

## The status of *Rangifer tarandus caribou* in Yukon, Canada

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*Abstract:* This paper summarizes the population trends as well as research and management programs for woodland caribou (*Rangifer tarandus caribou*) in Yukon. Most herds are stable although not all are counted regularly and systematic monitoring of herds remains an essential need. Over the past decade the Southern Lakes, Aishihik, and Finlayson herds have been well studied and provide valuable models for guiding Yukon management programs. Over harvest and the spread of agriculture, forestry and mining are ongoing human activities are of concern to caribou managers.

**Key words:** woodland caribou, North America.

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### Introduction

This paper summarizes the most recent population trends and research and management programs for woodland caribou (*Rangifer tarandus caribou*) in Yukon. Woodland caribou in Yukon are classified as the mountain/terrestrial ecotype based on their winter foraging behavior (Edmonds, 1991) and relative to barren-ground caribou occur at lower densities, form smaller aggregations, make less extensive seasonal movements and disperse rather than concentrate at calving. Studies indicate that the likelihood of population change due to inter-herd movement is low, at least for present densities.

First Nation harvesting rights are assured under the Yukon Act and thus unrestricted by law necessitating voluntary restraint by First Nation hunters where restrictions are required. As well, under the Yukon Land Claim Agreement indigenous and scientific information are evaluated within a co-management framework comprised of 14 local Renewable Resource Councils and a Yukon-wide Fish and Wildlife Management Board. Further, because Yukon is a Territory of Canada the Federal Government retain jurisdiction over land, water and timber resources, limiting the ability of Yukon to manage caribou habitats. These factors greatly influence harvest management of caribou within Yukon.

### Caribou inventory and research

Woodland caribou studies essentially began in Yukon in 1980 when the first systematic inventory of herds was established. The primary objectives of this program were to identify distinct seasonal movements and distribution of herds, secure reliable population estimates, monitor population trends through annual or periodic winter census and assess herd composition through fall breeding season surveys.

Caribou studies have increased markedly over the last 3 years (Fig. 2) in response to public concern for the welfare of wildlife exposed to expanding human settlement and industrial activity. A total of 236 animals have been captured, radio-collared and monitored since 1993 and an additional 90 have been collected to provide data on caribou physical condition and the presence of contaminants (Gamberg & Scheuhammer 1994; Gamberg 1993; Florkiewicz, 1993). A total of 128 relocation surveys were flown since 1993 providing 2200 contacts with radio-collared caribou. As well, 77 census and sex/age composition surveys have been flown.

### Status of caribou

Woodland caribou are estimated to number approximately 28 000–35 000 in Yukon, within 22

Table 1. Status of caribou in Yukon.

Herd	Population Estimate	Survey Technique	Last Survey	Status	Comments
<b>Woodland Caribou</b>					
1. Hart River	1 200	Estimate <sup>1</sup>	1978	Unknown	Lightly hunted due to inaccessibility.
2. Bonnet Plume	5 000	Guess	1982	Unknown	Increased mineral exploration in summer of 1995.
3. Mayo	Unknown			Unknown	Anecdotal information only.
4. Ethel Lake	300	Estimate <sup>2</sup>	1995	Stable	Vulnerable to over-hunting.
5. Moose Lake	200	Estimate <sup>2</sup>	1991	Stable	Small herd with limited access.
6. Tay River	4 000	Estimate <sup>2</sup>	1991	Stable	Naturally regulated herd with limited access.
7. Redstone	5-10 000	Guess	1982	Unknown	Ranges Largely in N.W.T., heavy hunting pressure.
8. Finlayson	4 000	Estimate <sup>2</sup>	1996	Decreased/ Stable	Experienced dramatic population flux following wolf control in the 1980's. Record high mining exploration activity on summer range.
9. Nahanni	2 000	Guess	1996	Unknown	Presently under intensive study by Nahanni National Park.
10. La Biche	400	Estimate <sup>3</sup>	1993	Unknown	Presently a remote and undisturbed population.
11. Smith River	200	Guess		Unknown	Remote and unhunted population shared with B.C.
12. Little Rancheria	700	Estimate <sup>2</sup>	1988	Stable	Under study to mitigate concern from planned forestry development. Highly accessible to winter hunting by First Nations.
13. Wolf Lake	1 200	Estimate <sup>2</sup>	1995	Stable	Naturally regulated herd with limited access.
14. Atlin	500-1 000	Estimate <sup>3</sup>	1995	Unknown	Ranges mostly in B.C., closed to hunting in Yukon.
15. Ibez	340	Estimate <sup>1</sup>	1995	Increasing	Increasing rapidly following prohibition of harvest. Closed to hunting.
16. Carcross	450	Estimate <sup>1</sup>	1997	Increasing	Ranges near large urban center and provides excellent viewing opportunity. closed to hunting.
17. Pelly Herds	1 000	Guess		Unknown	As yet no study but significant population based on incidental sightings.
18. Tarchann	300	Estimate <sup>1</sup>	1995	Stable	Vulnerable to over-hunting and presently under study.
19. Klaza	430	Estimate <sup>2</sup>	1996	Stable	Intense mineral exploration in the area. Permit hunt.
20. Aishihik	750	Estimate <sup>1</sup>	1996	Increasing	Harvest prohibition and wolf control used to restore herd to 2 000.
21. Klwane	180	Estimate <sup>1</sup>	1996	Increasing	Protected population ranging partly in Klwane Game Sanctuary. closed to hunting.
22. Chisana	700	Estimate <sup>1</sup>	1996	Decreasing	Experiencing rapid decline due to poor forage/nutrition and heavy predation. Closed to hunting.
<b>Barrenground Caribou</b>					
23. Nelchina	49 000	Estimate <sup>4</sup>	1995	Increasing	Has migrated into Yukon since 1991. Winter registration permit hunt.
24. Fortymile	22 000	Estimate <sup>4</sup>	1995	Stable	Recent plan to increase herd size to 50 000. Closed to hunting in Yukon.
25. Porcupine	160 000	Estimate <sup>4</sup>	1995	Increasing	Potential for oil and gas development on calving grounds.

<sup>1</sup> Total Count. <sup>2</sup> Stratified Random Quadrats. <sup>3</sup> Extrapolation. <sup>4</sup> Direct Photocount.

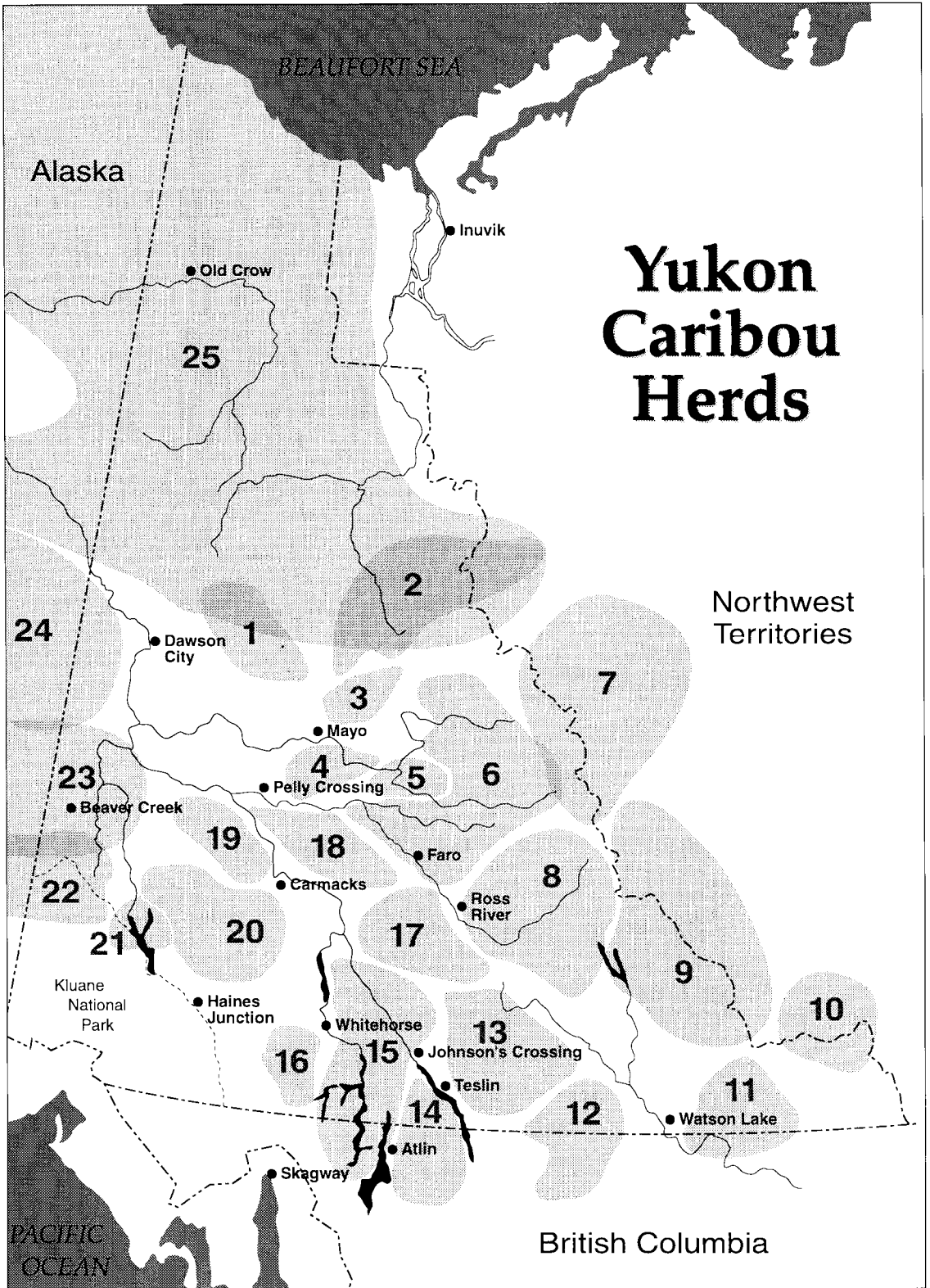


Fig. 1. The distribution of caribou herds in Yukon. (Numbers refer to herd numbers, Table 1).

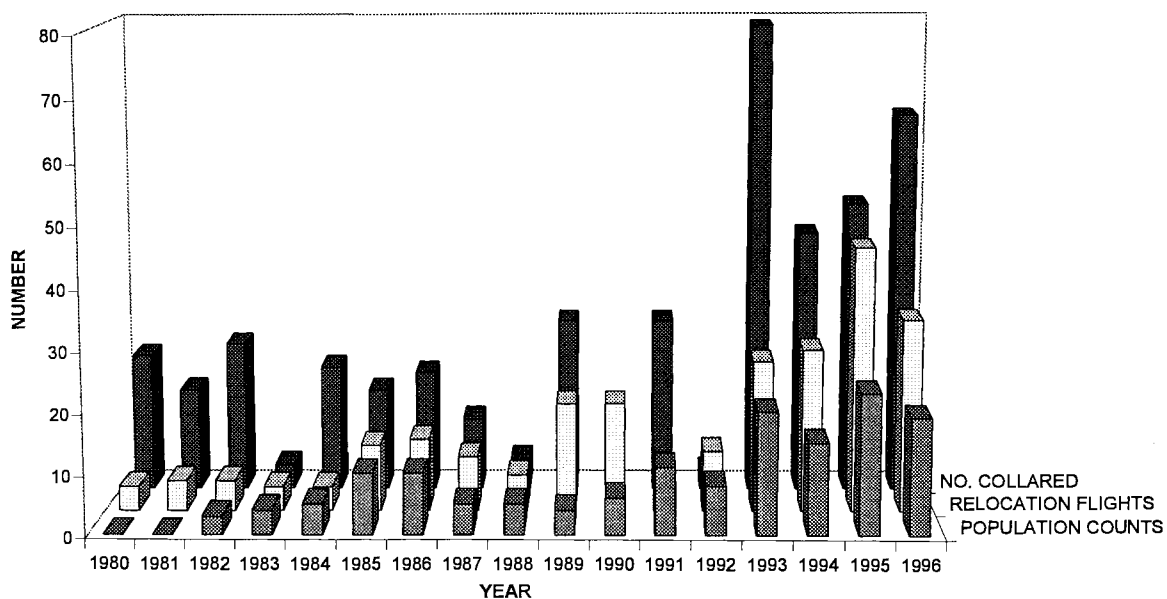


Fig. 2. Number of caribou radio-collared, relocation flights, and population counts conducted to inventory Yukon woodland caribou between 1980 and 1996.

recognized herds ranging from 180 to perhaps 10,000 individuals (Fig. 1, Table 1). Fifteen herds have been surveyed during the 1990s and of these 4 are increasing, 7 are stable, 1 is decreasing, and 3 are of uncertain status. For the other seven herds only crude estimates of population size and trend are available. The latter are populations in remote localities and their distributions are conjectured from superficial survey activity and/or anecdotal information from people with long term local knowledge of the area.

Annual licensed harvest of caribou has declined and become more erratic in the last 5 years and has averaged 271 (SD = 47) animals compared to 336 (SD = 28) in the 1980s (Fig. 3). Much of this change is due to increased restriction on caribou harvest. Harvest has been restricted to males only since 1984, and more recently, six herds have been closed to hunting (Table 1). Presently quotas are being formulated for licensed outfitters who guide non-resident hunters. The average annual harvest by residents ( $n=162$ ) is greater than non-resident hunters ( $n=154$ ). First Nations harvest is unknown but is suspected to equal that of licensed hunters harvest. Enforcement of compulsory reporting by all licensed hunters began in 1994.

### Research and management programs

A number of herd ranges are known to overlap with adjacent jurisdictions and joint management efforts

are underway with Alaska (Chisana herd), British Columbia (Carcross, Atlin, and Little Rancheria herds) and with the N.W.T. (Nahanni herd - Nahanni National Park). However, there are no formal management agreements in place at present. While these informal management arrangements appear adequate at this time, more formal management plans may be required where harvest and land use issues persist between neighboring jurisdictions. The Redstone herd remains a potential management problem with moderate to high levels of harvest and minimal population information available.

There are presently 3 programs directed at recovery and maintenance of woodland caribou herds in the Yukon (Fig. 4).

#### *Southern Lakes Caribou Recovery Program*

The Southern Lakes caribou program is aimed at rebuilding what may be called the 'urban caribou herds' (Ibex, Carcross, Atlin) that exist near Whitehorse, Yukon (O'Donohue, 1996) (Fig. 4a). Southern Lakes caribou had declined in both numbers and distribution since historic times and their biological viability had come into question. A management plan to restore the herds was developed in 1992 which entails co-management with 6 First Nations whose traditional territory boundaries include the herd ranges. Hunting was prohibited (including First Nation hunting by voluntary com-

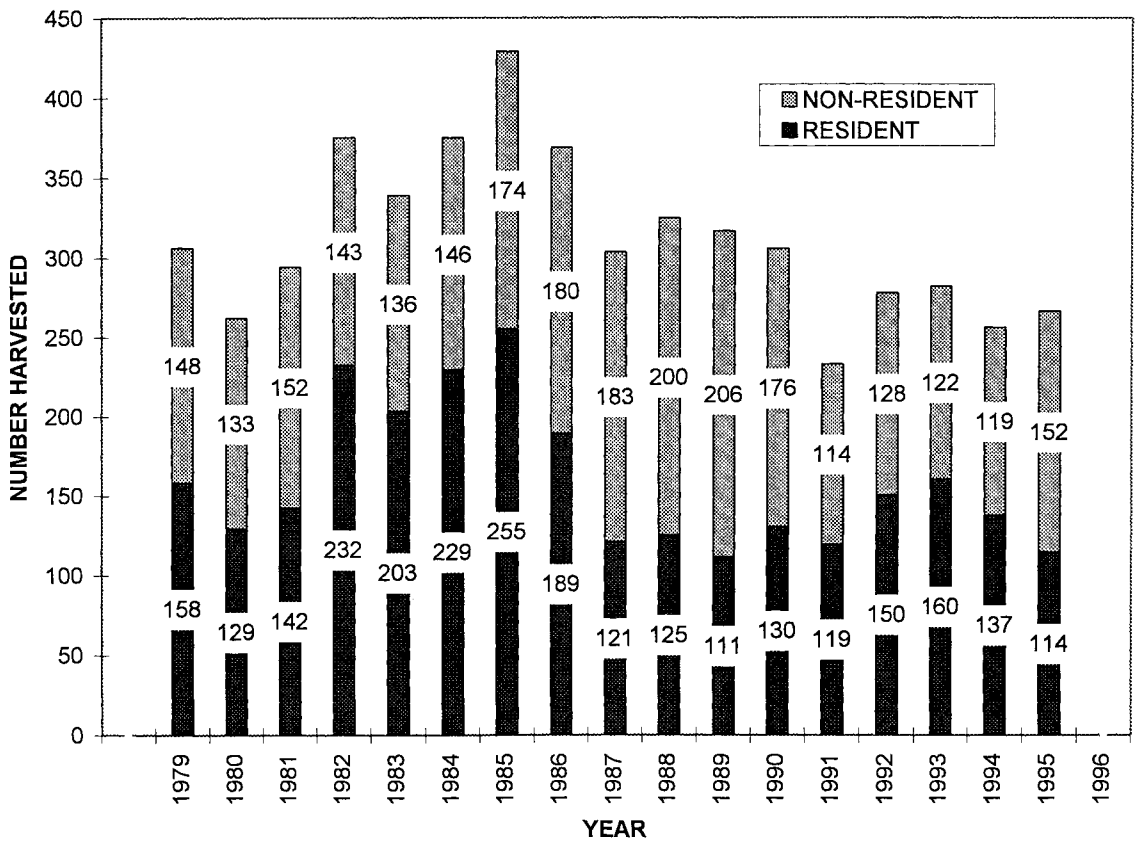


Fig. 3. Number of woodland caribou harvested in Yukon 1979 - 1995.

pliance) and meaningful input made to logging and agricultural land use practices. Initial indicators suggest that at least the Ibex and Carcross herds are now experiencing population growth as a result of this program. It is recognized that local harvest demand can never be satisfied by these herds and will one day be allowed for cultural and traditional consumptive uses only. Nevertheless, the Southern Lakes caribou herds offer enormous wildlife viewing benefit for tourists and people who reside in the area.

#### *Aishihik Recovery Program*

The Aishihik Recovery Program began in 1993 in response to both scientific and traditional information indicating that the herd had drastically declined, and was showing poor calf recruitment and an imbalanced sex ratio (Hayes, 1992) (Fig. 4b). An intensive research and management plan was developed to attempt herd recovery using harvest prohibition (including First Nation harvest) and wolf control following the provisions and guidelines set out in the publicly developed Yukon Wolf

Conservation and Management Plan (Yukon Wolf Management Planning Team, 1992). An initial 2 year evaluation found significant increase in calf survival following an 80% reduction in wolves compared to untreated (no wolf control) caribou herds (Wolf Lake, Ibex, Klaza, and Chisana, Fig.1) (Yukon Fish and Wildlife Branch, 1994). Surveys have further documented improved adult survival, based on reduced mortality of radio-collared caribou, normalization of sex ratio and population increase. While providing valuable research on predator-prey relationships, the Aishihik project has nevertheless been controversial nationally and internationally because it entails lethal control of wolves. Locally the herd is recognized as an important resource for subsistence hunters and as an integral component of one of Yukon's most diverse large mammal ecosystems.

#### *Finlayson Herd Management Program*

Management of the Finlayson herd is the most advanced of all Yukon's woodland caribou programs (Fig. 4c). Harvest reduction and wolf control were

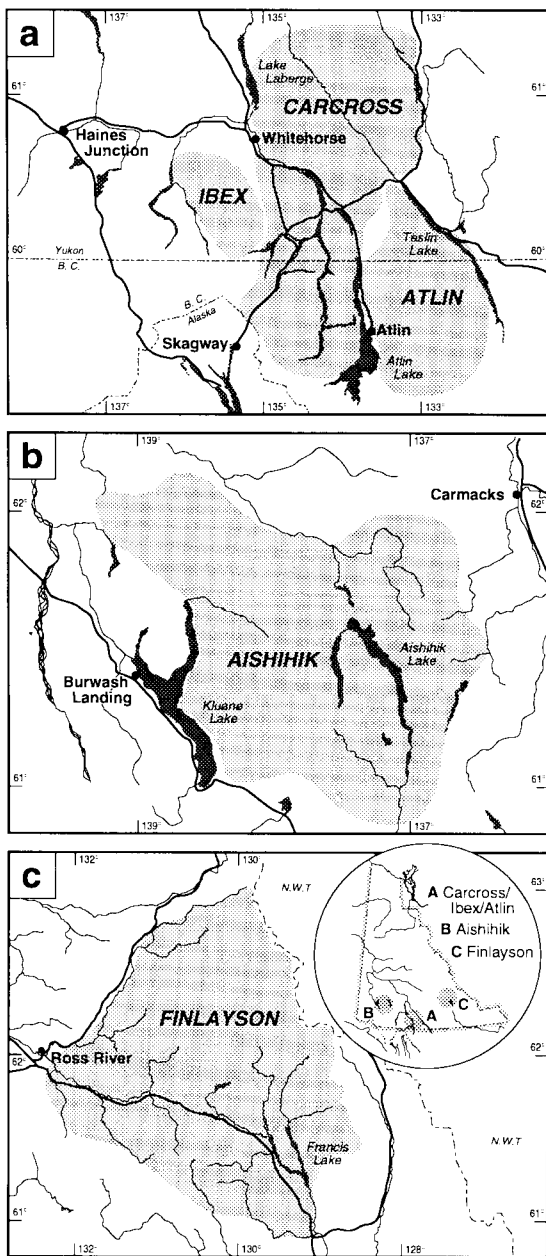


Fig. 4. Distribution of the Southern Lakes<sup>a</sup>, Aishihik<sup>b</sup>, and Finlayson<sup>c</sup> caribou herds.

used to restore this population in the 1980's (Farnell *et al.*, in prep.). The herd increased from approximately 1800 to 4500 adults in the span of 7 years (1983-1990) following an 80% reduction in wolves. This was accompanied by an increase in the region's moose population from 3000 to 10 000. Wolves subsequently rebounded and stabilized at 250, higher than the pre-reduction population size

of 215. Meanwhile the caribou herd appears to have presently stabilized at 4000 adults. Efforts are now directed at sustainable harvest management and assessment of potential disturbance impacts from recent large scale mining exploration activity. The range of the Finlayson herd experienced a record 16 000 new quartz claims registered in 1995-96 following discovery of massive sulfide ore deposits with high metal values on the herd's summer range (Dept. of Northern and Indian Affairs, 1996). This development presents a new challenge to herd management. Findings from disturbance assessment work presently being carried out cooperatively with mining companies may shed new light on how industrial developments can be mitigated to lessen or avoid serious impacts to caribou.

### Research priorities and management needs

Predation, primarily by wolves, has been considered limiting for Yukon's Kluane (Gauthier & Theberge, 1986), Aishihik (Hayes *et al.*, 1994), and Finlayson herds (Farnell *et al.*, in prep.). Wolves occur at natural densities in Yukon and therefore play an important role in the interaction with factors such as human caused mortality, climate, and forage/nutrition relationships.

Yukon has conducted wolf control and found it unacceptable to much of the Canadian public. Research focused on development of more humane non-lethal control methods may provide a publicly acceptable alternative to the trapping or shooting of wolves. Experimental fertility control is presently being applied to slow the recovery of 6 selected wolf packs in the range of the Aishihik caribou herd (Bubela, 1995). This involves artificially reducing birth rates by sterilizing wolves whose territories occur in the control area. The objective is to reduce wolf numbers but also wolf immigration from outside the control area. If successful, this technique could be applied in exceptional circumstances where predation must be addressed to sustain caribou herds.

Problems associated with logging and agricultural development (increased access, direct loss of habitat, changing predator/prey relationships) are rapidly spreading northward into Yukon. Following experience in British Columbia and Alberta, it is expected that these activities could precipitate declines in Yukon caribou if management actions are not taken to maintain population

levels. It is therefore essential that baseline inventory data be used to develop specific timber harvesting quotas and guidelines, and to direct allocation of agriculture land in a way which minimizes threats to caribou. Yukon's caribou inventory effort should proceed in all cases before caribou ranges are designated for logging and agricultural development. Long-term monitoring of specific herds should also continue to provide baseline assessment of changes over time.

Increased mining exploration activity in central Yukon is cause for some concern. Behavioral responses to disturbance associated with mining activity could result in range abandonment and subsequently compromise caribou antipredation tactics and/or foraging strategies. Moreover, post exploration development and production activity may result in direct losses of caribou where such activity traverses winter range concentration areas. Because of the normally high adult mortality rates in these caribou herds, any increased mortality could result in lost human harvest opportunities. While perhaps acceptable to the resident hunting fraternity, this would be unacceptable to local First Nations.

Preliminary caribou disturbance assessment is underway in cooperation with mining proponents. Caribou distribution, peak of calving date, annual calf recruitment levels, and population size are being monitored to assess potential behavioral and demographic responses to advanced exploration activity. Input to the long-term access and seasonal activity plans of mining companies is absolutely essential to avoid population decline.

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