MOOSE POPULATION RESEARCH AND MANAGEMENT STUDIES IN THE YUKON

Summary of Aerial Trend Surveys for Moose in 1993

Cor Smits and David Bakica

Progress Report
PR-94-1

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January 1994

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ABSTRACT

This report presents the results of aerial trend surveys of the Fish Lake and North Canol areas conducted in November/December 1993. The Fish Lake trend area was surveyed from December 7-9 and a total of 38 moose were observed. Mature cows, mature bulls, yearlings, and calves comprised 47%, 39%, 0%, and 13%, respectively. The North Canol trend area was surveyed from November 30 - December 2 and a total of 99 moose were observed. Mature cows, mature bulls, yearlings, and calves comprised 38%, 48%, 2%, and 11%, respectively. The numbers of moose observed were similar in both areas relative to 1992. In both areas, calf survivorship of the 1992 cohort appears to have been low as evidenced from the lack of yearlings observed in 1993.

INTRODUCTION

During 1993, trend surveys for moose were flown in selected areas throughout Yukon for the sixth consecutive year. The Fish Lake and North Canol areas reported here have been surveyed annually since 1989. The original objective of this programme was to provide low-cost annual information on moose population trends in priority management areas (Larsen and Ward, 1990). However, the utility of trend surveys using the current technique (SASCB technique) (see Methods section) for accurately and precisely determining moose population trend has been questioned (M. McNay and D. Reed, Alaska Department of Fish and Game; pers. comm.). Alternative survey techniques, currently being developed by M. McNay and D. Reed (pers. comm.) and C. Smits (unpubl. data), are more reliable than the SASCB technique but more cost-effective than the Gasaway technique (Gasaway et al., 1986). Nevertheless, if the SASCB technique would prove to be an acceptable population trend indicator, it would, given its low cost, be useful in some moose management areas in Yukon. As a result, the focus of the trend survey programme is now to test whether the SASCB trend survey technique provides an acceptable indication of moose population trend in two areas: the Fish Lake and North Canol trend survey areas. This report presents the results of the surveys in these areas during 1993.

STUDY AREA

The Fish Lake and North Canol trend survey areas are composed of 13 and 18 sample units, and encompass 249.1 km^2 and 317.6 km^2 respectively. The areas were originally surveyed as part of regional moose censuses (Jingfors and Markel, 1987; Jingfors, 1988). Descriptions of the climate, topography, and

habitat are provided in Oswald and Senyk (1977), Jingfors and Markel (1987), Jingfors (1988), and Larsen and Ward (1991).

METHODS

The survey was done with a slow-flying aircraft in a selected contiguous block of the study area, the SASCB technique. A Maule M-7 aircraft was flown at 60-120 m above ground level at indicated airspeeds from 100-120 $km.hr^{-1}$. The entire area was searched at an intensity of about 2 $minutes.km^{-2}$. All moose observed were classified to sex (bull or cow) and age (adult, yearling or calf). For a more detailed description of the survey technique, see Larsen and Ward (1990).

RESULTS

A summary of the 1993 trend survey results is presented in the following sections. A more detailed presentation of the results by sample unit is provided in Appendices 1 and 2. Appendix 3 contains a breakdown of the 1993 survey costs.

Fish Lake

The Fish Lake trend area was surveyed from December 7-9 (Table 1). Average search intensity was 1.8 $min.km^2$ (S.E. = 0.06). Moose were observed at a rate of 1 moose per 12.0 minutes of survey time. A total of 38 moose were observed.

Mature cows, mature bulls, yearlings, and calves comprised 47%, 39%, 0%, and 13%, respectively. The recruitment rate calculated from the observed yearling and adult moose was 0 (Table 2).

North Canol

The North Canol trend area was surveyed from November 30 - December 2 (Table 1). Average search intensity was 1.8 min.km^2 (S.E. = 0.10). Moose were seen at a rate of 1 moose per 6.1 minutes of survey time. A total of 99 moose were observed.

Mature cows, mature bulls, yearlings, and calves comprised 38%, 48%, 2%, and 11%, respectively. The recruitment rate calculated from the observed yearling and adult moose was 0.02 (Table 2).

DISCUSSION

Total numbers of moose observed in both survey areas appear similar to those observed in 1992. When this year's North Canol survey is compared to the one of 1992, the most obvious difference appears to be the lack of yearlings in 1993 relative to 1992. In the Fish Lake survey area, no yearlings were observed this year, not different from 1992. The low survivorship of calves born in 1992 has also been observed in other survey areas across the Yukon and is possibly related to weather conditions during spring and autumn in 1992 (R. Ward, pers. commun.). The small number of calves in both areas is a reason for concern. However, conclusions about sex and age classes observed in both survey areas are bound to be inaccurate as even small shifts in moose distribution between years may have great impact on the numbers within these

sex and age classes. An obvious example is the number of mature bulls in this year's North Canol survey, 48 compared to 34 in 1992. The apparent 41% increase cannot possibly be attributed to an increase of mature bulls from the 'subpopulation.' Evidence of movements out of the study area just prior to the survey has been witnessed in the Fish Lake survey area in 1992 (Smits et al., 1993). In some sample units in the Fish Lake area where moose were observed in surveys prior to the 1992 survey, no moose were sighted again this year and it was suggested that moose might have been present there earlier in the autumn (D. Dennison, pers. commun.). A potential problem with the Fish Lake survey area appears to be their high altitude, generally above 3,500 ft. Between-year variation in seasonal movements out of this high altitude region may cause major fluctuations in the survey results without being representative of actual fluctuations in the number of moose in the region.

LITERATURE CITED

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Table 1. Observation frequency and sex/age composition of moose observed during trend surveys in 1993.

SURVEY AREA	AREA (km^2)	DATE	SEARCH INTENSITY ($min.km^2$)	MINUTES FLOWN PER MOOSE SEEN	COWS (≥18 mo)	CALVES (6 mo)	YEARLING BULLS* (18 mo)	MATURE BULLS (≥30 mo)	TOTAL MOOSE SEEN	TOTAL MOOSE DENSITY ($moose/km^2$)
Fish Lake	249.1	Dec. 7-9	1.8	12.0	18	5	0	15	38	0.15
North Canol	317.6	Nov. 30 -Dec. 2	1.9	6.1	39	11	1	48	99	0.31

* The number of yearling cows was assumed to equal yearling bulls, therefore, total yearlings = 2x yearling bulls.

Table 2. Sex and age composition ratios from 1993 trend surveys.

SURVEY AREA	% MATURE COWS (≥30 mo.)	% MATURE BULLS (≥30 mo.)	% YEARLINGS (19 mo.)	% CALVES (6 mo.)	MOOSE/100 MATURE COWS (≥30 mo)			RECRUITMENT RATE $\frac{\text{YEARLINGS}}{\text{YEARLINGS + ADULTS}}$
					CALVES	YEARLINGS	MATURE BULLS	
Fish Lake	47	39	0	13	28	0	834	0
North Canol	38	48	2	11	29	5	126	0.02

Table 3. Numbers of moose and sex and age composition ratios observed during aerial surveys in the North Canol and Fish Lake trend survey areas, during 1990-1993.

CATEGORY	TREND SURVEY AREA							
	NORTH CANOL				FISH LAKE			
	1990* (Oct.29-Nov.2)	1991** (Dec.7-9)	1992*** (Dec.6-8)	1993 (Nov. 30-Dec. 2)	1990* (Nov. 11-16)	1991** (Nov.25-Dec.2)	1992*** (Dec.1-5)	1993 (Dec.7-9)
Mature Bulls (≥30 mo.)	17	37	34	48	23	28	16	15
Yearling bulls (18 mo.)	8	8	19	1	11	6	0	0
Cows (≥18 mo.)	41	51	46	39	27	36	14	18
Calves	31	20	8	11	14	11	3	5
Bull/100 cows (≥30mo)	52	86	126	126	144	93	114	83
Calf/100 cows "	94	47	30	29	88	37	21	28
Yearlings/100 cows "	48	37	140	5	138	40	0	0
Recruitment rate	0.24	0.17	0.38	0.02	0.36	0.17	0	0
TOTAL	97	116	107	99	75	81	33	38

* from Larsen and Ward 1991
** from Smits, Hunter, and Bakica 1992
*** from Smits, Bakica, and Hunter 1993

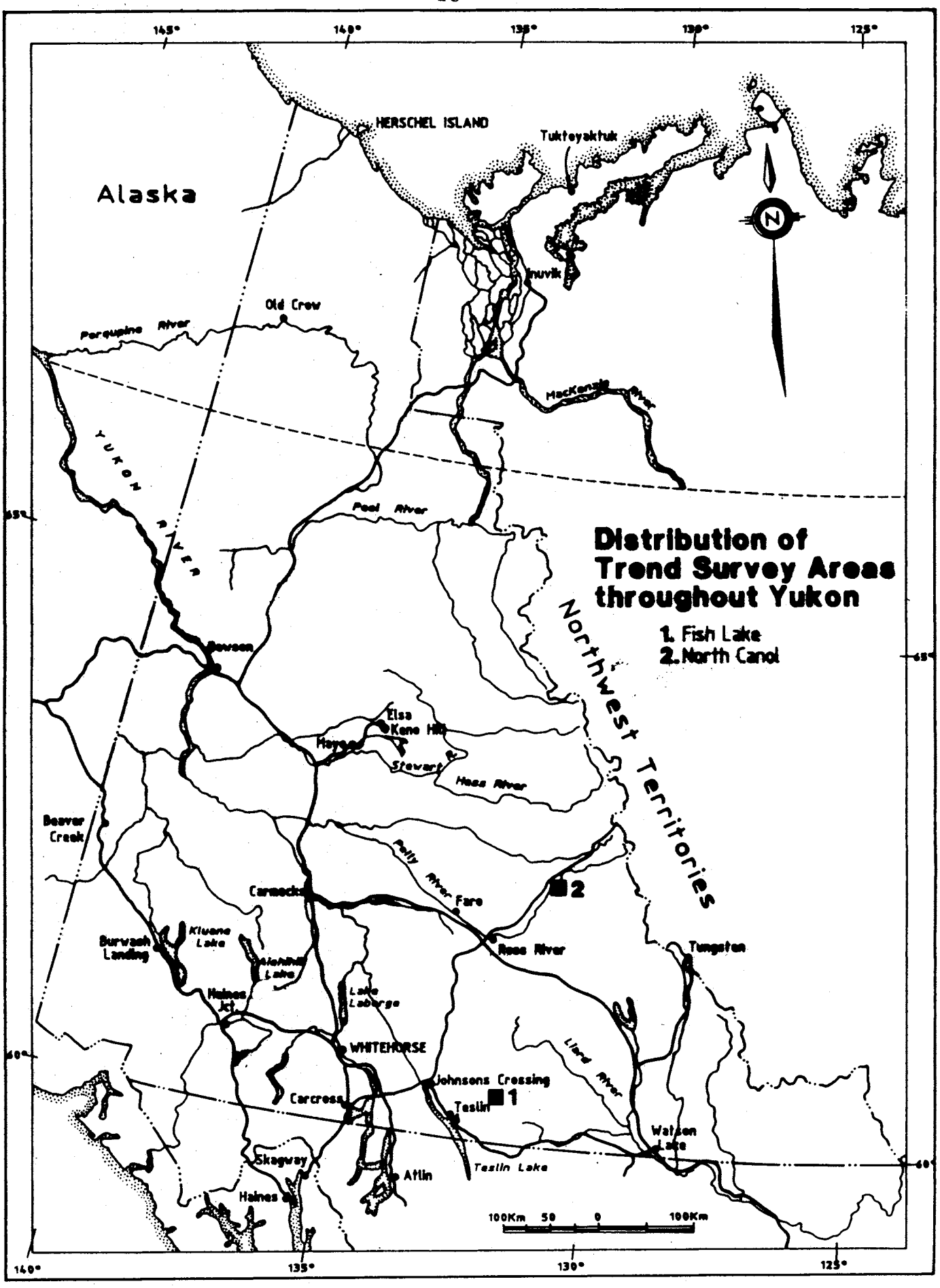
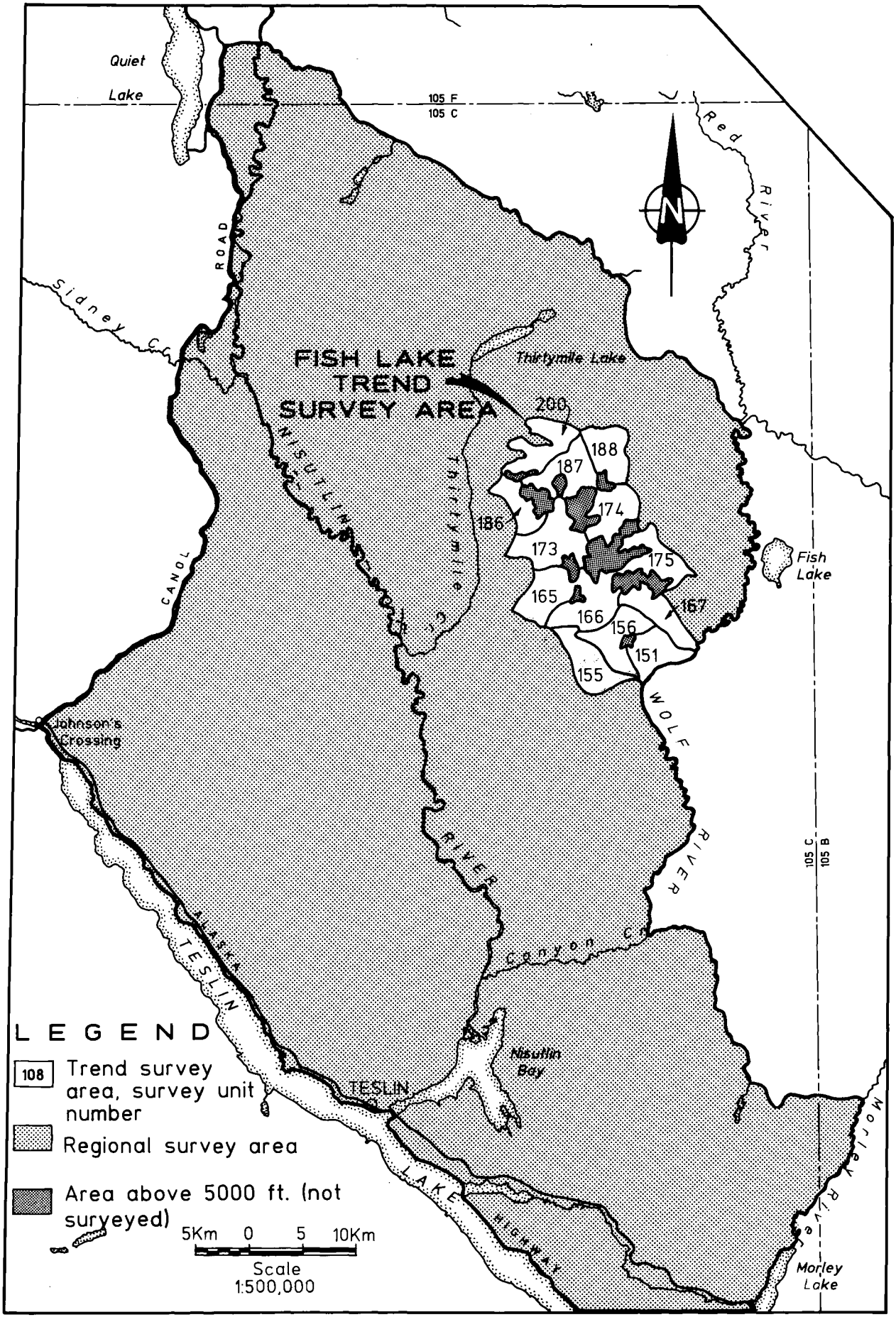


Fig. 1 Distribution of Trend Survey Areas in Yukon.

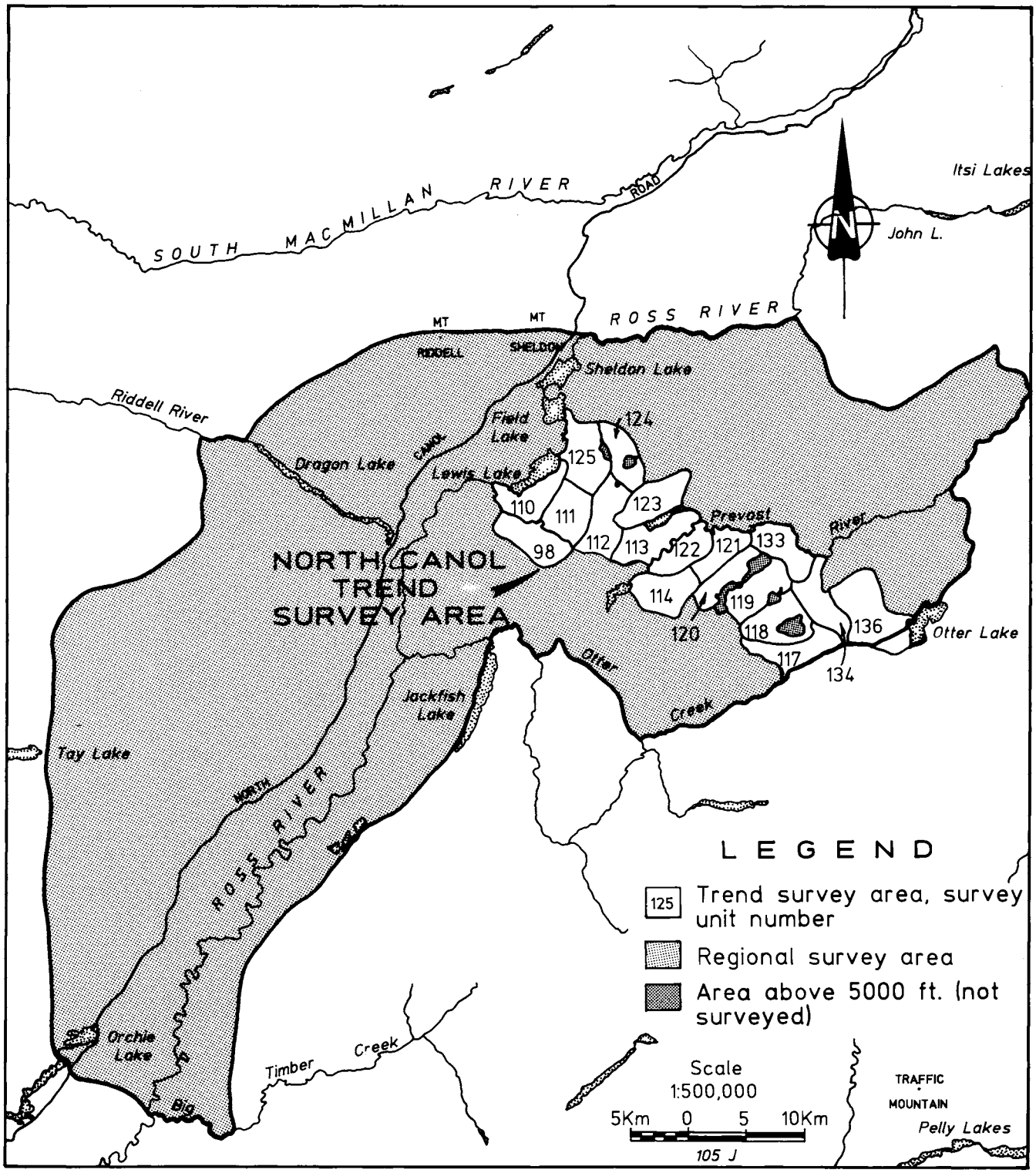
APPENDICES



Appendix 1a. Fish Lake trend survey area.

Appendix 1b. Survey results of the Fish Lake trend area, December 7-9, 1993.

SAMPLE UNIT	AREA (km^2)	SEARCH INTENSITY (min./km^2)	SEARCH TIME (min.)	LONE COWS	COWS WITH 1 CALF	COWS WITH 2 CALVES	YEARLING BULLS	MATURE BULLS	TOTAL MOOSE SEEN
151	16.6	2.0	33	1	1	0	0	0	3
155	28.2	1.7	49	1	0	0	0	1	2
156	26.4	1.4	37	4	0	0	0	1	5
165	19.9	2.1	42	1	2	0	0	0	5
166	17.9	1.4	25	0	0	0	0	0	0
167	17.9	2.1	38	0	0	0	0	0	0
173	19.2	1.7	32	1	1	0	0	0	3
174	18.1	1.9	35	2	0	0	0	1	3
175	19.7	2.0	39	0	0	0	0	0	0
186	14.0	1.9	27	2	1	0	0	5	9
187	15.5	1.9	30	1	0	0	0	0	1
188	17.6	2.0	36	0	0	0	0	7	7
200	18.1	1.8	33	0	0	0	0	0	0
All Sample Units	249.1	1.8	456	13	5	0	0	15	38



Appendix 2a. North Canol trend survey area.

Appendix 2b. Survey results of the North Canol trend area, November 30 - December 2, 1993.

SAMPLE UNIT	AREA (km^2)	SEARCH INTENSITY ($min.km^2$)	SEARCH TIME (min.)	LONE COWS	COWS WITH 1 CALF	COWS WITH 2 CALVES	YEARLING BULLS	MATURE BULLS	TOTAL MOOSE SEEN
98	18.7	1.9	35	3	2	0	0	0	7
110	16.2	2.0	33	1	0	0	0	1	2
111	18.6	2.0	38	1	0	0	0	3	4
112	17.3	2.0	34	3	0	0	0	2	5
113	15.5	2.0	31	1	1	0	0	7	10
114	16.3	1.8	30	6	0	0	0	2	8
117	16.9	1.9	32	1	1	0	0	0	3
118	16.9	1.8	30	2	1	0	0	5	9
119	18.7	1.6	29	1	0	0	0	0	1
120	15.8	1.5	23	0	1	0	0	0	2
121	16.8	2.0	34	1	3	0	0	12	19
122	15.8	1.9	30	3	0	0	1	4	8
123	17.3	1.9	33	0	0	0	0	0	0
124	16.8	2.0	34	0	0	0	0	0	0
125	19.3	2.0	39	0	0	0	0	3	3
133	18.1	1.9	35	4	0	0	0	3	7
134	18.1	2.1	38	0	0	0	0	2	2
136	24.5	1.9	47	1	2	0	0	4	9
All Sample Units	317.6	1.9	605	28	11	0	1	48	99

Appendix 3. Summary of 1993 Trend Survey Costs.

Survey Area	Aircraft Type	Charter Rate	Hours Flown	Charter Cost	Fuel Cost	Food & Accommodation	Total Cost
North Canol	Maule M-7	$220.00/hour	15.8	$3,476.00	$477.75	$218.76	$4,172.51
Fish Lake	Maule M-7	$220.00/hour	10.5	$2,310.00	$315.00	$109.70	$2,734.70
Total				$5,786.00	$792.75	$328.46	$6,907.21