in the Russian Federation, 2014).

Snare-hunting of snow leopards is the primary threat to the species in the Argut River basin, nearby parts of Katunsky, South Chuisky, and North Chuisky Ridges (Altai Republic), within the borders of Sayano-Shushensky State Biosphere Reserve and its buffer zone (Krasnoyarsky Krai), and on Sangilen Ridge (Tyva Republic). Snare-hunting is a lesser threat in the southern part of Shapshal Ridge, on the Chikhachev and Tsagan-Shibetu Ridges, and on Mongun-Taiga Massif (Tyva Republic).

Local residents are the primary perpetrators of illegal hunting with snares (targeting snow leopards or other species). The high value of snow leopard derivatives, musk deer and other species, drives this illegal activity. For many local people, it is one of the main sources of income in the snow leopard habitat. Snare hunters work in remote parts of the snow leopard's range, often remaining out of sight of enforcement agencies. If illegal hunting becomes highly intensive, critical populations could be completely extirpated within the next 10-15 years in Russia. Snare hunting does not occur in the highest elevation parts, above the treeline, of the snow leopard's range in Russia (Paltsyn et al., 2016).

Retaliatory killings

In certain regions, pastoralists who wish to protect their livestock from predation, and retaliate by killing snow leopards, present a significant threat to the species. This issue is most prominent in western Tyva (Chikhachev, Tsagan-Shibetu, and Shapshal Ridges, Mongun-Taiga Massif) and to a lesser extent in southeastern Tyva (Sangilen Ridge) and Altai Republic. There are virtually no snow leopard attacks on livestock in Buryatia Republic and Krasnoyarsky Krai.

Snow leopard attacks on livestock occur when domestic animals graze in rangelands that are directly in snow leopard habitats or when the populations of wild ungulates decline significantly due to illegal hunting. Livestock attacks are more common during winter months, especially in severe and high-snow winters. Snow leopards may attack both small livestock (goats and sheep) and large livestock (yaks and horses). Attacks may occur both in open pastures and in corrals or shelters where livestock are kept overnight. While snow leopard attacks on open pasture usually result in the death of one to three animals, an attack in an enclosure can lead to the death or injury of dozens of animals (up to 80), causing significant losses for herders. These corrals often trap snow leopards, as the cats cannot always escape through the hole in the corral's roof. Increasing livestock populations in snow leopard habitats not only increase the frequency of such conflicts but also outcompete wild ungulates, the snow leopard's natural prey, from mountain pastures (Paltsyn et al., 2016).

Decreased populations of primary prey species

The snow leopard population is directly influenced by the availability of its prey species. A reduction in the populations of ungulates (especially Siberian ibex *Capra sibirica*), the snow leopard's main prey base, is one of the key factors driving the decline in snow leopard populations.

Illegal hunting also affects the populations of the snow leopard's prey. In western Tyva, snow leopard attacks on livestock are believed to be driven by a significant decline in the population of wild ungulates due to intensive illegal hunting. Local residents report a sharp decrease in Siberian ibex population on the southern end of Tsagan-Shibetu Ridge following the construction of Mugur-Aksy - Kyzyl Highway. Ungulate populations (Siberian ibex) remain low in relatively accessible areas of snow leopard habitats, such as Southern Chuisky and Chikhachev Ridges, Mongun-Taiga Massif, Tsagan-Shibetu and Shapshal Ridges, and Sangilen Ridge. However, illegal hunting for ungulates (with the exception of illegal snare-hunting for musk deer) has a lesser impact on the snow leopard populations in the Argut River basin, due to its remoteness and inaccessibility,

and in the Sayano-Shushensky State Biosphere Reserve, due to enforcement regime.

Illegal snare hunting for musk deer, a prey species, is widespread in snow leopard habitats and further reduces the prey base.

Currently, hunting (second to livestock agriculture) is the main livelihood in Tyva, Altai Republics, and southern Krasnoyarsky Krai, following the collapse of the collective farming system and other state enterprises. Local residents possess a significant number of illegal firearms, a situation reflected in the annual confiscation of dozens of weapons. There are also documented cases of illegal hunting occurring within protected areas and snow leopard habitats.

Free-range livestock further exacerbates the depletion of wild ungulate populations in snow leopard habitats. In areas adjacent to herder camps, the population of wild ungulates are extremely low.

Ungulate populations in snow leopard habitats may decrease due to other occurrences, such as extreme winter events and epizootic disease.

Economic infrastructure development

Large-scale economic infrastructure development projects, both existing and planned, pose serious threats to snow leopard habitats.

Mining operations for minerals and other resources can lead to the degradation of key snow leopard habitats in the Altai-Sayan Ecoregion. Currently, the central part of the Chikhachev range, as well as the Sailugem and Sangilen ridges, face such threat due to planned large-scale mining projects (a series of complex ore deposits) in the proximity of a transboundary snow leopard population. These development projects will not only result in the direct habitat destruction but will also increase disturbance and risk of illegal hunting for both ungulates and snow leopards.

4. Conservation

Legislation

The snow leopard is listed in the Russian Red Book (Category 1), which designates species whose population has been reduced to a critical level such that the species could be eliminated entirely in the near future.

The harvesting of fauna species listed in the Russian Red Book, including snow leopards, is regulated by a decree dated 6 January 1997, N 13, titled "On confirmation of the Rules for harvesting fauna belonging to species listed in the Russian Red Book, with the exception of water-based biological resources". Under this decree, snow leopards can only be harvested in exceptional cases for specific purposes, such as with the goal of its conservation, scientific population monitoring, regulating population numbers, safeguarding public health, eliminating threats to human life, or controlling large-scale infectious diseases in livestock or other domesticated animals.

The trade in fauna listed in the Russian Federation Red Book (including snow leopards) is regulated by a decree of the Russian Federation government dated 19 February 1996, N 156, entitled "On the procedure to issue permits (administrative licenses) for trade in wild animals belonging to species inscribed in the Russian Red Book". According to this decree, holding wild animals in captivity listed in the Russian Red Book, including snow leopards, is only permitted for the goal of conservation, reproduction of animals in artificially created environments, scientific purposes, or cultural/educational activities. Any release of such animals back to its natural environment must aim to support the conservation and/or increase their natural population. Snow leopards can only be harvested under exceptional cases, following a permit issued by Rosprirodnadzor (in accordance with the administrative procedures published by the Federal Oversight Service in the Area of Natural Resource Use). The harvest of flora and fauna listed in the Russian Red Book and affirmed by the Ministry of Natural Resources-Russian Federation decree dated 18 February 2013, N 60, (registered by the Russian Ministry of Justice, 25 June 2013, registration N 28880), according to the "Estimating procedures for calculating damage caused to fauna listed in the Russian Red Book as well as to other fauna not considered to be species targeted in hunting and fishing or caused to their habitat, affirmed on 28 April 2008 by decree N 107" at the Russian Ministry of Justice, the amount of damage inflicted by the destruction of one snow leopard is determined to be 1,100,000 roubles.

The snow leopard is listed in the Red Books of seven administrative regions in the Russian Federation: the Altai, Tyva, Khakasiya, and Buryatiya Republics, Irkutsk Oblast, Krasnoyarsky and Zabaikalsky Krais.

Key legislation governing the protection and use of natural of fauna resources, including the snow leopard, and their habitat includes:

- Federal law dated 10 January 2002, N 7, "On environmental conservation";
- Federal law dated 24 April 1995, N 52, "On the animal world";
- Federal law dated 14 March 1995, N 33, "On protected areas"; and

- Federal law dated 24 July 2009, N 209, "On hunting and the conservation of hunting resources and amendments to certain legislative acts of the Russian Federation".

In addition to these laws, various regulations govern the protection and use of fauna resources, including the snow leopard, and their habitats, based on specific federal and regional frameworks (including departmental regulatory legal acts in various branches of the law, e.g. civil, criminal, administrative law).

The Federal Law "On the Animal World" provides the legal foundation for managing the conservation and use of animal resources, establishing government ownership of the wildlife within the boundaries of the Russian Federation. The federal law defines the authority of Russian federal agencies in managing wildlife and their habitats, outlines the rights of citizens and legal entities in conservation efforts, and sets out the government's role in monitoring and conserving rare and endangered species like the snow leopard. The law establishes the necessity of conducting government population surveys of fauna species, the use of those surveys, maintaining government cadastres of fauna, conducting government monitoring of fauna and the implementation of governmental programmes on the conservation of fauna species and their habitats.

Federal Law No. 150, dated July 2, 2013, amended the Russian Code of Administrative Violations to include penalties for illegal harvesting, transport, and trade of protected animals. The law also established criminal liability for certain offenses related to species like the snow leopard, including contraband activities and violations related to international borders (Strategy on Conservation of Snow Leopards in the Russian Federation, 2014).

Despite these measures, enforcement remains challenging in many protected areas. Some protected areas require boundary adjustments and improvements in enforcement to better protect snow leopards. Transboundary cooperation between Russian and Mongolian conservation areas is also vital for protecting cross-border snow leopard populations (Karnaukhov et al., 2024).

The most significant protected areas for snow leopard conservation in Russia include:
- Sayano-Shushensky Biosphere Reserve,
- Ubsunurskaya Kotlovina State Biosphere Reserve,
- Sailyugemsky National Park,
- Tunkinsky National Park,
- Ak-Cholushpa, Belukha, Uch-Enmek and Ukok Quiet Zone Nature Parks,
- Tyva Nature Park.

These areas are crucial for the preservation of snow leopards and their habitats, but more coordinated and effective protection measures are needed to ensure their long-term survival.

Territorial enforcement

The total area of federal and regional protected areas (PAs), including buffer zones in snow leopard habitats, is 5,478,600 hectares. This means that 23% of the species' potential distribution in Russia, encompassing all habitat types, is under formal protection. However, only 16% of the snow leopard's favorable or high-quality habitat is currently protected.

Enforcement to protect snow leopards is inadequate in many protected areas. Changes in status, expansion, optimization of boundaries, and improvements to enforcement regimes are recommended for certain protected areas. To protect transboundary populations of snow leopards, it is important to ensure transboundary cooperation between Russian and Mongolian protected areas.

The northernmost population of snow leopards in Russia, with a population of 9-10 individuals, resides within the boundaries of Sayano-Shushensky State Biosphere Reserve and its buffer zone. The total area of potential snow leopard habitat on the boundary of Sayano-Shushensky Reservoir within the Reserve and its buffer zone is 100,000 hectares. The largest population of Siberian ibex in the Sayan Mountains, with an estimated 2,500 individuals, occupies this territory. This snow leopard population is stable as a result of the strict enforcement regime overseen by the Reserve's rangers.

The Mongun-Taiga site in Ubsunurskaya Kotlovina Biosphere Reserve in southwestern Tyva is located in the highest part of the massif and occupies 15,890 hectares, including glaciers, snow fields, rock masses, and rubble and rock field tundras. This marks the upper boundary of snow leopard habitat. The buffer zone of this Reserve is the most significant area to snow leopard conservation in Tyva, covering 125,600 hectares. It includes snow leopard habitat on the Mongun-Taiga Massif, the eastern macroslope of Chikhachev Ridge, and the southern part of Tsagan-Shibetu Ridge on the Mongolian border. 8 to 10 snow leopards are estimated to occupy this area. The total population of ungulates in this area is low, with an estimation fewer than 200-300 individuals. The Reserve collaborates with various conservation agencies in enforcement efforts (an interagency antipoaching brigade was established) and works with local residents to prevent conflict between herders and snow leopards. Expanding the buffer zone and adding a new site on Tsagan-Shibetu Ridge would strengthen protection for the existing snow leopard population.

Sailyugemsky National Park, created in the Altai Republic in 2010, consists of three sites: Argut, Sailyugem and Ulandryk, covering a total area of 118,380 hectares. Snow leopard habitat is located inside the Argut (80,730 ha) and Sailyugem (34,400 ha) sites. The largest snow leopard population in Russia is located now in this area.

In 2002, Shavlinsky Regional Nature Refuge was re-established (after a closure of 2 years) by a decree of the Altai Republic government. The refuge covers 248,081 hectares and surrounds the Argut site of Sailyugem National Park on three sides. It includes optimal snow leopard habitat in the Argut, Shavla, Karakem, Bolshoy Ary-Yuly, Maly Ary-Yuly, and Sredny Ary-Yuly river valleys, with a high density of Siberian ibex (up to 18 animals/ km^2).

Belukha Nature Park is located adjacent to the Argut site of Sailyugemsky National Park and Shavlinsky Regional Refuge to the west. Potential snow leopard habitat within the park is situated in the headwaters of the Akkem and Kucherla Rivers. Within the Natural Park, there are an estimated 400-500 Siberian ibex, sharing the landscape with musk deer and red deer. Uch-Enmek Nature Park, also located in Central Altai mountains near Argut river watershed, is adjacent to Sailugemsky National Park.

Ak-Cholushpa Nature Park, located in the Kuraisky ridge, is important for snow leopard conservation in Russia as it is the only protected area in the ridge, providing a migration corridor between Inner Mongolian and Russia populations through the Chikhachev and Talduair ridges. Unfortunately, conservation efforts of the Park have been ineffective, and the snow leopard population is currently low.

Ukok Quiet Zone Nature Park includes potential snow leopard habitat in the eastern part of the Sailyugem Ridge and on the northern macroslope of the Tabyn-Bogdo-Ola Ridge, on the borders of Russia, Kazakhstan, Mongolia, and China. The population of wild ungulates within the park (Altai argali *Ovis ammon*, Siberian ibex, Siberian musk deer, and red deer *Cervus elaphus*) is relatively low, but the area is an important migratory corridor for snow leopard populations from the Mongolian Altai, the Katunsky, Northern and Southern Chuisky Ridges, and Southern Altai Ridges.

Tuva Nature Park consists of several clusters, two of which are critical for snow leopard conservation in Russia – the Shuy and Shanchy sites. A stable snow leopard population exists in the Shuy watershed at the intersection of Tsagan-Shibetu and Shapshal ridges. Over the past three years, there has been a gradual recovery of the snow leopard population in the Shanchy site, which is near the Sayano-Shushensky and Ubsunurskaya Kotlovina Nature Reserves.

This area forms a single snow leopard habitat.

Tunkinsky National Park includes a small area of potential snow leopard habitat on the Tunkinsky Ridge along the Russia-Mongolia border. The snow leopard population in the park is low, with an estimate of no more than 2-3 individuals. Given the extensive industrial development in the Eastern Sayan Mountains (including the construction of mining enrichment facilities, major roads, and power transmission lines), there are insufficient protected areas for snow leopards in this region.

There are no protected areas in critical snow leopard habitats on the Russian side of the Chikhachev, Tsagan-Shibetu, and Sangilen Ridges.

Currently, there is no comprehensive territorial enforce-ment system for the entire snow leopard population in Russia. The importance of habitats vital for the species' conservation is rarely considered when selecting protected area categories and determining enforcement regimes for snow leopard habitats (Karnaukhov et al., 2024).

5. Acknowledgements

6. Conflicts of Interest

The author declares no known conflicts of interest.

7. References

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