

Snow leopard along the border of Russia and Mongolia

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The snow leopard population in its northern range is characterized by an island-type distribution. Many groups in Siberia, Mongolia, and also northern China and northeastern Kazakhstan are separated by hundreds of kilometers of taiga, deep winter snow, and deserts. The zone of death here is significantly larger than the zone of life, and the survival of the population on the whole depends on conserving separate "cores" and the possibility for their spatial contact. But it is surprising that, even in the most extreme conditions, the snow leopard not only retains many parts of its range where it was recorded 100-200 years ago (Pallas, 1811; Radde, 1861, Przevalskiy, 1875), but has also appeared in regions where it was not known earlier.

The least understood fact of survival of the snow leopard is in the isolated mountains of In-Shan and Taikhan-Shan in China (Czhu-Bo-Pin, quoted by A.A. Sludsky, 1973; Wang Zong-Yi & Wang Sung, 1986; Schaller et al., 1988) and also in a series of regions in southern Siberia. The In-Shan and Taikhan-Shan Mountains situated to the south and southeast of the Gobi, are divided from the main part of the range of the snow leopard (Nowell and Jackson 1996) and no one has explained how the snow leopard has populated these areas. Incursions of the snow leopard in Kuznetsk-Altai, Kansk Belogorye, and Transbaikal in the most northern and western parts of its range (Matyushkin, 1981; Baranov, Boiko, 1988; Smirnov et al., 1990; Zavatskiy, 1988; Bologov et al., 1996; Koshkarev, 1997; Koshkarev unpublished data) are also located within the frame established by V.G. Heptner (Heptner and Sludsky, 1972), the most widely accepted area of species distribution. The apparent spatial isolation of the Transbaikal part of the range (Russia) from neighboring hearths can also exceed 800 km. This surpasses in magnitude the largest break, Dzhungarian-Gobi, which divides the range of snow leopard into two gigantic sections - Siberian-Mongolian and Himalayan-Tibetan.

An even bigger surprise has been incursions over recent years into Siberian regions of northern and western Transbaikal. The snow leopard was found here in the winter of 1976/77 in the southern Muiski Mountains (tracks of one animal were found: my unpublished questionnaire data), winter 1992/93 - in Kodar Mountains (one animal was killed: Bologov et al., 1996), in February of 1997 - in the Ulan-Burgasy Mountains (one animal was seen: my unpublished questionnaire data). In Ulan-Burgasy, the snow leopard was even encountered 40 years ago.

The length of new incursions of the snow leopard are amazing, even for the nearest borders of range, where continual presence of the snow leopard is not yet demonstrable. The Ulan-Burgasy Mountains are located 400 km. from Khentei Chikoiskiy uplands, and 500 km. from Eastern Sayan; Kodar Range - corresponding 800 and 1,200 km. Such unusual incursions may be unbelievable, but the coincidence of four factual encounters with the animal in one region cannot be accidental or a mistake. It is more apparent that the ability of the snow leopard to adapt to extreme conditions is higher than imagined. The species extends into the north much further than its basic prey species, mountain goat *Capra sibirica* is accustomed to in the Central Asian landscape.

From contemporary data, reliably describing distance travel of the snow leopard, only the data of Tom McCarthy in the Gobi Altai is well-known. Here the animal, followed with the help of a radio collar and satellite, freely crossed desert between separate mountain massifs. The maximum distance of a traverse across desert was 60 km, and most commonly 40 km. (Tom McCarthy, 1997, personal correspondence).

Eastern Sayan (Buryatia, Russia)

In February and March, the western and central parts of Tunkinskiy Mountains were surveyed. The tracks of six snow leopards were found - four on the northern slopes and two on the southern. With the exception of a female with cubs (northern slopes), all tracks were of solitary individuals.

At a distance of 7-8 kilometers (according to a straight line on the map) from the female and the cubs on the same day the tracks of another individual were found, probably a male. The animals had simultaneously crossed in one region, but by different sections. The actual distance between them was larger and according to the path of movement by the river channel exceeded 15 km. The tracks of the various animals differed by segments of 10 to 20 km (by a straight line).

The area for which the tracks were noted of all the animals could be described by a rectangle of 16x26 km. and in excess of 400 km². This section was located in the highest central region of the Tunkinskiy Ridge. The average density of population of snow leopard here according to data gathered is 1.5 individuals per 100. km².

Can one consider the research territory populated by a "core"? Apparently, one can. This territory includes the largest group of mountain goats in the mountain range, and perhaps in all the eastern Sayan. Moreover, to the west and east, the conditions for snow leopard habitat are worse and evidence about snow leopard less.

The only evidence in recent years about snow leopard in the more eastern region was in the upper reaches of the Zun-Khandagai River. In November of 1995, snow leopard tracks were found here along the major divide. The animal had crossed the ridge from the direction of the southern slopes through Udachniy Pass or V. Krupenin pass (personal correspondence with Aleksei Usoltsev, and there is a photograph of the tracks). At present, the Zun-Khandagai River is the easternmost point of distribution of the snow leopard in the Tunkinskiy Mountains and in Eastern Sayan. This point is located 35 km. from our study area and could also be included within the population "core" territory.

Even earlier evidence of snow leopard further to the east occurred in 1962/63. A hunting expert from Irkutsk Agricultural Institute found tracks of one individual along the watershed of the Irut and Bystraya Rivers. This point was further from our study area by a factor of 100 km. It is the eastern end of Tunkinskiy Mountains and is located 25 miles from Lake Baikal. The appearance of snow leopard in this region could be connected to a high density of musk deer *Moschus moschiferus* characteristic of this region 30 years ago. In those years, a hunter with dogs could catch 5-6 deer in a day. In the winter of 1962/63, two hunters caught 80 musk deer in a 1 1/2 month period (B.K.Pavlov, pers.comm.).

In the western part of Tunkinskiy Mountains, conditions for snow leopard life are a bit better than in the east. Most of all, the neighboring region has the mountain junction at Munku Sardyk (3,492 m.), good habitat for snow leopard. It is located next to Tunkinskiy Mountains and thus a natural corridor for the snow leopard - the only way to the Bolshoi Sayan Mountains and further into Mongolia to the mountains of western Hovsogoul. It is not yet known whether a local group exists around Munku Sardyk. No one has observed a female with young here, but solitary, adult animals and their tracks have been found. The most recent two cases took place in the winter of 1996/97.

Khentei-Chikoiskiy Uplands (Transbaikal, Russia)

Our field research was the first in this region. Material published earlier (Matyushkin, 1981; Baranov, Boiko, 1988; Bologov et al., 1996), was based only on questionnaire data. This evidence, as well as the new information, which was based on letters from local inhabitants in the last days before the expedition, was the main reason for choosing this region for study.

Working from the new information, we changed the original plan for the expedition and instead of one region, surveyed three where evidence of snow leopard seemed most reliable: Stanovik Ridge (section between Boruyan Peak 1,906 m.- and Tarbal'dzhei Rier); Sokhondinskiy Reserve (the Khentei Ridge itself); Chikokonskiy Range (section between Bystrinskiy 2,519 m. - and Kumylskiy 2,350 m. - peaks). Despite the fact that we met local people who had not only seen snow leopards or tracks, but had killed them as late as the 1990s, we were not able to find hard evidence about the species in this region during our field work. During more than 400 km. of study route in the territory of high mountains and middle-elevations, we did not once find clear tracks of snow leopard. In more reliable places with possible snow leopard habitat we collected 36 examples of excrement but the exact species determination awaits DNA analysis.

More often in the high mountains we saw tracks of wolverine *Gulo gulo* and in middle elevations, wolverine and lynx *Lynx lynx*. In terms of ungulates, most widely distributed are red deer *Cervus elaphus*, musk deer, moose *Alces alces*, boar *Sus scrofa*.

Western Hovsogul (Northern Mongolia)

In previous expeditions in 1995 (July, October-November), tracks of snow leopard were found only in the northern parts of the region - the Bayan Ooling Mountains. To the south - the Khor'dil-Sar'dag - the snow leopard has not been observed. It has been suggested that the snow leopard comes into Hovsogul from the Russian side through the mountain junction at Munku Sardyk, connected with the Tunkinskiy ange. But how far and how often the snow leopard can travel into Hovsogul region remains unknown.

In 1997, places where snow leopard had appeared in the past were rechecked and new positions further to the south were studied. Along the main watershed, 21 transects were followed, with a length of about one kilometer each. The route went through all major high elevation points of the region - peaks at 3,130, 3,124, 3,103, 2,850, and 3,023 m. (due to mix ups of place names from various maps, I am citing only their elevations).

Along all the transects, only old scrapes and scat of snow leopard were found. We did not see any fresh ones, such as those found in 1995. The length of the transect where we found marking signs did not exceed 1/5 of their general length.

The southernmost border of snow leopard track incursions took place along the divide of Monguren-Gol, Dzhairin-Gol, and Khoton-Gol. A straight line distance from them to Munku Sadyk would not be more than 70-80 km. The whole territory with potential for snow leopard takes up about 20% of the area of the western Hovsogul Mountains, while the region where sign of snow leopard actually occurred was about 1%.

In various scats of snow leopard, hooves of young mountain goat was found, thus giving evidence about summer incursions of the predator. In all probability, the snow leopard actively populates the territory during the breeding season of its prey. Conservation of the snow leopard in the region is now supported by national parks in Russia and Mongolia: Tunkinskiy and Hovsogul. Thanks to the work of the English organization, Discovery Initiatives, the area of Hovsogul Park was expanded in 1997. Now both reserves form a single protected territory. The general border follows Bolshoi Sayan Range and Munku Sadyk junction where there is an ecological corridor connecting eastern Sayan with the northernmost part of Mongolia. In the recent past, western Hovsogul apparently was a strong migration bridge between groups of snow leopard in Eastern Sayan and Khangai. Now the link is interrupted and highly weakened, even in the sections closest to Khangai or East Sayan mountains. A preliminary conclusion (without DNA analysis) is that in the past two years, animals have not gone into Mongolia from Eastern Sayan. But, in any case, sign was not observed in places where it occurred in 1995.

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