

THE BROWN BEAR OF NORTHWEST RUSSIA

PUOTR I. DANILOV, Laboratory of Zoology, Institute of Biology, Karelian Branch of the Russian Academy of Science, Pushkinskaja str. 11, 185610, Petrozavodsk, Republic Karelia, Russia

Int. Conf. Bear Res. and Manage. 9(1):199-203

The brown bear of the northwestern part of Russia belongs to the subspecies *Ursus arctos arctos* L., characterized by medium-sized body and skull. The maximum body weight is 400 kg. The male body length is 110-255 cm (\bar{x} = 168.5) and females 100-245 cm (\bar{x} = 156.7). The condylobasal length of the skull is 280.4-368.0 mm (\bar{x} = 328.3) for males, and 260.2-348.0 mm (\bar{x} = 302) for females, and the width of skull is respectively 186-261 mm (\bar{x} = 202.2) and 149-216 (\bar{x} = 181.9) mm.

The skin color varies from almost yellow (straw-colored) to black. When young, many bears have the so-called white "collar" or "tie." Sometimes that feature is preserved into maturity.

DISTRIBUTION

Distribution of brown bears in the northwestern parts of Russia is given in Fig. 1. In the northern part of the study area (the Kola Peninsula) the brown bear is common up to the northern border of the subtundra forests. Bears penetrate deeper into the tundra along river valleys, and sometimes appear on the Barentz Sea coast. The bears of the Kola Peninsula also visit the mountain tundra in the autumn due to the rich harvest of berries available to them.

Farther south, in The Russian Karelia, the brown bear is common throughout the whole republic. It has even become common in the southwest, where in the mid-1970s bears were only encountered occasionally (Danilov et al. 1979).

The same phenomenon was also observed on the Karelian Isthmus of the St. Petersburg region, an increase that was possible because of protection of the animals (Danilov 1990). Bears are also common in the other parts of the St. Petersburg region.

The brown bear of the Novgorod and Pskov regions inhabits most of the region except for the central part of the Pskov region, which lacks adequate forests (Fig. 1).

POPULATION ESTIMATES AND DENSITY

The density of the brown bear in the Kola region is not high. During a 25-year period in the Lapland reserve (in the central part of the Murmansk region), it fluctuated from 5.5 to 8.5 (average - 7) individuals per

1,000 km² (Semenov-Tjanshansky 1979, 1982). The same author reported that the total number of bears in the Murmansk region was 200-400 animals. According to more recent information (Makarova and Ermolaev

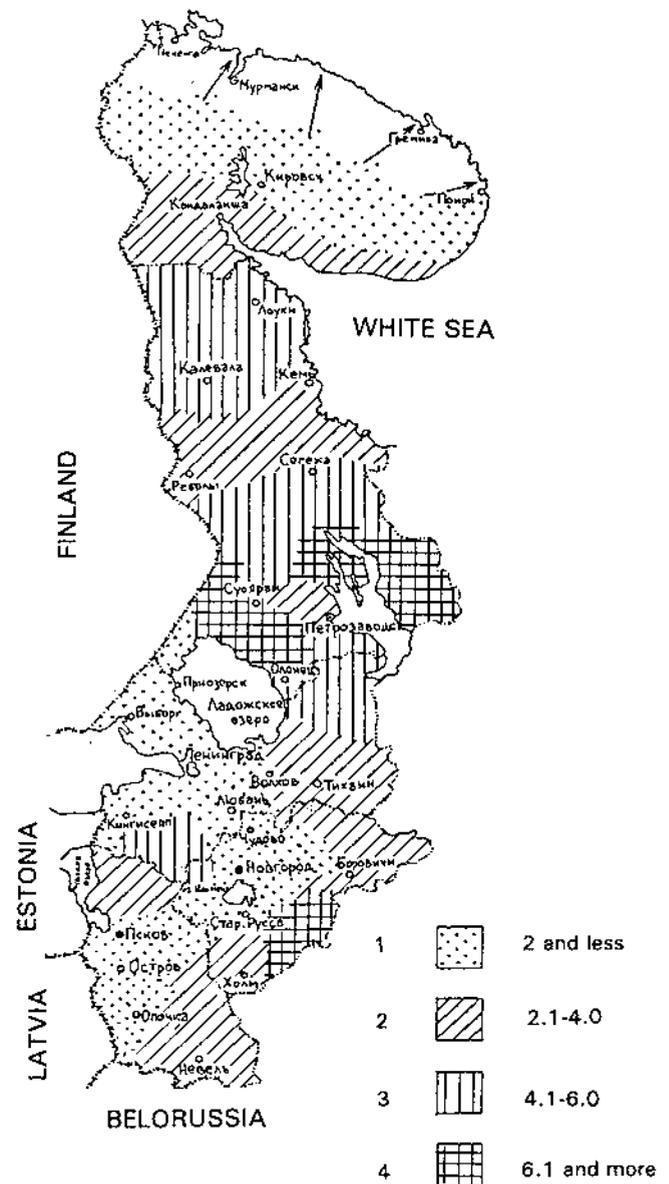


Fig. 1. Distribution of the brown bear in northwestern Russia. Figures represent the number of animals per 1,000 ha.

Table 1. The number of brown bear in northwestern Russia (counted on selected areas) distributed by regions.

Region	The area of inventory 1,000 ha	Bears counted	Bear density per 1,000 km ²		Estimated number of bears
			Mean		
Murmansk	5,343	220	2.5-9	4	350
Karelia	504 (51)	250	14-82	50	2,700
St. Petersburg	554 (24)	91	2-60	21	1,100
Novgorod	310 (13)	53	10-83	24	950
Pskov	251 (13)	52	9-47	24	800

1986), the number of bears in that region is closer to 350, with an average density of only 4 bears per 1,000 km² (Table 1).

In Karelia, a bear census has been conducted twice: in the mid-1970s and 10 years later. These censuses were based on a systematic track census on forest roads. Numbers were estimated by measuring the size of fresh footprints, to determine the minimum number of different bears in the census area. There appeared to be no difference in the total number of bears in the 1970s and 1980s, but the distribution had changed. Bear density had increased in the Pryazsha, Pudozh, and Medvedsjegorsk districts; in some districts, such as Zaonezhje, densities of 200 bears per 1,000 km² were estimated. There was a rather high density of bears in the Olonets, Pitkjaranta, and Suojarvi districts, and lower densities in others (Fig. 1).

Some attempts to estimate the number of bears in the St. Petersburg region were made in the 1960s by Novikov et al. (1969), who estimated 520 bears. Verezchagin (1972) mentioned a total of 660 bears, and the Regional Hunting Society reported a bear population of 870 bears.

Inventories to obtain data on bear densities were conducted for both the mid-1970s and the mid-1980s, in the St. Petersburg, Novgorod, and Pskov regions as well. Bear densities in the St. Petersburg region achieved highest indexes in the northeastern parts of the region (40-80 bears per 1,000 km²), and the lowest density on the Karelian Isthmus along the southern coast of the Finnish Bay.

In the Novgorod region, bear densities have been 30-80 bears per 1,000 km², but only in the northeastern parts of the region (Fig. 1, Table 1).

HABITAT UTILIZATION

Bear habitat use has been studied, with the

conclusion that bears in northwestern Russia prefer areas with variation in habitat opportunities, with low hills containing brooks, rivers, and lakes. But of all the variety of spots where bears and their tracks were registered, the favorites were mature and overmature spruce and mixed forests, and young forests regrowing after timber cutting (Table 2).

It is possible from these data to make a suitability and quality estimation of any area as habitat for bears. The best areas for bears in our study zone were composed of the following habitat ratio: Spruce forests, 15-20%; Pine forest, 5-10%; mixed, 10-15%; deciduous 5-10%; regrowing clearcut forests, 10-15%; marshes, 5-10%; hay meadow and forest glade, 5-10%; shores of water bodies, 3-5%; and agricultural fields with pastures grasses, 1-3% (Fig. 2).

HOME RANGE

Bear home ranges have never been studied by the means of telemetry, only by tracking individual bears for periods of time. It appears that most adult bears have stayed on a more or less constant home range during long periods of their lives, depending on food availability, quality of shelter, and degree of disturbance.

In the Lapland reserve the home range size of individual bears varies from 20 to 90 km² (Semenov-Tjan-Shansky 1982). In the southern part of Karelia, where the conditions for the bear are much better, bear

Table 2. Habitat distribution of brown bear observation spots in northwestern Russia. (Number of bear observations and/or bear-signs in brackets.)

Habitat type	Karelia (n = 1,444)	St. Petersburg (n = 103)	Novgorod (n = 127)	Pskov (n = 163)
Spruce forest	16.4	10.6	19.6	20.2
Pine forest	8.3	3.8	3.9	4.2
Mixed forest	16.0	14.5	8.7	10.3
Deciduous forest	11.3	9.7	3.9	6.1
Felled areas	13.0	4.9	13.4	12.2
Marshes	8.6	4.0	7.1	12.4
Shores of water bodies	7.3	6.8	4.7	6.1
Hay meadows and forest glades	8.9	8.7	9.4	4.9
Oat fields	8.6	40.0	26.9	20.9
Burned areas	1.6	1.9	2.4	2.4

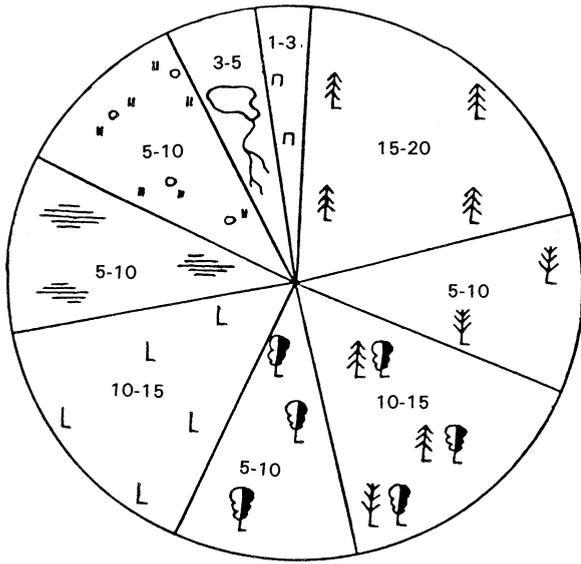


Fig. 2. Biotopical preference of the brown bear in European taiga, %.

home ranges were estimated at 13-25 km², and in the northern part twice that size.

Individual home ranges of bears varied in the southernmost Novgorod and Pskov regions from 15 to 80 km². The reason for that was the same as in northern Karelia: home range increases because it includes the land areas without forests. But the quality of these open places is quite different. In Karelia they consist of areas of big, open bogs, while in the south they are agricultural fields.

POPULATION STRUCTURE

Fertility and sex-age structure of a bear population are critical data for management purposes and for the evaluation of the population status. According to Danilov (1990) and newly collected data from the same author, the average number of cubs per female on the Kola Peninsula was 1.65; in Karelia, 2.02; in the St. Petersburg region, 1.97; and in the Novgorod and Pskov regions, 2.23. These figures are rather similar to data recorded in the adjacent regions; for instance, in Voioгда region (on the east), it was 1.73 (Kalezckay 1981), and to the southwest (Estonia), 2.03 cubs per female (Kaal 1972).

The mortality rate of bear cubs during the first active season of their life has been estimated by comparing the number of cubs per female at the beginning and at the end of that season. It was 19.2% for Karelia (Danilov 1988 with supplement), and 24.2% for St. Petersburg

Table 3. Sex ratio of bears shot in periods with and without protection of females.

Region	Free shooting		Females protected		Author
	N	male %	N	male %	
Karelia	322	57.7	354	73.1	Danilov 1988
St. Petersburg	81	58.7	52	66.6	Novikov et al. 1969
Novgorod, Pskov, and Vologada	134	54.7	274	72.9	Novikov et al. 1969, Varnakov 1979, and Danilov et al. 1979

region (Novikov et al. 1969).

The sex ratio of shot bears was provided by analyzing hunting statistics. Males dominate the hunting harvest (Table 3), mainly because the hunting rules strictly protect females with cubs. The sex ratio for cubs of the year and yearlings in the hunting bags was approximately 1:1. This hunting harvest should result in a female dominance in the population. Males dominated the hunting harvest even before females with cubs were protected, but to a lesser extent (Table 3).

The age structure of a bear population is difficult to study without the ability to age animals by the means of tooth-sectioning. We had to use data on bear-encounters and measurements of track sizes, information that only allowed us to distinguish 3 age groups: cubs of the year (width of the forepaw track = 6-9 cm), yearlings (1.5-year-old bears with a front-paw width of 9.5-11.5 cm), 2.5 year and older bears (width of track 12 cm or more). The average percent of cubs in the Karelian bear population was found to be 23.5%, while yearlings were 12.6% (Fig. 3). Novikov et al. (1969) have estimated cubs to be 18.7% and yearlings

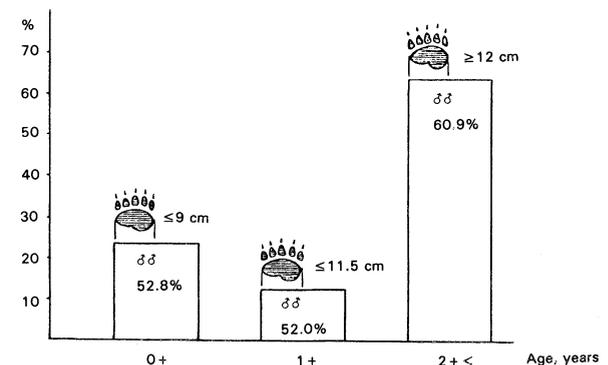


Fig. 3. Sex and age structure of bear population in Karelia.

Table 4. Age structure of bear populations, based on body weight of bears shot.

Body weight kg	Karelia region		St. Petersburg region	
	1973-76	1977-83	1865-15	1926-67
50 and less	4 (2.3)	17 (6.6)	10 (12.8)	6 (9.4)
51-100	37 (21.7)	70 (27.2)	21 (26.9)	18 (28.1)
101-150	68 (39.8)	96 (37.4)	24 (30.8)	25 (39.1)
151-200	45 (26.3)	55 (21.4)	12 (15.4)	11 (17.2)
201-250	12 (7.0)	15 (5.8)	5 (6.4)	3 (4.7)
251-300	4 (2.3)	4 (1.6)	5 (6.4)	1 (1.5)
301 and more	1 (0.5)	1 (0.4)	1 (1.3)	-

11.9% of the population in the St. Petersburg region. Almost the same figures for these age groups are given for the Novgorod and Pskov regions: 18.2% and 9.1% respectively (Danilov et al. 1979).

Another method for estimating the age structure of a bear population, and hence its status, is to use data on the weight of killed bears (Table. 4). The following weight and age classes were distinguished:

- less than 100 kg = young, sexually immature bears;
- 101-200 kg = middle-aged bears, (i.e., the most productive part of the population);
- more than 200 kg = old animals.

Sexually immature bears have, according to this classification, increased from 24 to 33.8% of the population during last 20 years in Karelia. No difference of size groups were found in the St. Petersburg region throughout the century (Table 4).

These figures coincide well with the data relating to the foot-size method, and proves the validity of these data for management purposes. Moderate hunting bags of bears, 4-5% of the estimated population, have not significantly altered the age structure of the bear populations over a century-long period in the St. Petersburg region and a decade in Karelia (Table 4).

BEAR MANAGEMENT

Bear hunting in northwestern Russia was not intensive during a rather long period (Fig. 4). The high number of bear skins purchased in the 1950s can be explained by the facts that it was officially encouraged to reduce predators, and high bounties were paid.

The purchase of bear skins decreased in the late 1960s and early 1970s due to very low skin prices and the introduction of the bear-hunting license system.

Old hunting statistics show that the period of

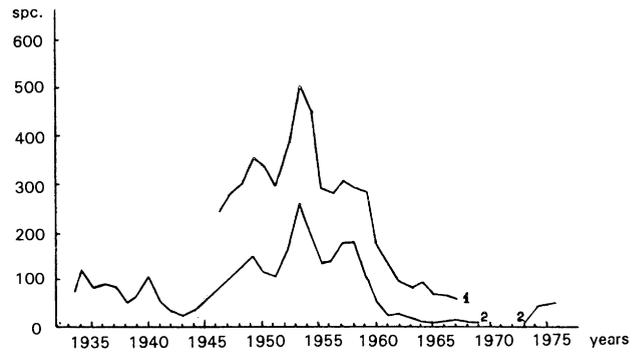


Fig. 4. Purchasing of bears' skins: 1 in the northwest totally, 2 in Karelia.

maximum bear shooting was in the 1880s, when the average number of bear skins sold by hunters in the Olonets province, now Karelia, was 310 per year. Nowadays, 100 years later, the bag limit in Karelia is 250 bears per year, but the real harvest is only about 100 bears per year.

Sometimes in the last century, hunters shot bears in great numbers. For example, in 1808, they shot 514 bears; in 1882, 428; in 1888, 361; and in 1891, 329 (Silantjev 1898). In this century, the largest number of bear skins bought was in 1933, when 160 were bought; 1953, 254; and in 1958, 179. During the last 20 years, the highest number of bears shot was in 1979 with 152, 1987 with 153, and 1993, with 163 bears. (Danilov unpubl. data.)

Comparison of bear hunting in the 1950s, 1970s, and the 1980s shows a sharp decrease of bears killed with snares and other self-made traps, as well as in dens and

Table 5. Methods of shooting brown bears in Karelia (%).

Hunter method	Bears killed		
	1955-59 (n = 292)	1973-76 (n = 193)	1978-83 (n = 169)
At the den	14.0	14.0	2.9
With a dog	18.5	15.5	4.1
In oat field	22.3	46.7	64.5
With bait	3.8	6.1	20.8
With traps	8.5	0.5	0.0
On occasional encounters	32.9	17.2	7.7

by chance encounters (Table 5). Bear hunting with dogs has also changed significantly. All bears killed with dogs in the 1950s were shot before denning, from August to early November, but in the 1970s dogs were used only for hunting to the dens or to track wounded animals (75% of the animals registered as killed with dogs were shot in December, i.e., after moving into the dens).

Bear hunting on oat fields from a "Hoch-sitz" or by using a special bait is most popular now (Table 5). Forest glades remote from settlements are the best places for such hunting. Many bear hunters sow oats in such glades, to attract bears, and their chances of success can be improved with fish and meat scraps laid out in a pit.

In northwestern Russia bear hunting is regulated by a special act, or "Hunting Rules," where an article is devoted to bear shooting. In every region these rules have specific features.

For example, before 1973 in Karelia, bear hunting was licensed with no payment needed. Between 1981 and 1991, hunters had to pay 70 rubles for a license, and since 1991 the fee has been 300 rubles.

Hunting season before 1988 was from August through February, but there is now also a short spring hunting season from 15 April through 14 May. It is categorically prohibited to shoot a female with cubs.

In 1989, foreign bear hunters (tourists) appeared for the first time since 1917 in Karelia. There is now a large number of foreign hunters and many small, often unofficial firms have been established that arrange bear hunts in Karelia. It is dangerous for the bear population because most people responsible for foreign hunters have a simple goal of making money, and show little care for bear populations. The State Control Service is at the same time in a state of neglect, which might increase illegal hunting and overharvesting of bears. In this situation, the main task is to struggle with these "arrangers" and to restore the State Wildlife Service.

LITERATURE CITED

- DANILOV, P.I. 1988. The demography of the brown bear (*Ursus arctos* L.) in USSR. Fauna and ecology of terrestrial vertebrates. Petrozavodsk. Karelian Branch USSR Acad. of Sci., 138-154. (In Russian.)
- _____. 1990. The brown bear in Soviet Karelia. Trans. the XIXth IUGB Congress. Trondheim, 566-572.
- _____, Rusakov, O.S., and I.L. Tumanov. 1979. The predatory animals of the Northwest USSR. Leningrad. "Nauka," 91-125. (In Russian.)
- KAAL, M.I. 1972. The brown bear in Estonia. Ecology, morphology, protection and harvesting of bears. Moscow, 41-44. (In Russian.)
- KALEZCKAY, M.L. 1981. The brown bear in Darwin reserve. Predatory mammals. Moscow, 47-57. (In Russian.)
- MAKAROVA, O.A., AND V.G. ERMOLAEV. 1986. The brown bear in Murmansk region. Ecology of terrestrial vertebrates of the USSR North-West. Petrozavodsk, Karelian Branch of the USSR Acad. of Sci., 104-110. (In Russian.)
- NOVIKOV, G.A., A.E. AJRAPETJANZ, J.B. PUKINSKYA, E.K. TIMIFEEVA, AND I.A. FOKIN. 1969. The brown bear in Leningrad region. Bull. MOIP, sec. biol. 74(3):102-117. (In Russian.)
- SEMENOV-TJAN-SHANSKY, O.I. 1979. Ecological features and perspectives of the brown bear protection in Murmansk region. The ecological basis of the protection and rationally harvesting of predatory mammals. Moscow, 213-214. (In Russian.)
- _____. 1982. The wild animals of the Murmansk region. Murmansk, 87-101. (In Russian.)
- SILANTJIEV, A.A. 1898. The review of the hunting in Russia. St. Petersburg. 619pp. (In Russian.)
- VARNAKOV, A.P. 1979. Harvest and number of bears in the Vologda region. The ecological basis of the protection and rationally harvesting of predatory mammals. Moscow, 213-214. (In Russian.)
- VEREZSHAGIN, N.K. 1972. How many bears are in USSR? Journ. Ochota i ochotn. Hozjaistvo, N 11:20-21. (In Russian.)