

Ministry of Natural Resources and the Environment of the Russian Federation

A photograph of two snow leopard cubs in a natural habitat. The cub on the left is looking directly at the camera with its mouth slightly open, showing its pink tongue. The cub on the right is looking slightly to the side. Both cubs have light-colored fur with dark spots and stripes. The background is a blurred natural setting with green foliage and a rocky ground.

STRATEGY

for snow leopard conservation
in the Russian Federation

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**Moscow
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INTRODUCTION

The snow leopard or *irbis* (*Uncia uncia* or *Panthera uncia*) is the only large felid adapted to live in harsh high mountain conditions. The species has survived by occupying remote mountainous areas in Central Asia. The snow leopard is a species that is still poorly known: little is understood about the biology or ecology of this rare predator, and population and habitat estimates have only been provisionally determined.

The snow leopard is listed in the International Union for the Conservation of Nature (IUCN) Red List and has a status of Endangered in all 12 countries of its contemporary range.

The snow leopard is situated at the top of the ecological pyramid in Central Asia's mountain ecosystems. As a result, the preservation of viable snow leopard subpopulations is directly related to the conservation of mountain-steppe and mountain-tundra biomes inhabited by humans since ancient times. For many Asiatic peoples, the *irbis* is a symbol of power, wellbeing, and strength. Its image can be found on the emblems of some cities in Central Asia.

In Russia, the snow leopard resides at the northern border of the cat's modern range, in seven different constituent territories of the Russian Federation (Republics of Altai, Buryatiya, Tyva, Khakasiya, Zabaikalsky and Krasnoyarsky Krai, and Irkutsk Oblast) and it has only a few stable subpopulations in optimal habitats – the mountains of the Altai-Sayan Ecoregion – in Altai, Tyva, and Buryatiya Republics, as well as in southern Krasnoyarsky Krai. The Russian population of snow leopards is only 1-2% of the species' global population. The big cat's survival in Russia depends significantly on the preservation of connectivity of habitat and the genetic ties of its Russian subpopulations with the main population centre in Mongolia, as well as with large subpopulations in eastern Kazakhstan and northwestern China. As in the other nations within this species' range, the main threats to snow leopards in Russia are killings by poachers and herders, reductions in the main species that form its prey base, and, in a few cases, habitat degradation related to the development of mining activity and transportation infrastructure. Snow leopard de-

rivatives are used in traditional Eastern medicine as a substitute for tiger derivatives, while its pelts are highly valued by luxury lovers. The involvement of snow leopards in illegal trade raises serious concerns about the animals' future. Conservation of the northernmost snow leopard populations, living in Russia and adapted to unfavourable environmental factors at the edge of its range, is an important aspect of overall conservation work for this species and its genetic diversity in Central Asia.

The requirement for snow leopard conservation in Russia is vested in a number of laws and other regulatory acts, as the snow leopard is listed in the Red Data Book of the Russian Federation.

In 2002, the Ministry of Natural Resources of the Russian Federation affirmed the first “Strategy for Snow Leopard Conservation in Russia”. That document relied on broad-reaching research conducted at the initiative of WWF-Russia and calculated the snow leopard population in the Altai-Sayan region to be 120-150 animals, with a total expert assessment of the snow leopard population in Russia at 150-200 animals. More recent research conducted between 2003-2011 calculates a significantly smaller snow leopard population – no more than 90 animals. During implementation of the first Strategy between 2002-2011, the population and distribution of snow leopards living in Altai and Tyva Republics was more closely ascertained, as well as in southern Krasnoyarsky Krai. With support from the UNDP-GEF “Conservation of Biodiversity in the Russian part of the Altai-Sayan Ecoregion”, WWF-Russia, and the “Programme for the Study and Monitoring of Snow Leopards of Southern Siberia” (Permanent Expedition of the Russian Academy of Sciences for the Study of Russian Federal Red Book Species and Other Important Animals in Russia), a Monitoring Programme for Snow Leopard in Russia was developed (2009). Efforts to monitor key subpopulations utilize modern methods such as camera-traps and noninvasive genetic approach. Anti-poaching activities have been undertaken in snow leopard habitats, including first and foremost, the fight against illegal snare-poaching. New protected areas were established in the species' habitat, including Sailyugem National Park, Argut Nature Park, Ukok Quiet Zone Park, Ak-Cholushpa Nature Park in Altai Republic, Shuisky Nature Park in Tyva Republic, and Poyarym Federal Refuge in Khakasiya Republic. Between 2002-2011, projects to reduce conflicts between snow leopards and pastoralists took

place in western Tyva Republic. Small business eco-tourism development programmes have begun for residents living in snow leopard habitat to provide an alternative to illegal hunting. There is active cooperation between Russia and Mongolia on the study and conservation of transboundary populations of this species. As a result, key snow leopard populations in Russia have remained at a stable level in recent times.

The successful completion of tasks provided for in the first Strategy for the Conservation of Snow Leopards in Russia combined with changes to socio-economic conditions in the country in the 2000s are the justification for creating a new Strategy for the Conservation of Snow Leopards in Russia for the next ten years.

The new Strategy devotes significant attention to solving the following problems:

- Conservation of stable snow leopard subpopulations in Altai Republic, Tyva Republic, and in southern Krasnoyarsky Krai; restoration of a sustainable snow leopard population in the Argut River basin (Altai Republic);
- Development of transboundary collaboration with Mongolia and Kazakhstan in areas where snow leopards are found;
- Conservation of key snow leopard subpopulations by developing and increasing the effectiveness of a functioning system of special protected areas;
- Optimization of natural resource use and increased environmental responsibility in the area of subsurface resource use in snow leopard habitat;
- Reducing conflicts between herders and snow leopards;
- Development of stimuli for the development of economic activity for local residents to aid conservation of snow leopards and their habitat; inevitability of responsibility, including criminal, for illegal hunting, possession, and trade in snow leopards and their derivatives;
- Strengthening the fight against illegal snare-poaching and poaching in general with regard to snow leopards and wild ungulates;
- Develop managed hunting and increase populations of wild ungulates living within snow leopard habitat;
- Creation of an effective snow leopard monitoring system;
- Ongoing clarification of the current distribution and population dynamics of the snow leopard in Russia, implementation of new research methods.

1. STRATEGY GOAL AND OBJECTIVES

1.1. Strategy goal

The main goal of the current Strategy is the conservation of a sustainable population of at least 150 snow leopards (*irbis*) over the long term within the Russian Federation, with maximum possible genetic diversity and the preservation and restoration of viable subpopulations.

1.2. Strategy tasks

The following objectives must be completed in order to achieve the above goal:

- Protect existing sustainable snow leopard subpopulations in Russia and ensure conditions for the growth of their populations;
- Develop and implement additional mechanisms to protect sustainable snow leopard subpopulations in situations of increased anthropogenic impacts on ecosystems;
- Develop mechanisms to restore extirpated or disrupted subpopulations;
- Minimize the negative impact of anthropogenic factors on sustainable subpopulations of snow leopards and their habitat; and
- Increase populations of wild ungulates within the snow leopard's range.

2. CURRENT STATUS OF THE SNOW LEOPARD AND ITS BIOLOGICAL TRAITS

2.1 Systematic status of the snow leopard

2.1.1. Russian, English, and Latin terminology

Snezhny bars, or *irbis*; Snow Leopard, Ounce; *Uncia uncia* Schreber, 1775 (since 2006 *Panthera uncia*, Schreber, 1775 (Johnson et al., 2006))

2.1.2. Taxonomic status

Class: Mammals *Mammalia*

Order: Carnivores *Carnivora*

Family: Felids *Felidae*

Genus: Snow leopards *Uncia* (as a result of genetic research, it was merged with the large cats genus *Panthera* in 2006 (Johnson et al., 2006))

Species: Snow leopard *Uncia uncia* (since 2006 - *Panthera uncia*)

2.2. Distribution of the snow leopard in Russia

The current global range of snow leopards is limited to high-mountain regions in Central Asia and China and includes the following mountain systems: Pamir-Gissarsky, Alay, Tien-Shan, Tarbagatai, Saur, Altai, Sayan, Tibet, Kun-Lun, Hindu-Kush, Himalaya and Karakoram. According to assessments by Hunter and Jackson, potential snow leopard habitat in Central Asia occupies approximately 3 million km², of which approximately 1.8 million km² are verifiably established habitats, while the area of optimal habitat is just 550,000 km². The species' range stretches across 12 countries: Afghanistan, Bhutan, India, Kazakhstan, China, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tadzhikistan, and Uzbekistan.

Historically, 200-300 years ago, the snow leopard's range in Russia stretched from the Altai Mountains to the headwaters of the Lena River.

The snow leopard's modern distribution in Russia is concentrated in the Altai-Sayan region, where the species lives in the Altai and Western and Eastern Sayan mountain ranges as well as the mountain massifs of Tyva and Buryatiya (Figure 1). There are accounts of snow leopard encounters on Kuznetsky Alatau Ridge in the 1970-80s, as well as in southern Transbaikal.

In Altai Republic, potential snow leopard habitat is located within Central, Southeastern and Eastern Altai and include Terektinsky (eastern portion), Katunsky, Northern and Southern Chuisky, Aigulaksky, Kuraisky, Abakansky, Kurkure, Chulyshman, Shapshal, Chikhachev, Sailyugem, and Tabyn-Bogdo-Ola Ridges.

According to research in recent years, verified snow leopard encounters within Altai Republic have occurred only in the central and eastern portions of Katunsky Ridge, Northern and Southern Chuisky Ridges, Tabyn-Bogdo-Ola and Sailyugem Ridges, eastern Kuraisky Ridge, southern Shapshal Ridge, the Chulyshman Highlands, and Chikhachev Ridge (mainly its southern portion). Currently, there is only one identified sustainable subpopulation of the species that resides on Chikhachev Ridge at the border with Tyva Republic and Mongolia.

In Tyva Republic there are sustainable snow leopard subpopulations 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. Encounters with snow leopards are documented on Alashsky, Khemchiksky, Eastern Tannu-Ola, Akademik Obruchev, Ergak-Targak-Taiga, and Udinsky Ridges, facts that more likely demonstrate temporary ventures by snow leopards rather than forming any areas of continuous habitation.

Snow leopard may inhabit Khakasiya Republic at the headwaters of the Bolshoy Abakan, Maly Abakan, Karasibo, Urten, and Kantegir Rivers. However, the presence of sustainable snow leopard subpopulations has not yet been determined at the present time.

There is a sustainable subpopulation of snow leopards inhabiting the shores of the Sayansky Reservoir within the Sayano-Shushensky State

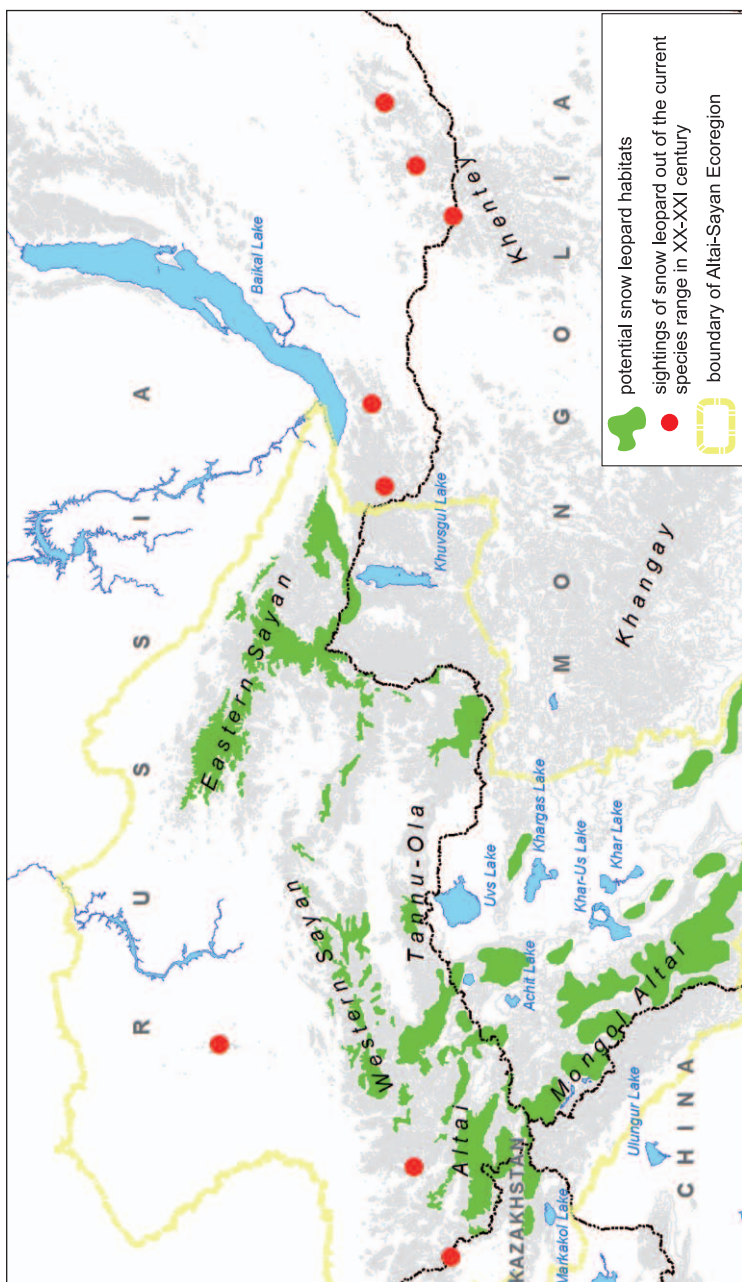


Figure 1. Distribution of the snow leopard in Russia and in adjoining Mongolia, Kazakhstan, and China

Biosphere Reserve and its buffer zone (Khemchiksky and Kurtushubinsky Ridges). Sporadic snow leopard encounters have been documented in the alpine tundra belt on Western Sayan Ridge.

In Irkutsk Oblast snow leopards have been noted at the southernmost part of Eastern Sayan Ridge at the headwaters of the Dzhuglym, Kara-Buren, and Barbitai Rivers. The best habitat for snow leopards is on the Bolshoy Sayan Ridge in Tofalariya, where in recent years the frequency of documented snow leopard spoor has increased. Continuously occupied habitats have not yet been identified in Irkutsk Oblast.

There is ongoing presence of snow leopards on the slopes of Okinsky, Tunkinsky, and Kropotkinsky Ridges in Buryatiya Republic, as well as sporadic visits to Primorsky and Khamar-Daban Ridges.

There have been encounters and signs of snow leopard activity at the headwaters of the Chikoy, Khilok, Ingoda, and Onon Rivers in the Khentei-Daursky Highlands.

In accordance with the 2002 Strategy for Snow Leopard Conservation in Russia affirmed by the Russian Ministry of Natural Resources, the total area of potential snow leopard habitat in our country is approximately 60,000 km², which comprises 2% of the current global range of the species.

The area of optimal snow leopard habitat (areas with minimal or no snow cover during winter months and with sufficient prey base) is significantly smaller and does not exceed 20-30,000 km² (Fig. 2). The area of occupied snow leopard habitat in Russia is no more than 12,000 km². This includes the Russian part of Chikhachev Ridge (approximately 1,000 km²), Tsagan-Shibetu Ridge (approximately 2,500 km²), Sayano-Shushensky State Biosphere Reserve and its buffer zone including adjacent parts of Khemchiksky and Kurtushubinsky Ridges (no more than 500 km²), Sangilen Ridge (1,500 km²), and Okinsky and Tunkinsky Ridges (5,000-6,000 km²). The sustainable subpopulation of snow leopards living in the Argut River basin at the end of the 20th century in an area of 1,000-1,200 km² was radically disrupted at the beginning of the 1990s and early 2000s and currently, there are only a few individuals present.

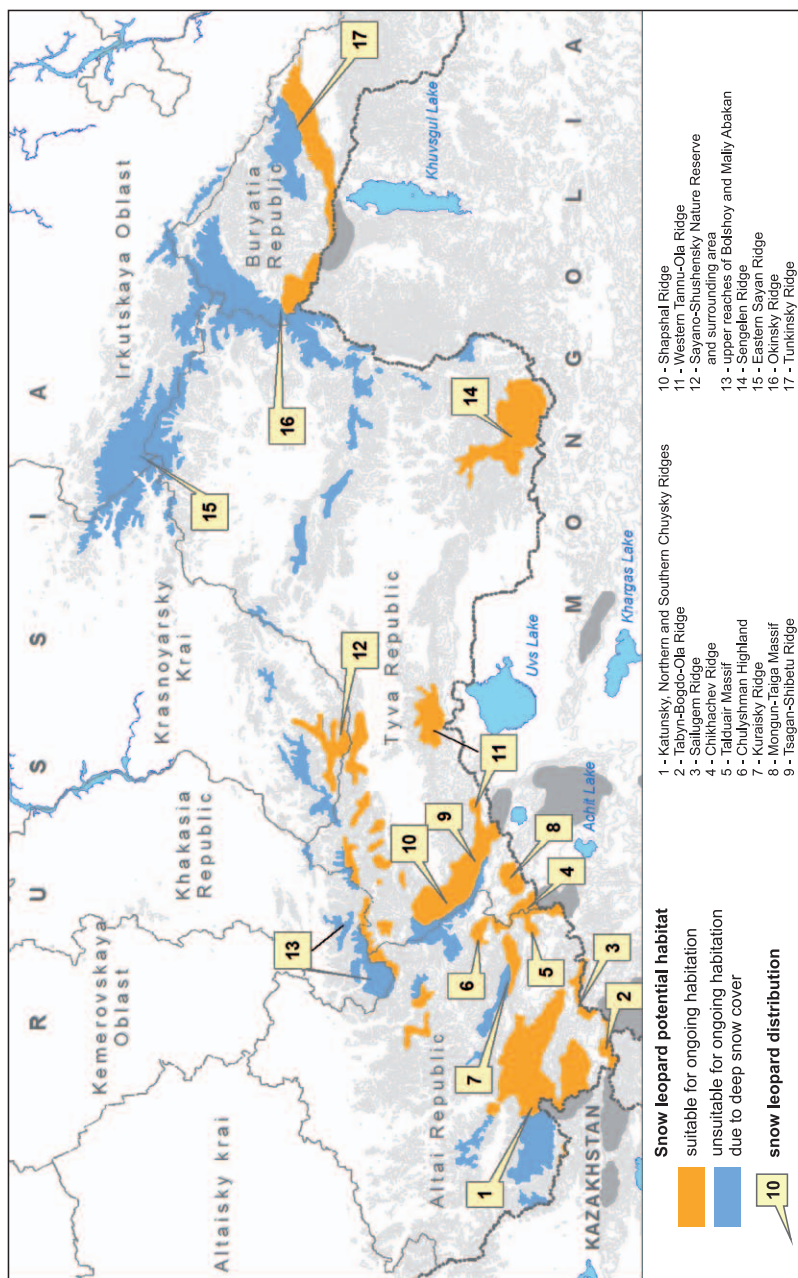


Figure 2. Potential snow leopard habitat in Russia Locations

2.3. Snow leopard population in Russia

The total global population of snow leopards is 4,080-6,590 animals. In the “Strategy for Snow Leopard Conservation in Russia” (2002), the total population of the species is estimated by experts at 150-200 individuals. According to the latest data (2000-2011), the current snow leopard population in the country is assumed not to exceed 70-90 animals. Below, the most recent data gathered between 2000 and 2012 on the snow leopard subpopulations in Russia is presented.

Katunsky, North and South Chuisky Ridges System (Altai Republic). According to the “Strategy for Snow Leopard Conservation in Russia” (2002), this is one of the largest areas of snow leopard habitat in the Russian part of the felid’s range, with a total area of 8,000-9,000 km². According to research results in this area in 1998-1999, the total snow leopard population here was estimated at 30-40 animals. However, field-work conducted between 2004-2011 showed that the snow leopard population here is much lower. During the period of 2004-2011, staff from Altaisky State Biosphere Reserve were unable to find evidence of ongoing snow leopard habitation in the middle part of the Argut River basin. Surveys using camera-traps of the middle Argut River valley also failed to find evidence of this predator. Evidence of continuous snow leopard habitation by several felids was discovered in the most remote parts of Argut only in 2012 – in the Kulagash, Iedygem, and Karagem river valleys. There, photographs of three different individuals were captured on camera-trap, as well as signs of activity belonging to another 3-4 animals. Thus, the total population of snow leopards in the middle Argut River basin at the current time does not exceed 6-7 animals. The main reason for the absence of snow leopards in the survey area is, most likely, intensive poaching using snares to target musk deer, and, consequently, snow leopards.

In 2004 and 2001, no evidence of snow leopard activity was found in the eastern part of Southern Chuisky Ridge (headwaters of the Kok-Ozek, Sebystei, Irbistu, Elangash, Kara-Oyuk, Akkol, and Taldura Rivers), despite the presence of suitable habitat, when earlier there had been evidence of snow leopard activity (pugmarks, scat, scrapes).

Tabyn-Bogdo-Ola Ridge (Altai Republic). The area of potential snow leopard habitat in the Russian portion of this ridge is 250-300 km².

There has been evidence of ongoing habitation by 3-4 snow leopards only on the western part of the ridge along the border with Kazakhstan and China. The total population of snow leopards on Tabyn-Bogdo-Ola Ridge is low, and the area is more likely used by the predator as a migration corridor to reach Altai Tavan Bogd, Sailyugem, Southern Altai, and Southern Chuisky Ridges.

Sailyugem Ridge (Altai Republic). There is potentially suitable snow leopard habitat on the western and central parts of this ridge (total area 350-400 km²). Between 2000 and 2010 there were no focused surveys, although beginning in 2003, staff from Altaisky State Biosphere Reserve regularly visited this area with the goal of conducting population surveys of Altai argali and Siberian ibex. During that field work, evidence of snow leopard activity was found only once at the headwaters of the Uznoik River. In August 2011, survey of potential snow leopard habitat on the western side of Sailyugem Ridge turned up only one old snow leopard scrape. According to Mongolian researchers, snow leopards are present on Sailyugem Ridge only sporadically at the headwaters of the Khara-Dzhamat, Shara-Yamatyn, and Shara-Nokhoityn Rivers at the Russia-Mongolia border. The snow leopard population in this area is low (1.3 scrapes/km of survey transect), and the clearly the predator visits this part of the range only sporadically.

Chikhachev Ridge (Altai and Tyva Republics). The total area of potential snow leopard habitat in this transboundary corridor between Altai Republic, Tyva Republic, and Mongolia is approximately 1,000 km². Between 2000 and 2011, evidence of snow leopard activity was seen here regularly on both the Altaian and Tyvan sides of the ridge. During this time, there were 6 snow leopard attacks on livestock. The snow leopard population on the Russian side of Chikhachev Ridge during this period is estimated at 7-8 individuals (in 2011-2013, at least 7 different snow leopards were caught on camera-trap). Mongolian researchers estimate that there are at least 8-10 snow leopards on the Mongolian part of Chikhachev Ridge. Thus, the total population of snow leopards on Chikhachev Ridge can be estimated at no fewer than 12-16 animals.

Talduair Massif (Altai Republic). Participants in Biosphere Expeditions programmes found infrequent snow leopard pugmarks and scrapes during the summer months of 2003-2010 on Talduair Massif. Partici-

pants of the programme believe that no more than 1-2 of the felids live on the Massif. In 2013, during surveying work conducted by staff of Altaisky State Biosphere Reserve, no evidence of snow leopard activity was found.

Chulyshman Highlands (Altai Republic). There are approximately 500 km² of potential snow leopard habitat primarily located in the southeastern part of this mountain range where the species is sometimes found. Currently, it seems clear that no more than 1-2 snow leopards continuously occupy this area.

Kuraisky Ridge (Altai Republic). The total area of potential snow leopard habitat on this ridge is 900-1,000 km². Kosh-Agach district residents reported accounts of snow leopard pugmarks once a year on the eastern part of Kuraisky Ridge. In 2011-2012, occasional snow leopard marking sites were discovered on the central part of the ridge, which attests to the low concentration of this species in the area.

Mongun-Taiga Massif (Tyva Republic). The total area of potential snow leopard habitat on this massif is approximately 500 km². Glaciologist K. Chistyakov reported finding pugmarks and snow leopard sightings in the early 2000s while conducting research in this area. Between 2003 and 2006 no evidence of snow leopard activity was found on Mongun-Taiga. May-December 2011, staff from the Institute for Ecology and Evolution-Russian Academy of Sciences (IEE-RAN) and Ubsunurskaya Kotlovina State Biosphere Reserve collected images of two snow leopards in the Shara-Khargai River valley. Snow leopard scrapes have been found periodically in two places on the southern slope. Given this data, the snow leopard population on Mongun-Taiga Massif can currently be assessed at 2-4 animals.

Tsagan-Shibetu Ridge (Tyva Republic). The total area of potential snow leopard habitat in the Russian part of Tsagan-Shibetu Ridge is approximately 1,000 km². There is a stable population of snow leopards, and between 2000 and 2011, there were 63 cases of snow leopard attacks on livestock.

Ubsunurskaya Kotlovina State Biosphere Reserve and IEE-RAN staff jointly conduct research in this area. Using camera-traps and noninvasive

genetic approach, they identified at least 6 adult and 2 immature snow leopards, including a reproducing female and 3 adult males between 2010 and 2012. The sex of the other cats is unknown.

Mongolian research results, including DNA analysis of snow leopard scats collected on the Mongolian side of Tsagan-Shibetu Ridge, set the Mongolian side's population at 9-10 individuals. Thus, the current population of the transboundary subpopulation of snow leopards on Tsagan-Shibetu Ridge is at least 14-18 animals.

Shapshal Ridge (Tyva Republic). The area of potential snow leopard habitat in the Shapshal Ridge is approximately 3,500 km². In reality, the ridge is a northern continuation of Tsagan-Shibetu Ridge. Both ridges comprise a single habitat for a large snow leopard population.

In 2009, research occurred on southern Shapshal Ridge led by a team from Altaisky and Ubsunurskaya Kotlovina State Biosphere Reserves. They found snow leopard scrapes and scat at the headwaters of the Kyskash River, in the Onguluk-Oyuk River valley, in the Sailyg-Khem and Shui river watersheds, and in the Maganatyg River headwaters. There are estimated to be at least 3-4 snow leopards in the Shui River basin.

In 2010, Ubsunurskaya Kotlovina State Biosphere Reserve staff twice conducted surveys on Shapshal Ridge during which they collected observations in snow leopard habitat and documented cases of predator attacks on livestock. As a result of field research and surveying local residents, they identified 4 areas inhabited by snow leopards in the northern and central parts of Shapshal Ridge, two of which are continuously occupied by snow leopards.

Between 2000 and 2011, there have been 40 cases of snow leopard attacks on livestock on Shapshal Ridge. Given the data gathered above, it can be calculated that key snow leopard habitat on Shapshal Ridge is located in the southern part of the mountain chain (headwaters of the Khemchik and Shui Rivers) at the intersection with Tsagan-Shibetu Ridge. Based on the data gathered, the snow leopard population on Shapshal Ridge is no fewer than 6-8 animals.

Western Tannu-Ola Ridge (Tyva Republic). The total area of potential snow leopard habitat on the western part of Western Tannu-Ola Ridge is 500 km². This area is immediately adjacent to Tsagan-Shibetu Ridge, and together with Shapshal Ridge, comprises one of the largest snow leopard habitats in all of Russia. Moreover, another potential snow leopard habitat is situated at the intersection of Western and Eastern Tannu-Ola Ridges (approximately 1,300 km²).

In June 2006 a Tyva Republic government hunting enforcement ranger conducting patrol activities in Ovyursky District observed 2 snow leopards at a distance of 200 meters not far from the border of Mongolia.

Earlier, in 1999, the tracks of 2 leopards were observed at the headwaters of the Targalyk River at the intersection of Western and Eastern Tannu-Ola Ridges. Currently it is not clear whether or not snow leopards occupy this region continuously or only during temporary visits to this part of the ridge.

Sayano-Shushensky State Biosphere Reserve and the adjoining Khemchiksky and Kurtushubinsky Ridges (Krasnoyarsky Krai). The total area of potential snow leopard habitat in this part of the range at the intersection of Krasnoyarsky Krai and Tyva Republic is 1,800-2,000 km². The snow leopard resides here at 540-1,000 meters above sea level, only rarely climbing higher. The snow leopard is continuously present in this large area only within Sayano-Shushensky State Biosphere Reserve, an area of 130-150 km².

Since 2008, staff from Sayano-Shushensky State Biosphere Reserve have been engaged in a long-term project to study the snow leopard population using camera-traps. They have gathered detailed information about the subpopulation's composition, number, and sex-age structure. According to this data, the population is stable and does not exceed 9-10 animals.

It is unlikely snow leopards continuously occupy the high elevation zone on Western Sayan Ridge in light of deep snow cover in that area over the winter.

Headwaters of the Bolshoy Abakan and Maly Abakan Rivers (Khakasiya Republic). Mountainous massifs located in the headwa-

ters of the Bolshoy Abakan and Maly Abakan Rivers were surveyed several times by staff of Khakassky State Biosphere Reserve between 2007-2010, however, no verifiable evidence of on-going snow leopard presence was found in this region.

Sangilen Ridge (Tyva Republic). The total area of potential snow leopard habitat in this area is approximately 3,000 km². Surveying took place in this area in June 2004, September-October 2009, and August 2012. Evidence of snow leopard activity was found in the Balyktyg-Khem River valley, in the valley and on the watershed divides above 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. Staff from Ubsunurskaya Kotlovina State Biosphere Reserve found evidence of activity in the Kucherik, Verkhny Shinnyg-Khem, Chik, Zhin-Khem, and Sailyk river basins. Two scats collected and processed for DNA analysis were identified as belonging to a snow leopard. According to surveys of local residents, snow leopards and their sign can be found on Sangilen Ridge in the following areas: mountains at the headwaters of the Tarbagatai, Solbeldir, and Erzin Rivers; basins of the Zhin-Khem, Chokhyrtai, Sailyg, Davady-Bullu and Ustyuu Bullu Rivers; basins of the Tuskul, and Verkhny and Nizhny Shinnyg-Khem Rivers; basins of the Kharkhuren-Gol, Kargure, and Kundus Rivers. In 2012, no evidence of snow leopard activity was found in the places listed above. The population of snow leopards in the area around Sangilen Ridge is approximately 6-8 animals. It seems likely that the snow leopard population is heavily impacted by poaching pressure and that the population is on the decline.

Okinsky and Tunkinsky Ridges (Buryatiya Republic and Irkutsk Oblast). This part of the snow leopard's range is more poorly studied than those listed above. The total area of potential snow leopard habitat at the intersection of Tyva Republic, Buryatiya Republic, and Mongolia is approximately 10,000-12,000 km². In 1995, during a survey of Munku-Sardyk and Tunkinsky Ridges, 4 snow leopard pugmarks and 7 scrapes were found. Surveying of Okinsky and Kropotkinsky Ridges in 1991 and 1995 revealed 8-9 snow leopard spoor. Two individual snow leopards were captured on camera-trap on Tunkinsky Ridge in 2012-2013. Insufficient data means that it is only possible to broadly estimate

the population (10-25 animals) occupying Okinsky, Kropotkinsky, and Tunkinsky Ridges.

Thus, according to data collected between 2000 and 2013, the total population of snow leopards in Russia does not exceed 70-90 animals.

The following areas occupied by sustainable snow leopard subpopulations and comprised of optimal habitat conditions are the most promising in terms of snow leopard conservation in Russia (Figure 3):

1. Chikhachev Ridge – continuous habitation by 7-8 individuals on the Russian side, total transboundary population 12-15 animals;
2. Tsagan-Shibetu Ridge, southern end of Shapshal Ridge and western part of Western Tannu-Ola Ridge – continuous habitation by 8-10 snow leopards on the Russian side, total transboundary population 20-25 animals;
3. Sayano-Shushensky State Biosphere Reserve and its buffer zone – continuous habitation by 9-10 individuals;
4. Sangilen Ridge - continuous habitation by 6-8 individuals;
5. Middle part of the Argut River basin – currently there are no more than 6-8 resident snow leopards, but with proper conservation enforcement the population could be restored to 20-25 individuals; and
6. Okinsky and Tunkinsky Ridges – possible population of 10-25 individual snow leopards.

2.4. Snow leopard biological characteristics and conservation assumptions

2.4.1. Biological characteristics and reproduction rates

The snow leopard is the only large cat species adapted to life in the harsh conditions of high mountains. This predator is relatively small in size – the average weight for males is 45-55 kg and for females 35-40 kg. A snow leopard's body is 100-130 cm in length, with a tail length of 105 cm, or 75-90% of the length of the body. Snow leopards have thick fur with a well-developed undercoat that is grey-white in colour, sometimes yellowish in colour with dark-grey rosettes. The snow leopard's coat pattern is ideal camouflage among the rocks and cliffs, rendering it practically invisible in the mountains. A long tail, short strong paws, and broad ribcage with strong chest muscles facilitate climbing rocky cliffs.

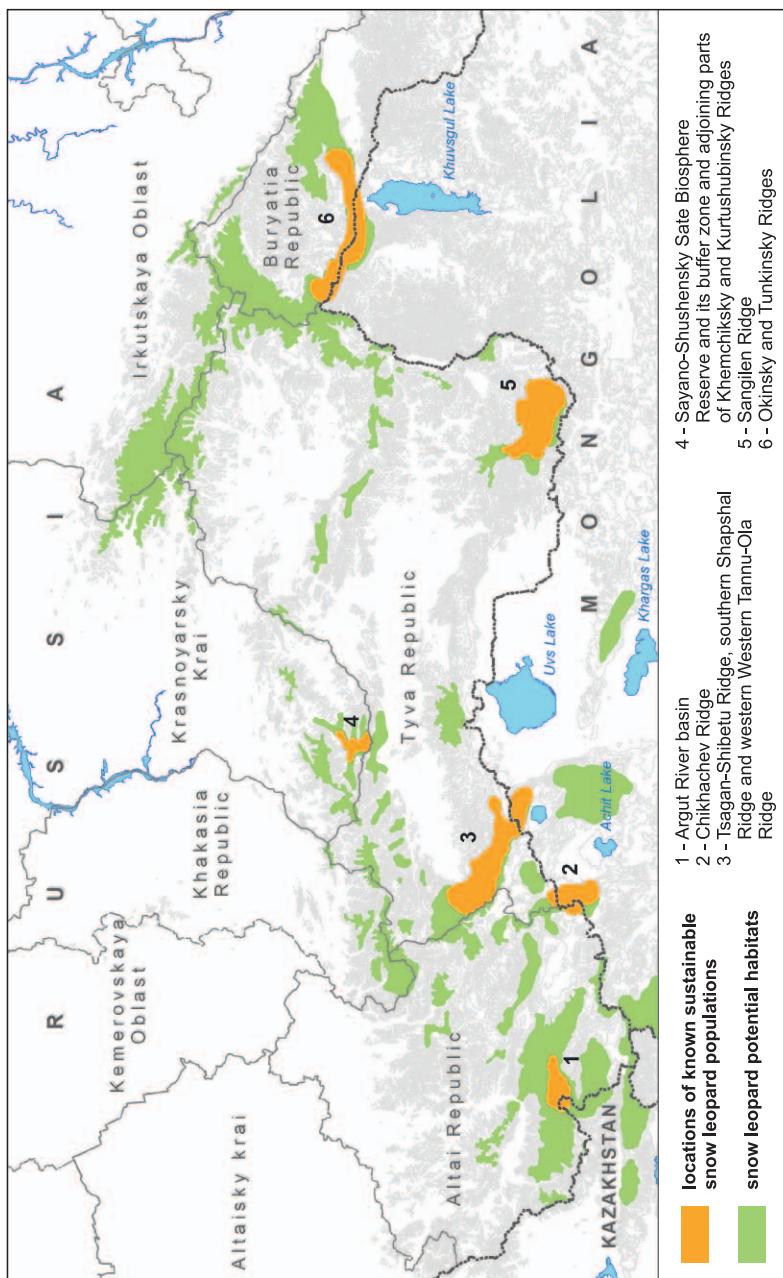


Figure 3. Sustainable subpopulations of snow leopards Legend

As a rule, the snow leopard leads a solitary life, although groups of up to 6 animals can be found, consisting of a female with cubs, and sometimes even a male. In Sayano-Shushensky State Biosphere Reserve and on Chikhachev and Tsagan-Shibetu Ridges groups of up to 4 snow leopards have been documented in the Russian part of the range.

Females reach sexual maturity at 2-3 years of age, and females reproduce once every other year. Mating takes place between the end of January and mid-March. During this period, the predator actively marks his territory; leaving noticeable scrapes on the ground, scent markings on rock faces, and scoring tree trunks on freestanding trees. Gestation lasts 93-110 days, and between May and July the females give birth to 1-5 kittens (usually 2-3 kittens). Young remain with the female 1.5-2 years. The snow leopard's life span in the wild stretches 13-14 years and 21-28 in captivity. Throughout her life, a female will give birth to no more than 10-15 kittens. This relatively late sexual maturity, low birth rate, and the long periods in between births renders the snow leopard a relatively sensitive species, not capable of quickly restoring its population in the event of a significant decrease. Nevertheless, in advantageous conditions, breeding is capable of ensuring population growth and a gradual restoration of a subpopulation. Data on the sex and age structure of snow leopard subpopulations in the Russian part of the range is extremely limited. Expert assessments within Sayano-Shushensky State Biosphere Reserve in 2010 identified the following subpopulation structure: 33% (3 individuals) females, 33% (3 individuals) males, and 33% (3 individuals) kittens. Observations of the snow leopard population on Tsagan-Shibetu Ridge in 2010-2012 determined a sex and age structure of 37.5% (3 individuals) males, 12.5% (1 individual) females, 25% (2 individuals) kittens, and 25% (2 individuals) were not identified.

Data regarding the sizes of home ranges for individual felids are limited. Home range size varies from 12-40 km² in areas with high populations of ungulates and other prey species (for example, Nepal and northern India) and up to 1,500 km² in areas with low numbers of prey species (in Gobi Altai, Mongolia). Moreover, individual cats may have significant overlaps in their territories. In Sayano-Shushensky State Biosphere Reserve, the average size of a male's territory is 50-130 km² and may overlap with the territories of 2-3 females, each with an average territory of 25-40 km².

A snow leopard's average daily movements range from 1-7 km within its territory. In certain cases, snow leopards may make multi-day trips to other territories, 200-600 km. The cat may cover up to 20 km or more per day, crossing river valleys and broad intermontaine basins. As a result of such long distance movements, the snow leopard can exploit large territories, a fact that plays an important role in the felid's dispersal and territorial expansion.

When moving within its habitat, a snow leopard typically travels along clearly defined landscape elements such as mountain ridgelines, canyons, along the base of cliffs, consistently using the same routes and visiting prominently noticeable territorial marking sites. During the winter months, snow leopards may enter the forest and use paths created by musk deer and other ungulates to move across the landscape. These peculiarities render the predator quite vulnerable to snare and leg-hold traps – snow leopards often fall victim to snares set for musk deer and other animals.

Wolf, European lynx, and brown bear can be natural enemies and competitors for snow leopards in the Russian part of its global range. However, there is insufficient data about interrelations between these predators. Data collected in Sayano-Shushensky State Biosphere Reserve and on Tsagan-Shibetu, Chikhachev, and Sangilen Ridges indicate that snow leopards and wolves can coexist within a single shared territory.

2.4.2. Habitat requirements

As a rule optimal snow leopard habitat in the Russian part of the species' range consists of extremely rugged mountains with clearly defined ridges and deep canyons, cliff massifs, and large boulders. Steep mountain slopes with southern, eastern, or western exposures are covered with steppe or tundra vegetation and shrubs in this area. Northern slopes may contain mosaic patches of forest. The amount of forest covering optimal snow leopard habitat ranges from 0% to 40-50% depending on the site's elevation above sea level. These cats usually avoid gentle slopes and level surfaces, as is also the case for dark coniferous forest areas. In Russia, optimal snow leopard habitat is distributed broadly at elevations between 540 and 3,500-3,900 meters above sea level. In Sayano-Shushensky State Biosphere Reserve, snow leopards occupy the shores of the Sayansky Reservoir at an elevation of 540-1,500 meters, in the Argut Riv-

er basin at 700-3,800 meters, on Tsagan-Shibetu and Sangilen Ridges at 1,700-3,500 meters, on Chikhachev and Mongun-Taiga at 2,200-3,700 meters above sea level. As a rule, all optimal snow leopard habitat is distinguished by absent or insignificant levels of snow cover during winter. Such habitats are also preferred by Siberian ibex and other species of ungulates – the snow leopard's main prey base. Ideal snow leopard habitat is also ideal for pasturing livestock, which is often a point of contention between herders and this predator. In optimal habitat, snow leopards form sustainable subpopulations, the presence of which is easily detected by the predator's noticeable marking site activity. The total area of optimal habitat in the Russian part of the range is severely limited and does not comprise more than 10-20% of total potential snow leopard habitat. The irregular character of distribution of such habitats is the determining factor in giving Russia's snow leopard population an island-like structure.

Snow leopards avoid mountain slopes and river valleys with a high degree of snow cover, which handicaps the predator's movements. However, experts have also found that snow leopards on Tunkinsky, Okinsky, and Kropotkinsky Ridges may reside in areas of deep snow. An unusual case of snow leopards living in the mountain-taiga zone in the Near Baikal area has been documented as well.

The information provided here is a testament to insufficient knowledge of the snow leopard's biology and distribution.

2.4.3. Predation and prey base

The snow leopard is a strong predator, capable of killing ungulates 3-4 times the felid's weight, including red "maral" deer, Altai argali, reindeer, yak, and horse. The snow leopard's main prey base in the Altai-Sayan Ecoregion is Siberian ibex; its Russian range almost entirely overlaps with the snow leopard's range. Other prey species for the snow leopard include roe deer, musk deer, hare, marmot, Altai snowcock, ptarmigan, and pika. In some regions, for example in western Tyva, the snow leopard will attack livestock (mainly sheep and goats). The snow leopard's wide dietary preferences greatly increase the chances of survival in a variety of habitat types when populations of one or another prey species fall.

Experts calculate that one snow leopard annually harvests 12-30 ungulates with the average size of a Siberian ibex. In order to ensure successful exist-

ence, there must be at least 100-150 individual ungulates of varying species within a single snow leopard's territory. The majority of ungulate populations can sustain an annual loss of 15-20% of its population without a population decrease. Any human use of ungulates as a hunting resource in snow leopard habitat must take the demands of the felid into account.

According to approximate estimates, the population of wild ungulates (Siberian ibex, Altai argali, Siberian roe deer, red "maral" deer, and musk deer) in potential snow leopard habitat in the Russian part of the range totals 17,000-20,000 animals. Thus, existing ungulate populations in potential snow leopard habitat are sufficient to support a stable population of at least 110-150 individual snow leopards in Russia.

During winters when there is significant snowfall, the population of ungulates decreases, and it is also much more challenging for snow leopards to kill their prey. In those situations, the frequency of attacks by snow leopards on livestock increases. Snow leopard attacks on livestock are especially frequent in western Tyva.

2.4.4. Interactions with humans

As a rule, the snow leopard does not show aggression toward humans. There are only a handful of cases of attacks on humans by starving or rabies-infected individuals. Even a snow leopard that has been wounded by a human or surprised at a kill would prefer to leave the scene rather than protect itself or its kill. When a snow leopard encounters a human it usually does not show fear and calmly leaves the area, often abandoning its kill. This absence of fear in the presence of humans can often result in a snow leopard's death. Between 2000 and 2011 in western Tyva, experts documented 11 cases of encounters between snow leopards and herders in which the felid attacked livestock. In 6 of those cases, the snow leopard abandoned its victim and left calmly, while in the 5 remaining cases, the snow leopard was chased off its kill only with shouting, thrown rocks, and shots fired. Snow leopard attacks on livestock can also occur in the presence of humans, and when this occurs, the predator demonstrates no aggression toward the humans present. In Mongun-Taiginsky District in Tyva Republic there was a case of a snow leopard caught in a livestock shed being killed by herders using just rocks and poles, and even then the cat did not attack its attackers.

2.5. Limiting factors

A number of natural and anthropogenic factors (Figure 4) have an influence on the status of snow leopards. All limiting factors that impact snow leopards can be divided into two main groups: direct and indirect threats.

Direct threats include the killing of snow leopards as a result of poaching and retaliation for livestock attacks, live captures of snow leopards for captivity, and infectious disease.

Of the indirect threats, the largest influencing factors that decrease snow leopard population are reductions in prey species populations, economic infrastructure development within the snow leopard's range, and loss of suitable habitat.

2.5.1. Direct threats

2.5.1.1. Snow leopard mortality due to poaching

Poaching is currently the most serious threat to the existence of snow leopards in Russia and other nations.

It is illegal to trade in snow leopard pelts in Russia. Between 2003 and 2006, 19 advertisements were found on the internet referring to the sale of snow leopard pelts, although the source of those pelts was not known. The majority of snow leopard pelts enter Russia from western Mongolia (each year 3-5 pelts are confiscated by customs officers). Experts estimate that approximately 10 snow leopards are killed illegally each year in Russia. The price of snow leopard pelts in Russia ranges from \$500 to US\$5,000-\$10,000. Snow leopard bones are in great demand in countries in Southeast Asia, where they are used in eastern medicine as a substitute for tiger derivatives. Merchants will pay several thousand dollars for a fresh snow leopard skeleton.

Snare-poaching also presents a serious threat to this predator, and the practice is widespread across its entire range in Russia, including within protected areas. Thanks to its use of habitual routes (reusing the same paths and routes to travel along ridges), the snow leopard is easily caught

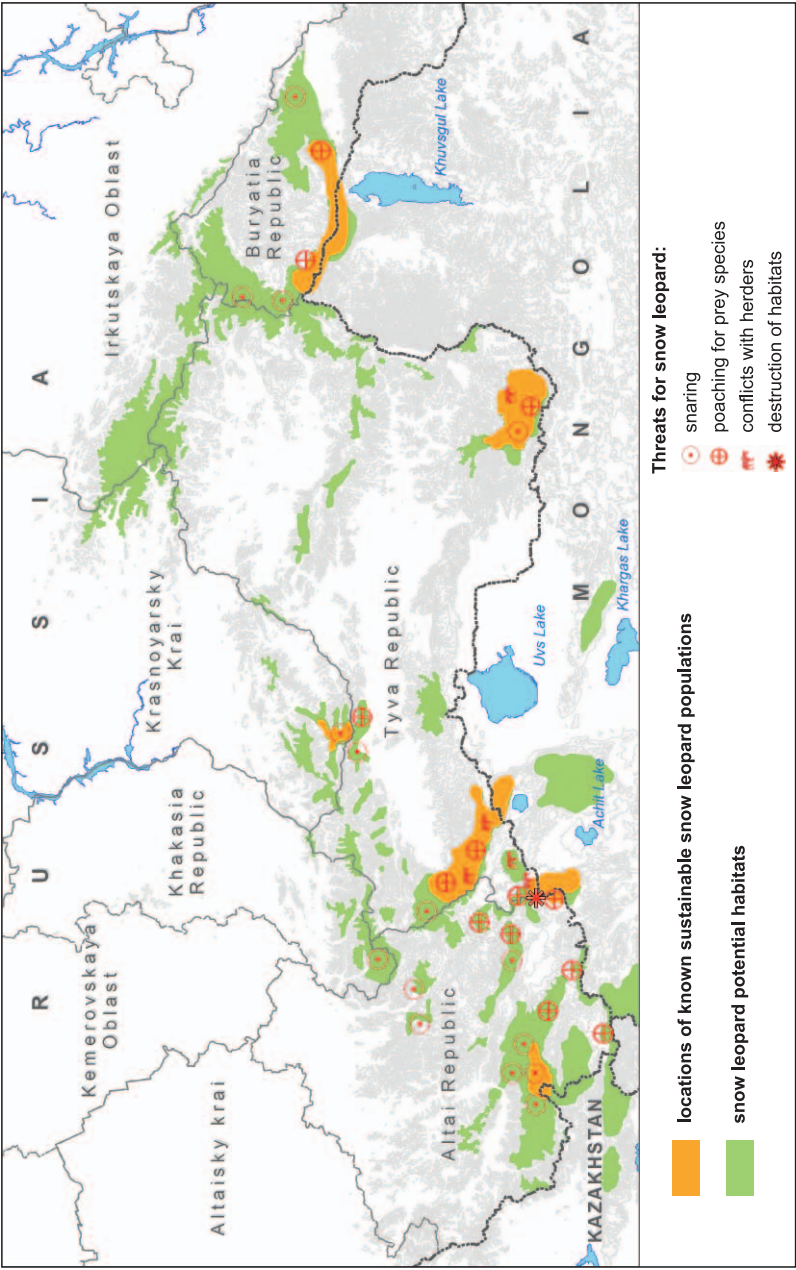


Figure 4. Factors negatively influencing snow leopards

in snares set on ridgelines and narrow mountain trails and can thus fall victim to poachers. Snow leopards are caught for their valuable pelts and other derivatives but also as simple bycatch in illegal snares set out for musk deer and other ungulates. Snare-poaching of snow leopards is the primary threat to the species' survival in the Argut River basin and in nearby parts of Katunsky, Southern Chuisky, and Northern 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-poaching is a lesser threat to snow leopards in the southern part of Shapshal Ridge, on Chikhachev and Tsagan-Shibetu Ridges, and on Mongun-Taiga Massif (Tyva Republic).

Snow leopard population decreases can be attributed in large part to the widespread use of snares by poachers in critical parts of their range. For example, in the 1960s-1970s in the Argut basin, local herders illegally snared 10-20 snow leopards each year. Targeted poaching and bycatch losses of snow leopards (in snares set for musk deer) continued in the 1980s and 1990s, and by the early 21st century, the Argut subpopulation of snow leopards had been almost entirely extirpated.

Illegal snare-poaching of snow leopards has also been documented within the boundaries of Sayano-Shushensky State Biosphere Reserve and its buffer zone. Over the last 20 years, residents from Verkhneusinskoye village alone illegally killed at least 7 snow leopards. The killing of 2 snow leopards in snares was documented over the winter months of 2004-2005 inside the Reserve. In 2009, camera-traps deployed in snow leopard habitat in Sayano-Shushensky State Biosphere Reserve photographed a male snow leopard (named "Mongol") with a metal snare on his neck: the cat had been tangled in a poacher's snare but managed to tear away. The snow leopard subpopulation resident in Sayano-Shushensky State Biosphere Reserve and its buffer zone persists exclusively thanks to an effective enforcement regime, but population growth is limited due to the widespread use of snare-poaching targeting musk deer and other species.

Another case of a snared snow leopard was documented in 2007 by staff of Ubsunurskaya Kotlovina State Biosphere Reserve in the Kozher River valley on Shapshal Ridge (Bai-Taiginsky District, Tyva Republic). Experts determined that snares set for musk deer by local residents in the middle

part of the Barlyk River basin (Tsagan-Shibetu Ridge, Tyva Republic) kill 1-2 snow leopards each year. A snow leopard died in a snare set for musk deer in the Ungo River valley in the Transbaikal area in 2000.

Local residents are the primary poachers hunting for snow leopards and other species using snares. The high price of derivatives of snow leopard, musk deer, and other animal species is the main reason for the development of snare-poaching in the mountains, and it is also one of the very few sources of income for people living in snow leopard habitat. Snare-poachers conduct their work in inaccessible parts of the snow leopard's range, only very rarely appearing in the view of enforcement agencies. In the case of highly intensive poaching, critical subpopulations could be completely extirpated in just 10-15 years in Russia. There is no snare-poaching of snow leopards in the highest elevation parts of the felid's range – above the treeline.

Moreover, there have been infrequent documented cases of illegal killings of snow leopards using firearms, usually as a result of coincidental encounters with the elusive cat while hunting in the mountains. There are 2 known cases of snow leopards being poisoned with barium fluoride acetate in the middle branch of the Shui River in Bai-Taiginsky District and in the Ustyuyymaty River in Mongun-Taiginsky District in Tyva Republic in 1999-2000.

Between 2000 and 2001, there have been cases of contraband snow leopard pelts entering Russia from Mongolia (via Altai Republic). In the spring of 2004, citizens of Russia and Mongolia were detained when it was found they were illegally transporting 17 snow leopard pelts into Russia from Mongolia. The accused were convicted and sentenced to 9 months imprisonment and fined 450,000 roubles.

In April 2009, employees of the Altai Republic office of the Bureau of Criminal Investigation (Ministry of Internal Affairs) and the Gorno-Altai customs office confiscated 3 pelts and one snow leopard skull, illegally brought in from Mongolia, during investigative operations and a controlled buy from a resident. Another 2 snow leopard pelts were confiscated by Altai Republic operatives from a hidden compartment in a Russian citizen's vehicle carrying contraband from Mongolia. In January

2010 another 2 snow leopard pelts were confiscated during enforcement operations after being smuggled in from Mongolia. All perpetrators were charged with possession of contraband.

2.5.1.2. Snow leopard killings due to livestock attacks

In a number of locations pastoralists wishing to protect their herds from predation present a serious threat to the existence of snow leopards. This problem is common in western Tyva (Chikhachev, Tsagan-Shibetu, and Shapshal Ridges, Mongun-Taiga Massif) and to a lesser extent in south-eastern Tyva (Sangilen Ridge). There are virtually no snow leopard attacks on livestock in Altai.

Predator attacks on livestock occur when domestic animals are pastured on rangeland directly in snow leopard habitat and/or when the population of wild ungulates drops significantly due to poaching. More often than not, livestock attacks occur during winter months, especially during severe and high-snow winters. Snow leopards may attack both small horned livestock (goats and sheep) and large animals – yaks and horses. Attacks can occur both at pasture as well as in corrals or shelters where livestock is kept at night. Although snow leopard attacks in open pasture usually result in the death of one to three animals, when the cat enters an enclosure, the predator is capable of killing and wounding dozens of the panicking animals (up to 80), resulting in significant losses for the herder. Often these pens then entrap the snow leopard as well, as the cats are not always able to escape again through the hole in the shelter's roof. Increasing livestock populations in snow leopard habitat leads not only to direct increases in the number of conflict situations with herders but also due to crowding wild ungulates, the snow leopard's natural prey base, out of mountain pastures.

Between 2000 and 2011, researchers documented more than 100 cases of snow leopard attacks on livestock in western Tyva (Mongun-Taiginsky and Bai-Taiginsky Districts, Tyva Republic) (Table 1).

According to research data, on Shapshal Ridge alone in 2010, more than 700 livestock died due to wolf attacks (4.5 times the number of deaths attributed to snow leopards in the same territory over a 10-year period). The majority of cases of snow leopard attacks occurred while livestock were

in pasture (104 cases, or 94%), and only 7 cases (6%) in pens. However, livestock deaths caused by snow leopards in pastures total 205 animals (44%), while 260 animals (56%) were killed in shelters in the course of just a few attacks. Data gathered between 2000 and 2011, show that of the 6 documented killings of snow leopards at the hands of herders, 4 of those occurred as a result of the felid attacking livestock in shelters. Obviously, there are many additional snow leopard killings by herders, but those events are carefully concealed to avoid criminal prosecution for the destruction of this endangered species.

In 2004 on Sailyugem Ridge, local residents reported snow leopard attacks each year on livestock in the Chokhyrtai and Kundus River valleys, although in 2009, herders reported that snow leopard attacks had become much rarer, a trend that is possibly related to the decreasing snow leopard population on Sangilen Ridge.

Table 1. Data on snow leopard attacks on livestock in western Tyva, 2000-2011

Snow leopard habitat	Number of attacks on livestock	Quantity of animals killed by snow leopard			Of which	
		Small-horned livestock	Large-horned livestock & horses	Total	Killed in pasture	Killed in pens
Tsagan-Shibetu	63	114	58	172	87	85
Mongun-Taiga	2	86	0	86	1	85
Shapshal	40	122	35	157	67	90
Chikhachev Ridge	6	45	5	50	50	0
TOTAL:	111	367	98	465	205	260

2.5.1.3. Live capture for cultural/educational and scientific purposes

Considering its secretive lifestyle in the wild and its highly effective camouflage, the snow leopard is particularly valuable to zoos and private breeders.

Live capture of snow leopards from the wild is permitted only in exceptional cases with a special permit issued by Rosprirodnadzor (Federal Service for the Oversight of Natural Resource Use). No permits have ever been issued in Russia for the capture of snow leopards for zoo captivity.

In addition, there are 3 known instances of illegal capture of snow leopard kittens that occurred between 2000 and 2011 in Altai and Tyva Republics to be kept by private citizens in large cities (Barnaul, Krasnoyarsk). In 2003, information arose about the capture of snow leopard kittens in western Tyva for a private citizen in Krasnoyarsk. In 2004-2005, 2 snow leopard kittens captured in Altai were illegally housed in a home in Barnaul. As a result, the kittens were sent to the Kazan Zoo. In 2011, there was an internet advertisement offering a snow leopard kitten for sale in the city of Rubtsovsk, Altai Krai.

2.5.1.4. *Infectious disease*

There are a number of infectious and protozoan diseases that has the potential affect all age and sex groups of the Felidae family: feline herpes, toxoplasmosis, parvovirus, distemper, chlamydia, mycoplasmosis, influenza A, feline syphilis, dilofilariasis, Aujeszky's Disease, candidiasis, bartonellosis, and others. These diseases are found in many Felidae species as well as in other predators and ungulates and can lead to high levels of mortality in snow leopard subpopulations. The snow leopard may also be infected with various types of mange caused by widely distributed mange mites (*Sarcoptes sabiei* and *Choriptes* sp.) as well as other types of helminthic infestations. There have been repeated reports of mange infections in snow leopards in western Mongolia and Kyrgyzstan. Researchers at the Institute for Ecology and Evolution (RAS) have begun studying the issue of infectious disease in snow leopards in the wild, but the at the moment the study has only gathered preliminary data.

2.5.2. *Indirect threats*

2.5.2.1. *Decreased populations of primary prey species*

The snow leopard population is directly dependent on the populations of its prey species. For this reason, a reduction in the populations of ungulates – the snow leopard's main prey base – is one of the most important factors in decreases in the number of the predator's subpopulations and the population overall.

Poaching affects the population of the snow leopard's prey base. In western Tyva, the main reason for frequent attacks by snow leopards on livestock is believed to be the extreme drop in the population of wild ungulates in the mountains as a result of intensive illegal hunting. Local

residents assert that following the construction of Mugur-Aksy – Kyzyl Highway, the population of Siberian ibex dropped sharply on the southern end of Tsagan-Shibetu Ridge due to the increased incidence of poaching. Ungulate populations remain low in the relatively accessible parts of snow leopard habitat such as Southern Chuisky and Chikhachev Ridges, Mongun-Taiga Massif, Tsagan-Shibetu and Shapshal Ridges, and Sangilen Ridge. Illegal hunting for ungulates (with the exception of illegal snare-hunting for musk deer) has a lesser impact on the snow leopard population in the Argut River basin, given its significant remoteness and inaccessibility, and the snow leopard population in Sayano-Shushensky State Biosphere Reserve, thanks to its enforcement regime. Snare-poaching of musk deer is widely practiced in snow leopard habitats, and it not only reduces the population of one of the felid's prey species, but also represents a threat to the predator itself.

Currently, hunting (second to livestock agriculture) is the main occupation of the majority of local residents in Tyva and Altai Republics and southern Krasnoyarsky Krai after being left without work following the collapse of the collective farming system and other state enterprises. People have significant reserves of illegal firearms, a fact that is borne out by the confiscation of dozens of weapons each year. There are cases of illegal hunting documented within protected areas and snow leopard habitats. In addition to local hunters, hunters from neighbouring regions and around the world travel to Altai to hunt, many of them illegally. Advertising materials belonging to a variety of tourism firms openly offer trophy-hunting inside protected areas (for example, in Altai Republic's regional Shavlinsky Refuge), where all hunting is forbidden. Illegal hunting with the use of helicopters in snow leopard habitat (Chikhachev, Sailugem Ridges, Argut River basin) is a serious problem for enforcement authorities (mainly in Altai Republic). In the last 10 years, snowmobiles have come into wide use to hunt for hoofed animals in Altai and Tyva Republics. Snowmobiles permit poachers to penetrate the most remote and untraveled corners of snow leopard habitat in winter months on Southern Chuisky, Sailugem, Chikhachev, and Mongun-Taiga Ridges.

Free-range livestock agriculture also leads to decreasing wild ungulate populations in snow leopard habitat. The population of wild ungulates is extremely low in areas adjacent to herder camps in almost all snow leopard habitats.

Ungulate populations in snow leopard habitats may also be lower due to natural occurrences such as severe high-snow winters and epizootic disease.

2.5.2.2. Economic infrastructure development

Large existing and planned economic infrastructure development projects have or will have serious impacts on the condition of snow leopard habitats.

The largest of these is the construction of the natural gas pipeline system and projected road from Russia into China via the Ukok Plateau. The construction of a pipeline and road system could negatively impact snow leopard subpopulations in the Argut River basin and on Tabyn-Bogdo-Ola Ridge as a result of possible disruptions of corridors connecting these subpopulations with others in western Mongolia and China.

Mining of minerals and other subsoil resources can lead to the degradation of key snow leopard habitats in the Altai-Sayan Ecoregion. At the current time, there is such a threat in the central part of the Chikhachev range, where large-scale development of a series of complex ore deposits situated in the immediate vicinity of a transboundary subpopulation of snow leopards is planned. The development of these deposits is related not only to direct habitat destruction for the species but also a factor for increased disturbance and risk of poaching for ungulates and snow leopards.

3. CONSERVATION STATUS OF THE SNOW LEOPARD

3.1. Legal conservation framework

3.1.1. Main international conservation conventions and agreements

The snow leopard is listed in the IUCN Red List as Endangered: a species whose population is reduced over the course of 2 generations (16 years) by at least 20% as a result of poaching, persecution by livestock owners, and reductions in the populations of its main prey species.

The conservation and restoration of rare and endangered species, including the snow leopard, is facilitated by:

- The Convention on Biological Diversity (Rio De Janeiro, 5 June 1992) and ratified by Russian federal law № 16-FZ on 17 February 1995. The convention provides for conservation *in situ* and *ex situ* and sustainable use of biological resources;
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Washington, 3 March 1973). The snow leopard is listed in CITES Appendix I, which provides for strict regulation of its export, re-export, and import for commercial purposes; and
- The “Agreement between the government of the Russian Federation and the government of Mongolia on cooperation in the area of environmental conservation”, 15 February 1994, a primary area of which is the conservation of rare and endangered species of flora and fauna and their habitats.

3.1.2. National law

3.1.2.1. Red Data Book listings

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

The harvest of fauna belonging to species listed in the Red Book of the Russian Federation is regulated by a Russian Federation decree dated 6 January 1997, № 13, “On confirmation of the Rules for harvesting fauna belonging to species listed in the Russian Federation Red Book, with the exception of water-based biological resources”.

According to the aforementioned Rules, the harvest of snow leopards is only permitted in exceptional cases with the goal of its conservation, scientific monitoring of its population, population regulation, protecting public health, eliminating threats to human life, and as a precaution against large-scale infectious disease of livestock or other domesticated animals.

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, № 156, “On the procedure to issue permits (administrative licenses) for trade in wild animals belonging to species inscribed in the Russian Federation Red Book”.

This decree states that holding in captivity wild animals belonging to species listed in the Russian Red Book, including the snow leopard, is permitted only with the goal of conservation or reproduction of animals in an artificially created environment, as well as for scientific and cultural-educational goals. Their release into a natural environment is conducted with the goal of conservation and (or) increasing the natural population. The harvest of a snow leopard occurs only in exceptional cases and only on the basis of a permit (issued by Rosprirodnadzor) in accordance with the administrative procedures published by the Federal Oversight Service in the Area of Natural Resource Use (Rosprirodnadzor) on the harvest of flora and fauna listed in the Russian Red Book and affirmed by a Ministry of Natural Resources-Russian Federation decree dated 18 February 2013, № 60, (registered by the Russian Ministry of Justice, 25 June 2013, registration № 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 № 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 7 administrative subjects in the Russian Federation: Altai, Tyva, Khakasiya, and Buryatiya Republics, Irkutsk Oblast, and the Krasnoyarsky and Zabaikalsky Krai.

3.1.2.2. Legislative and other regulatory acts of the Russian Federation

The key legislative acts regulating issues of conservation, the use of fauna resources, and fauna habitat are:

- Federal law dated 10 January 2002, № 7, “On environmental conservation”;
- Federal law dated 24 April 1995, № 52, “On the animal world”;
- Federal law dated 14 March 1995, № 33, “On protected areas”; and
- Federal law dated 24 July 2009, № 209, “On hunting and the conservation of hunting resources and amendments to certain legislative acts of the Russian Federation”.

In addition to the laws listed above, regulations on the protection and use of animal world resources, including the snow leopard, and their habitats are contained in other regulatory acts including departmental regulatory legal acts in various branches of the law (civil, criminal, administrative law).

The federal law “On the animal world” remains the foundation that regulates relationships in the area of the conservation and use of animal world resources overall, as well as in the area of habitat conservation, and it determines the right of government ownership of the animal world within the boundaries of the Russian Federation. The federal law “On the animal world” determines the authority of Russian federal agencies in the area of conservation and the use of the animal world, Russian federal authority that is conveyed to administrative subjects within the Russian Federation, the specific authority of regional governing agencies of Russian administrative subjects, and the authority of local self-governing agencies in this arena. The law lays out the rights of citizens and legal entities to conduct public monitoring and conduct conservation activities related to the animal world and related habitat, as well as to facilitate the realization of relevant government programmes. The law identifies the entities responsible for government management in the area of conservation and use of the animal world, habitat conservation, and the main principles for government oversight of conservation and sustainable use of parts of the animal world.

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.

To a significant extent, numerous regulatory and departmental regulatory acts comprise the established legal foundation of government agencies responsible for managing the conservation of rare and endangered fauna species and conservation of their habitats. Those same regulations also ensure a regulatory mechanism with sufficiently well-defined authority and distinctions among federal and regional government agencies.

However, the generally established system of regulatory and legal management retains a number of specific regulatory-legal gaps that limit the effectiveness of law enforcement practice. First, these gaps are related to the need to further strengthen accountability for illegal harvest, trade, and smuggling of rare and endangered species of animals.

Federal law dated 2 July 2013, № 150 “On amendments to certain legislative acts of the Russian Federation” made additional amendments in the Administrative Violations Code of Russian Federation as a result of which administrative responsibility is established for illegal harvest, storage, transportation, collection, ownership, acquisition, and the sale or consignment of animals listed in the Russian Federation Red Data Book, their products, parts, or derivatives.

This federal law establishes exclusively criminal responsibility for committing one of the listed actions related to particularly valuable wild animals and water-based biological resources belonging to species listed in the Russian Federation Red Book and (or) described in international conservation agreements signed by the Russian Federation, the list of which is affirmed by the Russian federal government. There is also criminal liability for the illegal transport of the animals indicated across the international border as contraband, independent of their monetary value. The snow leopard is assigned to the aforementioned category of fauna in the Russian Federation government decree dated 31 October 2013, № 978 “On approval of the list of particularly valuable wild animals and water-based biological resources belonging to species listed in the Red Book of the Russian Federation and (or) those protected by international agreements signed by the Russian Federation for the articles 226.1 and 258.1 of the Russian Federal Criminal Law Code”.

A new concept was included in the federal law dated 23 July 2013, № 201, “On amendments to the federal law ‘On hunting and the conservation of

hunting resources and amendments to certain legislative acts of the Russian Federation”; and in the Administrative Violations Code of the Russian Federation: non-governmental hunting oversight. The law gives non-government hunting enforcement inspectors the right to verify execution of requirements related to hunting and conservation of hunting resources and issue citations in the case of administrative violations in that area. This authority provides for more than 30,000 hunting game-wardens to be involved in protection of the animal world.

At the same time, new measures have been put in place to strengthen administrative responsibility for violations of Hunting Rules in the form of loss of hunting rights for violators.

3.2. Territorial enforcement

The total area of federal and regional protected areas (henceforth PAs) with buffer zones in areas of snow leopard habitation is 5,478,600 hectares. Thus, 23% of the total Russian range for the species (potential habitats) is under protection (Table 2). However, only 16% of the habitat for known stable subpopulations of snow leopards is under any form of protection (Figure 5).

Table 2. List of protected areas in Russia containing potential snow leopard habitat

Name of Protected Area	Area, ha.	Location
State Nature Reserves		
Altaisky*	881,238	<i>Altai Republic</i> , Ulagan District
Katunsky*	151,637	<i>Altai Republic</i> , Ust-Koksa District
Ubsunurskaya Kotlovina*, Mongun-Taiga, Kara-Khol and Khan-Deyer sites	251,258	<i>Tyva Republic</i> , Mongun-Taiginsky, Bai-Taiginsky, and Sut-Kholsky Districts
Azas	300,390	<i>Tyva Republic</i> , Todzhinsky District
Khakassky, Zaimka Lykovykh and Maly Abakan sites	246,500	<i>Khakasiya Republic</i>
Sayano-Shushensky*	390,368	<i>Krasnoyarsky Krai</i> , Shushensky District

Buffer zones of State Reserves		
Buffer zones around Mongun-Taiga, Kara-Khol, and Khan-Deyer in Ubsunurskaya Kotlovina Reserve	465,328	<i>Tyva Republic</i> , Mongun-Taiginsky, Bai-Taiginsky, and Sut-Kholsky Districts
Buffer zones around Zaimka Lykovykh and Maly Abakan in Khakassky Reserve	45,200	<i>Khakasiya Republic</i>
Buffer zones around Sayano-Shushensky Reserve	106,200	<i>Krasnoyarsky Krai</i> , Shushensky District
National Parks		
Sailyugemsky, Argut and Sailyugem sites	115,130	<i>Altai Republic</i> , Kosh-Agach District
Tunkinsky	1,183,662	<i>Buryatiya Republic</i>
Nature Parks		
Ukok Quiet Zone	254,204	<i>Altai Republic</i> , Kosh-Agach District
Uch-Enmek, Argut site	34,441	<i>Altai Republic</i> , Ongudai District
Belukha	131,337	<i>Altai Republic</i> , Ust-Koksa District
Ak-Cholushpa	189,183	<i>Altai Republic</i> , Ulagan District
Shuisky	98,000	<i>Tyva Republic</i> , Bai-Taiginsky District
Federal Nature Refuges		
Pozarym	253,743	<i>Khakasiya Republic</i> , Tashtypsky District
Tofalarsky	132,700	<i>Irkutsk Oblast</i>
Regional Nature Refuges		
Shavlinsky	248,081	<i>Altai Republic</i> , Ongudai and Kosh-Agach Districts
TOTAL:	5,478,600	

* - Biosphere Reserves

Enforcement to protect snow leopards is inadequate in many protected areas. Changes in status, expansion, optimization of boundaries, and improvements to enforcement regimes are advisable in certain protected areas. In order to protect transboundary subpopulations of snow leopards it is important to ensure the transboundary cooperation of Russian and Mongolian protected areas.

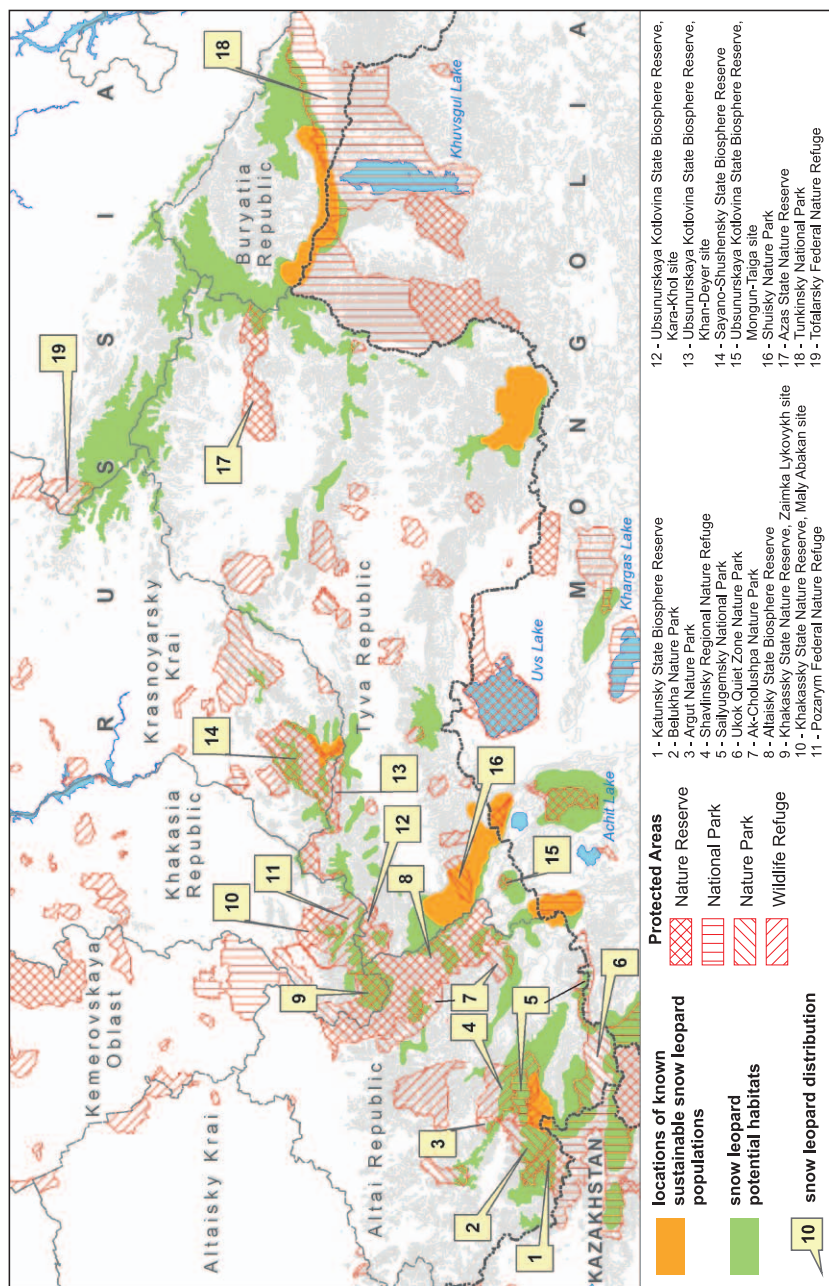


Figure 5. Protected areas in snow leopard habitat

The following PAs have the most significance for snow leopard conservation in Russia: Sayano-Shushensky, Ubsunurskaya Kotlovina (Mongun-Taiga site and its buffer zone) State Biosphere Reserves, Sailyugemsky National Park, Shavlinsky Regional Refuge, Belukha and Ukok Quiet Zone Nature Parks, and Tunkinsky National Park.

The northernmost subpopulation of snow leopards in Russia, with a population of 9-10 animals, resides within the boundaries of Sayano-Shushensky State Biosphere Reserve and its buffer zone. The total area of potential snow leopard habitat located on the shores of Sayansky Reservoir within the Reserve and its buffer zone is 1,000 km². The largest population of Siberian ibex in the Sayan Mountains, with a population of 2,500 individuals, occupies this territory. This population of snow leopards survives thanks to the existing enforcement regime that is strictly 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 of the same name and occupies 15,890 hectares, including glaciers, snow fields, rock masses, and rubble and rock field tundras. This is the upper boundary of snow leopard habitat. The buffer zone of this Reserve is the most significant land related to snow leopard conservation in Tyva and totals 125,600 hectares in area, including snow leopard habitat on Mongun-Taiga Massif, on the eastern macroslope of Chikhachev Ridge, and the southern part of Tsagan-Shibetu Ridge on the Mongolian border. 8-10 snow leopards occupy this area. The total population of ungulates in this area is not high and does not exceed 200-300 animals. The Reserve involves a variety of conservation agencies (an inter-agency anti-poaching brigade was established) in enforcement efforts and works jointly with local residents with the goal of preventing conflict between herders and snow leopards. An expansion of the buffer zone to protect the existing snow leopard subpopulation and strengthen its protection would be effective, as would the addition of a new site to the Reserve in snow leopard habitat on Tsagan-Shibetu Ridge.

Sailyugemsky National Park was created in Altai Republic in 2010 and consists of three sites: Argut, Sailyugem and Ulandryk, with a total area of 118,380 hectares. Potential snow leopard habitat is located inside the

Argut (80,730 ha) and Sailyugem (34,400 ha) sites. Despite the presence of optimal habitat and a high density of prey species (up to 20 Siberian ibex per 1 km²), no evidence of snow leopard activity was found in the Argut site (in the Koir and Yungur River valleys) between 2004 and 2011. The subpopulation that was previously found in that location was almost completely destroyed by poacher snaring activity. In the event that protection of the subpopulation of snow leopards in the Argut site is strengthened, the population may be restored in the next 10-15 years.

In 2002 Shavlinsky Regional Nature Refuge was resurrected (after a closure of 2 years) by a decree of the Altai Republic government. The total area of Shavlinsky Refuge is currently 248,081 hectares, and it surrounds the Argut site of Sailyugem National Park on 3 sides. Shavlinsky Refuge 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/ km²). At the moment, there is no known stable subpopulation of snow leopards in this area. As in the case of the Argut site of Sailyugemsky National Park, the population of snow leopards could be restored in the event that effective enforcement is resumed. Currently, all types of hunting are forbidden, livestock grazing is limited, as is the harvest of medicinal plants. However, there is essentially no enforcement in the refuge.

Belukha Nature Park is 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 nature park, there are 400-500 Siberian ibex, sharing the landscape with musk deer and red maral deer. According to current data, the population of snow leopards in the nature park does not exceed 1-3 animals. Enforcement within the nature park is almost absent in light of the lack of inspectors with the necessary amount of enforcement authority issue citations for administrative violations.

Ukok Quiet Zone Nature Park includes potential snow leopard habitat in the eastern part of Sailyugem Ridge and on the northern macroslope of Tabyn-Bogdo-Ola Ridge on the border of Russia, Kazakhstan, Mongolia, and China. The population of wild ungulates (Altai argali, Siberian ibex, Siberian musk deer, and red maral deer) within the nature park is rela-

tively low, and there is no documented stable snow leopard subpopulation here although the nature park's territory is a migratory corridor for the snow leopard subpopulations of Mongolian Altai, the Katunsky, Northern and Southern Chui Ridges and Southern Altai Ridges.

Tunkinsky National Park includes a small area of potential snow leopard habitats on Tunkinsky Ridge on the Russia-Mongolia border. The population of snow leopards within the national park is unknown. When one examines the intensive industrial development underway (construction of mining enrichment facilities, major road networks, power transmission lines) in the Eastern Sayan Mountains, it is clear that there are an insufficient number of protected areas.

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

There is still no comprehensive system of territorial enforcement for the entire snow leopard population in Russia. The significance of the habitats vital to the species' conservation is only very rarely taken into account when selecting a protected area category and determining enforcement regimes for snow leopard habitats.

3.3. Reproduction in captivity

Zoos play an important role in attracting the interest of a broad spectrum of the public to issues related to snow leopard conservation and to the need for protecting animals in their natural habitat.

Zoos are also a source of valuable scientific data and practical experience in housing and breeding animals. New anaesthetics and combinations thereof have been developed and tested in zoos, as a result of which it has become possible to use these same drugs in snow leopard research in the wild. A number of other important biological aspects of the felid have been studied in zoos as well.

As of 1 January 2013, the number of snow leopards in captivity in 207 zoos around the world, with the exception of China, totalled 486 animals (223 males and 263 females).

As of 1 January 2013, the number of cats in captivity in Russia is 25 snow leopards (9 males, 14 females, and 2 young cats born in the previous 12 months) kept in 8 zoos in the following cities: Moscow, Kazan, Krasnoyarsk, Abakan, Novosibirsk, Perm, St. Petersburg, and Kaliningrad.

If necessary, the population size of snow leopards in zoos would permit the use of captive animals to replenish the genetic stock of the wild population in nature. At the current time, there is no need within Russia to reintroduce captive-born snow leopards into the wild, but it may be that population replenishment becomes advisable or even necessary in the future.

4. PRIMARY SNOW LEOPARD CONSERVATION MEASURES

The conservation of critical snow leopard subpopulations in Russia can only be achieved through a series of measures directed at saving the snow leopard itself and its habitat. Moreover, it is necessary to consider this species' particular biological characteristics, its location in Russia at the northernmost part of its global range, and the last 10 years of experience in protection the cat.

In order to increase the effectiveness of snow leopard conservation, it would be helpful to implement conservation measures incorporating the most recent technologies, specifically including remote sensing.

The primary tasks in snow leopard conservation are the elimination of factors reducing the predator's population and the minimization of negative factors leading to the reduction in and destruction of suitable habitat. High priority measures to protect snow leopards in our country should focus on resolving these issues.

4.1. Developing international cooperation

The conservation of transboundary snow leopard habitat at the border of Russia with neighbouring countries (Mongolia, Kazakhstan, and China) is very important to the conservation of the snow leopard population within Russia.

In light of the limited suitable habitat for increasing the snow leopard population in Russian territory and the importance of maintaining the exchange of animals among large populations in western Mongolia, eastern Kazakhstan, north-western China, and scarce subpopulations in Russia, international cooperation is very important. First, it would be useful to ensure effective protection of the two stable snow leopard subpopulations on the Russia-Mongolia border that reside on Tsagan-Shibetu Ridge (14-18 cats), and Chikhachev Ridge (10-15 cats). It is important to evaluate the roles of other transboundary corridors on Russia's border with Mon-

golia, China, and Kazakhstan, such as Tabyn-Bogdo-Ola and Southern Altai Ridges and the Prikhubsugulye Massifs, for survival of the Russian snow leopard subpopulations.

Intergovernmental cooperation in the conservation and study of snow leopards with other nations in the species' range should be developed along the following lines:

- Development and approval of a programme of actions for snow leopard conservation in the Russia-Mongolia and Russia-Kazakhstan transboundary zones;
- Create and expand Russian-Mongolian transboundary protected areas to ensure the conservation of sustainable snow leopard subpopulations on Chikhachev, Tsagan-Shibetu, and Sailyugem Ridges, including the Sailyugem Russian-Mongolian Transboundary Reserve comprised of Russia's Sailyugemsky National Park and Silkhemin Nuruu National Park (in Bayan-Olgii Region) in Mongolia;
- Expand the boundaries of the "Golden Mountains of Altai" UNESCO World Heritage Site according to established guidelines by including the territory of Sailyugemsky National Park;
- Coordinate activities and information exchange between Russia, Mongolia, Kazakhstan, and China to halt the smuggling of derivatives of snow leopards and other rare species. Cooperation between customs agencies of snow leopard range countries is particularly important for ending the movements of illegal animal products, and for information-sharing with relevant government agencies about international illegal trade in our nation;
- Coordination of scientific programmes and development of collaboration among experts in Russia, Mongolia, China, and Kazakhstan in the study of snow leopards; the development of joint snow leopard population monitoring programmes is especially important in the Russia-Mongolia transboundary zone, as is identifying the snow leopard's migration corridors; and
- Development of transboundary eco-tourism based in local communities residing in snow leopard habitat within protected areas in Russia and Mongolia.

Collaboration with international community-based conservation organizations, charitable foundations, and other non-governmental structures engaged in the field of snow leopard conservation and research is also es-

sential, including WWF, Snow Leopard International Trust, Snow Leopard Network, Snow Leopard Conservancy, and Panthera.

These kinds of collaboration facilitate attraction of additional financial resources, information exchange, the use of cutting edge international experience, realization of joint projects between Russian and foreign experts in the field of snow leopard conservation and research throughout the species' range.

4.2. Refinement of the legal and regulatory framework

The following actions are recommended to increase the effectiveness of legal enforcement policy and legislation in the field of environmental conservation related to snow leopard protection:

- Make changes to regulatory laws in the area of hunting, regulations regarding the management of game species' populations and quotas for harvests of wildlife when conducting game management activities in snow leopard habitat in order to account for the need to support stable populations of ungulates and other species that are the foundation of the predator's prey base;
- Ensure that the necessary authority is granted to relevant staff of government agencies in the Russian Federation and its administrative subjects, who conduct enforcement activities in nature parks and regional refuges, including issuing citations for administrative violations and other aspects of providing government oversight in regional protected areas.

4.3. Improvements to the network of protected areas

One of the most effective measures for the conservation of snow leopard subpopulations and other rare species in Russia is the creation of protected areas. In snow leopard habitat there are 14 protected areas created at various levels and of various categories and that serve to protect approximately 23% of potential snow leopard habitat. However, only 16% of the habitats of known sustainable snow leopard subpopulations are within protected areas, and in many protected areas, the existing protection of snow leopards and its habitat is insufficiently effective.

To optimize snow leopard conservation, it is recommended that the following actions be taken:

- Ensure functionality at Sailyugemsky National Park to:
 - Organize effective functioning of the federal budgetary institution es-

tablished for management of this national park;

- Develop a mid-term development plan for the national park;
- Create a buffer zone for the national park;
- Expand the park's territory to include part of the western macroslope of Chikhachev Ridge (Altai Republic) on the Mongolian border (approximately 50-80,000 ha.) as well as the land within Ukok Quiet Zone Nature Park;
- Expand Ubsunurskaya Kotlovina State Biosphere Reserve (Tyva Republic) to include parts of Chikhachev Ridge (headwaters of the Dzhetydei, Teligoyuk, Shyngyldyrak rivers), and parts of Sangilen Ridge (Tszaigal-Gol, Saigal, and Karkure river basins), as well as part of Mongun-Taiga Ridge (including the headwaters of the Shara-Kharagai River);
- Expand Sayano-Shushensky State Biosphere Reserve (Krasnoyarsky Krai) to include the watersheds of the Mezhel, Khadanok, Urbun, Kurgol, and Maly Shugur Rivers;
- Expand the boundaries of Tunkinsky National Park (Buryatiya Republic) to include snow leopard habitat;
- Establish Shanchy Nature Park in Tyva Republic, adjacent to Sayano-Shushensky State Biosphere Reserve; and
- Establish a nature park in the Toolailyg River basin (Tsagan-Shibetu Ridge) in Mongun-Taiginsky District in Tyva Republic.

4.4. Increasing the effectiveness of snow leopard conservation outside of protected areas

The effectiveness of conservation efforts for snow leopards outside of protected areas depends to a significant degree on the coordinated joint actions of federal executive agencies and regional executive agencies within the Russian Federation, as well as on community-based initiatives and the local population.

In order to increase the effectiveness of snow leopard conservation and to ensure that its habitat is protected outside of protected areas, the following actions are recommended:

- Develop and implement a comprehensive conservation enforcement system for snow leopard habitats which accounts for their ecological significance for the population in Russia;
- Establish restrictions on economic activity (first and foremost, mining activities) in the most important habitats of sustainable snow leopard subpopulations;

- Actively involve hunters in snow leopard conservation and research;
- Develop game management territories within the snow leopard's range as well as realize measures to restore wild ungulate populations in critical snow leopard habitats (primarily on Chikhachev, Southern Chuisky, Tsagan-Shibetu, and Sangilen Ridges and Mongun-Taiga Massif);
- Guarantee effective work by regional authorized executive agencies for wildlife protection and antipoaching enforcement in snow leopard habitats, paying particular attention to the fight against illegal snare-poaching in snow leopard habitat and the illegal trade in musk deer and other wildlife derivatives;
- Develop collaboration among nature conservation and legal enforcement agencies in government in order to strengthen the fight against illegal trade in snow leopards, other rare species, and their derivatives;
- Create conditions for economic stimulation of game management territories in areas where the snow leopard is present, including by means of attracting investment and other extra-budgetary funding sources;
- Establish rigorous veterinary oversight of populations of wild and domesticated animals, conduct screenings for various infectious diseases of all dead or captured snow leopards and other carnivores;
- Within snow leopard habitats, develop and bring into practice a system for sustainable rangeland management for free-range livestock grazing that considers the needs of wild ungulates;
- Monitor the condition of livestock pens and shelters in snow leopard habitats and strengthen and improve them in a timely fashion to prevent livestock losses due to predator attacks;
- Study the possibility of introducing a herder compensation system for livestock losses due to snow leopard attacks in open pastures where the snow leopard is not killed in retaliation;
- Develop and implement an incentive system to encourage herders to protect snow leopards on their lands;
- Ensure the timely gathering of information on the illegal trade in snow leopard pelts and other body parts and derivatives by engaging the participation of local residents;
- Identify cases of the trafficking of illegally killed snow leopards, establish monitoring of markets, identify sales offers of pelts and other derivatives on the internet and in other forms of mass communication;
- Actively increase the awareness of local residents about the fact that the snow leopard is inscribed in the Russian Federation Red Book and about the penalties for illegally killing this species;

- Provide for the creation and functioning of community-based enforcement teams comprised of community members living and conducting their livelihoods in snow leopard habitats to protect rare species;
- Facilitate the attraction of investments to develop tourism (except for large-scale tourism in locations where there are sustainable snow leopard subpopulations), small business, and jobs creation with the goal of providing local employment opportunities and to eliminate the causes of poaching; and
- Prioritize programmes and projects that have minimal impacts on the environment and snow leopard habitat when preparing regional socio-economic development programmes.

Programmes and projects for the development of ecological and rural tourism and that directly depend on the degree of preservation of mountain ecosystems and accessibility for the purposes of wildlife observation (such as Siberian ibex, Altai argali, red maral deer) are particularly promising for snow leopard conservation.

Collaborations with organizations such as Wild Altai, Biosphere Expeditions, and Earthwatch Expeditions that involve tourists and volunteers in the monitoring of rare species could be promising. The realization of long-term ecotourism programmes in snow leopard habitats jointly with the aforementioned organizations in Altai and Tyva Republics more actively enables the involvement of area residents in the process of serving tourists and volunteers visiting the area to study snow leopards.

It is also worthwhile to develop other mechanisms to increase the interest of area residents in the conservation of snow leopards.

4.5. Scientific research

The conservation of biodiversity, including rare and endangered species is possible through the use of scientific findings and developments. At the present, only very limited data on the biology and ecology of snow leopards is available. During development and phased implementation of a scientific research programme for snow leopards in Russia, it is important to make provisions for work in the following arenas:

- Study of the current range of the snow leopard and its dynamics, the species' population and development of revised maps of the species' habi-

tat areas. It is important to study all potential snow leopard habitats in the Russian part of its range. Particular attention should be paid to surveying potential snow leopard habitats in the Eastern Sayan Mountains and in Transbaikalia;

- Study the influence of natural and anthropogenic factors on population dynamics and changes to snow leopard habitats;
- Identify critical habitats where snow leopard reproduction occurs;
- Revise data on the snow leopard's population structure using genetic analysis and other modern methods;
- Study the sex and age structure of the population and its demographic indicators as well as the social structure of the snow leopard subpopulations;
- Study genetic connections and the degree of genetic isolation of various snow leopard subpopulations;
- Determine potential dispersal corridors for snow leopards between subpopulations, evaluate their significance to species conservation;
- Study interrelations between snow leopards and other mammal predators;
- Study snow leopard predation, prey base abundance, distribution, and population dynamics of the cat's primary prey species in various parts of the range;
- Examine the reproductive biology and offspring survival rates of the snow leopard;
- Zoological and veterinary research on snow leopards from various subpopulations; and
- Development of programmes to restore snow leopard subpopulations by means of translocation and reintroduction in habitats where the species was extirpated.

Each wild snow leopard found dead or captured in the wild should have samples taken that can be used for future analysis of genetic material. Sex organs of recently deceased animals should be collected, as should samples of gametes (spermatozoa and oocytes), skin, and muscle be collected from living specimens. Minimally invasive methods of sample collection (endoscopy, electroejaculation, and biopsy) should be used and improved to collect such samples, and the possibility of establishing a centralized sample bank should be studied.

Particular attention must be paid to scientific and applied aspects of developing and implementing measures aimed at preserving viable subpopulations of snow leopards in regions where there is socio-economic development. The study of snow leopards and other endangered species should be included among the priority themes of scientific research programmes at federal reserves and national parks, as well as specialized institutions of higher learning and science research institutes. International partnerships should be leveraged in order to successfully realize research programmes, an effort that will aid in ensuring the exchange of scientific ideas and cutting edge international experience and involvement in joint research partnerships.

4.6. Monitoring the status of key snow leopard subpopulations

The monitoring of key snow leopard subpopulations in Russia assumes long-term data collection of the distribution, population, and other population-related indicators, as well as the status of habitat in order to identify, analyse, and predict possible changes in a timely fashion.

Beginning in 2004, staff of Altaisky, Sayano-Shushensky, and Ubsunurskaya Basin State Biosphere Reserves conducted a field survey of key snow leopard subpopulations in the Altai-Sayan Ecoregion with support from WWF-Russia, and the UNDP/GEF programme “Biodiversity Conservation in the Russian Portion of the Altai-Sayan Ecoregion”. In 2009, the Programme for the Monitoring of Snow Leopards in the Russian Federation was prepared as a result of that research. Since 2010 the “Programme for the Study and Monitoring of Snow Leopards of Southern Siberia” has been in operation, led by the Permanent Expedition of the Russian Academy of Sciences for the Study of Russian Red Book Species and Other Important Russian Fauna with financial support from the Russian Geographic Society.

The goal of that monitoring programme is to ensure the collection of annual reliable data on the status of key subpopulations of the species in Russia in order to develop scientifically based practical measures for the long-term preservation of the snow leopard.

The programme’s tasks include:

- Annual estimation of the abundance of key snow leopard subpopulations and inter-annual tracking their dynamics;

Data collection on the structure and changes of the species' distribution, overall population dynamics, spatial, sex, and age structure of the subpopulations, reproduction and mortality rates, habitat status, and the impact of anthropogenic factors.

Snow leopard monitoring itself includes:

- Annual winter population surveys of key subpopulations using designated permanent routes in snow leopard habitats;
- Monthly wintertime surveys on selected transects within key habitat;
- Spring population surveys using pugmarks in sludge deposits (conducted on the shores of Sayansky Reservoir within Sayano-Shushensky State Biosphere Reserve and its buffer zone);
- Year-round collection of data documenting snow leopard encounters throughout the species' range.

This monitoring program was piloted for a two-year period and proved to be well-suited to collect objective information on the status of key snow leopard subpopulations, information that is necessary to develop suitable practical measures for their long-term conservation. In addition, cumulative experience in realizing this programme has shown that it requires fine-tuning and the incorporation of the latest high-technology monitoring methods to permit more exact estimation of parameters for the species' subpopulations (camera-traps, non-invasive genetic techniques).

The following measures should be taken in order to improve monitoring of the status of snow leopard subpopulations:

- Enhance survey methods in key snow leopard habitats using the latest technology in order to improve data accuracy on snow leopard population (via the use of camera-traps and collection of scat samples for DNA analysis) at selected monitoring sites. Specially-trained dogs are recommended for field identification of snow leopard scat. Use telemetry (satellite tracking collars) to study the sizes of the felid's home range, dispersal routes, and migration patterns;
- Include the health status and genetic structure of subpopulations in the list of study parameters used to conduct monitoring of snow leopard; Use traditional SLIMS methodology, based on snow leopard sign survey on transects, for monitoring purposes;

- Involve hunters and area residents (herders) in snow leopard monitoring in order to facilitate the ongoing collection of information about this elusive predator as well as to actively engage area residents in its conservation; and
- Take maximum advantage of science departments and other subdivisions of federal state-funded institutions responsible for managing state reserves, national parks, and federal refuges for monitoring the status of sustainable snow leopard subpopulations.

4.7. Environmental education and outreach activities

The most important aspect in this area is shaping public opinion about the snow leopard as an object of national heritage and global importance with the necessity of consciously following relevant recommendations and limitations for the cat protection and striving to participate personally in environmental conservation activity.

The criteria for evaluating the effectiveness of public engagement are a positive outlook by residents on snow leopard conservation activities and a willingness to support them that can be observed through reduced incidence of poaching, growth in voluntary participation in conservation efforts, support for protected areas, and adjustments to economic activity that account for the limitations necessary for the preservation of this species.

The following activities are recommended for the effective and long-term conservation of snow leopards in Russia:

- Form an understanding among Russian citizens of the role of Russia in the conservation of the snow leopard. This work in Altai, Tyva, and Buryatiya Republics and Krasnoyarsky Krai, where sustainable subpopulations of these animals live, is especially important;
- Support the development of the concept among area residents living within snow leopard habitat that the felid is a part of natural and cultural heritage and that there is a necessity of protecting the snow leopard. Regional and federal mass media are important tools in this work, informing the public of the value of snow leopards and the need for their conservation;
- Develop and implement targeted propaganda campaigns with the goal of establishing a positive image of the creature as a symbol of Altai and Sayan, including through the annual Snow Leopard Day festival, organized with support from local non-governmental organizations in Altai and Tyva Republics;

- Restore traditional respect for the snow leopard by the peoples of the Altai-Sayan Ecoregion, including active engagement of Buddhist leaders and other respected people in the regions and outreach related to snow leopard conservation in the general public;
 - Facilitate the preservation of spiritual culture and indigenous practices; provide education about traditional knowledge, ceremonies, and customs related to a respectful relationship with the snow leopard;
 - Facilitate increased professional knowledge among decision-makers and specialists in the area of natural resource management;
 - Support community understanding of the need for conservation and sustainable natural resource use in mountain ecosystems and snow leopard conservation, as well as restrictions introduced in protected areas to lower tolerance for poaching;
 - Engage area residents in monitoring of snow leopard subpopulations, eco-tourism development, and anti-poaching activities;
- Facilitate the popularization of results of current scientific research into snow leopard biology.





ACTION PLAN

2015



ACTION PLAN

THROUGH 2025 ON THE IMPLEMENTATION OF HIGH PRIORITY
MEASURES FOR SNOW LEOPARD CONSERVATION
AS IDENTIFIED IN THE STRATEGY FOR SNOW LEOPARD
CONSERVATION IN THE RUSSIAN FEDERATION

ACTION PLAN

**THROUGH 2025 ON THE IMPLEMENTATION
OF HIGH PRIORITY MEASURES FOR SNOW LEOPARD
CONSERVATION AS IDENTIFIED IN THE STRATEGY
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THE RUSSIAN FEDERATION**

**Moscow
2015**



МИНИСТЕРСТВО
ПРИРОДНЫХ РЕСУРСОВ И ЭКОЛОГИИ
РОССИЙСКОЙ ФЕДЕРАЦИИ



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High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
1. Developing international cooperation			
1. Completion of measures necessary for the establishment of the international Ubsu-Nur Transboundary Reserve based on Ubsunurskaya Kotlovina State Biosphere Reserve (Tyva Republic, Russia) and protected areas in the Uvs Lake basin (Uvs Aimag, Mongolia).	Decision by the Russian federal government to approve (affirm) "Agreement between the governments of Russia and Mongolia to establish the Ubsu-Nur Transboundary Reserve (Moscow, 31 May 2011)".	2015	Ministry of Natural Resources and Environment, Ministry of Foreign Affairs
1.2. Establishment of Sailyugem Transboundary Reserve based on Sailyugemsky National Park (Altai Republic, Russia) and Silkkhemin Nuruu National Park (Bayan-Olgii Aimag, Mongolia).	Decision by the Russian federal government to establish Sailyugem Transboundary Reserve.	2018	Ministry of Natural Resources and Environment, Ministry of Foreign Affairs
1.3. Coordination of Russian and Mongolian actions related to cessation of smuggling activities and the resale of derivatives of snow leopards and other rare species that are illegally hunted.	Draft agreement between Russian and Mongolian customs agencies for joint initiatives and information-sharing related to controlling the transboundary movement of flora and fauna listed in the CITES appendix.	2016	Ministry of Natural Resources and Environment, Federal Customs Service
1.4. Coordination of scientific programmes and development of collaboration among specialists in Russia, Mongolia, Kazakhstan, and China related to the study of transboundary snow leopard subpopulations.	Agreements between scientific research institutions, universities, protected areas, and other organizations in Russia, Mongolia, China, and Kazakhstan relating to collaborative studies of transboundary subpopulations of snow leopards and their habitats.	2015 - 2025	Ministry of Natural Resources and Environment, Russian Academy of Sciences institutes, universities, Altaisky State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Sailyugemsky National Park, Tunkinsky National Park
1.5. Development and coordination of programmes for conservation and monitoring of transboundary snow leopard subpopulations on Chikhachev Ridge, Tsagan-Shibetu Ridge, and Tunkinsky Ridge within the framework of the "Agreement between the governments of Russia and Mongolia to cooperate on environmental conservation dated 15 February 1994".	Programme for the conservation and monitoring of snow leopard populations in the Russia-Mongolia transboundary zone approved by the Joint Russian-Mongolian Commission for Environmental Conservation.	2016	Ministry of Natural Resources and Environment, Russian Academy of Sciences institutes, universities, Altaisky State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Sailyugemsky National Park, Tunkinsky National Park

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
1.6. Development and coordination of programmes for conservation and monitoring of transboundary snow leopard subpopulations on Katunsky and Southern Altaisky Ridges on the Russia-Kazakhstan border.	Programme for the conservation and monitoring of snow leopard subpopulations in the Russia-Kazakhstan transboundary zone approved by the Ministry of Natural Resources and Environment and the Kazakhstan Committee for Forestry and Hunting Grounds.	2016	Ministry of Natural Resources and Environment, Russian Academy of Sciences institutes, universities, Katunsky State Biosphere Reserve, Sailyugemsky National Park, Ukok Quiet Zone Nature Park
1.7. Implementation of the Russian portion of the Global Snow Leopard Conservation Programme (approved in 2013 at the Global Snow Leopard Conservation Forum in Kyrgyzstan).	Annual reports on implementation of the Russian part of the Global Snow Leopard Conservation Programme.	2015-2025	Ministry of Natural Resources and Environment, Russian Academy of Sciences
1.8. Expansion of the "Golden Mountains of Altai" UNESCO World Heritage Site by including the territories of Sailyugemsky National Park in Russia, and Silkkhemin Nuruu National Park and Altai Tavan Bogd National Park in Mongolia, Kanas National Reserve in China, and Katon-Karagaisky National Park in Kazakhstan.	Coordinated proposals submitted according to deadline to the UNESCO World Heritage Committee as part of the materials justifying the expansion of the "Golden Mountains of Altai" UNESCO World Heritage Site.	2017	Ministry of Natural Resources and Environment, Ministry of Foreign Affairs, Russian Committee for UNESCO "Man and Biosphere" Project
2. Legal and regulatory improvements			
2.1. Secured implementation of the Strategy for Snow Leopard Conservation in the Russian Federation.	Annual reports to the Ministry of Natural Resources and Environment on implementation of the action plan for snow leopard conservation in the Russian Federation.	2015-2025	Ministry of Natural Resources and Environment, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai, Russian Academy of Sciences, Protected Areas, non-governmental organizations

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
2.2. Establishment of laws and regulations to prosecute individuals providing internet advertising services and individuals posting advertisements on the sale of animal parts and derivatives from endangered and at-risk animals, including the snow leopard.	Amendments to relevant articles of the Administrative Offences Code of the Russian Federation.	2015-2016	Ministry of Natural Resources and Environment, Rosprirodnadzor ¹ , relevant federal agencies, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai
2.3. Provision of implementation of criminal liability for the illegal killing, trade, and transport of animals, body parts, and derivatives from rare and endangered animal species, including the snow leopard, across the Russian customs zone.	Analysis of legal enforcement of Articles 258.1 and 226.1 of the Russian Federation Criminal Code.	2015 – 2025	Federal Customs Service, Ministry of Internal Affairs, Federal Security Service, Ministry of Natural Resources and Environment, Rosprirodnadzor, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai
2.4. Strengthening enforcement provided for by article 41 of federal law № 209 “On hunting and the conservation of hunting resources and amendments to several laws of the Russian Federation” by empowering hunting entity employees with the right to perform searches and prepare protocols for administrative offenses.	Changes to the Administrative Offences Code of the Russian Federation and regional Administrative Offences Codes to provide authority to hunting entity employees to perform searches and prepare protocols for administrative offenses as part of the work of hunting enforcement.	2016	Ministry of Natural Resources and Environment, Rosprirodnadzor, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai
2.5. Provision of the execution of enforcement audits of hunting land leaseholders by a specially authorized agency at the regional level, as needed.	Changes to federal law № 294 dated 26.12.2008 -Ф3 “On the rights of legal entities and individual business owners to conduct federal and local government monitoring (oversight)”.	2015-2016	Ministry of Natural Resources and Environment, Rosprirodnadzor, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai

¹ Transl. – Federal Service for the Supervision of Natural Resource Use

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
2.6. Effecting changes to federal law № 209 dated 24.07.2009 "On hunting and conservation of hunting resources and on amendments to certain laws of the Russian Federation" in order to protect ungulate species in snow leopard habitats.	Rules regulating the trade in products produced as a result of hunting will be approved. Regulatory changes relating to hunting laws that regulate the maximum allowable harvest of ungulate species by hunters when engaged in hunting in snow leopard habitat.	2015 - 2016	Ministry of Natural Resources and Environment, Rosprirodnadzor
2.8. Implementation of environmental impact assessments of capital construction projects proposed to occur in habitats of animals listed in the Russian Red Data Book, including snow leopard habitat, in order to assess the adequacy of environmental conservation requirements in project documentation and improve the legal status of habitats belonging to animals listed in the Russian Red Data Book.	Draft amendment proposing changes to federal law № 174 dated 23.11.1995 "On the environmental impact assessment" to require that project documentation for capital construction projects taking place in habitat belonging to animals listed in the Russian Red Data Book, including snow leopard habitat, undergo the federal environmental impact assessment process. Documentation of governmental environmental impact assessments occurring for areas containing snow leopard habitat.	2015 - 2025	Ministry of Natural Resources and Environment, Rosprirodnadzor, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai
2.9. Development of a mechanism to establish tax benefits for legal entities and citizens making charitable donations to biodiversity conservation in Russia, including snow leopard conservation.	Legal instrument enacting a mechanism to provide tax benefits to legal entities and individuals making charitable donations.	2015 - 2016	Ministry of Natural Resources and Environment, Ministry of Finance, Federal Tax Service

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
2.10. Empowering nature park rangers with the same powers as federal protected areas rangers in Russia.	Legal instruments providing for the provision of the necessary authority to enforcement staff in Russian federal institutions engaged in enforcement in regional nature parks and nature reserves, particularly related to the production of administrative violation citations and other forms of government oversight in regional protected areas.	2015 - 2016	Ministry of Natural Resources and Environment, Rosprirodnadzor, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai
3. Improvements to the network of protected areas			
3.1. Development of a management and development plan for Sailyugemsky National Park.	Draft management and development plan for Sailyugemsky National Park.	2015	Ministry of Natural Resources and Environment Sailyugemsky National Park, Altai Republic government
3.2. Establishment of a buffer zone around Sailyugemsky National Park.	Decree by the Russian federal government establishing a buffer zone for the national park.	2017	Ministry of Natural Resources and Environment, Sailyugemsky National Park, Altai Republic government
3.3. Expansion of Sailyugemsky National Park to include the western macroslope of Chikhachev Ridge and the entire area of Ukok Plateau Quiet Zone Nature Park (alternative fulfilment of 3.3 is to establish Republic-level Talduair Nature Refuge on Chikhachev Ridge).	Decree by the Russian Federation including additional areas for Sailyugemsky National Park or a decree by the Altai Republic government establishing the Republic level Talduair Refuge.	2020	Ministry of Natural Resources and Environment, Sailyugemsky National Park, Altai Republic government
3.4. Expansion of Ubsunurskaya Kotlovina State Biosphere Reserve to include Mongun-Taiga and additional areas on Chikhachev, Tsagan-Shibetu, and Sangilen Ridges.	Decree by the Russian Federation government to make the corresponding additions to Ubsunurskaya Kotlovina State Biosphere Reserve.	2016	Ministry of Natural Resources and Environment, Ubsunurskaya Kotlovina State Biosphere Reserve, government of Tyva Republic
3.5. Creation a nature park in the Tolailyg River basin in the Mongun-Taiga District of Tyva Republic.	Decree by Tyva Republic government establishing a nature park in the Tolailyg River basin.	2016	Government of Tyva Republic

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
3.6. Creation Shanchy Nature Park in Tyva Republic, adjacent to the border of Krasnoyarsky Krai.	Decree by Tyva Republic government establishing Shanchy Nature Park.	2016	Government of Tyva Republic
3.7. Expansion of Sayano-Shushensky State Biosphere Reserve to include lands in the Burunyk, Adanart, Khadanok, Urbun, Kurgol, and Maly Shugur river basins (Ermakovsky District, Krasnoyarsky Krai) (alternative fulfilment could be the creation of two regional refuges – Usinsky and Urbunsky – in that same area).	Decree by the Russian Federation to add additional territory to Sayano-Shushensky State Biosphere Reserve or a decree by the Krasnoyarsky Krai government establishing the krai-level Usinsky and Urbunsky Nature Refuges.	2020	Ministry of Natural Resources and Environment, Sayano-Shushensky State Biosphere Reserve, Krasnoyarsky Krai government
3.8. Expansion of Tunkinsky National Park to include the northern macroslope of Tunkinsky Ridge in Buryatiya Republic.	Decree by the Russian Federation to expand Tunkinsky National Park.	2020	Ministry of Natural Resources and Environment, Tunkinsky National Park, Buryatiya Republic government
3.9. Establishment of Munku-Sardyk National Park on Bolshoy Sayan Ridge.	Decree by the Russian Federation to create Munku-Sardyk National Park.	2023	Ministry of Natural Resources and Environment, Buryatiya Republic government
4. Increasing the effectiveness of snow leopard conservation outside of protected areas			
4.1. Provision of effective protection of critical snow leopard habitat in the Russian Federation by authorized agencies responsible for enforcement and the use of animal resources in cooperation with law enforcement to prevent and interdict poaching.	Timetables and reports on enforcement patrols conducted by executive agencies responsible for protection and the use of animal resources in Altai, Tyva, and Buryatiya Republics as well as Krasnoyarsky Krai.	2015 – 2025	Rosprirodnadzor, authorized executive agencies related to enforcement and the use of animal resources in Altai, Tyva, Buryatiya Republics, as well as Krasnoyarsky Krai, Ministry of Internal Affairs, Federal Border Service, Federal Security Service
4.3. Improved monitoring and oversight of the authority given to government agencies for enforcement and animal resource use in Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai	Reports on the results of audits presented to the Ministry of Natural Resources and Environment.	2015 – 2025	Rosprirodnadzor

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
4.4. Development of a strategy and action plan to develop hunting territories in Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai.	Strategies and action plans approved by relevant regional governments on the development of hunting territories in Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai.	2016	Governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai
4.5. Organization of veterinary oversight of domestic animals pastured in snow leopard habitat, including herder dogs.	Reports on the results of veterinary inspections of domestic animals.	2015 - 2025	Rosprirodnadzor, Rosselkhoznadzor ² , veterinary oversight agencies in Altai, Tyva, and Buryatiya Republics
4.6. Development and implementation of sustainable rangeland management practices for free-range livestock grazing in snow leopard habitat in order to protect that species and wild ungulates.	Sustainable natural resource use programmes for rangeland, affirmed by the governments of Altai, Tyva, and Buryatiya Republics.	2020	Governments of Altai, Tyva, and Buryatiya Republics
4.7. Establishment of a monitoring programme to assess the condition of winter corral shelters for livestock in snow leopard habitat in Mongun-Taiginsky and Bai-Taiginsky Districts in Tyva Republic in order to prevent large-scale livestock loss due to snow leopard attacks.	Reports on the results of corral and shelter inspections.	2015 - 2025	Rosselkhoznadzor, regional administrations in Mongun-Taiginsky and Bai-Taiginsky Districts in Tyva Republic
4.8. Implementation of a programme to compensate herders in Mongun-Taiginsky and Bai-Taiginsky Districts in Tyva Republic for livestock killed by snow leopards, as well as systems to encourage local residents to protect snow leopards in Altai, Tyva, and Buryatiya Republics.	Annual reports on implementation of the compensation and education programme for herders in Altai, Tyva, and Buryatiya Republics.	2016	Rosselkhoznadzor, governments of Altai, Tyva, and Buryatiya Republics, regional administrations in Mongun-Taiginsky and Bai-Taiginsky Districts in Tyva Republic, non-governmental organizations

² Transl. – Federal Service for Veterinary and Phytosanitary Oversight

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
4.9. Creation and implementation of proper functioning of community-based inspection teams for the conservation of snow leopards and other rare species by engaging area residents in Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai.	Regulation permitting community-based inspection teams as developed and affirmed by local self-governance organizations, protected areas, and authorized government agencies within Russia engaged in enforcement and animal resource use. Reports on the results of community-based inspections for the conservation of rare species as submitted to the Ministry of Natural Resources and Environment, Rosprirodnadzor, government agencies responsible for the protection and use of animal resources.	2015 – 2025	Ministry of Natural Resources and Environment, Rosprirodnadzor, authorized executive agencies in Russian regions related to enforcement and use of animal resource use, local self-governing agencies, protected areas, WWF and other non-governmental organizations
4.10. Creation and use of an operational database for information on the illegal trade in snow leopard pelts and other derivatives as well as those from other species in Altai, Tyva, and Buryatiya Republics as well as Krasnoyarsky Krai. Carrying out special internet searches to identify illegal trade.	Regional databases with operational information about illegal trade in rare species are created and updated by agencies authorized to protect and manage the use of animal species in the Russian Federation.	2015 – 2025	Authorized executive agencies related to enforcement and the use of animal resources in Altai, Tyva, Buryatiya Republics, as well as Krasnoyarsky Krai
4.11. Decreasing negative environmental impacts on snow leopard habitat during the realization of socio-economic development programmes in the regions.	Proposals submitted with other project materials for regional socio-economic development programmes as well as proposed amendments for existing socio-economic development programmes in the regions.	2015 – 2025	Ministry of Natural Resources and Environment, Ministry of Economic Development, governments of Altai, Tyva, and Buryatiya Republics

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
4.12. Attracting investment for tourism development, small business and manufacturing development, and jobs creation in order to increase area employment and reduce poaching in snow leopard habitat.	Developed investment and business projects. Sustainable community development programmes financed by the governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai.	Annual	Ministry of Natural Resources and Environment, Ministry of Sport, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai, non-governmental organizations, tourism businesses
5. Scientific research			
5.1. Creation of a unified database on snow leopards in Russia that includes up-to-date information on the current distribution, biology and ecology, and habitat data, as well the status of the cat's main prey species populations.	Database created and approved by the Ministry of Natural Resources and Environment .	2015	Ministry of Natural Resources and Environment, Russian Academy of Sciences Institutes, Altaisky State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Saillyugemsky National Park, Tunkinsky National Park, Sayano-Shushensky State Biosphere Reserve
5.2. Development and phased realization of a comprehensive scientific research program on snow leopards in the Russian Federation.	Approved scientific research projects, reports on research performed, science journal publications, and recommendations for applied conservation efforts.	2015 - 2025	Ministry of Natural Resources and Environment, Russian Academy of Sciences Institutes, Altaisky State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Saillyugemsky National Park, Tunkinsky National Park, Sayano-Shushensky State Biosphere Reserve
6. Monitoring of snow leopard subpopulations in Russia			

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
6.1. Establish a snow leopard monitoring programme in Russia using traditional and innovative population survey methods.	Snow leopard monitoring programme in Russia, affirmed by the Ministry of Natural Resources and Environment .	2016	Ministry of Natural Resources and Environment, Russian Academy of Sciences Institutes, Altaisky State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Sailyugemsky National Park, Tunkinsky National Park, Sayano-Shushensky State Biosphere Reserve
6.2. Organize and conduct monitoring of key snow leopard sub-populations in the Russian Federation.	Reports on the results of snow leopard monitoring in the Russian Federation.	Annual	Ministry of Natural Resources and Environment, Russian Academy of Sciences, Altaisky State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Sailyugemsky National Park, Tunkinsky National Park, Sayano-Shushensky State Biosphere Reserve
7. Outreach and education activities			
7.1. Educating the population of the Russian Federation on the uniqueness of the snow leopard, its biological, ecological, and aesthetic value, and increasing public conservation interest in the species.	Radio and television programming, printed materials, internet resources.	Annual	Ministry of Natural Resources and Environment, Altaisky State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Sailyugemsky National Park, Tunkinsky National Park, Sayano-Shushensky State Biosphere Reserve, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai, non-governmental organizations

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
7.2. Engaging the public in activities and actions to support snow leopard conservation, including scientific research, transboundary research, and community-based conservation enforcement.	Large-scale conservation and public relations activities, radio and television programming, printed materials, internet resources, annual festivals.	Annual	Ministry of Natural Resources and Environment, Altaisky State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Sailyugemsky National Park, Tunkinsky National Park, Sayano-Shushensky State Biosphere Reserve, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai, non-governmental organizations
7.3. Protecting spiritual culture and traditional practices of indigenous peoples, traditional knowledge education, ceremonies, and customs related to conservation and respect for snow leopards.	Large-scale holiday events, "Snow Leopard Days", activities, radio and television programming, printed materials, internet resources.	Annual	Ministry of Natural Resources and Environment, Altaisky State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Sailyugemsky National Park, Tunkinsky National Park, Sayano-Shushensky State Biosphere Reserve, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai, non-governmental organizations
7.4. Educating local residents on the importance of the snow leopard and the penalties for illegal killing of the species.	Information campaigns on the conservation of snow leopards and other species in the media in Altai, Tyva, and Buryatiya Republics as well as Krasnoyarsky Krai. Information distributed among the local population regarding the penalties for poaching.	Annual	Rosprirodnadzor, Authorized executive agencies related to enforcement and the use of animal resources in Altai, Tyva, Buryatiya Republics, as well as Krasnoyarsky Krai, non-governmental organizations

High Priority Snow Leopard Conservation Measures	Performance Indicators	Time-line	Responsible
7.5. Development of eco-tourism in snow leopard habitat.	Eco-tourism programmes in snow leopard habitat.	Annual	Relevant tourism businesses, Russian Geographic Society, Altai State Biosphere Reserve, Ubsunurskaya Kotlovina State Biosphere Reserve, Sailyugemsky National Park, Tunkinsky National Park, Sayano-Shushensky State Biosphere Reserve, governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai, non-governmental organizations
7.6. Publication and distribution of an <i>Atlas of the Snow Leopard in Russia</i> .	Published atlas.	2016	Russian Geographic Society, Institute of Ecology and Evolutionn Academy of Sciences, WWF
7.7. Incorporating lessons on rare species, including the snow leopard, and conservation methods in preschool and school education curriculums.	Approved curriculum for preschool and school education programmes.	2018	Governments of Altai, Tyva, and Buryatiya Republics, as well as Krasnoyarsky Krai, non-governmental organizations

