

Caribou-22

WEST-CENTRAL BC CARIBOU RESEARCH PROJECT

ANNUAL REPORT

March 1988

by

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INTRODUCTION

In April 1985, the West-Central B.C. Caribou Study was initiated to investigate the potential effects of logging on woodland caribou (Rangifer tarandus caribou) in the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow areas in west central B.C. The primary objectives of the study were to determine seasonal range, habitat use and food habits of the caribou, and to determine population size, calf production, calf survival and adult survival so that current population status and major limiting factors could be determined. The objectives were achieved through studies of radiocollared caribou in the two areas. This report summarizes the results of the data collected during the third year (April 1987 - March 1988) of the study.

METHODS

Habitat use, seasonal and altitudinal movements

A total of 40 radiocollared adult female caribou (20 in Tweedsmuir-Entiako, 20 in Itcha-Ilgachuz-Rainbow) were located by telemetry from aircraft biweekly from April to November 1987, and weekly from December 1987 to March 1988. Locations were plotted on to 1:100 000 map sheets and habitat, aspect and elevation of each location were recorded. Coordinates of each location were recorded to the nearest .5 kilometer and plotted by the HOME program on UBC MTS. In addition, winter locations were plotted onto forest cover maps and caribou habitat maps (habitat classes based on terrestrial lichen abundance) developed by the Ministry of Forests for this project. Data on caribou habitat type utilization has not yet been analyzed and therefore will not be presented in this report.

Feeding habits and diet quality

During the winter months, feeding habits of caribou in low elevation forested areas were investigated. The winter range of each caribou population was visited biweekly (alternating weekly) following radiotelemetry flights, and fresh caribou tracks were followed. Distance travelled through each habitat type was measured by the number of steps taken to travel through that habitat. Feeding site type (cratering vs. arboreal lichen feeding) was noted at each feeding site.

Cratering sites were compared to pits dug at 100 step intervals where caribou were not cratering, in order to determine whether snow conditions (snow depth, snow penetrability), lichen presence and/or abundance and canopy closure affected cratering site selection by caribou. Snow depth and snow penetrability were measured at each crater and pit and were compared. Snow penetrability was measured as the distance that a 1 kilogram weight penetrated the snow after being dropped from a height of 1 meter above the snow, divided by the snow depth at the site. Presence and % ground cover of each vegetation type, and canopy cover were also measured for each crater and pit. For preliminary analysis, percent ground cover of vegetation types was grouped into 5 classes; absent (0%), trace ($\leq 1\%$), low (2-14%), medium (15-39%) and high ($\geq 40\%$). Canopy cover was visually estimated as very open ($\leq 5\%$ canopy cover), open (6-10%), moderately open (11-15%), moderately open - moderately closed (16-20%) and moderately closed ($> 20\%$).

Also, to determine snow accumulation in different habitat types over the winter, snow depth was measured at snow stations set up in 3 habitat types (mature pine, immature pine, meadow).

Food habits and food quality were determined through faecal analyses. Faecal samples were collected monthly during the winter (December-March) for each area and opportunistically during the rest of the year. General trends in food habits were determined through faecal fragment analysis. Pellets from 10 samples were pooled and sent to Wildlife Habitat Laboratory, Washington State University for analysis. Percent faecal nitrogen for each of 10 samples collected during each time period are being analyzed by the Faculty of Agriculture, UBC. Faecal data from April 1987 - March 1988 has not yet been analyzed.

Population size, calf mortality, adult mortality

Population censuses of the Itcha-Ilgachuz-Rainbow caribou were conducted in June when most caribou cows were present in the alpine in post-calving aggregations. A correction factor of the total number of radiocollared cows/ number of radiocollared cows spotted above timberline was applied to the June cow census to determine the number of cows in the population. Few bull caribou were present above treeline during the June census, therefore a bull:cow ratio was determined from the fall counts and applied to the number of cows present in June to obtain a total population estimate of bulls.

Less than 50% of the radiocollared animals in the Tweedsmuir-Entiako area are present above timberline at any one time during the year; therefore, an estimate of the population size was attempted during the fall counts when approximately half the population was present in rutting areas above treeline. Alpine areas in the Quanchus Range were censused and the correction factor of the total number of radiocollared cows/ number of radiocollared cows spotted above timberline was applied to the census to estimate the size of the population.

Pregnancy rate of the Itcha-Ilgachuz-Rainbow and Tweedsmuir-Entiako caribou was determined from a sample of 31 radiocollared female caribou. Blood samples collected were analyzed for serum progesterone levels to determine whether the females were pregnant.

Calf production for both radiocollared and unmarked cows was determined by helicopter survey in mid-June. Ground surveys assessing early calf survival and causes of calf mortality were conducted during the first three weeks of calving in the Itcha Mountains. A calf count was conducted in October to determine survival over the summer and another calf count was conducted in mid-March to determine calf recruitment into the population for the year.

Adult mortality rate was determined from the proportion of radiocollared caribou dying between April 1987 and March 1988. Causes of adult mortality were determined by necropsying radiocollared animals that had died.

RESULTS

Habitat use and seasonal and altitudinal movements

Tweedsmuir-Entiako: In April, radiocollared caribou were found using low elevation forested areas south of Tetachuck Lake (Figs. 1,5,6). By early May, all radiocollared animals had moved north across Tetachuck Lake. During migration between winter and summer ranges, 17 of the 19 radiocollared animals were found throughout low elevation forested habitats along the Chelaslie River drainage. Animals moved through the Quanchus Mountains at lower elevations in the Ghitezli and Glatheli Lake and Fenton Lake areas en route to calving areas to the west and southwest near Tahtsa Lake, Whitesail Lake, Eutsuk Lake and the

Fig. 1. Locations of radiocollared female caribou in the Tweedsmuir-Entiako area during spring migration, summer and fall, April - October 1987.

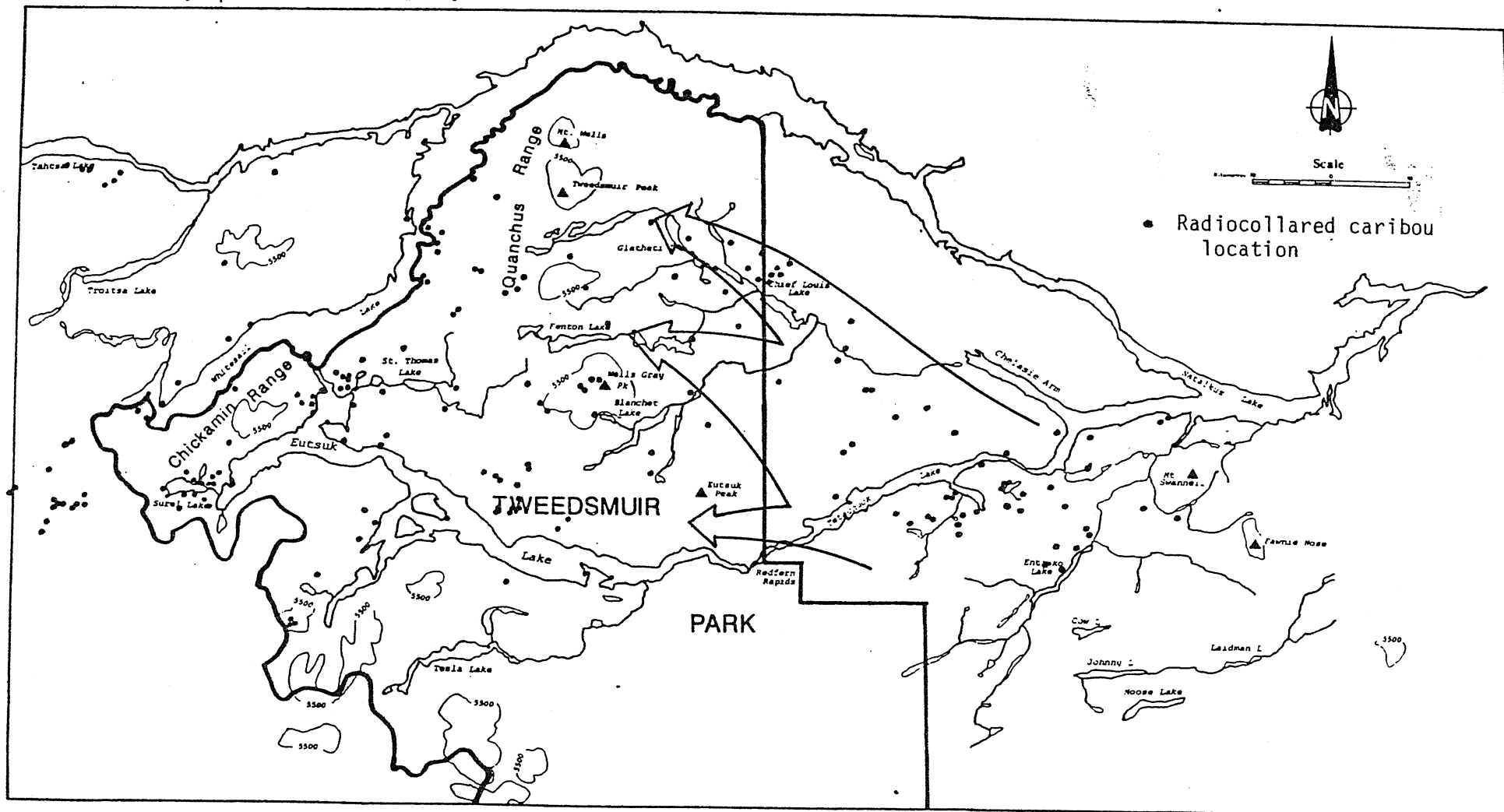
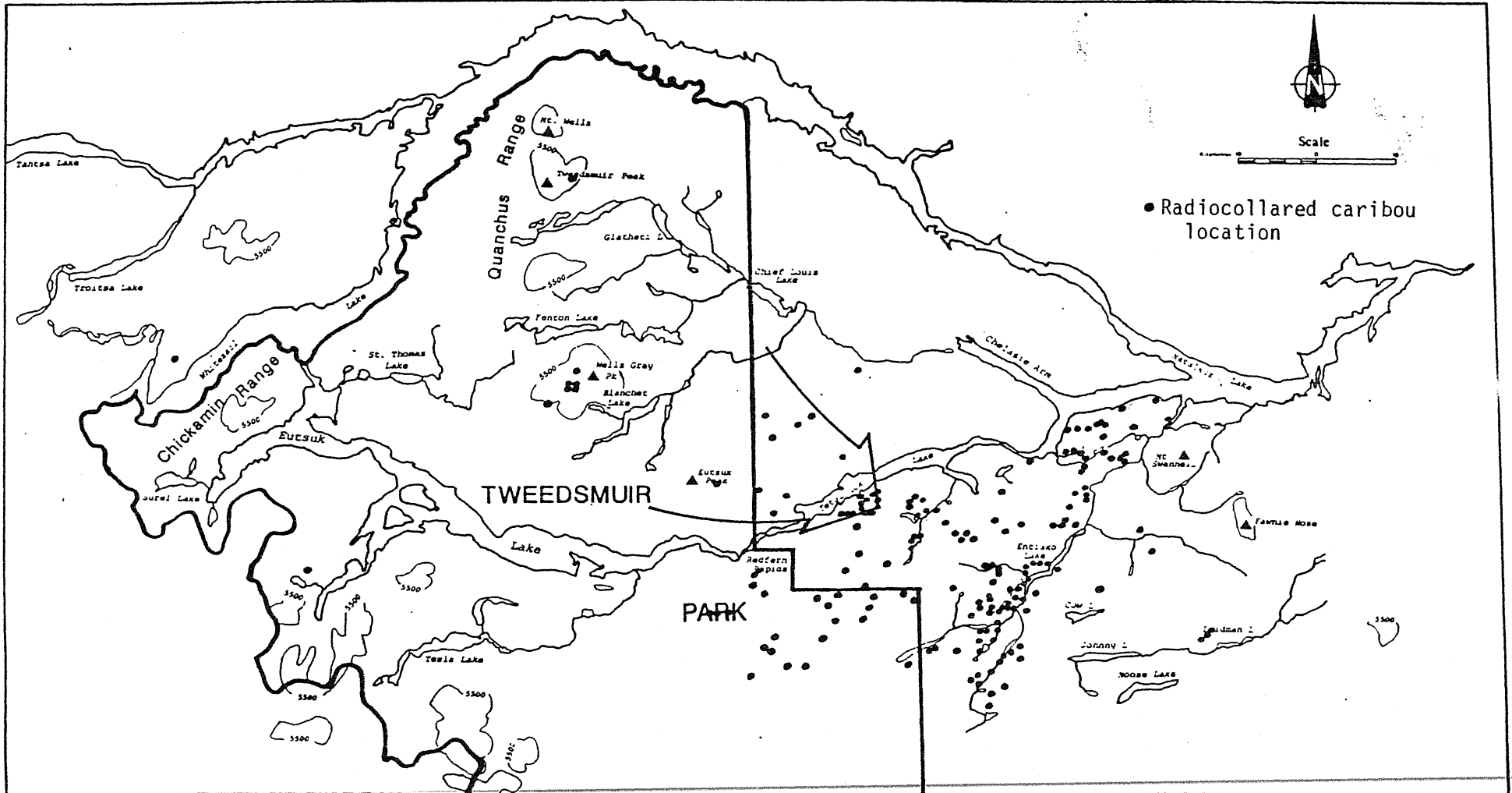


Fig. 2. Locations of radiocollared female caribou in the Tweedsmuir-Entiako area during fall migration and winter, November 1987 - March 1988.



Gamsby River. Two of the 19 radiocollared caribou moved along the north shore of Eutsuk Lake enroute to calving areas near Surel Lake.

During calving and early summer (June-July), 8 of 17 radiocollared caribou cows were found at high elevations in the mountains in the Eutsuk Lake area and in areas to the west and northwest of the Tweedsmuir Park boundary. The other 9 caribou were found throughout northern Tweedsmuir Park north of Eutsuk Lake in low elevation forested habitat types as well as at higher elevations in the Quanchus Mountains. Movements during the summer and early fall consisted primarily of movements from high elevation alpine/subalpine habitat to lower elevation forested habitat. In August and September 80% of all radiocollared caribou locations were in lower elevation forested areas. By October, movements increased as several radiocollared animals moved east to rutting areas in the Quanchus Mountains. Eight of 14 radiocollared female caribou concentrated in high elevation alpine and subalpine in the Quanchus Mountains in October and early November. Other radiocollared animals were found distributed throughout the Park and in lower elevation forested habitat on the north side of Tetachuck Lake in October before crossing the lake in mid-November.

By early December, 13 of the 14 radiocollared cows had moved south across Tetachuck Lake to the Entiako Lake area (Fig.2). One animal was found in subalpine habitat in the Eutsuk peak area until mid-January before moving south across Tetachuck Lake. From December to mid-January, radiocollared animals were using primarily high elevation forested/subalpine habitat in Tweedsmuir Park in the area south of Redfern Rapids. During late January and February radiocollared caribou cows were distributed throughout the Entiako River drainage and south side of Tetachuck Lake and were using mostly pine forests. By mid March, caribou cows began moving north along the Entiako Lake/Entiako River drainage to

Fig. 5. Average elevation of radiocollared caribou locations in the Tweedsmuir-Entiako, Itcha-Ilgachuz and Rainbow areas, April 1987 - March 1988.

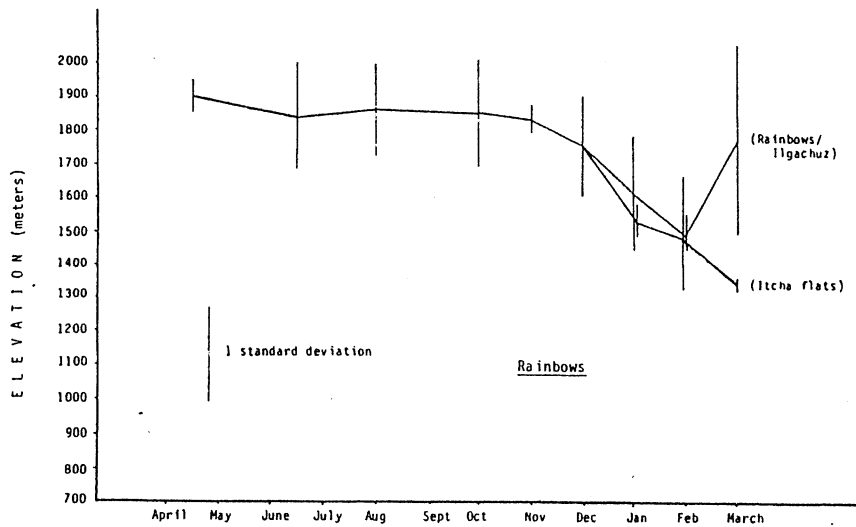
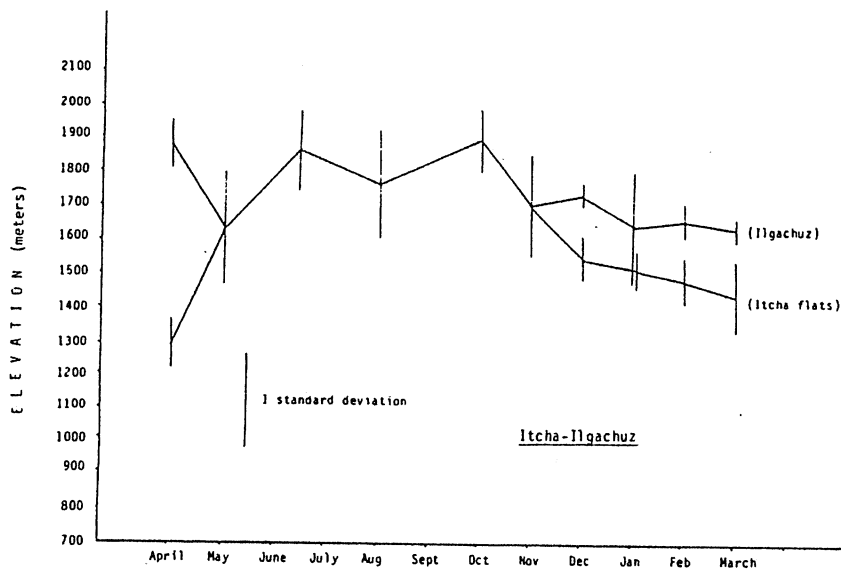
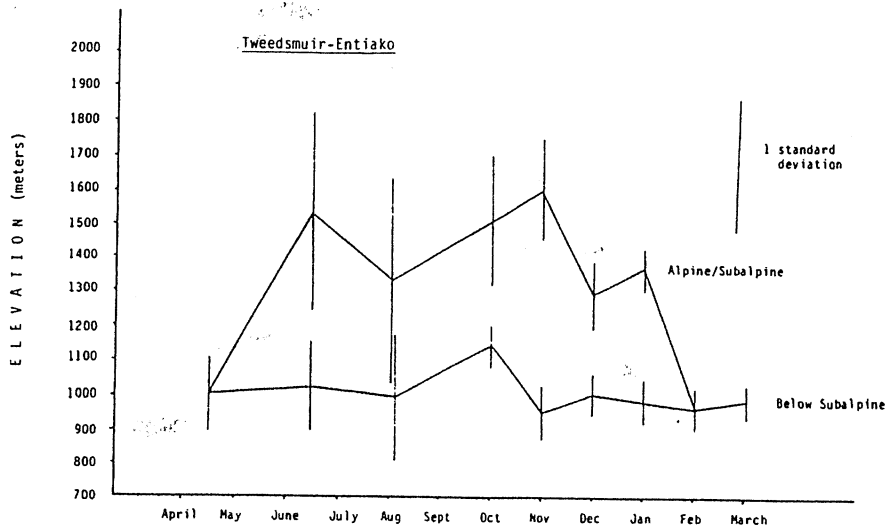
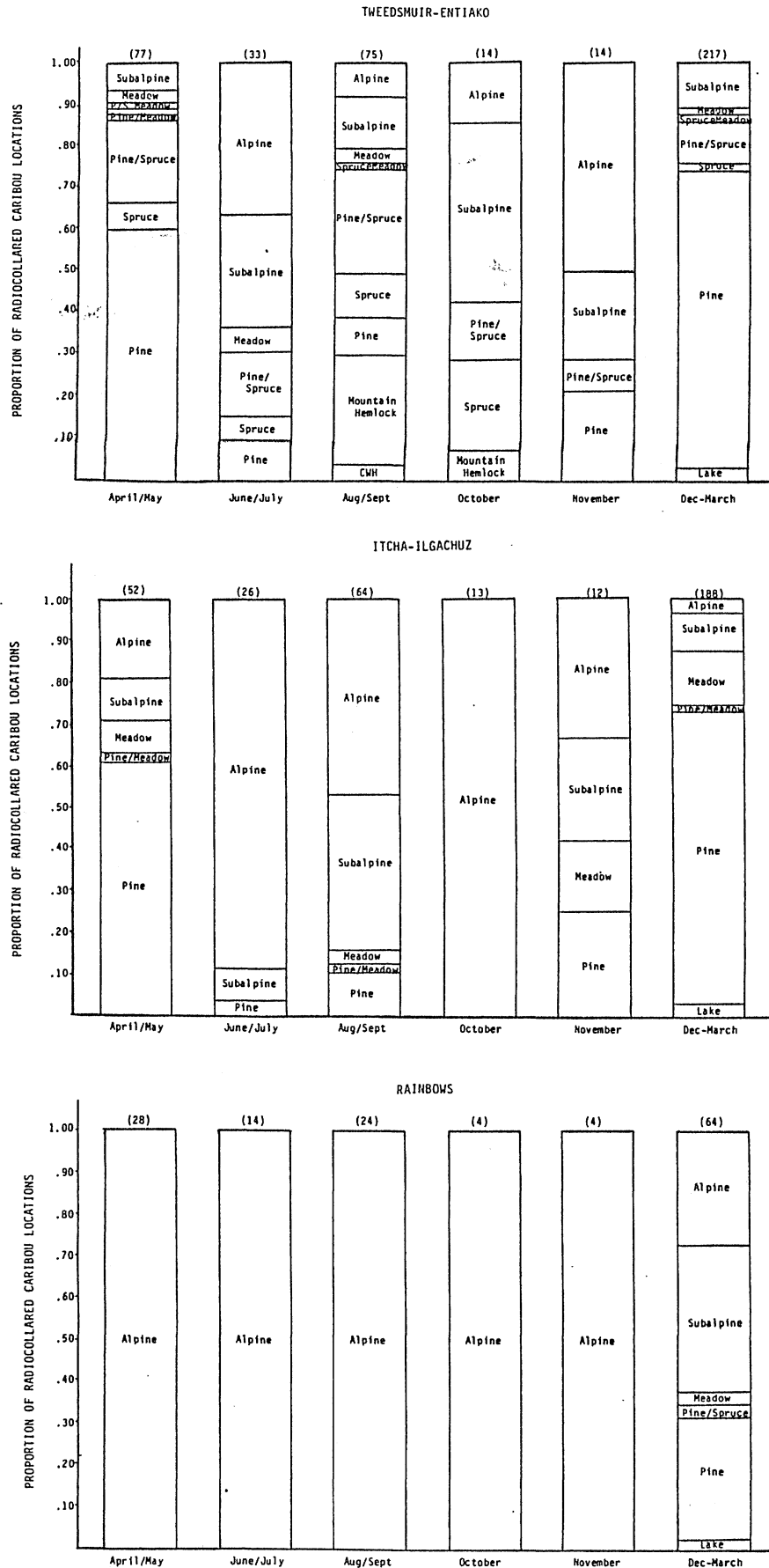


Fig. 6 Proportion of radiocollared caribou locations in each habitat type in the Tweedsmuir-Entiako, Itcha-Ilgachuz and Rainbow areas, April 1987 - March 1988.



the Nataalkuz Lake area. Both pine and pine/spruce habitats in the Nataalkuz Lake area were used by radiocollared caribou throughout March.

Itcha-Ilgachuz: In April, 10 of the 13 radiocollared caribou cows were found in low elevation pine forests in the Chilcotin River and Coglistiko River areas (Fig.3,5,6). The other 3 animals were located on the north side of the Ilgachuz Mountains in alpine and subalpine habitat. Movements back to summering areas in the Itcha and Ilgachuz Mountains began in late April and by early May, animals were using forested habitats and meadows at the base of the Itcha and Ilgachuz Mountains.

During calving and early summer, radiocollared caribou cows primarily used high elevation alpine or subalpine habitat in the Itcha and Ilgachuz Mountains. However, individual animals were found in both the Itcha and Ilgachuz Mountains as several caribou moved from one range to the other at least once during the summer. Animals that were found at lower elevations in the summer and early fall used pine forests or meadows in the vicinity of the Itcha and Ilgachuz Mountains.

In October, all 13 radiocollared caribou cows were found in the alpine in the Itcha and Ilgachuz Mountains. By November, animals began moving east from the Itcha and Ilgachuz Mountains to large dry (fescue-lichen) meadows and pine forests (Fig.4). Of the 12 Itcha-Ilgachuz radiocollared caribou, one wintered in alpine and subalpine habitat on the north side of the Ilgachuz Mountains whereas the other 11 caribou wintered in the area to the east of the Itcha Mountains. In early winter (December-mid January) animals were using pine forests throughout the Chilcotin River drainage and large dry meadows in the Itcha flat and the Baezaeko flat areas. By February and March, caribou were using primarily lower elevation pine forests in the Chilcotin River and Punkutlaenkut Creek areas.

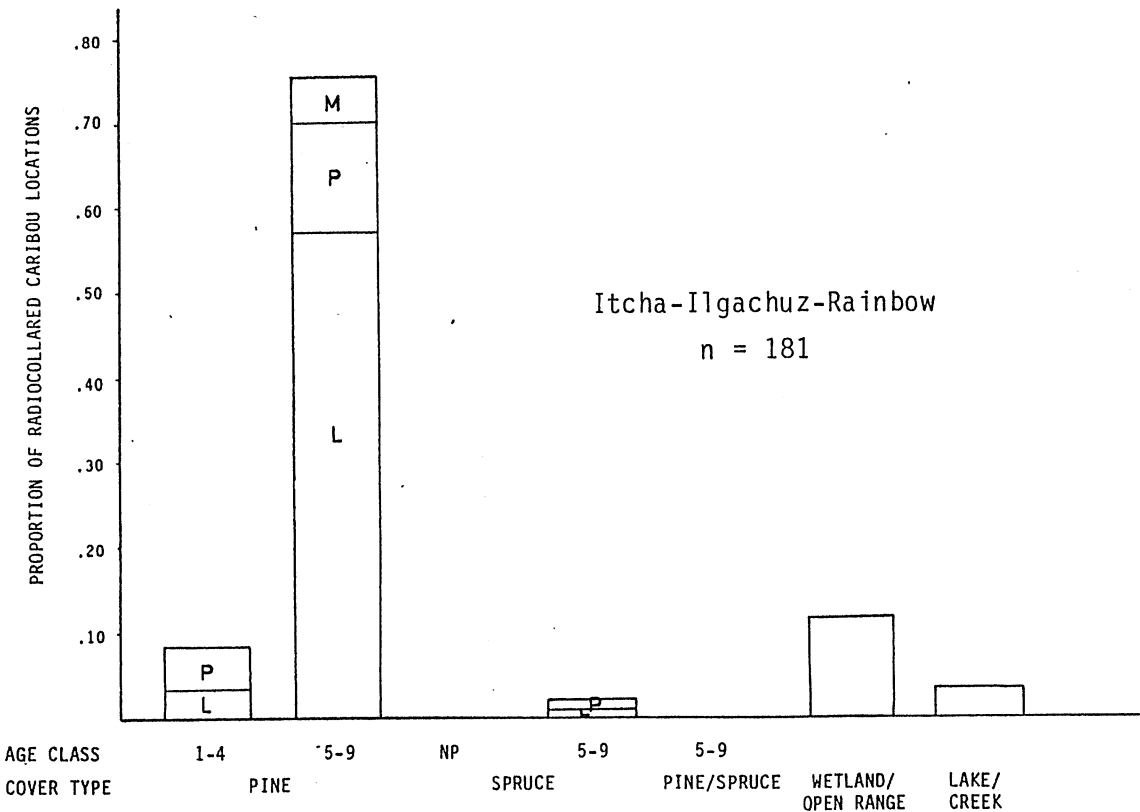
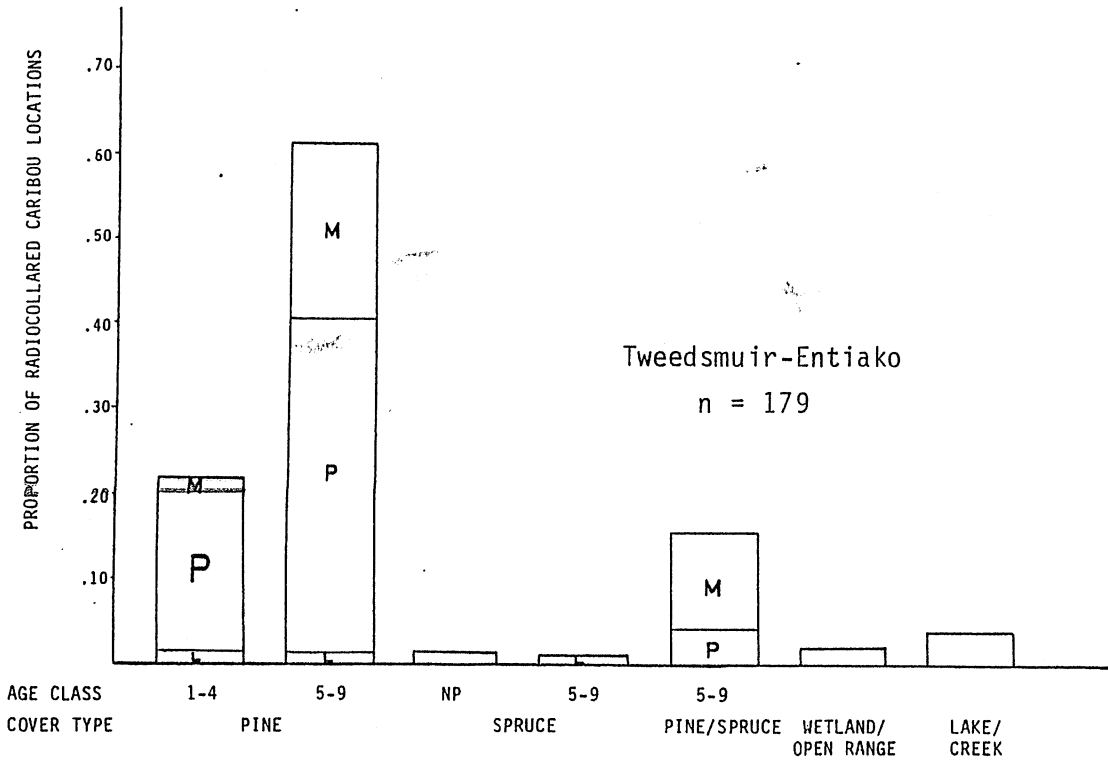
Rainbows: Radiocollared Rainbow caribou cows used exclusively high elevation alpine habitats from April to November 1987 (Fig.5,6). In April, 6 of the 7 radiocollared Rainbow caribou were on the north side of the Rainbow Mountains whereas one was on the north side of the Ilgachuz Mountains (Fig.3). By May, all 7 animals were found on the north side of the Rainbow Mountains before dispersing throughout the range for the summer.

In late August, one radiocollared caribou moved from the Rainbow Mountains to the Itcha Mountains before moving to the Ilgachuz Mountains in late September where it remained throughout the winter. In October, all of the radiocollared caribou cows in the Rainbow Mountains concentrated on the north side of the mountains. By November two more radiocollared Rainbow caribou had moved to the Ilgachuz Mountains and by December one of those two animals had moved to the area to the east of the Itcha Mountains (Fig.4). From December to March, of the 4 surviving radiocollared Rainbow caribou, one was found in the northern Rainbow Mountains, two were found in the northern Ilgachuz Mountains and one was found in the area to the east of the Itcha Mountains. The animals in the Ilgachuz and Rainbow Mountains were using high elevation alpine habitat in December but in January and February, these animals moved to subalpine or low elevation forested habitat. In March, animals were again using higher elevation alpine habitat. The radiocollared Rainbow caribou in the area to the east of the Itcha Mountains used low elevation pine forests in the Punkutlaenkut Lake area throughout the winter.

Forest Cover Type Use

Tweedsmuir-Entiako: Radiocollared caribou cows were found primarily in mature pine stands on poor and medium site types (Fig.7). Immature pine forests on poor sites and mature pine/spruce forests on medium sites were less

Fig. 7. Proportion of radiocollared caribou locations in each forest cover type in the winter ranges of the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow caribou, December 1987 - March 1988.



frequently used.

Itcha-Ilgachuz-Rainbow: Over 50% of all radiocollared caribou locations during the winter were in mature pine stands on low sites (Fig.7). Mature pine stands on poor and medium sites were used to a lesser extent and immature pine stands and wetland/open range habitats were used occasionally.

Winter snow accumulation

Snow accumulation in all 3 habitat types (wetland, immature and mature pine) increased steadily between December and February then remained relatively constant through February and March (Fig.8). Snow depths in the mature and immature pine stands were approximately equal and between 10 and 15 centimeters less than in the wetland. Less snow accumulated in the Moore Creek area in the winter of 1987/88 than in the previous two winters. Snow depths in February 1988 were comparable to snow depths in December 1986 (Cichowski, unpublished data). On average, snow accumulation at the snow stations in the wetland in 1987/88 was 30 centimeters less than in 1986/87 for the same time period.

Winter feeding sites

In both Itcha-Ilgachuz-Rainbow and Tweedsmuir-Entiako caribou winter ranges, 80% of feeding site types in pine forests consisted of craters (Table 1). Pine/spruce stands were used primarily for arboreal lichen feeding in the Itcha-Ilgachuz-Rainbow caribou winter range although in the Tweedsmuir-Entiako caribou winter range, pine/spruce stands were used for both arboreal lichen feeding and cratering. Spruce stands in the Entiako area were used exclusively for arboreal lichen feeding. In all forested habitat types combined, craters made up 80% of the feeding site types in the Itcha-Ilgachuz-Rainbow winter range and 66%

Fig. 8. Average snow depth at snow stations in 3 habitat types (wetland, mature and immature pine stands) in the Itcha-Ilgachuz-Rainbow winter range, December 1987 - March 1988.

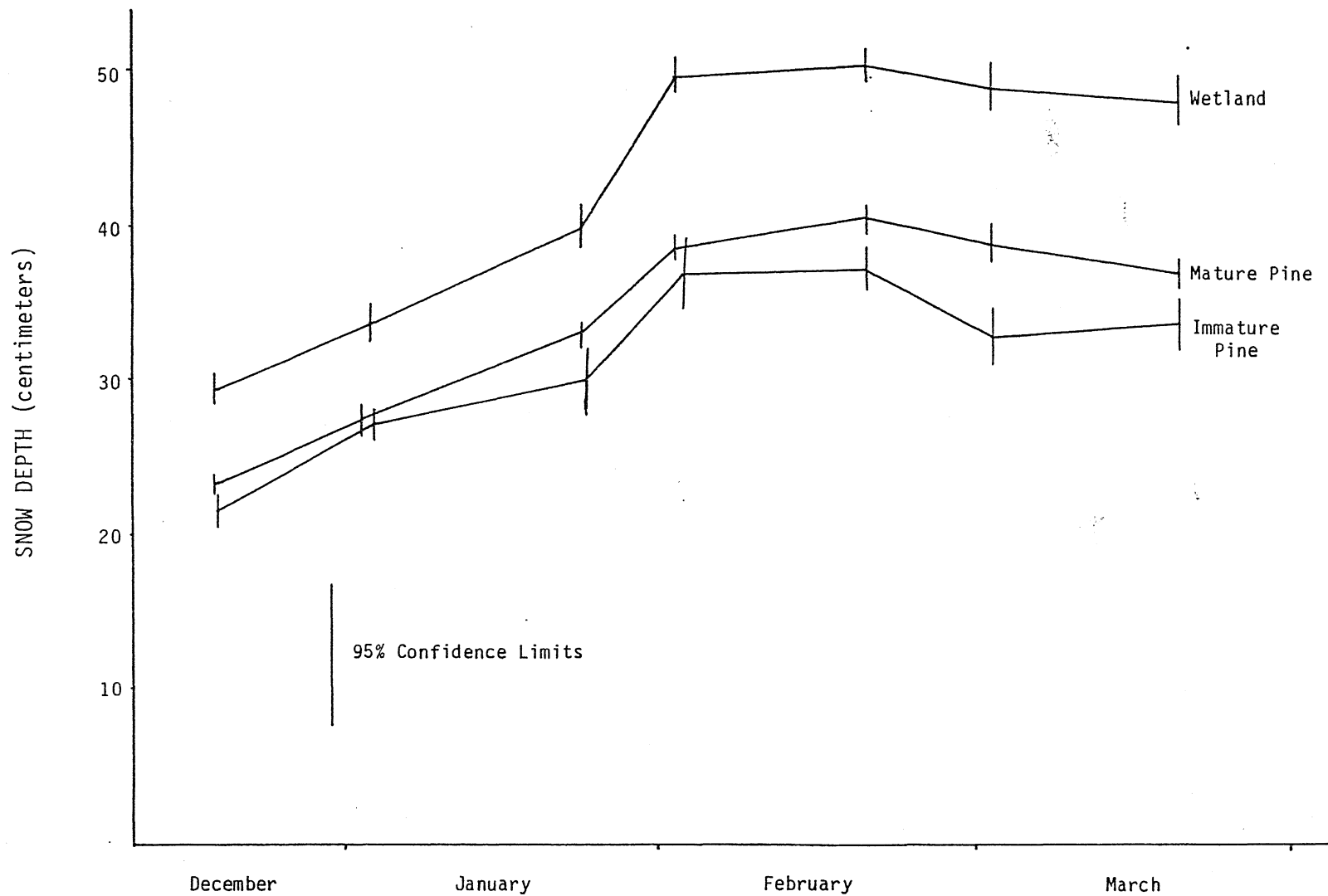


Table 1. Percentage of feeding site types investigated (cratering vs. arboreal lichen feeding) in each habitat type in the winter ranges of the Itcha-Ilgachuz-Rainbow and Tweedsmuir-Entiako caribou, December 1987 - March 1988.

Itcha/Ilgachuz/Rainbow caribou winter range

<u>Habitat</u>	<u>% cratering</u>	<u>% arboreal feeding</u>	<u># sites investigated</u>
Pine	82	18	542
Pine/Spruce	14	86	14
Total Forest	80	20	556
Fescue/Lichen	100	0	84
Wetland	100	0	23
Forested Wetland	50	50	2
Lake/Creek	100	0	14

Tweedsmuir/Entiako caribou winter range

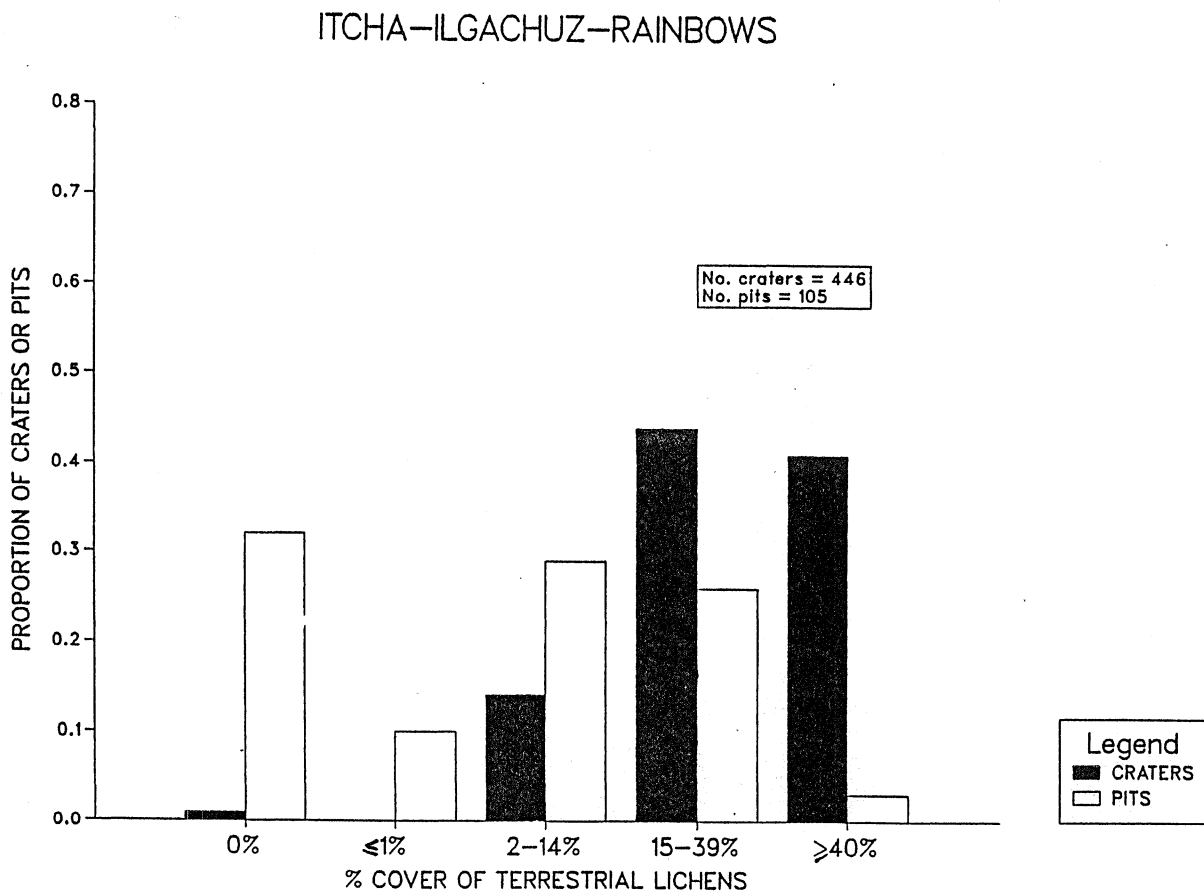
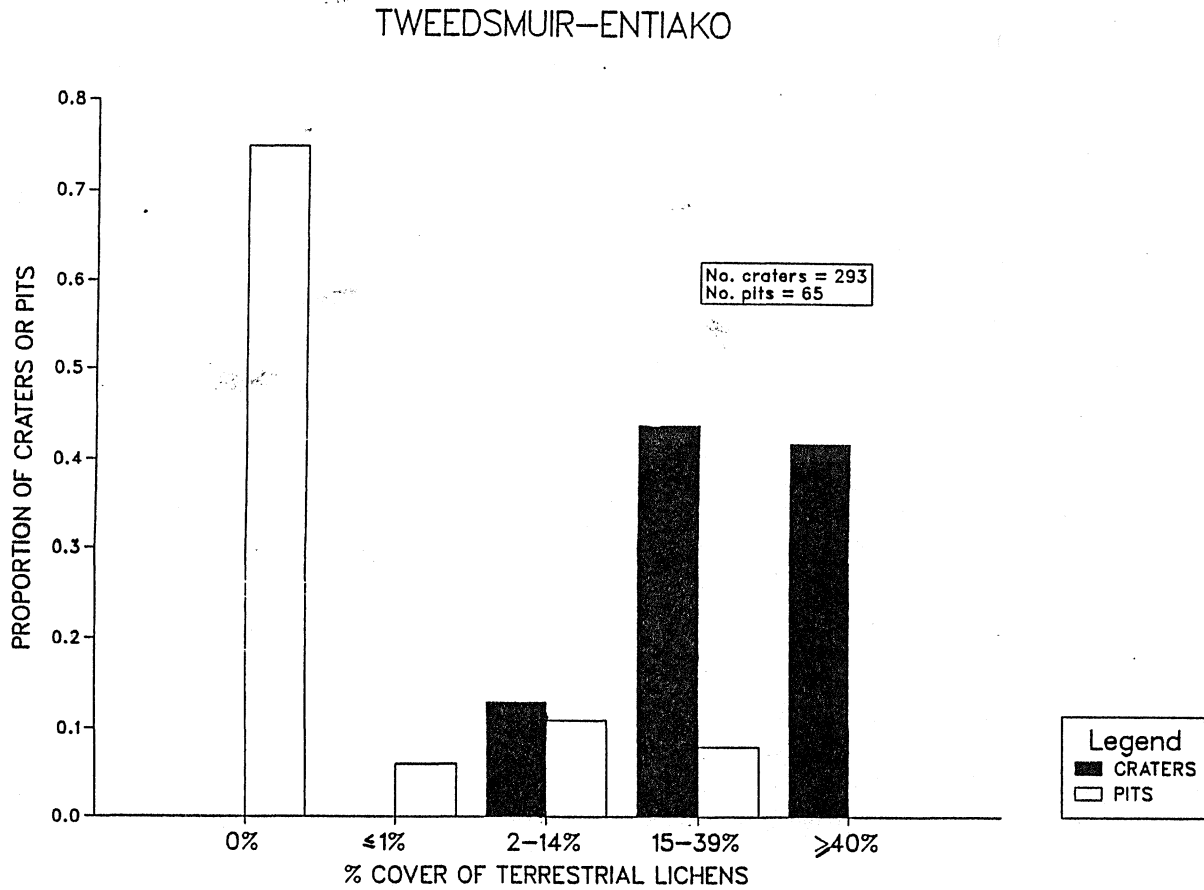
<u>Habitat</u>	<u>% cratering</u>	<u>% arboreal feeding</u>	<u># sites investigated</u>
Pine	78	22	325
Spruce	0	100	10
Pine/Spruce	35	65	110
Total Forest	66	34	445
Lake/Creek	100	0	22

of the feeding site types in the Tweedsmuir-Entiako winter range. Feeding sites in open habitats such as wetlands, lakes and fescue/lichen meadows consisted of cratering sites only.

Terrestrial lichens were the most frequently occurring vegetation type found in craters in all forest types combined (Table 2). Cladonia sp., Cladina sp. and Stereocaulon sp. combined were found in 99% of all craters in the Itcha-Ilgachuz-Rainbow area and in 100% of all craters in the Tweedsmuir-Entiako area. Of the terrestrial lichens present, Cladina sp. were most common. Terrestrial lichens were not as prevalent in the pits dug where caribou were not cratering. Of pits dug in all forest types, in the Tweedsmuir-Entiako caribou winter range, 25% contained terrestrial lichens and in the Itcha-Ilgachuz-Rainbow caribou winter range, 68% contained terrestrial lichens. The proportion of craters containing terrestrial lichens was significantly greater (X^2 , $p < .05$) than the proportion of pits containing terrestrial lichens for both areas. Also, in both areas, terrestrial lichens were found in moderate to high quantities in craters whereas in pits, terrestrial lichens were absent or found in low to moderate quantities (Fig.9). The distribution of craters in abundance classes of terrestrial lichens was significantly different from the distribution of pits in the same abundance classes (X^2 , $p < .05$).

In the Itcha-Ilgachuz-Rainbow caribou winter range, fescue-lichen meadows were heavily used in early winter. The most frequently occurring vegetation types were terrestrial lichens (contained in 100% of the craters) and grasses (contained in 99% of the craters) (Table 2). Use of wetlands and forested wetlands increased as the winter progressed. Ice and/or free water were present in 100% of the craters in these habitat types. The proportion of craters containing sedges was significantly lower than the proportion of pits containing sedges (X^2 , $p < .05$), and the proportion of craters containing ice were significantly greater than the

Fig. 9. Proportion of total craters (C) and pits (P) containing % ground cover classes (0%, ≤1%, 2-14%, 15-39%, ≥40%) of terrestrial lichens (*Cladina* sp., *Cladonia* sp., *Stereocaulon* sp. combined) in all forested habitat types combined in the Itcha-Ilgachuz-Rainbow and Tweedsmuir-Entiako winter ranges (December 1987 - March 1988).



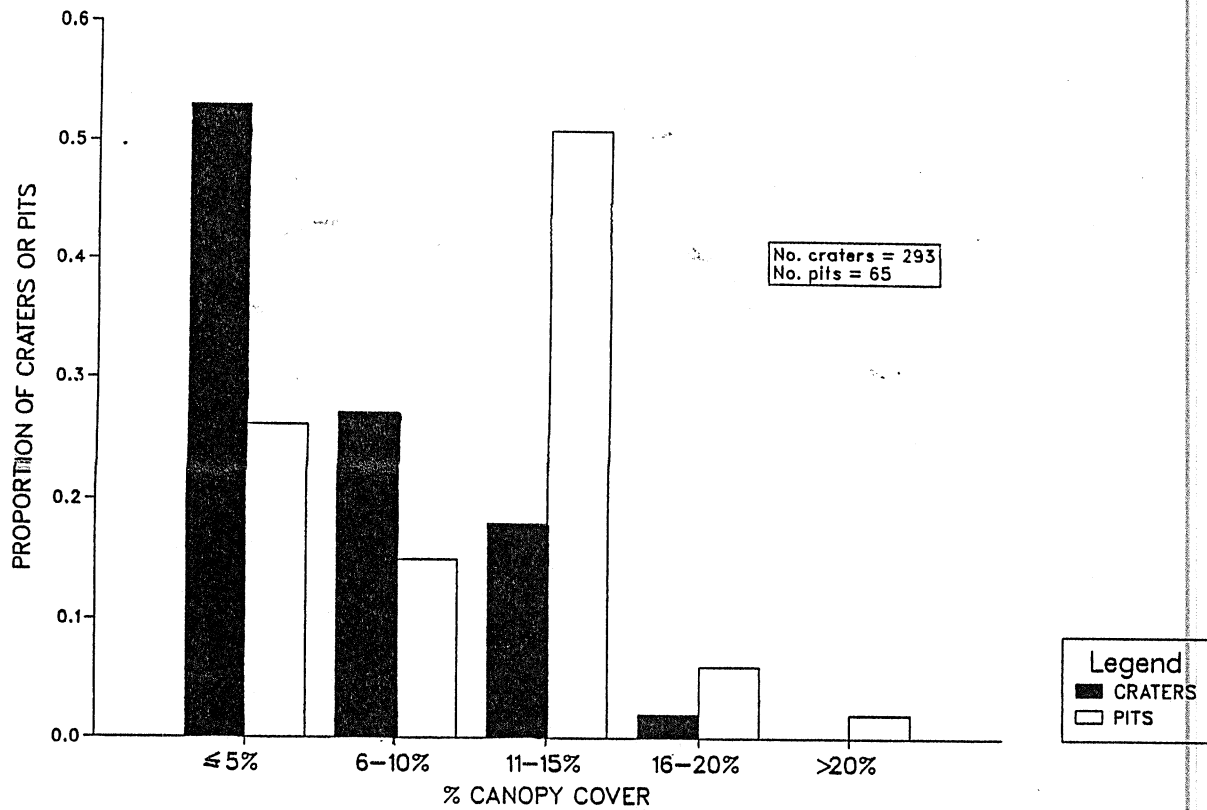
proportion of pits containing ice (X^2 , $p < .01$), suggesting that caribou were probably not cratering for food but for ice or free water in wetlands. Caribou also cratered on lakes and creeks in both the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow winter areas (Table 2). These craters contained ice/free water only.

The distribution of craters in canopy cover classes was significantly different from the distribution of pits in the same canopy cover classes in both the Tweedsmuir-Entiako (X^2 , $p < .05$) and Itcha-Ilgachuz-Rainbow (X^2 , $p < .05$) winter ranges (Fig.10). Relatively more craters than pits were found in forested areas with very open ($\leq 5\%$ canopy cover) and open (6-10%) canopies whereas relatively more pits than craters were found in forested areas with less open canopies (11-15%, 16-20%, $>20\%$ canopy cover).

Snow conditions did not appear to affect selection of cratering sites by caribou in the Itcha-Ilgachuz-Rainbow winter range. Both snow depth and snow penetrability varied over the winter (Fig.11,12); however, no significant differences between cratering sites and pits were detected (Wilcoxon's signed-ranks test, $p < .10$). In the Tweedsmuir-Entiako winter range, snow depths of craters and pits were similar in January, but in February and March, snow depth at craters exceeded snow depth at pits. Snow penetrability decreased in both pits and craters through the winter in the Tweedsmuir-Entiako area, but snow penetrability at cratering sites exceeded snow penetrability at pits only during March. Neither snow depth nor snow penetrability were significantly different between cratering sites and pits in the Tweedsmuir-Entiako area (Wilcoxon's signed-rank test, $p < .10$).

Fig. 10. Proportion of total craters (C) and pits (P) in % canopy cover classes (<5%, 6-10%, 11-15%, 16-20%, >20% canopy cover in all forested habitats combined in the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow winter ranges (December 1987 - March 1988).

TWEEDSMUIR-ENTIAKO



ITCHA-ILGACHUZ-RAINBOWS

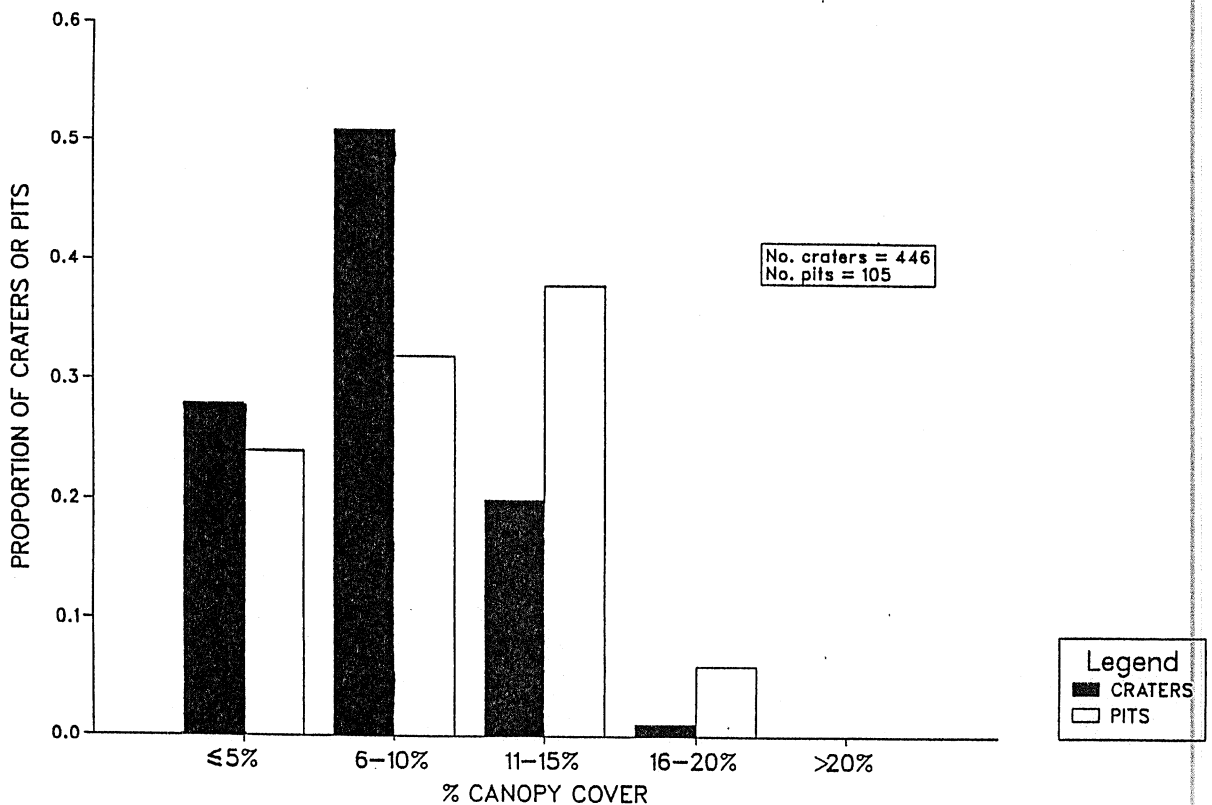


Fig. 11. Average snow depths of craters (C) and pits (P) over time in all forested habitat types combined in the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow winter ranges, December 1987 - March 1988.

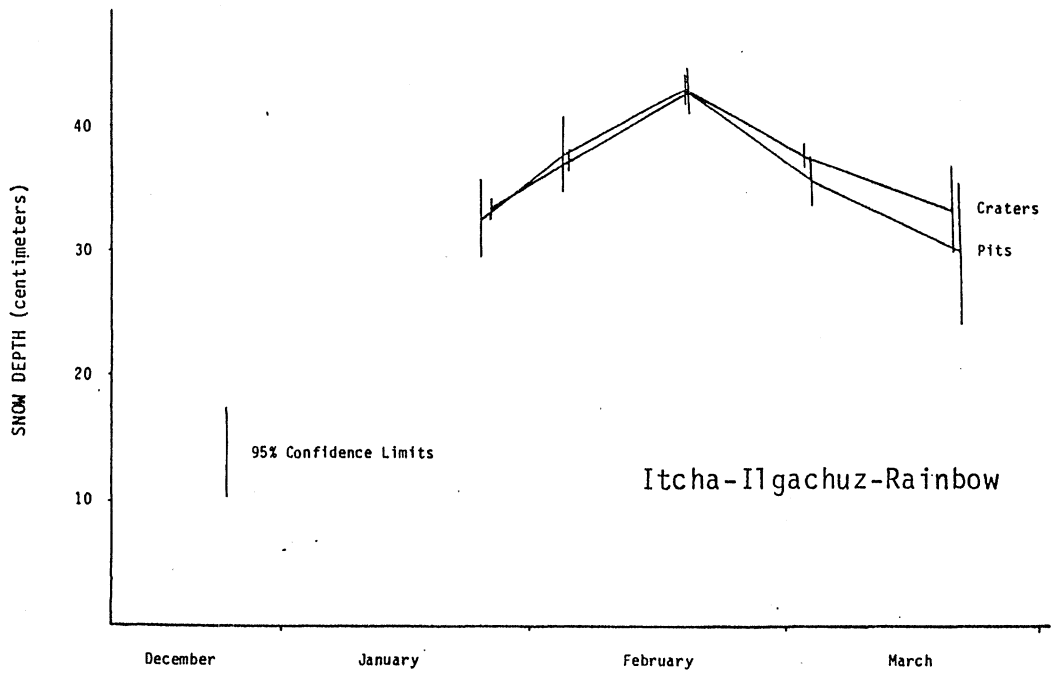
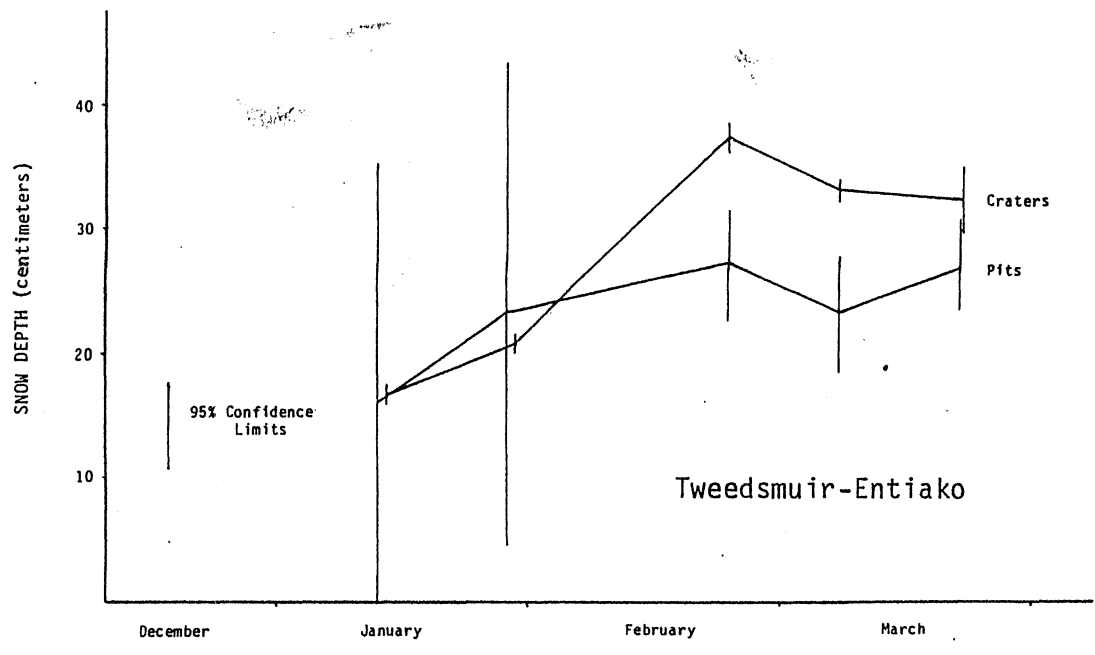
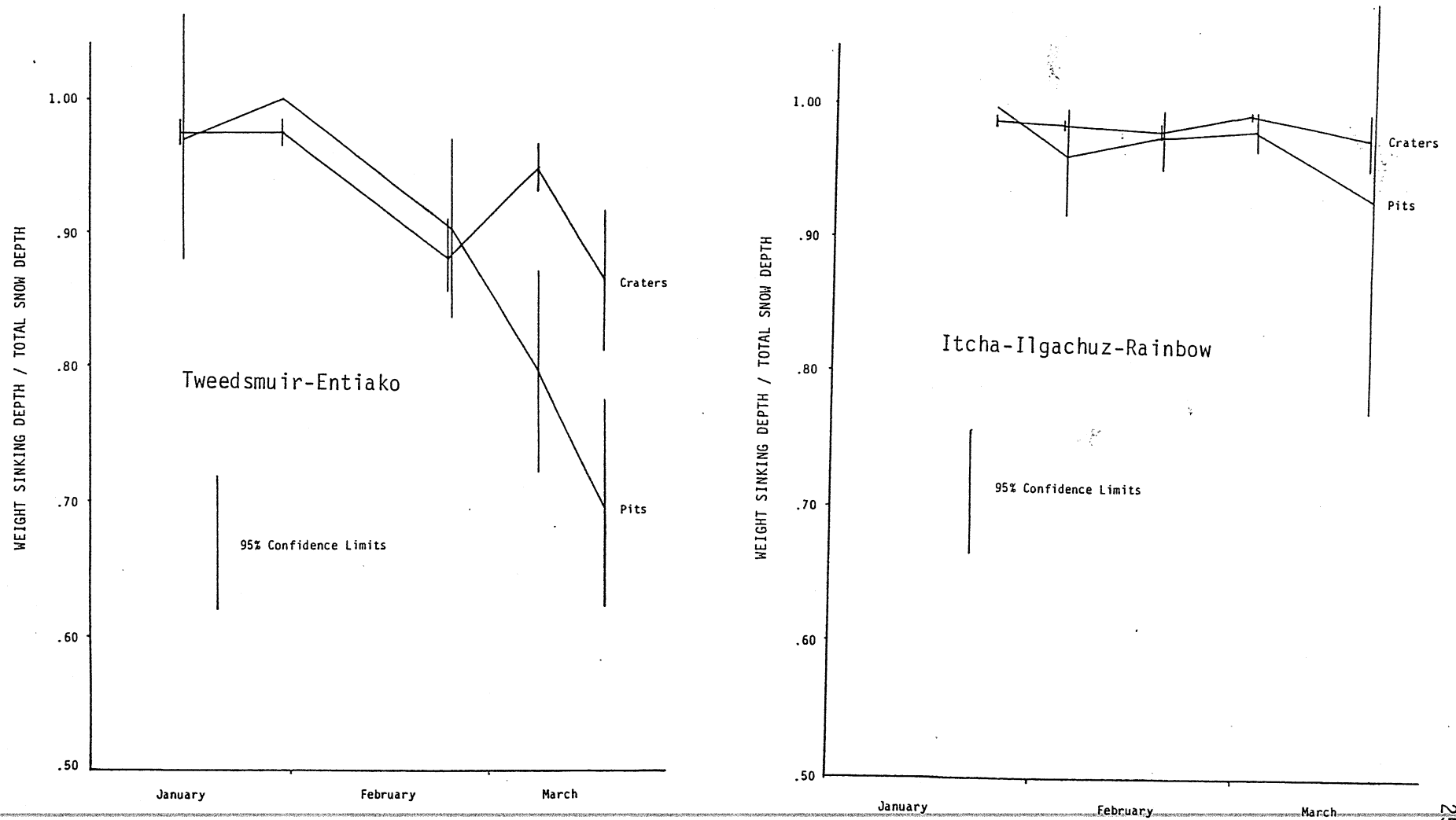


Fig. 12. Average snow penetrability (weight sinking depth / snow depth) of craters and pits over time in all forested habitat types combined in the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow winter ranges, December 1987 - March 1988.



Population size

A total of 270 animals were counted in alpine areas in the Quanchus Mountains during the October calf survey in the Tweedsmuir-Entiako area (Table 3). Eight of the 14 radiocollared caribou were present in the alpine in the Quanchus range. Application of the correction factor ($1 \div \#$ radiocollared animals in the alpine / total $\#$ of radiocollared animals) to the total number of animals counted in the alpine yielded a population size estimate of 473 animals for the Tweedsmuir-Entiako caribou population in October 1987.

During the June census of the Itcha-Ilgachuz Mountains, totals of 556, 257 and 42 cow, calf and yearling caribou respectively were counted and classified (Table 3). Of the 13 radiocollared caribou cows, 8 were sighted above treeline. Therefore, the corrected population sizes of the cow, calf and yearling caribou were 904, 418 and 68 respectively. Applying the bull:cow ratio from the October survey (92/483) to the corrected number of adult female caribou in June (904) resulted in an estimate of 172 bulls present in the population in June. Therefore, the total estimated population size for the Itcha-Ilgachuz caribou in June was 1562 animals.

The population estimate for the the caribou in the Rainbow Mountains was derived from a survey conducted on the north side of the Rainbow Mountains in March 1987. A total of 165 animals were counted during the survey. Of the 7 radiocollared Rainbow caribou, 6 were present on the north side of the Rainbow Mountains. Correcting for the proportion of animals not present on the north side of the Rainbow Mountains during the survey yielded 193 animals in March 1987.

Table 3. Number of caribou cows, calves and bulls counted during aerial surveys conducted in the Itcha-Ilgachuz-Rainbow and Tweedsmuir-Entiako areas, April 1987 - March 1988.

	<u>CALVES</u>	<u>COWS*</u>	<u>BULLS</u>	<u>TOTAL</u>
Itcha/Ilgachuz/Rainbows				
June 19/20, 1987	270	614	78	962
June 19, 1987**	257	598	78	933
October 21, 1987	82	483	92	657
March 10, 1988	47	338		385
Tweedsmuir/Entiako				
June 18, 1987	14	20		34
October 20, 1987	20	192	33	245
March 11, 1988	12	123		135

* includes yearlings

** Itcha/Ilgachuz only

Table 4. Percent of female radiocollared caribou that were pregnant in the Itcha-Ilgachuz-Rainbow area and in the Tweedsmuir-Entiako area based on serum progesterone levels.

<u>Age Group</u>	<u>% Pregnant</u>	<u>Sample size</u>
Itcha/Ilgachuz/Rainbow caribou		
Adults (>22months)		
March 1987*	91	11
March 1987	100	3
March 1988*	100	9
<u>Total</u>	<u>96</u>	<u>23</u>
Yearlings (22months)		
March 1988*	0	1
Tweedsmuir/Entiako caribou		
Adults (≥22months)		
February 1987	86	7

* data provided by Idaho Dept. of Fish and Game

Calf Production and Survival

Pregnancy rate of adult female caribou in the Itcha-Ilgachuz-Rainbow Mountains was 96% in March 1987 and 1988 combined (Table 4). In June, 80% of the 20 radiocollared cows produced viable calves but by October, only 1 of the 17 radiocollared caribou had a surviving calf (Fig.13). This calf also survived through to the March 1988 survey.

In the Tweedsmuir-Entiako area, pregnancy rate of adult female caribou in March 1987 was 86% (Table 4). Although 65% of the 17 radiocollared caribou cows produced viable calves in June, only 2 of the 14 radiocollared caribou had calves surviving until October 1987 and then until March 1988 (Fig.13).

Calf recruitment into the population, based on total animals counted in March 1988, was 14% for the Tweedsmuir-Entiako caribou and 12% for the Itcha-Ilgachuz-Rainbow caribou.

Mortalities

Mortality rates of the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow caribou population were 30% and 20% respectively based on the sample of radiocollared caribou. In both areas, all mortalities (Tweedsmuir-Entiako - 6, Itcha-Ilgachuz-Rainbow - 4) occurred between late April and early November 1987 (Table 5). Seven of the ten dead animals were found within the boundaries of Tweedsmuir Park and 9 of the 10 mortalities occurred on summer or fall ranges (Figs.14,15)

Causes of death for 3 of the 6 mortalities in the Tweedsmuir-Entiako area were undetermined (Table 5). Mortality sensors were not present in 2 (mortalities 1 and 6) of the 3 radiocollars, therefore the mortalities were not detected for at

Fig. 13. Percentage of radiocollared caribou cows with calves during June, October and March calf surveys in the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow areas, April 1987 - March 1988.

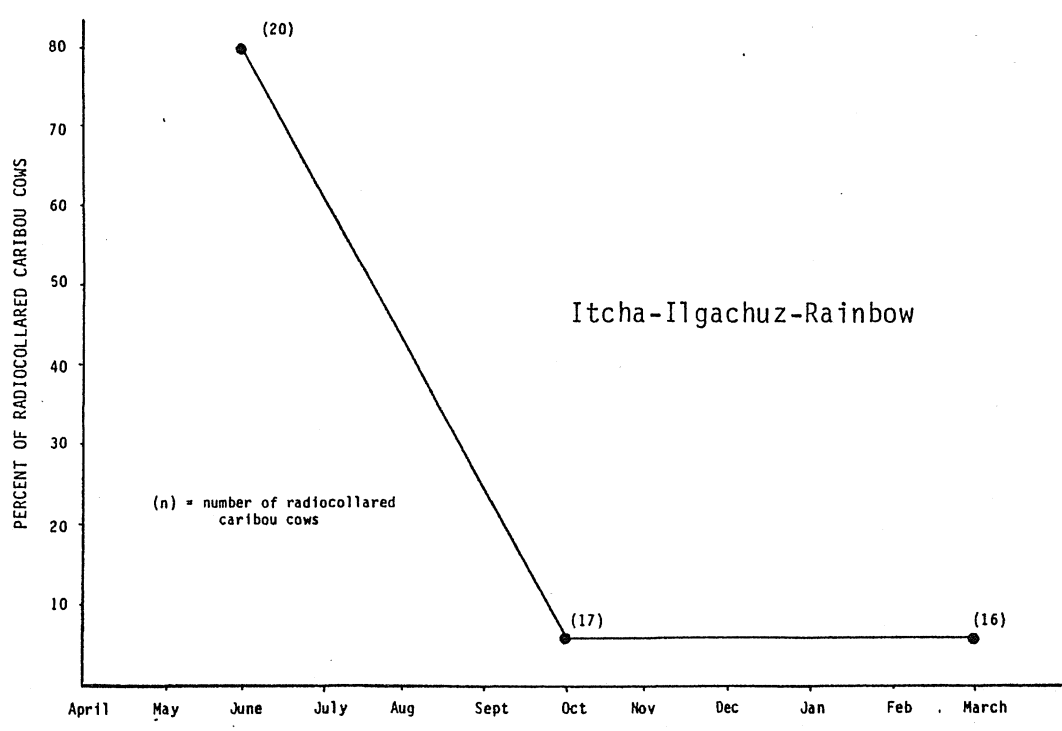
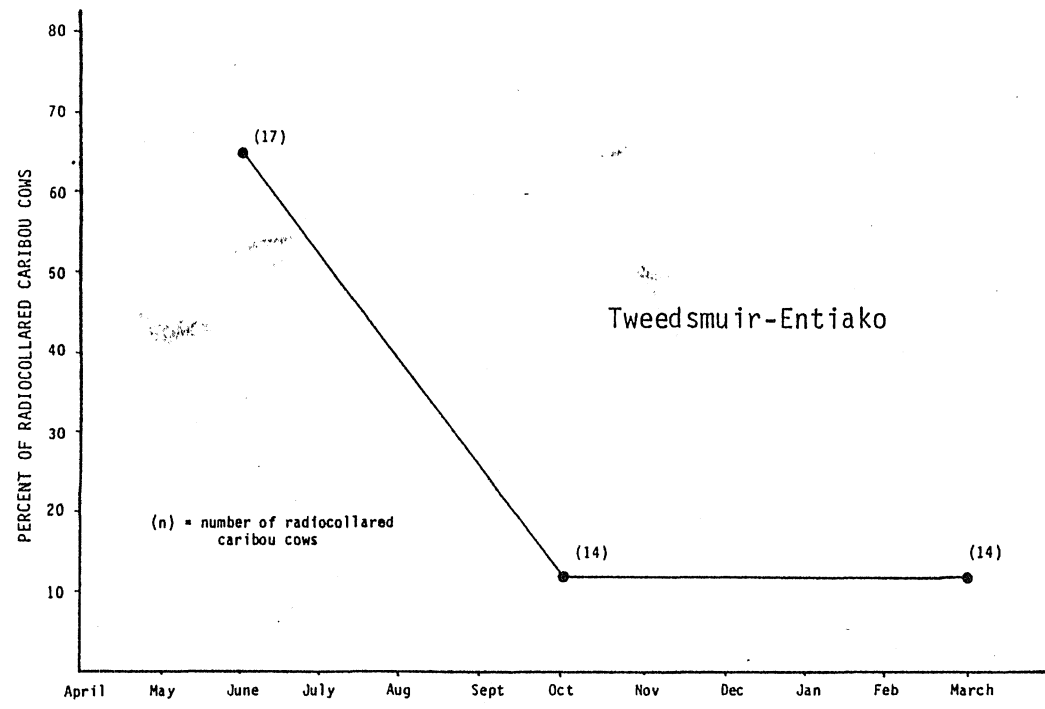


Table 5. Causes of mortality of adult female radiocollared caribou in the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow areas between April 1987 and March 1988. (Chronological numbers of mortalities correspond to locations of mortalities in figs. 14, 15).

<u>NUMBER</u>	<u>DATE</u>	<u>CAUSE OF DEATH</u>
Tweedsmuir/Entiako		
1	April 1987	unknown - possible wolf kill
2	June 1987	wolf kill
3	June 1987	bear scavenge/kill
4	July 1987	unknown
5	October 1987	accident
6	August 1987	unknown
Itcha/Ilgachuz/Rainbow		
1	July 1987	wolf kill
2	July 1987	wolf kill
3	September 1987	wolf kill
4	October/November 1987	poached

Fig. 14. Locations of radiocollared caribou cow mortalities in the Tweedsmuir-Entiako area, April 1987 - March 1988.

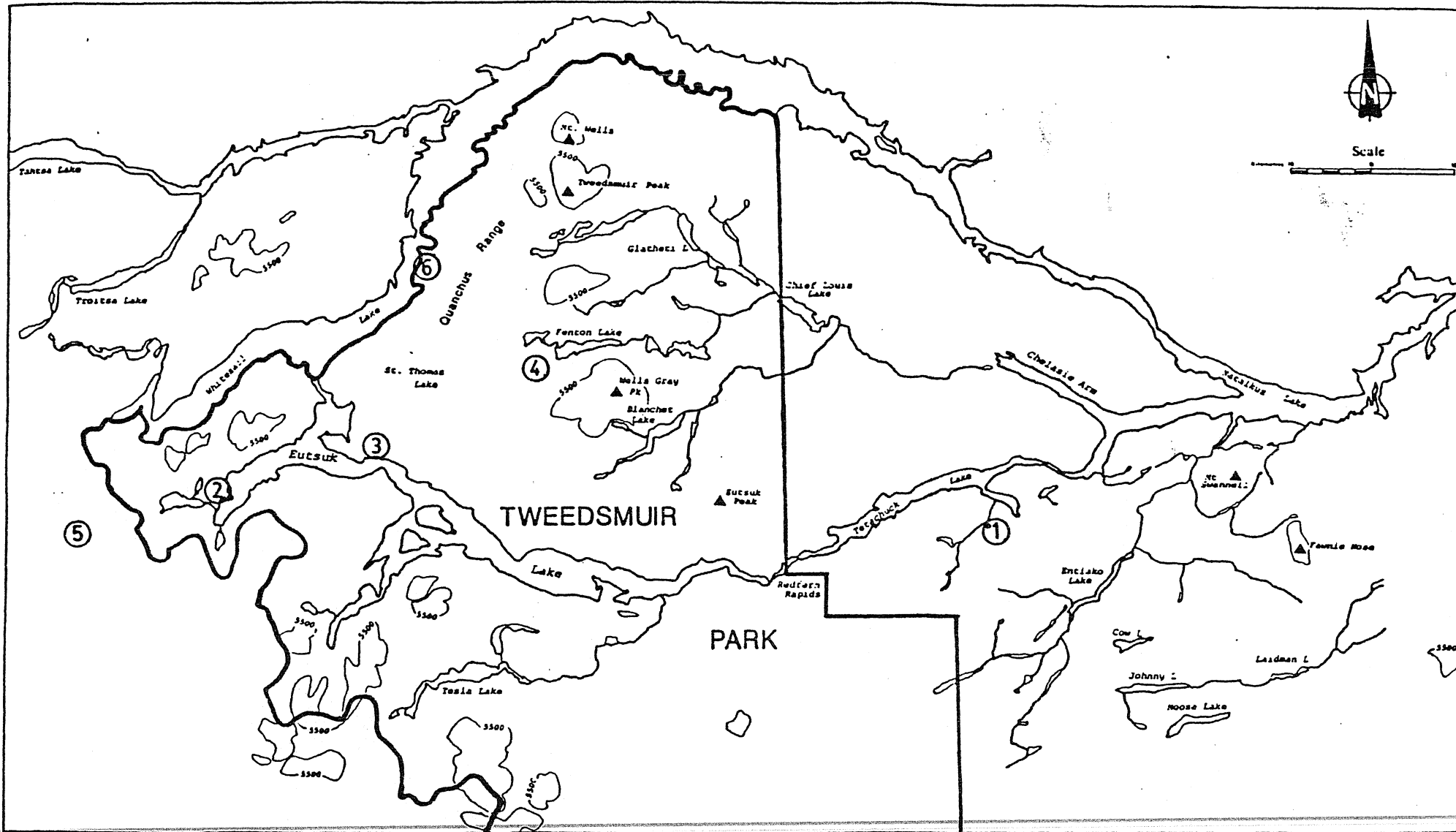
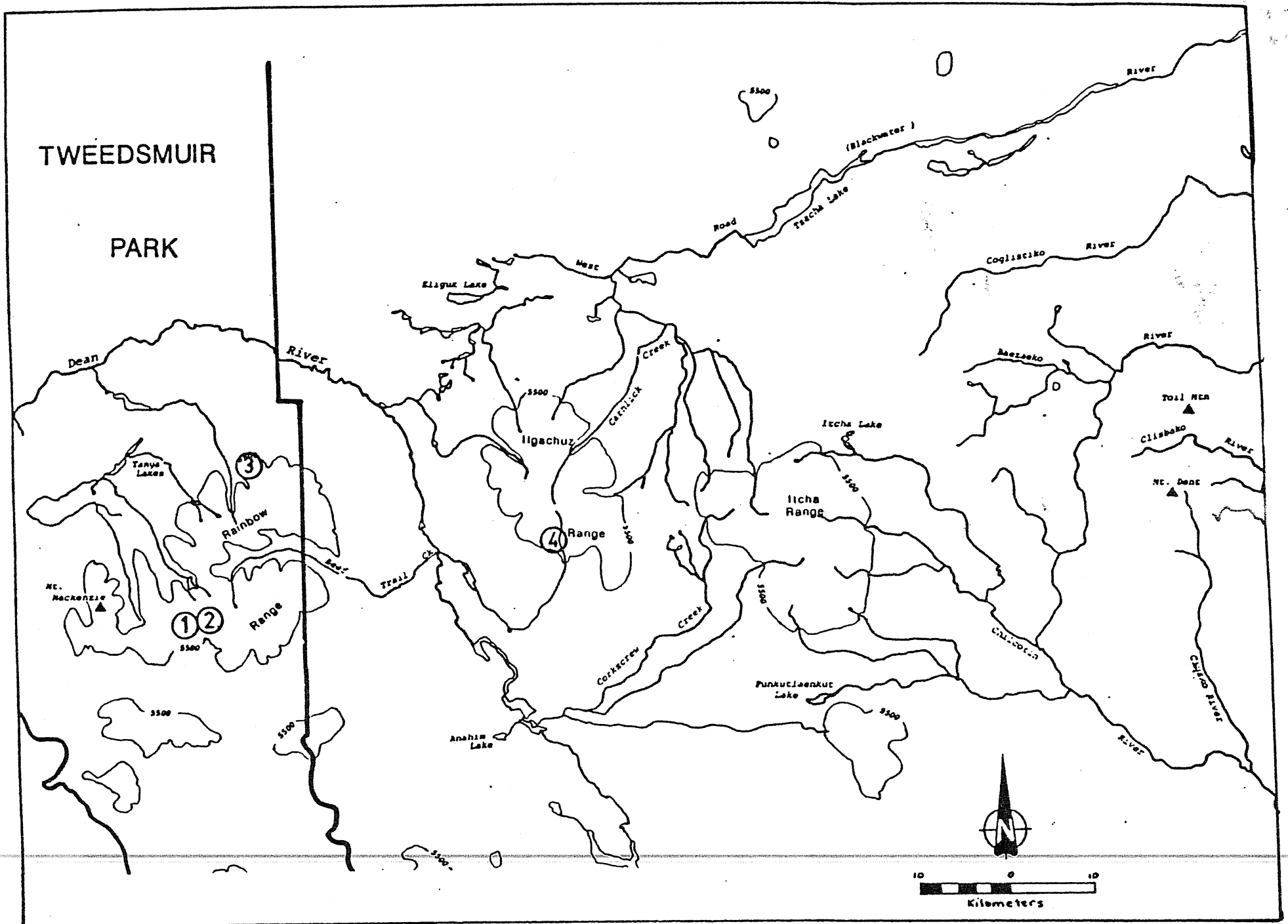


Fig. 15. Locations of radiocollared caribou cow mortalities in the Itcha-Ilgachuz-Rainbow area, April 1987 - March 1988.



least 4 weeks after the animal died. Mortality 4 occurred during a period when the interval between telemetry flights was almost 4 weeks. The animal was therefore dead for up to 4 weeks before it was necropsied. Of the 3 animals whose cause of death was determined, one was killed by wolves, one was scavenged and possibly killed by a bear and one appeared to have slipped while travelling on a steep slope and injured itself as it slid into a tree.

Of the 4 Itcha-Ilgachuz-Rainbow radiocollared caribou mortalities, 3 were killed by wolves and 1 was killed by poachers (Table 5). Mortalities 1 and 2 were found within 2 kilometers of each other on the south side of the Rainbow Mountains and were killed during the same 2 week period. The carcass of the animal killed by poachers was not found, however, the radiocollar, which had been cut with a knife was found in a thicket of spruce in subalpine habitat on the south side of the Ilgachuz. Evidence of a recent hunting camp was found less than 100 meters from the radiocollar. The animal had been seen alive 2 weeks previously during the helicopter survey on October 18 which was 3 days after the end of the legal caribou bull and cow hunting season.

CONCLUSIONS

1. During spring, summer and early fall (April–October) 1987, seasonal movements and habitat use of Tweedsmuir–Entiako and Itcha–Ilgachuz–Rainbow radiocollared caribou were similar to movements and habitat use documented during the first two years of the study. Tweedsmuir–Entiako caribou moved north across Tetachuk Lake in early May then moved through low elevation forested and meadow habitats to calving areas throughout northern Tweedsmuir Park and the area adjacent to the west of the park. Animals were widely distributed during the summer and habitat use and elevations ranged from Coastal Western Hemlock forests at 500 meters to alpine habitats at 2000 meters. By October caribou began moving east towards the Quanchus Mountains and Tetachuk Lake. Itcha–Ilgachuz caribou moved from late winter ranges to high elevation forested and meadow habitats on the north side of the Itcha Mountains and in the pass between the Itcha–Ilgachuz Mountains. Radiocollared caribou summered primarily in alpine habitat in the Itcha–Ilgachuz Mountains but also in forested and meadow habitats adjacent to the mountains. Radiocollared Rainbow caribou that wintered on the north side of the Ilgachuz Mountains returned to the Rainbow Mountains by May. Caribou were widely distributed throughout the Rainbow Mountains in the summer and early fall. One radiocollared Rainbow caribou exhibited an unusual movement when it first moved to the Itcha Mountains in late August then to the Ilgachuz Mountains in September.

2. Late snowfall and low snow accumulation influenced caribou habitat use and movements during fall migration and winter. In the Tweedsmuir–Entiako area, one radiocollared caribou remained on the north side of Tetachuk Lake until mid January whereas during moderate snowfall years, all animals were found south of Tetachuk by December. During early winter, caribou were using higher elevation

habitat than normal in an area not used during the previous two winters. Low elevation forests were used for the duration of the winter. Also, caribou were not observed at any time in alpine or subalpine habitat in the Fawnie Mountains. In moderate snowfall years, up to 100 animals used alpine habitat in the Fawnie Mountains from mid February to mid March. Itcha-Ilgachuz caribou remained at higher elevations in large dry (fescue-lichen) meadows until mid January. During moderate snowfall years, these meadows were used only until early December before snow accumulation and drifting made locomotion and cratering difficult. Lower elevation pine forests were used during the rest of the winter. Radiocollared caribou that wintered on the north side of the Ilgachuz and Rainbow Mountains exhibited movements similar to those of the previous two years but were delayed by 4-6 weeks. Caribou remained in the alpine until early January before they moved below treeline. Movements back into the alpine did not begin until early March.

3. Terrestrial lichens were the primary winter food source for both the Tweedsmuir-Entiako and the Itcha-Ilgachuz-Rainbow caribou. Preliminary analyses suggested that terrestrial lichen abundance and availability influenced selection of cratering sites by caribou. Cratering sites were also related to canopy cover but not to snow depth or snow penetrability. Arboreal lichens were also used in forested areas but to a lesser extent than terrestrial lichens.

4. The proportion of radiocollared cows that produced calves in June 1987 in both the Tweedsmuir-Entiako and Itcha-Ilgachuz-Rainbow areas, was considerably greater than the proportion of radiocollared cows that produced calves in June 1985 and 1986. In the Tweedsmuir-Entiako area, 1987/88 was the first year during the three year study that any radiocollared caribou had calves surviving until March. In the Itcha-Ilgachuz-Rainbow area, 1987/88 was the first

year during the three year study that less than 20% of the radiocollared cows had calves surviving until March.

5. Moderate adult mortality and moderate calf recruitment in the Itcha-Ilgachuz-Rainbow caribou population suggest that the population may be stable. Increased impact of wolf predation on the Itcha-Ilgachuz-Rainbow caribou population over the last 3 years suggests that the wolf population in the area may be increasing.

6. High adult mortality and low calf recruitment in the Tweedsmuir-Entiako caribou populations suggests that the population is probably decreasing. Major limiting factors for this population were difficult to determine due to a large number of unknown causes of mortality.

FUTURE DIRECTION

Fieldwork

The fieldwork component of the West Central B.C. Caribou Research Project was completed in March 1988. No fieldwork has been scheduled for the immediate future for the Tweedsmuir-Entiako area. In the Itcha-Ilgachuz-Rainbow area, Ministry of Environment and Parks is continuing monitoring of radiocollared caribou at a reduced level.

Data Analysis

Data collected during the three years of the study (April 1985 - March 1988) will be synthesized and presented in the form of an MSc. thesis. Subsequent reports and analyses may be produced if further funding becomes available.

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WEST-CENTRAL B.C. CARIBOU RESEARCH PROJECT - EXPENDITURES

<u>Activity</u>	<u>Budgeted</u>	<u>Expended</u>		<u>Source</u>
Cichowski -employment	10 000	7 840	2 100 5 740	UBC Careertrac Wildlife Branch (W.L.)
Summer telemetry Telemetry	10 000	13 589	2 265 (1 003) (1 261) 11 324	Parks Branch (MOEP) Smithers Williams Lake Section 88 - Westar P.G./P.R.
Travel expenses	3 000	2 485		UBC
Winter telemetry	20 000	16 016		Section 88 - Westar P.G./P.R.
Winter site investigations	10 000	8 585		Section 88 - Westar P.G./P.R.
Calf Counts	25 000	21 435	16 517 (7 778) (8 739) 925 3 993	Parks Branch (MOEP) Smithers Williams Lake Wildlife Branch (W.L.) Section 88 - Westar P.G./P.R.
Calving ground observations	2 000	2 838		UBC
Necropsies	5 000	708		UBC
Habitat mapping	20 000	22 500	20 000 2 500	Section 88 Cariboo Habitat Protection (MOEP) Williams Lake
<hr/> Total	<hr/> \$ 105 000	<hr/> \$ 95 996		

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WEST-CENTRAL B.C. CARIBOU RESEARCH PROJECT - CONTRIBUTORS

<u>Source</u>	<u>Amount</u>
Ministry of Environment & Parks	\$ <u>27 946</u>
Parks Branch	
Smithers	8 781
Williams Lake	10 000
Wildlife Branch	
Williams Lake	6 665
Habitat Protection Branch	
Williams Lake	2 500
Ministry of Forests & Lands	
Section 88	
Prince George/Prince Rupert	\$ 39 918
Cariboo	\$ 20 000
University of British Columbia	\$ 8 132
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Total	\$ 95 996

