

## Wild and semi-domesticated reindeer in Russia: status, population dynamics and trends under the present social and economic conditions

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*Abstract:* At present (in 1999) there are approximately 1.5 million semi-domesticated and 1.3 million wild reindeer in Russia. The co-existence of these two forms remains a major problem. Reindeer herding has declined while the number of wild reindeer has increased during the last 10 years. The main causes of these changes are social and economic. The 1960s and 1970s were characterised by a deliberate attempt to eradicate the nomadic way of life of reindeer herders. It was relatively easy to introduce public (*kolkhoz* or *sovkhov*) reindeer herding in the Nenets, Chukchi and Komi-Izhem areas where large-scale reindeer herding was typical and, as a result, there were almost 1 million reindeer in collectives in the extreme north-eastern part of the USSR. At the same time reindeer herding deteriorated among the Khanty, Mansi, Evenk, Even, Selkup peoples. *Perestroika* in the 1990s resulted in the formation of a market economy. Collective reindeer herding declined and the number of semi-domesticated reindeer decreased during a period of gradual return to private ownership of reindeer. The largest region of reindeer herding is now the Nenets region in the north-west of Russia. Successful sympatric existence of wild and semi-domesticated reindeer is not possible. The Taimyr wild reindeer population numbers about 500-600 000 reindeer. From 1971 to 1981 not less than 700 000 reindeer in this population were shot. Ecological and economic control over them has now been lost. There are approximately 200 000 animals in Yakutia. The number of wild reindeer here has grown following the decline of reindeer husbandry. Yakut and Even reindeer herders believe that the decline has been due to wild reindeer drawing semi-domesticated reindeer away. At present 13 aboriginal peoples in northern Russia engage in reindeer herding. Five former reindeer herding peoples have given up herding but there are signs of improvement in the situation among those peoples which have retained reindeer herding culture following the gradual restoration of private ownership of reindeer. In the 20 regions where only a few wild reindeer remain hunting should be prohibited and measures should be taken for protecting and restoring the populations. There are approximately 6000 reindeer on Novaya Zemlya; a further 6000 animals live on the Novosibirsk islands. The Red Data Book of Russia should include rare and disappearing populations both on the periphery of the species' distribution and inside it to preserve and restore the species and to conserve its genetic diversity.

**Key words:** Chukchi, Even, Evenk, herding, hunting, Khanty, *kolkhoz*, Komi, Mansi, Nenets, *Rangifer tarandus*, Selkup, *sovkhov*, Taimyr, Yakutia.

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### Note on terminology provided by David Andersen

A *kolkhoz* (*kollektivnoe khoziaistvo*) is an abbreviation for a common property institution common in Siberia from 1925 until the mid 1960s. It was characterised by common access to land, wages calculated according to the quantity produced by each member and local democratic institutions such as group meetings of members. It is often translated as 'collective farm'. A *sovkhov* (*sovetskoe khoziaistvo*) was a much more centralised version of the *kolkhoz* wherein producers fitted into a complex division of labour regulated by labour statutes, trade unions and formal professional qualifications. Remuneration was made on the basis of official salary tables. Direction of the *sovkhov* was not locally based but filtered through a long chain of authority culminating in the Ministry for Rural Economy in Moscow. Although *sovkhovs* were designed in the early 1930s they did not replace *kolkhozes* in most places in Siberia until the early 1960s. Some parts of Siberia retained the *kolkhoz* structure right to the end of the Soviet period.

Table 1. The numbers (thousands of animals) of semi-domesticated reindeer in different regions of Russia, 195

Regions	1951	1961	1965	1970	1971	1975	1976	1977	1978	19
Amur Region	6.3	12.6	15.0	17.3	17.3	16.1	14.7	14.9	15.0	15
Arkhangelsk Region	189.7	169.9	174.6	193.2	193.2	180.0	183.2	183.4	181.8	192
Buryatia Republic	2.3	3.9	4.2	5.0	5.0	4.8	4.2	4.3	2.6	1
Chitta region	10.3	11.6	14.1	18.3	18.3	17.3	15.9	15.2	15.6	14
Irkutsk region	5.5	7.0	7.5	5.4	5.4	4.5	4.1	4.0	4.1	1
Kamchatka Region	194.2	158.8	174.8	178.9	178.9	174.8	175.6	176.3	177.0	177
Karelia Republic	0.400	-	0.200	0.100	0.100	-	0.003	-	-	-
Khabarovsk Territory	38.0	42.3	52.4	50.3	50.3	51.5	51.6	49.3	41.9	48
Komi Republic	211.0	136.7	135.9	147.1	147.1	100.6	104.9	107.7	97.6	120
Krasnoyarsk Territory	137.0	136.8	188.1	164.8	164.8	142.9	143.3	144.2	126.1	102
Magadan Region	512.2	579.3	710.3	738.5	738.5	685.4	696.7	710.	711.9	705
Murmansk Region	53.9	74.2	77.1	81.9	81.9	65.6	65.2	65.5	64.8	66
Sakhalin Region	10.2	13.1	15.1	14.2	14.2	13.4	13.3	12.5	10.7	3
Tomsk Region	0.8	0.6	0.3	0.1	0.1	-	0.1	-	-	-
Tyva republic	3.1	-	9.1	11.6	11.6	10.5	11.1	11.8	13.1	10
Tyumen' Region	366.8	400.5	431.3	480.9	480.9	440.4	441.3	433.8	411.2	427
Yakutia Republic	312.9	340.6	359.3	356.3	356.3	371.9	377.8	379.2	375.9	371
Total	2054.6	2087.9	2369.3	2463.9	2463.9	2279.7	2303.0	2312.1	2249.3	2259

## Introduction

Russia has always been a leading country for semi-domesticated and wild reindeer. At present (in 1999), Russia has two thirds of the world's population of semi-domesticated reindeer (1 510 000 animals) and about 1 246 000 wild reindeer. Thus, there are approximately equal numbers of wild and semi-domesticated reindeer in Russia now. The co-existence of wild and semi-domesticated reindeer has been a big problem for Russia throughout this century. Numbers of wild and semi-domesticated reindeer have changed substantially during the last 10 years. Reindeer herding has declined significantly while the number of wild reindeer has increased. The main causes of this phenomenon are social and economic. By saying so I would like to stress that population sizes of wild and semi-domesticated reindeer in Russia have for the most part never been food-limited. I have always considered as wrong the opinion widely spread in Russian scientific literature that reindeer herding in Russia has been limited by lack of pasture owing, in particular, to loss of habitat as a result of technological development. The present-day changes in reindeer numbers confirms my view. In this paper I will examine the data on changes in numbers of semi-domesticated and wild reindeer in Russia and consider the causes of changes in numbers throughout this century.

## The current situation and dynamics of populations of semi-domesticated reindeer in Russia

Table 1 shows numbers of semi-domesticated reindeer in Russia from 1951 to 1998. Figs. 1 and 2 show the distribution of reindeer in 1997 and in 1984.

The number of semi-domesticated reindeer in Russia has changed significantly during the last 100 years, varying from 1.5 million to almost 2.5 million animals. The leading factors causing these changes have been socio-political in character. The changes in numbers of semi-domesticated reindeer in the 20th century can be divided into several stages:

### *The beginning of the century*

The beginning of the century was characterised by the highest number of reindeer. The relatively low official figures in the first decades of the century (1 455 000 in 1906 and 1 674 000 in 1912) probably reflect low accuracy in counting. I do not agree with Khrushchev & Klovov (1998) that numbers increased steadily up to the 1930s although there may have been some increase in the numbers associated with the development of large-scale Nenets and Chukchi reindeer herding. The first more or less accurate registration of reindeer was carried out in

1984	1991	1997	1998
3.5	12.9	10.3	9.3
4.0	190.7	182.9	171.6
-	2.1	0.9	0.7
2.4	9.2	2.0	1.3
2.6	3.9	2.0	0.5
56.6	167.1	98.3	72.3
-	-	-	-
14.6	42.7	20.0	17.2
55.3	123.6	124.0	122.8
37.0	107.4	57.8	50.3
26.0	612.5	241.1	192.3
52.4	77.3	77.0	71.4
3.6	4.0	3.1	2.9
-	-	-	-
9.6	8.1	3.1	3.4
49.6	537.6	554.0	573.6
19.9	361.5	215.9	196.4
17.1	2260.6	1592.4	1486.0

1926-1927 during the Polar census of the population and economy in Russia's Extreme North. The total figure amounted to 2 195 000 reindeer. All semi-domesticated reindeer belonged to private herders: there was no public reindeer herding of the *kolkhoz* or the *sovkhos* type then.

#### *The second stage*

The second stage saw the development of publically owned reindeer herding in the so-called *kolkhoz* form. Transferring reindeer herds into public ownership was a painful process for Northern peoples. *Kolkhoz* reindeer herding was formed mainly through compulsory procedures. It was almost forbidden to own reindeer privately and the size of private herds was strictly limited. As a result, the total number of semi-domesticated reindeer in Russia decreased to the minimum level of 1 434 700 by 1934; 331 000 (23.1%) of these were *kolkhoz* reindeer, compared to none in 1927, while all the rest were privately owned.

#### *The third stage*

During the third stage, which began in mid-1930s, the total number of semi-domesticated reindeer increased steadily though slowly and erratically at first.

#### *The fourth stage*

The 1950s were characterised by unstable dynamics in reindeer populations owing to epizootics in Komi Autonomous Republic and West Siberia and by a crisis in taiga reindeer herding (Khrushchev & Klovov, 1998). In 1951, the total number of semi-domesticated reindeer was 2 054 500 of which in public (*kolkhoz* and *sovkhos*) enterprises accounted for 1 664 100 animals while only 390 400 (19%) were privately owned.

#### *The fifth stage*

During the fifth stage (1960s and 1970s) the number of semi-domesticated reindeer reached a maximum of over 2 million animals. In 1968-1972 numbers exceeded 2 400 000 animals; less than 13% of these were privately owned.

The indigenous peoples of the North were still passively opposed to public reindeer herding but they gradually became accustomed to it. The Soviet government paid great attention to developing the public reindeer herding and allocated big sums of money for its development. Various zootechnic and veterinary procedures were carried out on a wide scale. In particular, a great deal of work was done in overcoming reindeer diseases like anthrax, scabies, brucellosis, necrobacillosis. Great attention was paid to scientific support of reindeer herding. In Norilsk, Yakutsk, Magadan, Naryan-Mar special institutes and a network of research stations were set up to serve agriculture in the North and reindeer herding occupied a prominent place among the agricultural projects carried out. New technologies were introduced including the use of off-road vehicles, aeroplanes, helicopters, radio communication and electric power.

This same period was characterised by a deliberate attempt to reduce the nomadic way of life of reindeer herders and other Northern peoples. The system of traditional wildlife management and of traditional way of life of the reindeer herder peoples was destroyed. Nomadism (which was the reindeer herders' normal way of life and the basis of their survival) and the aboriginal family way of life deteriorated. The introduced system of shift-work herding divided herders' families in a most unnatural manner for these people; under the new system only the men stayed in the herds while the women and children were moved to specially built settlements.

It was much easier to introduce public (*kolkhoz* or *sovkhos*) reindeer herding in the areas for which large-scale reindeer herding was typical (the

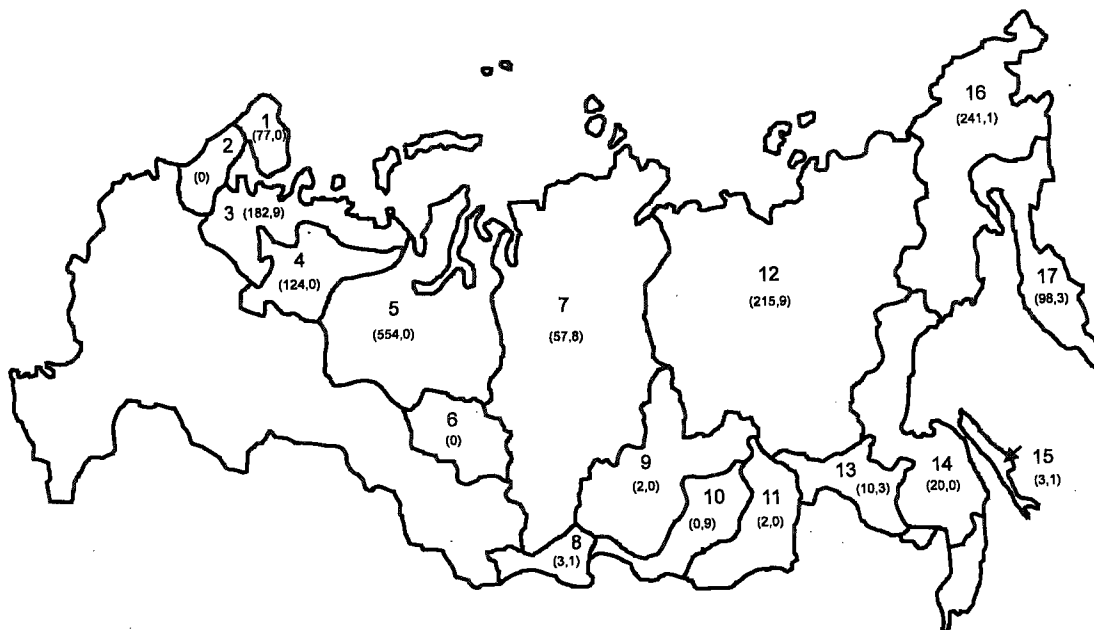


Fig. 1. Distribution of semi-domesticated reindeer and number (thousands in brackets) in Russia, 1997:

- 1 - Murmansk Region
- 2 - Karelia Republic
- 3 - Archangelsk Region (with Nenets Autonomous District)
- 4 - Komi Republic
- 5 - Tyumen' Region (with Yamal-Nenets & Khanty-Mansi Autonomous Districts)
- 6 - Tomsk Region
- 7 - Krasnoyarsk Territory (with Taimyr, Evenk Aut. Districts and Khakasia Republic)
- 8 - Tyva Republic
- 9 - Irkutsk Region
- 10 - Buryatia Republic
- 11 - Chitta Region
- 12 - Yakutia Republic
- 13 - Amur Region
- 14 - Khabarovsk Territory
- 15 - Sakhalin Region
- 16 - Magadan Region (with Chukotka Autonomous District)
- 17 - Kamchatka Region (with Koryak Autonomous District)

Nenets, Chukchi and Komi-Izhem types). The large-scale reindeer farms in Chukchi National District were particularly successful. The Chukchi, a strong and self-dependent nationality, had begun to breed reindeer for selling meat at the market

even before the Soviet period. They did it earlier than other peoples of the Russian North. It is also typical that in Tsarist times the Chukchi were the only aboriginal nationality in the Russian North

Table 2. Semi-domesticated reindeer in Russia: forms of ownership.

	1906	1912	1927	1934	1941	1946	1951	1956	1961	1966
Total (thousands)	1457.7	1673.7	2194.6	1434.7	1931.2	1821.5	2054.5	1993.2	2103.7	2369
Social property	-	-	-	331.2	843.2	1274.9	1164.1	1714.2	1815.6	2109
%	-	-	-	23.1	43.7	70.0	81.0	86.0	86.3	89
Private property	1457.7	1673.7	2194.6	1103.5	1088	546.6	390.4	279	288.1	260
%	100	100	100	76.9	56.3	30.0	19.0	14.0	13.7	11

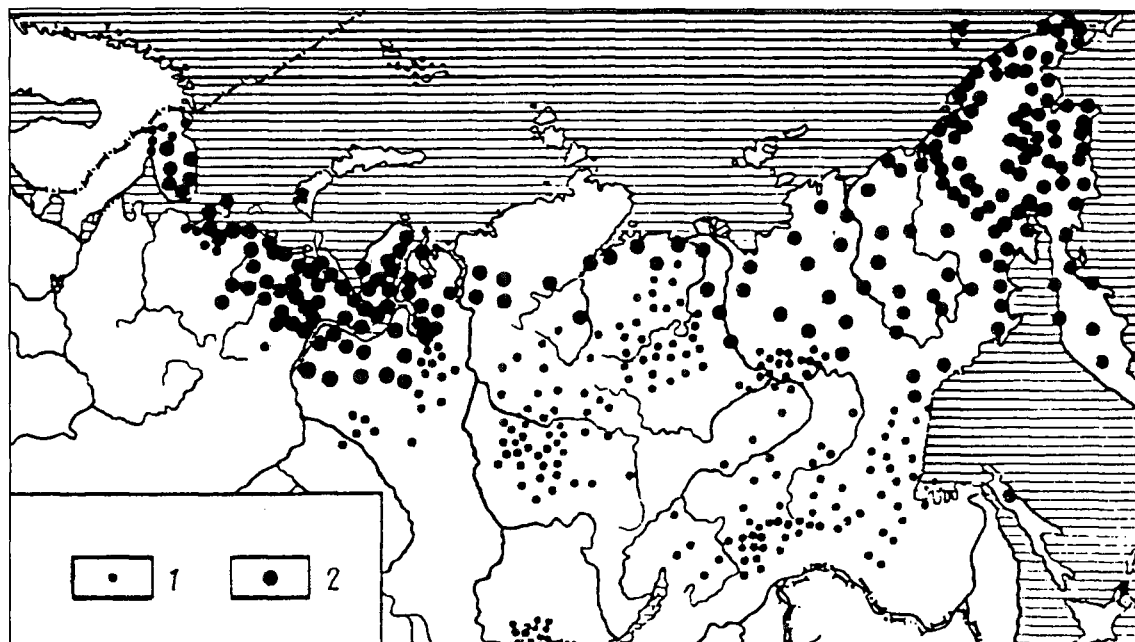


Fig. 2. Distribution of semi-domesticated reindeer in the USSR, 1984: 1 - 1000 reindeer; 2 - 10 000 reindeer. From Syroechkovski (1995).

who managed to maintain their independence to a great extent.

As a result, the extreme north-eastern part of the USSR became the world's largest region of large-scale collective reindeer herding with almost 1 million reindeer in collectives. This region comprised the Chukchi National District and a part of the Koryak National District where there were 917 400 reindeer in 1971 and 880 200 reindeer in 1981. In those years there were 738 500 reindeer in Magadan Region, including 705 300 reindeer in the Chukchi National District, while in Kamchatka Region there were 178 900 reindeer, including 174 900 reindeer in the Koryak National District.

The second largest region of semi-domesticated reindeer herding in the USSR was the Yamal-Nenets National District (in the north of West Siberia) which numbered 480 900 semi-domesticat-

ed reindeer in 1971 and 418 000 semi-domesticated reindeer in 1981. In that region, herding was done mostly by Nenets (reindeer herding on the tundra) and partially by Khanty (reindeer herding in taiga).

The third largest region of semi-domesticated reindeer herding was located in the tundra areas of the European part of Russia. Here, in the Nenets National District of Archangelsk Region, in the best years of the fifth stage there were almost 200 000 reindeer (193 200 in 1971). Reindeer herders of Komi Republic had almost 150 000 reindeer (147 100 reindeer in 1971). In total, in the European region of Russia there were about 350 000 semi-domesticated reindeer.

As this review shows, large scale reindeer herding on the tundra was done mostly by Chukchis and Nenets. The Komi-Izhem and the Khanty peoples

1971	1976	1981	1986	1991	1992	1993	1994	1995	1996	1997
3.9	2279.9	2267.6	2205.9	2260.6	2207.8	2126.6	1965.5	1833.9	1695	1592.5
9.9	1986	1978.4	1888.9	1831.7	1746.4	1579.3	1391.5	1250.5	1111.7	1006
6.9	87.1	87.2	85.6	81.0	79.1	74.3	70.8	68.2	65.6	63.2
4	293.9	289.2	317	428.9	461.4	547.3	574	583.4	583.3	586.5
3.1	12.9	12.8	14.4	19.0	20.9	25.7	29.2	31.8	34.4	36.8

practiced smaller scale reindeer herding in the taiga and forest-tundra. During calving, they drove their herds as far to the north as possible into the tundra or mountain tundra zones of the Ural Mountains. In winter they took their herds south to forest-tundra and to northern taiga.

The fifth stage was characterised by the deterioration of taiga reindeer herding of the Khanty, Mansi, Evenk, Even, Selkup peoples. In the 1970s there were 300 000 reindeer on the taiga. By 1989 reindeer herding on the taiga was reduced to 100 000-150 000 reindeer while probably at least 1-1.5 million semi-domesticated reindeer could have been successfully pastured there. Taiga reindeer herding has never been characterised by the keeping of large herds. In the traditional way of life the main trades of the people were hunting and fishing; reindeer herding was an auxiliary occupation and reindeer were kept mainly for transport. However, in the period before *kolkhoz* management was introduced, some Khanty in West Siberia and some Evenks in taiga east of the Yenisey, as well as some Even people in Yakut taiga had successfully combined hunting and reindeer herding and some owners had herds of 1000 reindeer and more.

#### *The sixth stage*

The sixth stage started in the 1990s, in the time of *Perestroika*, when the formation of the market economy and the democratisation of society began. This stage has not yet ended. On the whole, it is characterised by a significant reduction in the population size of semi-domesticated reindeer, by decline and decay of collective reindeer herding of the *kolkhoz* and *sovkhos* type and by a gradual return to private ownership of reindeer herds.

Privately owned semi-domesticated reindeer constitute now (in 1997) almost 37% of the total number (in 1966 they made up only 11%) (Table 2). The general trend of increase in the number of privately owned reindeer has continued. Remarkable changes in reindeer numbers have taken place. The largest region of semi-domesticated reindeer herding in the north-east of Russia has undergone a threefold reduction in the number of reindeer. That region used to have almost 1 million reindeer, mostly in the Chukchi National District of Magadan Region. In 1971 the Chukchi National District had almost 740 000 semi-domesticated reindeer, while in 1998 the number was a little over 200 000.

The collapse of Chukchi reindeer herding can be explained as follows. The Chukchi National District

had large-scale herding that more easily adapted to *sovkhos* type reindeer herding than small scale herding. Indeed Chukchi private large-scale herding was the prototype of *sovkhos* reindeer herding. The large herds were owned by rich reindeer herders who employed workers. That type of reindeer herding was the first to go over to market-oriented production of reindeer. When the Soviet State introduced *sovkhos* herding, reindeer herding in the Chukchi National District became more 'industrialised' than in other places. The Chukchi were moved to large settlements and their former close ties with the herds were broken. Heavy cross-country vehicles were used for communicating with the herds resulting in the destruction of pasture. Very few privately owned reindeer remained in the Chukchi National District. It is therefore quite understandable that reindeer herding in the Chukchi National District began to decay quickly following the decline of *sovkhos* herding throughout all northern areas of Russia.

In contrast, Nenets reindeer herding in the north of West Siberia, mainly the Yamal Peninsula, and in the Nenets National District in the European part of Russia proved to be better adapted to modern conditions. Large-scale herding was common here but the Nenets had opposed collective herding more stubbornly than the Chukchi and retained private herds to a much greater extent. Quite often Nenets owners hid their herds in remote and inaccessible parts of tundra and forest-tundra. Unlike the Chukchi, they actively resisted attempts to make them live in large settlements. Up to now, the Nenets have retained large and strong families which lead a nomadic life and roam with their herds while living in well-equipped *choom* (pyramid tents similar to the Sami 'lavvo' or North American 'tepee') outside large settlements all year round. This has helped them to preserve their culture and the characteristic elements of their traditional tundra way of life.

This traditional tundra management has been well preserved in the Nenets National District in the European part of Russia. As a result, Nenets reindeer herding suffered much less damage when the system of collective herding introduced under socialism was destroyed. So-called 'backward' Nenets reindeer herding has therefore survived much better than the so-called 'progressive' mechanised reindeer herding of the Chukchi.

As a result of these changes, radical alterations have taken place in the distribution of reindeer

herding in Russia. The largest region of reindeer herding is now Nenets region in the north of the European part of Russia and in the north of West Siberia where herding is widely spread in spite of these same areas being greatly damaged by the expansion of oil and gas development.

The Yakutia Republic has remained a significant reindeer herding region. There were 380 000 semi-domesticated reindeer there in 1981. These animals were kept in large herds almost exclusively on the Yakutian tundra and forest-tundra. The Yakut people have long inhabited the central part of Yakutia with its steppes and forest-steppes and have always engaged in the breeding of cattle and horses. Reindeer herding was mostly done by the 'Northern Yakuts', a special ethnic group formed as a result of the merging of Yakut people of Turkish origin with natives of non-Turkish origin such as the Yakagir,

Dolgan, Even and Evenk peoples. In eastern part of Yakutia, large reindeer herds were owned by Evens (large-scale herding in forest-tundra and mountain taiga). During *Perestroika*, Yakut reindeer herding started declining but by 1997 there were still a little over 200 000 semi-domesticated reindeer left there.

Reindeer herding on the taiga has declined throughout Russia from Karelia in the west to the Okhotsk Sea in the east. The zone of taiga reindeer herding is no longer more or less continuous and has been broken down into separate isolated areas which are becoming smaller and smaller. Some small nationalities and separate ethnic groups in the North have given up reindeer herding altogether. This applies to the Kets (the taiga part of the Yenisey basin), the Nganassans (the central part of Taimyr), the Yakagirs (the north-eastern part of

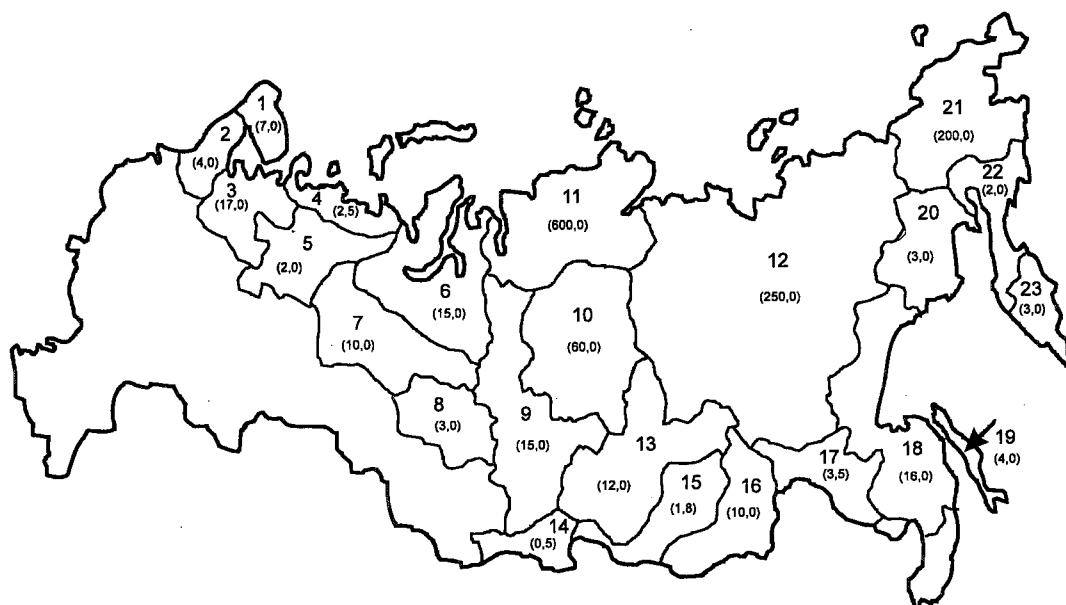


Fig. 3. Distribution and numbers (thousands in brackets) of wild reindeer in Russia, 1997-1998:

- |                                      |                                   |
|--------------------------------------|-----------------------------------|
| 1 - Murmansk Region                  | 12 - Yakutia Republic             |
| 2 - Karelia Republic                 | 13 - Irkutsk Region               |
| 3 - Archangelsk Region               | 14 - Tyva Republic                |
| 4 - Nenets Autonomous District       | 15 - Buryatia Republic            |
| 5 - Komi Republic                    | 16 - Chitta Region                |
| 6 - Yamal-Nenets Autonomous District | 17 - Amur Region                  |
| 7 - Khanty-Mansi Autonomous District | 18 - Khabarovsk Territory         |
| 8 - Tomsk Region                     | 19 - Sakhalin Region              |
| 9 - Krasnoyarsk Territory            | 20 - Magadan Region               |
| 10 - Evenk Autonomous District       | 21 - Chukotka Autonomous District |
| 11 - Taimyr Autonomous District      | 22 - Koryak Autonomous District   |
|                                      | 23 - Kamchatka Region             |

Yakutia Republic) and the ethnic group of Selkups from the Baikha River (the Turukhan River basin).

Some small-scale but relatively stable reindeer herding remains in the western part of Russia on the Kola Peninsula. It is sustained by Kola Sami (77 000 semi-domesticated reindeer in 1997). By 1980 taiga reindeer herding disappeared in the Katelian Republic.

In the vast taiga areas of West Siberia where the Khanty and Mansi peoples engaged in reindeer herding only small isolated herding areas remain in what used to be a large well-organised herding zone. Only 34 000 semi-domesticated reindeer are now (1998) left in the vast Khanty-Mansi Autonomous District. Here the main reason for the decline in reindeer herding has been the intensive development of the gas and oil industry which has resulted in massive destruction of pastures, poaching, development of roads, pipelines and so on. The same factors have led to the deterioration of the traditional way of life among indigenous peoples on the taiga. By 1998 only 5000 reindeer were left in the vast Evenk Autonomous District in Central Siberia from what used to be a prominent region of taiga reindeer herding with 60 000 semi-domesti-

cated reindeer in the 1930s; the remaining reindeer are scattered around the whole Autonomous District.

In mountain-taiga areas of South Siberia (Irkutsk Region, Chitta Region, Buryatia Republic, Tyva Republic) and in Sakhalin Region reindeer herding has almost disappeared. In each of these regions there are less than 3000 semi-domesticated reindeer left (Fig. 1).

### The present-day situation and dynamics of wild reindeer populations in Russia

Wild and semi-domesticated reindeer both belong to the species *Rangifer tarandus* L. The biological difference between them is not great but it is nevertheless present. The semi-domesticated form of the species, in particular, is more accustomed to eating lichens which is a characteristic feature developed during in the process of domestication (Syroechkovskii, 1975; 1986). The diet of wild reindeer is much more diverse. Other differences exist in the behaviour, ecology and physiology of the two forms. Semi-domesticated reindeer in Siberia are apt to become wild and often tend to join migrating

Table 3. Population and distribution of wild reindeer in Russia (in thousands) 1961-1998.

	1961	1965	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	19
Altay Territory	-	0.1	0.1	-	-	1	-	-	1	0.4	0.4	0.4	0
Amur Region	2	2	2	-	-	8	-	-	8	4.15	3.17	3.2	2
Arkhangelsk Region	2.5	3.6	9.7	15.4	15.4	20	20	20	15	20	-	21	6
Buryat Republic	3	3	5	6.5	7	7	7	7	3.5	3.7	4	4	3
Chitta Region	-	5.6	6.7	6	6	5	5	5	5	7.5	7.2	7.2	7
Irkutsk Region	11	11	12.5	20	20	20	14.5	14.5	2	0	20	20	14
Kamchatka Region	-	5.5	8	7	6	5.5	5	5	4	7.3	4.9	5	4
Karelia Republic	1	3	1.1	7	8	3.5	6	4.8	5.3	6.6	5.8	7	5
Kemerovo Region	0.9	1	1	1	0.8	0.8	0.5	0.6	1	0.6	0.6	0.6	0
Khabarovsk Territory	5	10	10.5	11	11	13	13	5	17	11	17	17.5	17
Komi Republic	4	2	4.3	5	5.5	6	6	5.5	4	6.5	5.4	5.5	5
Krasnoyarsk Territory	103	120	340	540	543	521	500	543	480	523	565	570	575
Magadan Region	3.	3.5	3.5	3.5	4.5	14	14	15	8	16	16	11	11
Murmansk Region	7.5	10.5	22	6.4	1.5	1.5	1.5	1.3	1.2	2	1.85	2.2	2
Omsk Region	0.1	0.6	0.6	0.9	0.9	0.8	0.75	0.7	0.7	0.8	0.6	0.6	0
Perm' Region	0.4	0.4	0.6	0.22	0.5	0.6	0.55	0.55	-	0.25	0.02	-	-
Sakhalin Region	5	5	3	2.8	2.8	3	3	3	-	4.4	4.4	5	5
Sverdlovsk Region	-	1	1	-	1	-	-	1	1	1	1	1	0
Tomsk Region	7	3.5	0.7	2	2.5	2.5	2.5	1	1.8	2	1.5	5	4
Tyva Republic	0	6	2.5	3.5	3.5	3.5	4	4	4	4	4	4	4
Tyumen' Region	-	10	16	30	28	27.5	26	25	17	21.4	20	21	19
Yakutia Republic	30	100	160	170	170	170	260	170	220	170	170	240	250
Total	185.4	307.3	610.8	838.2	837.5	834.2	889.3	831.9	799.5	812.6	852.9	951.2	939



wild herds. The reverse process never occurs even though semi-domesticated reindeer originally appeared as a result of gradual domestication of wild forms. Specialists often mention Altay-Sayan, the Samoyedic (Nenets) area, as the region where reindeer herding originated. In my opinion, there were more likely to have been three such areas: the Altay-Sayan, the Baikal area and Scandinavia. This is confirmed by the location of ancient petroglyphs and other archaeological materials.

Wild and semi-domesticated reindeer are biological and ecological antagonists. The contradictions between wild and semi-domesticated reindeer are discussed in a considerable amount of scientific literature (Michel, 1938; Sdobnikov, 1933; 1939; Drury, 1949; Geller, 1969). This topic has been summarised in Syroechkovsky (1975; 1986 - for English versions see Syroechkovsky 1984; 1995). The general conclusion is that there is little possibility of the sympatric existence of wild and semi-domesticated reindeer. It is possible to reconcile the ecological contradictions only through geographically separating their home ranges, giving preference to either one or the other biological form in each specific territory. This is perfectly feasible on the vast territories of northern Russia.

The main contents of the problem of contradictions between wild and semi-domesticated reindeer have been formulated by Michel (1938):

1. the drawing away of semi-domesticated reindeer by wild reindeer;
2. the damaging the pastures by one biological form for the other;
3. the contributing to preservation of various reservoirs of infectious diseases for each other.

While the main factors affecting the changes in numbers of wild and semi-domesticated reindeer are of social and economic character, some biological factors play a role, in particular, the competition between wild and semi-domesticated reindeer on pastures. A typical example of that is the decline of the world's largest reindeer herding region in the Chukchi National District. This crisis was mainly caused by social and economic factors (above) but this resulted in the simultaneous desertion of pastures by both reindeer and people. Consequently, an ecological niche became vacant and the few wild reindeer that remained, and which had been protected by the state when almost extinct, began to increase quickly.

Nowadays (in 1998) the total population of wild reindeer in Russia is 1 246 000 (Figs. 3 and 4). This

1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
0.3	0.3	0.1	0.1	0.05	-	-	-	-	0.35	0.35	0.3	0.3	0.3
2	1.8	1.8	4	5	5	2.9	3	3	3.5	3	3.8	3.5	3.5
17	17	18	17	17	16	16	16	16	16	17	19	19	19.5
3.5	3.5	3	3	3	3.35	2.1	2.2	2.2	2.2	2.2	1.8	1.8	1.8
3	7.2	8.9	8.9	9	9.9	9.9	10	9.6	10	10	10	10	10
10.3	14	15	14	14	13.5	13	13.1	13	12	12	12	12	12
3	4.5	4.2	4	5	4.5	4.5	5.5	5.6	6	5	5	5	4.5
5	4.9	4.5	5.5	5.6	5.35	5.5	5.6	5	4.5	4	4	4	4
0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.1
9.8	14.6	17.4	17	17	17	17	17	17	14	10	15	15	16
4	5.5	5.5	5.5	4.7	4.5	6.4	6	6	5.5	3	2	2	2
30	650	550	620	645	645	645	600	600	600	578	675	675	675
29	32	32	0	3	3	33	30	33	35	35	45	165	203
2.5	3.5	3	3	4	3	3.5	3.5	3.5	3.5	4	4	5	7
1	0.8	0.8	0.8	1	1	0.8	0.8	1	0.8	0.8	0.7	0.7	0.7
-	sol	sol	sol	sol	sol	sol	sol	sol	sol	sol	sol	sol	sol
4.2	4	3	2.5	2	2	2.1	2.1	2	2	2	4	4	4
0.4	0.4	0.3	0.2	0.1	0.1	0.05	0.05	0.05	-	-	-	-	-
4	4.3	4	4	4	2.5	5.4	4.2	4.5	4.5	3	3	3	3
-	4	4	4	4	3	2	1	0.8	0.7	0.7	0.5	0.5	0.3
14	18.3	18	17.8	15	17	16.2	1	16	15.5	18	39.5	30	30
272	220	220	220	260	220	240	210	230	230	240	250	250	250
15.5	1011.1	914.0	951.8	1018.95	976.2	1025.75	931.45	968.65	966.45	948.45	1094.9	1206.0	1246.7

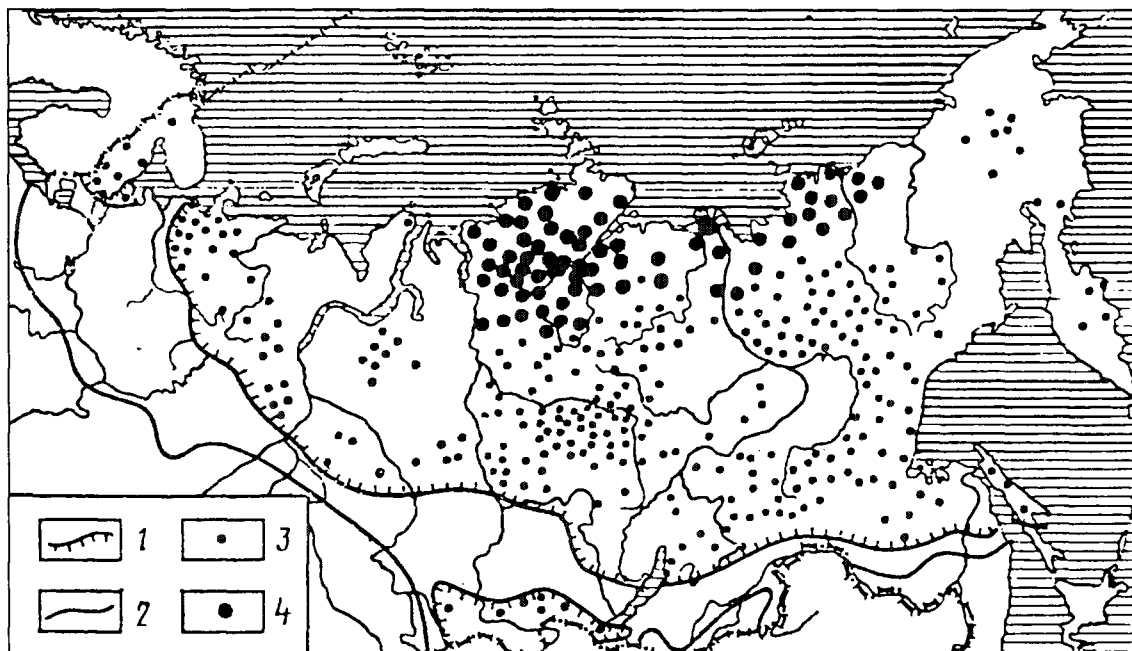


Fig. 4. Distribution of wild reindeer in the USSR, 1984: 1 - Boundary of contemporary range; 2 - Boundary of former range; 3 - 1000 reindeer; 4 - 10 000 reindeer. From Syroechkovski (1995).

is the largest total within the last 50 years, i.e. within the period when attempts were made to count the total number of wild reindeer in Russia (Table 3). It is quite possible that the present-day population has been underestimated a little because in recent years the number of wild reindeer has increased while census work has been much reduced.

The original population size of wild reindeer in northern Russia is unknown but according to estimates from the period when reindeer herding in Russia was still developing, i.e. in the 16th century, the total number of wild reindeer probably did not exceed 5 million. In the 20th century, the total number of both wild and semi-domesticated reindeer has never exceeded 3 400 000 (2.4 million semi-domesticated and 1 million wild reindeer) (Syroechkovskii, 1986).

According to my own estimates of the carrying capacity of reindeer pastures, it is probable that there were 5-7 million reindeer in Russia about 1000-2000 years ago before reindeer herding began. This is at least twice as many as the maximum population of both wild and semi-domesticated reindeer in the 20th century. My estimate is based (i) on the assumption that wild reindeer use pastures

approximately twice as effectively as semi-domesticated reindeer and (ii) on analysis of 17th-18th century documents.

The geographic range of wild reindeer in Russia was characterised throughout most of the second half of the 20<sup>th</sup> century by the following features:

Most wild reindeer (about 85%) were concentrated in two large regions: in Taimyr and in northern Yakutia. The area of these two regions was not more than 15% of the total area occupied by wild reindeer in Russia. The distribution of the animals was continuous in these regions.

On the whole, the wild reindeer population area in Russia comprises tundra and forest-tundra zones the major part of the taiga and mountain-taiga areas in South Siberia. About 100-150 years ago the southern boundary of this area reached in the European part of Russia only 200-300 kilometres north of Moscow along the southern lower boundary of the taiga. In West Siberia, the southern boundary of this area went along the boundaries of taiga and forest-steppe. In East Siberia the zonal taiga part of this area stretched virtually down to the reindeer areas in the South Siberian mountains.

Already in the previous century, the range of wild reindeer lost its continuity within 85% of its terri-

tory (except Taimyr and northern Yakutia). Nowadays it has been broken down into numerous isolated areas which are becoming smaller and smaller. This process of insularisation is continuing. Simultaneously the general shape of the range is changing: in the European part of Russia and in West Siberia the southern boundary of the range has shifted far to the north. In Southern Siberia, a wide gap in the range has been formed around the trans-Siberian railway and adjacent territories where taiga has largely disappeared as a result of human influence.

In addition to the insularisation, areas of each separate population have become reduced in size and have even disappeared. On the whole, the number of wild reindeer has been decreasing in the major portion of the total range. A slight increase in the total number of wild reindeer in Russia can be accounted for by growth of the population in Taimyr and by the restoration of a large wild reindeer area in the Chukchi National District.

#### *The Taimyr population of wild reindeer*

At present the Taimyr wild reindeer population remains the largest in Russia and, maybe, in the world. In the last 20 years, the population has numbered about 500-600 000 reindeer. At present the aerial censusing of wild reindeer in the Taimyr population done previously by zoologists from Norilsk has virtually stopped. No accurate data are available. The population has probably increased to 700 000 animals.

Since 1971, this population has been exploited by a specially organised Taimyr State Hunting Economy which specialises in shooting wild reindeer. The population remained at a stable level despite intensive hunting of up to 60-80 000 reindeer a year. From 1971 to 1981 not less than 700 000 reindeer were shot in Taimyr and adjacent Evenkia and the western border of Yakutia where Taimyr wild reindeer overwinter (Syroechkovskii, 1986). The reindeer were shot mainly for procuring meat for the city of Norilsk and other local populations. For a certain period reindeer were also shot for velvet antlers. These antlers were used for producing the medicament 'Rantarin' which is analogous to 'Pantocrin'. The boom for antlers was soon over mainly because of the flooding of the market and subsequent decline in prices.

Wild reindeer from Taimyr are migratory. The distance between their calving places on the tundra and their overwintering places in the forest-tundra

and northern taiga can be up to 1500 kilometres. A favourable factor for the growth of the Taimyr reindeer population was the absence of competition between wild and semi-domesticated reindeer. There were never more than 130 000 semi-domesticated reindeer husbandry on the Taimyr Peninsula even when numbers reached a peak in the 1960s. Reindeer herding on Taimyr has declined under pressure from wild reindeer, which draw semi-domesticated reindeer away, and various social influences. At present in the Taimyr Autonomous District there are only a few tens of thousands of semi-domesticated reindeer left, owned mainly by Nenets near the western boundary of the District on the Yenisey's left bank. Reindeer herding in the central part of Taimyr has declined almost completely. The Dolgans have retained a small number of semi-domesticated reindeer. Nganasan reindeer herding has disappeared completely.

Ecological and economic control over wild reindeer on the Taimyr Peninsula has been lost in recent years. None but wolves and poachers hunt there now. These alone limit the population. Collapse is possible because of overgrazing. According to Kolpashchikov (1982) the carrying capacity of Taimyr is 820-850 000 reindeer. It cannot be excluded that epizootics, in particular anthrax, may spread there because in many places semi-domesticated reindeer which died of anthrax were buried, not burned. The infection can survive quite well in permafrost conditions and is capable of infecting animals many years later if the burial places are disturbed.

#### *The Yakut population of wild reindeer*

Many authors (e.g. Novikov, 1996) think that there are several populations in the Yakut Republic: the westernmost one is the Bulun population located in the Lena-Anabar interfluvium (50-60 000 reindeer); there is the Yana-Indigirka population (116 000 reindeer); the easternmost one is the Sundrun population located west of the river Alazeya (20-25 000 reindeer). Thus, the total number of wild reindeer in Yakut tundra in the mid-1990s is about 200 000 animals. There are about 50 000 more wild reindeer scattered in small isolated areas on the Yakut taiga. The above-mentioned Yakut tundra reindeer populations are actually remnants of an earlier geographically continuous tundra reindeer population that used to stretch from the River Anabar to the River Kolyma. Such was the situation in the 17th-18th centuries when there were not less than 600-

800 000 wild reindeer on the Yakut tundras (Syroechkovskii, 1986). In the 18th-19th centuries the largest North-Yakut wild reindeer herd which inhabited the lower reaches of the River Kolyma diminished gradually and by the 20th century it had virtually disappeared mainly because of the intensive development of Yakut and Even reindeer herding in this region.

The number of Yakut wild reindeer has grown a little in the last decades chiefly because of the decline of reindeer husbandry there. Yakut and Even reindeer herders think that the main reason for this decline was the leading away of semi-domesticated reindeer by wild reindeer. In my opinion, the principal causes were of social and economic character, including the break up of collective reindeer herding of the *kolkhoz* and *sovkhos* type. However, both factors may have operated: the leading away of semi-domesticated reindeer by wild reindeer was probably enhanced by the decline of effective herding.

Today there are approximately equal numbers of wild and semi-domesticated reindeer on the Yakut tundra. Yakut reindeer herding is continuing to decline. In the 1970s-1980s there were about 360-380 000 semi-domesticated reindeer in Yakutia. Now the number is about 200 000. Yakut reindeer herding is also declining in the taiga zone but competition between wild and semi-domesticated reindeer is much more intense on the tundra. Thus, at present there are about half a million wild and semi-domesticated reindeer of the tundra and forest type in Yakutia. The pasture reserves here are big enough and cannot restrict the numerical growth of these populations.

The future is difficult to predict. It is difficult to stop the decline of reindeer herding even though reindeer herders do all they can to eliminate wild reindeer. They resort to poaching: they shoot pregnant female reindeer and shoot reindeer from helicopters. There are grounds to suppose that it will be possible to stop the decline of reindeer herding when the *kolkhoz-sovkhos* reindeer herding has disintegrated completely and when private reindeer herding starts developing successfully. In some other parts of Russia this tendency is already quite clear - for example among the Nenets of the Yamal Peninsula and in the north of European Russia.

During the last decades, the main Russian regions inhabited by large wild reindeer herds were Taimyr and Yakutia Republic. But quite recently (in 1990-1998) a third large and quickly develop-

ing area of wild reindeer distribution has appeared in the Chukchi Autonomous District. The Chukchi Autonomous District used to be the largest area of large-scale reindeer herding and wild reindeer were almost completely ousted from this territory. In the 1970s-1980s, not more than 6-7000 wild reindeer remained there. These reindeer inhabited the central part of the Chukchi Autonomous District in the area of the almost inaccessible lake Elgygytgyn. The prognoses for the preservation of that small reindeer population were negative because of poaching. There was a plan to register the population as almost extinct in the Red Data Book of Russia.

After the collapse of large-scale reindeer herding in the Chukchi Autonomous District, which started in the late 1980s, and after the abrupt decrease in the number of semi-domesticated reindeer (from over 700 000 in 1981 to about 200 000 in 1998-1999), the pasture ranges have been deserted and many people have left the tundra. As a result, very favourable conditions have developed for the increase and dispersal of wild reindeer. This has led, in spite of a high rate of poaching, to the formation of a new, rapidly growing population of wild reindeer. In 1996 there were 40 000 reindeer there, in 1997 160 000, and in 1998 200 000. This trend is likely to continue.

## Trends in semi-domesticated and wild reindeer in Russia

### *Reindeer herding*

Up to now Russia has remained the country where about two thirds of the world's semi-domesticated reindeer exist. At present 13 aboriginal peoples in Northern Russia engage in reindeer herding. In the European part of Russia there are Sami, Nenets and Komi; in Siberia there are Nenets, Khanty, Mansi, Selkups, Evenks, Dolgans, Yakuts, Evens, Chukchi, Koryaks and Tuvinians. Five former reindeer herding peoples have given up reindeer herding: the Nganasans, Kets, Enetz, Yukagirs and Tofalars. Reindeer herding has declined among four peoples: the Selkups, Mansi, Dolgans and Tuvinians. It has declined significantly but less severely among the Komi, Sami, Khanty, Koryaks.

There is a tendency towards reduction of reindeer herding throughout the taiga zone, in particular among the Evenks and Evens. Thus we can see a general negative trend in the development of reindeer herding in Russia. Nowhere in Russia reindeer herding has achieved the high standards of prosperi-

ty typical for Scandinavia and for Norway in particular. The strongest and most developed traditional reindeer herding can be found only with Nenets people in the Nenets Autonomous District and on the Yamal Peninsula. Quite recently Chukchi reindeer herding, which had been completely efficient, underwent a rather unexpected but explicable disintegration (see above).

It is difficult to predict the development of reindeer herding in Russia. Ten years have passed since the fall of the system of collective reindeer herding in northern Russia. That system was inefficient and unpromising for northern peoples because it undermined their traditional way of life on the tundra and the taiga resulting in the elimination of their cultures. We see signs of change for the better in the gradual restoration of private reindeer herding among peoples who have managed to retain their culture in reindeer herding. This applies first of all to the Nenets and to a certain extent to the Chukchi. There are good prospects for reindeer herding among all peoples who are numerous enough and who have conserved the basis of their traditional way of life. Such peoples include the Khants, Evenks, Evens, Yakuts, Sami and the Dolgans. Of course, with this purpose in mind the Russian state should create at least some minimum preconditions for restoring the reindeer herding.

#### *Wild reindeer*

The prognoses for the largest wild reindeer populations on the tundra and, in particular, for Taimyr and Yakutia are different. While the Taimyr reindeer herding tends to dwindle and the organised hunting for wild reindeer tends to diminish, the wild reindeer population will grow until it reaches its limit determined by the pastures when the laws of self-regulation will take effect. The Taimyr population should not be allowed to exceed 800 000 reindeer (maybe a little more). If that number is exceeded there may be increased danger of epizootics, in particular anthrax.

The prognosis for the Yakut tundra wild reindeer population is less clear. As long as semi-domesticated reindeer herding is preserved in the Yakutian Republic wild reindeer population will remain in the state of stagnation. If reindeer herding continues to decline in Yakutia, the wild reindeer population will expand there and have the same fate as wild reindeer on the Taimyr Peninsula. In any case, the numerical growth of large wild reindeer popula-

tions can be regulated through organised hunting which Russians are very experienced at.

#### **Protection of wild reindeer in Russia**

Wild reindeer are simultaneously hunted and protected in Russia. The large populations need rationalised exploitation. Such are reindeer populations in Taimyr and in northern Yakutia. Protection measures for reindeer should consist in prevention of poaching and diseases and in observation of hunting rules and licensed hunting periods. A special service for the ecological control over each reindeer population should be established. The large and quickly growing Chukchi reindeer population should remain under strict control because not long ago it was nearly extinct. Today the three large populations number over 1 million reindeer.

The other vast areas occupied by this species in Russia are inhabited by only 200 000 wild reindeer. In total wild reindeer are spread over 24 regions of the Russian Federation (Table 3).

Out of these, three (Taimyr, Yakutia, the Chukchi area) have together over 1 million wild reindeer, while the other 21 regions of the Russian Federation have only a little over 200 000 wild reindeer. Of these other 21 regions, the chief ones are the Evenki area (60 000 reindeer) and the taiga zone of Yakutia (50 000 reindeer). In the latter two, the areas occupied by reindeer are not continuous but cover the major portion of the local territories. Here it is possible to hunt wild reindeer on a limited scale especially for supporting the economy of small northern indigenous peoples.

In other 20 regions there are few wild reindeer (Table 3, Fig. 4). Only seven regions have more than 10 000 animals (Archangelsk Region, Khanty-Mansi Autonomous District, Yamal-Nenets Autonomous District, Krasnoyarsk Territory, Irkutsk and Chitta Regions, Khabarovsk Territory). In the remaining 12 regions there are very few wild reindeer (from 500 reindeer in Tyva Republic to  $\leq$  3000 reindeer in seven regions (Nenets and Koryak Autonomous Districts, Komi and Buryatia Republics, Tomsk, Kamchatka and Magadan Regions) and to 3.5-7000 reindeer in the remaining five regions (Karelian Republic, Amur, Murmansk, Tyumen, Sakhalin Regions)).

Not included here are four regions of South Siberia (Altay-Sayan mountains) from which no data on the number of wild reindeer are available. These regions are Altay Republic, Khakassia

Republic, Altay Territory and Kemerovo Region. But we can most certainly say that in each of these regions there are not more than several hundred reindeer.

In all these 20 regions hunting wild reindeer should be prohibited and measures should be taken for protecting and restoring the populations. In particular, special reserves or refuges should be organised. On the Russian Federal level a number of measures have been taken for protecting small wild reindeer populations. All small populations of mountain and taiga reindeer in Altay-Sayan mountains have been registered in the Red Data Book of Russia since 1998. On the islands of Novaya Zemlya there is a special wild reindeer population (*Rangifer tarandus pearsoni*) which might be a subspecies of wild reindeer. It numbers about 5-7000 and is listed in the Red Data Book of Russia.

One should mention specially arctic island populations of wild reindeer the largest of which is on the Novosibirsk islands (up to 6000 reindeer). It is not sufficient at all to include only two wild reindeer populations in the Red Data Book of Russia. This does not solve the problem of protecting rare populations of a species. The Red Data Book of Russia should include a considerable number of rare and disappearing populations both on the periphery of the species' distribution and inside it. This will contribute not only to preserving and restoring the species as such but also to conserving its genetic diversity.

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