

Wild reindeer *Rangifer tarandus* (L.) in Chukotka¹

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Abstract: We reviewed historical records of the abundance and distribution of wild reindeer (*Rangifer tarandus* L.) in Chukotka and studied reindeer numbers, distribution and behavior from 1983 to 1993. There were large numbers of wild reindeer in Chukotka until the end of the eighteenth century, but during the nineteenth century the population declined probably from intensive harvest after the introduction of firearms by the Cossacks. During the nineteenth century herding of domestic reindeer also increased, and reindeer herders continued to hunt wild reindeer intensively. During the 1950s there were only about 8500 wild reindeer in two separate herds in Chukotka. By the late 1970s the wild reindeer population had increased to about 11 000. Ten years later we estimated 16 534 reindeer, and found only one contiguous population. Presently, the population calves and spends the summer in the Anadyr Uplands and migrates west and southwest to spend the winter in forest tundra and northern taiga regions. Predators, primarily wolves and brown bears, kill a significant number of calves. Today, the wild reindeer in Chukotka coexist with 300 000 domestic reindeer. However, current costs of gasoline and helicopters make it prohibitive to herd reindeer in much of central Chukotka, so that wild reindeer have room for expansion. Poaching is a major conservation problem. Poachers shoot wild reindeer from helicopters to obtain velvet antlers. Leaders of domestic reindeer cooperatives encourage poaching by telling people that wild reindeer are in fact just stray domestic reindeer and there is no enforcement of game laws.

Key words: caribou, population size, Russia.

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Introduction

Written information about the existence of a large population of wild reindeer *Rangifer tarandus* (L.) in Chukotka comes from reports by Russian travelers in the first part of the nineteenth century (Sarychev, 1802; Wrangell, 1841). However, pictographs of kayakers hunting wild reindeer were found on the Pegtymel River and these have been dated to the

second century B.C. (Dikov, 1989). Research on the Neolithic camps along the Anadyr River also show us that reindeer hunting was an important activity.

Large numbers of wild reindeer inhabited the Chukotka region until the end of the eighteenth century. During the nineteenth century they were subjected to intensive harvest with firearms brought by the Cossacks (Wrangell, 1841; Argentinov,

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Table 1. Numbers of domestic reindeer in Chukotka (from Dikov, 1989).

Year	Total number of reindeer
1933	395 000
1940	437 000
1946	414 000
1951	442 000
1955	408 000
1959	571 000
1970	553 000
1978	565 000
1980	540 000
1983	519 000
1985	464 000

1860; Maidel, 1894; Iochelson, 1898). Numbers of wild reindeer then decreased slowly (Sokol'nikov, 1927; Druri, 1949).

At the same time, the population of the domestic reindeer increased in this area. Reindeer herders shot wild reindeer and harvested them at river crossings. Until the 1930s, overhunting was an important reason for decline of the wild reindeer population (Table 1).

Until the 1960s, the existence of wild reindeer in Chukotka was a subject of scientific discussion. Some authors (Tavrovskiy *et al.*, 1971; Kichinskii & Flint, 1973) said nothing about wild reindeer. Others including Druri (1949) and Zaitzev (1966) wrote about the wild reindeer herd that inhabited the Main-Anadyr's valley. Zaitzev estimated their numbers at 1500 individuals.

Obukhov (1967), Egorova (1973), and Chernyavskii (1974) wrote about the small herds of wild reindeer on the upper reaches of the Anyi River. In addition wild reindeer were noted in the upper of the Rauchua, Yarakvaam, Ugatkyn and Enmyvaam Rivers (Chernyavskii, 1974).

These reports were the basis for Zhelesnov's (1980) belief that three isolated herds of wild reindeer were found in northeastern Siberia. In our opinion, these areas were inhabited by the formerly large herd of wild reindeer and were never isolated from each other.

During the time domestic reindeer decreased in Chukotka the number of wild reindeer increased (Table 1). The first reports of the growth of wild reindeer came in 1983 (Chernyavskii *et al.*, 1990).

Study area

The Anadyr Upland is the source of the Anadyr, Enmyvaam, Yurumkuvem and Ugatkyn Rivers. In the northern part, average height of the mountains is around 700 m, in the southern, around 1200-1300 m. The plateaux and the tops of the hills in the area are rocky, mountain tundra with lichens and *Dryas* spp. The gentle slopes and the parts of the river valleys are covered with tussock tundra, and taller willows and poplar (*Salix* spp. and *Chosenia* spp.) occur along the rivers. Permafrost polygons are found on the low-lying areas and meadows occur where annual snowfields form.

Tall willow and alder (*Alnus* spp.) are found on the Anadyr-Main Lowland. The floodplain is large and covers about 40% of the area. Horsetail (*Equisetum* spp.) meadows and sedge (*Carex* spp.) and grass meadows are developed here too.

The forest tundra of the Anadyr Lowland is the wet, tussock tundra, with Siberian Dwarf Pine (*Pinus pumila*) bushes and alder. The hills of the northern and southern parts of the Anadyr valley are covered with Siberian Dwarf Pine.

The northern taiga zone where the wild reindeer spend part of their winter is mostly a sparse mountain larch (*Larix sibirica*) taiga with lichens and Siberian Dwarf Pine on the lower elevations.

Materials and methods

We collected data and made ground observations on the numbers and distribution of wild reindeer during the following periods: April to October 1983, Anadyr-Main Lowland; April to October 1984, Anadyr-Main Lowland; July to August 1985, Anadyr Upland; September 1985, Anadyr-Main Lowland; June and July 1986, Anadyr Upland; July to October 1986, Anadyr Lowland; July to September 1987, Anadyr Upland; May to September 1988, Anadyr Upland; June to September 1989, Amguema River Drainage and Chukotkan Upland; June to October 1990, Oloi River Drainage; July and August 1993, Anadyr Upland.

An Antonov (AN-2) aircraft equipped with an aerial camera and four observers was used for aerial observations and counting reindeer. The aircraft was flown at 200 m above ground level at a speed of 150-160 kph. Reindeer were counted in a 1000 m strip on each side of the aircraft. Reindeer outside the strip were also counted. Reindeer groups were either photographed or counted visually. All counts

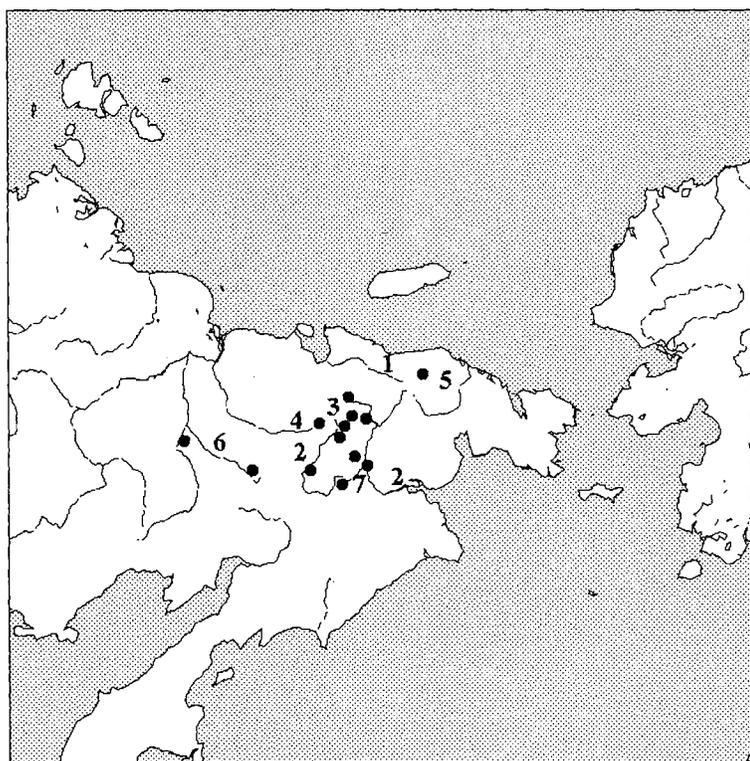


Fig. 1. Study area in eastern Siberia. 1. Pegtymel river. 2. Anadyr river. 3. Anadyr Upland. 4. Malyi Anui river. 5. Amguema river. 6. Oloi river. 7. Anadyr lowland.

were done in winter. In December 1985 we flew 3855 km; in April 1986, 6560 km; in April 1987, 7276 km; in October 1987, 9990 km.

Population estimates were made using two methods of extrapolation. In the first, the mean density of reindeer was extrapolated to the entire area over which transects were flown. In the second, the mean density was extrapolated to only the part of the area in which reindeer occurred.

We estimated the age and sex structure of the population from the ground with binoculars, and from analysis of scats of predators (30 wolf scats, 14 wolverine scats, and 148 bear scats).

We reconstructed historical migration routes by mapping old reindeer trails which were very distinctive in summer and fall.

Results and discussion

Population size

During the late nineteenth and early twentieth century, the formerly large population of wild reindeer in Chukotka declined probably as a result of over-

hunting by reindeer herders and conflict with increased herding of domestic reindeer. By the 1950s the population of wild reindeer was very low and was divided into two parts—about 7000 in central Chukotka and 1500 in the Anadyr-Main Lowland. The population has recently increased and coalesced into one herd with a single calving area in the central part of the Anadyr Uplands.

The number of wild reindeer in Chukotka has recently been subject to much discussion and some controversy. Novikov *et al.* (1980) first estimated 11 000 wild reindeer in 1977. Subsequently, the Regional Hunting Office in 1982–1983 estimated their numbers at 7000–9000 (Reports of the density estimation work of Anadyr State Hunting Office, 1982). At the same time, Zhelesnov (pers. comm.) estimated their number at 6000–7000 individuals. However, six years later

Kolpaschikov (1990) estimated their number at 32 000.

The large difference between the estimates of Kolpaschikov (1990) and other authors may be due to differences in census techniques. For mountain country with few reindeer the best method of estimation is to extrapolate only to areas in which reindeer are known to be distributed. This method was used on the Taimyr Peninsula by Pavlov *et al.* (1975), Pavlov & Borjgonov (1981), and Egorov & Popov (1970) in northern Yakutia.

In the present study we estimated 16 534 reindeer with the partial extrapolation methods of Pavlov *et al.* (1975) compared with about 30 000–32 000 with the complete extrapolation methods similar to those of Kuzmin *et al.* (1984) and Kolpashchikov (1990). We believe the latter method resulted in an overestimate.

Behavior

Wild reindeer in Chukotka have a main calving area in the central part of the Anadyr Upland. In summer they use the mountain tundra in this territory,

and fall and winter, like most wild members of the genus *Rangifer* they move to the forest-tundra and northern taiga regions.

In April wild reindeer prefer the melted southwest slopes with developed tussock tundra. During late winter mean group size averaged 25.3 ($n = 18$).

The main calving area of the wild reindeer is located in the central part of the Anadyr Upland, in the mountain tundra around the Elgygytgyn Lake and in the upper drainages of the Malyi Anui, Ugatkyn, Enmyvaam and Yurumkuvem Rivers. In this territory, the herds of the wild reindeer begin to concentrate in April and May. Here groups of reindeer prefer low hills with newly thawed snowless patches and calving begins at the time of active snow melting. Usually, approximately 50% of the tundra is free of snow by the time the first calves are born. In 1986 and 1988 the first newborn calf was observed on 31 May and the last on 13 June. The weight of the newborn calves ranged from 3.6 to 6.5 kg.

Wild reindeer begin to gather in big herds in early July. This period coincides with the emergence of mosquitoes, blackflies and the two bot fly species. The insects are probably one of the stimuli that cause reindeer to concentrate (Egorov, 1965; Yakushkin *et al.*, 1975; Syroechkovskii, 1986).

Big gatherings of wild reindeer usually travel fast, around 30 km in 24 hours. We noted two types of movement. The first, called «the rush» type of the movement, was typical of relatively small groups (300-1000 individuals). With this type of movement, the reindeer usually traveled about 4-5 km. During these movements they stopped little, only for 0.5 to 2 min in some places with green grass and water. After these movements, the reindeer often stopped for a long rest.

Another type of movement we called the «slow shift». It was typical for the largest gatherings, but occurred when aggregations were not dense. These movements were slower and reindeer moved in separated loose groups so that the direction of movement came from the local movements of various parts of the main group.

During summer movements, groups traveled in two major formations—the «columns» and «fronts» (Kretchmar & Aksenov, 1993). When in columns, reindeer traveled 6-10 abreast with large adult males in the lead and in the middle of the column and females with calves and young animals in the rear. «Fronts» were characterized by groups about 3-6 times wider than they were long. Males were

often in the lead in these movements as well with females and younger animals behind.

Wind direction determines the direction of reindeer movement. Reindeer generally moved into the wind, except for larger groups (> 70) which often moved with the wind. When reindeer occupy a restricted territory, as in Chukotka, this phenomenon can be one of the most important influences on the seasonal migration of the animals (Chernyavskii, 1974).

During the last two weeks of July aggregations of wild reindeer began to divide into smaller groups. The number of insects declines during this period. We observed the last large gathering on 28 July (more than 4000 individuals) (Kretchmar & Aksenov, 1993).

In August we observed only single reindeer or groups of just two or three animals in the central part of the Anadyr Uplands. From 10 August to 20 August they preferred to graze in wet parts of the valleys where fresh green grass was growing. Later most wild reindeer used dry lichen tundra on top of plateaux and on hills. During all of August reindeer showed no tendency to form groups and wind direction did not appear to influence the direction of travel.

At the beginning of September, the tendency of wild reindeer to form herds increased. Herds observed before the breeding season contained low numbers of large males (4%, $n = 881$). In two cases we observed only two large males in a herd of 200 and a herd of 250 individuals (Kretchmar & Aksenov, 1993). At that time many small herds (usually 8-12 in number) consisted of only large males.

The most important factor influencing wild reindeer migrations and distribution in a winter appeared to be snow cover. In November and December wild reindeer preferred snow-free tops of plateaux and hills. Group sizes ranged between 200 and 500. In March and April the wild reindeer preferred northern and northeastern slopes of the hills and mountains that had shallow snow. They seemed to prefer grazing not on the snow-free areas, but where the snow cover was 15-45 cm thick.

In September wild reindeer formed groups of 300-500 individuals. Cleaning of the antlers occurred in the second week of September. The males at this time become very active, and the most numerous contacts between wild and domesticated reindeer occur then.

The peak of rut occurred in mid October. At this time single males and small groups of adult males move from one band of females to another. During October there is a western and southwestern movement toward the boundary of forest-tundra zone.

Mortality

Mortality of the calves is high during the first month but the mortality rate varies from year to year and depends on weather and other factors. On 19 July 1985 the percentage of the calves in a group of 460 reindeer was 18.5%. Two years later, on 27 July 1987 a group of 1336 (12.3%) animals consisted of only calves. The subsequent year, at the end of July 1988, there were 26.5% calves in a group of 1339 reindeer.

Predators kill a significant number of calves. Seventy-nine percent of the wolves' scats gathered in the spring ($n = 30$) contained hair and bones of reindeer calves. Remains of reindeer were also found in bear and arctic fox scats that were gathered in spring. However, it is possible that these predators also eat carcasses of reindeer that die for other reasons.

Interactions with man and domestic reindeer

Twenty thousand wild reindeer in Chukotka must coexist with around 300 000 domestic reindeer. However, now that the costs of gasoline and helicopters have increased to the point that herders can no longer use the central parts of Chukotka, wild reindeer have more room for expansion. A major problem is the lack of law enforcement in Chukotka. Poachers take wild reindeer for velvet antlers from helicopters. The authors found headless wild reindeer lying on the tundra on 26 July while doing fieldwork. The leaders of reindeer herder's cooperative encourage poaching by claiming that wild reindeer are really just domesticated deer that have strayed.

Today we have no independent information about the numbers of wild reindeer in Chukotka. All estimation of numbers of Chukotka wild reindeer is under the control of the local government and local governments are interested in protecting the interests of the heads of reindeer herding cooperatives.

When domesticated reindeer join wild herds they tend to move separately at a distance of about 30-50 m from the main herd. The same behavior has been in other regions where wild and domesticated reindeer exist together (Zakharov, 1975). Thus, when domestic and wild reindeer are together, the num-

ber of wild reindeer can still be counted. At the present time wild reindeer appear to be trying to reestablish their old migration patterns but are impeded by man and domestic reindeer. In fall reindeer herders deliberately shoot all male wild reindeer they encounter to prevent them from breeding with domestic reindeer (Chernyavskii *et al.*, 1993).

References

- Argentinov, O. H. 1860. Reindeer east of the Lena region. – *Akklimatizatsiya* 1 (1): 20–33.
- Chernyavskii, F. B. 1974. Ecological and ethological factors determining the structure and dynamics of wild ungulates (Artiodactyla) on the margin of north-east Siberia. – *Theriology* 2: 106–111.
- Chernyavskii, F. B., Aksenov, V. V. & Kretchmar, M. A. 1990. Distribution and numbers of wild reindeer (*Rangifer tarandus* L.) in Chukotka. – *Ecology* (Russian Journal of Ecology).
- Chernyavskii, F. B., Aksenov, V. V. & Kretchmar, M. A. 1993. Breeding behavior of wild reindeer (*Rangifer tarandus* L.) in Chukotka. Pages 31–35. – *In: Ecology and Physiology of the reindeer*. Vladivostok.
- Dikov, N. N. (ed.) 1989. *The history of Chukotka from ancient times to the present*. Moscow, Mysl'. p. 487.
- Druri, I. V. 1949. *Wild reindeer of the Soviet arctic and sub-arctic*. Trudy Arkticheskogo Institute. Vol. 200. Izd. GUSMP, Moscow-Leningrad.
- Egorov, O. V. 1965. *Wild ungulates of Yakutia*. Nauka, Moscow. 258 pp.
- Egorov, O. V. & Popov, M. V. 1970. Counting the wild reindeer from the airplane. Pages 25–37. – *In: Methods of counting wildlife in Yakutia*. Publishing House of Yakutia, Yakutsk.
- Egorova, G. N. 1973. The landscapes and peculiarities of the distribution of wild mammals in the upper part of the Omolon Drainage. – *Biol. Problems of the North* 2: 36–58.
- Iochelson, V. I. 1898. *A sketch of the animal harvest and fur trading in the Kolyma Region*. Works of the Yakutian Expedition. St. Petersburg, Div. 3, Vol. 10, Part 3, 1898. 167 pp.
- Kichinskii, A. A. & Flint, V. E. 1973. The population of wild reindeer east of the Indigitka River. – *Bull. MOIP., Div. of Biology* 78 (1): 5–9.
- Kolpashikov, L. A. 1990. The number and distribution of wild reindeer in Chukotka. Pages 272–274. – *In: Wildlife resources of Siberia-game mammals and birds*. Novosibirsk, Nauka.
- Kretchmar, M. A. & Aksenov, V. V. 1993. Ecological aspects of the behavior of wild reindeer (*Rangifer tarandus* L.) in Chukotka. Pages 36–46. – *In: Ecology and physiology of the reindeer*. Vladivostok.

- Kuzmin, I. V., Khakhin, G. V. & Thelintzev, I. G. 1984. *Aviation in hunting management*. M. Lesnaya Promyshlennost (J. Forest Industry). 127 pp.
- Maidel G. 1894. *A journey to the northeastern part of the region of Yakutia, 1868-1870*. Addendum to Vol. 74, of works of the Empire Academy of Sciences, St. Petersburg. 599 pp.
- Novikov, B. V., Tarchov, V. S., Zhelesnov, N. K. & Bogatyr, V. S. 1980. *The distribution, numbers and structure of the wild reindeer populations in Magadan Region*. Nauka, pp. 97-98.
- Obukhov, P. 1967. Wild reindeer of the lower Kolyma River. – *Hunting and wildlife management* (5): 17.
- Pavlov, B. M., Yakushkin, G. D., Zyryanov, V. A., Kuksov, V. A. & Savelev, V. D. 1975. Peculiarities of census, population and population dynamics of wild reindeer in Taimyr. Pages 154-157 – In: E. E. Syroechkovskii. (ed.). *Wild reindeer of the Soviet Union*. Amerind Publ. Co. Pvt. Ltd., New Delhi (1984). 309 pp.
- Pavlov, B. N. & Borjgonov, B. V. 1981. Summer distribution and estimation of numbers of the wild reindeer of Taimyr. Pages 13-21. – In: *Ecology and fauna of the north Yenisey region*. Novosibirsk.
- Sarychev, G. A. 1802. *A journey to the northeastern part of Siberia, the Polar Sea and Eastern Ocean*. St. Petersburg. 187 pp.
- Sokol'nikov, N. P. 1927. Game mammals of the Anadyr region. – *Bull. MOIP., Biol. Div.* 36 (1-2): 117-162.
- Syroechkovskii, E. E. 1986. *The wild reindeer*. Agropromizdat. Moscow. 256 pp.
- Tavrovskiy, V. A., Egorov, O. V., Krivosheev, V. G., Popov, M. V. & Labutin, Y. V. 1971. *The Mammals of Yakutia*. Nauka. Moscow. 660 pp.
- Wrangell, F. 1841. *A journey on the northern coast of Siberia and the Ice Sea*. St. Petersburg.
- Yakushkin, G. D., Pavlov, B. M., Geller, M. H., Zyryanov, Savel'ev, V. D., Kuksov, V. A. & Borzhanov, B. B. 1975. Population and ecological characteristics and future study of wild reindeer of Taimyr. Pages 47-53. – In: E. E. Syroechkovskii (ed.). *Wild reindeer of the Soviet Union*. Amerind Publishing Co. Pvt. Ltd., New Delhi. (1984). 309 pp.
- Zaitzev, I. I. 1966. Wild reindeer in Chukotka. – *Hunting and hunting management* 8: 9.
- Zakharov, R. S. 1975. Wild reindeer of the Marmansk region. Pages 167-171. – In: E. E. Syroechkovskii (ed.). *The wild reindeer in the Soviet Union*. Amerind Publ. Co. Pvt. Ltd., New Delhi (1984). 309 pp.

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