

SNOW SHEEP (*OVIS NIVICOLA*) IN THE U.S.S.R.

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ABSTRACT

The snow sheep (*Ovis nivicola*) of the U.S.S.R. have been divided into 5 subspecies, however, subspecific differences are not well defined. Estimates of total population size vary from 60 to 90,000, and the total range occupied is estimated at 500,000 km<sup>2</sup>. However, within this large area occupancy is not continuous but is clumped in suitable, mountainous habitats. Population densities vary with habitat quality and range from 0.1 to 0.3 sheep per 1,000 ha on the Aldan-Uchur and Yano-Oimyakon highlands to as high as 3.3 sheep per 1000 ha on certain experimental ranges in the Putoran Mountains. Sheep habitat extends to a maximum altitude of 2,000 m, with southern slopes being the preferred wintering areas. Certain populations undertake long seasonal migrations to wintering areas. Snow sheep have a maximum life expectancy of 18 to 20 years, which is longer than that of any other wild sheep species. Hunting of snow sheep is presently outlawed in the entire territory of U.S.S.R., and one subspecies (*Ovis nivicola borealis*) is declared endangered in the Red Data Book of the U.S.S.R. The following summary is based on a survey of the most recent literature on snow sheep.

RESULTS AND DISCUSSION

The snow sheep (*Ovis nivicola* Esch.) has 5 subspecies in the Territory of the U.S.S.R. These are the following:

- 1) The Kamchatka sheep, (*O. n. nivicola*), which is the largest subspecies with monochromatic coloration. It has the heaviest horns and its distribution is primarily found in Kamchatka.
- 2) The Koriak sheep, (*O. n. koriakorim*), which is a smaller subspecies of lighter coloration. Its main distribution is found on the Koriak uplands northward of Kamchatka.
- 3) The Okhotsk or Allen sheep, (*O. n. alleni*), which has light spots behind the scapulas, and the tips of its horns turn forward. It inhabits the

Stanovoi Range, the Dzhugdzhur Range the southwestern portion of the Kolyma Range, and the mountains of the Taiganoss peninsula.

- 4) The Yakut sheep, (*O. n. lydekkeri*), is the subspecies with the lightest coloration, its horns are thin and short. It is widely distributed in Yakutia, where it inhabits the Verkhoyan Range, the Chersky and the Minsky Ranges, etc., as well as the northern parts of the Kolyma Range in the Anadyr Territory (Chukotka).
- 5) The Putoran or Norilsk sheep, (*O. n. borealis*), is of light coloration. It is widespread on the Putoran Uplands in the watersheds of the Enisei and Lena Rivers, southward to the Taimyr peninsula.

The subspecific characteristics of these sheep vary greatly, reliable differences have not been established. The largest males of the Kamchatka sheep, (the largest subspecies), have body lengths of up to 160 cm, heights at withers of about 100 cm; with females reaching 140 cm in length and 85 cm in height. The maximum weights of rams approach 150 kg. The smallest subspecies, the Yakut sheep, reach heights at withers of 93 to 108 cm for males.

The present distribution of snow sheep extends from the Putoran Mountains to Kamchatka and from the coasts of the Arctic Ocean to the northern slopes of the Stanovoy Range. In the recent past this area was slightly larger, reaching the region of Irkutsk and the northern Kurile Isles. The total extent of the present range of this species amounts to 500,000 km<sup>2</sup>. However, distribution is not continuous over this large area. Distribution is patchy with many gaps. There are many isolated habitats, since these sheep only occupy mountains. It was also noticed that these sheep are absent from areas which appear to constitute suitable habitat.

The total population size of this species of wild sheep was estimated to be 60,000 (Rubkov, 1979). Other authors assessed their numbers to equal 70-90,000, but these appear to be overestimations (Gribkov and Fil, 1977). Sizes of some populations are given on Table 1.

Table 1. Numbers of sheep in some selected populations (after Gribkov and Fil, 1977).

<u>Location</u>	<u>Population Size</u>
Putoran Uplands	1200-1500
Kamchatka	200-300
Koriak Highlands	6-8000
Chukotka	5-8000
Yakutia	44-55000
Trans Baikal area	
Northern parts of Amur River area	15-20000
Magadam Region (except Chukotka)	

Scientists have paid special attention to the sheep inhabiting an isolated section of the Putoran Mountains. The main habitats are situated in the northeastern part of this upland, covering an area of 120,000 km<sup>2</sup>. The densest population inhabits an area of about 40,000 km<sup>2</sup>. The 5 control

sites investigated, covering an area of some 5,376 km<sup>2</sup>, revealed a population density of 3.3 sheep per 1,000 ha (Borzhenov et al., 1979). The total population of sheep on the Putoran uplands is estimated at 1,400 to 1,450.

In Yakutia regular aerial censuses were carried out by helicopter in the years 1977 to 1980. This technique proved to be quite successful in that 2,356 animals were counted during 72 flying hours over a flight route 9,000 km in length (Fertikov, 1979). The population of this wild sheep species on the Aldan-Uchur and Yano-Oimyakon highlands was found to have a density of 0.1 to 0.3 animals per 1,000 ha. Considering that the total habitat covers an area of 27,100 km<sup>2</sup>, the sheep population here is estimated to be 300 to 800 head. A high population density of sheep was documented for the northern part of the Verchoyansk Range, where it amounted to 2.86 animals per 1,000 ha. Sheep habitat here covers an area of 99,600 km<sup>2</sup>, and the total sheep population is estimated at 28,500. In the southern part of the Verchoyansk Range the population density is much lower, amounting to only 0.57 animals per 1,000 ha. This range extends over an area of 79,300 km<sup>2</sup>, with an estimated sheep population of 33,000. On the Chersky Range sheep density amounts to 1.1 animals per 1,000 ha. With a range size of 113,500 km<sup>2</sup> the sheep population is estimated at 12,500 head. The population density in the Territory of the Minsky Range is estimated at 0.9 sheep per 1,000 ha; with a range size of 21,800 km<sup>2</sup> the sheep population will be around 2,000. The entire area of Yakutia has a sheep population of 48 to 50,000 (Revín, 1982).

In the territories adjacent to Yakutia, such as those in the Trans-Baikal area, the northern part of the Amur River area and the Magadan Region (except Chukotka) the size of the sheep population is thought to be 15 to 20,000 head. Rather detailed investigations have been carried out in Chukotka and on the Koriak Uplands. Certain ranges here have a fairly high sheep density. For instance, for the Pikulnei Range the density is estimated at 1.2 to 3.2 animals per 1,000 ha, and for the Anadyr plateau at 0.7 to 1.8 per 1,000 ha. In total, the sheep population size in Chukotka approaches 5 to 8,000 head and on the Koriak Uplands 6 to 8,000 head. This includes some 200 to 300 sheep living in central Kamchatka (Gribkov, 1969; Zhelezov, 1975; Chernyavsky, 1977). The initial assessments of sheep densities on the Koriak Uplands, ranging from 8 to 18 animals per 1,000 ha, appeared to have been an overestimation (Chernyavsky, 1971; Gribkov, 1977). At the same time, there can be no doubt that with further economic growth and human settlement in this territory, and with the construction of various roads and urban centres, the population of sheep will decline.

These sheep usually inhabit mountain ranges that do not exceed 2,000 m in elevation, and as a rule seek the upper parts of these ranges, the zone of bald mountain peaks. These mountains are usually oval-shaped, elongated ranges stretching from north to south or to southwest. The eastern slopes of the ranges usually consist of steep cliffs, while the northern, western and southern ones are more flattened and curved with talus debris or tundra vegetation. The cliffs are usually used by sheep for resting, while the other slopes constitute grazing areas. In winter the animals feed primarily on southern slopes, in spring and fall then prefer to use western slopes, and in summer they seek northern ones.

In terms of altitudinal range, the sheep habitat extends from the upper limits of the forested zone upward to the limits of vegetation. In regions

located far north, sheep range extends northward of the continental tree line, and in such locations embraces the entire length of the mountain slopes. The living conditions for the sheep are extremely severe in winter. Temperatures may dip to  $-60^{\circ}\text{C}$ , snowfalls are abundant and heavy, often the snow surface is covered with ice. Also, the winds here are very strong. These factors force sheep in Yakutia to undertake annual migrations of 80 to 120 km in distance from the western slopes to the eastern slopes, where the snow cover is less severe. Similarly, in Kamchatka migrations of over 50 km have been documented.

The main forage items of sheep consist of various lichen, grass, sedge, shrub, moss and mushroom species.

The structure of sheep populations is similar in all parts of their range. Rams of 6 years and older comprise 11.6 to 21.5%, those 2 to 5 years of age 7.5 to 15.5%, adult females make up 34.5 to 37.3%, yearlings 7.2 to 17.2%, and young of the year constitute 23.3 to 25.4% of the population (Chernyavsky, 1963; Gribkov and Fil, 1977).

Three types of population components appear to segregate themselves from others: adult rams over 4 to 5 years of age, ewes and lambs, and thirdly young males of 2 to 4.5 years of age. Band sizes average 6 to 7 animals and never exceed 20 sheep (Chernyavsky, 1970; Rudkov, 1979).

Rams and ewes reach sexual maturity at 2 years of age. The rutting season lasts 1.5 months, and typically occurs in December and January. The pregnancy period extends over 6 months, therefore, the lambs are born at the time when the snow melts and green vegetation emerges. Single births are the rule. The lambing period peaks in July. The mortality rate of lambs during the first 3 months of life amounts to 30%, that over the entire first year of life reaches 50%. Therefore, the annual growth rates of sheep herds are not very great. Tooth replacement is completed by the fourth year of the animal's life, and by the age of 14 to 15, the teeth are completely worn down. However, the maximum life expectancy is known to be 18 to 20 years, which is longer than for any other wild sheep species. The most important predator of sheep is the wolf. However, they are also hunted by the wolverine, and their lambs are attacked by foxes, golden eagles and white-tailed eagles. Some sheep perish accidentally by falling down steep mountain slopes or by getting caught in avalanches. Nevertheless, the abundance of sick or crippled animals in many populations testify to the rather insignificant pressure of predators.

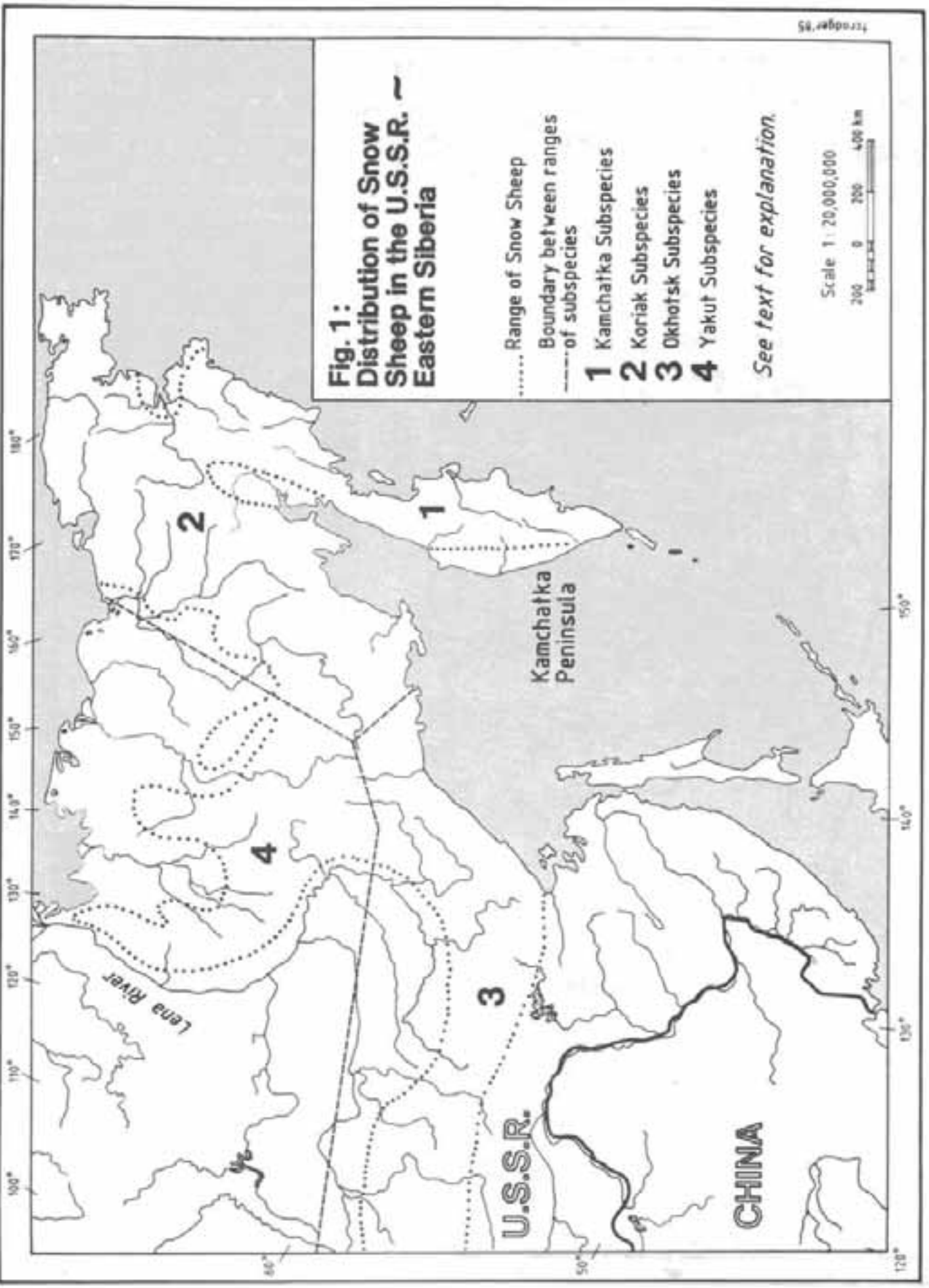
Sheep have been hunted by the local people since ancient times. Presently, the largest number are taken by people who work as herdsmen of reindeer. However, hunting is also carried out by geologists and residents of northern settlements. All these hunting operations are illegal, since the taking of snow sheep is outlawed in the entire territory of the U.S.S.R., and the Putoran subspecies (*Ovis nivicola borealis*) is listed as endangered in the Red Data Book of the U.S.S.R. As a matter of principle, wild sheep specialists do not object to the hunting of these sheep as such, since their population densities are rather high. However, proper regulation and licensing of hunting must take into consideration a proper network of inspection and enforcement, and the rather remote and inaccessible terrain these sheep inhabit presents great difficulties in these matters.

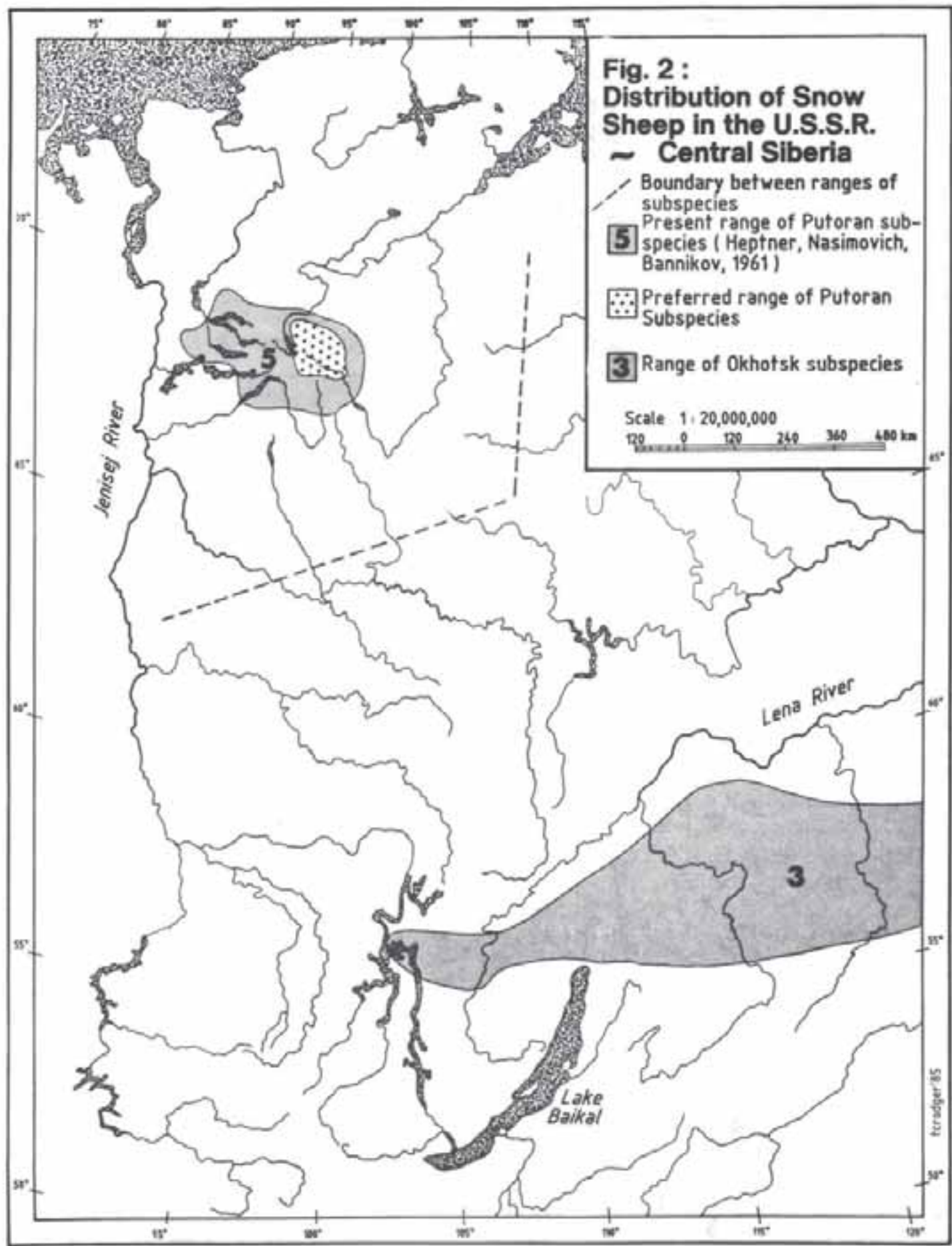
**Fig. 1:**  
**Distribution of Snow**  
**Sheep in the U.S.S.R. -**  
**Eastern Siberia**

- ..... Range of Snow Sheep
- Boundary between ranges of subspecies
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- 1** Kamchatka Subspecies
- 2** Koriak Subspecies
- 3** Okhotsk Subspecies
- 4** Yakut Subspecies

*See text for explanation.*

Scale 1: 20,000,000





**Fig. 2 :  
Distribution of Snow  
Sheep in the U.S.S.R.  
— Central Siberia**

- Boundary between ranges of subspecies
- 5** Present range of Putoran subspecies ( Heptner, Nasimovich, Bannikov, 1961 )
- 5** Preferred range of Putoran Subspecies
- 3** Range of Okhotsk subspecies

Scale 1 : 20,000,000  
120 0 120 240 360 480 km

trudger/85

It is believed that on ranges with average sheep densities, a hunting rate of some 50 to 60 animals for every 1,000 could be sustained, and for ranges with optimum densities one of 80 to 90 sheep (Gribkov and Fil, 1977).

Now under investigation are possibilities of transplanting sheep to the mountains of Putoran and adjacent ranges, where this species has almost disappeared. Such recolonization attempts are regarded as vital and necessary in view of the fact that these animals are rather conservative and traditional in the use of their ranges and tend to follow a non-migratory pattern of life. Some scientists have suggested to transplant these sheep to the Kurile and Commander Islands (Petrashev, 1982).

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