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Large predators in the Russian North-West

Key words: Great carnivores, wolf, bear, lynx, wolverine, prey, population, distribution, Karelia, Russia

The Northwest of Russia (Murmanskay, Leningradskay, Novgorodskay, Pskovskay provinces and Republic Karelia) inhabited by "big four" – brown bear, wolf, lynx, wolverine.

In all landscape zones of the study area from tundra of Kola Peninsula to broad leaves forests of Pskov province the large predators are on the top of food pyramid closing trophic chains of natural complexes. One of the most important functions of these animals is regulation of the number and state of their prey populations.

In the Russian Northwest they are mainly: moose *(Alces alces* L.*)*, tundra (*Rangifer tarandus tarandus* L.*)* and forest reindeers (*R. t. fennicus* Lönnb.), wild boar (*Sus scrofa* L.*),* roe deer (*Capreolus capreolus* L.*),* mountain (*Lepus timidus* L.*)* and brown hares (*Lepus europaeus* Pall.), two beavers (*Castor fiber* L.*)* and (*Castor canadensis* Kuhl*),* small mammals and grouse birds.

The feature of ecology of large predators and the problems of their populations manage attracted the researchers attention more then once. But even the well-known publications of G. Novikov, N. Vereshchagin, O. Semenov-Tyan-Shansky, A. Nasimovich and others concerning the study region, as well as our previous works did not cover all the complex of problems of management and protection of large predators. Our last years investigations continue with special attention on distribution and dynamics of predators and prey populations.

The **brown bear** spread throughout all forest territory of region and penetrates even in tundra zone along river valleys up to Barents Sea cost. The number of bears is growing from North to South, achieved maximum in southern Karelia and northern part of Leningrad province. It decreases again down to the south and southwest (Fig. 1). The reasons of such distribution are:

In the forest zone of Kola Peninsula and northern Karelia quite simple ecosystems chiefly represented by pine forest and mosses bogs with very limited feeding conditions for bear prevail.

In south it connected with reduction of wooded areas, high density of people and grows of the disturbance factor and hunting pressure.

The **wolf** is distributed in all the northwestern Russia. But in the Kola Peninsula we meet two subspecies – tundra wolf (*Canis lupus albus* Kerr) and midrussian (forest) wolf (*C. l. lupus* L.). In reality there is no possibility to outline their ranges.

The distribution of wolf in the area is determined chiefly by two factors – the availability of food and the composition of biotopes, including remote, hardly accessible place with good protective properties, necessary for arranging dens.

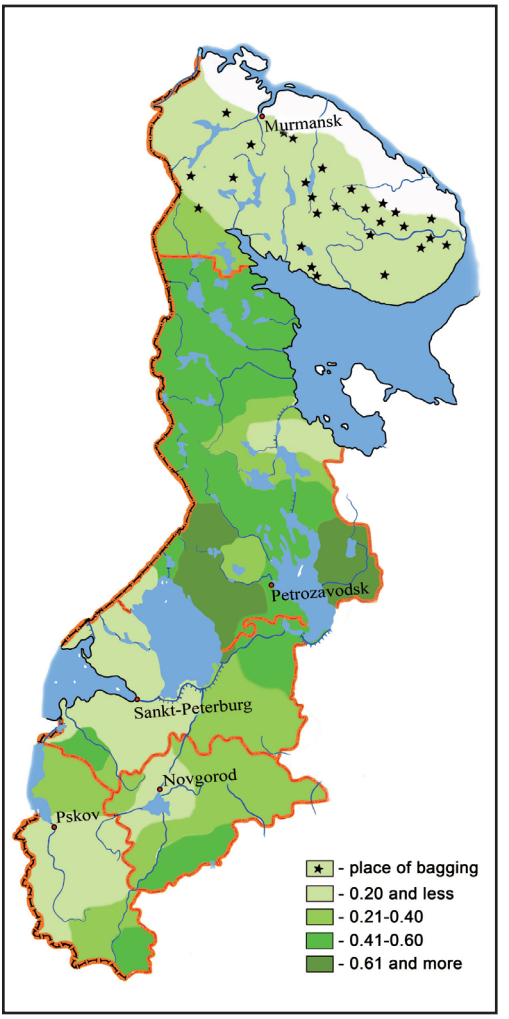

Fig. 1 Distribution and number of bear in the Russian North-West, animals per 1000 ha and place it's bagging in Kola Peninsular

In the southern part – Pskov and Novgorod areas the highest density of wolf population is observed in the most wooded and least developed (industry, communication, agriculture) eastern territories, i.e. where protective and nesting suitability are the determining factors, because the density of the populations of the preys practically don't differ from the ones in the west of these area.

In the northern part of Leningrad province, in Karelia and in Murmansk area, the distribution of predator is determined by availability of food as for remote thickets seldom visited by man places suitable for den, there are plenty of them (Fig. 2).

The **lynx** has the northern border of his range in the study region. Periodically it's registered in significant part of Kola Peninsula as far as the northern limit of taiga; sometimes it penetrates into the forest-tundra subzone even. Nevertheless only most southern districts of the Murmansk province adjacent to Karelia may be considered as lynx's resident habitats.

But even here as well only individual animals were met. A little down to south – in Karelia – lynx distributed all over the territory, but in the north it is meet rather seldom and not annually. There is some kind of periodicity of it appearance over here that is tightly connected with 9–10 years mountain hare fluctuation of number (Fig. 3).

As for the **wolverine** it has, on the contrary, the southern limit of distribution in Russian northwest. Only 40 years ago its southern boundary ran along northern part of the Leningrad province. However, in the end of 1970s only solitary encounters with the wolverine were marked along the northeast shore of the Lake Ladoga. During the next decade tracks of wolverine were encountered in Karelian Priladozhye only in 1984, 1988 and 1999 years. Thus for the last 30–35 years this species has receded by 50–70, in place 100 km to the north. But long protection brought some results and since 2005 single wolverine's tracks became meet more and more often in north-west of Karelian Priladozhja (Vjartsila), in southern part of Prjazha district (Kroshnozero) and in Prionezhje (Shetozero) (Fig. 4).

According last inventory studied species the total of their number, didn't changed dramatically comparing with the data for time 10 years earlier (Tabl. 1). But analysis of more detailed data such as every-year counting, have shown, that only the brown bear demonstrates constant number during long period. It is supported as well by dynamics of bear population structure checked by two methods.

First one is measuring of the bear's tracks. It's well known, that the width of bear's forepaw is tightly corresponding with animals body weight. Anyway our investigation, that took place mainly in Karelia, showed that only three

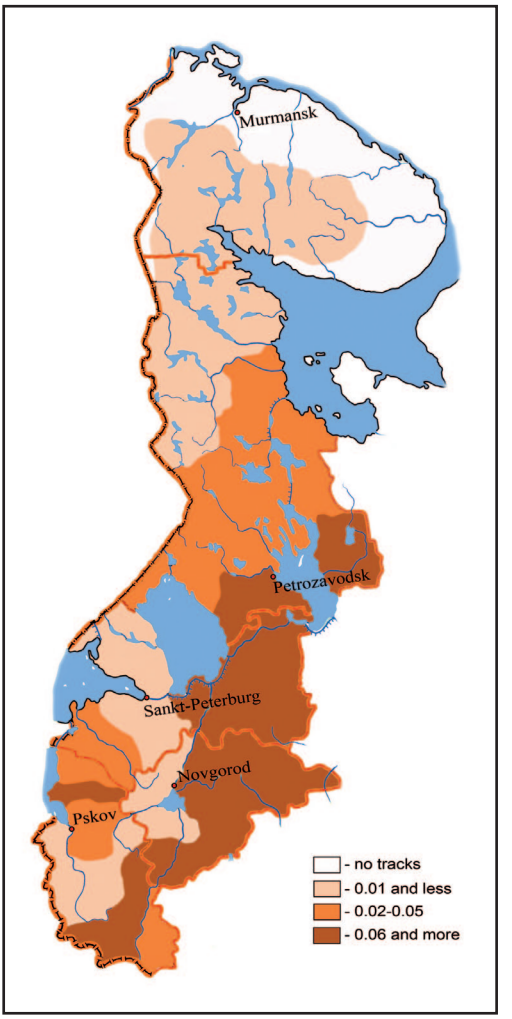

Fig. 2 Distribution and number of wolf in the Russian North-West, animals per 1000 ha

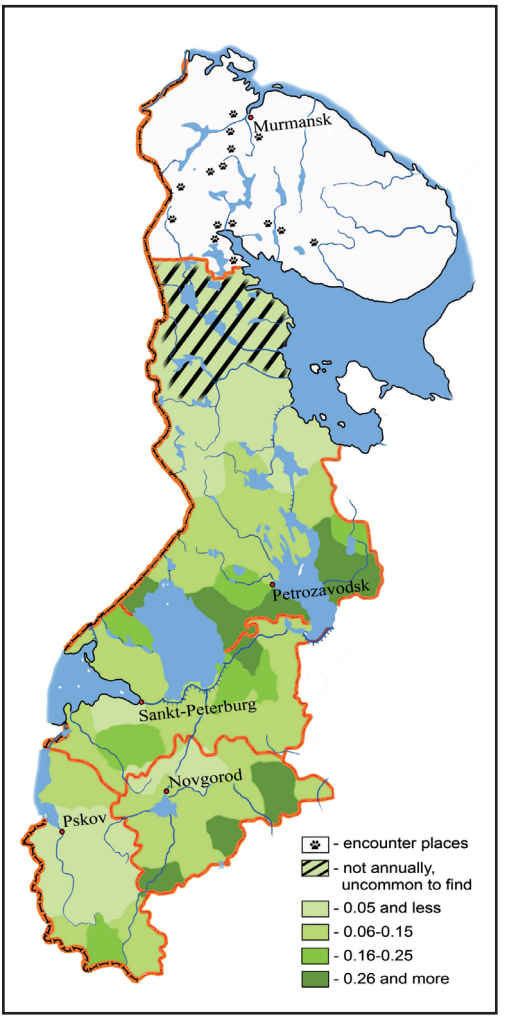

Fig. 3 Distribution and number of lynx in the Russian North-West, animals per 1000 ha and registration of animals and their tracks in Kola Peninsular

age categories could be identify for sure: 1 – young animals – cubs of the year and yearlings (width of forepaw 6 – 11.5 cm) 2 – middle-age – 2+ years and older (12 – 16.5 cm) and 3 – old bears (17.5 cm and more). Farther were differentiated the females with cubs. In the north-western Russia the first two categories varies from 15 % (Lapland reserve) to 36.1 % (Karelia). Females with cubs and yearlings make 9 and 18 % correspondingly. Single animals compose the most numerous group. Their relative number fluctuates from 45.1 in Karelia to 76 % in the Lapland reserve.

As for our experimental area – Karelia – the age structure of population didn't changed during 40 years almost.

For general estimation of the age structure of population, especially in hunting areas could be used another method – body weight of shot bears. With use of all data collected for long time the following categories of weight and age have been worked out: under 100 kg – young,

sexually immature; 101–250 kg – middle-aged, i.e. the most reproductive part of the population and finally, over 251 kg – old animals. In the situation, when the exploitation of bear population being moderate its age structure almost does not change even for long time. Thus during hundred years no significant changes took place in the age structure of bear population of Leningrad province (Новиков и др. 1969; 1970; Данилов 1994; 2005).

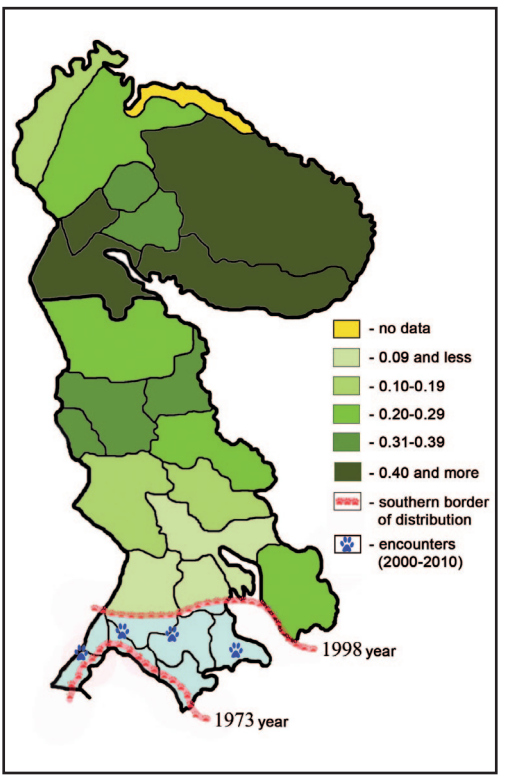

Fig. 4 Distribution and number of wolverine in Karelia and Kola Peninsular, tracks per 10 km and southern border of distribution

The fluctuation of wolf number determine by two factors – hunting pressure and abundance of its prey.

As for the influence of pursuing the predators by man it is appropriate here to refer to the situation in the Leningrad province. In 1955 there were 850 wolves, in 1961 there left only 56 animals. In some districts wolves have not been seen at all (Иванов, 1970). This has happened as result of intensive use of new poison – barium fluorine acetate. At the end of the 1950s and during 1960s with the use of this poison 60 % of wolves were killed in the northwest of Russia. Since late 1970s poison was totally forbidden.

Second factor was described and illustrated earlier (Данилов 1981; 1994; 2005). Now we try to emphasize only haw closely the wolf's number connected with this one of the moose, and haw strong is the damage to moose population from this predator. It is illustrated within the territory of Karelia, because just for that territory we collected more detailed data (Fig. 5).

Tight connected changes in the number of wolf and moose may be seen on the whole Karelia and for all period of investigation (1964–2010 years).

The estimation of annual death of moose caused by wolves among exploited populations is very difficult. It is extremely difficulty and even impossible to count exactly the preys and predators on large territories and it is not easy at all to discover dead animals or its remnants in forest. Judging by the part of moose killed by wolves of the total number of moose found

Table 1 The Large predators number in the Russian North-West

Province	Brown bear		Wolf		Lynx		Wolverine	
	1990s	2000s	1990s	2000s	1990s	2000s	1990s	2000s
Murmansk	350	500	90	70	single	single	200	250
Karelia	2700	3000	560	380	750	550	200	150
Leningrad	1800	1800	470	400	500	350	single	not annually
Novgorod	1000	1300	300	240	300	250	no	no
Pskov	600	800	320	200	200	150	no	no

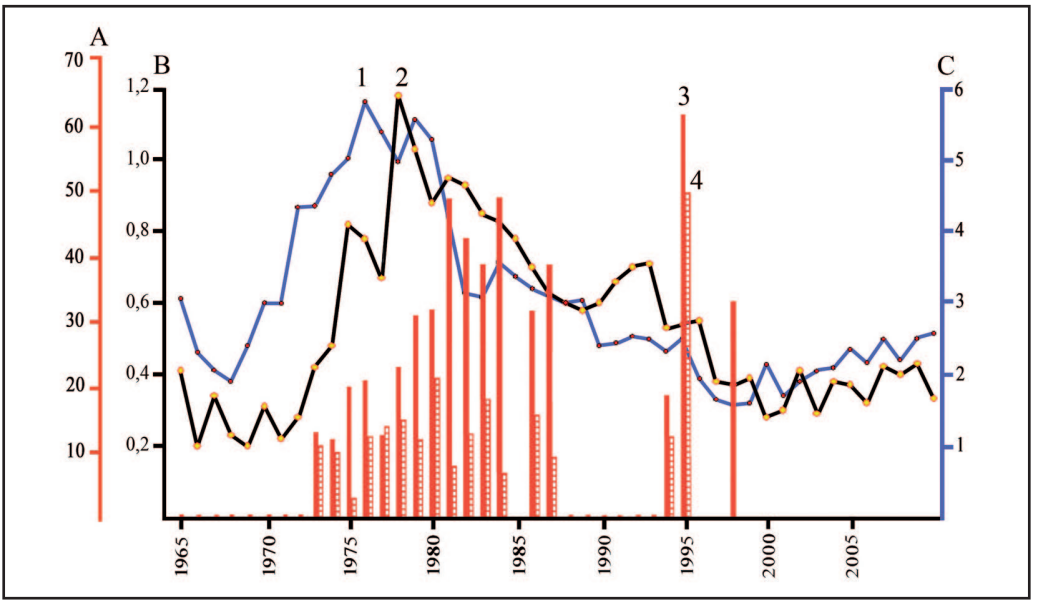

Fig. 5 Dynamics of moose (1) and wolf (2) numbers and moose's death from wolves (3) and bears (4) in Karelia. On axis of abscissas – years. On axis of ordinates: A – moose death-rate, % of the total animals number found dead on different reasons, B – wolf number, C – moose number, tracks per 10 km route

dead from different reasons throughout all Karelia, the wolf's damage to moose population was estimated as 5–7 % of total moose number.

Another method for calculating the losses of moose population caused by wolf is based upon direct registration of wolf's prey in the process of winter tracking. It has been established that a pack of 4–6 wolves at the average kills 2 moose per month (Данилов 1981). In Karelia the snow covers the ground during 6 months, i.e. the pack kills 12 moose during this time. The number of wolves in Karelia in March, according to data on winter rout counting 2010, was 400 specimens. To the beginning of winter the population increases by 100–110 young animals, so, the total number by that time amounts to 500–520 individuals. There are 35 % of single wolves and pairs in the population, i.e. the number of packing wolves is 340. In Karelia the mean number of animals in pack during the middle winter is 4.2 sp. Thus the number of pack amount to 80–85 and the total number of killed moose achieved 950–1000 individuals. It means the same 5–7 % of total moose population number.

The number of lynx and dynamics of its population in taiga depends on the number of its main prey – mountain hare (Fig. 6). As a result of snow tracking show, the absolute majority of attacks attempted by lynx – 72.8 % fall on the hare, about 20 % on tetraonids and only 6.2 % upon other animals. As well as number the length of predator's daily movement depends on hare density.

By the data obtained by snow tracking in the southern Karelia it was counted the number of hares caught by one lynx during snow period and thus determined the size or the pressure upon the population of the prey. Considering the length of the snow period 160 days and the kill by a lynx during one "lynx-night" 0.5 hare (Данилов 1994) it may be concluded that one predator catches about 80 hares for the season.

To continue calculation, we shall try to determine how strong is the pressure of the predator on the population of the prey depending of its density. The average home range of the lynx is 3200 ha (Данилов 1994).

During years when the amount of hares is high, its density is 40–50 per 1000 ha, for the period of depression 12–15; at an average 30–35

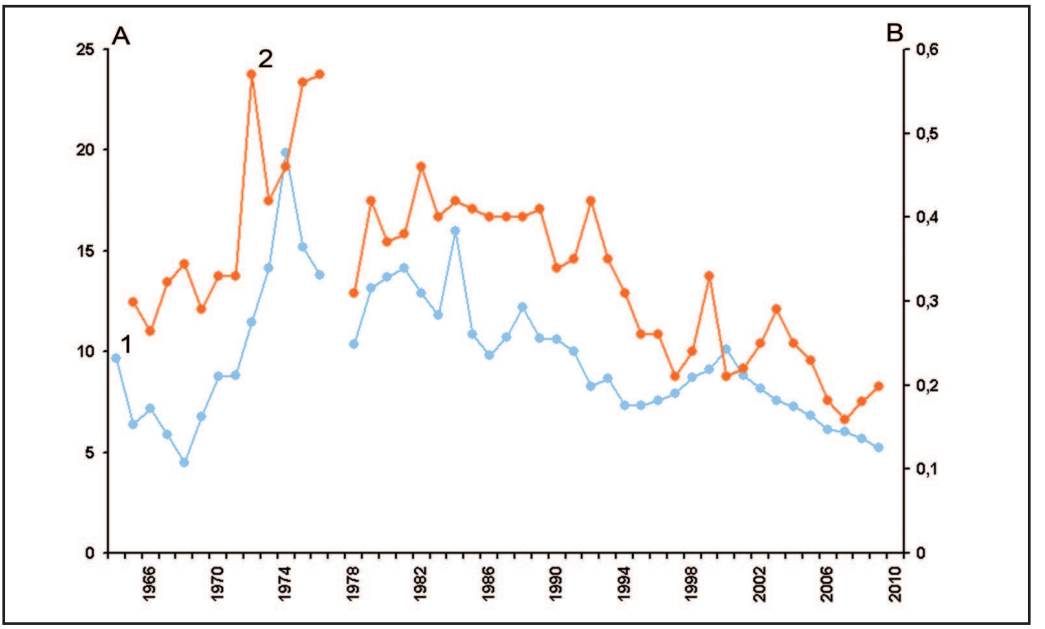

Fig. 6 Dynamics of hare (1) and lynx (2) numbers in Karelia. On axis of abscissas – years. On axis of ordinates: A – hare number, B – lynx number, tracks per 10 km route

individuals per 1000 ha. Thus, on the area of the predator home range to the end of winter maximum hare number is 150 – 170 hares, minimum 40-50, average 100–110 hares. This is initial so called "live-stock". After breeding the maximum number makes 500, the minimum 150, average 300 hares over home range of the lynx. Thus 80 hares caught by the lynx comprise 27 % of the hare population. It is understood that such calculation is quite conditional, but, nevertheless, allows concluding that during years of large and medium number of hares, the lynx alone is not able to limit its number. Only during years of the lowest number of the hare population the activity of the predator can hold back the number of prey somewhat, however not deepening its depression. In the southern part of the northwestern Russia the pressure of the lynx on the whole hare population is weaker. Because, the nutrition spectrum of the lynx in the south of the region is considerably wider and, accordingly, the consumption of hares is smaller.

In conclusion we offer the directions of management and protection of the large predators in the Russian Northwest. As was mentioned above the wolverine is totally protected throughout Karelia and Kola Peninsula, i.e. all its area in Russian northwest.

The lynx hunting is forbidden in Karelia since 1999 year, but not in southern provinces. It's known that the strategy of wolf population management based on ecology-geographical principles was worked out by the team of zoologists and game managers headed by Professor D.I. Bibikov as long ago as beginning of the 1980s. It is published in the monograph "The Wolf" (Волк, 1985). It defines four categories of territories former Soviet Union with different regimes of wolf population management.

The brown bear is very popular hunted animal. Its year bagging changed from 250 to 300 animals. It is not many at all, but it is remarkable, that the way of hunting bear changed dramatically during last 50 years.

Nowadays, the most popular ways are hunting in oats field and over bait. The practices of hunting at den and with dogs are being revived little by little. Bear traps is prohibited. The main idea of large predator management and protection is to conserve their all over Russian Northwest as hunted animals.

Summary

The four large carnivore species in northwest Russia are brown bear, wolf, lynx and wolverine. *Gulo gulo* is under protection in the whole area, *Lynx lynx* only in some provinces. There are given actual data on distribution, population number, age structure, bag record, predator-prey relations.

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