

## **Caribou Predation on the Bathurst Winter Range NWT CIMP Project Report, 31 March 2006**

### **Principle Investigator**

Dean Cluff, Regional Biologist, Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, NT Canada X1A 2P9

Tel: (867) 873-7783 Fax: (867) 873-6230 Email: [dean\\_cluff@gov.nt.ca](mailto:dean_cluff@gov.nt.ca)

### **Executive Summary**

Wolves are a major mortality source for caribou. Quantifying the extent of predation of caribou on the winter range, especially during a decline phase of caribou, will assist in understanding caribou-wolf dynamics and determining management options to mitigate caribou declines. A capture and collaring program for wolves was proposed to closely monitor wolves and locate and map kill sites. However, most of the caribou that moved into the North Slave Region in the fall did not remain there and instead moved to the East Arm and Artillery Lake area in the South Slave Region. Snow depth was also not relatively deep this year, and therefore did not limit travel observed last year. Given the low probability of a successful capture effort, wolf collaring was cancelled. Monitoring up to the when collaring was to occur is discussed.

### **Background**

Changes in barren-ground caribou distribution and number respond to several limiting factors, many of which are poorly understood to determine their specific role in vital rates (e.g., birth and death rates) of caribou. Some are nutritional constraints or "bottom-up" factors while predation, and sometimes parasites, are considered "top-down" factors. How caribou respond to these limiting factors may be hierarchically structured in time and space according to the magnitude of their effect on population processes. Resilience of caribou to these limiting factors determines thresholds and resulting shifts in population, community, or ecosystem trajectories two different stable states. Resilience to these factors in a one predator caribou-wolf system has not been studied and the impact of predation is unknown. We must understand the degree, type, and relationship of resilience of the various limiting factors before we can begin to understand larger scale processes and comment on the potential implications of natural and human caused change (e.g., climate change).

Collaboration with the Government of the NWT on two interrelated projects led by Dr. Chris Johnson at the University of Northern British Columbia (UNBC) and his graduate students will investigate responses of caribou to bottom-up factors of forage distribution and availability and the top-down factor of predation on caribou by wolves. Not having radio-collared wolves to monitor however, is a major obstacle for the fine-scale component of the study and will result in significantly greater aerial search times to locate kill sites. This proposed study will use frequent wolf locations to infer predation behavior but at the same time offers the promise of quickly finding wolves to monitor, an important consideration when daylight is limited in winter. The collaboration is further enhanced when wolf GPS location data from this proposed study are combined with known kill sites from the multi-scale study.

Wolves are the primary natural predator of Bathurst barren-ground caribou. The number of caribou killed by wolves is unknown and estimates vary widely, but wolves are likely the single largest source of caribou mortality. Therefore, quantifying the level of predation on the herd is needed, especially during a decline phase. Quantifying and mapping kill sites is the first step in understanding the impact of predation on caribou in the winter ranges, a time when caribou can be vulnerable as winter progresses. The study also assists the monitoring actions identified in the Bathurst Caribou Herd Management Plan (2004).

### **Project Objectives**

1. Quantify and map wolf kill sites during a decline phase in caribou.
2. Determine wolf movement and behavior around kill sites.
3. Provide wolf predation monitoring actions as identified in the Bathurst Caribou Herd Management Plan (2004).

### **Methods**

We used a small fixed-wing spotter aircraft to locate wolves among the Bathurst caribou herd in mid-winter 2006. The distribution of the satellite collared caribou was used to help delineate the search area. The fixed-wing aircraft was equipped with radio-tracking equipment to monitor previously collared wolves that may also be in the area. When wolves were sighted, numbers were counted and their proximity to caribou noted. A helicopter could then be called in to chemically immobilize a pair of wolves from each pack by darting in deep snow. Captured wolves could then be radio-collared, marked and measured, sampled and released. Individuals from four to six wolf packs were needed for monitoring to achieve a reasonable sample size.

A GPS radio-collar with a VHF beacon was to be fitted to one of the captured wolves in a pack. A conventional VHF- (Very High Frequency) only radio-collar was planned for the second captured wolf to monitor the pack beyond the operational life of the GPS collar. A VHF-only collar is preferred for female wolves because it would help locate where these wolves den in summer. This was important because it could determine whether these wolves are tundra denning or annual residents of the boreal forest. Conventional VHF radio-collars have a multi-year lifespan but have a break-away insert to facilitate drop-off from the animal. The GPS radio-collars were programmed to obtain a GPS location every 30 minutes and would allow reconstruction of the movement path of the wolf and the pack in general. The GPS collar has an operational life of 3-4 months and would have been retrieved after 3 months to obtain the location data stored on the collar. The collar has a release mechanism that can be activated remotely when the wolf is nearby after being radio-tracked. The breakaway mechanism is programmed to release after 4 months should a remote activation not occur as planned. The collar can be retrieved then via the VHF beacon to obtain the location data.

A map of the wolf movements and location clusters in association with the satellite collared caribou would have been possible with the detailed movement data. A statistical analysis of the wolf movement behavior from the GPS collars was also planned to interpret behavioral states, specifically to identify predation sites. The location data would also have been available for graduate students for use in a thesis.

## **Results**

Planning and preparation proceeded in late fall and early winter for a capture and collaring effort of wolves in February. Radio-collars were obtained and refurbished and capture supplies purchased. Communities were consulted as part of the wildlife research permit application process and a permit was issued. The NWT Wildlife Care Committee approved the wolf capture procedure. A radio-tracking flight occurred in mid-February and located only two previously radio-collared wolves, although one was in mortality mode in Fort Reliance and obviously harvested. A reconnaissance flight for caribou and wolf distribution occurred within the North Slave Region afterward. No wolves were seen and numbers of caribou observed did not exceed 100 individuals in any one group. Two old wolf kills were found. Given the low density of caribou and especially wolves in the North Slave Region this winter, the probability of not capturing wolves with the resources available was considered high. Consequently, the proposed wolf capture was cancelled. Therefore, radio-collars could not be deployed and detailed movement and predation data could not be obtained without them. Consequently, the budget was not entirely expended and unspent funds were returned.

## **Discussion**

In October when the study proposal was drafted, caribou were moving to the North Slave or seemed likely to do so. As such, the proposal to capture and collar wolves was restricted to the North Slave Region. This was practical because the administrative requirements would be less than a multi-regional one but more importantly, operations could have been based out of Yellowknife and minimize costs. In October, capture costs were estimated at about \$30K and that is what was requested from the Cumulative Impact Monitoring Program (CIMP). CIMP offered reduced funding to most of its approved applications and this project was awarded 65% of what was requested, or \$19,435. This was problematic but there was discussion within the Department of Environment and Natural Resources that we could perhaps find the shortfall.

Given that the bulk of the caribou were currently around the East Arm of Great Slave Lake, the logistics of a capture effort changed and basically increased. It also did not help that snow depth has been low this year. Although there are small concentrations of caribou scattered about in the North Slave Regions, there appear to be few wolves. At least there are not the wolves we have seen in the area south of Artillery Lake where there are thousands of caribou. CIMP offered additional funds to all their projects in February. A request for another \$20K from what had been approved earlier was discussed so that my total would now be \$40K. That seemed to be OK initially but then CIMP informed me afterward that they could only award the remaining amount from my original request, so about \$10.5 K so I'd have \$30K total.

Whether \$30K or \$40K was available became irrelevant because there was a strong possibility that flying the North Slave area with the helicopter could easily result in not capturing any wolves at all. First is finding wolves, which I think I could find some, but if these wolves chose to remain in the trees, then they would be unavailable for capture. If that happened, then one needs to find other wolves and this would be difficult this winter within the North Slave Region. The prospect of spending \$20K on helicopter flying for wolves and capturing none was problematic. Even catching one or

two wolves was not a viable scenario because of too low a sample size. Having four collars deployed as proposed is the lowest number practical. However, when even that number is not assured, then the effort it is not scientifically feasible. Capturing wolves in the Artillery Lake area was a remote possibility but was not logistically feasible at this time because the permit was only for the North Slave Region and additional fuel would also have to be cached.

Contributing to the cancellation decision was a dearth of funds to follow-up on newly radio-collared wolves to estimate kill rates. So even if four GPS collars could have been deployed on wolves, there was little money for their follow-up monitoring. The data would still have been useful, but it would be so much more robust if we had some "ground-truthing" to go with it. That is, to have known kill sites for which to compare to the GPS data collected (a location every 30 minutes). So if we want to obtain data on kill rates of wolves, we need a more robust design and funds than I could achieve this year. A bit more luck with the distribution on caribou would have helped immensely, but as the saying goes, "no one knows the way of the caribou". Next year will be different, that we can be assured.

### **Acknowledgements**

I thank Dr. Dave Mech for loaning the GPS radio-collars for this proposed study. This helped reduce the overall cost.

## Appendices

### Budget Summary

**FISCAL 2005 CIMP**  
**Caribou predation on Bathurst winter range**

CATEGORY	EXPENDITURE	
<b>INCOME:</b>	<b>ALL SOURCES</b>	
	NWT CIMP	\$19,435.00
	CIMP: Supplemental other	
	<b>TOTAL FUNDING:</b>	<b>\$19,435.00</b>
	Total Expenditures:	<b>\$11,675.56</b>
	Balance:	<b>\$7,759.44</b>
<b>EXPENDITURE</b>	<b>GNWT</b>	
<b>DETAIL</b>	<b>Capture Equipment</b>	
	Immobilizing drugs	
	Capture equipment	\$2,722.19
	Radio-Collars - VHF (4)	
	- GPS (4)	\$2,502.48
	Shipping	\$47.19
	<b>SUBTOTAL:</b>	<b>\$5,271.86</b>
	<b>Wolf capture</b>	
	Fixed Wing: Cessna 185	6.8 hrs + fuel \$2,954.36
	Maule	xx.x hrs + fuel
	Helicopter	20 hrs
	Field Equipment, Supplies	
	Telemetry equipment	
	Fuel Purchase-Jet B	\$1,760.00
	Fuel Purchase-AvGas	\$1,689.34
	Fuel Caching	
	<b>SUBTOTAL</b>	<b>\$6,403.70</b>
	<b>TOTAL EXPENSES:</b>	<b>11,675.56</b>