

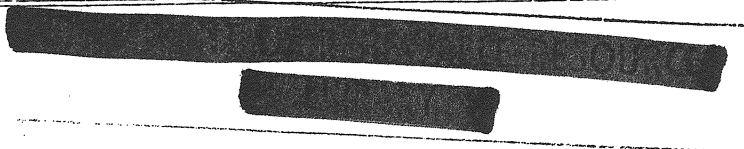
701 Farnell, Neelke 1981

RICHARD FARNELL

DL737 7
.44
F37 c.2

701

MOOSE/CARIBOU INVESTIGATIONS IN THE MACMILLAN/HOWARDS PASS DEVELOPMENT AREA



INTRODUCTION

The present level of mineral exploration and development in the MacMillan Pass/Howards Pass area potentially impacts upon wildlife populations. This report deals with investigations designed to provide basic moose (Alces alces gigas) and caribou (Rangifer tarandus caribou) inventory as input into a regional planning process.

This interim report presents the results of the first half of a two part inventory, documenting the post-rut (October - November) and late winter (March - April) distribution of moose and caribou. A secondary objective of this study is to assess population status as indicated by composition ratios, predator abundance and harvest records. General movement trends, and where obvious, seasonal habitat selection will be determined. The seasonal movements of caribou occupying the Mac Pass development area will be studied with the use of radio telemetry.

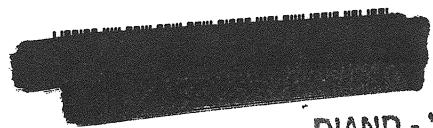
Data relevant to the population dynamics and distribution of moose and caribou, obtained through other wildlife field programs, will be reviewed.

WM 644

This baseline inventory data will provide information necessary for preliminary moose - caribou management strategies concurrent

DATE DUE

[Empty box for date due]



DIAND - YUKON REGION, LIBRARY

with increased access [REDACTED] human population, and habitat disruption. The funding for this study was provided by the Department of Indian and Northern Affairs, Government of Yukon, Pan Oceans Ltd., Hudson Bay Mining and Smelting, AMAX Northwest Mining Co. Ltd., and Placer Development.

[REDACTED]

STUDY AREA

This study area, which measures approximately 22,318 sq.Km, (Fig. 1), encompasses all the principal proposed mine sites and access roads, flanks the Yukon portion of the North Canal Road, and circumscribes all or part of suspected centres of habitation for moose - caribou populations that utilize the MacMillan Pass/Howards Pass development area. The boundaries of existing Game Management Subzones (G.M.S.) were utilized as study area outlines (Fig. 1). Because of the transient and gregarious nature of caribou, entire home ranges of herds potentially affected by development cannot be included in the study area. However, the study area is large enough to provide basic information on the relative abundance and distribution of herds potentially impacted by development. The moose populations of the development region should be adequately contained within the study area.

METHODS

Aerial Surveys:

Aerial surveys were flown simultaneously by both a Cessna 185 and a Helio 295 fixed wing aircraft, from bases at MacMillan Pass and Ross River, from 28 October to 8 November. Sixty-five hours of flight time was required to survey all G.M.S. Each subzone was subdivided into numerous subunits. Each subunit was intensively examined by two observers (from one aircraft), at 100-150 meters above ground level. An attempt was made to complete each subzone during a single survey to reduce the possibility of recounting or missing animals which may have moved between surveys.

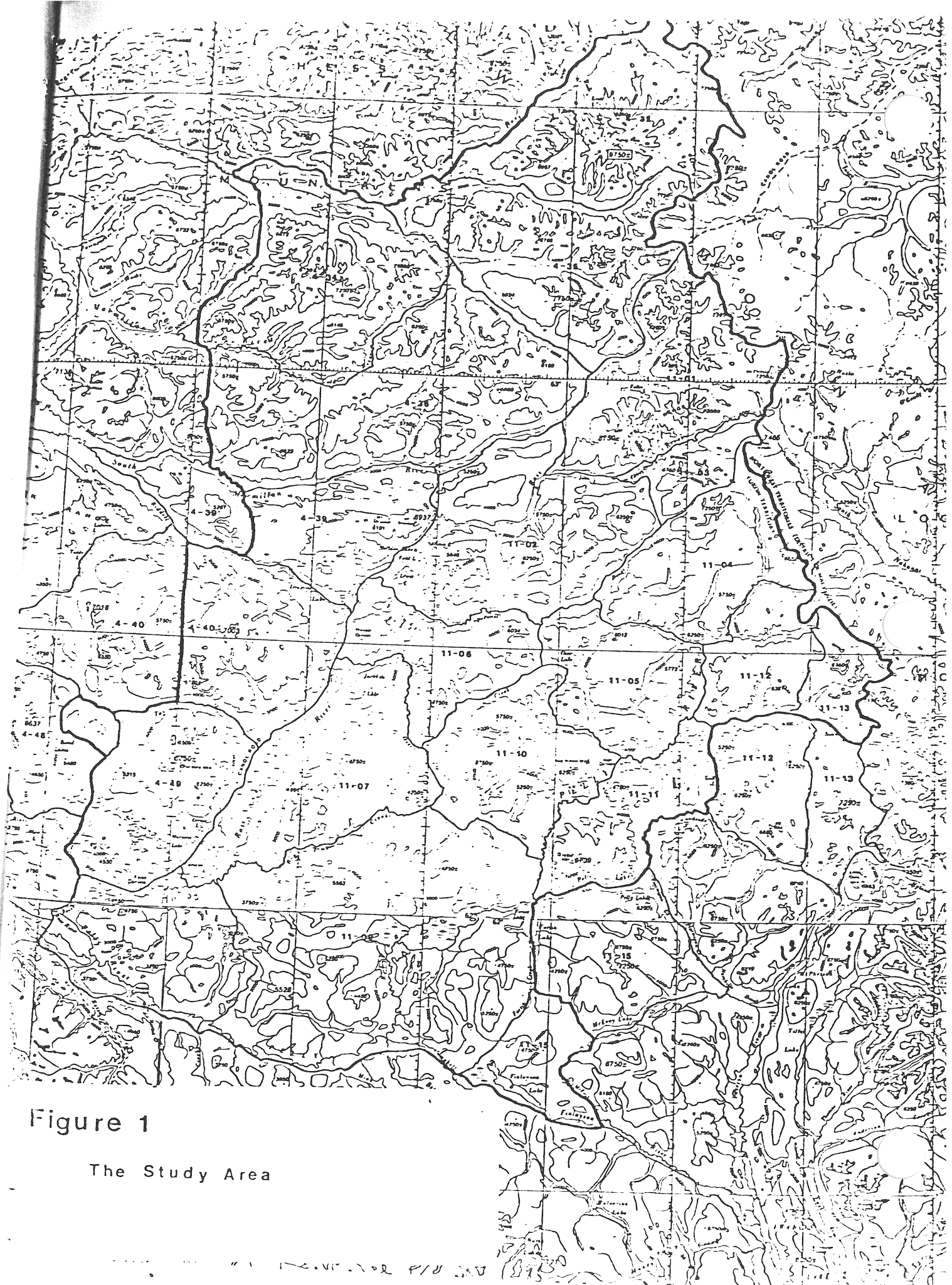


Figure 1
The Study Area

There are many biases associated with most aerial survey techniques. One is a sightability bias of animals or tracks in densely vegetated areas; another is a visibility problem created by overcast cloud and poor lighting conditions making observation difficult. As well, marginal weather conditions occasionally result in less than total coverage, and may result in an unavoidable variation in search intensity. Nonetheless, we feel that the data obtained through these surveys is representative and accurate within these limits.

Due to the homogeneous distribution of moose (as compared to caribou and wolves), each subunit was stratified into high, medium and low categories based on direct observation and/or a subjective habitat assessment. The criteria for the moose strata were:

High - Numerous moose and plentiful sign observed. Stratum boundaries extended to include continuous adjacent habitat type.

Medium - A. Sparse moose or moose sign observed. Stratum extended to include continuous adjacent habitat type.

B. No moose or moose sign observed but habitat considered highly suitable for moose (subjective assessment).

Low - No moose or moose sign observed and habitat considered unfavourable.

"Suitable habitat" is defined as areas with extensive willow - birch communities, often found near treeline or in burned areas.

The stratification represents the Post-Rut (October - November) distribution and relative densities of moose within the study area and may not be valid for the remainder of the year.

Composition

Where terrain permitted, moose were circled at low level to ensure a complete count and classified into five age/sex groups:

Large Bulls - large fully developed antlers

Medium Bulls - medium sized antlers

Small Bulls (yearlings) - small underdeveloped antlers

Cow - large bodied antlerless moose

Calf - small bodied antlerless moose

The presence or absence of antlers were used to sex moose as antler drop of mature males does not occur until late November.

Caribou observed on these surveys were likewise circled, counted and classified as large and small bodied animals, therefore segregating all one year and older animals from calves. Caribou cannot be effectively segregated into sex classes without close examination of genital characteristics.

Wolves encountered were circled and enumerated by color. The activity of the pack also was recorded. Fresh wolf pack trails were followed to count individual trails in areas where they braided out.

Radio Telemetry:

Because large numbers of caribou are known to occur in the mountains of the MacMillan Pass area during summer months, (Hayes and Mossop - 1981) (Nette O 1981), and very little is known about this population, we decided to employ radio telemetry techniques to gather baseline movement data. In July 1981, six female caribou were captured from a helicopter, utilizing a 'New Zealand Net Gun'. These caribou were captured adjacent to proposed mining sites in the MacMillan Pass development area and fitted with radio-collar transmitters that have a three year life expectancy. A high altitude relocation flight over suspected winter ranges was flown on November 7th.

Literature Review:

All available information pertaining to moose, caribou and wolves of this area of the Yukon was reviewed. Little formal work has been conducted with regard to range, habitat and population parameters of large mammals in this area. Other wildlife studies, ie. sheep, furbearers and raptors, presently being conducted in the area, by Yukon Government Wildlife Biologists, have afforded considerable information with regard to general summer distribution of moose and caribou within the study area.

RESULTS AND DISCUSSION

General

The intent of these surveys was not to locate or even estimate all moose, caribou and wolves within the study area, so that numbers presented should not be interpreted as such. However, the observations do provide an adequate sample to make an assessment of the seasonal distribution and relative densities of the population.

Survey effort by G. M. S. is presented in Table 1. Some areas, such as large rugged mountains or extensive dense spruce zones were covered more quickly as it immediately became obvious that these areas contained very few or no animals.

TABLE 1

SEARCH INTENSITY* BY GAME MANAGEMENT SUBZONE

G.M.S.*	Area (km ²)	Search Time** (min)	Search Intensity (min/km ²)	Moose/ Search Time (min)	Caribou/ Search Time
4-32	1290	180	.14	.44	0
11-01	1270	115	.09	.23	0
4-35	1560	277	.18	.19	0
4-34	1560	190	.12	.06	.07
4-36	2230	375	.17	.14	0
11-02	1620	175	.12	.25	0
11-08	1040	67	.06	0	0
11-06	750	140	.19	.21	.17
11-09	3240	207	.06	.16	.16
4-49	1270	115	.09	.06	.48
11-04	880	128	.15	.30	0
11-05	780	59	.08	.22	0
11-12+13	430	58	.14	.04	0
11-03	260	45	.17	.31	0
4-39+40	950	120	.13	.42	.10
11-07	1240	96	.08	.04	.12
11-10	880	99	.11	.16	.09
11-11	620	83	.13	.21	0
11-15	1240	60	.05	.02	.30

* Game Management Subzones (fig #1)

** based on actual survey time (not including ferry time).

Moose:

Observations of moose, caribou, wolves and their tracks, are indicated on Map A. Based on these observations, combined with a habitat extrapolation (see methods), Map B presents a stratification of moose habitat into high, medium and low density area. Certain generalizations are presented below.

- a) the majority (79%) of animals observed were located at elevations of approximately 4,000 - 5,000 ft., and associated with shrubzones at or near treeline;
- b) high density areas occur at the headwaters of major drainages, i.e. Hess River, Ross River, the east fork of MacMillan River and Prevost River.
- c) relative high and medium moose densities which were not associated with treeline shrubzones, corresponded with burns, specifically between 3,000 - 4,000 ft., e.g. east of Lewis Lake; G.M.S. 11-09, just north of Robert Campbell Highway; and south of Wolf Canyon on the Pelly River.
- d) contrary to the numbers of moose found at the headwaters of other major water systems within the study area, the upper reaches of the west fork of the North MacMillan River (which parallels the North Canal Road access corridor and encompasses heavy exploration activity) is presently supporting a relative low density of moose at this time period;
- e) moose were not observed in the low land (marsh, lakes, flood plains) areas. However, Hoefs and Lortie (1976) observed numerous moose

in the Itsi Lakes area during July, and noted heavy utilization of flood plain areas during late winter (March) in the southeastern portion of this study area;

- f) G.M.S. 11-08, 11-09 and 4-49 south, all containing medium rated moose habitat, are in close proximity to the community of Ross River and have relatively low densities of moose. This may be either a result of hunting activities or due to a lack of sub-alpine habitat which appears to be preferred by moose at this time of year.
- g) although this study area has relative high density areas, the animals never appeared to be aggregated in large numbers and what groups were found seemed loose in comparison to the southern Yukon where groups of 15 to 60 have been documented (Larsen, Nette, 1980).

Composition:

The following table presents classifications of moose observed during this survey.

The high bull to cow ratio, (104:100), may be due to a difference in sightability with bulls being more visible from the air. This may be a function of habitat selection. A comparison to moose populations of the southern Yukon in recent years (Hoefs - 1979) (Larsen and Nette - 1980) confirms that this ratio is unusually high.

The data indicates that calves of the year make up 11% of the total population or 35 calves per 100 cows (older than 2 years).

The total yearling cohort is calculated to be 23% of the total population assuming the number of females surviving to the age of 1 1/2 (yearling), is equal to the yearling males observed. This also appears to be an unusually high value.

In all, the high number of bulls, low calf numbers and large yearling ratio probably indicates that not all the cows with calves were counted. These animals may be selecting habitat types which offer more cover and make them less visible. The late winter surveys should provide additional information with regard to these ratios.

TABLE 2. CLASSIFICATION of MOOSE WITHIN the MACMILLAN PASS STUDY AREA

G.M.S.	Bulls				Cows (including yearling females)	Calves	Unidentified Adults	TOTAL
	sm.	med.	lg.	Total				
4-32	11	1	17	29	42	8	-	79
4-34	-	-	5	5	5	1	-	11
4-35	7	9	18	34	13	2	4	53
4-36	3	6	9	18	24	7	2	51
4-39	3	-	5	8	12	-	1	21
4-40	-	5	17	22	8	1	6	37
4-49	-	-	3	3	3	1	-	7
11-01	6	2	10	18	6	1	-	25
11-02	5	-	8	13	21	10	-	44
11-03	3	-	2	5	7	2	-	14
11-04	3	5	4	12	21	5	-	38
11-05	1	1	3	5	5	3	-	13
11-06	-	1	9	10	13	6	-	29
11-07	3	-	-	3	1	-	-	4
11-08	-	-	-	-	-	-	-	-
11-09	5	1	8	14	16	2	1	33
11-10	1	-	3	4	9	3	-	16
11-11	5	3	4	12	3	2	-	17
11-12	-	-	2	2	-	-	-	2
11-13	-	-	-	-	-	-	-	-
11-15	-	-	1	1	-	-	-	1
Total	56	34	128	218	209	54	14	495
% Total	11%		44%		42%	11%	3%	100

Caribou:

Background

Home range movements of caribou in the study area are complex, and may involve as many as three or more discrete herds. These herds occupy the study area seasonally in various concentrations and distributions.

During summer months (June - September) caribou inhabit most of the alpine regions of the study area (Mossop=Hayes 1981) (Nette 1981) (Hoefs-Lortie 1976). Figure 2 presents some incidental moose and caribou sightings made during raptor surveys (May - June 1981) and sheep surveys (July 1981). High concentrations of caribou generally occur along the continental divide of the MacKenzie Mountains. These individuals begin arriving from eastern winter ranges as early as mid May, at which time some calving occurs in the Yukon (Hayes pers. comm.). A number of additional calving grounds have been identified in the headwaters of the Keele and Natla Rivers in the N.W.T. immediately east of MacMillan Pass. Some principal migration routes identified for these caribou follow the Natla, Keele, Ekwi, Twitya, Intga and Tishu Rivers (Archibald 1974). This large herd of caribou are thought to be only seasonal residents (June - September) of the Yukon (Gill 1978). Fall migration takes place in September when caribou begin drifting eastward (pers. comm.) (Werner Kroser, outfitter). The primary winter range is located in the vicinity of Wrigley Lake and along the lower reaches of the Redstone River (Archibald 1974), hence this group of caribou have been known as the 'Redstone Herd'

(pers. comm. George Collin).

Another large winter concentration of caribou is known to occur along the upper reaches of the South Nahanni River (Land Use Information Series). This area may constitute the winter range of caribou occupying the Howards Pass area during the summer. It is not known at this time whether these caribou constitute a discrete population or are part of the 'Redstone Herd'.

Large numbers of caribou (400-500) are known to traditionally winter in the Fortin-Finlayson Lake area in the southern portion of the study area (Hoefs - Lortie 1976). These caribou are assumed to migrate between this winter range and the Pelly Mountains further south. Because this herd winters adjacent to the Robert Campbell Highway, the harvest level is thought to be very high, and population levels threatened (E. Russell, pers. comm.). Caribou hunter success in the Finlayson Lake area has declined in recent years (B. Tokarek pers. comm.).

Caribou are known to be abundant in the Anvil and South Fork Ranges in the western portion of the study area during summer months (Nette 1981), (Fig. 2). Winter range locations and movement trends are unknown at this time.

POST-RUT DISTRIBUTION AND DENSITY

The October/November surveys located various concentrations of caribou and tracks in three regions (Fig. 3).

- 1) In G.M.S. 4-34 two bands (13 individuals) in the headwaters of Cache Creek, a drainage flowing into the North MacMillan River.
- 2) In G.M.S. 4-40 and 4-49 near Tay Lake west of the North Canal Road (67 individuals).
- 3) In all or portions of G.M.S. 11-07, 11-09, 11-06, 11-10, 11-11 and 11-15, from Jackfish Lake south to Fortin-Finlayson Lakes and the Robert Campbell Highway (87 individuals).

The Cache Creek caribou may be part of a wintering group distributed further west outside of the study area. These animals may summer in the alpine regions of the Russell Mountain Range. The Tay Lake group probably represents a portion of a larger wintering caribou population that may summer in alpine regions of the Anvil and South Fork Mountain Ranges west of the study area. The Fortin-Finlayson Lakes group represent a more complex picture. At this time we are not sure whether the caribou wintering across this large distribution represent animals from one or two discrete populations since adjacent summer ranges occur to the east in the MacKenzie Mountains (Howards Pass Area) and to the south in the Pelly Mountains. Possibly the March surveys will document a distribution shift towards calving grounds and

summer range. A radio telemetry study should be initiated on this wintering group. Caribou appear to be absent from the immediate MacMillan Pass/Howards Pass areas during post-rut.

Most of the caribou were observed in subalpine or lowland shrub zones, and much of the snow tracking was observed in lowland spruce forests.

Composition:

The results from aerial composition counts on caribou bands are given in Table 3. Counts were grouped into the Tay Lake winter group and the Fortin-Finlayson Lake group.

TABLE 3. POST-RUT CARIBOU COMPOSITION CALVES/+1 YEAR OLDS

G.M.Z.	Bulls	Cows and Sub-Adults	Calves	Unidentified No. Calves?	Total	% Calves
4-34	2	10	1	-	13	
4-40	-	-	-	12	12	
4-49	2	18	12	23	55	
				Tay Lake Gr.	80	16%
11-06	1	15	8	-	24	
11-07	3	4	4	-	11	
11-09	2	12	2	8	24	
11-10	-	5	4	-	9	
11-15	1	5	4	8	18	
				Fortin-Finlayson Group	86	25%
Totals	11	69	35	51	166	21%

Because sample size is low, we should be cautious with the results. Calf percentages of 16% - Tay Lake group, and 25% - Fortin-Finlayson group do suggest poor to moderate reproductive success for this season. A more intensive effort at accurate sex and age segregation counts should be conducted in late winter.

Radio Telemetry:

A radio-tracking survey was flown 7 November. Although frequency signals were found in the study area, two of the six female caribou radiocollared in July, 1981 were relocated in the N.W.T., one near O'Grady Lake (K-28) another near June Lake along the Keele River (K-26) (Fig. 4). Deteriorating weather prevented adequate coverage of the regions east of the MacMillan Pass where the remaining marked caribou were suspected to be. Incidental to this high level flight, numerous caribou and heavy caribou sign were observed around O'Grady Lake, south of Lana Anna Lake, along the Natla, and in the Upper Keele-Tischu River area (Fig. 4). Both relocated individuals move approximately 64 km east of their capture sites. There is not doubt that the caribou of the MacMillan Pass area are individuals from the 'Redstone Herd' of the N.W.T.

More extensive high level radio-tracking coverage will be flown during the late winter field trip in March. Also an intensive low level non-systematic reconnaissance survey will be flown to delineate the winter distribution of this herd. This survey also should be carried out in the

upper reaches of the Little Nahanni River to verify presence of wintering caribou there.

Wolves

Abundance and Distribution

Locations of 21 wolves observed during the October/November surveys are summarized in Table 4. Additional tracks associated with these observed wolves yields a population estimate of 31 wolves. This estimate is considered a minimum due to poor observability and since we only covered the area on a single survey. Table 5 presents instances of tracks (but no wolves) observed indicating possible additional wolves that can be added to our minimum estimate (31). A minimum of 31 wolves within the confines of the study area yields a density of 1.4 wolves/1000 sq.km.

TABLE 4. SUMMARY OF WOLF OBSERVATIONS

<u>G.M.Z.</u>	<u>Wolf Sightings</u>	<u>No.</u>	<u>Kill Sites</u>
4-32	brown wolves	2	
4-36	black wolves	2	
11-02	wolves (1 light & 5 dark) - at least <u>10</u> wolf tracks on lake	10	1 killsite-calf?
11-05	wolves (4 grey & 5 black)	9	1 kill adult moose
11-09	grey and 1 black wolf - tracks of at least <u>8</u> wolves	<u>8</u>	2 kill sites
Total		31	

TABLE 5 TRACK OBSERVATIONS NOT ASSOCIATED WITH WOLVES

<u>G.M.Z.</u>	<u>Wolf Track Sightings</u>
4-35	Wolf tracks near N. Canal Road
4-34	Wolf tracks on N. MacMillan River
11-02	Fresh wolf track on John Lake; wolf tracks north of Prevost River on lake
11-04	Fresh wolf tracks along Prevost River
11-05	Wolf tracks north of the Pelly River
11-06	4 wolf trails along N. Canal Road
11-10	6 wolf tracks on lake-headwaters of Timber Creek
11-11	2 wolf trails on lake south of the Pelly River

REFERENCE

- Larsen D., Nette T., 1980. "Moose Census In The Lorne - Caribou Mountain Area." (Renewable Resources Files.)
- Hoefs M., Lortie G., 1976. "Big Game Inventory, Game Management Zone #11." (Renewable Resources Files.)
- Archibald P.L., 1974. "Some Observations of a Woodland Caribou Population In The Mackenzie Mountains." (C.W.S. Inservice Report.)
- Gill D., 1978. "Large Mammals Of The MacMillan Pass Area Northwest Territories and Yukon."
- Nette T., 1981. "Sheep Inventories MacMillan Pass/Canol Road Area." (Unpublished - Department of Renewable Resources, Y.T.G.).
- Hayes B., Mossop D., 1981. "Nesting Raptor Populations In The MacMillan Pass North Canol Road Area." (Unpublished - Department of Renewable Resources, Y.T.G.).

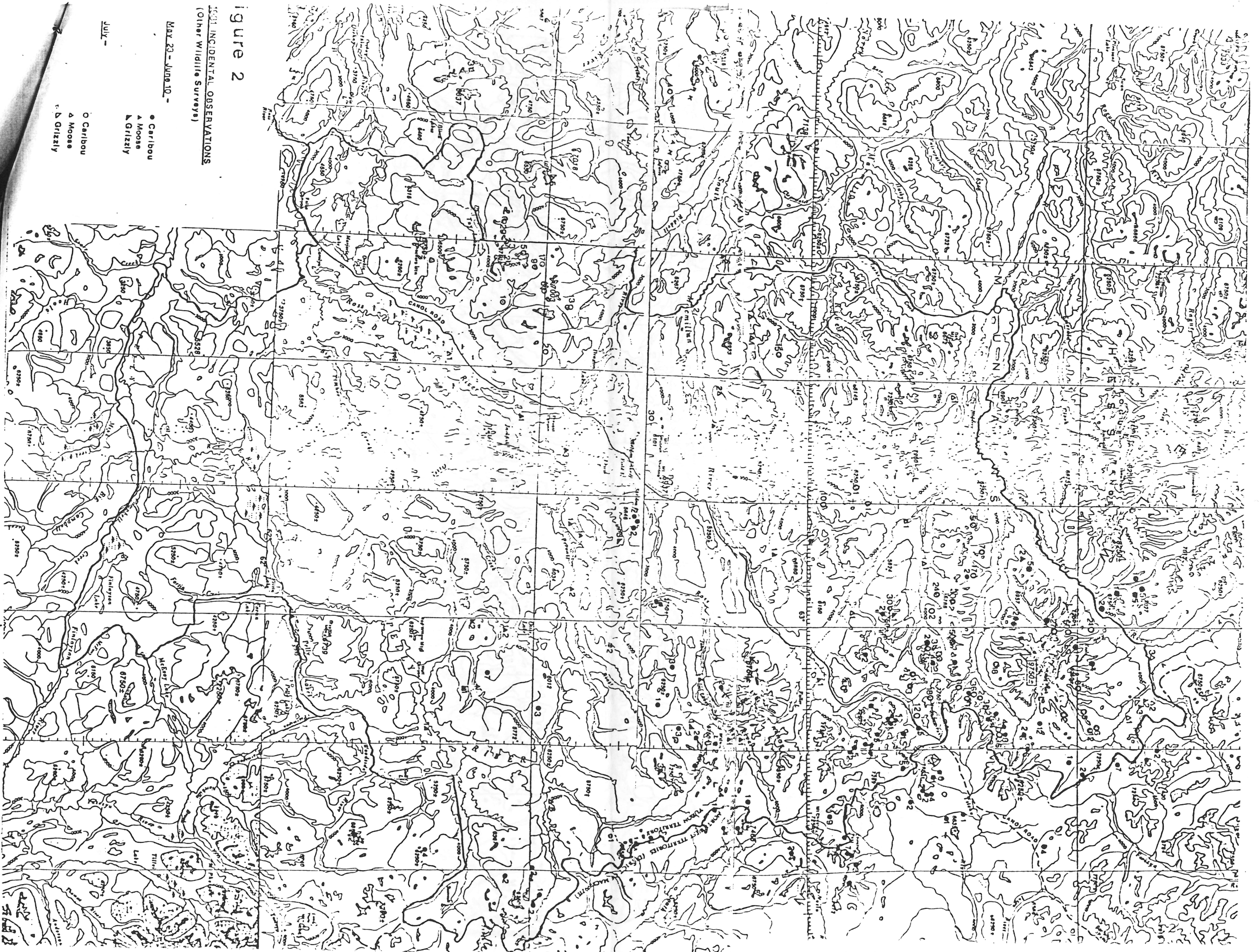


Figure 2

1500 INCIDENTAL OBSERVATIONS
(Other Wildlife Surveys)

May 23 - June 10 -

July -

- Caribou
- △ Moose
- ◻ Grizzly

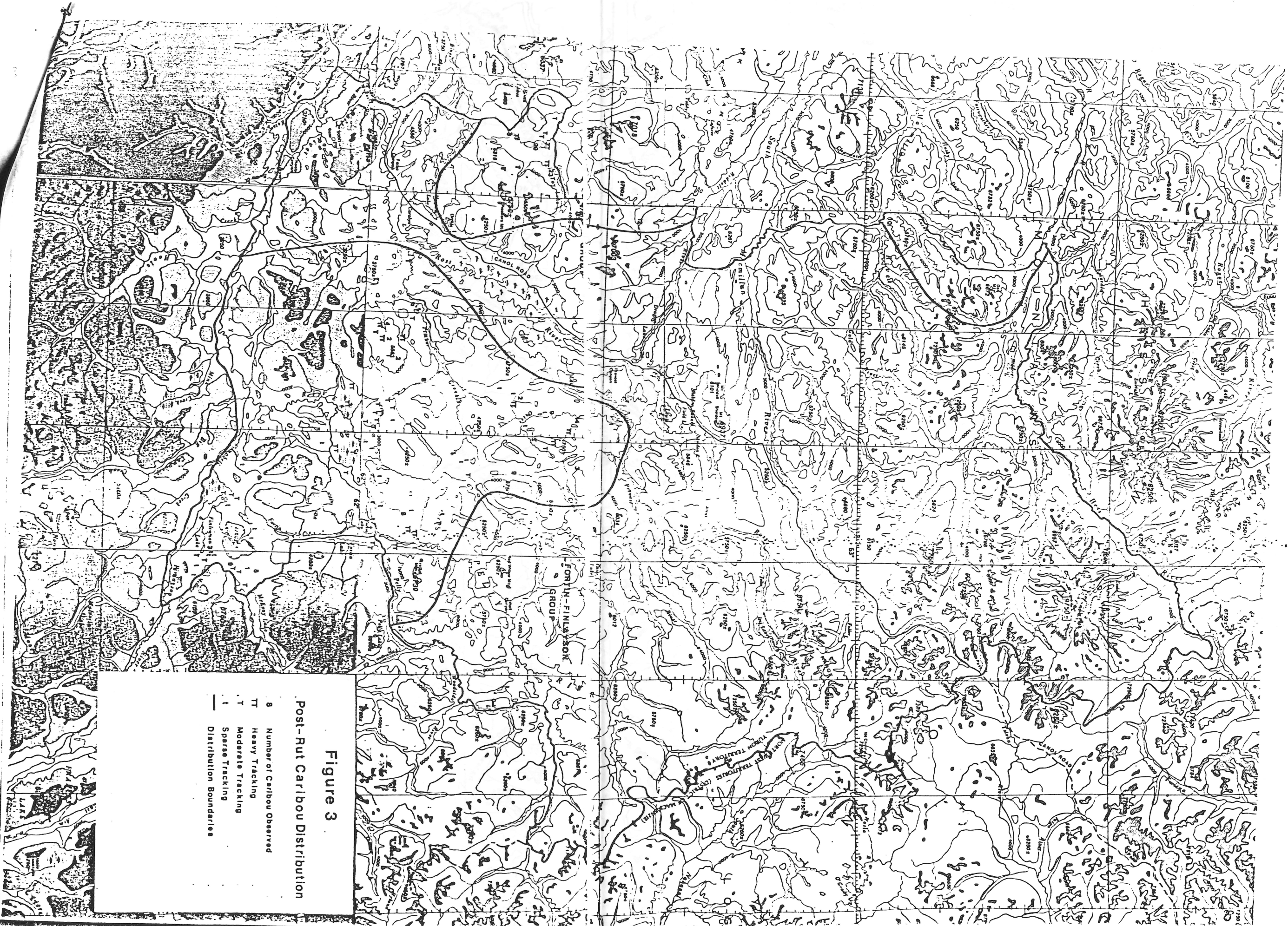


Figure 3
Post-Rut Caribou Distribution

- Number of Caribou Observed
- TT Heavy Tracking
- T Moderate Tracking
- I Sparse Tracking
- Distribution Boundaries

Figure 4

Radiocollar Relocations

- Capture Site
- Relocation
- Assumed Direction of Travel
- ▨ Abundant Sign

