WERNECKE MOUNTAIN CARIBOU STUDIES

PREPARED FOR PAN OCEAN OIL LTD.

by: D. Russell
R. Farnell

OCTOBER 1980 - OCTOBER 1981

Government of Yukon

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YOUR FILE

81 11 05

Bill Stephen,
Environmental Coordinator,
Pan Ocean Oil Ltd.,
Box 2533,
Station M,
Calgary, Alberta,
T2P 2M7.

Dear Bill:

Please find enclosed two copies of a report summarizing our field work on caribou in the Bonnet Plume area for October, 1980 to October, 1981. From our conversation we agreed that no formal report need be prepared until the scheduled completion of field work in June, 1981.

The following report is divided into five sections entitled:

1. Winter distribution of the Wernecke Mountain caribou, 1980-81;
2. Spring migration routes, composition and capture results for the Wernecke caribou, April 1981;
3. Calving surveys in Wernecke Mountains;
4. Post calving relocations of radio collared caribou of the Wernecke Mountain and Hart River herds, July 10-11, 1981;
5. Fall rut locations and composition of the Wernecke caribou, October, 1981.

You will appreciate that these "field reports" are far from polished and results should be treated as tentative.

Our future plans include March late winter distribution and possible census attempt and one more calving ground survey in mid to late May.

I hope this report is acceptable for your purposes.

Yours truly,

Don Russell

Don Russell
Caribou Biologist
Yukon Wildlife Branch
Department of Renewable Resources

Enclosure

WINTER DISTRIBUTION OF THE WERNECKE HERD - 1980 - 1981

METHODS AND OBJECTIVES

Late winter surveys were flown to determine the winter distribution, relative abundance and radiocollar locations for caribou of the Wernecke Mountains (see Table I).

TABLE I

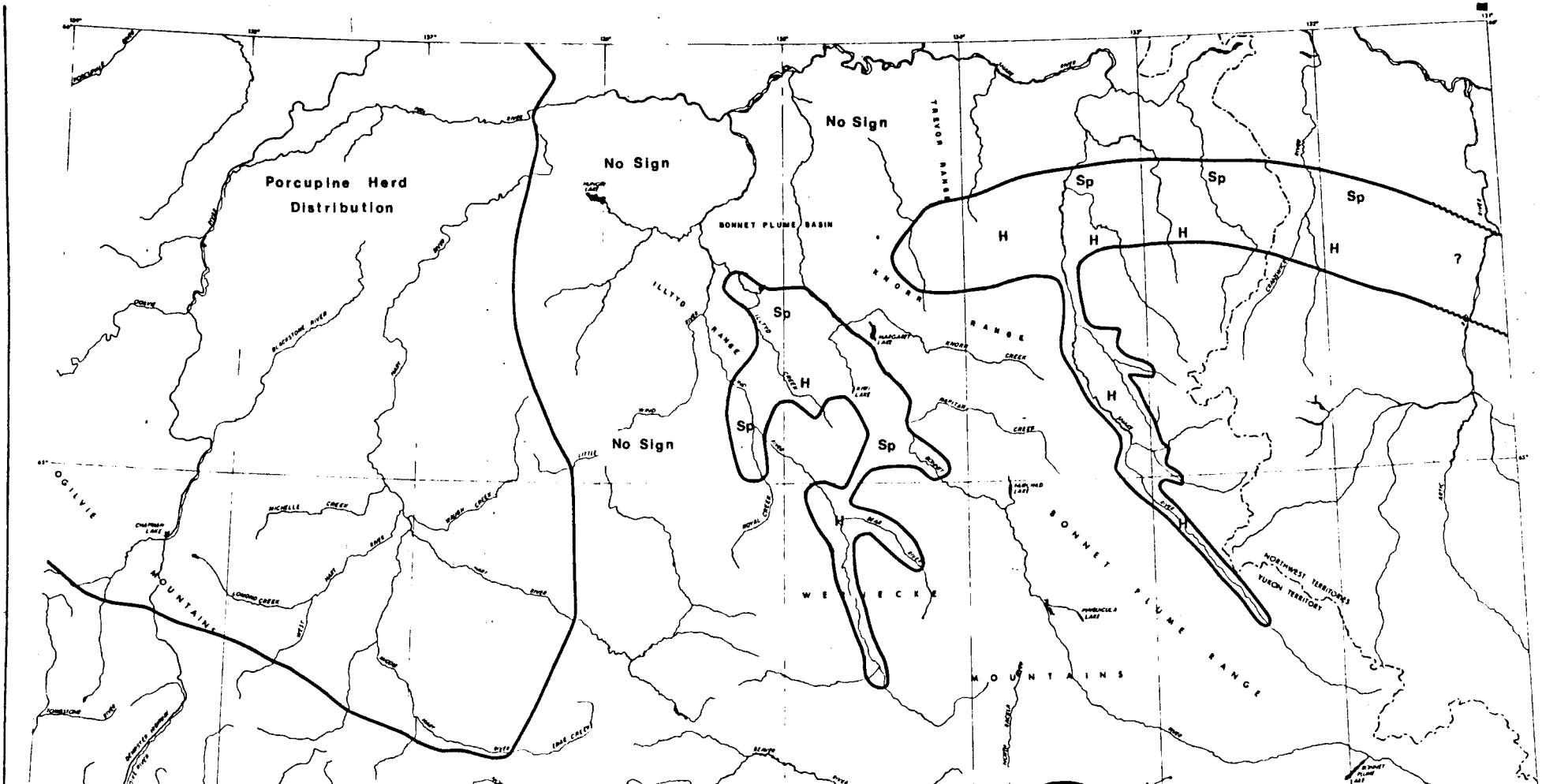
DATE	SURVEY TYPE	SURVEY POINTS	RADIOCOLLARS
80-11-22	High Level	Wind R., Bonnet Plume R.	E-57, G-29, G-15
80-11-30	High Level	Snake R., Cranswick R., Trevor Range, Knorr Range	E-66, E-69, G-09 G-03
81-1-28	High Level	Wind R., Bonnet Plume R., Snake R.	G-15, E-69, G-03
81-3-5	High Level	Beaver R., Snake R., Cranswick, N.W.T., Bonnet Plume, Arctic Red R., Knorr Range, Trevor R., Wind R.	G-35, E-59, E-69 G-03, G-09, E-57 G-29
81-3-5	Low Level	Beaver R., Snake, Bonnet Plume Arctic Red R., Knorr Range, Trevor R., Wind R.	None

As weather systems are typically dynamic in March, a Cessna 185 and a Cessna 337 were employed simultaneously to conduct an overview of winter distribution as rapidly as possible. Winter distribution and abundance of caribou was determined by recording direct observation of animals or extensive tracking on 1:250,000 maps. This data was later analysed to produce an overview of the extent of winter range use in the region by what appears to be a discrete mountain caribou herd. Radiocollars

were monitored and relocated during early and late winter field surveys to determine extent of winter range use and movement trends. An assessment of the degree to which these caribou lend themselves to a census during late winter was made. These field efforts were tied into an on-going study of the Porcupine caribou winter distribution and particular attention focused on a possible overlap in winter distribution between Wernecke Caribou and Porcupine caribou. Particular attention during low level surveys was made for presence of wintering caribou in the Trevor Range and northern Knorr Range, where Porcupine Caribou were assumed to winter in large numbers during 1970-71, 1971-72, and possibly 1973-74. We examined the Southern Richardson Mountains and the Peel River Basin during Porcupine Herd surveys to locate any evidence of caribou migrating north out f the Knorr and Trevor Range or the Bonnet Plume basin.

RESULTS

The distribution and relative abundance of Wernecke caribou in relation to the known distribution of the Porcupine Herd is presented on Map I. We found that regions where Wernecke caribou were found to winter during previous years, were heavily utilized again this year. The Bear River/Wind River Slats Pass area was heavily used as was the Snake River area. Sparse sign was noted in lower Illtyd Creek, southern Bonnet Plume Basin and the northern Knorr Range Highlands. Expanded survey efforts to the east of the Snake River found very heavy sign of wintering caribou along the northern flank of the Wernecke Mountains east at least as far as the Arctic Red River. This survey



Winter Distribution of the Bonnet Plume Herd in Relation to the Porcupine Herd

——— Distribution Boundary

~~~~ Assumed Distribution

Sp– Sparse

H – Heavy

Map 1
~~~~

had to be discontinued due to a shortage of fuel. Abundance of sign was not diminishing in that area and we assume that Wernecke Caribou possibly wintered even further east. Wintering evidence became sparser north of these highlands. Expanded survey efforts to the south in the headwaters of the McQueston Beaver, and Rackla Rivers found only a small region where a sparse number of caribou wintered. Because of the discontinuity of this groups distribution in relation to the Wernecke caribou we believe they are probably associated with another herd ranging further south.

The eastern margin of the Porcupine Herd winter distribution was accurately delineated by a low level survey. The region between the Hart and Wind River drainages also was closely examined and no sign of overlap between the Porcupine Herd and Wernecke Herd winter distributions was found. Surveys across the Southern Richardson Mountains, Trevor Range, Northern Knorr Range, Bonnett Plume Basin to Hungry Lake did not cross any migration or wintering dispersal sign of caribou moving north out of the areas inhabited by Wernecke caribou.

Group sizes observed during low level surveys were not large, seldom greater than 100 individuals. Most bands of caribou were inhabiting Spruce forest and other heavily vegetated habitats.

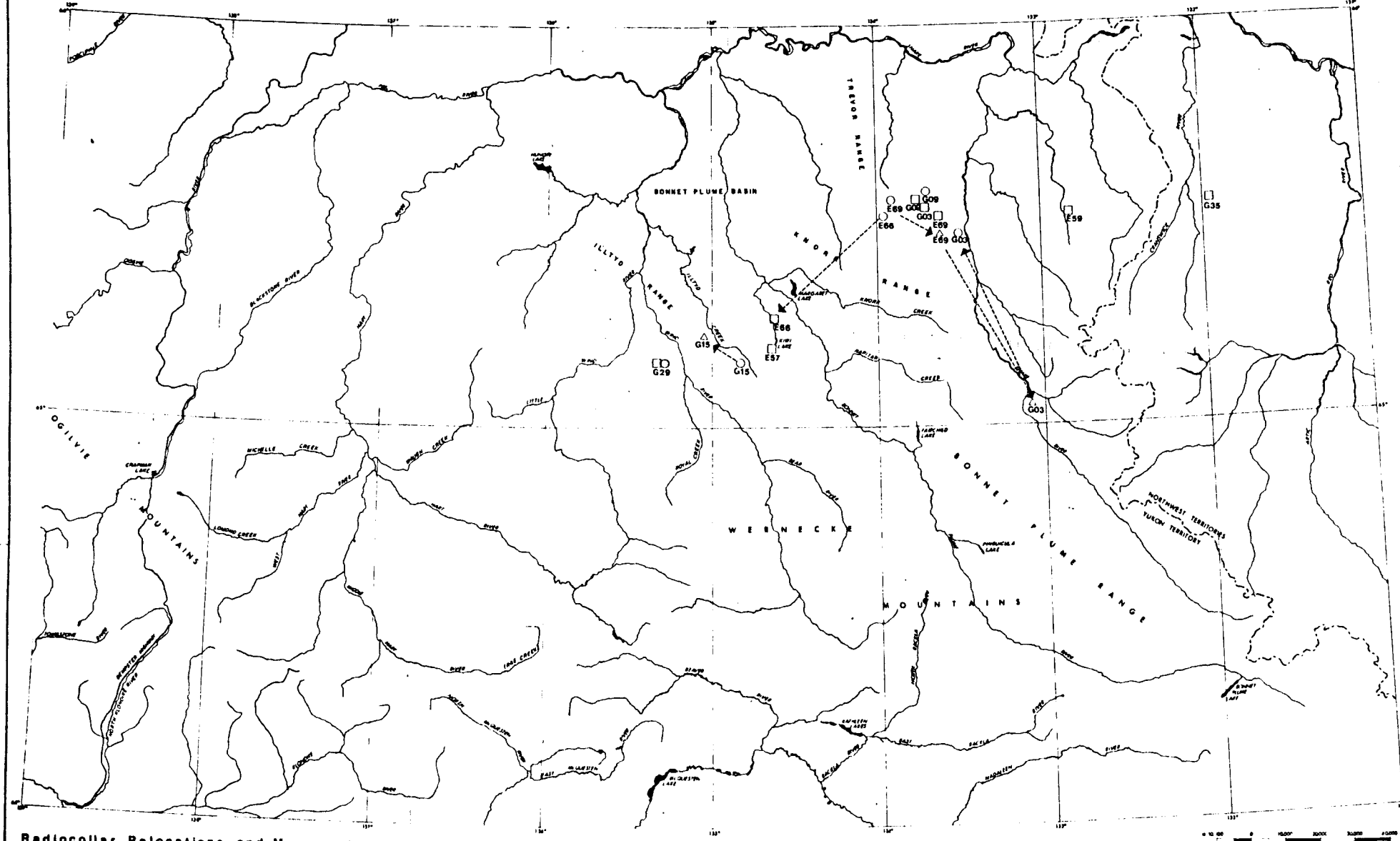
Subsequent relocations of a few radiocollared individuals found the following winter movements between November, January and March relocations.

	JAN.	MARCH
G-15	4 mi./67 days	----------
E-66	----------	13 mi./93 days
E-69	5 mi./58 days	1.5 mi./38 days
G-03	20 mi./58 days	16 mi./39 days
G-09	0.5 mi./95 days	----------

Because of the infrequency of relocations these movement rates may only be useful in determining gross movement trends. The relocations and subsequent movements are illustrated on Map 2.

DISCUSSION

The consistancy with which evidence is found of caribou wintering in the same general locality every winter demonstrates a strong loyalty to home range. This also supports our view that we are dealing with a discrete herd and not animals from the Porcupine Herd. Some evidence of wintering caribou has been found by biologists in the Bonnet Plume Basin since the winter of 1970-71, Table II. The abundance of caribou and evidence observed has varied from est. 20,000 to 'few'. We believe that during the winters 1970-71, 1971-72, and possibly 1973-74 Porcupine caribou did winter in large numbers in the Knorr and Trevor Range, as evidenced by large numbers of caribou migrating north up the Richardson Mountains to the Porcupine caribou calving grounds (Renewable Resources 1974). However



Radiocollar Relocations and Movements

○ November Relocation
△ January Relocation
□ March Relocation
←---- Possible Direction of Travel

Map 2

TABLE II

Winter Caribou Use in the Bonnet Plume Basin and Adjacent Areas

Year	Area	Comments	Source
1970-71	Blackstone-Snake Rivers	15000	Jakemchuk et al 1974
		many thousands	Calef & Lortie 1971
	Knorr Range	ca.10,000+	RRCS unpublished notes
		10-20,000	Calef & Lortie 1971
	Trevor Range	10-20,000	Calef & Lortie 1971
1971-72	Knorr Range	"Few"	RRCS unpublished notes
		"wintering"	Calef & Lortie 1973
	Trevor Range	ca. 3-4,000	McCourt et al 1974
		ca. 10,000	Calef & Lortie 1973
	Noisy Creek	ca. 1,000+	McCourt et al 1974
1972-73	Snake-Bonnet Plume	"few"	Surrendi & DeBock 1976
	Hungry-Palmer Lake	2,000	Doll et al 1974
1973-74	Hart-Snake Rivers	ca.20,000	Doll et al 1974
	Wernecke Mtns.-Wind River	"large numbers"	Surrendi & DeBock 1976
1974-75	Hungry Lk-Wind to Snake River	many trails crossing Peel R into this region by late Nov.,1974	Dennington person. comm. In Roseneau et al 1974
	Knorr-Trevor	occasion scattered sign in the Knorr -Trevor Range	Dennington (pers. comm.)
1975-76	Knorr & Trevor Ranges	scattered caribou & sign but no large concentrations	Dennington (pers. comm)
	Noisy Ck & Lower Bonnet Plume Drainage		
	Hungry Lakes-Wind River	scattered small groups	Dennington & Mossop (pers. comm.)
1976-77	Upper Peel/Hart River east through Snake River drainage & NW flanks of Mackenzie Mtns.	vast majority of herd	B. Horejsi (pers. comm.)
1977-78	Hungry Lk. area	140	J. Russell et al 1978
	Lower Wind River	500-1,000	J. Russell et al 1978
	Lower Snake River	500-1,000	J. Russell et al 1978
	Upper Snake River	100-200	J. Russell et al 1978
1978-79	Lower Wind River	moderate sign	R. Farnell winter surveys
1979-80	Bear River-Wind River	heavy sign	present study
	Upper Snake River	heavy sign	present study
	Lower Snake River	heavy sign	present study
	Lower Wind & Bonnet Plume	sparse sign	present study

the observed presence of caribou wintering in the Bonnet Plume Basin and adjacent areas during subsequent years was probably misinterpreted. Up to and until our initial collaring program in April 1980 biologists formerly working in this area conjectured that all winter caribou and sign of caribou in that area are made by Porcupine caribou which eventually migrate out in the spring. These conclusions were made despite knowledge that caribou do inhabit the Wernecke Mountains during the summer months. We have found no evidence of caribou migrating north out of the Bonnet Plume Basin and adjacent areas.

We believe that failure of marked caribou in the Bonnet Plume Basin and adjacent areas to migrate to Porcupine calving grounds, and the obvious annual utilization of traditional winter ranges, clearly demonstrate that a discrete resident woodland caribou herd "The Wernecke Herd" inhabits this region. With increased survey effort we've found that the winter ranges used are much larger than previously assumed. The somewhat discontinuous distribution of wintering caribou from the Wind River east to at least as far as the Arctic Red River in the Northwest Territories suggests that this herd is also larger than previously assumed.

Group sizes and dense vegetation habitats occupied by Wernecke caribou preclude census attempts. Aerial survey census techniques require highly visable caribou in concentrated group sizes.

The contrast between early and late winter movements between Porcupine Caribou, which may move 150 linear miles from November to March, and Wernecke Caribou, which may move 10 to 30 miles in that period, reveals a sedentary nature for the Wernecke Herd. Quite typical of resident Woodland Caribou Rangifer tarandus caribou.

SPRING MIGRATION ROUTES

COMPOSITION AND CAPTURE RESULTS

FOR THE WERNECKE CARIBOU HERD

APRIL 1981

METHODS AND OBJECTIVES

Between March 26th and April 12th a total of 75.8 hours of helicopter time was consumed to achieve objectives complimenting studies on the Porcupine, Hart River and Wernecke Caribou Herds. A Bell-206 was used to locate migration routes, make positive identification of marked caribou, capture caribou for placing radiocollars, and conducting sex and age segregation counts. At times a fixed wing aircraft was used to assist in moving a base of operations. The schedule of activities as they relate to the Wernecke and Hart River caribou study was as follows:

March 27th

- Relocated and made positive identification of all Hart River radiocollared
- Intensive low level reconaissance of Illtyd Range
- Retrieved a stationary radiocollar in Wind River
- Inspected Kiwi Camp

March 29th

- Relocated some Wernecke radiocollars
- Conducted composition counts at ten sites

March 30

- Made intensive search for any evidence of migrating caribou in the South Richardson Mountains.

March 31st

- Relocated more Wernecke radiocollars
- Conducted composition counts
- Surveyed migration trails

April 7th

- Relocated more Wernecke radiocollars
- Conducted composition counts

April 8th

- Moved base of operation from Eagle Plains Hotel to Kiwi Lake

April 9th

- Captured and radiocollared three caribou in Illtyd Creek

April 10th

- Captured and radiocollared two caribou in Illtyd Creek, and three in the Snake River Area

April 11th

- Monitored some short-term radiocollar movements
- Captured and radiocollared two caribou in Illtyd Creek

April 12th

- concluded activities by moving staff and equipment back to Dawson City

A low level positive visual identification of each relocation radiocollared caribou was made to ascertain the animals condition, and group composition.

Migration routes and other movement trends as evidenced by snowtrails were recorded on 1:250,000 maps on an on-going basis during all activities.

Sex and age segregation counts were conducted by employing two methods;

1) When herds were very large (>50) or in open terrain the observer using a spotting scope made counts from the ground paying particular attention to genital characteristics for sexing and body size or head and antler morphology for aging animals.

2) When herds were small (<50) and in dense vegetation habitats a slow low level overpass was made, and presence or absence of a vulva patch on the rump was used in determining sex.

These composition counts were conducted on all bands of caribou associated with radiocollared animals and on any bands encountered during aerial activities. Counts were made in separate geographic areas during each effort and against the flow of observed movement trend. Caribou bands were not counted on subsequent days in previously examined areas to ensure against second counting of same individuals.

Capture was made possible by using a hand held three barrel net gun fired from a helicopter. The 16 foot triangler net entangle the caribou's limbs allowing the ground crew to restrain the animal for handling. A neck-collared transmitter with a three year life expectancy was fitted on each individual. Cows were exclusively selected, across the herd's distribution.

RESULTS AND DISCUSSION

Absolutely no evidence of caribou migrating north out of the Bonnet Plume Basin and adjacent areas was found. No sign of caribou was found in the southern Richardson Mountains or were trails found crossing the Peel River from its confluence with Hart River to its confluence with the Snake River. We therefore assume that no Porcupine Caribou inhabitated the Bonnet Plume Basin and adjacent areas during winter 1980-81. Much evidence of movement trends was observed along the northern flank of the Wernecke Mountains however. Except for along the Snake River where trails were aligned to the north, the overall migration tendancy was toward the southwest, Map 1.

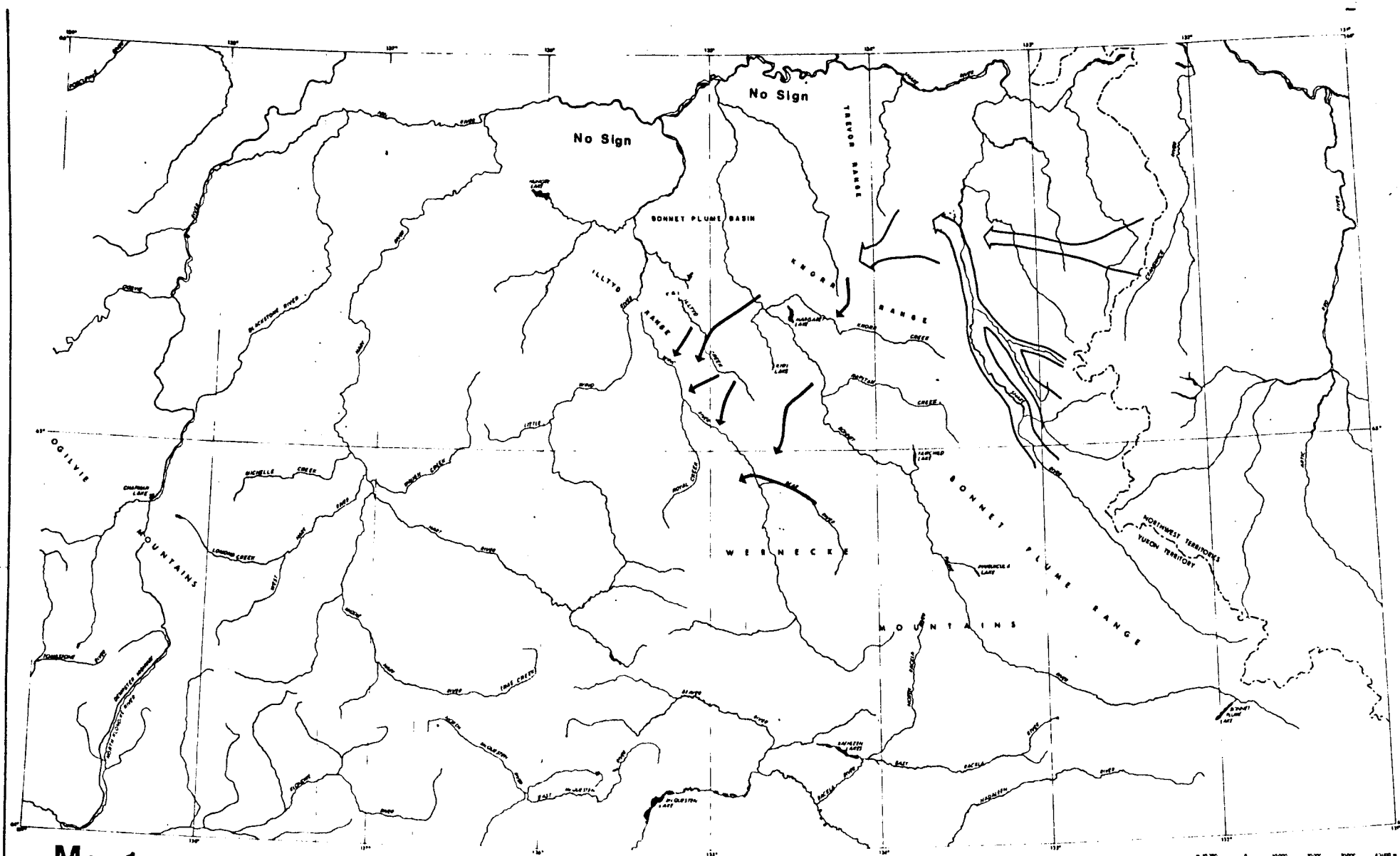
Likewise, most radiocollared caribou relocations between late winter surveys during early March, and these spring migration surveys, tended to be south and west of previous locations, Map 2. The stationary signal emitted from radiocollar C-29 was investigated and we found that this adult cow which was captured July, 1980, was killed

by wolf predation, location on Map 2. A badly torn and mutilated radiocollar was retrieved and no sign of the animals remains was evident. A few wolf tracks around what appeared to be a rendezvous site suggested to us that possibly the collar had been transported by a wolf from the kill site to this location.

Approximately 5.5 miles east of the retrieved collar site (Map 2) we found a wolf killed caribou calf of the year, in a side channel of the Wind River. The carcass was only partially disembowelled and appeared fresh. Tracks in the snow indicated that a pack of four wolves made the kill.

Thorough examination of the alpine and subalpine regions of the Illtyd Range lying between Illtyd Creek and the Wind River found no evidence of any ungulates having occupied that area immediately prior to surveys.

The results for composition counts are listed and summarized on Table I. Of the three band types typically found among caribou herds at this time of year the cow and juvenile bands predominated (N=20). The bull bands and mixed bands (N=7 ea.) were much less common. This is quite typical behavior for caribou herds during the spring migration



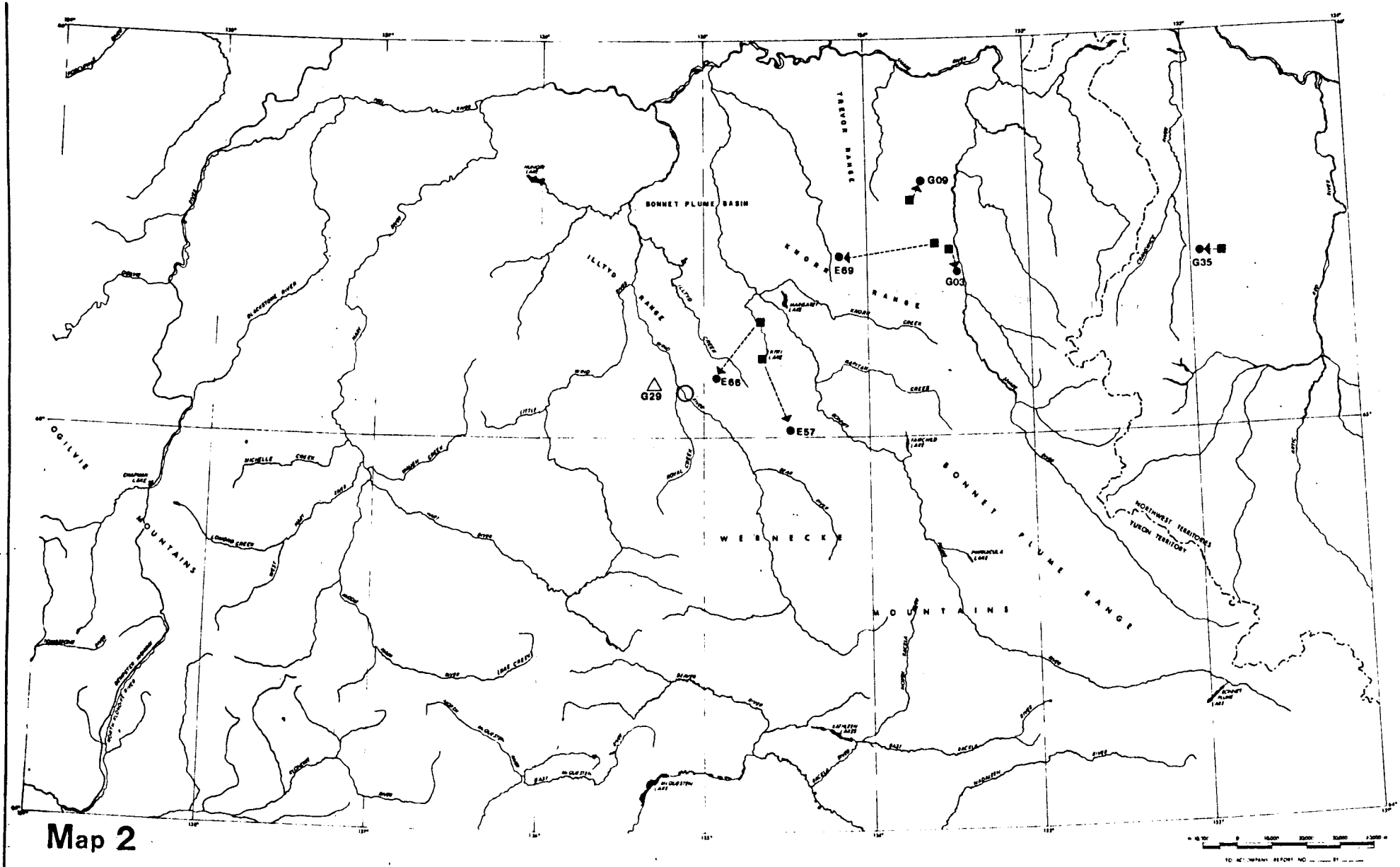
Map 1

Migration Routes Used by the Bonnet Plume Herd

Spring, 1981

Migration Trails Over A Broad Front

Migration Trails Over A Narrow Front



Map 2

Radiocollar Relocations and Some Wolf Kill Sites

- ● New Location
- ■ Previous Location
- △ Stationary Signal
- ○ Wolf Kill Site

life cycle period. Fewer mixed composition bands are encountered as the gravid cows begin segregating from the bulls and migrate towards calving grounds in the higher elevation summer ranges. The bulls remain typically in the dense spruce forest winter range habitats while the cows with associated juveniles are more visable in the highland, subalpine habitats. Hence the less visable bull bands are not as observable during this time of year.

The calf survivorship to this time of year appears excellent at 47.2 calves per 100 cows. By May after typically high spring mortality we expect that this years yearling cohort should be very good. Last years yearling recruitment of 10.9% of the herd should at least offset the natural mortality rate and leave the herd in a stable state. This figure indicates that the herd size is remaining constant and possibly growing slightly. The sex ratio of these counts at 42.1 bulls per 100 cows is not an entirely reliable figure. As previously discussed the segregated bull bands are often not observed because of their sedentary behaviour and habitat selection during this time of year. We expect a sex ratio of somewhere around 60 bulls per 100 cows in this relatively unexploited herd. After an actual count of 896 animals in one half of the herds winter range we suspect that the herd probably numbers somewhere around 2000 animals. The large sample size for these counts, almost one-half the herd, makes these productivity data very reliable (except for bull cohorts mentioned earlier). It would appear after these results that early April is probably

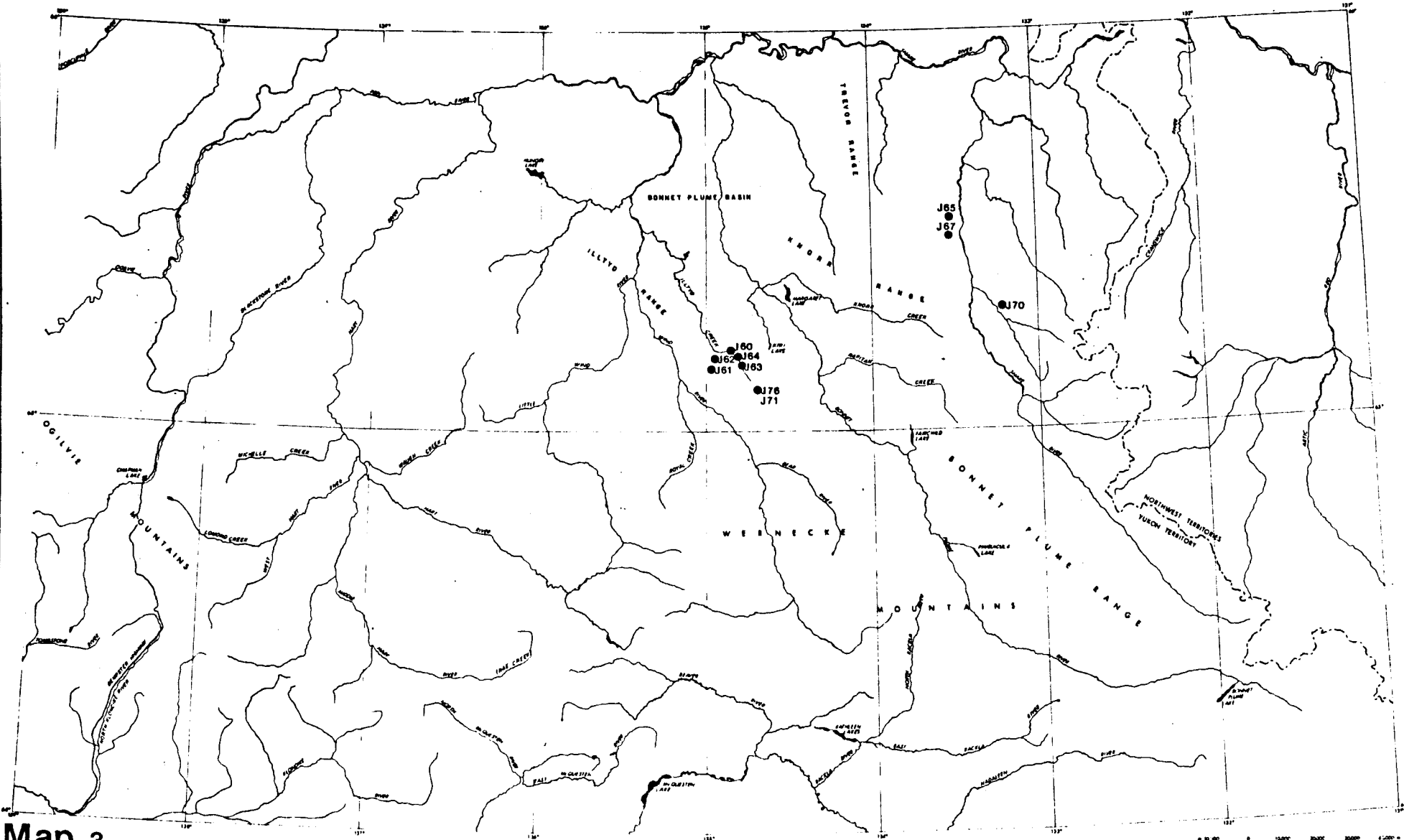
the best time of year to conduct an intensive census of the Wernecke Herd.

Despite an intensive effort to capture and radiocollar caribou across a broad geographic area, poor weather and aircraft fuel limitations prevented us from doing so. We, therefore, placed collars at two principal sites, upper Illtyd Creek, and the Snake River Area, Map 3. A summary of data for radio-collared caribou April 9-11 is given on Table 2.

TABLE 2

COLLAR	SEX	AGE	GROUP SIZE	LOCATION
J-60	Cow	Adult	15	Illtyd Cr.
J-61	Cow	Imature	12	Illtyd Cr.
J-62	Cow	Adult	17	Illtyd Cr.
J-63	Cow	Imature	---	Illtyd Cr.
J-64	Cow	Adult	8	Illtyd Cr.
J-65	Cow	Adult	10	Snake R.
J-67	Cow	Imature	3	Snake R.
J-70	Cow	Adult	10	Iron Cr.
J-76	Cow	Adult	8	Illtyd Cr.
J-71	Cow	Adult	12	Illtyd Cr.

Our proficiency at capturing became better as the program progressed. The last two individuals were captured and released within 16 minutes of initiations of chase (six minutes helicopter time, 10 minutes to collar, untangle, and release the animal). All captured caribou exhibited full mobility and typical behaviour when released. We expect these marked individuals to adequately augment others marked animal and provide ample information on the status and behaviour of the Wernecke Caribou Herd for the duration of this project.



Map 3

Radiocollaring Capture Sites

TABLE I

SPRING COMPOSITION, PRODUCTIVITY, AND MINIMUM POPULATION COUNT OF THE WERNECKE CARIBOU HERD

		COMPOSITION						
DATE	SITE	COW	CALF	YEARLING	IM. BULL	MAT. BULL	BAND TYPE	TOTAL
81-3-28	1	---	---	--	--	9	B	9
	2	23	9	4	2	2	M	40
	3	11	8	1	2	-	CJ	22
		---	---	--	1	16	B	17
	4	---	---	1	8	-	B	9
	5	33	16	11	5	5	M	70
		6	4	1	-	1	CJ	12
	6	7	4	2	-	1	CJ	14
	7	12	3	--	3	-	CJ	18
		11	3	1	1	-	CJ	16
	8	---	---	--	-	9	B	9
	9	7	5	3	-	-	CJ	15
	10	37	17	5	5	11	M	75
81-3-31	11	5	1	3	-	1	CJ	10
	12	---	---	--	1	7	B	8
	13	1	--	--	-	5	B	6
	14	75	30	10	13	3	M	131
	15	1	2	--	4	-	CJ	7
	16	2	1	--	-	-	CJ	3
	17	78	47	22	5	8	M	160
81-4-7	18	10	5	1	-	-	CJ	15
	19	4	3	1	1	-	CJ	9
		10	7	1	3	1	M	22
	20	5	--	2	1	1	M	9
		--	--	6	--	5	B	11
		2	--	1	2	-	CJ	5
		2	2	--	-	-	CJ	4
	21	5	--	2	1	-	CJ	8
		1	--	1	1	-	CJ	2
		3	2	2	1	-	CJ	8
		4	1	1	2	-	CJ	8
		9	4	2	-	1	CJ	16
		6	1	1	4	1	CJ	13
	22	3	1	1	4	-	CJ	9
TOTALS		373	176	86	70	87		792
%		47.1	22.2	10.9	8.8	11.0		
				Recruitment				
cow/100			47.2	23.1		42.1		
			Survivorship			sex ratio		

Unclassified 104
Total observed 896

B-Bull Band = 7
M-Mixed Band - 7
CJ-Cow and Juvenile Band = 20

CALVING SURVEYS IN WERNECKE MOUNTAINS

DON RUSSELL
MAY, 1981

INTRODUCTION

This survey was one aspect of a 2-3 year project designed to examine the population status and inter-relationship between resident caribou and Porcupine caribou in the southern portion of Porcupine caribou winter range.

Map I shows the 1981 late winter distribution of caribou in the study area and specific locations of radio-collared animals. From Map I, it is apparent that an overlap occured in late winter between resident and Porcupine caribou in the Hart River basin although no overlap was apparent in the Bonnet Plume basin and adjacent Wernecke Mountains.

OBJECTIVES

This survey was to document the:

a. calving success in the study area
b. timing of calving in the study area
c. location of calving
d. habitat preference for calving
e. specific location of radio collared caribou

In order to determine whether the resident animals in the study area are not simply a satellite herd of the Procupine herd, we felt it important to document the timing of calving to compare with the calving dates for the Porcupine herd. As well, in order to come up with any impact recommendations it is important to delineate the areas and habitats chosen for calving.

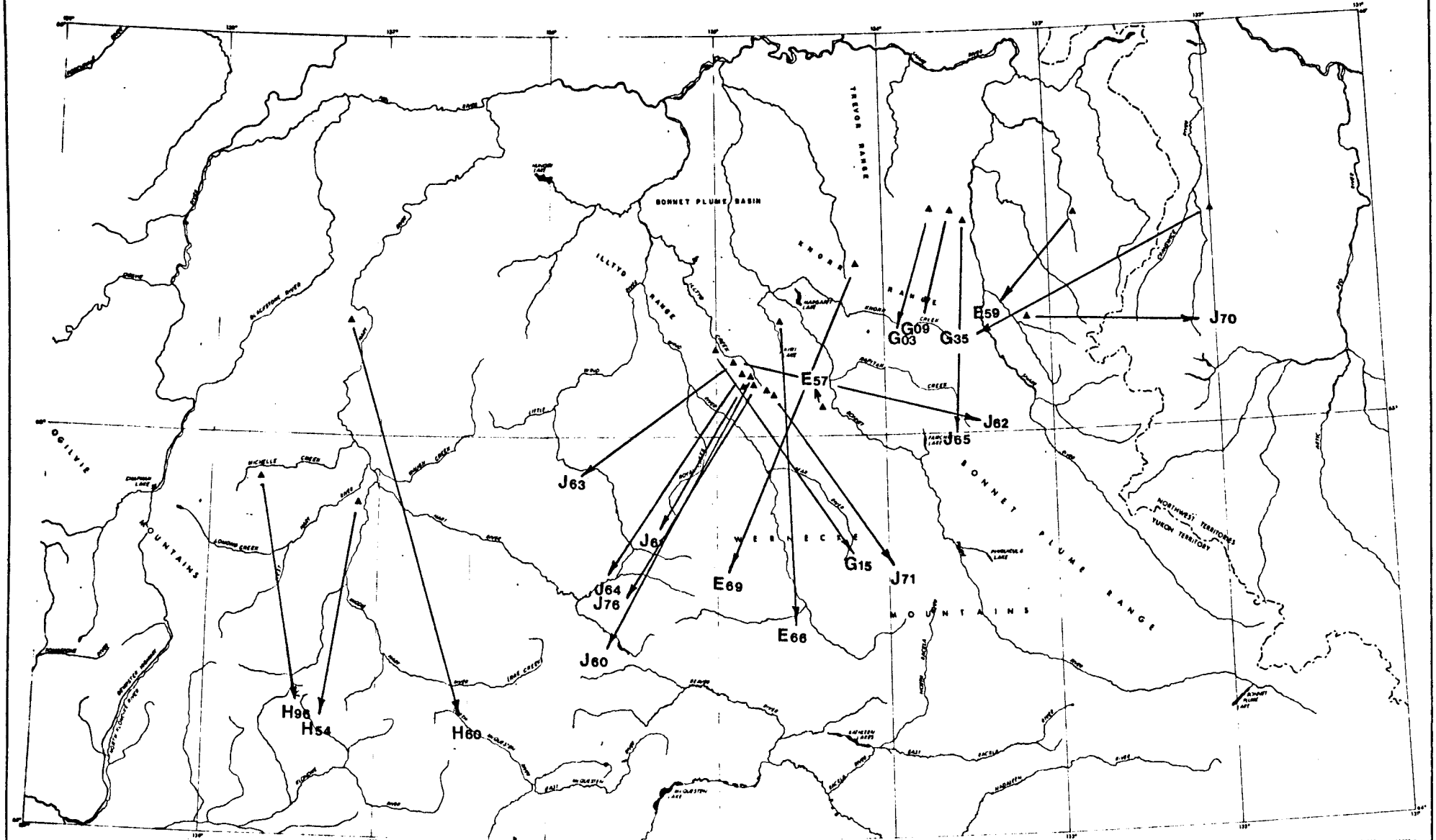
METHODS

A Cessna 206 was employed for high level radio relocations and low level visual spotting. As well Bell 206 helicopter was utilized for low level visual relocations of radio collared and associated caribou.

It was decided to base our results strictly on radio collared animals since calving cows were extremely difficult to locate without the aid of radio collars and since non-calving cows chose habitats in which they could be easier spotted.

RESULTS

Table I summarizes the results of our relocation surveys while Map 2 depicts known and probable calving sites within the study area and movements of radio collared animals from spring locations.



Map 2. Calving relocations and movements from spring locations, 1981

TABLE I Summary of Relocation Survey

COLLAR	STATUS AT LAST FIX	LATEST CALF DATE	HABITAT SELECTION	REMARKS
E-57	unknown	-----	alluvial valley bottom	suspected cast collar or mortality
E-59	unknown	-----		general relocation only once; could not relocate on subsequent flights.
E-66	calf	May 26	subalpine shrub	very difficult to visually relocate
E-69	no calf	-----	alpine basins	relocated 4 times, no calf as of May 26 when 3 cows and 1 calf associated
G-03	calf	May 19	talus alpine	first calf observed
G-09	unknown	-----	steep alpine	by herself in steep alpine appeared ready to calve
G-15	unknown	May 24	alpine cirque	at last fix animal lying down and never getting up. Probably in labour.
G-35	no calf	-----	alpine basin	relocated 3 times associated with up to 15 noncalving females & young bulls
H-54	unknown	-----	subalpine shrub	could not get visual relocation in calving type terrain associated with 2 cow, 1 calf on May 21.
H-96	unknown	-----	subalpine shrub	could not get visual relocation in calving type terrain
J-60	unknown	N/A	alpine	general relocation with fixed wing and could not relocate
J-61	calf	May 26	alpine	3 cows associated
J-62	unknown	-----	steep alpine	could not find on May 26. In cirque valley with 3 cows, 2 calves, 1 yearling, Probably calved.

TABLE I CONT'D

COLLAR	STATUS AT LAST FIX	LATEST CALF DATE	HABITAT SELECTION	REMARKS
J-64	calf	May 24	talus alpine	in same side valley as J-76; one collared cow & 1 calf seen.
J-65	calf	May 21	talus alpine	1 cow and 1 calf associated
J-70	calf	May 24	alpine ridge	with 2 cows and 2 calves; 2 grizzlies in vicinity
J-71	calf	May 21	talus alpine	1 cow associated
J-76	calf	May 24	talus alpine	see comments under J-64

Table I sets out known lastest calving dates (when collared cow and calf were first observed). Terrain chosen by calving caribou was extremely rugged and difficult to survey. Normally several passes through a small confined side valley were necessary to spot the collared animal. Invariably if the cow was observed after numberous passes, she was accompanied by a calf. Table I shows that 8 calf/collared cow groups were observed; 2 collared cows observed were only relocated at high elevation on May 20 and not relocated again. 1 collared cow either lost her collar or is a mortality; 3 collared cows could not be seen after repeated passes in side valleys and are suspected to have calved; 1 collared cow appeared to be in labour and no attempt was made to return and confirm the birth and the remaining collared cow was observed alone in calving type terrain and appeared to be ready to calve. Optimistically, therefore, working with a base of 15 animals 13 (or 86%) probably calved or pessimistically (if we assume that the 5 unconfirmed animals had an equal chance of having calves as the

10 confirmed) then calving success would be 12 of 15 or 80%.

DISCUSSION

Calving Success & Timing

A calving success defined as calves per 100 cows observed within a week of calving was between 80-88% based on 15 collared females (as discussed in "results" section). This figure is in agreement with literature estimates for most caribou herds (Bergernd, 1979).

Figure 1 is a best guess reconstruction of timing of calving from May 19 to May 26. If we define peak of calving as that date when 50% of calves are born then peak of calving for these caribou is May 23.

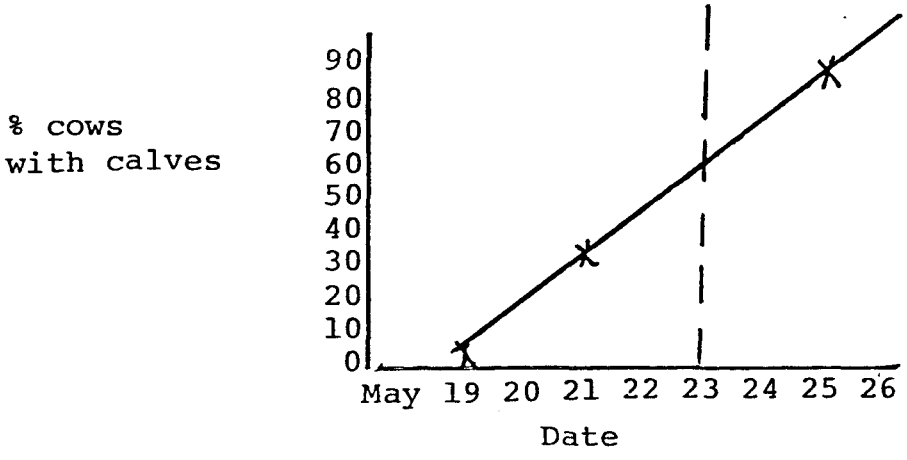


FIGURE 2. PROGRESSION OF CALVING 1981

This is about 10-12 days earlier than dates reported for the Porcupine herd (Curotolo & Bent, 19). Porcupine caribou calving peak is about June 4-6th. This fact suggests that we are dealing with a distinct herd rather than a satellite group of the Procupine herd. Peak of calving for Wernecke Mountain caribou agrees favourably with South Yukon Mountain caribou herds (MacMillan Pass (Hayes, pers. comm.,

Squanga Lk.-Larsen1973, 1980; Burwash herd; Gauthier, pers. comm.).

CALVING LOCATION AND HABITAT SELCTION

Caribou invariably chose very steep confined sidevalleys and cirque basins for calving. These terrain types were utilized throughout the study area (from Map 2) and although local areas of concentration were noted, we do not believe this herd has a well defined calving ground commonly found in barren-ground caribou. In fact 5 of our spring 1981 collared caribou calved in areas outside of known summer range (J63, J61, J64, J60, J76) necessitating the expansion of subsequent surveys. Based on results of the present study and similar studies of woodland caribou elsewhere, the whole topic of traditional calving grounds should be re-examined.

Although selection for steep rugged terrain is considered an adaptation for predator avoidance (Bergernd 1979), only one pair of grizzlies were observed in the vicinity of calving caribou. No wolves were observed.

Alpine vegetation was present on all but three calving sites (these were subalpine shrub). A stop at one of these sites revealled that plant phenology was very early with *Saxifragia oppositifolia*, *Anemone parviflora* and *Arctostaphylos alpina* flowering. Buds were not even swelled on most of the shrub species.

SUMMARY

This survey revealled that caribou in the Wernecke mountains had a good calving success (80-88%) peaking around May 23. These results are typical for southern Yukon woodland caribou herds and differs significantly (peak of calving) from the Procupine caribou herd.

Calving was widespread throughout the study area and not confined to any traditional calving grounds. Choice of calving site was normally steep alpine talus or cirque basins which contained sparse vegetation in an early phenological stage.

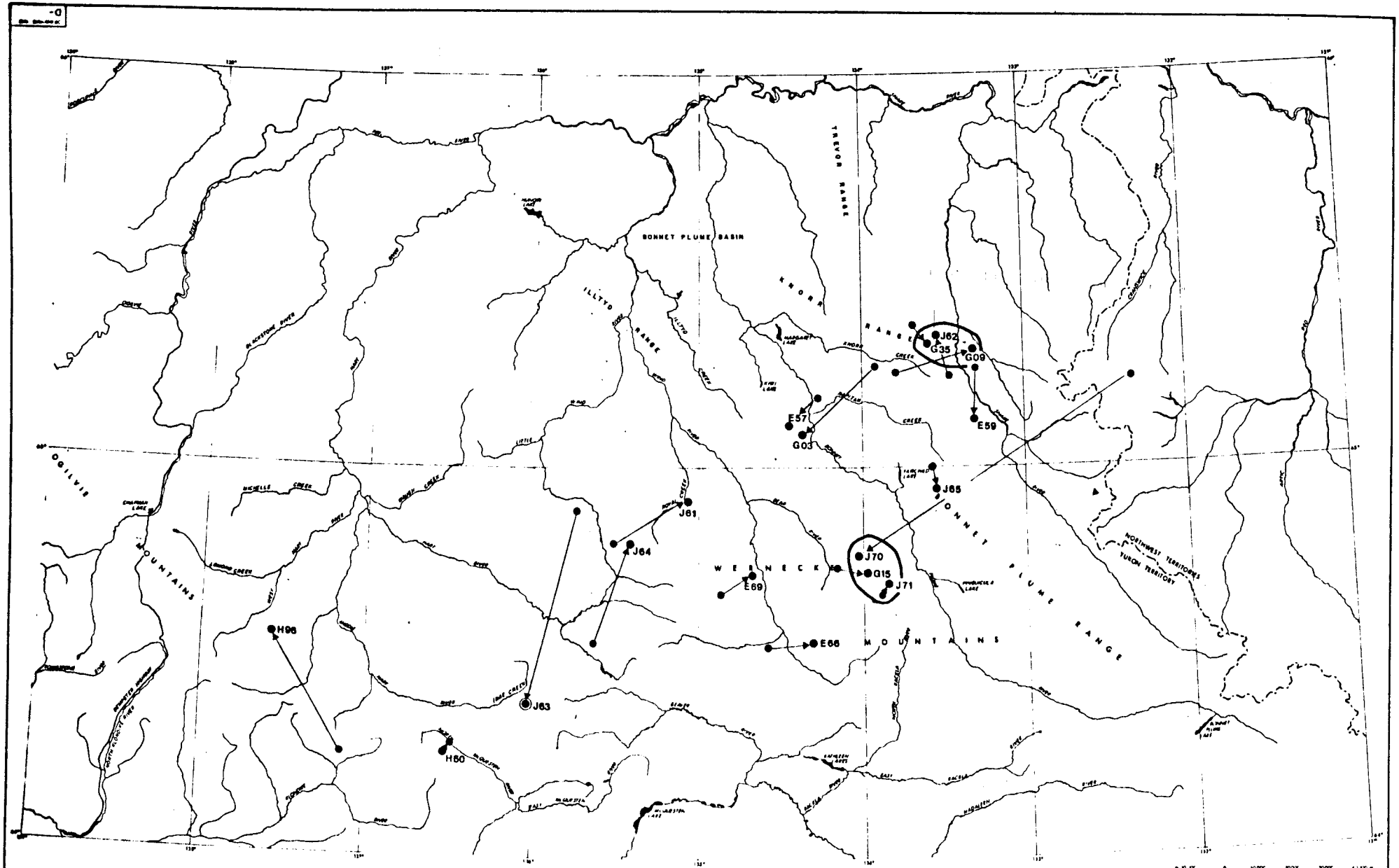
Post-Calving Relocations of Radiocollared Caribou of the Wernecke and Hart River Herds, July 10 and 11, 1981

On July 10 and 11, high level radiotracking surveys with a float equipped Cessna 206 were flown from a base at Kiwi Lake. No effect was made to obtain visual identification of radiocollared caribou. High level fixes were simply recorded on 1:250,000 maps. Due to an equipment malfunction during coverage in the headwaters of the Hart River, much of that area was not adequately monitored. Hence, some Hart River Herd individuals were not located. Altitudes maintained during these surveys were between 8-10,000' a.s.l. Transects were spaced approximately 30 miles apart to insure good overlap for picking up these 20 mile range transmitters. Total coverage required 13.1 hrs. flying time.

Seventeen radiocollared caribou were relocated, two individuals from the Hart River Herd and fifteen from the Bonnet Plume Herd. The attached map gives the July relocations for these individuals with their previous calving season location and probable direction of travel between relocations.

One interesting finding from these surveys was the location of J-63, circled on the map, in the extreme headwaters of Rae Creek. This individual is within the periphery of what we previously thought to be the Hart River Herds centre of habitation and in fairly close proximity to a Hart River Herd radiocollared individual, H-60. This suggests that considerable overlap may exist between the Wernecke Herd and the Hart River Herd summer ranges. Future monitoring for this individual may produce even more interesting results with respect to migration and home range loyalty between the two herds.

Another finding suggests that large post-calving aggregations may have dispersed in the headwaters of Gillespie Creek and at the Knorr Creek-Snake River area vicinities circled on the map. At each location, three radiocollared individuals were relocated in close proximity to each other. Also with more radiocollared caribou to monitor now in the Wernecke Herd, we are finding the summer range occupation to be over a very broad area.



July Radiocollar Relocations 1981

FALL RUT LOCATIONS AND COMPOSITION OF THE WERNECKE CARIBOU - OCTOBER 9 - 12, 1981

OBJECTIVES

1. Determine rut locations and composition of Wernecke caribou;
2. Determine fall migration movement trends.

METHOD

Radio relocations were conducted from a fixed wing aircraft. After relocations a B206 helicopter, containing radiotracking equipment, was used to conduct sex and age composition counts. Migration trails were noted on both flights from relocation (compared to July) results and snow trailing.

Two methods were employed on composition counts:

1. When large herds (+50) were encountered we landed and made counts at a distance with a spotting scope;
2. When smaller bands were located we made the counts from the aircraft as it proceeded low level directly behind and then over the bands.

In both methods counts were recorded on a hand held five digit tallywacker device.

It was hoped that we could get a sufficient composition count to assess this years fall calf crop, yearling recruitment and sex ratio, to aid the analysis of population reproduction status. We also expected to get another season's worth of specific migration route information in

relation to the proposed Bonnet Plume Basin development. By comparison of October's (1981) radiocollar relocations and last October's (1980), we hoped to determine individual and herd loyalty to rutting areas. All of these field efforts were devoted to the Caribou in the Bonnet Plume region only. The Hart River Caribou were not dealt with this fall.

RESULTS

The high level fixed wing radiotracking survey on October 9th relocated eleven radiocollars. Due to daylight and aircraft fuel limitations seven of these signals were located precisely and four signals were located by a general fix only.

The following table gives results from the composition counts:

Bonnet Plume Herd Composition Counts, October 12, 1981.

	Cow	Calf	Yearling	Im. Bull	Mat. Bull	Total
1.	3	2	-	-	-	5
2.	26	4	3	12	3	48
3.	10	4	4	2	5	25
4.	3	1	-	3	2	9
5.	4	1	-	5	1	11
6.	13	5	2	4	3	27
7.	48	12	9	20	16	105
8.	33	4	2	12	5	56
9.	1	1	-	1	-	3
10.	3	4	-	-	1	8
11.	2	2	-	2	-	6
12.	-	-	-	-	1	1
Totals	146	40	20	61	37	304
%	46	13	7	20	12	
/100 Cow		27	14	67		

Ave. Band Size = 25

The movement of caribou since previous summer location (if known) is given in Map I. Signal emitted from radiocollar transmitter E-57 has been stationary since May/81 and we suspect that mortality or cast collar has occurred. An attempt at confirmation will be made next spring. The assumed movements between summer range and mid-migration distribution of radiocollars suggests that fall migration proceeds north and east exclusively to winter ranges on the north flank of the Wernecke Mountains.

Snow trail alignments observed during the helicopter survey on October 12th, also tended north and east. The map in Figure 2 presents major snow trails observed and sites where composition counts were conducted. Major specific migration routes were found moving east through Slats Pass, north down Ittlyd Creek, east up Rapitan Creek and north through the Know Range. The single highest concentration of rutting caribou was observed immediately north of Fairchild Lake in an unnamed tributary to Rapitan Creek (3-8 on Figure 2).

Because of the limited time and fuel constraints restricting intensive survey in such a remote region of the Yukon, we were unable to obtain as large a composition sample as one would desire to assess reproductive status. A total of 304 caribou were classified.

Low fall calf crop (27 per 100 cows) low yearly recruitment (7 per 100 cows) and a sex ratio with a rather high proportion of bulls (67 per 100 cows) make these counts suspect for a lightly exploited herd where

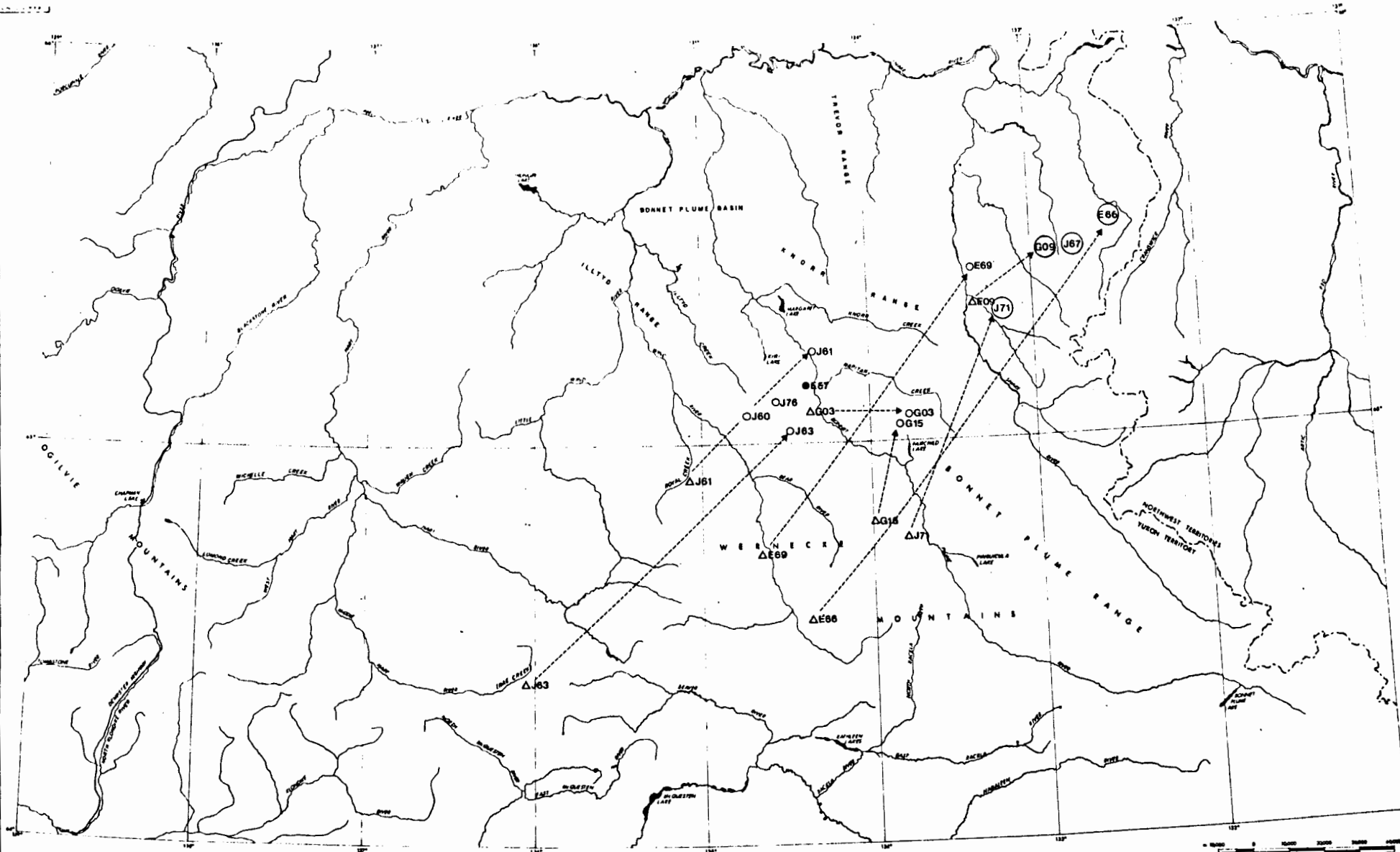


Figure 1

Fall (Oct. 9th) Radiocollar Relocations With Subsequent Summer Locations and Assumed Movements

○ Fall Relocation (J71) Approximate Location

△ Summer Location

● Stationary Signal

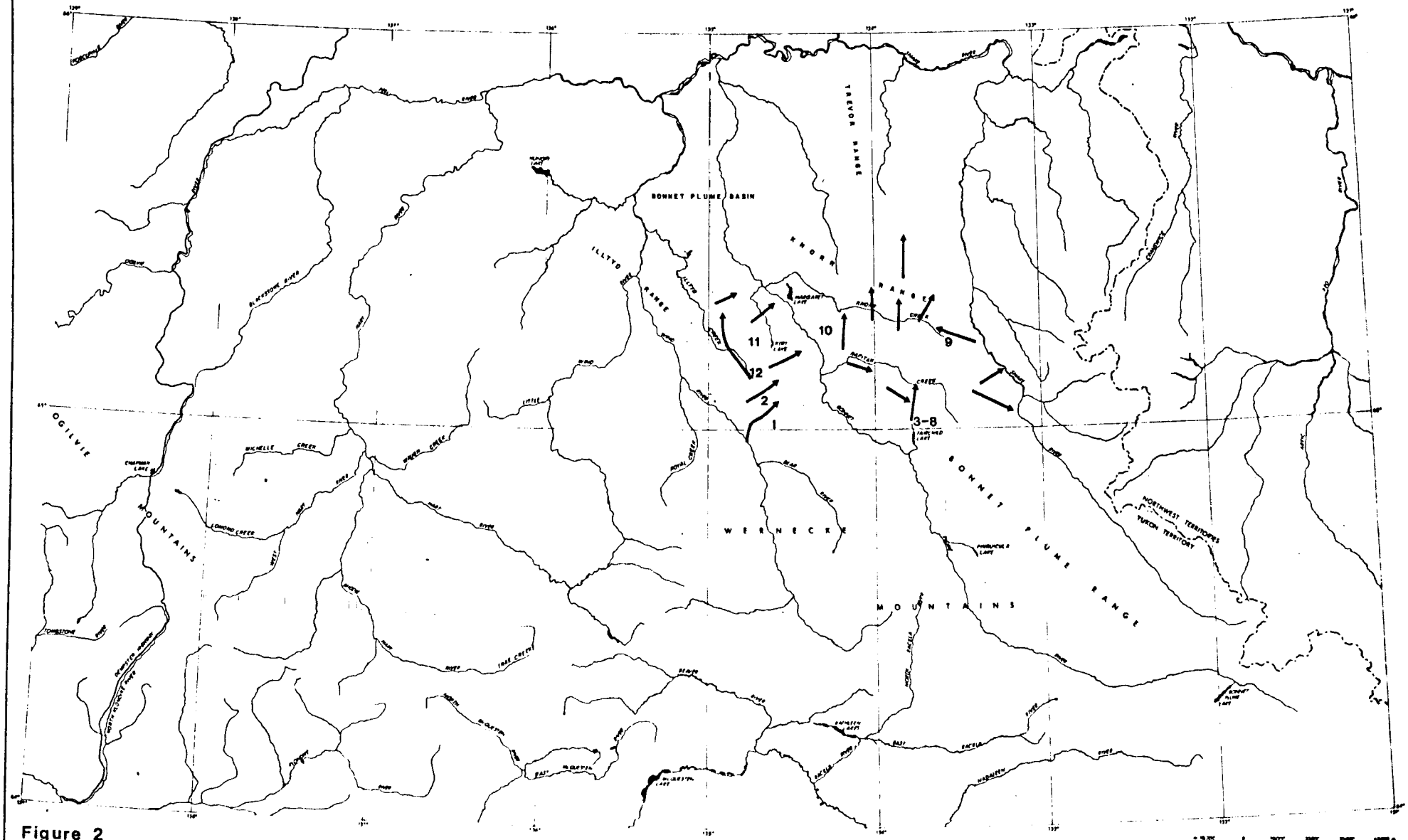


Figure 2

Specific Snow Trail Alignments and Composition Count Site Locations

predators appear to be moderate to low. Previous late winter composition counts (April, 1981) also suggest that these counts could be inaccurate. If we assume that this population is around 2000 caribou, then we have an adequate sample at 15%. However, from past experience, we know that herd composition may vary a great deal across a given geographic distribution and a strong possibility exists that our count is inadequate because we didn't get a sample across the herds entire fall distribution. Another effort at composition counts should be conducted next spring.

Analysis of this herd's possible loyalty to specific rutting areas through comparison of fall radiocollar relocations shall be done for a final report.