

Number' Distribution and Status of Habitats for Snow Leopard in Gissar Nature Reserve and Neighboring Areas

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The Gissar Nature Reserve, 80,986 hectares in size, is located in the Kashkadarya region of Uzbekistan on the western slopes of

Gissar ridge, ranging in altitude between 1750 and 4349 m. The largest reserve in Uzbekistan, Gissar was established in 1983 by joining the Mirakinsky and Kyzylsuisky Nature Reserves. At present, Gissar Nature Reserve is under the leadership of the State Committee for Nature Protection.

Traditional agricultural activity near Gissar Nature Reserve

From May to October 1999, the research group, comprised of Elena Kreuzberg, Alexander Esipov, Elena Bykova, Emilia Vashetko, Jamshid Juraev, Daniel Kreuzberg, and Bakhtiyor Aromov, began preliminary assessments of numbers of snow leopard, Siberian ibex, red marmot and other mammal species. Because most of the reserve is difficult to access until the beginning of summer, Gissar Director Bakhtiyor Aromov organized spring censuses for the end of April and beginning of May. Additionally, we collected inquest data received from local people (mostly rangers), and conducted field surveys from 10 to 29 of July.

Four separate areas comprise Gissar nature reserve, three of which we were able to visit during the field season: Kyzylsuisky to the south (Tashkurgan village area), Mirankinsky in the central part (Tamshush and Aksu areas), and Gilansky to the north (Kul' village part). We could not visit the Tankhazsky area due to the flooding of the Tankhaz river. However, based

on inquest data and survey, the density of snow leopard here is thought to be higher.

At present, there are no villages inside Gissar, but 13 villages are situated on its borders. Conflicts between the residents and the reserve include 11 illegal killings of snow leopards from 1960 to 1999, poaching of Siberian ibex (from 10 to 30 cases per year, anecdotal data), and poaching on other species of mammals. The main human pressure comes from traditional local activity: grazing of domestic cattle, agriculture, laying-in firewood, hay-making and collecting wild medical and food plants and grasses. Families earn money from the selling of potatoes, grains, livestock, walnuts, etc.

The flora of Gissar are typical for the mountains of Central Asia, and include grasslands, mountain gallery rivers forest, juniper mountain forest, subalpine and nival grassland, and rocks, screes, stony slopes, and cliffs from the middle to high altitudes. There are many endemic species and ecosystems. Because of long-term agricultural development in Western Gissar, it is very difficult to restore the natural vegetation, even in the nature reserve.

Western Gissar and its spurs, especially Kugitangtau, have a high degree of endemic insect fauna. There exist two fish species, 19 amphibian and reptile species, 103 breeding bird species (on the results of our observation), and 28 mammal species (excluding insectivores and bats). Common forest mammals include the wolf, stone marten, and wild boar. Four species of mammals and five birds listed in the Red Data Book (1983) inhabit the nature reserve: brown bear, Iranian otter, snow leopard and Turkestan lynx, short-toed eagle, golden eagle, lammergeier, Himalayan griffon vulture and sacker falcon.

Data on number and distribution of snow leopard, Siberian ibex, and red marmot come from the reserve's annual reports, and inquests of the rangers and local people. Based on this information and our own investigations of snow leopard sign, track census routes were located along watershed

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boundaries and at the base of cliffs above 3000 m. For Siberian ibex, we estimated their numbers based on counts of tracks, fecal pellets, eaten parts of plants, and parts of killed animals. For the marmot, we censused strips 20 m wide and 5 km long, counting all holes and determining the rate (percentage) of habitation. In ten colonies for each observed area, the number of animals was defined by visual count. The spring visual counts of animals, including snow leopard and Siberian ibex, were conducted along a route 500 km long and 200 m wide.

Kyzysuisky area: Snow leopards are found between 2200 to 4200 m, from juniper forest to subalpine. Kyzylsuisky has the second highest number of snow leopard records after Tankhazsky. From 1981 to 1994 there were 24 observations of snow leopards: 8 males, 8 females and 8 subadults. The last sighting was on 21 June 1996 by ranger Beshim Normatov. He saw a female with two cubs (2-2.5 months old). This group was going along the watershed border. Local inhabitants say that snow leopard do not attack the livestock or people, although during the winter season snow leopards, following the ibex, sometimes come very close to Tashkurgan village. From 1960-1995, 3 snow leopards were killed (known data). The main prey of snow leopards is ibex, though they also take young wild boars, marmots, snow cocks and chukars. Estimated snow leopards in this area are 4-5 individuals.

We found much ibex sign along the Kyzyl'darya River, and the maximum number registered was 46 individuals in Katta-Kurgan valley (spring 1999). The total number for this area is estimated at 400-500 animals. The almost inaccessible region and excellent food base have provided good conditions for the ibex population. The red marmot is found in high-mountain grasslands, subalpine meadows, and juniper and floodland forests. We estimated relative number of marmots in the Kyzyl'daria River basin as 8.5 individuals per km of bank line (4.3 individuals per hectare).

Mirakinsky (Miraky) area: Snow leopards are observed between 2200 to 4200 m, from the zone of juniper forest to the alpine meadows, subnival and nival zones. From 1981 to 1994 there were noted 13 records of animals, among them 5 males, 4 females and 4 cubs. One of the places where snow leopard is observed consistently is Khodjakulbars valley in the high parts of Tamshush river (3700-4000m.). On 21

July, Elena Kreuzberg watched a single cat observing red marmots, which appeared around on the rocks and near the holes on the slope. The cat got down from the rock and disappeared. We found the fresh tracks of a young snow leopard, as well as old prints of an adult snow leopard. In 1989, the senior researcher of Institute of Zoology, Ulugbek Mirzaev, had seen the snow leopard in the high parts of Tamshush river outside of nature reserve in Surkhandarya region. In Tupalang, a neighboring area, snow leopards also were observed many times by local shepherds. During the winter season, at the beginning of December, snow leopards are following the Siberian ibex to 2000 m in the valley of Tamshush. Perhaps this area is inhabited by one family of snow leopards - 3-4 animals. Siberian ibex numbers can be estimated at 150-200 individuals. During the spring census of 1999 the ranger Karimov observed in Tamshush valley 20 ibexes. On the Tamshush pass and near Khodjakulbars Lake there were found many fresh tracks and fecal pellets of ibexes. The tracks of a small flock of ibexes of 5-7 individuals of different ages were found in the valley of Sepaya-say, tributary of Tamshush River, as well as broken and eaten stems of *Heracleum lehmannianum*, the favorite food plants of Siberian ibex.

Red marmots are observed in the zone of alpine meadows from 3200-4000 m. The colonies are small and usually composed of 5-10 holes. We could observe from 2 to 9 animals outside - over the colony, near their holes. The total number of marmots in the observed area of 2km² is about 280 animals; the density is 1.4 individuals per ha.

Gilansky area: Gilan area is the highest of all three observed areas. It is located in the Aksu basin, one of the biggest rivers in the nature reserve. Due to high mountain terrain, the food production is small and numbers of mountain ungulates and snow leopard are not high here. Snow leopards are distributed from 2500 to 4300 m. From 1981 to 1995 there were 6 records of snow leopards (3 males, 2 females and 1 cub). Two times this season the snow leopard had attacked a flock of sheep. Both attacks were observed during twilight, one sheep was killed, and the shepherd's dogs drove the cat off. During 11 years of work in the nature reserve the ranger, Oymakhmad Madadov, observed 3 adult snow leopards and many tracks in the high parts of Botyrboy say river (big tributary of Aksu river). Snow leopards

were also observed several times by meteorologists working on the Severtsov's glacier in the high parts of Aksu river. The total number of snow leopard in this area can be 1-2 animals.

The Siberian ibex is not numerous in the basin of Aksu river. According to Oy-makhmad Madadov, in the basin of Western Aksu river (Botyrboy say) there are 20-25 Siberian ibexes (data of spring census of 1999). We saw 8 adult ibexes (4+4) in this area. A local shepherd, Bakhrom Sharipov, saw 12 ibexes in Eramku valley - in the places of consistent observations of snow leopards. Thus, the number of ibexes can be estimated here at 50 individuals.

Long-tailed or red marmot is the usual species in this area. In valley of Aksu river on the 7 km route there were found 8 marmot colonies. The maximum number of staying overland animals was 9 in one colony. The number of babies was 3-4. The density of settlements is 0.27 individuals per 1 hectare.

Conclusions: The 1994-1995 estimate of snow leopard in the nature reserve was 13-17 individuals.

Spring census of 1999 provided by the rangers has **Recommendations:** We recommend the following

shown that total number of snow leopard is 16 to continue snow leopard conservation in Uzbekistan:

individuals (there were noted 2 finds of leopards on the 500 km route; these data were extrapolated to all of nature reserve). On our preliminary survey of 1999 its number in nature reserve is 12-16 individuals, however, this figure fluctuates with the seasons, due to movements following their main prey, Siberian ibexes. The available habitats of snow leopard can be estimated at 500 km². The total number of ibexes in nature reserve can be estimated at not more than 1000 individuals (the spring census of 1999 assessed the number of Siberian ibex in the nature reserve at 903 animals). The available habitat for ibex totals 400 km². The number of long-tailed or red marmot is 4800-5000 individuals; available habitat being 550 km².

The limiting factors for snow leopard, Siberian ibex, and red marmot are poaching or illegal trapping, habitat destruction (livestock overgrazing, agricultural development), disturbance by humans or domestic animals, and natural enemies and disease (red marmot). Additionally, snow leopard and ibex are limited in the Gilansky area by low productivity and limited food base.

There is observed an increasing number of snow leopard and its main prey species. However, some

shortcomings exist with our data: extrapolation of numbers for all areas of nature reserve, without estimation of appropriate areas for species; we counted only animals visible on the route; holes, shelters, tracks, fecal pellets and other important elements of animal vital activity were not counted; width of census strip does not correspond to the real possibility of finding big animals (only 200 m); this method was not adopted to the mountain conditions. Therefore in our opinion, the official data should be used with some reservations.

Thus, the results of our survey have shown that the area of Gissar nature reserve may support 4-5 families of snow leopard (no more), however, their distribution on the various areas is seasonal. In the northern part of nature reserve the snow leopard is occurring in the warm seasons; during the winter it is going to the southern slopes of Gissar ridge in Tajikistan. More optimal habitats of snow leopard in nature reserve are presented on Kyzylsuisky and Tankhasky areas. On the Tamshush area its number is lower owing to the low number of ibex.

conduct censuses during more appropriate seasons - during autumn or winter;
train scientific staff and inspectors (rangers) of nature reserve to the SLIMS methods of survey and monitoring of main big mammal species;
support the staff of nature reserve by providing field and laboratory equipment for the work;
survey neighboring areas, in particular, the high parts of Tupalang river in Surkhandarya region of Uzbekistan (Western Gissar);
provide tables (sign-boards) and cordons for the marking of borders;
establish buffer zones (special protected areas) in the places of probable settlements of snow leopard and its main preys in the Surkhandarya region in Uzbekistan and in Tajikistan
(trans boundary protected areas);
prepare a special thematic phrase book in the local languages (Uzbek- Tajik-Russian - English) as appendix to SLIMS.

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