

Expanded abstract

Reproductive status of female muskoxen harvested on Banks Island, NWT., 1982 - 1991.

Paul Fraser, Bruce D. McLean and John Nagy

Department of Renewable Resources, Government of the Northwest Territories, Inuvik, NWT,
Canada X0E 070.

Rangifer, 12 (3): 159-160

Age of first breeding and frequency of breeding are good indicators of the nutritional status of a population. Calving by younger age classes is typical of rapidly increasing muskox (*Ovibos moschatus*) populations (Jingfors and Klein, 1982; Thing *et al.*, 1984). The muskox population on Banks Island has been expanding since the 1970s. An increase in age of first reproduction, decline in body condition and productivity, increase in incidence of disease, and lowered survivorship (density dependent effects) may manifest themselves with increasing population density. We hypothesize that as the muskox population increases on Banks Island there will be an increase in the age of first reproduction and in the proportion of adult females calving in alternate years.

Population estimate surveys were conducted on Banks Island in 1979, 1982, 1985 and 1989. Muskox numbers increased from $19,300 \pm 4100$ to $25,700 \pm 2100$ between 1979 and 1985 (Vincent and Gunn, 1981; McLean *et al.*, 1986): an annual rate of increase of 5%. Densities within the harvest area (SW Banks Island) increased from $0.08/\text{km}^2$ in 1982 (Latour 1985) to $0.21/\text{km}^2$ in 1985 (McLean *et al.*, 1986). The 1989 population estimate was $34,300 \pm 2400$, giving an annual rate of increase of 7% during

the period 1985 to 1989; density increased to $0.4/\text{km}^2$ (McLean and Fraser, 1991).

Rowell (1989) surveyed reproductive tracts of female muskoxen commercially harvested on southern Banks Island from 1982-1986. She documented calving among 2-year-olds in 1982 and 1983. Pregnancy rates of 92-100% in ≥ 4 -year-olds indicated that cows were producing calves in successive years. A significant decline in the pregnancy rate of 3-year-olds in 1986, coupled with a higher incidence of parasitism, led her to conclude these were density dependent effects. However, weather may also have been a factor as the 1985-86 winter was characterized by above average snowfall and late spring melt (Gunn *et al.*, 1991). A reduction in forage availability with prolonged snow and ice cover could account for the decline in body condition and lowered productivity, i.e. a density independent effect (Gunn *et al.*, 1991).

Six harvests were conducted on southern Banks Island between 1987 and 1991: May 1987, Nov 1987, Nov 1989 and April 1990, Oct 1990 and Feb 1991. Results were pooled from harvests conducted during the same breeding year (e.g. Nov 1989 and April 1990; Oct 1990 and Feb 1991). Animals were aged by tooth eruption and classed as 2, 3, or ≥ 4 year olds

Table 1. Percentage of Banks Island muskox that calved or were pregnant, 1982 - 1991.

Harvest interval	% pregnant by age class (n)		
	2	3	≥ 4
May/82	8 (12)	85 (13)	100 (19)
May/83	33 (6)	100 (9)	94 (34)
May/85	0 (8)	75 (4)	92 (13)
May/86	0 (10)	67 (12)	97 (71)
May/87	0 (9)	20 (5)	100 (26)
Nov/87	0 (1)	33 (3)	100 (16)
Apr/90	0 (11)	22 (23)	68 (47)
Feb/91	0 (37)	50 (52)	73 (108)
1982-1985	8 (26)	88 (26)	95 (66)
1986-1991	0 (68)	43 (95)	83 (268)

(Henrichsen and Grue, 1980). Reproductive status was determined by examination of uteri and animals were classed as pregnant, not pregnant, or recently calved (Rowell 1989). A chi square test for independence ($p \leq 0.05$) was used to compare pregnancy rates, within and between age classes, between the periods 1982-85 and 1986-91. These periods reflect the intervals between the 1979 and 1985 and the 1985 and 1989 population estimate surveys, respectively.

A total of 338 female reproductive tracts were examined during the 1987-91 commercial harvests. None of the 2-year-olds were pregnant ($n=58$); 1 set of twin fetuses was recovered from a 3-year-old ($n=83$) during the 1990 harvest. Annual pregnancy rates for 3- and ≥ 4 -year-olds fluctuated but declined overall. Some of the lowest pregnancy rates occurred in April 1990 after the severe 1988-89 winter (McLean and Fraser 1991).

Pregnancy rates of 3-year-olds did not differ significantly from ≥ 4 -year-olds during 1982-85 but were significantly lower than ≥ 4 -year-olds during 1986-91. Pregnancy rates of 3- and ≥ 4 -year-olds were significantly lower during 1986-91 than during 1982-85 (Table 1).

Lower pregnancy rates in recent years are a result of density dependent and density independent effects working in concert. With an increase in the age of first reproduction and the proportion of muskoxen calving in alternate years a slower rate of growth of the Banks Island population is anticipated.

References

- Gunn, A., Shank, C. and McLean, B. 1991. The history, status and management of muskoxen on Banks Island. - *Arctic* 44: 188-195.
- Henrichsen, P. and Grue, H. 1980. Age criteria in the muskox (*Ovibos moschatus*) from Greenland. - *Danish Review of Game Biologists* 11: 1-18.
- Jingors, K. T. and Klein, D. R. 1982. Productivity in recently established muskox populations in Alaska. - *Journal of Wildlife Management* 46: 1092-1096.
- Latour, P. B. 1985. Population estimates for Peary caribou and muskoxen on Banks Island in 1982. - *NWT Wildlife Service File Report* 49. 21 p.
- McLean, B. D., Jingfors, K. and Case, R. 1986. Abundance and distribution of muskoxen and caribou on Banks Island, July 1985. - *Department of Renewable Resources File Report* 64. 45 p.
- McLean, B. D. and Fraser, P. 1991. Abundance and distribution of Peary caribou and muskoxen on Banks Island, NWT. June 1989. - *Department of Renewable Resources File Report*, 29 p.
- Rowell, J. 1989. Survey of reproductive tracts from female muskoxen harvested on Banks Island, N.W.T., Canada. - In: P. E. Flood (Ed.), *Proceedings of the 2nd International Muskox Symposium, Saskatoon, Saskatchewan, Canada, 1-4 October 1987*. National Research Council of Canada, Ottawa.
- Thing, H., Henrichsen, P. and Lassen, P. 1984. Status of the muskox in Greenland. - *Biological Paper University of Alaska Special Report* 4: 4: 64-66.
- Vincent, D. and Gunn, A. 1981. Population increase of muskoxen on Banks Island and implications for competition with caribou. - *Arctic* 34: 175-179.

Manuscript accepted 15 January, 1992