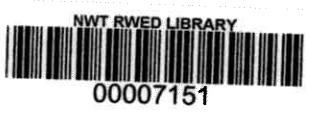

CARIBOU TAGGING ON THE KOUKDJUAK RIVER, BAFFIN ISLAND, N.W.T. A SUMMARY AND ANALYSIS OF TAG RETURNS

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N.W.T. WILDLIFE SERVICE

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ABSTRACT

A total of 3114 barren-ground caribou (*Rangifer tarandus groenlandicus*) was collared or ear tagged on the Koukdjuak River, Baffin Island, Northwest Territories, from 1974 to 1982. The purpose of the project was to determine the movements of caribou between their calving and wintering areas through tags returned by hunters. The sex ratio of tagged adult caribou was 23 males:100 females. For years in which tagging was not obviously biased for either cows or calves, the ratio of tagged calves to cows was 40:100. Adult female caribou comprised 59% of the animals tagged of known sex and age, adult males 13%, yearlings 9% and calves 19%. Results from tagged caribou data indicate that at least 60% of cows produced calves and that calf mortality was between 18% and 33% from the time of calving to mid-August.

As of 30 June 1984, about 11% of the tags have been returned by hunters. Tags from female caribou represented 71% of all hunter returns. The average interval between tagging and recovery by a hunter was 30 months, and the greatest 94 months. Most tag recoveries were made between December and May. Approximately 61% of the tag recoveries were from Foxe Peninsula.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

During the establishment of a commercial arctic char fishery on Nettilling Lake on Baffin Island in the summer of 1974, large numbers of barren-ground caribou (Rangifer tarandus groenlandicus) were observed migrating southward across the Koukdjuak River (Land and Bourque 1974). As an experiment, a few caribou were collared and ear tagged. Subsequently, an annual program of tagging on the Koukdjuak River was initiated in 1975 by the N.W.T. Wildlife Service, Baffin Region, with the involvement of the Hunters and Trappers Associations of Cape Dorset, Pangnirtung, Frobisher Bay, and Lake Harbour (Redhead 1975, 1976; Popko 1977, 1978, 1979; Kraft 1980, 1981, 1984).

The main objective was to determine the movements of caribou from their calving grounds in the Dewar Lakes area (Elliott 1972) to their wintering areas in the south through tags returned by hunters. During the tagging operation additional data were collected on the post-calving condition of females, calf survival, sex and age ratios, the number of caribou observed using the Koukdjuak River crossing, and the crossing dates. This report summarizes the tagging data from 1974 to 1982 and the hunter returns to June 1984.

The Koukdjuak River is located on south Baffin Island and drains west from Nettilling Lake into Foxe Basin (Fig. 1). It crosses the Great Plain of the Koukdjuak, a flat featureless area characterized by many small streams and ponds, and an important nesting area for geese (Nettleship and Smith 1975). The river

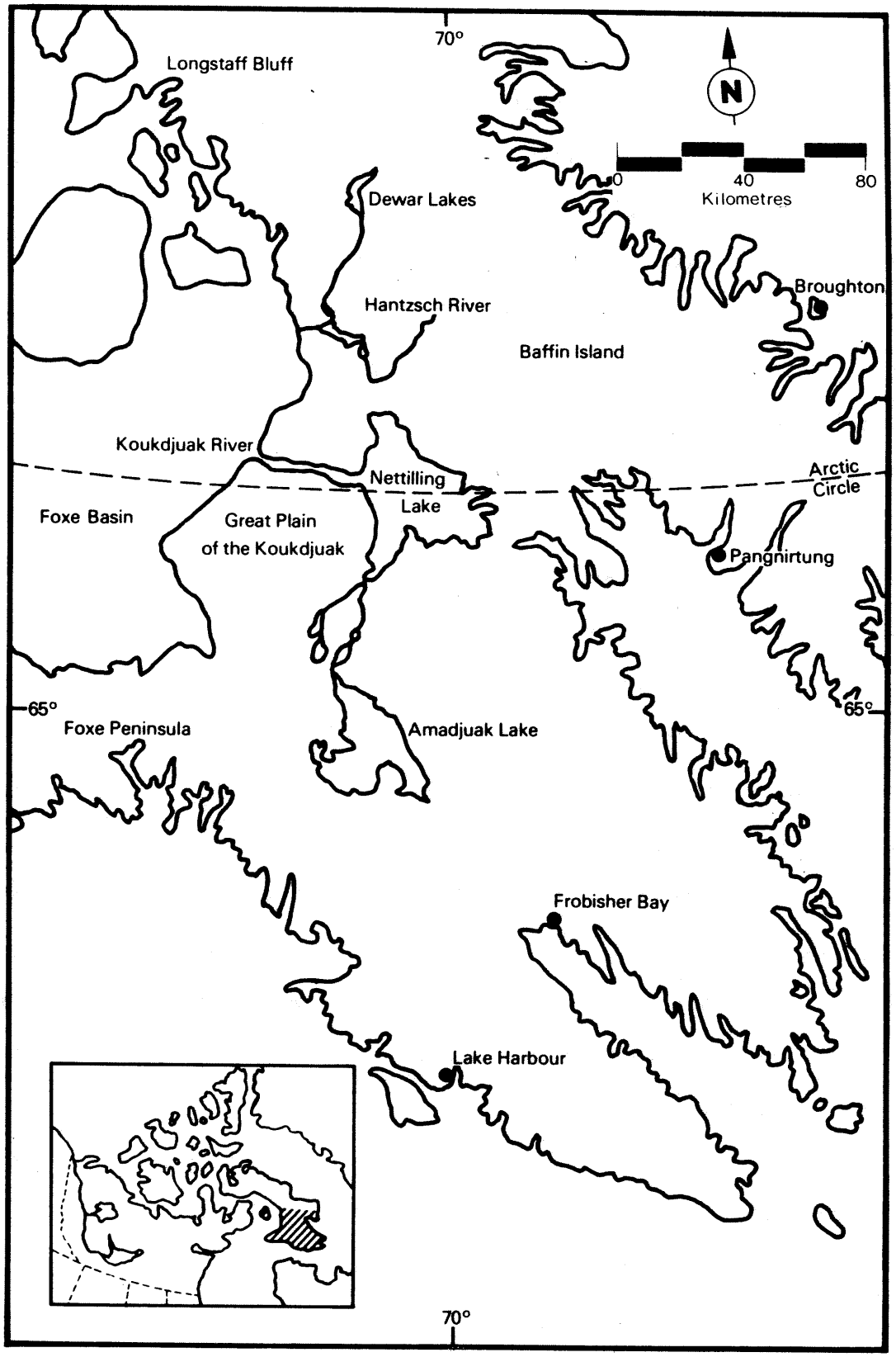

Figure 1. Location of Koukdjuak River on South Baffin Island, Northwest Territories.

varies in width from 1.2 km to 5.7 km and is about 75 km long. The depth of the river varies, depending on the amount and timing of the spring run-off and ice break-up on Nettilling Lake. The depth of the water does not affect the crossing of the caribou, although the presence of ice in the river is a significant factor.

Caribou arrive at the north shore of the river in mid to late July from calving grounds located in the area of Dewar Lakes and Longstaff Bluff. Caribou do not always cross the river immediately, but move along the river, resting and grazing before crossing. The majority of the caribou cross where there is a set of islands 20 km from Nettilling Lake, and from Niko Island and its surrounding islands (Fig. 2). Caribou continue to cross until mid to late August.

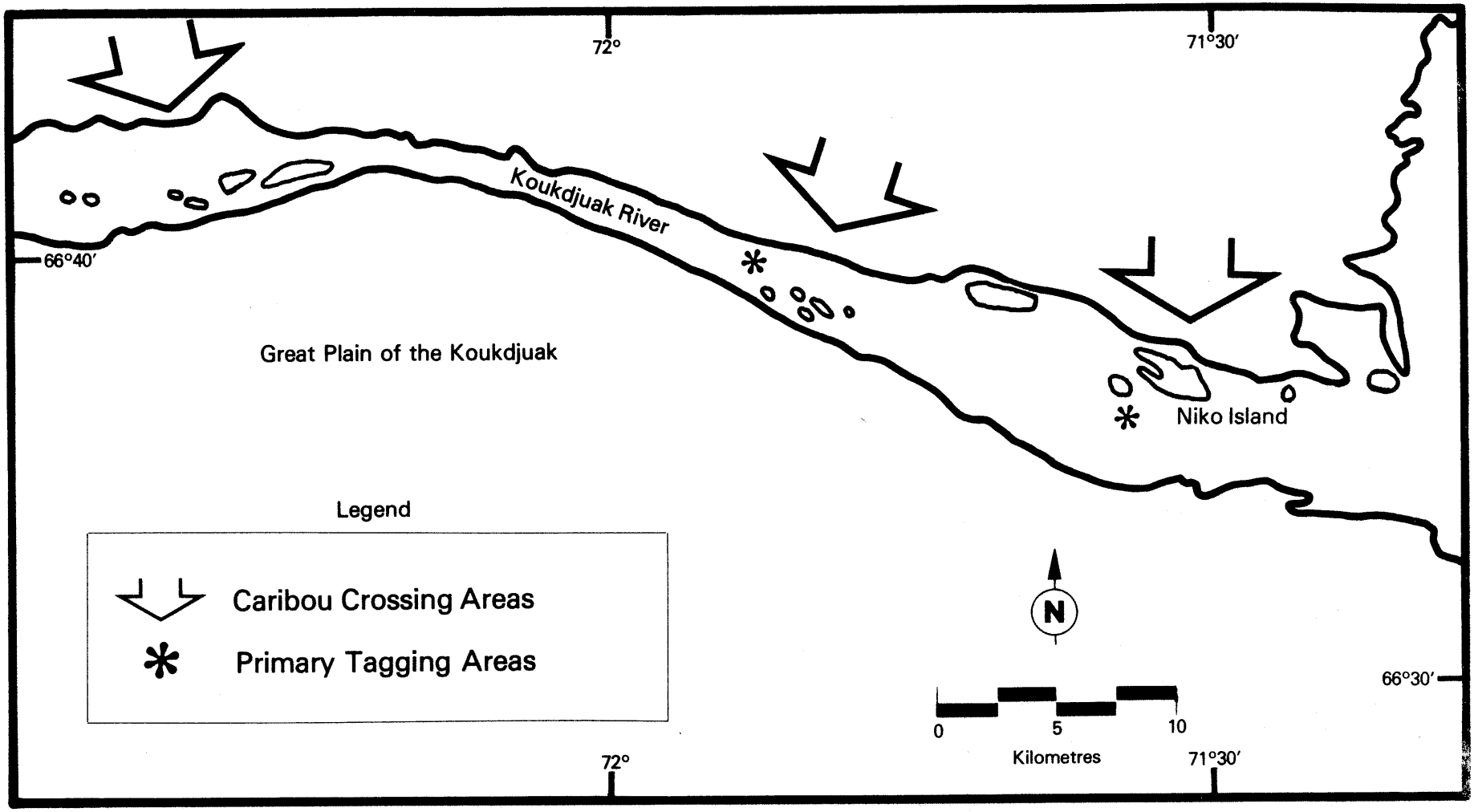

Figure 2. Location of caribou crossing areas along the Koukdjuak River.

METHODS

Tagging

Capture and tagging techniques on the Koukdjuak River have remained the same throughout the project. Swimming groups of caribou are approached with a 22-foot freighter canoe powered by an outboard motor. Individual caribou are captured using a wooden or aluminum shepherd's hook. The animal is then firmly held with its head and rump against the left side of the canoe while a tag is affixed to one ear.

In 1974 and 1975, numbered plastic neck bands of various colours were put on some of the captured caribou. Ketchum Kurl Lock aluminum ear tags were used from 1974 to 1976 (Fig. 3, Appendix). These tags were applied using a device resembling a hand-held stapler. Beginning in 1976, red plastic Starbar and Temple tags (Fig. 3) were applied using a knife-like instrument that cut through the ear and inserted the tag. The change from Kurl Lock to Starbar and Temple tags was made with the intent to make the tags more visible to hunters, and hence increase tag returns (Redhead 1979). Under field conditions, it was found that the plastic tag took slightly longer to apply; however, up to six applicators could be loaded and ready for use. Occasionally, caribou suffer minor injuries during tagging such as bleeding from the tag-insertion slit and broken antlers.

Though calves are susceptible to separation from their mothers while swimming, few cases of long-term abandonment during tagging operations were observed. Cows and calves frequently

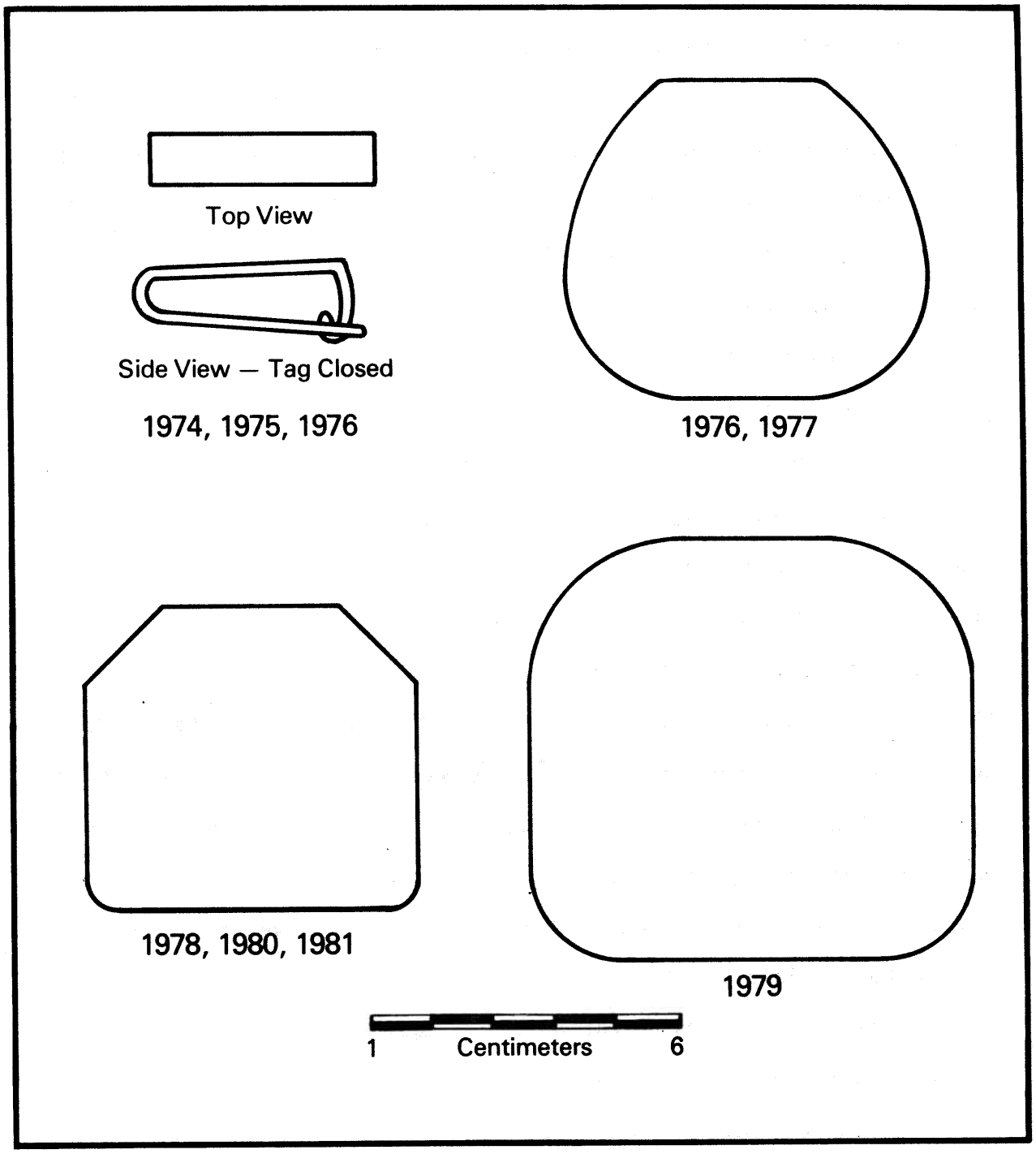

Figure 3. Sizes and shapes of ear tags used to mark caribou at the Koukdjuak River crossing.

expended considerable effort to rejoin each other and did not readily leave the area despite the presence of the tagging crew. When a separation appeared imminent, the tagging crew placed the calf in the canoe and returned it to its mother after tagging. To reduce the chance of separation many calves were not tagged in 1978 and none were captured in 1979. Calves were not selected for or against in other years.

Calves were easily identified by their small body size, brown summer pelage, and antler stubs. Yearlings were smaller than adults, possessed spike antlers, were usually in dark summer pelage, and had a characteristically thin and lanky body form. Adult males had thick antler bases, elaborate antler branching, and a brow tine. The large body size and thick neck also identified mature bulls. Females were identified by the presence of an udder or vulva as determined by palpation while the caribou was held against the side of the canoe. Females with swollen udders were usually accompanied by calves. Adult females with soft, involuted udders were considered to have recently lost their calves. Bergerud (1964) found that in Newfoundland caribou the udder becomes indiscernible (about 2.5 cm in depth) within 3-4 weeks after the calf ceases nursing. Females without udders did not give birth or had lost their calf soon after calving.

Tag Returns

Hunters shooting a tagged caribou turn in the tag to a Wildlife Officer for a reward. Until February, 1980, the reward

for a tag was $3.00. This was increased to $10.00 in March 1980 to provide an added incentive to hunters to return all tags. Upon receipt of a tag the Wildlife Officer recorded the number, kill-date, location, sex, age, and general condition on a return form (Fig. 4). This information was then compared with the tagging information retained on file.

GOVERNMENT OF THE NORTHWEST TERRITORIES
CANADA

FISH & WILDLIFE SERVICE

CARIBOU EAR TAG RETURN FORM

DATE September 23 19 80

WILDLIFE OFFICER P. Kraft HERD South Baffin

LOCATION OF WILDLIFE OFFICE Cape Dorset

EAR TAG NUMBER & COLOUR # 91, 1979 Red

DATE KILLED September 22, 1980 SEX Female

AGE ☐ 1st year (calf) ☐ 2nd year (yearling) ☒ adult

HUNTER Salomonie Pee

CONDITION Good

EXACT LOCATION OF KILL Shukbuk Bay

LAT. 64 47 N LONG. 74 36 W

COLLECTIONS, IF ANY Nil

IF AVAILABLE,

DATE TAGGED 13/08/79

LOCATION TAGGED Koukdjuak River

RECORDED SEX AND AGE AT TAGGING Adult female with calf

TAGGED BY R. Popko

COMMENTS ON REVERSE SIDE ☐

DISTRIBUTION: WHITE - Local Office
PINK - Hunter
CANARY - Retain in book & submit completed book to Yellowknife

NWT 10294

Figure 4. Example of a completed caribou ear tag return form.

RESULTS AND DISCUSSION

Tagged Caribou

Tagging operations during July and August from 1974 to 1982 resulted in 3114 caribou being collared or ear tagged (Table 1). From 1975 to 1982, the average number of caribou tagged per year was 389. The number of caribou tagged was dependent upon the number of caribou, water depth, time of daily crossing, skill of the tagging crew, reliability of field equipment, and most importantly, weather and ice conditions. Caribou crossed the river during rain storms, darkness, and even when the water was rough or a great deal of ice was present. Under those conditions, it was impossible to safely operate a canoe.

Forty-three tagged caribou were recaptured along the Koukdjuak River from 1976 to 1982. Efforts to recapture tagged caribou were inconsistent as emphasis was placed on the application of new tags over capturing caribou already bearing a tag. In 1980, two caribou out of the 421 tagged (0.5%) were found to have lost a tag (Kraft 1980). Tag loss may result from the caribou scratching the tag with a back hoof or by rubbing the tag against a rock. If the insertion slit were enlarged slightly during application, the tag would be easier to remove.

Age and Sex of Tagged Caribou

The proportion of adult males tagged from 1974 to 1982 was consistently low, averaging 13% or 23 males per 100 females (Table 1). This is similar to the adult sex ratio of 23.5 males per 100

Table 1. Age and sex of caribou tagged on the Koukdjuak River, 1974 to 1982.

Year	Calves (%)		Yearlings (%)		Adults (%)		Unknown sex or age (%)	Number of caribou tagged
	Male	Female	Male	Female	Male	Female		
1974	3.7	0	3.7	0	33.3	40.7	18.5	27
1975	6.3	8.0	3.0	5.9	19.2	47.9	9.6	426
1976	12.3	14.8	2.6	3.7	11.4	52.6	2.6	350
1977	8.4	7.9	2.8	5.6	13.3	60.7	1.3	533
1978	3.1	3.4	5.2	8.9	12.3	67.1	0	325
1979	0	0	1.3	3.4	17.9	77.4	0	234
1980	9.0	14.8	4.0	5.5	12.8	53.9	0	421
1981	15.9	15.9	0.9	2.9	10.8	53.6	0	416
1982	10.5	10.2	4.7	10.7	5.5	58.4	0	382
Number tagged	270	306	97	181	404	1794	62	3114
Average annual percentage	8.7	9.8	3.1	5.8	13.0	57.6	2.0	

females found by Elliott (1972) north of the Koukdjuak River. The adult sex ratio in the population is usually closer to 50 males per 100 females (Parker 1972) suggesting that most adult males do not move north of the Koukdjuak River in the spring. Yearling males were also under-represented with a sex ratio of 54 males per 100 females. Most males remain south of the Koukdjuak River and probably summer around Amadjuak Lake and along the south coast of Baffin Island.

On the average 9% of tagged caribou were yearlings, while 19% were calves (Table 1). However, when the data for the biased years (1978 and 1979) are excluded, calves comprised 22.3% of the caribou tagged. Redhead (1979) found that in 1976 calves represented 23% of the caribou located between the Koukdjuak River and the Hantzsch River.

At least 60% of the tagged adult cows produced calves, as inferred by adding the proportion of cows with firm udders (cows with calves) and those with soft udders (recently lost a calf) (Table 2). This is a minimum estimate of production, as females that had lost a calf within a month of calving would have been classed as cows without udders at the time of tagging.

Crossing the Koukdjuak River

Since the tagging project began in 1974, caribou have been observed crossing the Koukdjuak River between 10 July and 18 August with the majority usually crossing between 4 and 18 August. By the second week of July, the river is free of ice and permits a relatively safe crossing. By late July and early August, ice

Table 2. Reproductive status of adult female caribou tagged on the Koukdjuak River in July and August, 1977 to 1982.

Year	Number of adult females	Percent of adult females		
		Soft udder	Swollen udder	No udder
1977	323	15	55	30
1978	218	18	25	57
1979	181	18	60	22
1980	227	9	56	35
1981	223	3	48	49
1982	223	1	48	51
Number tagged	1495			
Average %		11	49	40

usually begins moving downriver from Nettilling Lake (except in 1978 and 1981 when the ice did not break up). The break-up causes a steady stream of candled ice to flow downriver, slowing down or preventing caribou from crossing.

Caribou cross the river at all times of the day or night. Groups of caribou will gather along the north shore and apparently wait for favourable crossing conditions. Some animals, however, will attempt the crossing during rough water conditions, through ice floes, in fog, rain, or snow. Crossing in these conditions will occasionally cause the separation of a calf from its mother. Caribou cross as individuals or in groups up to 200. The average group size from 1977 though 1981 was 22.

The tagging crew can be alerted to caribou crossing by the splashing sounds made when the animals enter the water and by the grunting sounds made by the females and calves. Grunting is fairly constant as the animals swim, probably to keep the cow and calf and the group together. While being tagged, the adults are quiet but the calves usually continue to grunt. Kelsall (1968) mentions that after calving, cows and calves communicate to each other with short grunts, but this behaviour diminishes rapidly in late July and early August. Grunting during the crossing of large water bodies may lead to increased calf survival by keeping calves closely associated with their mothers.

Mortality

During each year of the project, caribou were found dead along the shores or on the islands of the Koukdjuak River. They

died from drowning brought on by exhaustion or injuries from candled ice. The underside of ice floes is covered in razor-sharp ice spikes which do considerable damage to the forelegs, throat, and flanks; even healthy animals were found dead after attempting to swim through ice floes. In most instances where no physical damage was evident on a carcass, the animal was either quite old (teeth worn down to the gumline), or in very poor condition (very thin and no fat reserves).

In all years except 1979 and 1982, less than 1% of all observed caribou were found dead along the river (Table 3). Due to a late spring in 1979, ice was present in the river until 10 August, and a large number of dead caribou was recorded in that year (Popko 1979). In 1982, extended periods of inclement weather may have been a factor in higher observed mortality (Kraft 1984). Of the 26 tagged caribou found dead between 1975 and 1982, 20 were found the same summer they were tagged. The mean length of time between tagging and finding the same animals dead was 8 days. Since the recently tagged proportion of all animals using the crossing was unknown, the effect of tagging on drowning, if any, could not be determined.

Only once was a wolf observed killing a caribou calf along the north shore of the river (Redhead 1976). Almost every year crews have sighted or heard wolves along the river, but predation rates are unknown.

Mortality of calves to the time of tagging was indicated by the difference between the proportion of cows which produced calves (60%, Table 2) and the proportion of cows with calves at

Table 3. Numbers of tagged and untagged caribou found dead along the Koukdjuak River, 1975 to 1982.

Year	Tagged	Untagged	Total	Percent of observed caribou
1975	0	9	9	-
1976	0	11	11	-
1977	1	6	7	0.1
1978	1	21	22	0.4
1979	4	100*	104	3.8
1980	7	16	23	0.7
1981	4	4	8	0.1
1982	9	40	49	1.2
All years	26	207	233	1.05
Percent	11	89	100	(N=30, 358)

* minimum estimate (Popko 1979).

the time of tagging (40%, Table 1, excluding data for 1978 and 1979). The difference of 33% probably represents the maximum calf mortality. A minimum mortality of 18% is indicated by the proportion of cows with soft udders (11%, Table 2) to the proportion of cows which produced calves (60%, Table 2). Elliott (1972) found a calf mortality of 27.3% (June to September) from observations made on caribou calving in the area around Dewar Lakes. Calf mortality is affected by the occurrence of rain and snow storms, rate of abandonment, predation by wolves, accidents, drowning, trauma, and disease. Kelsall (1968) has shown that losses of calves correlate with periods of inclement weather. Popko (1978) attributes the low calf survival in 1978 to snowstorms during calving, a late spring thaw, and extensive flooding along the Koukdjuak River.

Tag Returns

As of 30 June, 1984, hunters have returned 349 (11.2%) ear tags from caribou tagged on the Koukdjuak River (Table 4). Tag returns from caribou tagged and shot in the same year account for 26% of the tags returned (excluding data from tags returned between July 1983 and June 1984). The average interval between tagging and hunter return was 30 months, with a range of 10 days to 94 months.

The maximum distance of a tag return from the Koukdjuak River was 450 km, and the maximum distance between two individual tag returns was 530 km (Fig. 5). Caribou ear tags have been returned from five south Baffin Island communities: Cape Dorset (61% of

Table 4. Number and proportion of ear tags returned by hunters from caribou tagged on the Koukdjuak River from July 1974 to June 1984.

Year of tagging	Return year (July-June)										Total	Percent of tags returned
	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84		
Unknown	0	0	0	0	1	1	0	0	0	0	2	--
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	-	6	1	4	2	0	2	5	4	0	24	5.6
1976	-	-	3	18	6	9	11	12	4	6	69	19.7
1977	-	-	-	25	14	11	18	7	8	10	93	17.4
1978	-	-	-	-	6	4	14	4	9	4	41	12.6
1979	-	-	-	-	-	3	8	4	5	4	24	10.2
1980	-	-	-	-	-	-	12	9	6	3	30	7.1
1981	-	-	-	-	-	-	-	6	17	18	41	9.9
1982	-	-	-	-	-	-	-	-	16	9	25	6.5
Total	0	6	4	47	29	28	65	47	69	54	349	11.2

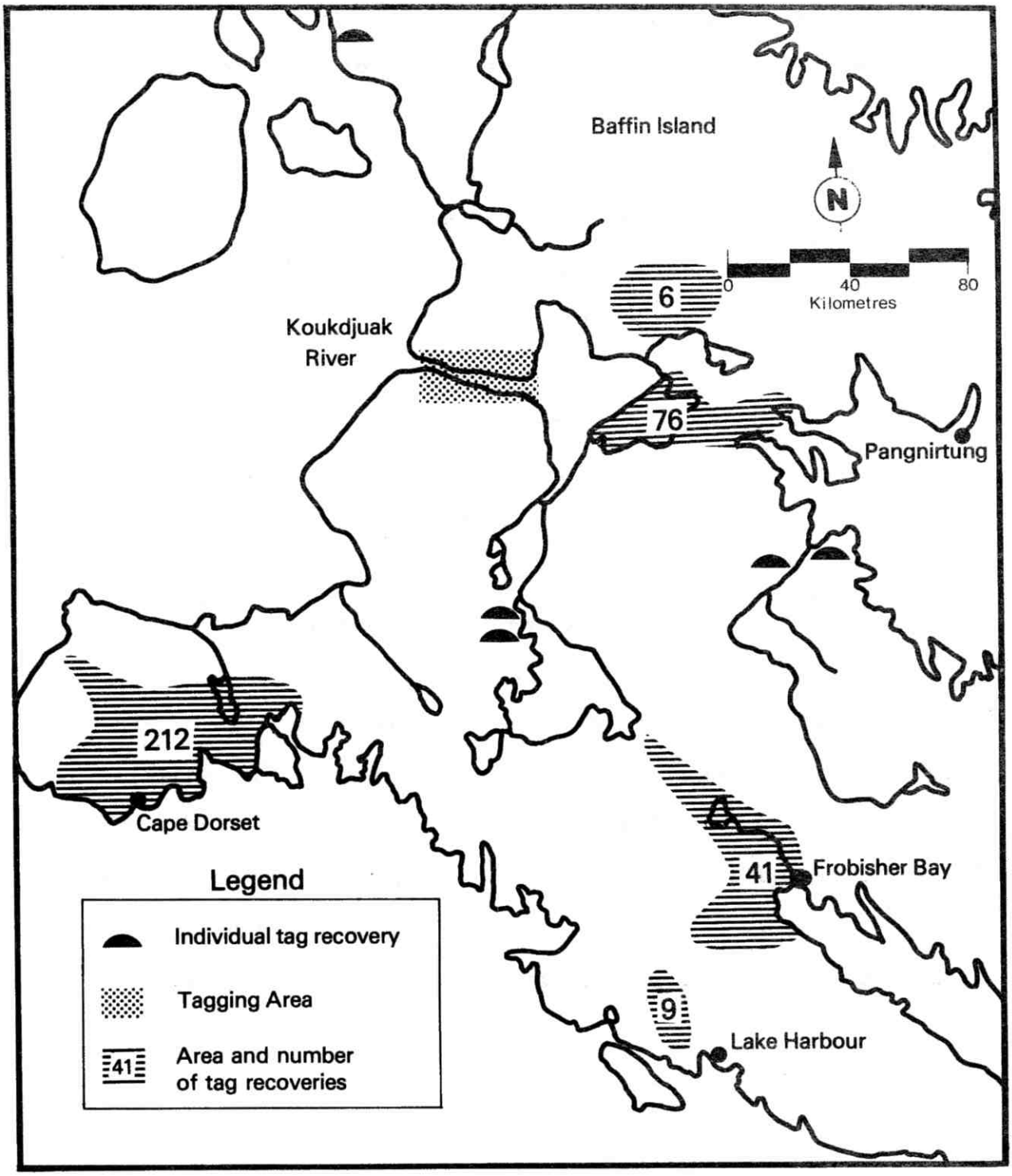

Figure 5. Location of caribou ear tag returns from hunters in south Baffin Island.

returns), Pangnirtung (23%), Frobisher Bay (12%), Lake Harbour (1.8%), and Broughton Island (1.8%) (Table 5). One tag was returned from Igloolik; the animal, however, was hunted north of the Koukdjuak River.

Tagged caribou have been shot at all times of the year; however, most kills were made between December and May when the caribou were on their winter ranges (Table 6). Fewer tagged caribou were shot during the spring thaw and fall freeze-up when travel by hunters was limited to coastal areas. No tagged female caribou have been shot in June or July (Table 6), probably because females on the calving grounds were not accessible to hunters.

The sex and age of caribou shot by hunters were similar to the proportions tagged (Table 7). Since fewer males were tagged than expected in the population, hunters were probably selecting for females. This was likely the case in the Foxe Peninsula (where the majority of tagged caribou were harvested), since Cape Dorset hunters report a preference for females (Popko 1978).

All community hunting areas have returned some tags from caribou tagged in the same year. The full extent of the caribou wintering area is not revealed through tag returns but it does indicate the portion of the caribou range that is hunted.

Table 5. Proportion of ear tags returned by community from caribou tagged on the Koukdjuak River, July 1974 to June 1984.

Community	Percent		
	Tags returned	Male**	Female**
Cape Dorset (205)*	61	23	77
Pangnirtung (76)	23	28	72
Frobisher Bay (42)	12	50	50
Lake Harbour (6)	1.8	67	33
Broughton Island (6)	1.8	50	50
Igloolik (1)	0.3	0	100
Total (196)	100	29	71

* Sample size in parentheses.

** Those of unknown sex and/or community excluded.

Table 6. Number and sex of tagged caribou shot by month from caribou tagged on the Koukdjuak River, July 1974 to June 1984*.

	Number		
Month shot	Males	Females	Total
January	14	41	55
February	10	44	54
March	10	47	57
April	8	19	27
May	15	13	28
June	2	0	2
July	6	0	6
August	9	17	26
September	4	16	20
October	5	8	13
November	4	10	14
December	9	25	34
Total	96	240	336
Percent	29	71	100

* Those of unknown sex and/or month shot excluded.

Table 7. Proportion of caribou by sex and age tagged and recaptured on the Koukdjuak River and shot by hunters, July 1974 to June 1984.

	Percent by sex and age			
	Adult male	Adult female	Yearling	Calf
Caribou tagged (3052)*	13	59	9	19
Tagged caribou recaptured (43)*	16	79	5	0
Tagged caribou shot (336)*	17	55	13	15

* Those of unknown sex and/or age excluded with sample size in parentheses.

ACKNOWLEDGEMENTS

Credit for the initiation of the caribou tagging program on the Koukdjuak River must go to E. Land and A. Bourque, Northwest Territories Wildlife Service. Supervisors of subsequent tagging work have been Wildlife Officers R. Redhead (1975, 1976), R. Popko (1977, 1978, 1979), and P. Kraft, (1980, 1981, 1982).

Special mention must be made of the tagging crew members who assisted in the project over the years. Without their dedication, skill, and hard work, this project would not have met with the success it has, nor provided the quality of data necessary for the management of caribou on Baffin Island. Assistants of the tagging project have been: I. Iklaukjuak, Kiniyook, A. Nowdlak, J. Papatsie, and G. Veevee, Frobisher Bay; P. Etuangat, M. Keeshak, M. Kooneelusie, and L. Kudluarjuk, Pangnirtung; K. Curley, Q. Petualassie, and M. Saviakjuk, Cape Dorset; L. Eyeevadlook and S. Killiktee, Lake Harbour.

Thanks must also be given to the Hunters and Trappers Associations of Pangnirtung, Frobisher Bay, Lake Harbour and Cape Dorset, which have supported the project and have aided in the selection of tagging crew members.

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Appendix. Number and description of collars and ear tags applied to caribou along the Koukdjuak River, 1974 to 1982.

Year	Tag type	Collar or tag number series	Number tagged or collared	Total	Tagging leader
1974	Collars	4-45	8	8	Elliott
	Collars	11-27	8		
	Tags, Metal/Silver, Ketchum	16-48	11	19	Land, Bourque
1975	Collars, blue*	A7-A31, B16-B36	26		
	Collars, orange*	10-24, A4-A17	17		
	Tags, Metal/Silver, Ketchum	7305-7399	85		
	Tags, Metal/Silver, Ketchum	126-464	301	426	Redhead
1976	Tags, Metal/Yellow, Ketchum, stamped "1976 South Baffin"	1-175	154		
	Tags, Plastic/Red, Starbar, marked with black ink "1976"	1-197	196	350	Redhead
1977	Tags, Plastic/Red, Starbar, stamped in black "1977", reverse marked with black ink, "Return to your local Fish and Wildlife Officer" (in syllabics)	0-535	533	533	Popko
1978	Tags, Plastic/Red, Temple, marked with black ink 1978	0-49	50		
	stamped in black "1978"	50-325	275	325	Popko
1979	Tags, Plastic/Red, Starbar, stamped in black "1979 Return to Wildlife Service, Reward"	1-235	234	234	Popko

Appendix. (continued)

Year	Tag type	Collar or tag number series	Number tagged or collared	Total	Tagging leader
1980	Tags, Plastic/Red, Temple, stamped in black "1980", reverse stamped "10.00 Reward"	1-422	421	421	Kraft
1981	Tags, Plastic/Red, Temple, stamped in black "10.00 Reward"	1-416	416	416	Kraft
1982	Tags, Plastic/Red, Temple, stamped in black "1982" reverse stamped "10.00 Reward"	1-385	382	382	Kraft

* Three caribou were both tagged and collared.