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Expanded abstract

Comparative patterns of winter habitat use by muskoxen and caribou

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Reestablished muskoxen populations are currently expanding in northeastern Alaska, both in numbers and in areas occupied (Reynolds, 1989). Because muskoxen have dispersed westward into areas occupied by Central Arctic Herd caribou, chances for forage and habitat overlap between these two species have increased. The objectives of this study were twofold: (1) to quantify the extent of resource use overlap at muskoxen and caribou winter feeding sites (those areas where snow had been cratered by the animals to gain access to forage), and (2) to describe late winter habitat selected by dispersing muskoxen. Comparison of muskoxen and caribou feeding site characteristics, including snow depth, snow hardness, location, and types of vegetation in feeding craters, was used to assess resource use overlap. The % relative cover of vegetation at feeding sites was also quantified. Microhistological analysis of feces collected at the feeding sites will also provide an index to diet of the two species.

The study site was located in the Ivishak River drainage in northeastern Alaska. The Ivishak flows into the Sagavanirktok River, entering it approximately 95 km south of Prudhoe Bay. Both muskoxen and caribou overwinter in this area and were present during the late winter field studies in both years of the study. Feeding sites were located and marked in late March and April of 1990 and 1991. In 1990, 40 muskoxen and 36 caribou feeding sites were marked. In 1991, 40 muskoxen and 42 caribou feeding sites were marked. These sites were relocated in June and July of the same years. The size of the feeding sites varied due to variation both in group size of the animals and duration of the feeding bout in that particular area.

To measure snow depth and snow hardness, a rammsonde penetrometer was used. Measurements were taken on a straight line every 5 m from the center to the two opposing edges of the feeding site in a random direction. The same number of points measured in each half of the feeding site were taken in the area adjacent to each edge as well as in an area 100 m from each adjacent area. I then combined the measurements taken in each half into one value for feeding, adjacent and far, respectively. Crater data were collected from the first 10 craters closest to the line established in the feeding site. Fecal samples were collected at each feeding site.

The vegetative characteristics of the feeding sites were determined using a 10-point sample frame. Measurements were taken every 5 m along the same line established the previous winter.

Due to non-normality, all data were ranked prior to analysis. The variables used for multivariate analysis of variance (MANOVA) were selected by stepwise discriminant analysis. All

analyses were completed using SAS (1989). All results reported are preliminary. Analysis of 1991 data has not yet been completed.

No significant difference in snow characteristics was found in 1990. However, for 1991 a Mann-Whitney U Test indicated snow at muskoxen feeding sites and feeding craters was significantly deeper than at those of caribou ($p < 0.002$ and $p < 0.003$, respectively).

Feeding site snow and vegetation data were analyzed using MANOVA to compare differences based on animal (muskoxen and caribou), habitat (lowland/riparian and upland), and type area (feeding, adjacent and far). The variables selected by stepwise discriminant analysis were snow depth and hardness and the % relative cover of the following: *Salix planifolia* ssp. *pulchra,* moss, herbaceous plants, evergreen shrubs, *Equisetum* spp. and lichens. The overall MANOVA was highly significant ($p < 0.0001$, $n = 40$, $n = 38$ for muskox and caribou, respectively). Snow hardness ($p < 0.018$), and cover of *Salix planifolia* spp. *pulchra* ($p < 0.0001$) and *Equisetum* spp. ($p < 0.001$) were significantly related to animal species.

Feeding crater data were analyzed using MANOVA as well. Variables selected by stepwise discriminant analysis were *Salix* spp., herbaceous, grass and lichen. Again, the overall MANOVA was highly significant ($p < 0.0001$). *Salix* spp. occurrence in craters was greater for muskoxen ($p < 0.0001$, $n = 39$), and lichen occurrence in craters was greater for caribou ($p < 0.0001$, $n = 37$). Sedges had a high frequency of occurrence: 73% for muskox and 83% for caribou. However, the difference was not significant, and sedges were not selected by stepwise discriminant analysis for either MANOVA.

Some resource use overlap does occur in both snow and vegetative characteristics of feeding sites. Whether or not this overlap is significant enough to affect caribou or muskoxen is uncertain at this time. Extremes is snow conditions or higher densities of one or both species presumably could result in a greater degree of overlap in feeding site selection and forage use. Complete analysis of the data should reveal further similarities and differences in winter habitat use by muskoxen and caribou.

References

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