

INDICATOR
#02

Wild reindeer and caribou

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Girdwood, Alaska, USA Serdar Uckun/iStockphoto

Wild reindeer and caribou, *Rangifer tarandus*, are widely distributed around the circumpolar Arctic (Figure 2.1) where they play a key role in the environment, culture, and economy of the region. Their migrations often involve several hundred thousand individuals. Being sometimes so abundant, these medium-sized herbivores support a diversity of large- (grizzly bears, *Ursus arctos horribilis*) and medium-sized predators (wolves, *Canis lupus*, and wolverines, *Gulo gulo*), as well as scavengers. They are also an important part of the nutrient cycle in the Arctic. Terrestrial Arctic habitats are mostly nutrient-limited and reindeer and caribou [1], through their forage intake and output (i.e., fecal pellets [2]), could have complex and cascading effects [3, 4].

Caribou and wild reindeer have also been fundamental to the diversity and strength of aboriginal peoples. Many aboriginal people across the circumpolar regions have evolved with reindeer or caribou, and these animals have become part of their spiritual values, as well as their subsistence or commercial economies [6, 7].

Global warming is anticipated to have complex and interacting effects on caribou and wild reindeer. Climate and weather have a direct impact on most aspects of wild *Rangifer*

ecology through influences on forage quality, quantity, and availability, as well as influences on vulnerability to their predation and parasites. Other indicators of global warming, such as the timing of green-up, as well as lake or sea freeze-up and break-up, will impact the timing and routes for seasonal migrations and distribution. This, in turn, influences the availability of caribou and wild reindeer to harvesters. There are no simple answers as to how global warming will affect the persistence of wild *Rangifer* herds given regional diversity and herd histories.

Population/ecosystem status and trends

Currently wild reindeer and caribou have declined by about 33% since populations (herds) peaked in the 1990s and early 2000s (3.8 million compared to 5.6 million) which followed almost universal increases in the 1970s and 1980s. The declines are likely natural cycles, driven by continental and perhaps global atmospheric changes in combination with changing harvest practices and industrial developments [9]. Regionally, there is a tendency for herds to show a measure of synchrony in their phases of increase and decrease. For example, currently all seven of the major migratory tundra herds in Canada's Northwest Territories and Nunavut are declining

from highs in the late 1980s/early 1990s, with four of these herds having decreased by 75% or more in 2009 than in the 1990s. In neighboring Alaska, the two larger herds are declining including the well-known Porcupine herd, while two smaller coastal herds are still increasing from the 1970s.

More is known about the status of caribou in Alaska than elsewhere as monitoring is more frequent. Of Alaska's 24 southern and interior herds where trends are known, 16 are declining, six are stable, and two are increasing. In Nunavut, the status of the several smaller herds on the

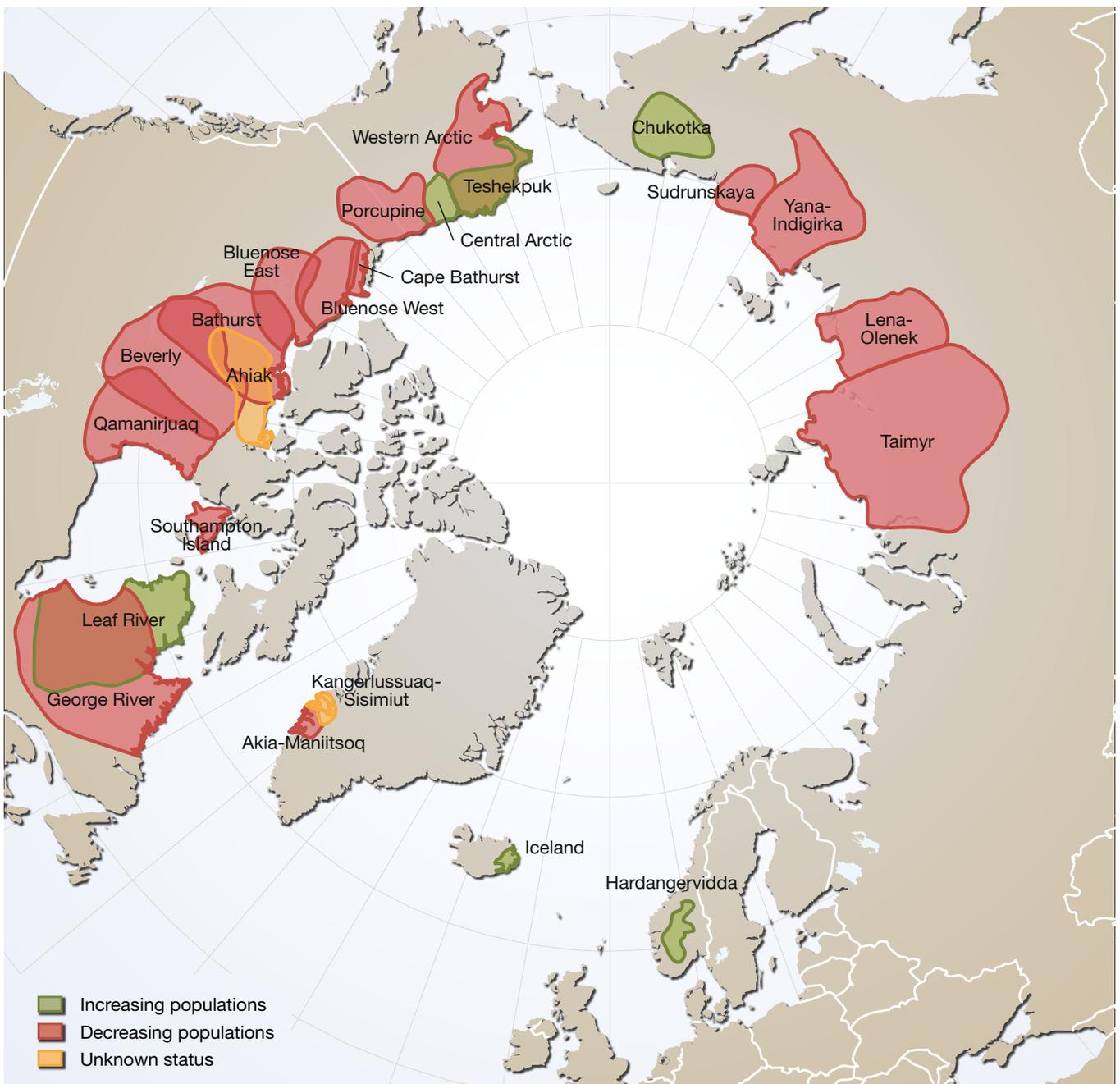


Figure 2.1: Distribution and observed trends of wild *Rangifer* populations throughout the circumpolar Arctic (from The CircumArctic Rangifer Monitoring and Assessment Network, CARMA [5]). Note: Wild boreal forest reindeer have not been mapped by CARMA and thus are not represented here.

northeast mainland and Baffin Island is unknown as the herds are not monitored. East of Hudson Bay, close to one million caribou in two herds occupy the Ungava Peninsula. As of the last population estimate, conducted in 2001, the George River Herd has declined while the Leaf River Herd has increased [10].

Canada is the only range for high Arctic Peary caribou, whose overall numbers have declined since 1961, including the loss of one large subpopulation [11]. The rate of decline has varied over time and between the different island populations, with few reversals in decline. Consequently, the Peary caribou is considered endangered in Canada.

One of the two major wild reindeer populations in west Greenland has declined from about 45,000 to 35,000 between 2001 and 2005, while the trend for the second major herd is uncertain. From a management and biological perspective, however, it may be desirable to reduce the size of this population due to a potential risk for overgrazing at the present population level. Neighboring Iceland's introduced wild reindeer have been increasing since 2000 with currently over 6,500 animals. Further east in Norway, mountain reindeer totaled about 25,000 animals in 2003 and the trend for the two largest herds is stable since then. In Finland, the numbers and ranges of wild boreal forest reindeer have been decreasing since 2000 after initial increases in previous decades. In Northern Russia, four of five major wild reindeer herds are declining while one herd, Lena-Olenyk increased as of a 2009 population estimate (Figure 2.2).

The major stressors contributing to recent declines vary between individual herds. Generally, *Rangifer* in the far north, notably the Peary caribou in Canada and the Arctic island reindeer in Russia, have been impacted by severity of local weather, primarily fall to spring icing [12]. For the migratory mainland herds, continental climate trends are implicated, with current climatic

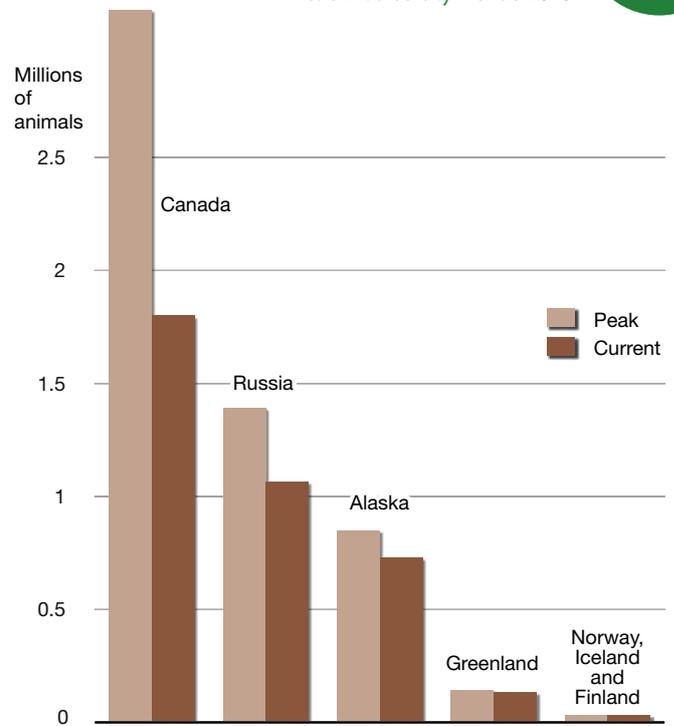


Figure 2.2: Wild *Rangifer* populations: population peak compared to today (millions of animals) [5].

changes likely exacerbating natural cycles and forcing lower population troughs and/or slowing the recovery period for some herds [9]. Increased human activity and industrial development are also implicated in the declines of many herds, particularly in the more southern ones [7]. The small mountain herds in Norway, for example, are affected by habitat fragmentation resulting from hydroelectric projects, roads, and recreational activities [13]. In Russia and western Alaska, the overlap between wild and domestic reindeer, with the subsequent loss of domestic stock, undoubtedly complicates or masks normal wild reindeer or caribou trends [7]. For all these herds, as population numbers decline, the impact of harvesting increases and in many cases may promote further declines and delay recovery.

Concerns for the future

The sheer numbers of wild caribou and reindeer, numbering in the millions, coupled with their historical resiliency, contributes to complacency about their future. However, given the changes taking place across the tundra, the recovery of most herds is not assured: recovery may be delayed or very slow, and some herds may disappear altogether. Habitat changes include a reduction in the size of tundra ranges through the expansion of roads, oilfields, and mining areas. At the same time, current and future climate-related changes occurring on the tundra will have interacting implications for the abundance of caribou and wild reindeer. These include the encroachment of the treeline and shrubs into the tundra and corresponding loss

of grasses, lichens, and mosses; increases in plant biomass and declines in plant nitrogen levels; increases in the length of the summer coupled with other changes, e.g., warmer summers; and changes in the timing of mushroom fruiting (an important fall food for caribou and wild reindeer).

There is also a need to integrate changes in predation from environmental changes (e.g., changing snow conditions), or changes in predation as alternate prey, such as moose and deer, move north. Those environmental trends set the context for the changing pattern of harvesting as technology and the socio-economic situation of northern people evolve as well.