



Snow Leopard (*Panthera uncia*) Status in Kazakhstan

CONTRIBUTORS:

Alexey Grachev ^{1,2,3}

KEYWORDS:

snow leopard; *Panthera uncia*; Kazakhstan;
country status; distribution; population;
conservation

CORRESPONDING EDITOR: Örjan Johansson

HANDLING EDITOR: Justine Shanti Alexander

This article forms part of a Special Issue on the country-level status of snow leopards. All contributions were reviewed by members of the Snow Leopard Reports Editorial Team and did not undergo external peer review.

COPYRIGHT: © 2026 Grachev et al.

This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), allowing third parties to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material for any purpose, even commercially, provided the original work is properly cited and states its license.

1 Institute of Zoology of Republic of Kazakhstan

2 Snow Leopard Foundation, Kazakhstan

3 Wildlife Without Borders, Kazakhstan

* Email: aleksey.al.grachev@gmail.com

1. Distribution

The north-western edge of the snow leopard's global range is situated in Kazakhstan, covering the Tien Shan, Dzungar Alatau, Tarbagatai, Saur, and Altai mountain ranges (Heptner & Sludskiy, 1972; Sludskiy, 1973; Grachev & Fedosenko, 1977). These transboundary mountain systems neighbor Uzbekistan, Kyrgyzstan, China, and Russia. With increasing economic development from the middle of the 20th century, the distribution area and number of snow leopards in Kazakhstan began to decline. Today, the snow leopard has disappeared from some peripheral ranges. Ongoing research in Kazakhstan suggests that over the past 20–30 years, the snow leopard population has been recovering (Grachev et al. 2023), albeit unevenly, and remains absent from certain key areas such as the Saur, Tarbagatai, and Uzynkara (Ketmen) ranges, as well as the Karatau (Figure 1). These areas are important for population connectivity and transboundary cooperation, and also offer insights into edge-of-range conservation in a changing world (Grachev et al. 2025).

In mapping the distribution of the snow leopard in accordance with IUCN Red List standards, we primarily relied on records of all known sightings of the species, as well as evidence of its presence. To determine the area of occupancy (Extant), all available snow leopard occurrence points collected during field surveys (from 2012 to present) were enclosed within polygons. The boundaries of each polygon were defined by the outermost occurrence points, with adjacent territories included up to limits imposed by natural barriers such as watershed ridges, plains bordering

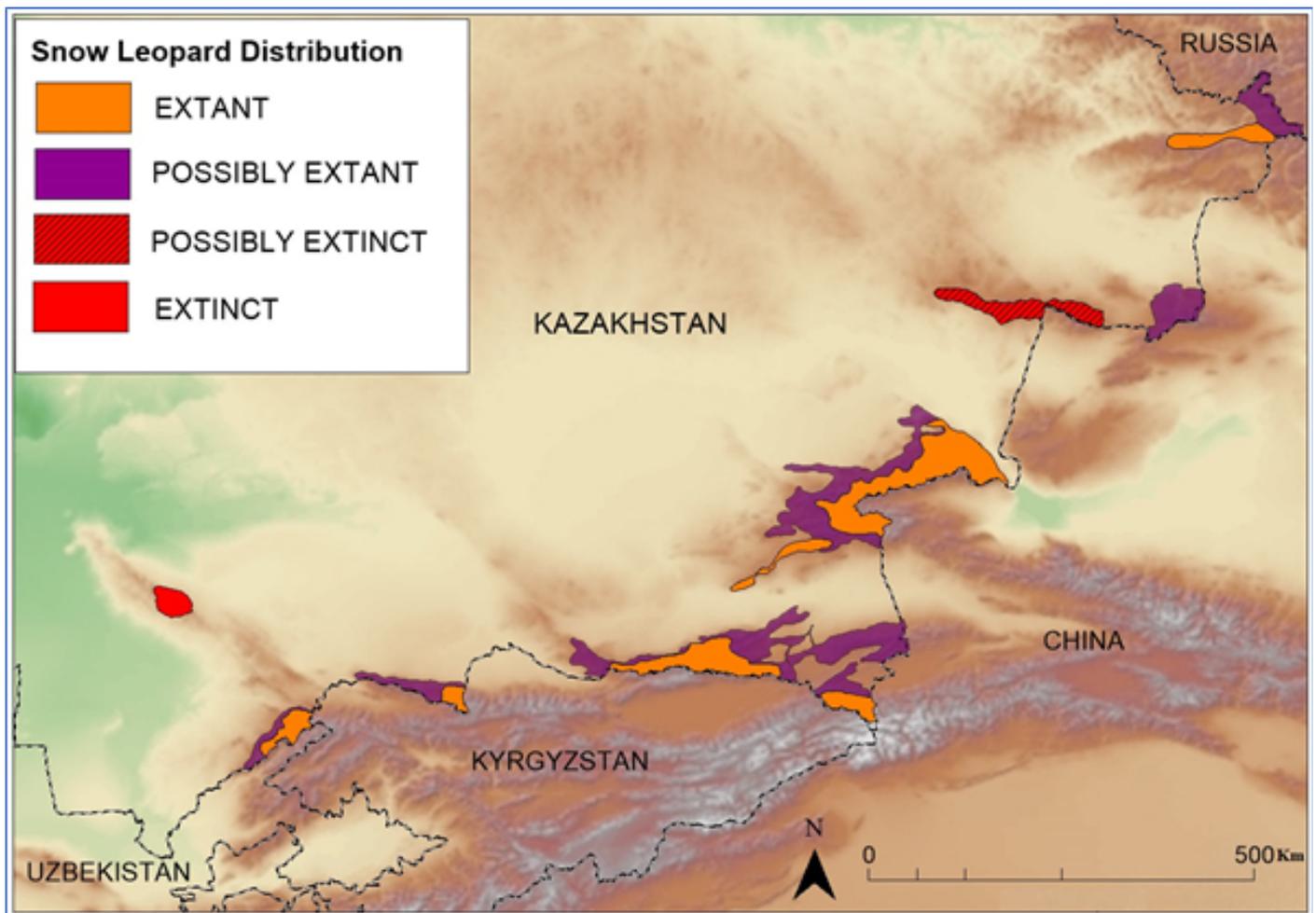


Figure 1. Distribution of the snow leopard (*Panthera uncia*) in Kazakhstan. Orange areas indicate extant range, where the species is confirmed or strongly inferred to occur based on recent records. Purple areas indicate possibly extant range, where presence is uncertain but considered likely based on habitat suitability and proximity to confirmed occurrences. Red hatched areas indicate possibly extinct range, where the species may have occurred historically but has not been confirmed in recent decades. Solid red areas indicate extinct range, where the species is considered no longer present. Range categories follow IUCN Red List mapping definitions.

mountain areas at the periphery of the range, state borders, and zones of increased anthropogenic pressure.

In addition, we applied a multi-scale species distribution model to identify factors influencing snow leopard abundance and developed a baseline model reflecting the historical distribution of the species in the country (Grachev et al., 2025). It is noteworthy that the simulation model fully reproduced all known snow leopard records in Kazakhstan since the early 20th century (Heptner & Sludsky, 1972; Sludsky, 1973; Grachev & Fedosenko, 1973), thereby proving to be a successful corrective strategy for identifying all ecological conditions capable of supporting the species' persistence in this region.

The extent of core areas (km²), classified by habitat quality (low, medium, and high), generally corresponded to the polygons delineated on the snow leopard distribution map (Figure 1). Specifically, the total area of polygons classified

as Extant was comparable to the area of high-quality habitat (90th percentile) in the model, whereas areas of medium-to-high habitat quality (80th percentile) corresponded to polygons classified as Possibly Extant.

Importantly, the model also indicated with considerable accuracy a site in the Syrdarya Karatau Range, which represents a peripheral northwestern spur of the Western Tien Shan where the snow leopard was last recorded about 100 years ago (Antipin, 1953). This site was classified as «Extinct».

Western Tien Shan. Snow leopard habitat includes the western end of the Talas Alatau, the Karzhantau ridge and the northwestern slopes of the Ugam and Maidantal ranges, along which runs the border with Uzbekistan. The Kyrgyz Alatau is transitional between the Western and Northern Tien Shan, and the Kyrgyzstan border runs along the ridge. In Talas Alatau, snow leopards occur in the Aksu-Zhabagly

Nature Reserve along the gorges of the Zhabagly, Aksu, Koksai, Aksai, Maidantal, Baldarbek, and Balabaldarbek rivers. On the Ugam Ridge in the Sairam-Ugam National Park, snow leopards occur along the valleys of the Sairamsu, Sary-Agyr, and Ugam rivers (Grachev, 2016). In the Kyrgyz Alatau, occupancy has only been consistently recorded along the Aspara and Merke gorges.

Northern Tien Shan. The Northern Tien Shan includes the Ile Alatau, Kungei Alatau, Ketmen (Uzynkara) and Terskey Alatau ranges. The primary snow leopard habitats occur on the northern slopes up to 4,000 m. Camera trapping and other surveys in Almaty Nature Reserve and Ile-Alatau National Park between 2012-21 indicated snow leopard presence widely across the region (e.g. Shilik, Turgen, Issyk, Talgar, Malaya and Bolshaya Almatinka, Kargalinka, Aksai, Kargauldy, Kaskelen, Chemolgan, Uzyn-Kargaly, Karakastek, Kastek) (Grachev et al., 2013, 2015, 2019, 2023). In Almaty Reserve, snow leopards are encountered down to 1,200 m.

In the eastern spurs of the Ile Alatau, the low mountains Turaigyr, Syugaty, Bolshoe and Small Buguty, snow leopards are only occasionally encountered. There are anecdotal reports of snow leopards in the Turaigyr, Boguty and Charyn Canyon mountains, but camera trap studies in the Bolshiye Boguty mountains in the winter 2015-16 and 2022-23 did not confirm their presence.

The Kolsai Kolderi National Park is located on the northern slope of eastern part of the Kungey Alatau. The creation of this national park in 2007 has improved habitats and snow leopards are more frequently encountered. As a result of research by the Institute of Zoology between 2012-20 using camera traps, snow leopards were recorded in almost all large gorges – Kaindy, Saty, Kulsai, Kurmekty, Taldy, Kutorga, Malye and Bolshie Uryukty, Karakiya, Karasai, as well as in the upper reaches of the Shelek River (Grachev et al. 2017).

The western part of the Ketmen (Uzynkara) ridge is located within Kazakhstan, with the eastern part in China. Snow leopards do not appear to live permanently in these mountains, although animals from neighboring China are anecdotally reported to have visited. However, residents and workers at hunting farms located in the central part of the ridge, consider the snow leopard to be absent.

The eastern part of the northern slope of the Terskey Alatau ridge is located within Kazakhstan, connected to the Kyrgyz Republic and China. In the 1970s and 1990s, the snow leopard was recorded in the upper reaches of the Karkara, Tekes, Bolshoi Kokpak, and Bayankol rivers (Fedosenko, 1982; Zhiryakov & Baidavletov, 2002). In 2018-19, they

were also recorded on camera traps in the tracts bordering China and Kyrgyzstan (Grachev et al., 2023).

Zhetysu (Dzungar) Alatau. The Dzungar Alatau consists of a series of east-west parallel ridges stretching for about 400 km, with isolated peaks exceed 4,000 m. The border with China runs along the crest of the ridge, with the northern slope in Kazakhstan. Two national parks, Zhongar-Alatau (3,560 km²), Altyn-Emel (3,077 km²) and three wildlife sanctuaries (Verkhne-Koksuisky, Toktinsky and Lepsinsky) are found here.

Snow leopard signs and sightings have been recorded over the past 20 years in numerous river valleys (from east to west: Chindaly; Tokhty; Terekty; Zhamanty; Kyzyltal; Tastau; Tentek; Lepsy; Aganakatty; Maly Baskan; Sarkand; Aksu; Bien; Koku; and Usek), on the southwestern spurs of Toksanbay and Koyandytau ridges (Anenkov, 1992; Tushkenov, 2017; Zhatkanbaev, 2012; Grachev et al., 2023).

On the Altyn-Emel ridge snow leopards have previously only rarely been recorded, but in recent years they have become more frequent. Also, since 2017 a breeding population has been recorded year-round in the desert lowlands of Sholak, Degeres, Matai, in the Altyn-Emel National Park at an elevation of ~1,000 m. Due to high air temperatures, especially in summer (up to 40°C and more) predators lead mainly a nocturnal lifestyle, waiting out the summer heat in caves and rock niches. Concentrations of predators are observed near water sources, sometimes snow leopards can also be found in reed beds near watering places. Until the mid-1950s, the snow leopard was quite common in these mountains and its long absence followed uncontrolled illegal hunting in previous years.

Tarbagatai and Saur. The western half of the Tarbagatai ridge and the northern slope of its eastern half are located within Kazakhstan, neighboring China along the ridge of the Eastern Tarbagatai. The maximum elevation of the ridge is approximately 3,000 m.

Snow leopards have always been rare in Tarbagatai. In the 1960s and 1970s, no snow leopard tracks were found here, but in the late 1980s and early 1990s, several occurrences were recorded into Eastern Tarbagatai, apparently animals moving from China. Tarbagatai National Park (1,435 km²) was created in 2018 but, as yet snow leopards are not permanent residents.

Saur ridge, with a maximum elevation of 3,722 m, also shares the state border with China. Snow leopards were rare here in the middle of the 20th century (Sludsky, 1973). Anecdotal accounts of snow leopards by local communities were reported in 2010, 2013 and 2014 in the upper reaches

of the Kenderlyk, Karaungur, Akkezen and Chagan-Obo rivers.

Camera trap surveys during 2017 in the Saur mountains, failed to record snow leopards, although a snow leopard family group was observed in 2021 in the Ushtas tract, in the upper reaches of the Darnaozek River (tributary of the Kenderlyk River). At present there are no protected areas on Saur.

Altai. The Kazakh part of Altai includes several ridges of this vast mountain system. Snow leopards occur in the Southern Altai, Tarbagatai (Bukhtarminsky), Sarymsakty and Katunsky ridges, although infrequently (Grachev et al., 2023). Occasional snow leopards are recorded on the Kholzun, Koksuisky, and Ivanovsky ridges, which lie north of the main habitat. There are two key snow leopard habitats in the region, the first in the eastern half of the Southern Altai ridge and the Tarbagatai (Bukhtarminsky) ridge, and the second along the steep and inaccessible Sarymsakty ridge. Most records in these areas, both past and present,

are located on the territory of the Katon-Karagai National Park in the basin of the Bukhtarma River. Snow leopard tracks are very rarely found on the Katunsky Ridge and on the Ukok Plateau, to the north of their core area.

2. Population

The population of snow leopards in Kazakhstan at the beginning of the 1980s was estimated at 180-200 individuals (Fedosenko, 1982). In the early 1990s, the number of snow leopards in Kazakhstan was estimated from the literature at 80-100 individuals (Loginov, 1995). Estimates in the early 2000s were 100-110 individuals (Zhiryakov & Baidavletov, 2002); in the early 2010s, 110-130 (unpublished data, IoZ); and in the late 2010s, 130-150 individuals (unpublished data, IoZ). At present, the total number of snow leopards in Kazakhstan is estimated to be 152–189 individuals, with 77–97 in the Tien Shan, 71–83 in the Dzungar Alatau, 3–6 in Altai and 1–3 in Saur (Table 1).

Table 1 – Current number and average density of snow leopard populations in Kazakhstan

| Region and Range | Current range (km ²) | Estimated population average density (per 100 km ²) | Number of individuals | Method used* | Year |
|--|----------------------------------|---|-----------------------|--------------|------------|
| Western Tien Shan | | | | | |
| Ranges Karzhantau, Ugamaskiy, Maidantalskiy, Talasskiy | 1,700 | 0.7-0.9 | 12-15 | Q, S-T, CT | 2012-2014 |
| Kyrgyz Alatau | 800 | 0.6-1.0 | 5-8 | CT | 2020 |
| Northern Tien Shan | | | | | |
| Ile Alatau | 3,100 | 1.1-1.5 | 35-45 | CT | 2023-2024 |
| Kungey Alatau | 1,900 | 0.7-0.8 | 13-15 | CT | 2015-2017 |
| Terskey Alatau | 1,700 | 0.7-0.8 | 12-14 | Q, CT | 2018-2019 |
| Uzynkara (Ketmen) | n/a | - | 0 | Q | 2014, 2018 |
| Dzungar Alatau | | | | | |
| Ranges Toksanbay, Dzungar Alatau (Central), Kungey, Tastau | 9,500 | 0.5-0.6 | 50-60 | S-T, CT | 2022-2023 |
| Sholak, Degeres, Matai, Altyn-Emel, Koyandytau ridge | 1,400 | 1.5-1.6 | 21-23 | CT | 2022-2023 |
| Saur-Tarbagatai | | | | | |
| Saur | n/a | - | 1-3 | Q, S-T, CT | 2016, 2020 |
| Tarbagatai | n/a | - | 0 | Q | 2018-2019 |
| Altai | 1,800 | 0.2-0.3 | 3-6 | S-T, CT | 2017-2024 |
| In total: | 21,900 | | 152-189 | | |

* Q – questionnaire; S-T – snow-tracking; CT – Camera Traps

Northern Tien Shan. In the Ile Alatau, the number of snow leopards in the early 2000s was estimated at 30-35 individuals, of which 20-25 individuals continue to live and breed in Almaty Reserve (Dzhanyspaev, 2002; Zhiryakov & Baidavletov, 2002), with frequent sign and sighting encounters recorded. The creation of the Ile-Alatau National Park in 1996 secured significant areas of habitats in protection, and numbers increased due to movement of animals from Almaty Reserve. Recent field surveys have estimated the snow leopard population in the Ile Alatau at 35-45 individuals, with an average density of 1.29 individuals per 100 km². Despite intensive human impacts on these mountain landscapes due to proximity with large urban centers, including the 'super-city' of Almaty, the number of snow leopards in Ile Alatau remains stable.

In Kungei Alatau, camera trap surveys between 2015-2017 yielded estimates of 13-15 snow leopards, with an average population density of 0.74 individuals per 100 km² (Grachev et al. 2017).

In the Kazakh part of the Terskey Alatau, in an area of 1,700 km², recent surveys suggest 12-14 snow leopards, with an average density of 0.76 individuals per 100 km². Previously, in the late 1990s, the number of snow leopards here did not exceed 2-3 individuals (Zhiryakov & Baidavletov, 2002). Increased protection has been afforded by high-end hunting concessions, with well-organized and resourced protection and the absence of livestock in key areas, leading to increased numbers of wild ungulates.

Western Tien Shan. In the early 1980s, the snow leopard numbers in the Aksu-Zhabagly Nature Reserve were estimated at 10-12 individuals, with a population density of 1.3-1.6 individuals per 100 km² (Burgelo, 1986). By the early 1990s, estimates had declined to 7-8 animals (0.9-1.0 individuals per 100 km²; Shakula, 1995); with further declines to 2-3 individuals by the late 1990s (Kolbintsev, 2001). The current population of snow leopards in the reserve is estimated at 8-10 individuals. Additional animals in the Sairam-Ugam National Park, on the Karzhantau, Ugam, Maidantal, Talassky ridges, give a total estimate at 12-15 individuals, with an average density of 0.8 individuals per 100 km².

In the Kyrgyz Alatau, camera trapping in the Merken Forestry Enterprise (since 2025, the Merke Regional Nature Park) in 2020 suggested a population of 5-8 individuals (average density of 0.81 individuals per 100 km²), probably due to movement of animals from neighboring Kyrgyzstan.

In the Dzungar Alatau in the 1980s, 65-70 snow leopards occurred across 8,200 km², but the number decreased to

~50 individuals by 1990, of which 11 snow leopards lived in the western half of the ridge, 20-25 in the eastern half, the rest lived along the state border on the ridges (Anenkov, 1992). Results of recent surveys in the northeastern part of the Dzungar Alatau from the upper reaches of the Tentek River in the west to the end of the ridge in the area of the Dzungarian Gate in the east suggest 15-20 extant snow leopards. The total population in the Dzungar Alatau (including Toksanbai, Dzungar Alatau (Central), Kungei, Tastau ridges) is estimated at 50-60 individuals, and the average density is 0.58 individuals per 100 km².

Surveys carried out in 2022-23 along the southwestern spurs of the Dzungar Alatau, on the Sholak, Degeres, Matai, Altyn-Emel, Koyandytau ridges, suggest 21-23 individuals (average density of 1.57 individuals per 100 km²).

In the Kazakhstan Altai between the 1970s and 1990s, snow leopard occurred across approximately 1,800 km², supporting an estimated 14-18 individuals (Baidavletov, 1997). By 1995, this had declined to 10-15 (Zinchenko, 1995). By 2000 only 7-8 individuals were estimated to remain (population density of 0.3-0.4 individuals per 100km²; Zhiryakov & Baidavletov, 2002). Estimates of 10-12 individuals were made in 2009 (Loginov, Loginova, 2009). Recent surveys between 2017-24, suggest that numbers remain low, ~3-6 individuals (average density of 0.25 individuals per 100 km²). Recent limited surveys in the *Saur and Tarbagatai* mountains, did not suggest snow leopard numbers were recovering here either. Snow leopard were only encountered in the Saur mountains in 2021, with the number in these mountains estimated at only 1-3 individuals, with possibly none resident.

3. Threats

Poaching and trafficking

Poaching and trade in snow leopard parts in Kazakhstan were recorded during the 1990s and early 2000s but have become infrequent more recently. There remains insufficient official statistics on poaching and trade, but our surveys among communities in snow leopard habitats, and analysis of social network data, suggest that 5-10 snow leopards are illegally killed in Kazakhstan each year.

The issue of poaching is most acute in the mountains of the Dzungar Alatau, where large areas of snow leopard habitat remain unprotected. In the Kazakhstan Altai, snow leopard can be accidentally captured by traps set by poachers targeting musk deer (*Moschus moschiferus*) and brown bear (*Ursus arctos*). Evidence is scarce but by-catch might at least partially explain apparent declines in

snow leopard numbers in this region. Elsewhere, poaching impacts on snow leopard are not considered to significantly affect populations

Recent cases of direct and indirect persecution of snow leopard have been attributed to conflict with livestock farmers. Pastoralists are increasingly using chemically undetermined poisons imported across the border with China, to control other predators, mainly wolves, which are also threatening snow leopards. Increasing populations of snow leopard in Kazakhstan, including beyond protected areas, requires ongoing monitoring. Thus far, cases have been recorded in the Tien Shan and the Dzungar Alatau. Reductions in the snow leopard's natural prey due to illegal hunting remains the most important issue and requires further attention by national and local authorities.

Habitat degradation

The number of livestock declined sharply in the 1990s but has increased again in many areas within the snow leopard's range, including some protected areas. This has driven declines in natural prey species abundances through competition and reduced breeding rates. Snow leopard prey-switching to livestock occurs where natural prey has disappeared leading to conflict spirals with farmers, and potentially further persecution.

Infrastructure development

Infrastructure developments are causing increased habitat fragmentation, further isolating snow leopard populations. Road and rail infrastructure is being newly built, reconstructed or enhanced in response to new economic opportunities developments, such as the modern "Silk Road" along the Ili Basin. These have obstructed movement of snow leopards between the Northern Tien Shan and the Jungar Alatau, which is indicated as an important area for range-wide connectivity.

The construction of new fences, including those along international borders, has a negative impact on the regular seasonal migrations and movements of snow leopards and their principal prey species, such as Argali and Siberian ibex. Border fencing between China and Kazakhstan poses a particularly severe barrier to snow leopard dispersal, as demonstrated by satellite telemetry and visual observations (unpublished data). For example, in spring 2025, one snow leopard became entangled in barbed wire while attempting to cross the border fence. Addressing this problem will require modifications to fence design that facilitate wildlife passage, which in turn necessitates coordinated efforts between the two countries.

Human population growth and urbanization

The snow leopard range in Kazakhstan is increasingly

facing pressures from urban expansion, including the mega-city of Almaty, which has engulfed two large mountain gorges of the Malaya Almatinka and Bolshaya Almatinka rivers, into built-up and heavily populated suburbs. Snow leopards appear to have vacated these areas, allowing jackals and domestic dogs to become problematic for wildlife.

Disturbance

Disturbance factors affecting wildlife have been exacerbated by the massive and uncontrolled movements of people to the mountainous areas near the city of Almaty. Increases in accessibility for both organized and informal tourism coincides with the snow leopard breeding season, particularly in winter. The previous inaccessibility of snow leopard habitats was one of the main factors contributing to the species conservation. Further efforts are now urgently required, consolidated across numerous sectors, to ensure that snow leopards remain a contemporary cultural emblem of Kazakhstan and not a history lesson.

Climate Change

In the context of ongoing climate warming, glaciers are undergoing accelerated retreat, driven predominantly by rising summer temperatures. This process has profound implications for water availability, affecting both human populations and wildlife. The most pronounced retreat is observed in peripheral, low-elevation mountain ranges located near densely populated foothill regions, where arid summer conditions prevail and snowmelt together with glacial runoff constitute essential sources of water supply (Sorg et al. 2012; Shahgedanova et al. 2020).

Recently observed climate change is having fundamental environmental impacts, such as a shift in the timing and nature of snow cover in these mountains. This is especially noticeable in the Northern Tien Shan, with very little snow cover until the end of winter and the beginning of spring. This in turn results in ski resorts needing to produce artificial snow, leading to increased disturbance with polluting and noisy modern technology, as well as due to the increase of people in the mountains in winter. The Government of the Republic of Kazakhstan has approved a Concept of Tourism Industry Development, which envisions large-scale infrastructure expansion in the mountains. Against a backdrop of continued climate warming, such developments are likely to compound pressures on snow leopard populations.

Elsewhere, in the desert spurs of the Ileisky and Dzungar Alatau, where snow leopards live at low elevations, water sources (springs and small rivers) have been drying earlier. Remaining water sources, especially those outside of protected areas are utilized by cattle herders and become

inaccessible to snow leopards and their prey. Furthermore, declines in drinking water quality have been observed across the Turkestan region in south Kazakhstan. In response, the government launched a project to build several reservoirs in the mountain valleys of the Western Tien Shan. Such a large-scale project is expected to lead to further degradation of snow leopard habitats at the very edge of the species' range.

More broadly, climate change facilitates expanding human intrusion into previously undisturbed habitats, accelerating fragmentation of snow leopard range and undermining ecological connectivity. These processes not only threaten isolated populations but also reduce opportunities for gene flow across the species' range. Effective responses must therefore extend beyond national borders, prioritizing both the establishment of new protected areas and the ecological connectivity of existing ones through habitat corridors. Strengthening transboundary cooperation between range states will be critical to maintaining viable snow leopard populations under the combined pressures of climate change and intensifying anthropogenic activity.

4. Conservation

Research and Monitoring

Long-term research on snow leopards in Kazakhstan has been carried out by the government-based Institute of Zoology since its foundation in 1932. Early work laid the foundations for biodiversity conservation in Kazakhstan including the creation of protected areas, publishing the Red Book of Kazakhstan, and providing critical policy guidance for species and habitat protection. The Red Book of Kazakhstan lists snow leopard as Category III: "a rare species whose range and number are decreasing". The Snow Leopard Conservation Strategy (2011) and National Action Plans (2015, 2020, 2025) have been developed for Kazakhstan, further adopting the Global Snow Leopard & Ecosystem Protection Program (GSLEP) Bishkek Declarations (2013, 2017).

The recently established Snow Leopard Monitoring Center at the Institute of Zoology strengthens efforts to understand the state of snow leopard populations and their prey throughout Kazakhstan and establish effective conservation measures. Key areas of snow leopard habitat have been surveyed annually since 2012, working with protected area teams. In 2019, the first molecular genetic studies were initiated, making it possible to identify individuals and their sex.

In the period from 2021 to 2024, a total of 11 snow leopards were equipped with satellite collars within the territories of

Ile-Alatau National Park (Northern Tien Shan) and Altyn-Emel National Park (Dzungarian Alatau). Subsequent satellite telemetry research is planned in other regions of Kazakhstan in order to investigate the survival strategies and movement dynamics of snow leopards at the periphery of their distribution range.

National Policy and Legislation

The snow leopard is a national and state symbol of Kazakhstan, with great social and cultural significance. Their protection is enshrined by environmental policies and tightly observed regulations. In the 30-years since Kazakhstan's independence, 10 new protected areas have been created in snow leopard habitats, leading to apparent population increases.

At the legislative level, the protection of the snow leopard in Kazakhstan is regulated by key laws under the Criminal Code of the Republic of Kazakhstan: "On the protection, reproduction and use of Wildlife"; and "On Specially Protected Natural Territories". The legal framework for combating snow leopard poaching has been reinforced, introducing fines exceeding USD 20,000 along with criminal liability, including terms of imprisonment, as a deterrent measure.

Protected Areas

Protected areas have been established in Kazakhstan's mountain ecosystems, with three nature reserves (IUCN Category Ia) and eight national parks (Category II) in snow leopard range. Aksu-Zhabagly State Reserve (1,281 km²), Sairam-Ugam National Park (1,500 km²) and Merke Regional Nature Park (860 km²) are in the Western Tien Shan. Almaty Nature Reserve (717 km²), Ile-Alatau National Park (1,992 km²), Kolsai Kolderi (1,610 km²) and Charyn (1,270 km²) are in the Northern Tien Shan. Altyn-Emel (3,077 km²) and the newly created Zhongar-Alatau National Park (3,560 km²) are in the Dzungar Alatau. Markakol Nature Reserve (1,030 km²) and Katon-Karagai National Park (6,435 km²) are in Altai. There are no reserves or national parks in Saur, and the key ridges of Kyrgyz, Ketmen and Terskey Alatau in the Tien Shan, although there are four wildlife sanctuaries (IUCN category IV): Almatinsky (5,124 km²), Verkhne-Koksuisky (2,400 km²), Toktinsky (1,870 km²), and Lepsinsky (2,580 km²).

In Kazakhstan, protected areas safeguard a substantial portion of the mountain ecosystems that support the core of the national snow leopard population. Between 70% and 90% of the country's total population of the species is found within protected areas. These areas also provide conditions for successful reproduction and high cub survival. According to approximate estimates, between 30 and 50 snow leopard cubs are born annually in Kazakhstan.

The snow leopard and its ecosystems are relatively well protected in the Western Tien Shan, the Ile Alatau and Kungei Alatau ranges of the Northern Tien Shan, as well as in the Altai. In the Dzungarian Alatau, it would be advisable to expand the existing national park eastward. Effective protected areas are particularly needed in the Saur, Ketmen, and Terskey Alatau ranges. At present, the Government of Kazakhstan, in cooperation with other organizations, is working on the establishment of new protected areas and the enhancement of existing ones. In August 2025, a new Regional Nature Park «Merke» was established in the Kyrgyz Alatau Mountains (Western Tien Shan) for the conservation of the snow leopard.

Mitigating Human–Snow Leopard Conflicts

With the increasing number of snow leopards in Kazakhstan and their dispersal beyond protected areas, previously sporadic conflicts with livestock herders are becoming a serious threat. Outside protected areas, intensive land use leads to habitat degradation and a rise in conflict situations, resulting in direct persecution of the species: an estimated 5–10 individuals are killed annually by humans. Long-term monitoring has shown that the main source of conflict is depredation by young snow leopards dispersing from protected areas and attacking livestock or approaching herder camps. Satellite telemetry data (2021–2024, 11 individuals) confirmed that nearly all snow leopards leaving protected areas came into conflict with humans, particularly in the Dzungarian Alatau and its spurs. Additional risks are posed by hunting concessions, where the species may be regarded as a ‘harmful’ predator causing economic losses to trophy hunting enterprises. Although ungulate densities (the main prey species of snow leopards) are considerably higher in some hunting concessions than in protected areas, systematic monitoring of snow leopard populations is not carried out.

A dedicated program for resolving human–snow leopard conflict situations has not yet been adopted in Kazakhstan. However, the Institute of Zoology has undertaken limited efforts to translocate conflict individuals. In 2022–2023, two snow leopards were relocated to safer habitats, where they successfully adapted to the new environment. Given the seriousness of this threat, compounded by ongoing habitat degradation intensified by climate change, urgent conservation measures and an integrated approach are required. Priority actions include the resumption and expansion of the protected area network; providing economic incentives to local communities (e.g., compensation schemes, ecotourism support); strengthening protection and monitoring; implementing environmental education and awareness-raising on the ecological role of the snow leopard; and initiating a structured program for the translocation of conflict individuals to support

declining or locally extinct populations in Kazakhstan. Effective conflict resolution will require the joint efforts of government agencies, NGOs, and local communities.

5. Acknowledgements

This country status report acknowledges the long-term contributions of research institutions, protected area authorities, conservation organizations, and members of the research and practitioner community in Kazakhstan whose data, monitoring efforts, and expertise informed this synthesis. The report further acknowledges the IUCN SSC Cat Specialist Group and the wider IUCN Red List assessment team for their guidance and collaboration during the snow leopard assessment process. Support for coordination of this country status series was provided by Justine Shanti Alexander, WCS Mongolia.

6. Conflict of Interest

The author declare no known conflicts of interest.

7. References

- Annenkov, B.P. (1992). Modern distribution, numbers and conservation of rare mammals in the Dzungarian Alatau Range. In: *Protection and study of rare and endangered animal species in nature reserves: a collection of scientific papers*. Moscow, pp. 69–74. (In Russian)
- Antipin, V.M. (1953). To the ecology of the snow leopard. *Priroda*, 4, pp. 115–116. (In Russian)
- Baidavletov, R.Zh. (1997). On the biology of the snow leopard in the Southern Altai. In: *Rare species of mammals of Russia and adjacent territories: theses of reports of the international meeting*. Moscow, p. 9. (In Russian)
- Burgelo, T.B. (1986). Brief reports on the snow leopard. In: *Rare animals of Kazakhstan*. Alma-Ata: Nauka of the Kazakh SSR, p. 54. (In Russian)
- Dzhanispaev, A.D. (2002). Distribution and numbers of the snow leopard in the central part of the Ile Alatau. *Selevinia*, 1–4, pp. 208–212. (In Russian)
- Fedosenko, A.K. (1982). Snow leopard. In: *Mammals of Kazakhstan*, Vol. 3, Part 2: Carnivora (Mustelidae, Felidae). Alma-Ata: Nauka of the Kazakh SSR, pp. 222–240. (In Russian)
- Grachev, A.A., Grachev, Yu.A. and Baidavletov, R.Zh. (2013). Monitoring of snow leopard populations in Kazakhstan using camera traps. In: *Scientific and methodological foundations for the compilation of the State Cadastre of Wildlife of the Republic of Kazakhstan and neighboring countries*. Proceedings of the International Scientific and Practical Conference, Almaty, pp. 67–70. (In Russian)
- Grachev, A.A., Grachev, Yu.A. and Meldebekov, A.M. (2015). Preliminary results of the study and monitoring of the snow leopard (*Uncia uncia* Schreber, 1775) using camera traps in

- Kazakhstan. *Vestnik of Al-Farabi Kazakh National University. Ecology Series*, 44(2/2), pp. 512–518. (In Russian)
- Grachev, A.A., Grachev, Yu.A., Akhmetov, H.A. and Saparbayev, S.K. (2017). The National Park “Kolsai Kolderi” as a key area for the conservation and reproduction of the snow leopard in Kazakhstan. In: *Current issues of biodiversity conservation of the Northern Tien Shan*. Proceedings of the International Scientific and Practical Conference, Saty, pp. 6–10. (In Russian)
- Grachev, A.A., Grachev, Yu.A., Saparbayev, S.K., Dzhanyspayev, A.D., Kantarbayev, S.S., Bespalov, M.V., Bespalov, S.V. and Baydavletov, E.R. (2019). Snow leopard in the Zailiysky Alatau (Northern Tien Shan). *Selevinia*, 27, pp. 71–80. (In Russian)
- Grachev, A., Grachev, Y., Saparbayev, S., Bespalov, M., Baidavletov, Y., Dzhanyspayev, A. and Riordan, P. (2023). Conservation of snow leopards in Kazakhstan. In: Mallon, D. and McCarthy, T. (eds.) *Snow Leopards: biodiversity of the world – conservation from genes to landscapes*. 2nd edn. Elsevier, pp. 471–480.
- Grachev, A., Grachev, Y., Bespalov, M., Saparbayev, S., Baidavletov, Y., Konysbayeva, D., Riordan, P. and Atzeni, L. (2025). Snow leopard connectivity through transboundary areas surrounding the Dzungarian Basin in Kazakhstan. *Ecological Modelling*, 510, 111281. <https://doi.org/10.1016/j.ecolmodel.2025.111281>
- Grachev, Yu.A. and Fedosenko, A.K. (1977). Modern distribution and numbers of the snow leopard in Kazakhstan. In: *Rare mammals of the fauna of the USSR and their protection*. Moscow: Nauka, pp. 18–22. (In Russian)
- Grachev, Yu.A. (2016). Predatory and ungulate mammals of the Aksu-Zhabagly Nature Reserve and adjacent ridges of the Western Tien Shan. In: *Proceedings of the Aksu-Zhabagly State Nature Reserve*, Vol. 11. Almaty, pp. 437–456. (In Russian)
- Heptner, V.G. and Sludsky, A.A. (1972). Snow leopard (*Uncia uncia* Schreber, 1775). In: *Mammals of the Soviet Union*, Vol. 2, Part 2: Carnivores (hyenas and cats). Moscow: Vysshaya Shkola, pp. 212–244. (In Russian)
- Kolbintsev, V.G. (2001). Current state of populations of rare vertebrate species in the Aksu-Dzhabagly Reserve. In: *Biological diversity of the Western Tien Shan*. Proceedings of the Aksu-Dzhabagly State Nature Reserve, Vol. 8. Kokshetau, pp. 139–140. (In Russian)
- Loginov, O.Ya. (1995). Distribution of the snow leopard in the republics of the former USSR. *Irbis: Bulletin of the Snow Leopard Conservation Center*, 2, pp. 9–12. (In Russian)
- Loginov, O.Ya. and Loginova, I. (2009). *The snow leopard: a symbol of the Celestial Mountains*. Ust-Kamenogorsk: Satura. (In Russian)
- Shahgedanova, M., Afzal, M., Hägg, W., Kapitsa, V., Kasatkin, N., Mayr, E., Rybak, O., Saidaliyeva, Z., Severskiy, I. and Usmanova, Z. (2020). Emptying water towers? Impacts of future climate and glacier change on river discharge in the Northern Tien Shan, Central Asia. *Water*, 12, 627. <https://doi.org/10.3390/w12030627>
- Shakula, V. (1995). Snow leopard in the Aksu-Dzhabagly Nature Reserve. *Irbis: Bulletin of the Snow Leopard Conservation Center*, 12, pp. 5–9. (In Russian)
- Sludsky, A.A. (1973). Distribution and numbers of wild cats in the USSR. In: *Proceedings of the Institute of Zoology of the Kazakh SSR*, Vol. 34. Alma-Ata: Nauka of the Kazakh SSR, pp. 6–106. (In Russian)
- Sorg, A., Bolch, T., Stoffel, M., Solomina, O. and Beniston, M. (2012). Climate change impacts on glaciers and runoff in the Tien Shan (Central Asia). *Nature Climate Change*, 2, pp. 725–731.
- Tushkenov, S.N. (2017). Irbis in the Zhongar Alatau. In: *Current issues of biodiversity conservation of the Northern Tien Shan*. Proceedings of the International Scientific and Practical Conference, Saty, pp. 17–21. (In Russian)
- Zhatkanbayev, A.Zh. (2012). Records of snow leopard in southeastern Kazakhstan. In: *Zoological and game management research in Kazakhstan and adjacent countries*. Proceedings of the International Scientific and Practical Conference, Almaty, pp. 108–110. (In Russian)
- Zhiryakov, V.A. and Baidavletov, R.Zh. (2002). Ecology and behaviour of the snow leopard in Kazakhstan. *Selevinia*, 1–4, pp. 184–199. (In Russian)
- Zinchenko, Yu.K. (1995). Irbis in the mountains of the Kazakhstan Altai. *Irbis: Bulletin of the Snow Leopard Conservation Center*, 2, pp. 12–16. (In Russian)