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Results of the 2000 census of wild reindeer on the Taimyr Peninsula

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Abstract: We conducted a census of wild reindeer (Rangifer tarandus) on the Taimyr Peninsula during 21-25 July 2000. This was the eighteenth aerial population census of wild reindeer on the Taimyr since counts began in 1959. Prior to the census, we conducted reconnaissance flights to identify areas of reindeer concentration. After the reindeer became aggregated, we estimated group size both visually and by photographing the larger groups. Unusually hot and dry weather (temperatures of 25-30 °C) and a high density of mosquitoes during the census likely forced the reindeer to group into unusually large concentrations. In late July most of the reindeer in the Taimyr population were distributed in two groupings that contained at least 450 000 animals, and one area that contained about 110 000. Smaller groups found during the census and the estimated 43 000 resident wild reindeer that were not counted during the census brought the total minimum population estimate to about 1 040 000. The maximum number of wild reindeer present could have been as high as about 1 100 000.

Key words: aerial photography, caribou, Rangifer tarandus, Russia, weather.

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Introduction

The Taimyr population of wild reindeer (Rangifer tarandus) has shown considerable change since 1959 (see Pavlov et al., 1996). Since, the herd has continued to grow, and it is now considered the largest in the world.

Historically, the number, distribution, and migration of wild reindeer was documented from both air and ground observations (Andreev, 1961; Pavlov et al., 1996). During the first aerial surveys, biologists noticed the tendency of wild reindeer to concentrate in western and central Taimyr during mid- to late July. Biologists conducted total counts and/or photographed wild reindeer in these areas of aggregation, and conducted selective surveys to estimate numbers of reindeer that were dispersed in other areas. As the number of wild reindeer increased, counting them became more difficult, but biologists continued to rely on a combination of visual estimation and aerial photography. Biologists realized that the degree of aggregation was dependent on weather and insect abundance, and structured surveys accordingly. Precensus reconnaissance flights allowed biologists to locate areas of concentration and document migration routes. In this paper we present results of the 2000 census that was conducted during late July.

Methods

In preparation for the July census, we began documenting the distribution and movements of wild reindeer on the Taimyr Peninsula in early July with periodic flights in an AN-2 biplane and by contacting pilots who were also flying in the area. From 21-25 July we conducted a total aerial count (census) of wild reindeer on the Taimyr Peninsula using an AN-2 biplane. During the census large concentrations of wild reindeer were estimated visually and photographed with a large format camera. Photographs were counted later and compared with visual estimates. To derive the total estimate for reindeer in the Taimyr population, we also added results of previous surveys of resident caribou that live year-round in the mountainous parts of the Taimyr Peninsula and on the arctic tundra of the northern Taimyr Peninsula.

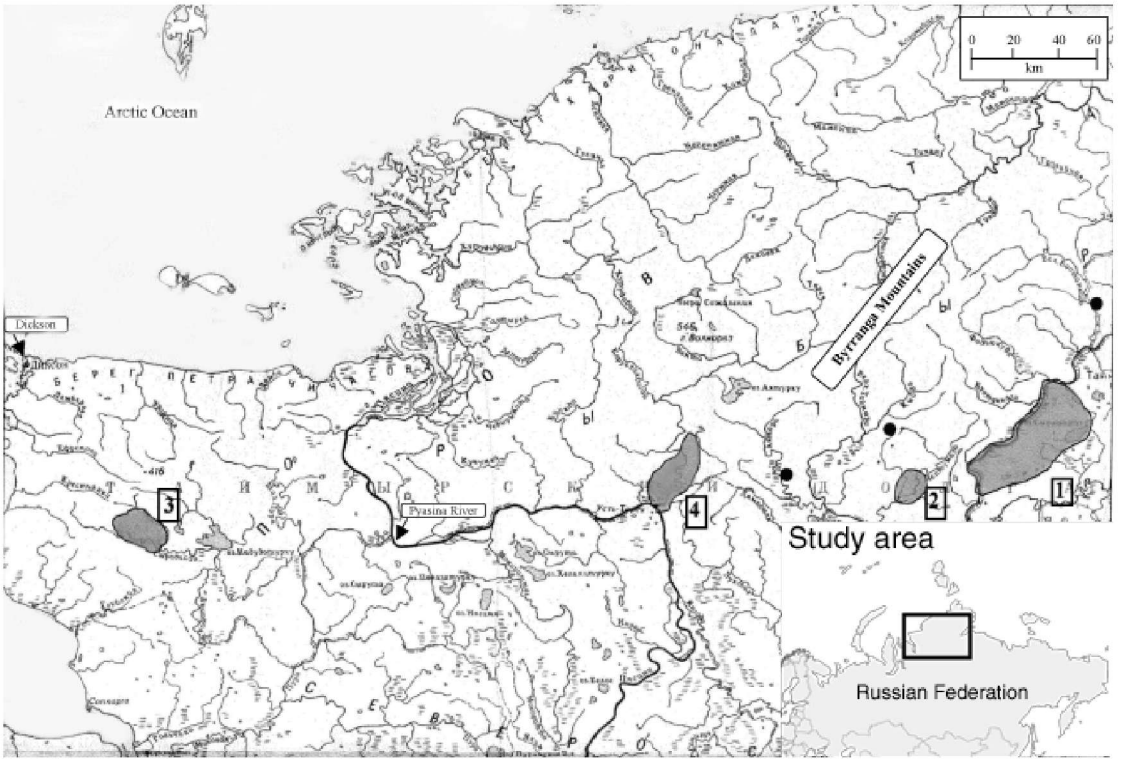

Fig. 1. Locations of concentrations of wild reindeer on the Taimyr Peninsula during 22-25 July 2000 (1 = Verhnetaimyrskaya, 2 = Deptumalskaya, 3 = Yeniseyskaya, 4 = Tareyskaya, ● = other, smaller groups).

Weather conditions during the second part of July were extremely favorable for an aggregation-type census; hot (25-30 °C) and dry weather prevailed, and mosquitoes were abundant. The wild reindeer moved north quickly and grouped into compact aggregations. During the third week of July 2000, wild reindeer were more concentrated than anyone had ever observed. This significantly simplified our census efforts. It was under these conditions during 21-25 July that we conducted the census.

Most of the largest groups found during the census were photographed and also repeatedly estimated visually. Photos were taken at 200-300 m altitude. We used Kodak high-speed color and black and white film. More than 1500 frames of black and white and color films were processed, and about 400 photos, measuring 18-24 cm, were prepared for counting and classification of reindeer by sex and age. During the census, different observers estimated caribou numbers in groups and observers agreed on a final estimate. Only counts of experienced observers were used. Aggregations were numbered and located on topographical maps. The aircraft circled repeatedly to allow observers to visually estimate the number of wild reindeer in the aggregations.

Results

Precensus movements and distribution

Biting insects began to appear in large numbers at the end of the first week of July with the coming of the very warm weather. In early July, reindeer in the central Taimyr began moving north to the area west of Taimyr Lake. On the western Taimyr, animals moved to the mouth of the Yangoda River and the middle fork of the Gorbita River. The hot weather and a high density of harassing insects hastened the formation of postcalving aggregations and caused the period of rapid movement to be earlier than normal. The rapid movement of groups of females with calves caused the death of large numbers of calves as they attempted to cross the larger rivers. By the end of the first week of July, calves composed only 20% of postcalving aggregations. In most years, during early July, calves make up about 40% of these groups.

The 2000 census

The 2000 census was unusually successful because of the prolonged period of extremely warm weather that occurred during the second half of July. Between 21 July and 25 July, 4 large areas of concentration were found on the northern Taimyr Peninsula. These areas were designated Verhnetaimyrskaya, Tareyskaya, Yeniseyskaya, and Deptumalskaya (Fig. 1). Three other smaller groupings (20 000-50 000) were found away from these areas. The degree of mixing between these areas during summer and at other times of the year is unknown.

Surveys began on 21 July, when the average density in the areas surveyed was about 700 reindeer/10 km^2. However, the animals were aggregating quickly, and during the following days (22-25 July), the reindeer became much more densely aggregated. During 22-25 July almost all of the Taimyr Peninsula was surveyed during flights that averaged 11 hours per day (with refueling in the field).

The highest density of reindeer was found in the environs of Syrutaturku Lake. This large concentration area was originally observed on 21 July and named Verhnetaimyrskaya (Fig. 1). By 22 July reindeer in this vicinity had coalesced into groups of 40 000-50 000 in 5 areas. The largest concentration area was Fadyukuda (still labeled as Vernhnetaimyrskaya on Fig. 1) where we counted about 300 000 reindeer. In another concentration area immediately to the west, Deptumalskaya, we counted 82 000-85 000 wild reindeer in 12 loose aggregations. This area was in the foothills of the Byrranga Mountains and in the Deptumala River valley. Also to the north and west we counted reindeer in 3 smaller concentration areas near the Kyida (10 000-15 000), Ayatari (35 000-50 000), and Bolshaya Bootankaga (10 000-15 000) Rivers. Thus, in the 5 concentration areas of central and eastern Taimyr on 22 July, about 445 000-473 000 reindeer were counted.

In addition to the location and counting of the 5 groupings of wild reindeer in the Verhnetaimyrskaya area on 22 July, we also observed another large concentration forming to the west (Tareyskaya, Fig. 1). We continued to monitor this group until 25 July when it became sufficiently aggregated for counting. This was the largest single aggregation of wild reindeer found and it numbered 440 000-450 000. Also on 25 July, on the far western Taimyr Peninsula, we found and counted another relatively large, concentrated group of reindeer that we designated Yeniseyskaya. We estimated this aggregation to number about 110 000-115 000.

Thus, during the counts of wild reindeer on 22 July and 25 July, we estimated the migratory portion of the Taimyr Peninsula wild reindeer population to be about 995 000-1 038 000. In addition to these migratory wild reindeer, we had previously estimated that there are about 35 000 resident wild reindeer that live year-round on the arctic tundra north of the Byrranga Mountains, and about 8000 that live in the mountainous portions of central and eastern Taimyr. In summary, therefore, we estimated the total number of wild reindeer in the Taimyr population to be between 1 038 000 and 1 081 000 individuals in 2000.

Discussion

The distribution of wild reindeer during the second part of July differed from previous years. The weather conditions which resulted in high phytomass early, followed by high numbers of biting insects, and then by drying and early plant senescence were the most likely cause of the change in distribution of wild reindeer. The 50-day drought (early Jul-late Aug) and extremely hot weather caused reindeer to remain in relatively high concentrations until the end of August. The hot weather also delayed the fall migration of reindeer from the north of the Peninsula to the south by almost a month.

Distribution of reindeer during the 2000 census was also unusually compact. Almost all of the aggregations occurred in the ecotone between typical and arctic tundra. Tundra areas to the south were devoid of reindeer. The fact that the reindeer immediately moved south after the hottest weather abated indicates that it was the unusually warm weather that forced them all toward the arctic tundra. Without the extreme weather conditions, it would be difficult to obtain an accurate estimate of the Taimyr reindeer population with the resources available. One of the most difficult aspects of an aggregation-type census is ensuring that groups do not mix before the census is complete (Davis et al., 1979). During the 2000 census, although 2 days elapsed between counts of the Verhnetaimyrskaya groupings and the 2 other large groups to the west, ongoing reconnaissance ensured that there was no mixing of groups counted on 22 July with those counted on 25 July.

Management implications

Although the total number of wild reindeer on the Taimyr Peninsula is probably at an all-time high and the entire population is increasing, some groups of reindeer may be overharvested. The discreetness of various groups of wild reindeer on the Taimyr Peninsula needs further study. If these groups remain

distinct from each other, throughout the year hunting must be more closely regulated to prevent overharvests of some groups and underharvests of others.

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