

MOOSE POPULATION RESEARCH AND MANAGEMENT STUDIES IN THE YUKON

Summary of Aerial Trend Surveys for Moose
in 1992

Cor Smits, David Bakica, Torrie Hunter

Progress Report
PR-93-2

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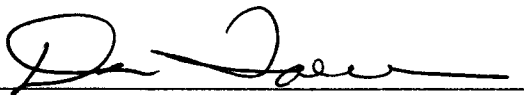
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ABSTRACT

This report presents the results of aerial trend surveys of the Fish Lake and North Canal areas conducted in December 1992. The Fish Lake trend area was surveyed from December 1-5 and a total of 33 moose were observed. Mature cows, mature bulls, yearlings, and calves comprised 42%, 48%, 0%, and 9%, respectively. The North Canal trend area was surveyed from December 6-8 and a total of 107 moose were observed. Mature cows, mature bulls, yearlings, and calves comprised 25%, 32%, 36%, and 7%, respectively. The Fish Lake survey yielded 59% fewer moose than the 1991 survey. The North Canal survey yielded 8% fewer moose than the 1991 survey with calves being the age class showing the greatest decline (60%).

INTRODUCTION

During 1992, trend surveys for moose were flown in selected areas throughout Yukon for the fifth consecutive year. The Fish Lake and North Canal 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 Canal trend survey areas. This report presents the results of the surveys in these areas during 1992.

STUDY AREA

The Fish Lake and North Canal trend survey areas are composed of 13 and 18 sample units, and encompass 249.1 km² and 317.6 km² 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 1992 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 1992 survey costs.

Fish Lake

The Fish Lake trend area was surveyed from December 1-5 (Table 1). Average search intensity was 1.6 min.km² (S.E. = 0.10). Moose were observed at a rate of 1 moose per 12.2 minutes of survey time. A total of 33 moose were observed.

Mature cows, mature bulls, yearlings, and calves comprised 42%, 48%, 0%, and 9%, respectively. The recruitment rate calculated from the observed yearling and adult moose was 0 (Table 2).

North Canal

The North Canal trend area was surveyed from December 6-8 (Table 1). Average search intensity was 1.9 min.km² (S.E. = 0.07). Moose were seen at a rate of 1 moose per 5.5 minutes of survey time. A total of 107 moose were observed.

Mature cows, mature bulls, yearlings, and calves comprised 25%, 32%, 36%, and 7%, respectively. The recruitment rate calculated from the observed yearling and adult moose was 0.38 (Table 2).

DISCUSSION

The most striking difference between this year's survey and previous surveys was the substantial decrease in observed moose numbers in the Fish Lake survey area (Table 3). Most sample units in this survey area that showed a decrease in moose numbers compared to last year showed more tracks than the moose observed were thought to be responsible for. It appeared that moose had moved out of the study area. It is not clear what caused this movement. Several factors were different this year relative to last year's survey conditions including snow accumulation (much greater last year), wind (much stronger this year), temperature (much lower this year), and period of survey (3-7 days later this year). Search intensity this year (1.6 min.km²) was also lower than last year (1.9 min.km²), however this was attributable to a decrease in the amount of time spent circling moose. It is not clear whether movement of

moose outside of the survey area, a population decline, or both were responsible for the low number of moose observed.

The number of moose observed in the North Canal survey area was intermediate to the number observed in 1990 and 1991. Compared to 1991, this constituted an 8% decline. Mature bulls, cows, and calves all declined since 1991 with calves showing the greatest decline (from 20 to 8, or 60%). Yearling bulls on the other hand showed a 138% increase (from 8 to 19) relative to 1991. Combined male and female yearlings would amount to twice the number of yearling bulls or 38. However, these could not have originated from the 20 calves observed in 1991 and it seems more likely that there was an influx of yearling bulls into the study area.

LITERATURE CITED

- Gasaway, W.C., S.D. DuBois, D.J. Reed, and S.J. Harbo. 1986. **Estimating moose population parameters from aerial surveys.** Biol. Pap. Univ. Alaska no. 22. 108 pp.
- Jingfors, K. and R. Markel. 1987. **Abundance and composition of moose in the Whitehorse south, Nisutlin and Liard east areas, November 1986.** Yukon Department of Renewable Resources, Unpubl. Report. Whitehorse. 55pp.
- Jingfors, K. 1988. **Moose population characteristics in the North Canal and Frances Lake areas, November 1987.** Yukon Department of Renewable Resources, Unpubl. Report. Whitehorse. 35pp.
- Larsen, D.G. and R.M.P. Ward. 1990. **Summary of Yukon moose population trend survey results, 1988 and 1989.** Yukon Department of Renewable Resources, Unpubl. Report. Whitehorse. 45pp.
- Larsen, D.G. and R.M.P. Ward. 1991. **Summary of Yukon moose population trend survey results, 1990.** Yukon Department of Renewable Resources, Unpubl. Report. Whitehorse. 35pp.
- Oswald, E.T. and J.P. Senyk. 1977. **Ecoregions of Yukon Territory.** Fisheries and Environment Canada, Victoria. 115pp.

Table 1. Observation frequency and sex/age composition of moose observed during trend surveys in 1992.

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. 1-5	1.6	12.2	14	3	0	16	33	0.13
North Canol	317.6	Dec. 6-8	1.9	5.5	46	8	19	34	107	0.34

* 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 1991 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 $\frac{\text{YEARLINGS}}{\text{YEARLINGS} + \text{ADULTS}}$
					CALVES	YEARLINGS	MATURE BULLS	
Fish Lake	42	48	0	9	21	0	114	0
North Canol	25	32	36	7	30	140	126	0.38

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 1990-1992.

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

* from Larsen and Ward 1991

** from Smits, Hunter and Bakica 1992

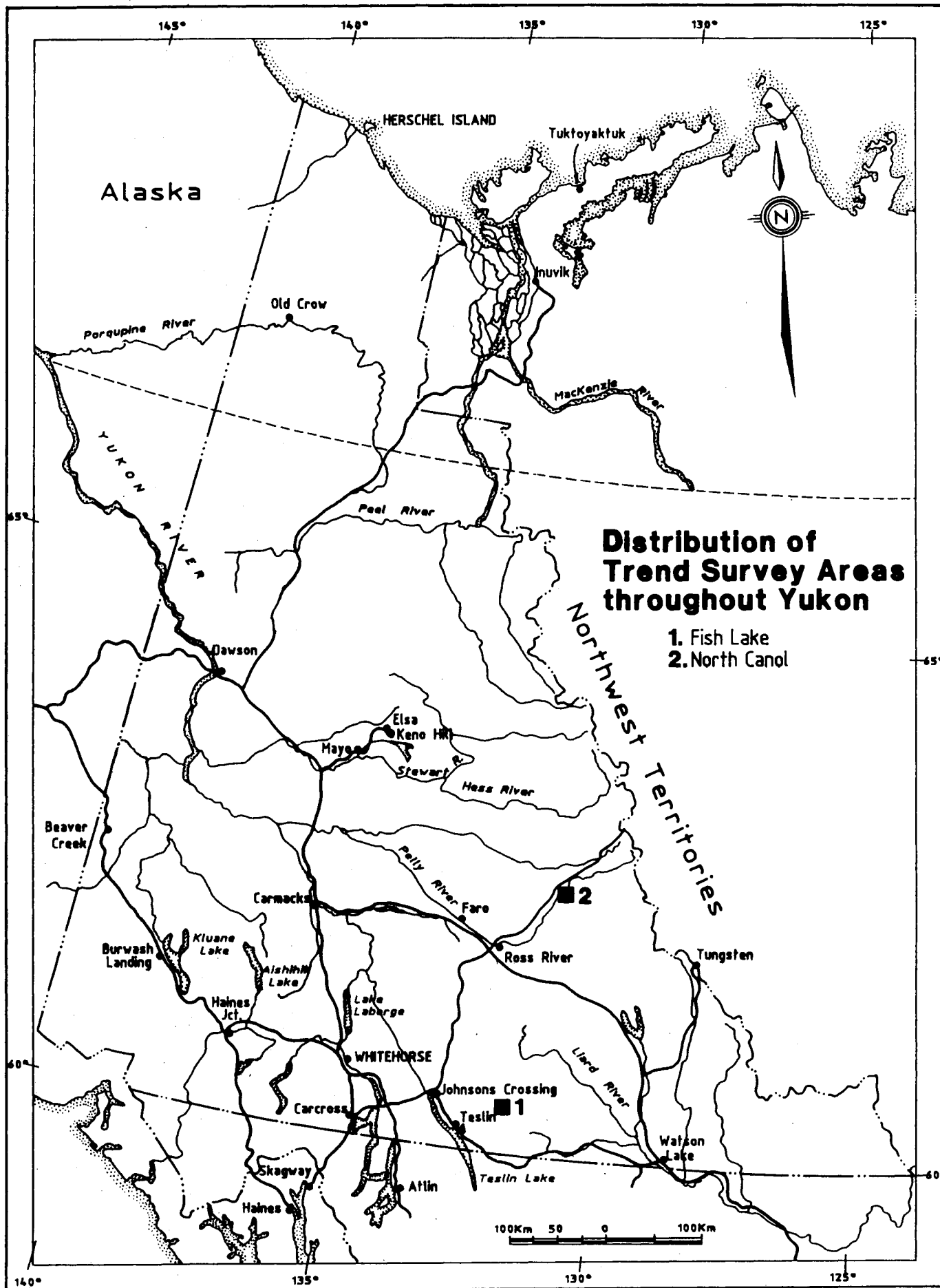
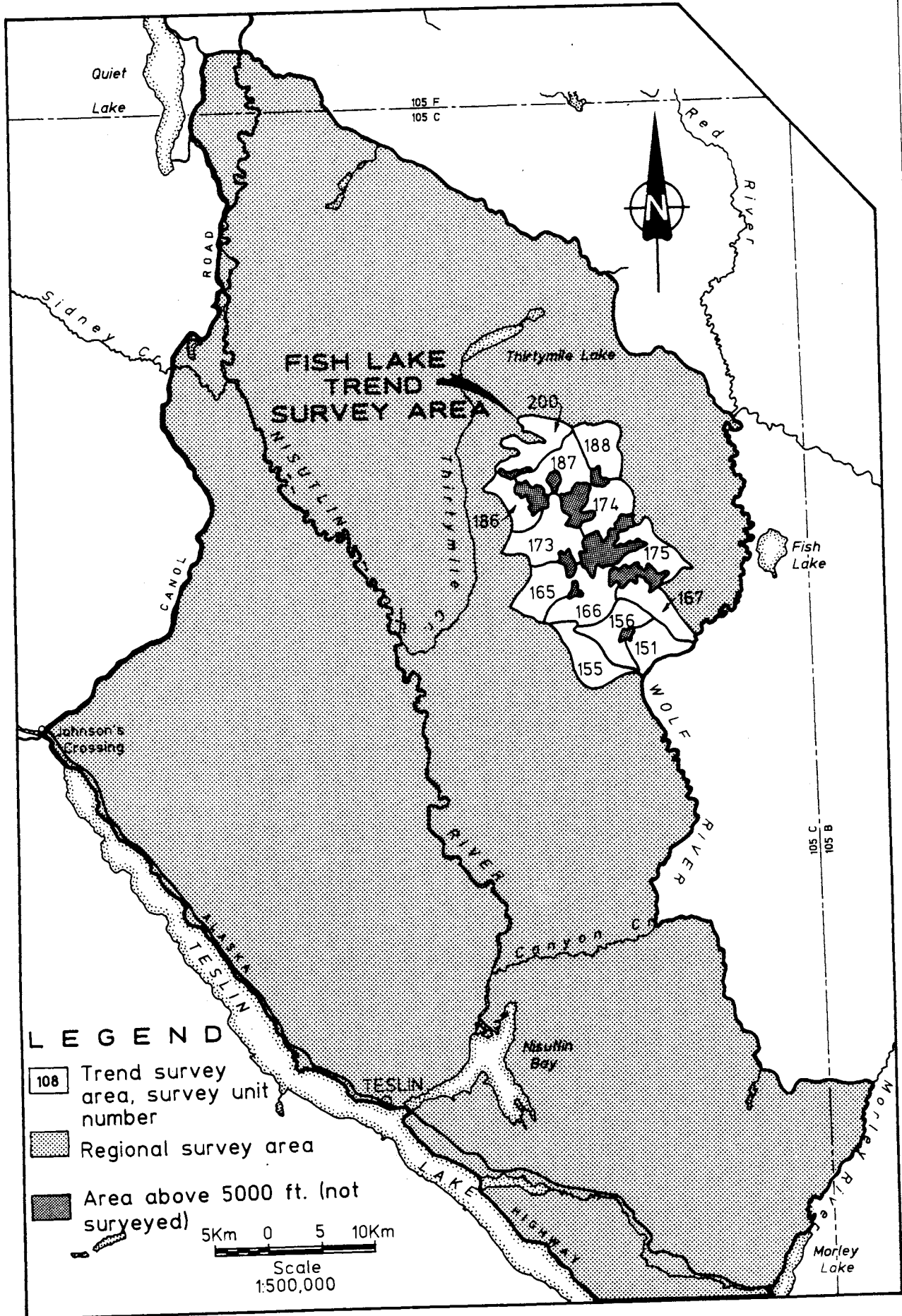


Fig. 1 Distribution of Trend Survey Areas in Yukon.

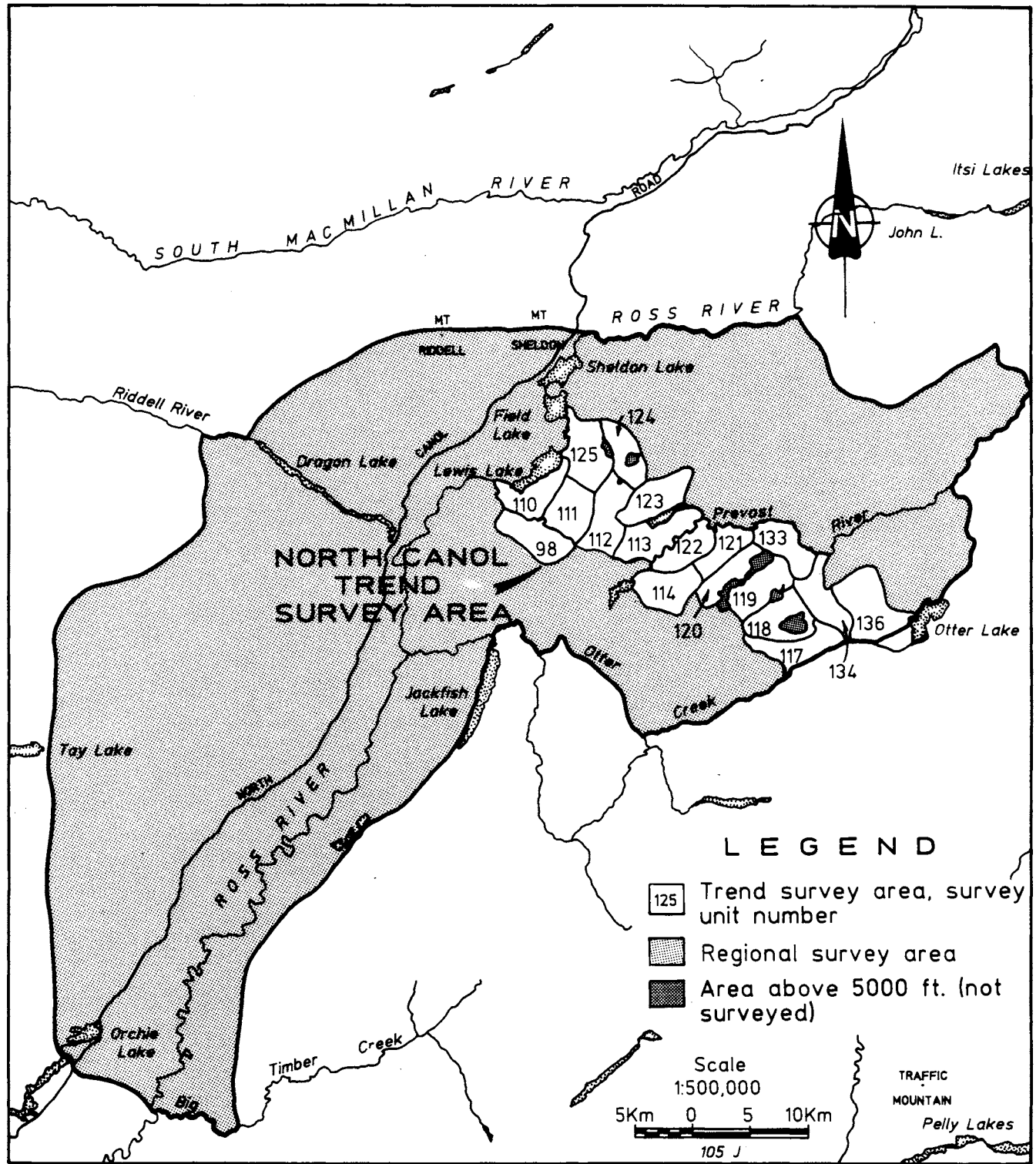
APPENDICES



Appendix 1a. Fish Lake trend survey area.

Appendix 1b. Survey results of the Fish Lake trend area, December 1-5, 1992.

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	1.7	28	0	0	0	0	0	0
155	28.2	1.5	43	1	0	0	0	0	1
156	26.4	1.9	51	3	0	0	0	1	4
165	19.9	2.2	44	1	0	0	0	0	1
166	17.9	1.2	22	0	0	0	0	0	0
167	17.9	1.3	23	3	0	0	0	0	3
173	19.2	1.8	35	1	1	0	0	1	4
174	18.1	1.5	27	0	0	0	0	0	0
175	19.7	1.4	27	0	0	0	0	0	0
186	14.0	2.0	28	3	0	0	0	10	13
187	15.5	1.0	16	0	0	0	0	0	0
188	17.6	2.0	35	0	0	1	0	4	7
200	18.1	1.2	22	0	0	0	0	0	0
All Sample Units	249.1	1.6	401	12	1	1	0	16	33



Appendix 2a. North Canol trend survey area.

Appendix 2b. Survey results of the North Canol trend area, December 6-8, 1992.

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	2.2	42	1	0	0	0	0	1
110	16.2	2.3	37	1	1	0	0	2	5
111	18.6	1.9	35	2	1	1	2	0	6
112	17.3	1.8	32	7	2	0	0	3	14
113	15.5	2.1	32	1	0	0	1	6	8
114	16.3	2.0	33	10	2	0	4	6	24
117	16.9	2.0	34	2	1	0	1	4	9
118	16.9	1.7	28	0	0	0	0	1	1
119	18.7	1.4	27	0	0	0	0	0	0
120	15.8	1.8	28	2	0	0	1	3	6
121	16.8	1.6	27	5	1	0	1	0	8
122	15.8	1.6	26	2	0	0	2	3	7
123	17.3	1.8	31	1	0	0	0	0	1
124	16.8	2.0	34	0	0	0	3	0	3
125	19.3	1.7	33	1	0	0	0	0	1
133	18.1	2.3	42	1	0	0	1	2	4
134	18.1	1.3	23	1	0	0	1	1	3
136	24.5	2.0	48	1	0	0	2	3	6
All Sample Units	317.6	1.9	592	38	8	0	19	34	107

Appendix 3. Summary of 1992 Trend Survey Costs.

Survey Area	Aircraft Type	Charter Rate	Hours Flown	Charter Cost	Fuel Cost	Food & Accommodation	Total Cost
North Canol	Maule M-7	\$210.00/hour	16.3	\$3,423.00	\$224.00	\$591.82	\$4,238.82
Fish Lake	Maule M-7	\$220.00/hour	10.9	\$2,464.00	included	N/A	\$2,464.00
Total			27.2	\$5,887.00	\$224.00	\$591.82	\$6,702.82