SPRING CLASSIFICATION COUNTS OF THE BLUENOSE CARIBOU HERD MARCH 1988

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ABSTRACT

Classification counts of Bluenose caribou were conducted from 2 to 8 March 1988. The majority of caribou were concentrated in an area north of Simpson Lake and west across the Anderson River. The calf/100 1yr+ females ratio was 46.0 ± 0.61 (S.E. of the mean) using the Jackknife method to calculate the variance. The calf/cow ratio suggests high calf survival and good potential recruitment. Continued growth of the Bluenose Herd would be expected. We did not observe a determined migration of animals towards the calving ground. However, from tracks, previous radio-tracking and anecdotal information it appears that there was a general movement northwards and eastwards.

It is recommended that a study of mortality during the first two years of life and of the breakdown of the calf/cow bond be initiated. These data would help quantify the relationship between spring calf/cow ratios and true recruitment (into the breeding population).

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INTRODUCTION

The Renewable Resources Caribou Strategic Plan identifies annual spring composition counts of all major herds as a component of monitoring the population status. Composition data have previously been collected on the Bluenose Herd in 1983 (Williams and Elliott 1985), 1986 and 1987 (McLean and Heard 1991). Funding for the 1988 work came from the Renewable Resources Caribou Project (Yellowknife).

McLean and Heard (1987) suggested that a sample of approximately 30 groups of 100 animals each should give a reasonably precise estimate of the calf/cow ratio for NWT barren-ground herds. Our objective in March 1988 was to locate the major concentration of wintering Bluenose caribou and classify 30 groups.

METHODS

From 2 to 7 March 1988 we classified caribou from the ground where feasible or from a helicopter where tree cover, small lakes or small group size restricted our ability to land and classify from the ground. A radio-tracking flight on 19 Feb 1988 located a large concentration of caribou in the Simpson Lake area.

Groups were selected arbitrarily but the area was changed daily to spread out the sampling effort. We attempted to sample against the apparent movements of caribou to avoid double counting of animals and to sample for segregation of calves from cows. The classification methods were the same as previous composition surveys (Williams and Elliott 1985, McLean and Heard 1991). We used the Jackknife Method (Sokal and Rohlf 1981) to estimate the ratio and the associated variance of calves to 100 1 year plus females.

RESULTS

Small groups of animals and particular groups of bulls were widely distributed on the Bluenose winter range (Figure 1). The majority of caribou located in March 1988 were distributed in an area north of Simpson Lake across the Anderson River (Figure 2).

We classified over 4500 animals in 30 groups during an 8 day period (Table 1). The calf/100 1 yr.+ females ratio was 46.0 $\pm$ 0.61 (S.E. of the mean) and the mean group size was 157 $\pm$ 97 (SD).

Wolves were associated with the concentrations of caribou and a total of 15 were observed during the survey (at least 11 individuals, Table 2). The number observed per hour of flying was comparable with other surveys in the 1980s which have ranged from 0.05 wolves/hr to a high of 1.25 wolves/hr (Williams and Elliott 1985). Information from recent studies of wolves in the Inuvik Region suggests that these wolves are associated with the Bluenose caribou herd throughout the winter season (P. Clarkson pers. comm.).

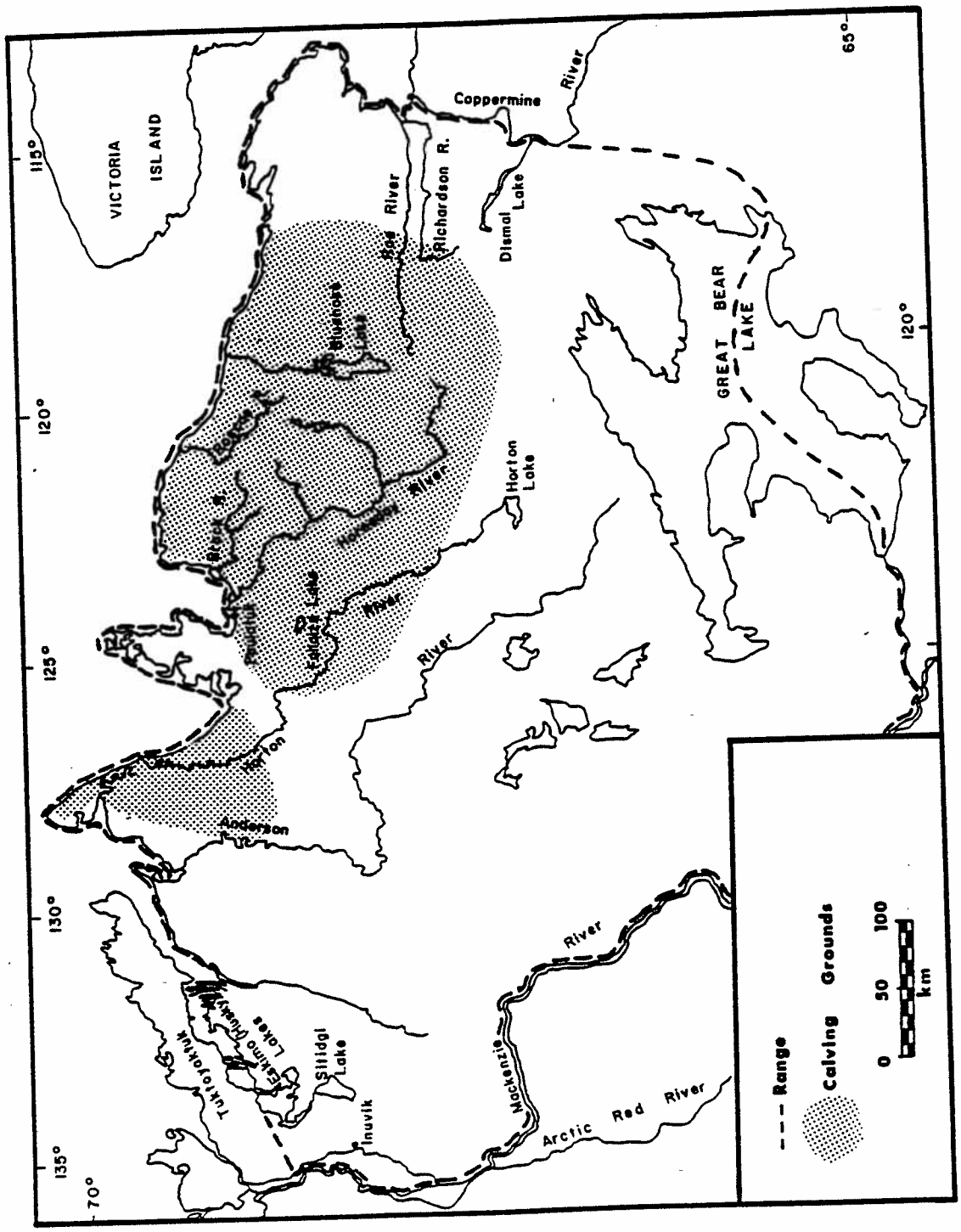

Figure 1. Range and general calving area of the Bluenose Herd, NWT.

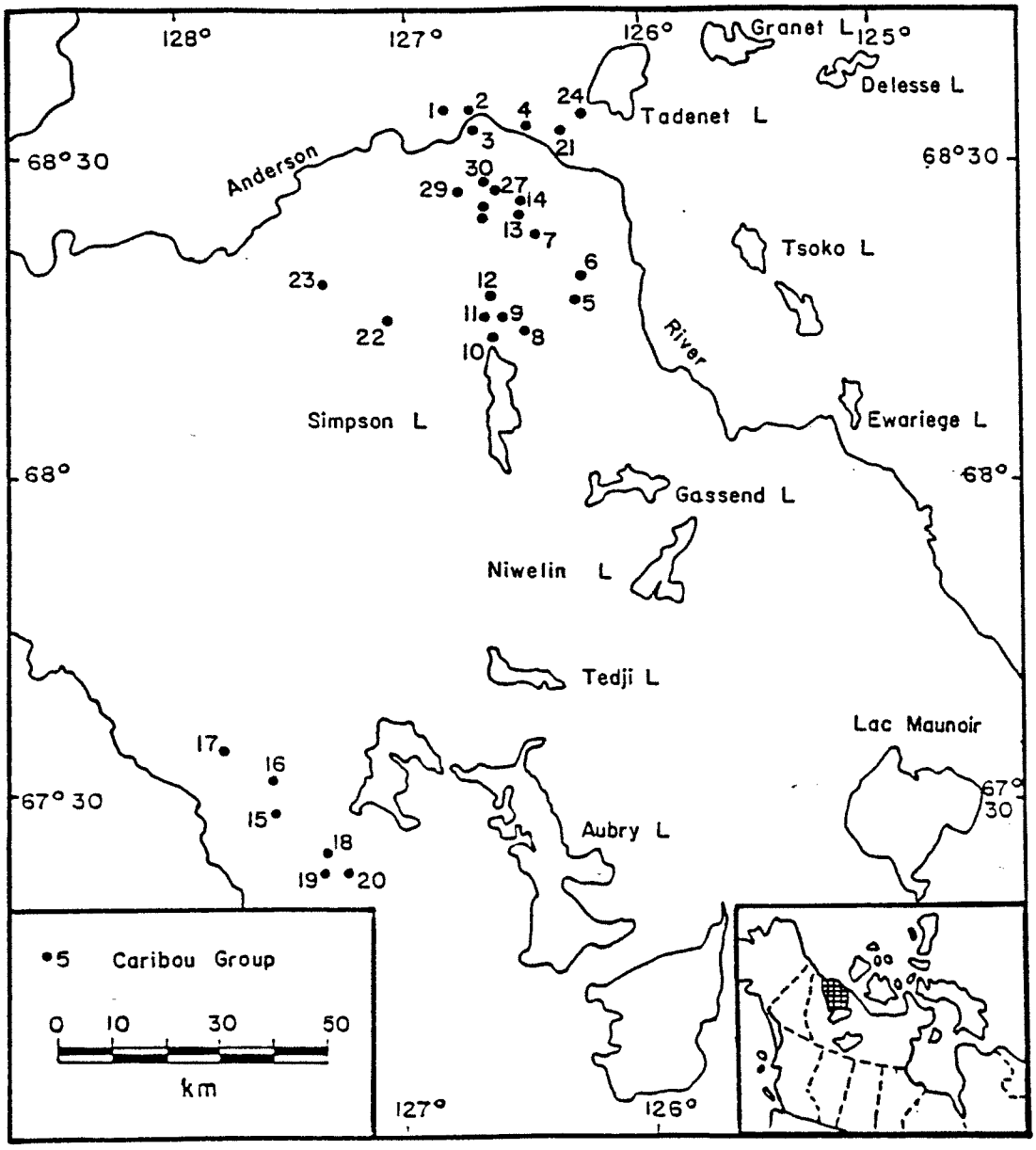

Figure 2. Locations of Bluenose caribou group classified during the composition survey, March 1988.

Table 1. Classification of Bluenose caribou, March 1988.

DATE	GROUP#	CALVES MALES	CALVES FEMALES	CALVES UNKNOWN	ADULT FEMALES	YRLG FEMALES	YRLG MALES	YOUNG BULLS	MATURE BULLS	TOTAL	OBSERVER
Mar. 2	1	5	5	10	70	0	2	3	0	95	BM
Mar. 2	2	12	4	10	52	2	4	10	0	94	BM
Mar. 2	3	3	9	9	55	3	5	3	0	87	BM
Mar. 2	4	20	11	16	123	16	7	15	0	208	BM
Mar. 2	5	42	17	34	182	18	26	92	1	412	BM/FJ
Mar. 2	6	1	10	17	88	5	0	11	0	132	BM
Mar. 2	7	13	9	52	193	13	12	25	0	317	BM/FJ
Mar. 3	8	4	12	44	154	15	3	23	0	255	BM
Mar. 3	9	8	8	39	148	14	7	34	0	258	BM
Mar. 3	10	0	6	16	53	5	2	21	0	103	BM
Mar. 3	11	26	10	57	141	16	9	55	4	318	BM/FJ
Mar. 3	12	5	7	9	50	9	3	10	0	93	BM
Mar. 3	13	14	7	22	81	4	10	37	0	175	BM/FJ
Mar. 3	14	0	4	44	73	8	2	19	0	150	BM
Mar. 3	15	1	-	26	84	8	0	11	1	131	BM
Mar. 4	16	6	6	24	53	12	7	43	27	178	BM
Mar. 4	17	2	4	3	6	1	8	19	3	46	BM
Mar. 4	18	17	22	19	39	6	29	142	18	292	BM/FJ
Mar. 4	19	2	0	13	17	3	5	63	40	143	BM
Mar. 4	20	4	1	3	6	0	6	17	10	47	BM
Mar. 7	21	0	0	0	0	0	0	4	8	12	BM
Mar. 7	22	9	9	46	81	8	15	37	1	206	BM
Mar. 7	23	2	0	0	2	0	0	12	6	22	BM
Mar. 7	24	3	4	27	90	9	5	7	0	145	BM/FJ
Mar. 7	25	12	13	34	83	9	15	33	0	199	BM/FJ
Mar. 7	26	0	4	20	73	10	0	9	0	116	BM
Mar. 7	27	9	3	23	45	7	7	19	1	114	BM/FJ
Mar. 7	28	9	4	9	56	5	7	21	0	111	BM/FJ
Mar. 7	29	6	10	8	27	0	1	9	1	62	BM
Mar. 7	30	2	2	11	22	1	5	12	0	55	BM/FJ
TOTALS		237	201	645	2147	207	202	816	121	4576	

Table 2. Wolf observations, Bluenose classification counts, March 1988

Date	Number of wolves	Location	Comments
2 March	5	S. Anderson R. 68 32 x 126 43	3 black, 2 grey (1 black collared)
3 March	4	68 17 x 126 38	grey / cream
3 March	4*	68 27 x 126 35	on kill, 2 black, 2 grey same group as 2 March?
4 March	2	67 15 x 127 20	grey colour, wounded caribou in area.
Total	15		

Wolves observed per hour flying = 15/33 or .45 wolves/hr.
* If same wolves on 2 and 3 March then .33 wolves/hr.

DISCUSSION

Spring classification counts are conducted annually if possible on all major mainland barren-ground caribou herds. The calf:100 cow ratio is a relative measure which can help interpret trends projected from population estimates which are usually available only every three years.

Previous studies of the spring composition of the Bluenose herd attempted to improve the sampling methods and statistical analysis (McLean and Heard 1987, 1991). It was recommended that a sample of a minimum of 30 groups of at least 100 animals per group gives an acceptably precise estimate of the calf/cow ratio and its associated variance.

The ratio of 46 $\pm$ .61 calves per 100 cows is lower than that of 1986 and approximately the same as calculated for 1987 (Table 3). The ratio suggests good calf survivorship from June 1987 through to March 1988. Annual calf mortality has not been determined for the Bluenose Herd but other work suggests that the majority of mortality occurs during the first 5 months of life (Davis et al. 1988). Late winter mortality can also be severe in years with deep snow or icing conditions (Skoog 1968). In some herds calf mortality during the first year is estimated to be greater than 50% (Bergerud 1980). Radio telemetry studies in Alaska suggest that annual mortality of yearlings (2nd year) is not significantly different from adult mortality (Davis et al. 1988).

Table 3. Composition of the Bluenose caribou herd, 1981 to 1988.

Date	Calves: 100 cows (% calves)	Yearlings: 100 adult females	Percent overwinter calf survival	Source
Feb. 1981[b]	(18)[a]	-	-	Carruthers & Jakimchuk 1981
Mar. 1983	44 (22)	18 (9)	59[b]	Williams & Elliott 1985
Mar. 1986	55 (26)	13 (5)	71 [b]	McLean & Heard 1987
Mar. 1987	45.8 (23)	14 (6)	75[b]	McLean & Heard 1987
Mar 1988	46 (24)	19 (9)	59[b]	This study

[a] Aerial classification by fixed-wing.

[b] Assuming 72 calves born per 100 cows in June (Parker 1972, Dauphine 1976) and female survival from June to March of 93% (Heard and Calef 1986)

The breakdown of the calf/cow bond and subsequent association of calves (mostly male calves) with bulls can seriously bias the calf/cow ratio if all segments of the herd are not represented (McLean and Heard 1991). Future work should attempt to determine annual mortality during the first two years of life and the timing of the breakdown of the calf/cow bond. This work could be modelled on some of the Alaskan caribou studies (Davis et al. 1988). Radio-collaring of cows and their newborn calves and monitoring mortality throughout the year would be the most effective method. Annual mortality data and an understanding of the timing of the breakdown of the calf/cow bond would permit us to make the connection between March calf counts and an estimate of the true recruitment of a cohort into the breeding population.

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PERSONAL COMMUNICATIONS

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Appendix A. Location, method and observer of groups classified during the March 1988 survey.

DATE	GROUP	NO. COWS	NO. CALVES	LOCATION	METHOD	OBSERVER
Mar. 2	1	70	20	68 35 x 126 50	Air	McLean
" "	2	54	26	68 34 x 126 43	Ground	McLean
" "	3	58	21	68 33 x 126 43	Air/Ground	McLean
" "	4	139	47	68 32 x 126 30	Ground	McLean
" "	5	201	93	68 17 x 126 17	Ground	McLean
" "	6	93	28	68 19 x 126 15	Air	McLean
" "	7	206	74	68 23 x 126 27	Ground	McLean/Jackson
Mar. 3	8	169	60	68 14 x 126 30	Air/Ground	McLean
" "	9	162	55	68 15 x 126 35		McLean
" "	10	58	22	68 13 x 126 38	Air	McLean
" "	11	157	93	68 15 x 126 38	Air/Ground	McLean/Jackson
" "	12	59	21	68 17 x 126 38	Air	McLean
" "	13	85	43	68 25 x 126 30	Ground	McLean/Jackson
" "	14	81	48	68 26 x 127 30	Air	McLean
" "	15	92	27	67 28 x 127 34	Air	McLean
Mar. 4	16	65	36	67 32 x 127 35	Air	McLean
" "	17	7	9	67 34 x 127 46	Air	McLean
" "	18	45	58	67 20 x 127 20	Ground	McLean/Jackson
" "	19	20	15	67 15 x 127 20	Air	McLean
" "	20	6	8	67 15 x 127 15	Air	McLean
Mar. 7	21			68 33 x 126 20	Air	McLean
" "	22	89	64	68 15 x 127 05	Ground	McLean
" "	23	2	2	68 18 x 127 20	Air	McLean
" "	24	90	34	68 34 x 126 15	Ground	McLean
" "	25	83	59	68 25 x 126 37	Ground	McLean
" "	26	73	24	68 26 x 126 37	Air	McLean
" "	27	45	35	68 27 x 126 36	Ground	McLean/Jackson
" "	28	56	22	68 26 x 126 37	Ground	McLean/Jackson
" "	29	27	24	68 27 x 126 45	Air	McLean
" "	30	22	15	68 28 x 126 40	Ground	McLean/Jackson

Appendix B. Calculations of age and sex composition.

Sex ratio of animals over 1 year old

816 young bulls + 121 mature bulls + 202 yearling males = 1139 1+ males
2147 adult cows + 207 yearling females = 2354 1+ females

% 1+ males = 1139/ (1139+2354) = 32.6
% 1+ females = 2354/(1139+2354) = 67.4

sex ratio = 33/67 x 100 = 49
1+ males:100 1+ females (Cochran 1977)

Percentage of calves and ratio of calves to 1+ cows

1083 calves/(1139 1+ males + 2354 1+ females) = 23.7%

calves/100 one yr+ females = 100 x 1083/2354 = 46 $\pm$ .61 (x $\pm$ SE)
(Cochran 1977)

Percentage of yearlings and ratio of yearlings to 2+ cows

Total yearlings = 409 (207 females + 202 males)
Total classified = 4576 (1083 calves, 1139 males, 2354 females)

Percentage of yearlings = 409/4576 = 8.9

yearlings/100 cows = yearlings/cows x 100
= 409/2147 x 100 = 19 $\pm$ .39 (x $\pm$ SE)

Survival of calves from birth to April

Assume a) initial calf production of 72 calves/100 females (Parker 1972) and
b) female survival from June 1987 to March 1988 of 93% (Heard and Calef 1979).

Y cows in June/87 x 0.93 = 100 cows in March/88
Y = 100/0.93 = 108. Therefore, 108 June cows = 100 March cows
72 calves/100 cows x 108 = 78 calves June/87
78 calves/100 June cows 46 calves/100 March cows
calf survival rate = 46/78 = 59%

Correction for unrepresented male segment

Brackett et al. (1982) found 73 1+ males/100 females (58% females) in fall 1978.
73/100 x 2354 1+ females = 1718 1+ males but we found 1139 1+ males, therefore, add (1718 - 1139) = 579 males
Total caribou = 4576 + (579 1+ males) = 5155

a) corrected % calves = 1083/5155 = 21
b) corrected % yearlings = 409/5155 = 8

Sex ratio of unclassified calves

Classified calves = 237 males/201 females = 201/(237+201) = 46.

645 unlclassified calves x 0.46 = 297 femles and 343 males (645 - 297).

Calf sex ratio = 237 + 348 males/201 + 297 females = 117 males/100 females.

Appendix C. Cost of March 1988 Bluenose class counts.

Item	Cost (x $1,000)
Radio tracking (4.9 hrs. C-310)	2.8
Helicopter (Bell 206B) 33hrs.	15.0
Fuel purchase (14 drums)	3.0
Fuel cacheing	5.5
Accommodation: Colville Lake	1.6
Inuvik	.3
Travel	.5
Food & supplies	1.0
Total	29.7

Appendix D. Field schedule: classification counts, March 1988.

Date	Activity	Weather	Personnel
1 March	Travelled to Colville Vaccinated dogs	Sunny, strong winds, -5^0 C	BM,FJ
2 March	Classification	Sunny, -10^0C	BM,FJ
3 March	Classification	CAVU, -15^0C,high cloud	BM,FJ
4 March	Classification Vaccinated dogs.	Fog in morning, over Simpson Lake	BM,FJ
5 March	Weather day. Attempted to fly but returned. Transcribed data.	Fog and low cloud in morning came down again in afternoon.	BM,FJ
6 March	Weather day. Transcribed data.	Fog and low cloud.	BM,FJ
7 March	Classification	Fog in morning. Clear PM -20^0C	BM,FJ
8 March	Weathered out. Vaccinated dogs. Returned to Inuvik.	Fog and low cloud.	BM,FJ