

**Mountain Caribou (*Rangifer tarandus caribou*)
Survey in the Northern Mackenzie Mountains,
Gwich'in Settlement Area, September 2000**



Photo W. Stebner

**Jennifer Shaw and Bryon Benn
Gwich'in Renewable Resource Board
Inuvik, NT**

**March 2001
Report 01-03**

Abstract. This report documents the results from our aerial survey and ground classification of mountain caribou in the Northern Mackenzie Mountains from September 10th to 18th, 2000. During two aerial surveys we observed 450 and 550 caribou in mixed groups of 20-100 animals along the front ranges of the mountains between the Cranswick River and the Ramparts River. During our ground survey we observed 546 caribou and successfully classified 360. With the exclusion of unclassified animals we calculated a ratio of 45 calves per 100 cows and a sex ratio of 200 bulls per 100 cows. Ratios including the unclassified cohort were 19 calves per 100 cows and 88 bulls per 100 cows. Criteria for using the unclassified animals are described. Harvest of caribou is low and habitat is secure at present. Implications of COSEWIC and Northwest Territories endangered species rankings and future research initiatives are discussed.



Creek running out of Mackenzie Mountains

TABLE OF CONTENTS

<i>Abstract</i>	i
INTRODUCTION	1
Objectives	2
STUDY AREA	2
METHODS	4
RESULTS	5
Aerial Survey	5
Ground Classification.....	5
Range and Movements	7
Feeding	8
Harvest	9
Predation	9
DISCUSSION	9
Ground Classification	9
Range and Movements	10
Harvest	10
CONCLUSION	11
COSEWIC Designation	11
Future Work	11
ACKNOWLEDGEMENTS	11
LITERATURE CITED	12
Personal Communications	12

INTRODUCTION

Mountain caribou and boreal caribou are two ecotypes of woodland caribou (*Rangifer tarandus caribou*) that inhabit the southern portion of the Gwich'in Settlement Area (GSA). We define ecotype here as a local race of a species with characteristics adapted to a particular habitat type. The greatest densities of mountain caribou occur along the front ranges of the Mackenzie Mountains in the winter and the headwater areas of the Arctic Red River in the summer.

This herd is part of the Bonnet Plume herd that migrates between the Mackenzie and Wernecke Mountains in the Yukon Territories (Farnell and Russell 1984). From 1980-1982, Farnell and Russell (1984) conducted a radio collaring study in the Ogilvie-Wernecke Mountains and found 2 distinct herds, the Hart River herd and the Bonnet Plume herd. They estimated 5,000 animals in the Bonnet Plume herd and noted that the herd was stable or increasing in numbers. To date, the status of the population and habitat in the GSA has only been subjectively assessed. Several caribou population surveys were conducted in the Mackenzie Mountains that included a portion of the GSA (Outfitting Zone G/OT/O1, Simmons 1969, Lortie 1982). Other woodland caribou research undertaken close to the GSA has been in the Sahtu region (Collin 1983 - Moose Horn River herd, Veitch et al. 2000 - Redstone River herd, Olsen 2000 - central Mackenzie Mountains, Gullickson 2000, Gunn 2000 – South Nahanni watershed) and the Yukon Territories (Farnell and Russell 1984 - Wernecke Mountains).

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed the boreal population of woodland caribou as threatened and the northern mountain population as not at risk (COSEWIC 2000). Woodland caribou are listed as sensitive in the NWT Species-2000 draft report (Government of the Northwest Territories). As COSEWIC and NWT Species 2000 designations may influence future use and management of woodland caribou in the GSA, important questions are:

- Do mountain caribou from the Arctic Red River area constitute a distinct mountain population or do they form part of a continuous population with woodland caribou found farther north in the Fort McPherson and Tsiigehtchic areas?
- Are the woodland caribou north of the Mackenzie Mountains of the boreal ecotype? If they constitute different ecotypes, are they sympatric or parapatric, and where and when do their ranges overlap?

In the GSA, woodland caribou populations receive low hunting pressure. Stresses on caribou habitat by development activities and related access have been minimal to date. However, with current fuel prices, oil and gas exploration and development will probably increase substantially in the next few years.

Despite the considerable subsistence and economic importance of woodland caribou throughout the Mackenzie Mountains, little effort and money has been spent on these animals in the NWT, especially in the GSA. Thus, there is little scientific or traditional information on seasonal range use, movements or food habits of this herd of mountain caribou. By comparison, research on barren-ground caribou in the NWT and on woodland caribou on the Yukon side of the mountains has been extensive.

Objectives

Our short term objectives (2000) are:

- i) to synthesize all the current information on woodland caribou in the study area through a literature search and workshop with Gwich'in elders, past and present wildlife researchers and managers, hunters, outfitters and guides.
- ii) to conduct a preliminary survey of woodland caribou population and habitat use in the study area.

Longer term objectives are:

- i) to identify the number of genetically distinct woodland caribou herds in the GSA and in the larger Mackenzie Mountains region.
- ii) to estimate the population size and density of woodland caribou in the GSA.
- iii) to determine the sex and age composition of the woodland caribou population in this area.
- iv) to describe the movements and seasonal habitat needs of the caribou population.

This information will serve as a baseline to which future surveys can be compared.

STUDY AREA

Our aerial and ground surveys occurred along the front range of the Mackenzie Mountains in the area of the Arctic Red River (Figure 1). In this region the mountains run in north and south ridges, ending abruptly in broad sedge meadows sloping away to the north. These meadows

are dissected by numerous active streams and dry washes, and are interspersed with ridges of heath communities (*Cassiope tetragona*, *Dryas spp.*, *Hedysarum spp.*), shrubland (*Betula glandulosa*, *Salix sp.*) and lichen beds. Lower elevations to the north and low elevations in the larger mountain valleys contain stands of black spruce (*Picea mariana*) and white spruce (*Picea glauca*).



Stand of black spruce in study area

METHODS

For Objectives – 2000

- i) We reviewed the existing literature for information pertaining to woodland caribou in the Mackenzie Mountains and in similar habitats in other regions.
- i) We hosted a workshop with elders, harvesters, wildlife researchers and managers, and outfitters to gather scientific and traditional knowledge on population trends, movements and seasonal ranges, behavior, predation and habitat use of woodland caribou in the GSA.
- i) We collected harvest data from the Gwich'in Harvest Study, Government of the Northwest Territories harvest records and Yukon Territorial Government harvest records.
- ii) We conducted an aerial search by fixed-wing aircraft to locate woodland caribou bands. Locations and broad habitat types were recorded on

- 1:250,000 NTS topographic maps. We hiked into the area where caribou were found to observe them on the ground. We classified all caribou observed, characterized feeding sign and described vegetation communities used by caribou.
- ii) We classified all caribou we encountered on the ground using a Bausch and Lomb 15-45x60 spotting scope on a tripod for classification. Classifications were made based on antler morphology, body size, presence or absence of antler velvet, penis sheath and vulva patch: calf (6 months), yearling (18 months), mature cow, mature bull, immature bull and unclassified. We were careful to avoid counting groups of animals more than once. All classifications were recorded on field data sheets and tabulated.

For Objectives – Long Term

The exact methods for this work will be determined and described in future funding applications.

RESULTS

Aerial Survey

During a September 10th reconnaissance survey in the front ranges of the Mackenzie Mountains, we observed 250 caribou in mixed groups of 20-60 animals between the Arctic Red and Ramparts Rivers, scattered mixed bands totaling 300 between the Arctic Red and Cranswick Rivers and a group of 33 bulls 5 km up Jersey Creek.

On September 15th, we observed 300-400 caribou in mixed groups between the Cranswick and Arctic Red Rivers and 130 caribou in 2 mixed groups east of the Arctic Red River and up the Ramparts River valley (Figure 2).

Ground Classification (Table 1 and 2)

We conducted our ground survey from September 10th to September 14th, west of the Arctic Red River between an unnamed lake (383900,7259000) and the Cranswick River. From September 15th to September 19th we conducted our ground survey east of the Arctic Red River between the Ramparts River and the next drainage west.

Our classification (excluding unclassified animals) gave a ratio of 45 calves per 100 cows, and a sex ratio of 200 mature bulls per 100 cows. The 186 unclassified caribou were probably lone

mature cows, young cows and young bulls. Calves and mature bulls were easy to differentiate even at the longest viewing distances we encountered (about 2 km). If the ratio of cows to immature and yearling bulls (assume males to be 1/2 of the yearling category) for the classified animals was extended to include the unclassified cohort, there would be 226 cows in our classification. This would give a ratio of 19 calves per 100 cows, and sex ratio of 88 mature bulls per 100 cows.



A view of the Mackenzie Mountains

Range and Movements

Caribou generally moved north out of the mountains along river drainages. Most of the caribou we observed west of the Arctic Red River and north of the mountains moved in an easterly direction. Weather appeared to affect caribou movements. They tended to move into the flats along the north edge of the mountains during stormy weather and back into the mountain valleys on warm, clear days.

Caribou summer in high mountain ranges at the headwaters of the Arctic Red River watershed (Kelly Hougen, Arctic Red River Outfitters, pers.comm.). They generally winter in the forests north of the mountains, but Arctic Red River Outfitter (ARRO) guides noted that caribou antlers are often found many kilometers up the larger river valleys indicating that some may spend at least part of the winter at low elevations in the mountains.

Table 1: Ground observations of woodland caribou in the Arctic Red River / Mackenzie Mountains region of the Gwich'in Settlement Area, NT, September 10-19, 2000.

Date	No. caribou observed	No. of groups/ composition	Comments: behaviors, activities, etc.
Sept 10	80	5 / mixed	-feeding and walking east
Sept 11	102	7 / mixed	-feeding and walking east, 1 group of 31 spooked and ran for 200-250m -no predator seen
Sept 12	77	2 / mixed	-resting and feeding
Sept 13	9	2 / mixed	-walking and feeding, 2 bulls sparring
Sept 14	7	1 / cow/calf	-walking
Sept 15	6	1 / mixed	-walking and feeding
Sept 16	232	4 / mixed	-walking and feeding, 2 bulls sparring 2 groups (~150 caribou) used a slump along the Ramparts R. (possible lick)
Sept 17			-fogged in
Sept 18	6	1 / mixed	-walking
Sept 19	33	2 / mixed	-walking and feeding

Table 2: Classification of woodland caribou in the Arctic Red River / Mackenzie Mountains region of the Gwich'in Settlement Area, NT, September 10-19, 2000. (percentage of classified caribou)

Bulls	Cows	Calves	Immature Bulls	Yearlings	Unclassified	Total
198(55)	98(27)	44(12)	12(3)	8(2)	186	546

Feeding

Caribou were observed eating lichens off the tops and sides of tussocks. The predominant lichens in the area are *Cladina mitis*, *C. rangiferina*, *C. stellaria*, *Cladonia amaurocraea* and/or *C. uncialis*, *Cetraria cucullata*, *C. islandica* and/or *C. ericetorum*, *C. tilesii*, and possibly *C. nivalis*, *Dactylina arctica*, *Nephroma arcticum* and *Thamnolia subuliformis*.

Harvest

The known annual harvest for the Bonnet Plume herd is 50-55 animals - 20-25 by non-resident hunters who hunt with ARRO (Kelly Hougen pers.comm.) and 30 by resident and non-resident hunters in the Yukon (Mark O'Donoghue, Yukon Department of Renewable Resources, pers.comm.).

Subsistence harvesters from the GSA harvest 10-15 woodland caribou annually around the communities of Tsiigehtchic and Fort McPherson (Gwich'in Harvest Study data). It is not known whether these animals are the mountain ecotype and part of the Bonnet Plume herd or the boreal ecotype.

Predation

We did not observe any predators interacting with caribou, but we did see tracks and other sign of grizzly bears and wolves. We observed one adult grizzly feeding on a moose gut pile near the Ramparts River for three days. A sow and cub were observed near our first camp west of the Arctic Red River.

DISCUSSION

Ground Classification

It was difficult to separate young bulls and mature cows without calves from a distance. Several groups were at least 2 km away and moving. In these groups we were only able to pick out mature bulls and cow-calf pairs with confidence and marked the rest unknown. For this reason the calf:cow and bull:cow ratios are high.

If the extrapolated ratio of 19 calves per 100 cows is accurate, recruitment is lower than the rate of 30-35 calves per 100 cows suggested by the Caribou Management Team (1996) as necessary for a stable to increasing population. Successive years with less than 30 calves per 100 cows indicate low recruitment and a declining population. In the past five years, recruitment has been below threshold levels in the South Nahanni (Gullickson 2000, Gunn 2000) and Redstone herds (Olsen 2000, Veitch et al. 2000). A fall population composition survey should be conducted annually for a few years in the Bonnet Plume herd to increase the precision of the recruitment rate.

Range and Movements

Year round data on seasonal ranges and movements are not available. Farnell and Russell (1984) report that a portion of the Bonnet Plume herd winters in the Arctic Red River area north of the mountains and in some of the larger mountain valleys. During spring migration they move in a southwesterly direction to higher elevations in the mountains towards calving sites and summer ranges. During fall they move in a northeasterly direction from summer pastures to their winter range. Gwich'in from Fort McPherson and Tsiigehtchic report seeing and harvesting woodland caribou farther north during the winter around their communities and south and west of the Mackenzie River. This herd has not been described as yet. We are waiting for the results of DNA analyses of harvested animals from this area and from the outfitting zone G/OT/O1 to determine the ecotype of these animals.



Photo I. Liepins

A group of Woodland Caribou on the move

Harvest

The Bonnet Plume herd was estimated at 5000 animals and deemed stable to increasing during 1980-82 (Farnell and Russell 1984). Assuming the herd size has remained stable, annual percent harvest of the herd is approximately 1.0-1.5%. The Caribou Management Team (1996) recommends an annual allowable harvest for a stable naturally regulated population of 2-3% of adult caribou.

CONCLUSION

COSEWIC Designation

From this preliminary survey it appears that the population and habitat in this part of the GSA is not under any threat from development or human activities. Based on our findings and past research in the Mackenzie Mountains (Simmons 1969, Collin 1983, Ferguson and Gauthier 1992), the Bonnet Plume herd, which uses the GSA for part of the year, should be included in the Northern Mountain population (designated 'not at risk').

Future Work

The information we collected on woodland caribou populations in the GSA is not complete or conclusive. Due to increased interest in oil and gas activity, stresses to caribou habitat will probably increase substantially in the next few years. COSEWIC and NWT Species 2000 designations may influence future use and management of woodland caribou in the GSA. For these reasons, future studies should be conducted to:

- i. identify the number of genetically distinct boreal/mountain caribou herds in the GSA and in the larger Mackenzie Mountains region.
- ii. estimate the population size and density of woodland caribou in the GSA.
- iii. determine the sex and age composition of the woodland caribou population in this area.
- iv. describe the movements and seasonal habitat needs of the caribou population.

ACKNOWLEDGEMENTS

We thank Fred Carmichael, Gabe Andre, Frederick Blake, Morris Blake, John Niditchie, Kelly Hougen (Arctic Red River Outfitters), Mark O'Donoghue (YTG Renewable Resources), John Nagy (DRWED Inuvik), Alasdair Veitch (DRWED Norman Wells), and Ben Olson (SRRB) for participating in our woodland caribou workshop. Kelly Hougen and his staff assisted us greatly during our survey by helping us find caribou aggregations, flying us into these areas, patiently answering our questions about caribou habits and movements in the area, and generally making us feel at home around their camps when weather prevented us from getting out into the field.

LITERATURE CITED

Caribou Management Team. 1996. Woodland Caribou Management Guidelines. Yukon Renewable Resources, Whitehorse, YK.

Collin, G. 1983. Developing a management plan for the Moose Horn River caribou herd, Mackenzie Mountains, N.W.T. Master's Degree Project. Faculty of Environmental Design. University of Calgary. 166pp.

Farnell, R. and D. Russell. 1984. Wernecke Mountain caribou studies 1980-82.

Ferguson, M.A.D. and L. Gauthier. 1992. Status and trends of *Rangifer tarandus* and *Ovibos moschatus* populations in Canada. *Rangifer* 12(3):127-141.

Government of the Northwest Territories. 2000. NWT Species 2000 - General Status Ranks of Wild Species in the Northwest Territories. Resources, Wildlife and Economic Development, GNWT, Yellowknife, NT.

Gray, D.R. 1999. Updated status report on the woodland caribou (caribou des bois) *Rangifer tarandus dawsoni* and *Rangifer tarandus caribou* in Canada. Draft Report to COSEWIC, Ottawa. 37pp.

Gullickson, D. 2000. South Nahanni woodland caribou study. Parks Canada interim report. Nahanni National Park Reserve, Fort Simpson, NT. 20pp.

Gunn, A, J. Adamczewski and K. Davidge. 2000. Progress report for the South Nahanni mountain caribou herd. October 1998-2000. Unpublished Report. Department Resources, Wildlife and Economic Development. Yellowknife, NT. 22pp.

Lortie, G.M. 1982. The 1981-82 winter distribution of woodland caribou in the Mackenzie Mountains, NWT. Unpublished Report. Yukon Department of Renewable Resources. Whitehorse, YT.

Olsen, B. 2000. 'Draft' Fall distribution and population composition of woodland caribou in the central Mackenzie Mountains, Northwest Territories, October, 2000. Sahtu Renewable Resources Board Manuscript Report No.1. Tulita, NT. 15pp.

Simmons, N. 1969. Aerial Dall sheep and woodland caribou surveys in game management zones 12 and 19, Mackenzie Mountains, N.W.T. March 7-15, 1969. Unpubl. Report. Canadian Wildlife Service. 16pp.

Veitch, A., R. Popko, and N. Whiteman. 2000. Classification of woodland caribou in the Mackenzie Mountains, NWT. August 1999. Unpublished Report. Dept. Resources, Wildlife, and Economic Development, Sahtu Region. Norman Wells. 15pp.

Personal Communications

Kelly Hougén. Personal Communications, 2000.

Mark O'Donoghue. Personal Communications, 2000.