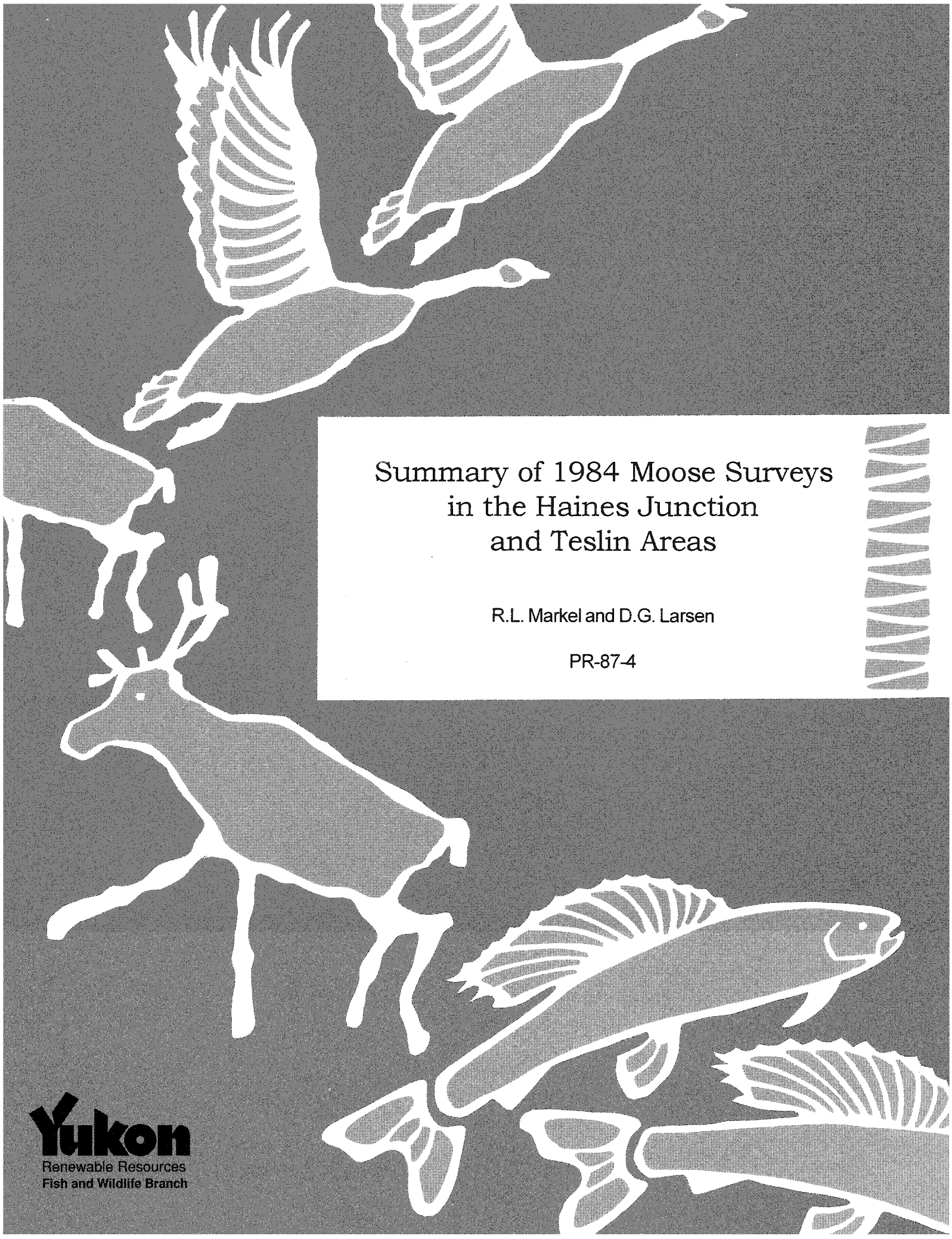

Summary of 1984 Moose Surveys in the Haines Junction and Teslin Areas

R.L. Markel and D.G. Larsen

PR-87-4

Yukon
Renewable Resources
Fish and Wildlife Branch

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MOOSE MANAGEMENT ANNUAL REPORT

Big Game Section
Fish and Wildlife
Department of Renewable Resources
Government of Yukon
P.O. Box 2703
Whitehorse, Yukon

Approved: _____
Director, Fish and Wildlife

Brian O. Pelchat
Senior Big Game Biologist

Date: August 3, 1987

Southwest Yukon Moose Survey Results, November - December 1984

R.L. Markel and D.G. Larsen

ABSTRACT

Moose in two different areas in the Southwestern Yukon were censused using a stratified random block aerial survey technique. Moose densities were higher in the souteast survey area (0.42 moose/km^2) than in the western survey area (0.14 moose/km^2). Adult females were the most abundant sex/age cohort consisting of 62% of the population in the Haines Junction area and 46% of the Teslin Area. Yearlings were the least abundant cohort making up 0.6% and 6% in the Haines Junction and Teslin areas respectively. The resident and non-resident harvest of moose in each area was tabulated and appears to have decreased in recent years.

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INTRODUCTION

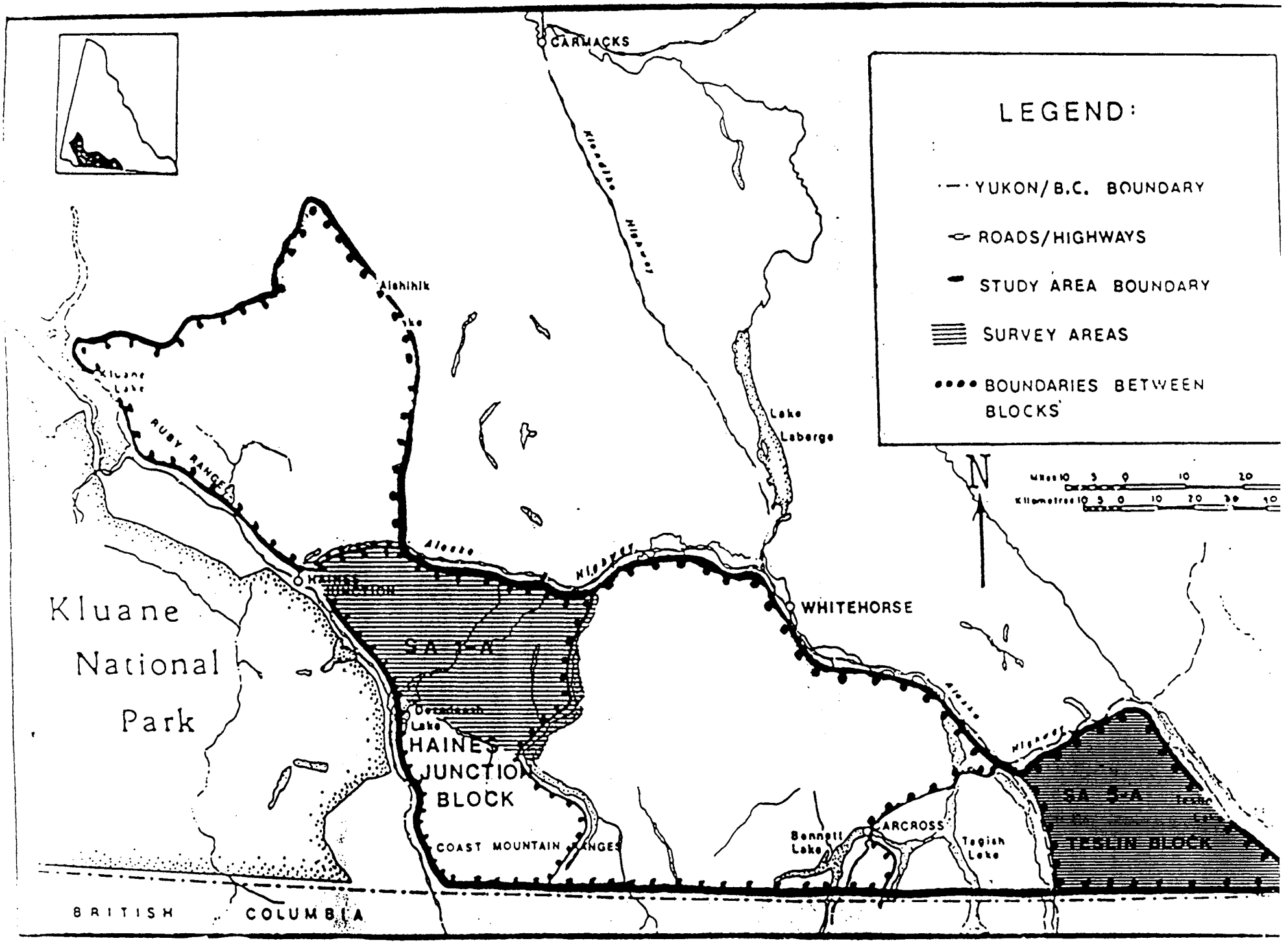
Moose (Alces alces) populations in the southwest Yukon have been censused annually since 1981 (Larsen 1982, Johnston and McLeod 1983, Markel and Larsen 1984). The primary objectives of these surveys were to determine moose population density, distribution, composition, and changes in population size over time. A study was initiated in 1983 to determine the limiting factors on moose population growth (Larsen and Gauthier 1985), based on the apparent low calf survivorship (6-24 calves/100 females≥30 mo.) documented to six months of age and a decline in some populations. It was found that predation by grizzly bears and wolves was the major cause of calf and adult cow mortality (Larsen and Gauthier, in prep.). A predator reduction program was introduced in 1982/83 as part of an experimental study design to determine to what extent predators were limiting the growth of the moose popultion. Four predator prescription blocks were delineated (Fig. 1). These blocks were further divided into five survey areas (SA) and the response of moose populations, i.e. changes in calf and adult female survivorship and overall population size, to different predator prescriptions, is monitored using aerial survey and telemetry techniques. This document is reporting only on the 1984 aerial survey results in those prescription blocks. The effects of the predator prescriptions on the moose population will be analyzed at a later date.

STUDY AREA

The two study areas reported on in this paper consist of 5530 km^2 total land areas and constitute 29.3% of the overall study area (Fig. 1). The Haines Junction survey area (SA 1-A) lies in the Coastal Mountain Ranges of Southwest Yukon and is characterized by rugged mountains and numberous large lakes. The Teslin Area (SA 5-A) is characterized by dissected plateaus, rolling hills, mountains rising to over 2012 m and numberous large water bodies. Survey area 5-A as delineated in this report is an expansion of SA 5-A reported on in the 1984 annual report.

Treeline occurs between 1067 and 1220 m above sea level. Shrub birch (Betula spp.) and willow (Salix spp.) are the predominant vegetation in the subalpine zone which extends from treeline to 1542 m. On the lower slopes, white spruce (Picea glauca) and lodgepole pine (Pinus contorta) are the dominant tree species. An extensive burn occurred in 1958 affecting 40% of SA 5. The

FIG. 1 MOOSE SURVEY AREAS IN SOUTHWEST YUKON, NOV.– DEC. 1984.



phsiography climate and vegetation have been described elsewhere (Oswald and Senyk 1977, Larsen 1982). The Yukon has been divided into 11 Game Management Zones (GMZ), which have been further divided in Game Management Subzones (GMS). Game Management Subzones 7-01 to 7-06 constitute SA 1-A while GMS 9-08 to 9-11 constitute SA 5-A. (Anon 1984).

METHODS

Aerial surveys were conducted between 9 - 18 November and November 20 to December 3, 1984, for areas 5-A and 1-A respectively.

This time period is preferred for moose surveys in the Yukon due to the aggregation behaviour of moose in open habitats during and immediately following the rut (Peek et al. 1974, Lynch 1975, Round 1978, Mytton & Keith 1981, Larsen 1982). In addition, the ground is covered with snow by early November. Both of these factors increase visibility of moose on aerial surveys (Gasaway et al. 1981). The presence of antlers on males to mid-December facilitates the sexing of moose from aircraft.

A stratified random block sampling technique was used (Gasaway et al. 1981) with modifications to accommodate the terrain, weather conditions and distribution of moose in Yukon (Larsen 1982). Briefly, the techniques used was as follows. Each SA was divided into sample units (SU) using natural terrain features for borders and delineated on 1:50,000 topographical maps. For comparative purposes, the SUs used on this survey were consistent with SUs from previous years (1982 and 1982). Fixed-wing aircraft were used to stratify SUs into high, medium and low strata based on the number of moose and tracks seen in the SU. Areas above 1542 m elevation, water bodies larger than 0.8 km^2 and precipitous slopes were considered uninhabitable for moose and were not surveyed. Areas above 1,542 m consisted of primarily talus slopes with little to no vegetation. Six hundred and thirteen km^2 or 20.7% of SA 1-A and 75.2 km^2 or 2.9% of SA 5-A were considered uninhabitable for moose.

Helicopters were employed to census the SUs within 48 hours of completing the stratification. SUs to be surveyed were randomly selected, therefore the same SUs were not necessarily surveyed between years. Total counts of moose were made within each SU surveyed. Search patterns varied from parallel

overlapping transects and following contour lines to tight circling depending upon the terrain and wind. A detailed description of the techniques can be found in Gasaway et al. (1981) and Larsen (1982).

Moose observations included information on the number of animals in each aggregation, their age (calves, yearlings and adults) and sex.

Moose harvest data were tabulated by GMS from questionnaires returned by licenced resident and non resident hunters. Annual harvest (non-native) was estimated for each survey area using Kale (1982). Information on non-licenced (native) harvest was not available.

RESULTS AND DISCUSSION

Search and Sampling Intensity

The overall sampling intensity based on habitable moose range and regardless of SA or stratum averaged 33% with a range of 31% to 34% among SAs (Table 1).

All of the high strata SUs were surveyed, while 70% of the medium, 32% of the low, and 17% of the extra-low strata were surveyed. Based on SUs the high and medium strata combined constituted 12% of the SAs with 56% in the low and 33% in the extra-low stratum. A total of 115 SUs averaging 13.8 km^2 in size were surveyed in the combined SAs.

Population Estimate, Density and Composition

The population estimates were 326 $\pm$ 20% (90% CI) and 1050 $\pm$ 18% (90% CI) for SA 1-A and 5-A respectively (Table 2). Moose densities were higher (0.42 moose/km^2) in SA 5-A than in Sa 1-A (0.14 moose/km^2). This pattern of decreasing densities from southeast to northwest is consistent with results from 1981-1983 (Larsen 1982, Markel and Larsen 1983, Markel and Larsen 1984).

Adult females ($\geq$30 mos.) were the largest single cohort in both SAs ranging from 62% (SA 1-A) to 46% (SA 5-A) of the respective population estimate (Table 2). Adult males ($\geq$30 mos.) represented the next largest cohort with 26% in SA 1-A and 30% in SA 5-A. Very few yearlings were observed, representing only 0.6 - 6% of the estimated population while calves ranged from 13 - 18% of the population (Table 2).

Calf: cow ratios of 20 calves/100 females and 39 calves/100 females were observed for SAs 1-A and 5-A respectively. Bull: cow ratios were 43 bulls/100 cows in SA 1-A and 65 bulls/100 cows in SA 5-A.

Distribution

A clumped distribution in both SAs was documented by comparing the proportion of the moose population (Table 2) and the proportion of the SA (Table 1) within each strata. In both areas the observed distribution was significantly different than the expected distribution. In SAs 1-A and 5-A the high and medium density strata combined comprised 8% and 14% of the habitable moose range respectively (Table 1) and accounted for 41% and 34% of

Table 1 Sampling Intensity by Stratum and Survey Area, November - December, 1984

Survey Area	Sample Units	STRATA				
		High	Medium	Low	Extra-Low	Total
	No. of SU (%)	4 (2)	10 (5)	93 (51)	77 (42)	184 (100)
1-A	SU surveyed (% sampled)	4 (100)	8 (80)	34 (37)	11 (14)	57 (31)
	No. of SU (%)	12 (7)	13 (62)	106 (27)	39 (23)	170 (100)
5-A	SU surveyed (% sampled)	12 (100)	8 (62)	29 (27)	9 (23)	58 (34)
	No. of SU (%)	16 (5)	23 (7)	199 (56)	116 (33)	354 (100)
COMBINED SURVEY AREAS	SU surveyed (% sampled)	16 (100)	16 (70)	63 (32)	20 (17)	115 (33)

Table 2 Moose Population Abundance and Composition by Study Area, November - December, 1984.

Area	Parameter	STRATUM High	Medium	Low	Extra-low	Total (90% CI)
	A. Abundance					
	Estimated total moose	50	85	177	14	326 ± 20%
Haines	Density (moose/km^2)[a]	1.07	0.62	0.15	0.01	0.14
Junction	B. Composition					
	Adult bulls (≥30 mo.)	14	17	55	0	85 ± 33%
1-A	Adult cows (≥30 mo.)	28	55	104	14	201 ± 24%
	Yearlings (18 mo.)[b]	2	0	0	0	2[c]
	Calves	6	13	22	0	41 ± 24%
	Bulls/100 cows (≥30 mo.)	50	30	53	0	43 ± 31%
	Yearlings/100 cows	-	-	-	-	1[c]
	Calves/100 cows	21	23	21	0	20 ± 29%
	A. Abundance					
	Estimated total moose	210	151	645	44	1050 ± 18%
	Density (moose/km^2)[a]	1.25	0.8	0.42	0.07	0.42
	B. Composition					
Teslin	Adult bulls (≥30 mo.)	74	48	190	4	316 ± 22%
	Adult cows (≥30 mo.)	94	71	295	22	482 ± 19%
5-A	Yearlings (18 mo.)[b]	10	0	44	9	63 ± 54%
	Calves	30	32	117	9	188 ± 21%
	Bulls/100 cows (≥30 mo.)	79	67	63	20	65 ± 20%
	Yearlings/100 cows	13	0	15	40	13 ± 50%
	Calves/100 cows	32	46	39	40	39 ± 12%

[a] Density is calculated on habitable moose range
[b] Yearling males are assumed to equal yearling females in number.
[c] The sample size was too small to determine a confidence Interval.

the moose (Table 2). This clumped distribution pattern is graphically presented in Figures 2 and 3.

Harvest

The number of moose harvested by resident hunters in the 2 survey areas appears to have decreased in recent years (Table 3). From a mean annual harvest of 29 moose in the Haines Junction Area between 1979-1983, the estimated harvest in 1984 was only 10 moose. The combined resident and non-resident harvest accounts for 4% of the estimated population.

In the Teslin Area the mean annual resident harvest for 1979-1983 was 62 moose. In 1984, the harvest decreased to 24 or 2% of the population. Non-resident harvest in this area only occurred in 1979. After 1979 no outfitter operated out of this area.

A bulls-only season for licensed hunters came into effect in 1982 for GMS 7 (Haines Junction) and in 1984 for GMS 9 (Teslin). Thus the 1984 harvest was on bulls only. The decreased harvest in the Haines Junction area may be in part due to a season change in 1984. The season in game management subzones 7-01, 7-03, 7-04 and 7-06 was reduced to 15 days.

The number of moose harvested by natives is unknown but likely equals or exceeds the sport hunter harvest.

Cost

The survey cost, including personnel, aircraft rental, fuel and accommodation was $79,294 or $16.50/km^2 of total habitable moose range in the SA. Rental of aircraft contributed most to overall cost (69% helicopter and 14.8% fixed-wing) while labour (including food and lodging) added 16% to the total budget (Table 4). The price of fuel was incorporated into the aircraft rental cost.

Fig. 2 : Moose Distribution in Survey Area 1–A, November–December, 1984.

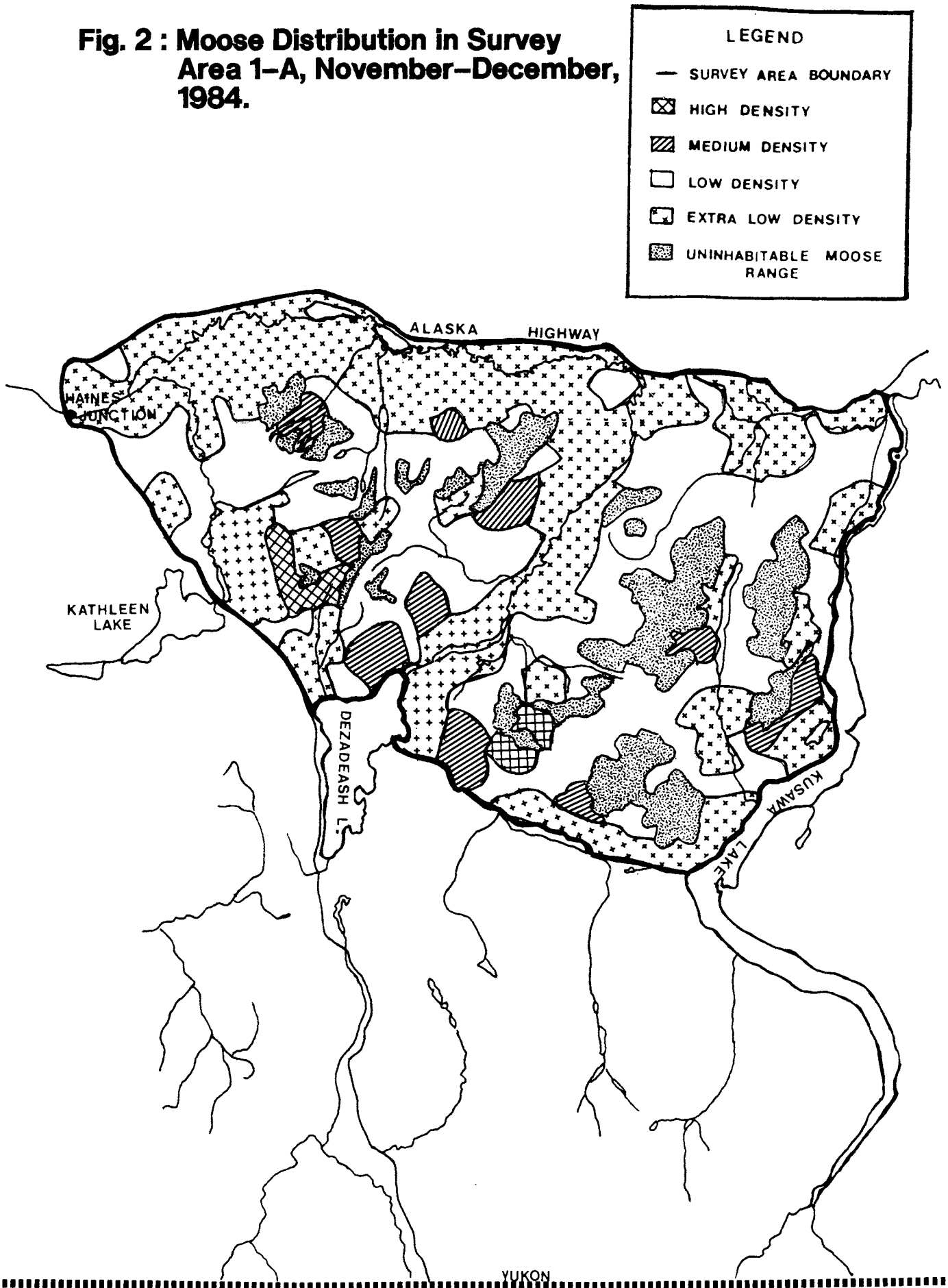


Fig. 3 : Moose Distribution in Survey Area 5-A, November-December, 1984.

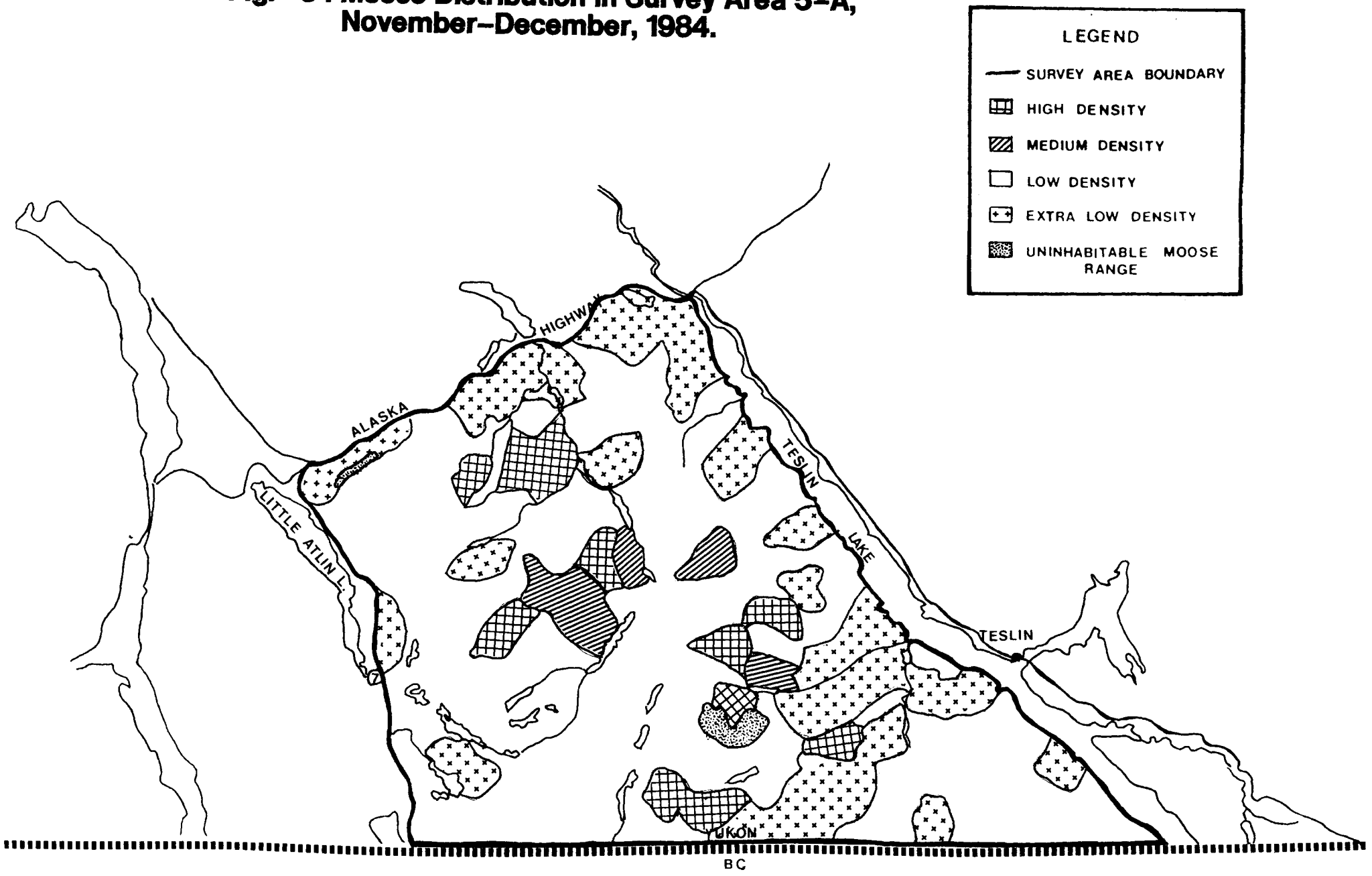


Table 3. Estimated number of moose harvested annually by Sport Hunters in Game Management Subzones (GMS) surveyed for moose.[a]

Survey Area	Resident Harvest 1979-83(mean)	Resident Harvest 1984	Non-Resident Harvest 1979-83 (mean)	Non-Resident Harvest 1984	% harvest of the pre-hunted population (1984)
Haines Junction 1-A (GMS 7-01 to 7-06)	29	10	5	4	4.1%
Teslin 5-A (GMS 9-08 to 9-11)	62	24	3	NA	2.2%

[a] Does not include native harvest

Table 4. Cost Breakdown for the 1984 Moose Surveys

Item	Cost
Fixed-wing (stratification)	11,850.
Helicopter (census)	55,190.
Personnel	7,534.
Food and Lodging	5,350
TOTAL:	79,924.

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