

## Conflicts between reindeer herding and an expanding caribou herd in Alaska<sup>1</sup>

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*Abstract:* The reindeer industry has existed in Alaska since 1892. This industry has largely been concentrated on the Seward Peninsula, Alaska because suitable habitat has been available and caribou have been absent here for over 100 years. Until recently, reindeer meat and velvet antler production consistently generated millions of dollars in revenue critical to the economies of rural Alaskan communities. From 1976 to 1996 the Western Arctic Caribou Herd (WACH) increased from about 75 000 to 463 000 animals. Concurrently, seasonal range use of the WACH shifted westward onto traditional reindeer ranges of the Seward Peninsula. Reindeer herders lost 75-100% of their herds through commingling and out-migration with wild caribou. This loss of over 12 000 reindeer represents a potential economic value of 13 million dollars. Sustainable meat and velvet antler production and the economies of western Alaskan are likely to be affected by these changes.

**Key words:** economic loss, out-migration, *Rangifer tarandus*, reindeer herders, WACH.

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### Introduction

Historically, it has not been possible for domestic reindeer and wild reindeer (referred to as caribou in this paper) to coexist free of conflict when using the same ranges. Throughout much of the Soviet Union, Canada, and Greenland, domestic reindeer have been lost to commingling and emigration with caribou (Klein, 1980). Currently, a conflict between domestic reindeer and caribou is severely impacting the reindeer industry on the Seward Peninsula, Alaska. The Western Arctic Caribou Herd (WACH) has increased from about 75 000 animals in 1976 to approximately 463 000 animals in 1996 (Dau *et al.*, 2000). During this time, winter range of the WACH shifted west onto traditional reindeer ranges of the Seward Peninsula. Thousands of reindeer have commingled with migratory caribou groups and left the

Seward Peninsula in the last 15 years. This has significantly impacted the production and viability of the Alaskan reindeer industry.

The reindeer industry has existed on the Seward Peninsula since 1892. The reindeer population there has fluctuated over time but has never dropped below 15-20 000 animals (Stern *et al.*, 1980). By the late 1980s, 20-25 000 reindeer occurred in 14 herds on or neighbouring the Seward Peninsula (Blodgett *et al.*, 1993).

Today, most herders practice an extensive management style of loose herding. Snow machines enable herders to travel great distances in a short time so herding is based out of villages rather than out-camps. This type of management is characterized by sporadic herder contact that often results in the herd being unsupervised for extended periods when over-

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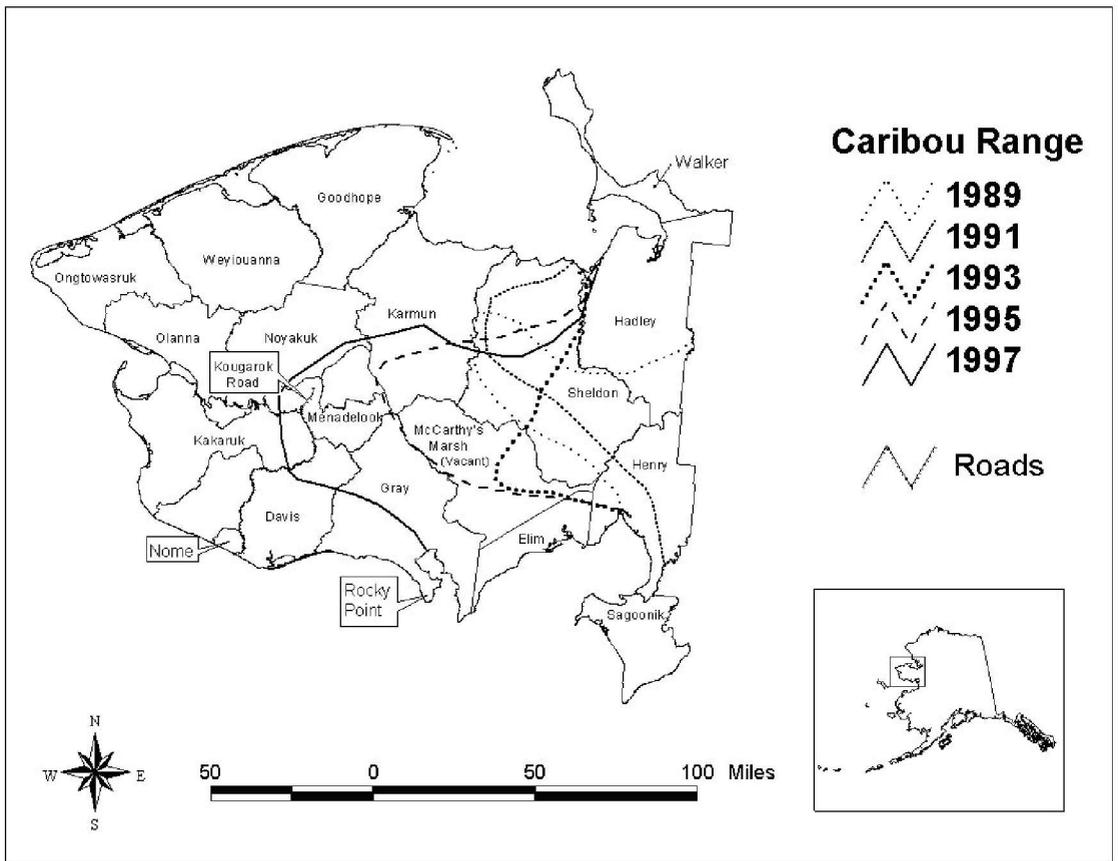


Fig. 1. Map of reindeer ranges and observed western extent of Western Arctic Caribou on the Seward Peninsula, Alaska.

land travel is difficult, or during mechanical breakdown of all-terrain vehicles. Unsupervised reindeer commingle with migrating caribou and emigrate from the Seward Peninsula. Reindeer have been observed with caribou 400 miles from their home ranges (Rose Fosdick, Director, Reindeer Herders Association, pers. comm.). Occasionally, some out-migrating reindeer will return to their traditional range but many do not return and probably succumb to predation, harvest by caribou hunters, and other factors (Klein, 1980). In addition, the presence of a small number of caribou in a reindeer herd will cause otherwise docile reindeer to become easily excited and difficult to herd (Nathan Hadley, reindeer herder Buckland AK, pers. comm.).

The herder not only incurs the present-day loss of reindeer and revenue due to caribou intrusion, but also lost yield of the herd for the future. Sustainable yield of reindeer on the Seward Peninsula is likely since they appear to have a good plane of nutrition and correspondingly high growth and reproductive rates. In some years as many as 40% of calves become

pregnant indicating the availability of excellent range resources (Prichard *et al.*, 1999).

This paper presents data on the direct and potential loss of Seward Peninsula reindeer to commingling and out-migration with the WACH.

## Methods

The Seward Peninsula reindeer industry is comprised of 14 ranges managed by local herders extending north to south from Cape Espenberg ( $66^{\circ}34'N$ ) to Egavik ( $64^{\circ}03'N$ ), and east to west from Wales ( $168^{\circ}03'W$ ) to the Inglutilik River drainage ( $159^{\circ}05'W$ ) (Fig. 1). Reindeer are brought into corral systems biannually where they receive veterinary care, velvet antlers are harvested, and demographic and nutritional status information is gathered and recorded into a central record keeping system. Total number of reindeer corralled annually is determined for each herd. The annual totals likely underestimate true herd numbers because animals are missed during the

gathering and moving of scattered groups across remote and rugged terrain to handling facilities.

The extent of caribou presence on the Seward Peninsula since 1991 was determined using reports of reindeer/caribou surveillance flights conducted by the Reindeer Herders Association (RHA), radio-tracking and reindeer surveillance flights conducted by the University of Alaska Reindeer Research Program (UAF-RRP), and observations by reindeer herders. In June and July 1999 a low altitude aerial survey was conducted to further assess the status of the reindeer herds and the presence of caribou on the Seward Peninsula.

## Results

From 1991 to 1995, major concentrations of wintering caribou shifted west from the eastern edge of the Seward Peninsula to extensively use the Hadley, Henry, Sheldon, and Karmun reindeer ranges, and the McCarthy's Marsh area (Fig. 1). By 1995, Hadley, Henry, and Sheldon had lost their entire herds to emigration with caribou.

In autumn of 1996 an estimated 90-100 000 caribou migrated through the central Seward Peninsula to the eastern edge of the Noyakuk range and were found as far west as the Kougarok road where hunters harvested caribou for the first time in over 100 years (P. Bente, unpubl. – 1997. Alaska Department of Fish & Game Caribou report: Reindeer Herders Association Annual Meeting, Nome, Alaska) (Fig. 1). Open water in rivers and lack of snow in October limited herder mobility in segregating their herds from the WACH. Sagoonick, Menadelook, Karmun, and Gray lost 50-75% of their herds to caribou (Table 1).

Caribou returned to the central Seward Peninsula during the winters of 1997 and 1998, and by summer of 1999 Menadelook, Karmun, and Sagoonick lost additional reindeer and could no longer economically justify corralling the few remaining reindeer on their ranges (reindeer herders Teller, Deering and Shaktoolik AK, pers. comm.). Gray retained a portion of his herd by segregating his animals on the peninsula extending to Rocky Point and using Golovin Bay as a caribou buffer zone.

The aerial surveys conducted during May, June, and July 1999 supported the corralling records and herder reports of missing animals. Few to no reindeer were located on the Henry, Hadley, Sheldon, Karmun, Sagoonick, and Menadelook ranges. Six

hundred reindeer from the Gray herd were found on Rocky Point.

Reindeer herders in areas used by caribou during winter have lost over 12 000 animals from 1987 to 1999 (Table 1) while adjacent herds on ranges with no caribou have experienced good herd growth (Prichard & Finstad, 1999). If the economic value of a reindeer is assumed to be \$550 U.S. (Renecker & Chetkiewicz, 1993), then the reindeer industry has

Table 1. Peak numbers and estimated losses of reindeer on the Seward Peninsula, Alaska.

Herds affected	Peak herd size	Year of peak herd size	Estimated herd size 1999	Losses - peak to current
Gray	2418	1993	600	1818
Hadley	2310	1987	0	2310
Henry	1397	1987	0	1397
Karmun	2155	1995	0	2155
Menadelook	1473	1995	0	1473
Sagoonick	1815	1992	0	1815
Sheldon	1582	1991	0	1582
Total	13150		600	12 550

suffered an economic loss of nearly 13 million dollars.

## Discussion

The intrusion of large numbers of caribou onto traditional reindeer ranges on the Seward Peninsula will have many consequences for the Seward Peninsula grazing system.

Reindeer are semi-domesticated animals tended for purposes of economic profit to communities that controls their numbers, social organization and grazing patterns. During much of the last 100 years the forage produced by ranges on the Seward Peninsula is converted into reindeer meat or velvet antler generating income for the reindeer industry. Long term sustainable yield of reindeer meat and velvet antler and a reliable source of income are likely if herds are managed properly with no degradation to rangeland (Karter & Dieterich, 1989). As caribou displace reindeer the grazing system converts from a stable food production process managed by local people to an unpredictable subsistence food source subject to the whims of migratory caribou and managed by agencies. As more Seward Peninsula forage is converted to caribou biomass the animal products do not generate income, a larger proportion of harvest and consumption occurs outside the region, and

potential human food is lost to predation and attrition. Local reindeer herders cannot protect or maintain their herds when large numbers of caribou are present on their ranges, thus reindeer will be eliminated from local rangeland. An established food production system in Alaska will disappear.

Range management plans are developed for all reindeer herds on permitted ranges on the Seward Peninsula. The Natural Resources Conservation Service, USDA and other land managers conduct utilization checks in each reindeer district to ensure that stocking densities of reindeer do not exceed carrying capacity. Plant communities of local rangeland, especially lichen stands, are monitored to prevent overgrazing. Now, lichen communities will be affected by uncontrolled grazing of large numbers of caribou. Depletion of the lichen reserves will decrease carrying capacity of the ranges for any future reintroduction of reindeer.

In Alaska, the influx of domestic reindeer into caribou herds may have altered the gene pool of caribou (Bailey & Hendee, 1926; Murie, 1944). Local people also believe that interbreeding of reindeer and WAC causes a genetic predisposition in caribou to return and colonize the reindeer ranges of the Seward Peninsula. In most cases it seems unlikely that there would be much genetic transfer. First, reindeer males are smaller than caribou males and are unlikely to compete successfully for breeding with caribou females during the rut (Klein, 1970; Mukhachev, 1975). Secondly, reindeer cannot travel long distances as efficiently as caribou so they fall behind and become separated from the main aggregation of breeding adults (Klein, 1980). Further, the calving season of reindeer precedes the calving season of caribou by 3-5 weeks; thus, reindeer will be dropping calves at the height of spring migration when the majority of female caribou are enroute to the calving grounds on the North Slope (Klein, 1980). Reindeer/caribou hybrid females drop calves 2-3 weeks prior to calving caribou females (Bill Hauer, Station Manager Large Animal Research Station UAF, pers. comm.). Early calves will be very conspicuous, vulnerable to predation and thus removed from the gene pool. In a study to investigate genetic similarities specific allele frequencies differ considerably between reindeer on the Seward Peninsula and WAC, which suggests gene flow has been limited between the two populations (Cronin *et al.*, 1995).

Reindeer owners with viable herds must adopt an intensive management plan if the WACH continues to winter on the Seward Peninsula. Herders must collaborate with state and federal agencies to track caribou movements and maintain tight control of their animals. Reindeer must be moved from areas

heavily used by caribou to secluded refuges. Identification of satisfactory reindeer refugia to provide segregation from caribou and adequate grazing resources will be critical. RHA and the UAF-RRP have initiated a radio-collaring and surveillance program to assist herders in tracking reindeer movements. The UAF-RRP is currently mapping seasonally critical habitats used by reindeer on the Seward Peninsula not used by caribou (G. Finstad, unpubl. – 1999. University of Alaska Reindeer Research Program Progress Report: Reindeer Herders Annual Meeting, Nome, Alaska). Traditional herding methods and information provided from these projects can be integrated using a Geographical Information System (GIS) to provide a tool for the reindeer herders to improve management of their herds to avoid losses to caribou.

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