

**Documenting Traditional Knowledge of Caribou Leaders
for the Porcupine Caribou Herd in Dawson City, Old Crow,
& Fort McPherson.**

Report to the Porcupine Caribou Management Board

December 1, 2010



(Photograph by Gary Kofinas)

By

Elisabeth S. Padilla
M.S. Wildlife Biology (Graduate Student Researcher 01/2006-08/ 2008)
University of Alaska Fairbanks
(Contact: erobins@alaska.edu)

And

Gary Kofinas,
Associate Professor (Faculty Advisor)
School of Natural Resources and Institute of Arctic Biology
University of Alaska Fairbanks
(Contact: gpkofinas@alaska.edu and 907.474.7078)

Citation: Padilla, E. and G. Kofinas, *Documenting Traditional Knowledge of Caribou Leaders for the Porcupine Caribou Herd in Dawson City, Old Crow, & Fort McPherson*. Report to the Porcupine Caribou Management Board. November 1, 2010. Pp 48.

Table of contents

	Page
1. Executive summary	3
2. Introduction.....	5
3. Methods	6
3.1 Study sites	6
3.2 Research cooperation with communities and selection of participants.....	7
3.3 Data collection.....	8
3.4 Data analysis	9
4. Findings: Traditional knowledge of caribou leaders	10
4.1 Caribou leaders and the way caribou migrate.....	10
4.2 Existence of caribou leaders.....	12
4.3 Defining the roles of caribou leaders.....	13
4.4 Classes of caribou Leaders.....	17
4.5 Physical characteristics of caribou leaders.....	21
4.6 Number of leaders	23
4.7 Leadership timing and position in the herd.....	26
4.8 Hunting traditions relevant to caribou leaders	30
4.9 Comments on the hunting closure to "let the leaders pass"	33
5. General Conclusions: caribou leaders of the Porcupine Caribou Herd	36
6. Local knowledge of caribou leaders of the Western Arctic Caribou Herd	38
6.1 Introduction.....	38
6.2 Methods.....	38
6.3 Findings: Reindeer herder's perspectives on caribou leaders of the Western Arctic herd.....	39
6.31 Classes, numbers of leaders, and physical characteristics	39
6.32 Leadership timing and position in the herd.....	40
6.33 Disturbing caribou leaders	40
7. Acknowledgements	41
8. References	43
Appendix.....	46

Executive summary

This study documented the traditional concept of “caribou leaders”, which has been used as a basis for a hunting closure along the Dempster highway (PCMB 2000). Traditional ecological knowledge has been acclaimed as an essential tool for sustainably managing resource harvest (GNWT 1993, Moller et al. 2004, Davis and Wagner 2003). Knowledge of leaders of caribou has been expressed by indigenous caribou hunters and reindeer herders across the Circumpolar North. In this study interviews about caribou leaders were conducted in three of the Porcupine Caribou Herd (PCH) user communities, including Dawson City, Fort McPherson, and Old Crow (Canada) with Elders and hunters of Porcupine Caribou. Added insight was obtained from six interviews with Seward Peninsula (Alaska) reindeer herders who have experience with the Western Arctic Caribou Herd (WAH).

Interviews were coded using a qualitative analysis tool. From our analysis a number of categories were identified, which form the structure of this report. They include: 1) whether people perceived caribou leaders, 2) how caribou migration was perceived, 3) how (if) caribou leaders were described, 4) when caribou leadership occurred, and 5) context of hunting traditions around caribou leaders, as well as some comments on the hunting closure. Findings from interviews with reindeer herders concerning the WAH were summarized in a separate section at the end of the draft report.

Most respondents perceived leaders to exist. People described caribou leaders in two ways: 1) a male or female distinction of animals at the front of the migration and 2) a more specialized, role specific classification of leaders. Caribou leaders were described using other terms as having many different roles besides “leaders”. Both cows and bulls of different ages were described as having some potential form of leadership, and many participants described several coexisting types of leaders. Caribou leaders were mainly described in small numbers, less reference was made to large herds of leading caribou. Some people mentioned that cows were ahead of spring migration, but bulls and/ or cows could be ahead of the fall migration. However, season was not a main topic of discussion. Time of year was only part of the explanation for leadership, since weather, food availability, predation, mating (etc.) also determined which caribou lead and what their roles are in the herd. Differences in hunting traditions, personal experience, and place of

hunt explained the ways in which caribou leaders were perceived. The majority of respondents in Old Crow and Fort McPherson did not mention the hunting closure, however, this topic was a central theme for Dawson interviews, with several respondents expressing dissatisfaction with the “Let the Leaders Pass” policy. Interviews with reindeer herders also pointed to context specific perceptions of caribou leadership.

This study documented a rich context-specific understanding of caribou behavior in traditional knowledge by indigenous Elders and hunters. These findings highlight the critical importance of accounting for context when seeking to apply traditional knowledge as the basis for regulations and policy protecting caribou and traditional lifestyles that depend on caribou.

The above topics of caribou leaders and "let the leaders pass" policy are further discussed in the Master's Thesis by Elisabeth Padilla (2010) "Caribou leadership: A study of traditional knowledge, animal behavior, and policy". The thesis is accessible online through the University of Alaska Resilience and Adaptation website, at the following URL: <http://www.uaf.edu/files/rap/THESIS-FINAL-Padilla.pdf>. Bound copies will be sent to the Porcupine Caribou management board as well as participating First Nations together with this report.

2. Introduction

Caribou (*Rangifer tarandus granti*) leaders exist as a concept in traditional hunting practice in indigenous communities of northern Alaska and Canada. Some indigenous Elders have brought the concept of caribou leaders to the forefront of management discussions (Alaska Department of Fish and Game 2005; PCMB 1995). The Porcupine Caribou Management Board used the traditional concept of caribou leaders to recommend a formal hunting closure for the Dempster highway, which was implemented by the Government of Yukon in 1999 (Northwestern Canada, Government of the Yukon 2002; PCMB 2000, Padilla 2010).

Traditional knowledge about caribou leaders (i.e. caribou that lead a group or herd of caribou) is sparsely documented for indigenous caribou hunters. Gubser (1961) describes caribou leaders in his early ethnography of Nunamiut Eskimo at Anaktuvuk Pass (Alaska). Traditional hunting strategies of Inuit in the Northwest Territories show concern for deviating caribou movement from common migration routes. For example, Gunn et al. (1988) described that hunters were inconspicuous at water crossings until lead caribou crossed, so that following caribou would continue to swim across when hunters began to shoot. Stewart et al. (2004) reported that hunters avoided butchering animals or disposing of bones near migration routes to avoid diverting caribou movement.

Similarly, some Porcupine Caribou hunters traditionally avoided shooting caribou leaders to ensure caribou harvest throughout the hunting season (Sherry and Vuntut Gwitch'in First Nation 1999; Smith and Cooley 2003). There exists a concern among Yukon and Northwest Territories communities that disturbing or shooting caribou leaders could cause caribou to abandon wintering areas (Benn 2001). The two following quotes, taken from interviews with caribou hunters illustrate: (1) the perception that shooting caribou leaders disrupts caribou movement and migration, (2) protecting caribou leaders is a hunting practice passed down through generations.

If you shoot the leader, then the herd go different direction, or they get lost, or they get mixed up with other caribou. You know, that's why Native people don't shoot the leader.

Dawson

My mama always tell us don't bother 'em. Let them go through first, there be more caribou coming. And if they have a trail, caribou follow. She said don't bother 'em. So we always respected, we never bother the front caribou.

Old Crow

Smith and Cooley (2003) reported Porcupine Caribou hunters' predictions of caribou reactions to disturbance on the road. Hunters in their study based their answers on their own experience with caribou. They found that "taking the leaders" was a predictor of how caribou react to human disruption. Participants in the study described different caribou leaders including individuals or groups of animals with different behavioral roles in the herd (e.g., steering migrating groups, detecting danger). The study recommended further work on defining caribou leaders following this range of opinions. The ambiguity in defining "caribou leader" and resulting need for "systematically gathered community-based knowledge" led to an approval by the PCMB in 2006 to conduct this study (Appendix).

In the following report, we describe traditional knowledge of caribou leaders based on the information provided during interviews with Elders and hunters of the Porcupine Caribou Herd. Interviews on the topic of caribou leaders were conducted with the Tr'ondëk Hwëch'in First Nation of Dawson City, the Tetlit Gwich'in First Nation of Fort McPherson and the Vuntut Gwitchin First Nation of Old Crow. Additional information on caribou leaders of the Western Arctic Herd was obtained from speaking with reindeer herders on the Seward Peninsula.

Traditional ecological knowledge can help understand how caribou leaders affect migration routes. This study is an example showing how some indigenous Elders and hunters talk about caribou leaders. However, much remains to be learnt from caribou experts in these communities as well as other caribou user communities in the Porcupine Caribou range and beyond.

3. Methods

3.1 Study sites

We conducted this project in three First Nation communities in the Canadian Yukon and Northwest Territories that are primary users of Porcupine Caribou. They

included Dawson City (pop 1,327), Fort McPherson (pop 776), and Old Crow (pop 253) (Statistics Canada 2006). The research was conducted in partnership with the Trondë'k Hwëch'in First Nation based in Dawson, Yukon Territory, the Teetli't Gwich'in Renewable Resource Council of Gwich'in First Nation, based in Fort McPherson, Northwest Territories, and the Vuntut Gwitch'in First Nation, based in Old Crow, Yukon Territory. We selected these communities because of their geographic location along the Porcupine Caribou migration and wintering range, the communities' involvement in issues related to Dempster Highway hunting, as well as their differing characteristics (i.e. population, road access). Fort McPherson and Dawson hunters make extensive use of the Dempster Highway for accessing Porcupine Caribou, whereas Old Crow hunters primarily use river and snowmobile access, depending on the season. Fort McPherson hunters take the greatest number of caribou of all communities of Canada and Alaska that hunt Porcupine Caribou, and Old Crow harvests the highest number of caribou per capita of all communities. While Dawson harvests caribou, the community is more dependent on moose.

3.2 Research cooperation with communities and selection of participants

We initiated this phase of the study by obtaining research approval from participating First Nations and the PCMB, and research permits from government agencies of NWT and Yukon Territory. The following institutions approved interviews: the Trondë'k Hwëch'in First Nation, Teetli't Gwich'in Renewable Resource Council, Vuntut Gwitch'in First Nation, the Gwich'in Social and Cultural Institute, and the Inuvialuit Tribal Council. The Northwest Territories Aurora Research Institute (Scientific Research License No. 14020N), and the Yukon Heritage Resources Unit (Yukon-Canada Scientists and explorers Act License 06-48S&E) granted formal research permits. Our research protocol and instrument were reviewed and approved by the University of Alaska Fairbanks (UAF) Institutional Review Board (IRB) (protocol # 06-39- approval 20060620).

Elisabeth Padilla (née Robins) conducted 29 interviews with Porcupine Caribou hunters and Elders during summer 2006, completing nine in Dawson City, eleven in Fort

McPherson, and nine in Old Crow. In each community she hired and worked with a local assistant, who worked with the local First Nation, or renewable resource council to select participants. She asked to interview a mixed sample of Elders and hunters with a high level of expertise in hunting Porcupine Caribou and or traditional knowledge pertaining to caribou migration and caribou leaders. All respondents from these communities were members of the local First Nation. Both younger and older hunters were selected to capture changing knowledge (Stevenson, 1996) but also to capture a wider space/ time scale (Ferguson and Messier 1997). Local organizations advertised this study of caribou leaders for several weeks before the researcher's arrival to inform the community in general. Local assistants contacted specific respondents informally to ask for their participation in interviews shortly before they were conducted.

We classified respondents as “Elder” versus “younger hunter”. Classification was made through information from local organization staff members and or Gary Kofinas, who had previously worked in these three communities. Additionally, age 65 and above were classified as Elders, adding two interviews to the Elder category, as the interview asked for date of birth. We used this combined method to classify Elders because they are usually older members, although recognition depends on the community’s recognition of the Elder (Hart 1995). Padilla spent 8-10 days in each community conducting interviews, which was not sufficient to provide other substantial evidence for Elder status based solely on community recognition. She interviewed five women and 24 men. Their ages ranged from 42 to 91 years of age, with 16 being Elders. We called the rest of the respondents “younger hunters”. All but one of the respondents reported having extensive personal hunting experience. Also, among some Gwitch’in it was not culturally appropriate for women to hunt.

3.3 Data Collection

Interviews were semi-structured and most questions were open-ended to allow subjects the freedom to respond with detailed information and anecdotal personal accounts (Huntington 2000; Perecman and Curran 2006). The interview questions are listed below:

- (1) When caribou move on the land, how do they know where to go?
- (2) In the fall, how do caribou know where to go to spend the winter?
- (3) What is a caribou leader?
- (4) Are they always leading?
- (5) Some people talk about “leaders of the herd” and others about “the vanguard of the caribou herd.” Is there a difference?
- (6) Which caribou usually lead the herd in the fall migration?
- (7) Which caribou usually lead the herd in the spring migration?
- (8) Are there caribou leaders during other times of the year?
- (9) How do caribou behave when they have to cross a river or a road?
- (10) How do caribou behave when they come to a river or a road?
- (11) How does that affect the herd’s migration patterns?
- (12) What is the role of the leader when the caribou have to cross a river or a road?
- (13) Does this knowledge help you when you hunt? If so, how?

The question of whether participants recognized caribou leaders was designed to allow quantification of results. We used semi-structured interviews to promote unanticipated responses and connections, as we expected the concept of caribou leaders in traditional knowledge was more complex and different from what we may perceive. Thus, this interview method partially addressed the issue of interviewer and interviewee having different cultural backgrounds. Interviews were constructed around the assumption that traditional knowledge is rooted in local cultural context and arises from long-term interaction between people and resources (Berkes 2008; Folke 2004).

Padilla audio-recorded all interviews with Porcupine Caribou hunters and transcribed their script entirely. Interviews took from 15 min to 1 h 11 min in duration, with a recorded interview total of 17 h 50 min. She asked questions during interviews in Dawson with the assistant helping clarify when necessary, whereas assistants in Old Crow and Fort McPherson conducted the interviews in all but two cases. Interviews in Dawson were longer on average (50 min) than Fort McPherson (34 min) and Old Crow (27 min). This difference may have been due to assistants rushing through some questions when they considered them repetitive. All participants were remunerated 50 Canadian dollars per interview.

3.4 Data analysis

We used HyperRESEARCH™ coding software for qualitative analysis and a content analysis protocol through open coding. We identified common themes and

concepts across interviews in relation to context to describe caribou leader concepts in local/ traditional knowledge (Krippendorff 2004). Open coding provided the basis for arriving at categories of responses that were captured as quotes within each interview. We started the analysis broadly by looking at all the words in each interview and extracting many key words. We then went through interviews a second time and grouped words with similar themes. Finally, we created overarching categories going through all interviews a third time. Using these codes, we analyzed the interviews comparing types and frequency of responses in all categories.

4. Findings: Traditional knowledge of caribou leaders

The following sections of the draft report provide results and brief discussion of findings for each of the main categories identified during the analysis of the interviews.

These categories include

- the way caribou migration is perceived in relation to caribou leaders,
- what behavioral roles were associated with leaders,
- which animals people identified as leaders,
- their characteristics, as well as timing and season of leadership,
- the context of hunting traditions around caribou leaders and comments related to the hunting closure to let the leaders cross the Dempster highway.

These sections overlap and are related to each other to further understand how caribou leaders are perceived through traditional knowledge in various contexts. Many quotes have been provided below. The community associated with the participant is the only identifying information provided. In each sub-section each separate quote belongs to a different participant. An effort was made to include all participants in this report.

4.1 Caribou leaders and the way caribou migrate

When asked the question “how do caribou know where to go when they migrate?” Twelve out of 29 participants mentioned caribou leaders specifically (10) or leadership behavior in the herd (2).

It's one caribou just going, eh, they follow that caribou, so they know where to go.

Fort McPherson

The calf, the cow, the cow that go, they have a leader, the caribou have a lead. So that's they follow the leader. Yeah.

Old Crow

Typical responses to this question described the migration depending on food availability and weather, that caribou have been around for a long time and complete the migration every year, and visible and olfactory trails present throughout the landscape guiding them. Several participants acknowledged that they did not really know the answer to this question.

Food and weather

Caribou herd they know where to go. Because they probably know where's their food and their, you know, their foot marks, all that, it never go away.

Dawson

Well they go with the feeding, whatever food supply there is, and the big part is also the weather.

Dawson

They go by, they travel by searching, always searching for food. That's all the caribou are doing, searching for good food and they travel, oh I'd say from the Dempster all the way to the calving grounds.

Old Crow

Knowledge from previous years and generations

That's their migration, they know where to go because they do it every year, they do it every year and they know, they follow their own trails.

Fort McPherson

Well they've been there for million years. So they go by, they smell, you know.

Fort McPherson

Difficult question

That's a hard question, eh. Maybe the caribou's been there before but how they remember is what puzzles me, you know, just settle down there for the winter.

Fort McPherson

It is hard to answer that question because its nature, the caribou its like its natural. They are born, once they're born they know too and they migrate through this way and then they migrate back and like I say they some calves loose there mothers, the bull will lead them back. Just naturally they know the way and they mostly stick to the herd so we learned that in school I guess once they go through the older caribou, so kind of organize themselves don't know, its a hard question, nobody know.

Old Crow

4.2 Existence of caribou leaders

Twenty-four participants out of 29 said that caribou leaders exist and identified them. The ways in which they were identified and different perceptions of caribou leaders will be explored in detail throughout the remainder of this report. Nevertheless, two individuals said that there may or may not be leaders (1 in Dawson, 1 in Fort McPherson) and three disagreed with the concept of caribou leaders (all in Dawson). The quotes below show why individuals disagreed with, or were unsure about caribou leaders.

I don't particular see, because there is like, I don't know it's not Rudolf, that's for sure. They just come in a great big herd. You don't see one crossing and say, ok, it's ok you can come now. You know, it's a big herd. And maybe, it's really hard to say. And I do know that they always speak of leaders, I know that. I also know that there is an issue about having to let the leaders pass. I don't understand myself how they determine leaders. Particularly on the Dempster. It could be a big first herd that could be crossing way out. They move. So that I have to think about, because when the herd move, they move you know and they cross along the Dempster for long ways up.

Dawson

They take them, I don't know if they take the herd, they're always running in the forefront, so it's hard for me to say if the stronger caribou take the herd anywhere. Just because they're running in the forefront does not necessarily mean to me that they are taking the herd, but to me it's natural for all of the caribou to get up and leave the calving ground after all of the calves are born, it's most likely, 99 percent that they are already () by then. So maybe it's the natural instinct of the whole herd to leave the calving ground. To me it's based on the environment, it's kind of what ties

into going there, going to the calving ground is their main purpose for going to the calving grounds, that's their main purpose. For that, once that job is done that they would know that it's natural to get up and head back to their wintering grounds.

Dawson

Can you tell me that one caribou is going to take them all the way back to the calving area, breaking snow on the trail, can you do that? You can't. So there's got to be, everyone's got to do their part, they all got to break trail. It's just like I break trail all the time and I get tired and someone takes over

Dawson

Yeah, I don't know if you can call them leaders, but the herds do start moving its something like a salmon that moves around, or a moose that moves to a moose lake. They all have a general idea of where to get the food and the nutrition for their bodies, and they're way smarted than us. But usually what you first see is the females and the young ones coming to the wintering grounds, or going to the calving grounds, but all animals have that pretty natural instinct of where to go to get their food and stuff.

Dawson

Pretty hard to tell, eh. Sometime it's bull caribou, sometime it's cow you know, but how they know, that's clever, where they go and where they settle down too.

Fort McPherson

4.3 Defining the roles of caribou leaders

The one-week hunting closure along the Dempster highway aims to protect the first bunch of caribou that arrive near the highway. The leader caribou are thought to have special knowledge of the migration routes and the rest of the herd must follow behind to find their way. The following quotes show people talking about caribou leaders knowing migration timing and direction.

I guess they know when to travel. The leaders start, you know, they talk, they talk their own language.

Dawson

Cow caribou and young bulls coming back but big bulls are going ahead of them, that's the one call leader, they just know where to go.

Fort McPherson

Although participants referred to this definition of caribou leaders, they also described a wider range of caribou roles that have various behavioral roles inside the herd. The following quotes illustrate the range of roles and importance of caribou roles in the organization of the herd beyond starting and directing migration. The quotes below were responses to specific questions to identify caribou leaders. The roles mentioned used alternate words besides "leader" including "boss", "trailbreaker", "scouts", "teacher", "guards" and "fool".

The different roles of caribou leaders

The leader? Well when they mate, they fight, stuff like that. They have a herd like you know what I mean, you see them on the ridge and stuff like that where they all fight. If he's a leader, he's the boss.

Dawson

When they go they claim, some of the Elder told me, the wolf is ahead of the caribou herd. And then the cow and calf follow. Nobody touch that one. Wolf don't touch it, human don't touch it. They're the trailbreaker.

Dawson

These young caribou, 2-4 year olds, those they don't mate, and the bulls and young, the young bulls and girls, they go, that's how these dry cow teach them to go, generation after generation, that's the ones. Then behind stays the big cows, those with the bulls, those are the ones that mate. So when you get up Dempster you watch, you see first bunch, they're little, they're small, not so brushy, some bulls are big, eh, big horn, that's the young cow, bulls. Then these young bulls go with them, they protect them. It's just like a guard to them, they're always the guard these young bulls, they watch, one sleep nighttime, one stay up they watch, one or two. Then they fool them and they just take off. They say just follow that little one, he say I just fool you guys he tell them, they say they always rub their neck with their horn, and then when you see the young bulls they got no hair on their neck, rough, you see them, crazy boys they're like that, and they fool the caribou steady, so they just rub their horn on them, they're no hair on their neck you know, you see you watch caribou, "dazhoo tsoo" they call it.

Fort McPherson

You know they got a leader, or what you call, the scout would be better, they go ahead, and then you get wolf too, wolf he goes around caribou that is ahead, maybe you see whole bunch of wolf, that means caribou is coming. (...) cow and calf. But I see that more than once. That's what you call leader, you call them scout I guess.

Fort McPherson

Sometime, it's young bull, that caribou got funny neck, dazhoo tsoo they call it. It's got, it's just scornful, that fool caribou too.

Fort McPherson

Yeah, there's always one watching, that's one, any animal is like that. If you go hunting, always one watching, all animals like that you know. Moose, the same way too, and caribou, now you see in caribou there's big herd laying and there's always one standing in there, see you all jump, they got their sense of sound. They all get up and go, they watch him now, they watch that direction he's going they all go too.

Fort McPherson

That *dazhoo tsoo*, I mean, that's all we call it, eh. We see lots of dark caribou and black-necked so we always watch, eh. No matter, there's 50 caribou who sit in one place and you got one that always watching.

Fort McPherson

Well, young bulls that two three year old, they're the leader, and during winter, winter area, when predator come around, they go off and that's when that two year old or three year old young bull they go ahead, and they break trail, and they're young, and then the rest of the caribou come behind, so the young bull is the one that's the leader when it's predator come around. And they escape, because there's deep snow and it's only those young bull that could break the trail. (...) I believe in spring time, when they migrate, there's some calves that they lose their mother by wolves or predator or by hunters, and spring time few times I see, between 6 and 10 calves and there's one or two bull traveling with them, so that's how this bull seems to me, it teach that young little calves the way too.

Old Crow

There's caribou leaders, there's a number of caribou leaders. *Dazhoo tsoo* is one of the leaders, he's a leader but yet he travels behind so dazhoo tsoo is a very important part of the caribou heard, *vadzai njoo'* that's the older women *vadzai njoo'* is one of the main caribou leaders, it's like an old women wants the caribou start and all the caribou start moving. So, those are the two leaders that the Elders talk to me about a long time ago, so *dazhoo tsoo* and *vadzai njoo'* because they understand the

migrate they go ahead, they go ahead of the heard and they just make trail. They know where to go according to the weather and the rain so those two are really important.

Old Crow

You hunt caribou, young bull knows danger, eh? Tells them what to do, girls don't tell them nothing.

Old Crow

Whereas most participants referred to the above diverse roles as also being leaders, some explained a difference between leaders and other roles.

Well there must be a boss in there, but he's not the leader. Guard all the time, when you watch, that's what I mean, where they settle down, always one standing up. If he see you he probably see you already before you see him, that's where they do the leg thing, when they go like this (shows one leg stretched towards the back).

Fort McPherson

Straggler caribou, the bulls that get left behind that are old a lot of time you see a lone caribou running behind that's an old bull, especially in the spring time when they migrate north the pattern is the young caribou come first when they migrate north and right until the older bulls the older bulls, the bulls come in July, or June, first week of June you see them pass through crow flats and you always see a straggler behind sometimes you go out on the river in the summer time you'll run into a bull caribou just an old bull (...) those old bulls are the prime breeders of the herd, I was told one time the biggest bull you see in the herd of caribou in the fall with the biggest racks, horns, is the probably it is the breeder of the caribou.

Old Crow

A few people did not use the term "leaders", naming the caribou directly after another type of role:

So I feel that there was never really any such thing as leaders, but the stronger caribou were always something that was mentioned. The stronger caribou were the first few hundred of the herd. They break the trail just as any lead dog does.

Dawson

The caribou that are two years old are the ones that stand guard, I don't know what they call them,

the alert caribou. You see a herd of caribou eating, there's always the one that's standing there or a few, always standing and these are young caribou. The other ones they're eating and these ones they stand. We call them alert caribou.

Fort McPherson

These descriptions show a complex understanding caribou behavior and migration patterns. No single age/ sex class could be identified as leading, but instead a more complex picture of leadership in migration exists in traditional knowledge. Knowledge of caribou leaders depends on people's hunting experience, where, when, and how people hunt.

4.4 Classes of caribou Leaders

In some interviews, bulls and cows were described as leaders, but without further identifying descriptions. Using the interviews describing caribou leaders with more detail beyond the cow/ bull distinction, I identified six main classes of leaders with their accompanying roles (Table 1).

Table 1. Sex-age/ role-specific caribou leaders described in Porcupine Caribou communities.

Type of leader	Roles	Mentions (n=29)
Young/ small bulls (dazhoo tsoo)	Guards, trailbreakers, fool caribou (trickster).	9 (Elders: 6)
Older dry cow (vadzai njoo)	Knows the way, teacher.	2 (Elders: 1)
Single cow and calf pair ahead	Scouts, trailbreaker, knows the way.	10 (Elders: 6)
Young/ small cows	Maternal urge, trailbreaker, scout.	4 (Elders: 3)
Large mature bull	Boss, breeder, teacher, knows the way.	5 (Elders: 4)
Wolves	Doctor.	3 (Elders: 2)

For each category of leaders, the number of caribou traveling together varied, they could travel alone or in groups, and could act according to different roles described in the

previous section. No single age/ sex class was uniformly identified as leading. 79% of participants mentioned cows as leaders or traveling ahead of the herd, four respondents specifically described them as young (all in Fort McPherson) and two as an older cow without a calf (both in Old Crow). Ten participants mentioned the cow and calf leading and four described the cow and calf as the only caribou leader there is (two in Dawson, two in Fort McPherson). 62% participants stated that bulls are the leaders, five specifically as large mature bulls (three in Dawson), nine as young/ “dazhoo tsoo” (five in Old Crow). Three participants, one from each of the caribou user communities, mentioned the wolf as leader, and one respondent in Dawson mentioned that ravens tell caribou when it is time to migrate. Overall, more people in Old Crow suggested that there were multiple leaders than in other communities, although this was a major theme throughout all communities.

The above findings suggest that no single class of animals could be designated as the only caribou leader. Instead, traditional knowledge points to complex understanding of leadership. The following quotations illustrate the variety of responses for each type of leader.

Bulls

It's a mature bull, it's a large bull that will more or less take charge.

Dawson

They're the 3-4 year olds, those they don't mate, they're the leaders, and they see the older ones, they taught them how to lead.

Fort McPherson

It seems to me, it look like I say, young bull, or young cow that they seem to follow, when they starve, and the bulls are north or up this way. Big line of it, go down to the North.

Fort McPherson

You can't have young caribou to go ahead. You got those big bulls they know, lots of big bulls they know the way.

Fort McPherson

Well, bulls, eh. (...) It will usually be, *dazhoo tsoo*, that's next to the cow caribou, eh. Then there is the bull. They call it *dazhoo tsoo*

Fort McPherson

Cows

I would say the majority would be the females for sure. You won't see the lambs ahead, or the calves.

Dawson

If they're taking of or if their leading it's always the cows that are in front, it's not the big bulls. They're only in front if they're looking for cows, they're running around looking for cows usually by themselves.

Dawson

Usually the cows and the yearling from that spring, they seem to be the ones that move the herds down and also move them back North.

Dawson

A lot of years hunting, I always see cows are always the leaders, and never fails, it's always the cows.

Fort McPherson

Well it's always older (cow), not young, because the oldest ones knows better.

Fort McPherson

Cow that's one that's leader all the time (...) Take turn leader.

Old Crow

Cow and calf

Well they rest, when they bunch up to go to North Slope, they take leader again. But they always say cows and calf.

Dawson

Yes, there's always caribou leading the caribou. It's always a cow and a calf leading (...) They're alone, eh, always way ahead.

Fort McPherson

Multiple leaders

There's always caribou leader in caribou, like it could be big bull or female. If you go up Dempster right now, you'll see little bunch here and there, there's always one great big bull there. (...) (in the Spring) They're mixed, they're mixed up now, but there's the bull leading. They're going back up North to the calving ground.

Dawson

The leader is the cow and the calf. (...) It's the one with its hind leg. (...) it's the older, you call it *vadzaih njoo'*, that means older healthy caribou. So they'll be probably dry cow and the dry cow is always fat. Well, leaders are healthy, leader's the healthy caribou.

Fort McPherson

It's whatever caribou take off, that's how they go in springtime, fall time the little ones they lead.

Fort McPherson

Young bulls that two three year old, they're the leader (...) migrating it's always cow is leading (...) And now they're ready to go south and it's probably same thing, small caribou go first. And then the bulls come later on.

Old Crow

Dazhoo tsoo is one of the leaders, he's a leader but yet he travels behind. that's the older women *vadzai njoo'* is one of the main caribou leaders, it's like an old women wants the caribou start and all the caribou start moving. (...) sometimes they (older cow) go ahead by themselves according to the Elders, Elders I'm talking about, they are all gone now. These Elders, and I see it lots of times that they come with their calf, usually it's just a calf and sometimes there's no calf. But they are way ahead of the pack, they travel way ahead.

Old Crow

Yeah. yeah that's cow without calf, they call that *vadzai njoo'*. (...) Young bull is the one that go ahead in deep snow.

Old Crow

There's always a different leader, a younger one. Most of the time, younger bull, in the fall time.(...) Oh it's always a cow if it's a herd of cow, sometimes it's cow and calf coming in there's always cow, the biggest cow, and then the little calf. (...) In fall, same, the big bull, big antler.

Old Crow

Well the leaders would be the mothers or the older caribou; the young ones follow the older caribou. It could be the big bulls.

Old Crow

Well, its always different caribou that come, don't matter if its a bull or a cow its nature (...) I cant say its only small caribou or big caribou you know, cause it doesn't matter.

Old Crow

Sometimes there is too much snow the wolves will make the trail see that happening too and cause the caribou would follow them.

Old Crow

The information gathered on caribou leaders during the interviews with Porcupine Caribou user communities shows that caribou are known under a variety of names in traditional language. As in any translation, the full meaning of each traditional term may not be reflected in the english translation "caribou leader". In interviews, caribou leaders were described with two traditional terms: *vadzai njoo'* and *dazhoo tsoo*. The diversity of caribou leader types described, and many words for caribou in Gwitch'in dialects, indicate that there may be many more traditional terms translated to "leader" (Gwitch'in Language Centre/ Gwitch'in Social & Cultural Institute 2005, Kofinas 1998).

4.5 Physical characteristics of caribou leaders

When asked to identify characteristics of caribou leaders, participants answered in the following ways:

Leaders can be identified by the antlers, wether bulls or cows.

Well they are large, with big antlers. The females are a little smaller. But both caribou, males and females they got antlers too. But you can tell by the bull because they stick together, they got large antlers.

Dawson

Yeah, cow caribou, you could tell cow caribou easy, it has small curly horns on them sometimes it's just a single one.

Fort McPherson

Some said that leaders could be recognised because they are the healthy caribou

Well the leader is a healthy caribou, tell you all his secrets.

Fort McPherson

When speaking of the young bulls/ *dazhoo tsoo* as leaders, they can be identified by the colors on their chest and hair:

Sometimes they have the white in front of their chest. And of course you look for the penis, that's the main part (laugh). (...) I guess the strongest has to be the leader. Because sometimes you see them, they're big.

Dawson

The leaders, the 2 year old caribou the ones with the roughy neck, like black, about 2 years old, them they lead.

Fort McPherson

Sometimes we notice we shoot caribou it's rough on coats, eh, right here. Those are leaders too. Because they come from Hart River, eh. Sometimes they make great way up around the Hart River area and they come back north and they got to go through bush, eh. So you are allowed to touch their hairs, they are roughed on both sides, that's from going ahead.

Fort McPherson

Leaders could also be recognized through their behavior:

When I am in Crow Flat I notice that when the caribou go by our camp they stop and they sleep on the ice during he day and then you see one of them would get up once in awhile and they'd take turns and I usually notice these are young ones too they take turns and they and they one would get up and the other one would lay down they walk around sniff the air and usually when they sleep out on the ice like that it last like that all that until they go and I see it happens all the time and they're pretty watchful too I see how they perform when they hear noises or they sense danger. I see what they do. They jump in the air or they rattle their feet or tap the ice with their feet. I see them do that

Old Crow

Although most participants did not give a lot of detail on this topic, people seemed to recognize leaders through context rather than appearance. Where leaders were identified through physical features, those features were directly linked to the class of caribou that the leader belonged to (e.g. large antlers on mature bulls in the fall, rough/colored neck on young bulls).

4.6 Number of leaders

Fifty-eight percent of respondents described the number of leaders associated both with each smaller herd of caribou or caribou ahead of the migration. Leaders were described both at a larger (i.e. whole herd) and a smaller scale (i.e. smaller group of caribou). Table 2 shows how often caribou leaders were identified as lone or few animals versus large groups.

Table 2. Number of caribou leaders and scale of leadership

Number of leaders	Mentions (n=29)	Interview references	Scale of leadership	Mentions (n=29)
1-few (<5)	14	1,5,9,10,11,12,14,17,18,20,22,24,25,28	For every group of caribou	4
			Ahead of the fall/ spring migration	6
10-15	1	19	Ahead of the fall migration	1
Several hundred*	3	4,8,9	Ahead of the fall migration	3

* Participants 8,9 reported this large group was what they “heard” were called leaders for the purposes of the hunting regulation on the Dempster Highway, but not expressing their own views or observations. Participant 9 then described leaders in the “1-few” category from personal observations.

The following quotes illustrate how caribou have leaders at different scales.

Everyone of those caribou they all got leaders, so this is why you see them cross over, you see them and they run and how around. They know the herd is coming behind.

Dawson

(Dialog between participant (A) and interviewers (B&C))

C: Just one cow and one calf?

A: yeah

C: For the whole herd?

A: Well they're told to go out there and look, see, and then there'll be thousands of them behind. They don't just go like that. They'll be, maybe around Stony, two they go up there. Well, let me, every herd got leader.

B: Every little herd?

A: yeah

Fort McPherson

Well you always watch the leader, is always one or two is the leader, you know. It's always a male, it's always a female, it's always a female or a male. See it's just like one group, of straight bulls, see they got the leader too, cow. See they got their own leader too. (...) every bunch got their own leader.

Fort McPherson

Most participants mentioned single animals or very small groups of no more than a few individuals as leaders, particularly as being ahead of the migration.

There's probably not only one leader. There's probably some bull together, you know, but there is one great big one always there.

Dawson

Usually it's just the one (cow), there's always the one. But then you know like there would be a few would be behind her and that's what I said, eventually they take the lead role.

Fort McPherson

If you disturb it, there's no such thing as a leader, and I mean not a whole bunch of them.

Fort McPherson

They've go one or two caribou ahead, all the time. Going ahead, and there's a small herd behind that all the time, and behind that small herd is the main herd.

Fort McPherson

That's something, first bunch comes leading, maybe 10, 15 something like that, they're way ahead. That's what I always see ones bunch, I see one little bunch up there.

Fort McPherson

Usually it would be about four out way ahead, eh. Yeah, way ahead there would be about four.

Fort McPherson

Spring time few times I see, between 6 and 10 calves and there's one or two bull traveling with them

Old Crow

Either one or two caribou come first so a lot of people today they never have the training that I had training, so they just figure the first bunch and see some caribou leading they think there's leaders but it's not, the caribou already went ahead, it's one or two caribou, they're already way ahead, it's just a bunch that's following them.

Old Crow

Well I live up there twelve miles up the river and I see one caribou and that's the leader. maybe sometime there are four or five more they are the first ones to come. And they call those leaders.

Old Crow

Fewer participants talked about the leaders numbering a few hundred caribou ahead of the migration referring to someone else's expertise.

I've heard the first leader are two or three hundred. I've heard that.

Dawson

Caribou I used to watch them when they first hit the highway we'd sit there and watch them come, and I asked my friend I said well how many, because that's when people started talking about the leaders, and I said what do you call the leaders, what would you say are the leaders? He said probably up to three or four hundred. They all cross the road first and then the rest will come, so three or four hundred.

Dawson

Where numbers were specified, leaders of the migration were described as being far ahead of the rest of the herd and traveled alone or in very small numbers. However, amongst other participants, comments such as “cows are the leaders” or “bulls are the leaders” often implied that all animals in that class could travel ahead and therefore lead in larger groups than is suggested above.

4.7 Leadership timing and position in the herd

Too few questions about seasonality were answered to provide a clear comparison between all four seasons, or contrasting migratory periods with non-migratory periods. However, 75% of participants specifically described caribou going ahead as leaders during fall and spring migrations. Table 2.2 shows the spread of responses for the two migration seasons. Of people who mentioned spring caribou leaders, 88% said that cows or the single cow and calf led in the spring. Of people who mentioned fall caribou leaders, this percentage was only 47% versus 53% for bulls or mixed sex groups of caribou leading.

Thirty-one percent of respondents also pointed out that leaders might not always be ahead. In particular they may change their position in a group or leading the migration according to their role and necessity of exercising that role (e.g., breaking trail, predator avoidance).

Overall, participants generally agreed that cows went ahead of the spring migration, but there was little agreement about which sex of caribou led the fall migration. The quotes below show how people described which type of caribou lead, and when they lead.

Ok, after that females ready to have their calves so the females would migrate back to the calving grounds, which is in Arctic refuge. The females would leave first. And the bull later on, they'll come after. In the fall time it's opposite. The bull would go back to the feeding ground that they go to back in the fall time. Be there, early part of September. Maybe it'll take about a month to travel from the Arctic National Refuge to the Dempster highway, where they're going to start feeding, feed themselves, and then female would follow the bulls. And sometime in October, it's mating time for them.

Sometimes the cows do come earlier and then other times. If it's later in October sometimes you see them and it's the middle of the rut and they usually all bunched together and come out as a herd of mixtures. But I don't know so much going this way, but going North when the Spring calving happens, the cows want to get their calves so they're always in a rush to get up there. Coming South It sometimes can be a mixture and other times you can see the females. So it's both, coming down, mixed and then more cows in the spring going north.

Dawson

In the fall, the females and then the bulls come after that. And then going back down to the calving grounds same thing.

Fort McPherson

Cow and calf I say. Well, that's where the cow and calf goes first and then the bulls follow them.

Fort McPherson

Cow caribou and young bulls coming back (fall time) but big bulls are going ahead of them. That's the one call leader, they just know where to go.

Fort McPherson

All the experience I have the winter in one area, then bulls are the main leader, and then spring time is cows.

Old Crow

In the fall time you can see different, the cows usually come back first, they usually cross up river approximately 50 60 miles up and maybe 70 miles, they usually hit the river first then the bulls come behind you can see some good leaders in those as well cause they know where to go and where to feeding are, since a lot of forest fire happen area and um they tend to by pass those areas, they always come back around to us to give us our winter supply of caribou meat.

Old Crow

Like I say spring time its usually cows that come first and with and then you get young bulls and older bull fits that patterns but in the last few years I see it mix last spring or two years ago we see start seeing bulls first before the cows and that had to do with the snow depth traveling was hard on them cause there was just too much snow.

Old Crow

The last quote illustrates how it is important to consider the variables that affect which caribou are "leaders". In the above case, deeper snow may require the strong trailbreaker bulls to facilitate traveling for the pregnant cows. Perhaps change in climate could change leadership patterns.

All individuals who thought that caribou leaders existed also thought that caribou leaders travel ahead. However, 9 individuals also pointed out that leaders are not always ahead. In particular they may change their position in the herd according to their role and necessity of exercising that role.

In some situations I guess they [females] can [be leaders]. When they get lost they see another herd and then the females have to take them over to the other herd. Then they get all mixed up in there again.

Dawson

Yeah, the old woman start and the caribou start but the *dazhoo tsoo* he stay behind, he stay behind the herd while they move, and sometime the herd wait for him and he takes his time and he's not hurrying and caribou get impatient. Sometimes they run back there and try to fool them so he could move faster but he just take is time. So, it's like if we start to go some place up mountain you guys would be way ahead of me, huh? And it would be slow and you don't know where to go. If I say we're going to go over here, you guys wouldn't know where I'm going so you got to wait for me so that the big bull *dazhoo tsoo*, that's his name. He take his time cause he's the boss.

Old Crow

In the herd you can pretty well see which ones are the leaders, when you see a bunch of caribou, maybe 20 or more something like that, it don't matter what number it is, but there is always a leader at the front and leader at the back of the herd cause if they ever run into any predator or they get scared for some reason then there is also a leader at the back.

Old Crow

Participants talked about caribou leaders ahead of the herd. While most used unspecific wording such as "way ahead", a few described how leaders could be from a short distance ahead, to a few weeks ahead. This appears to depend on the season, but too little information was obtained here to draw a timeline.

Bulls always ahead. Lots of it 10-15 miles behind coming same way, further over's more and they are coming, they're coming fast you know.

Fort McPherson

It's always a cow and a calf leading, you know it's about I'd say a day or something ahead of the caribou. They're alone, eh, always way ahead. (...) It's always that caribou I mean is always way ahead and then there's bunch behind it, that one, behind that one caribou, and the main herd is always behind that little bunch too, few days behind.

Fort McPherson

Yeah, they are waiting for, they take their time, eh, they wait for the main bunch. [when crossing the Dempster]

Fort McPherson

In the spring-time it's pretty easy to identify cause from the wintering grounds the cows usually come first the cows and the young calves, they usually come first and they're the ones that break the trail. And maybe a couple of weeks behind them are the bulls coming.

Old Crow

One of the questions during the interviews focused on whether leaders were present year round or for only part of the migration. Some described leadership year-round whereas others only during fall and spring migration.

Alaska caribou come in the fall and then there's caribou around from Dempster here and then they all join each other, and that's when they really have a leader. I see five hundred on the mountain couple years ago, had one leader. Wherever he run, they all go. Yeah.

Old Crow

In Dawson, several individuals mentioned that they did not see leaders ahead of the migration, as they perceived the herd to have settled once they reached their traditional territory. This perception may be related to seasonal leadership.

Where are they going to pass through? It's their wintering grounds and they don't have a place to pass after this.

Dawson

Although season was the subject of several questions, many participants also said that leaders were the same for all seasons or did not wish to address this distinction, viewing the question as repetitive.

From the interviews, no definite distinction between fall and spring caribou leaders could be made. People suggested that the time of year is only part of the explanation for when leaders take lead. Other factors such as weather, location on the land, size of the herd, predation, food availability, mating and the role of each leader class all affect which caribou lead.

4.8 Hunting traditions relevant to caribou leaders

Eight participants described that each small herd has a leader that should be shot first in order to confuse the rest of the herd and harvest a maximum number of caribou. This illustrates that caribou leaders are important to the caribou herd survival as well as the hunters' success.

When you hunt caribou and you want to get lots, you always shoot the leader, and that confuses the rest. And then when another one tries to lead you shoot that one. So you can actually get a big pile of caribou if you just shoot the right way, because they get confused, there's no leader.

Fort McPherson

If the leader is fat I shoot it...because the trail is already made. The trail is already made by one or two caribou so when caribou come it doesn't matter who shoot the leader. What ever is leading that little pack. You don't always just see caribou and start shooting. What I do is I look at it, I look for the fattest one, I'm not going to shoot skinny caribou. I'm going to shoot fat ones so grease can come down my mouth this side, while I eat.

Old Crow

Out of 29 participants, 9 specified that they would not shoot leaders according to their traditional hunting practices (3 in Dawson, 3 in Fort McPherson, 3 in Old Crow).

Protecting caribou leaders

Like a long time ago, they used to have fence, my father told me. They don't just shoot anything. They make a fence (...). They chase the caribou into this (...). Ok they going to maybe take two. So they take two caribou. That's what they used to eat. Or dry fish, or dry meat. This is where they make sure that they don't shoot the leader, you know what I mean. Maybe they get two or maybe they get three if it's a big family. That's what they do. Then they put the fence down and away they go.

Dawson

The wolf is ahead of the caribou herd. And then the cow and calf follow. Nobody touch that one. Wolf don't touch it, human don't touch it. They're the trailbreaker.

Dawson

People are used to take care of them long ago you know, leave the leaders alone for awhile and then another bunch of is down here about 1000, don't bother that one, you know, just leaver it so that it they shoot it and later on they go back to this other one.

Fort McPherson

When the first caribou come up they're the leaders and the guards he was saying, they're the ones that they're always told don't shoot those caribou you know when they first come up, yeah, first bunch, are these the leaders, Johnny Charlie was always telling not to shoot these caribou.

Fort McPherson

Yeah. Yeah that's cow without calf, they call that *vadzai njoo'*. You don't kill the leaders.

Old Crow

That's why I was told that when you see caribou you don't shot those leaders or so you don't front first caribou come trough and migrate you don't shoot them because sometimes those caribou are young they could be in training and I was told not to bother with them so I try to respect that and that is how I see it.

Old Crow

All participants in Dawson First Nation talked about timing of hunting when the caribou arrive in the fall, and that timing of the closure might interfere with this, described in similar terms as in the next quote:

You know when the caribou arrive here, we should hunt them at that time because that is when they are in their prime. After that, they go right into rutting, it's our traditional knowledge that's been passed down to us not to hunt during ruts because the meat is not good.

Dawson

This traditional timing of the hunt was also supported by some members of the Tetlit Gwitch'in First Nation:

One thing our Natives say in them days they wouldn't hunt during mating, no way, and then they wouldn't bother it during calving time too. You know, in the fall, caribou are mating, that's what I said, those caribou are mating, why they're killing them. "Boy I got big bull, fat" that's stupid, me I never go up when it's mating, it's ok you go around August, and then it's good to get them when it's fat, then they don't mate, they start mating around September. And then they go up and "here I got this much bull", I hear a lot of people throw meat away this year. Can't eat it, it's food. Even cows, I never kill one caribou, I never kill one moose this year, I don't get to hunt, I used to get thousands of it. Yeah, I used to feed people every year. I'm a good hunter.

Fort McPherson

According to the above quotes, traditional hunting practices vary according to the time and place of the hunt. Leaders could be both a target or be protected depending on the situation.

In recent years, time spent on the land to locate caribou has been reduced, as many hunting locations can be reached by truck, four wheeler and skidoo in a matter of hours, instead of several days of travelling by dog team. According to Elders interviewed, hunting is no longer organized as it used to be, as explained in the quote below. Today, hunting trips may be more restricted to individuals or single families.

We he had one boss that we go out hunting, we all gather together and the oldest guys told us what to do, you go there, you go there, you go there so everybody knows who's here who's there. That's the way we used to do it. (...) we used to have, circle around the caribou. Now you just go up and help yourself, and don't have to wait for nobody, and that's something like that. (...) And everybody knew and everything was safe, and everybody got their caribou, because if there was ten of us hunting then say two guys came that weren't supposed to come, I wouldn't even know

where they were supposed to be, where they all were. But still, we gave some caribou, everybody got the same amount.

Fort McPherson

Hunting values and traditions described by Elders in each community shows how the ways in which people hunt caribou have changed. The way caribou leaders are perceived may also change because observations of caribou leaders may not be used in the same traditional ways.

4.9 Comments on the hunting closure to “let the leaders pass”

Twelve out of 29 participants mentioned the hunting closure, giving their perspective on why it was established and/ or how it affected them. Two Dawson First Nation members mentioned how the closure is in place to prevent the caribou from getting mixed up with other caribou. Others in Dawson talked about a number of issues they perceived with the closure, including the previously mentioned hunting tradition that is compromised by the timing of the closure.

Preventing caribou from getting “mixed up”:

They all come one big bunch and get across. That's who come first. The female and the calves, they come first. That's why we have that closure, they get across and they keep on going and the rest come behind. That's what happen. But there's not only Porcupine caribou, there's Hart river caribou and there's Forty Mile caribou too and Porcupine caribou. And some way, further down I guess, Forty Mile, around Forty Mile, those caribou cross and they get all mixed up you know. That's why you see some caribou so close.

Dawson

(Question: do you think there are leaders?) Yes there are, because they lead the herd, but if you shoot the leader, then the herd go different direction, or they get lost, or they get mixed up with other caribou. You know, that's why Native people don't shoot the leader.

Dawson

Perceived issues with the closure for Dawson First Nation hunters:

And when they do arrive, they arrive by the thousands. And the leader would come first, that's the reason they have that closure on Dempster highway, so I don't know how true (laughing), that could be leaders on the () maybe some of the caribou will cross the highway but then you have,

you see herd scattered here and there. So it's kind of different every year, so that's the reason they have that one-week closure. The First Nation kind of oppose that. It's a regulation put in by YTG, but the First Nation always oppose that corridor. Tr'ondëk Hwëch'in First Nation always abide by the law, that's our law, we get what we need. Yet some of our members are being charged for no reason at all.

Dawson

So it's not only our traditional territory that the caribou migrate through but to me this theory of let the leaders pass on the Dempster highway is not something that I can concur with because this is their wintering grounds, so where are they going to pass through? It's their wintering grounds and they don't have a place to pass after this so they do their passing in the other traditional territories. (...) you know when the caribou arrive here, we should hunt them at that time because that is when they are in their prime. After that, they go right into rutting, it's our traditional knowledge that's been passed down to us not to hunt during ruts because the meat is not good anyways and caribou are all beat up and bruised up, so to me I think it's more out of respect to let the caribou, I mean, when there was no problems with the caribou crossing the highway, they cross the highway and the Dempster in the Southern area, in our area, they crossed the highway, different groups are going this side of the highway and then they'll cross to the other side of the highway because they're feeding, so do you have a closure every time you thing a group is going to cross over the highway?

Dawson

But what these biologists are doing, well don't touch leader, the closure there, don't touch those leader (xxx) every herd don't have leader. The first one come is the leader.

Dawson

If you were to put out regulations or acts or whatever, I really feel that you have to be accountable. You can't do it because you have to do it. Why, why are we doing this. It's not just because. Sometimes I feel that it's just because, like they have this closure because, well tell us why, the reasons why you're doing it. That's what I want to know, is it the why or is it because? If there's something wrong, then let us know. If there's nothing wrong then why do you have a because in there?

Dawson

I've heard the first leader are two or three hundred. I've heard that. Now, two or three hundred I can see crossing the highway in ten minutes. I've watched that. Some people call leaders a one-week closure. There's so many things going on up there but when you sit down and really look at

the picture, from my experience on the Dempster highway, is that I was able to drive up to a herd of caribou and they stopped crossing the highway when I drove up close to a hundred feet. And then you stop the vehicle, turn it off and say a hundred and fifty cross the road and another hundred and fifty are on the other side of the road, you shut the vehicle, stop and wait and all of a sudden the rest of the herd comes out a hundred feet from you. They just continue on, so the interruption of the vehicle what I mean by the interruption of the vehicle is within minutes of passing, they're crossing the highway anyhow. (...) The issues of hunting the caribou when they first come here, I'll say it again, after that long migration they don't have much fat. But they still have some. And you leave them here for another two weeks, and then it's the rut and the rut comes and the bulls are no good. All you've got left in November, December is cows, so I mean does that benefit the caribou when people would have to take a cow, because the caribou bull is rutted out, because we couldn't hunt them when the closures were on. So I've heard stories where dogs won't even eat it.

Dawson

Well, I won't bother them, I'll wait until they hit the road, and they cross and everything, until they're all over the place and then I believe it's safe. Actually when they cross the road and there's two, three hundred, I've seen as many as fifteen hundred cross the road and they are just milling down both sides of the road, if I can't hunt them how do, I mean that's when the leaders cross, they've already crossed as far as I'm concerned, and that's how I ended up with wildlife charges, because of YTG laws, not our laws.

Dawson

Participants in Fort McPherson and Old Crow did not particularly speak either in favor or against the hunting closure, but the few that addressed the closure added interesting points, as shown in the quotes below.

Fort McPherson (3)

We don't bother the cows, and the cows are leaders so it doesn't really affect us, because we're after the bulls

Fort McPherson

That first ones, that's the one they are trying to protect all the time. That's why they have border-lines, they have certain time, it up to RRC Council to say when it closes "Monday 12 o'clock is going to be closed for one week" or something and let the leaders go pass first. But right now those 18 wheelers, they got those damn trucks going that can hear them ten fifteen miles coming

and that why they got to take something off, I don't know what make noise. And even that they go across, but now as soon as a truck coming they just go different route. But they keep on going, they know where they are going. (...) only time you don't bother caribou is in October 2 to 12 or something, and you can't even go up near cause its finish mating season is finish and they stink.

Fort McPherson

Well you see how many times they tell them let that caribou pass, let it cross, whatever cross, goes up so far, maybe two, three big bunch, lots more is supposed to come, nothing comes so they turn around, go back down, check, there's nothing, go different route, or go that way too.

Fort McPherson

Old Crow (1)

The regulation that we made in Dempster Highway, through the Porcupine Management Board, they have a regulation there that states that there is closure of hunting for one week to let the leaders go past the Dempster. And still yet, in our own traditional territory here when the caribou hit the mountain nobody even think about letting the leaders go past, they just go right there right now are we going to make kind of regulation why don't we abide by it in our own home town, eh? Thats right for me anyways.

Old Crow

Overall, participants from Dawson First Nation expressed the most dissatisfaction with the hunting closure within the context of their hunting traditions. Most interviews in other communities did not address the closure. Where they did, no strong opinion was voiced. The above comments were included as they were relatively numerous, although opinion on the hunting closure was not a question in the interview.

5. General Conclusions: caribou leaders of the Porcupine Caribou Herd

Based on participants's descriptions of “caribou leaders” and the "letting caribou leaders pass" policy, caribou leaders are perceived in two different ways: (1) The first way is to call leaders the first caribou, group of caribou or first set of groups, cows, bulls or both depending on the people interviewed. In this case leaders are identified as the animals at the front of the migration, regardless of how far ahead they may be, and in small or large numbers. (2) The second way to perceive leaders is to directly associate leaders with other types of roles within the herd, such as trailbreakers, guards, or

knowledgeable caribou leading to a more diversified picture, where several different types of leaders coexist, both for the migration as a whole and for each group of caribou within the herd. These leaders usually are represented in very small numbers and may be at any position in the herd depending on the circumstances for them to play their “leadership” role. Some participants perceived leaders one way or the other, but also often showed both perceptions, suggesting they are compatible. The most detailed interviews that identified who the caribou leaders are, including many Elders interviewed, focused most on the second type of caribou leaders and their roles in the herd.

The in-depth knowledge of the way caribou organize themselves during and between migrations is largely associated with traditional hunting methods. Modern hunting technology (e.g., motorized vehicles reducing time needed to harvest caribou) may decrease the need to understand caribou leadership in such detail. Therefore, it is important for future generations to preserve the knowledge that Elders and hunters have gained through their own Elders and experience on the land. Interviews showed that Elders understood in most detail how several caribou leaders co-exist and how leadership behavior is played out in the herd. Overall, younger hunters gave less detailed explanations of leadership behavior.

Interviews showed that reasons for protecting leaders are also diverse in how to protect, how many leaders to let pass, and which leaders are protected. This diversity is important to recognize for future recommendations for managing harvest of Porcupine caribou. Understanding traditional knowledge requires attention to context (time and place) of observations, Elders' stories, and the way different people's perspectives relate to each other. Without understanding context, traditional knowledge might appear confusing. Perspectives on caribou leaders may look like they contradict each other, but are instead context specific. Young cows, old cows, young bulls, older bulls, cow and calf, and wolf may all be "leaders" if the context is made clear. For management it is important to understand how caribou leaders should be protected according to traditional knowledge, but it is key to define the specific context and details of when, where and how that protection should be carried out.

6. Knowledge of caribou leaders of the Western Arctic Caribou Herd

6.1 Introduction

Padilla conducted shorter informal interviews with Seward Peninsula Reindeer herders, western Alaska, USA. This site was included in the study because reindeer herders have a contrasting approach to caribou leaders from PCH hunters. It was valuable to compare reindeer herders' knowledge of leaders, including which sex, age, and group size of caribou they identified as leaders. Unlike caribou hunters, they aim to deflect the migration of the caribou herd to protect their own reindeer from migrating away with caribou. They also have in depth local knowledge of the way the Western Arctic Caribou herd migrates through their range (Schneider et al. 2005).

6.2 Methods

The Kawerak Reindeer Herders Association and the UAF IRB (protocol # 07-12-exempt 20070306) approved interviews with Seward Peninsula reindeer herders about caribou leaders of the Western Arctic herd. Six reindeer herders were interviewed during the Annual reindeer herder meeting in Nome in Spring 2007. The following questionnaire was semi-structured and answers were open ended. Questions were based on those asked to Porcupine caribou user communities with modified components based on questions that were successful in the prior part of the study.

(1) When does the Western Arctic Caribou Herd arrive on the Seward Peninsula ? Which caribou from this herd usually come first ?

(This question is interesting because from past interviews, many subsistence hunters speak of leaders and the vanguard of the herd interchangeably.)

(2) Have you seen or heard of caribou leaders? (yes/ no)

(3) What do you mean when you speak of caribou leaders? Could you define what a caribou leader is for us?

* If the following questions were not already been addressed, questions 4-7 were asked accordingly:

(4) Which caribou are usually leaders? (females/ males/ calves/ old/ young/ pregnant/ other: _____)

(5) Do leaders travel in the main herd, with a smaller group of mixed caribou, in a group of (just) caribou leaders, or alone? (If appropriate: Where are the leaders compared to the main herd? How many leaders usually travel together?)

(these differences are useful to clarify as there has been much discussion about how many caribou are leaders and where they are located compared to the main herd (e.g. cases of road closures))

(6) Do the caribou have leaders only for the migration, or do they have leaders all the time? also when they are foraging?

(7) Are the leaders the same in the Spring and in the Fall?

(8) What have you seen caribou leaders do? (different situations could include: barriers/ driving reindeer away/ feeding/ migrating/ reproduction/ predators/ calves/ deep snow/ dominance status, etc.)

(9) Is the word « leader » the best word to describe these caribou or are there other better words? (scouts, vanguard, boss, etc.)

These interviews were on average much shorter than those with Porcupine caribou users due to the conference context and lasted 5-15 minutes each. We also analyzed these interviews qualitatively. Participants talked about class, numbers, physical characteristics of leaders, leadership timing, position of leaders in the herd and ways in which leaders could or not be affected by disturbances.

6.3 Findings: Reindeer herder's perspectives on caribou leaders of the Western Arctic herd

6.31 Classes, numbers of leaders, and physical characteristics

Five out of 6 participants mentioned that the first caribou arriving are lone bulls 3-5 years old. Occasionally there can be female leaders, as mentioned by 2 individuals. Leaders travel alone, a few going the same direction but scattered, several miles apart. One participant said that he wouldn't necessarily call those bulls the leaders as they are "just sniffing around" for their range. Those single "leader"/ "front runner" caribou are the ones that mix in with the reindeer herds and lead them away and disrupt herding.

In my world, any caribou is a leader. If any one caribou can be high strong, antsy, dominating and hard to control, he can be a leader.

Seward Peninsula (Alaska)

One herder gave a different perspective, and presently hunted caribou because he had no reindeer anymore. He mentioned caribou leaders were a large herd of

approximately 30,000 animals that is composed mainly of older caribou that know the routes, stick together and travel at the same pace. He said these are the leaders that are left alone, as they are skinnier and older than the second herd.

If the first herd passes, then the second herd will follow their trail, their scent, because the caribou Elders showed them the way.

Seward Peninsula (Alaska)

Another participant mentioned that in Kotzebue (northwestern Alaska), he heard people say that the front runners are the skinny ones and the second wave of animals are fatter, more desirable for hunting. Similar knowledge is found to the North of the Seward Peninsula concerning the Western Arctic Herd where Elders have urged hunters to let the leaders through without hunting (Alaska Department of Fish and Game 2005). The same reindeer herder also described that in the fall, bulls are usually ahead but in the spring, he says females go first because they want to reach the calving grounds. Also, bulls are the last caribou left on the Seward Peninsula in the spring, still causing reindeer to walk away with them.

6.32 Leadership timing and position in the herd

The season seems to affect how strong leadership is amongst caribou. One said that Oct-Dec is the worse time to manage reindeer and keep them away from caribou because of the rut, the female reindeer smell the caribou and move towards them. Two herders described how leaders move mostly during the night and this is when many reindeer are lost. Finally, time and distance between the leaders and the following herd was somewhat variable, from 15-20 miles to 4 or 5 days of travel.

6.33 Disturbing caribou leaders

Many herders tried to protect the reindeer by chasing the first caribou that come. They also tried shooting them in some cases. Unfortunately for reindeer herding, shooting the leaders did not seem to affect the caribou moving through their ranges.

The old timers said if you kill one caribou, the rest will go look for it, you can't change the route (...) You can't change anything about caribou. (...) Travel 150 miles per day just to take care of reindeer, put them in safe place, chase caribou, but next day, same thing.

Seward Peninsula (Alaska)

Tried to get rid of bulls, but then pots of the caribou herd come in bunches of 150-500, at the end of February and in March there are quite a few caribou around.

Seward Peninsula (Alaska)

Another herder tried turning around a herd of caribou. He tried for a week, would push 15-20,000 animals east, succeeded but had to repeat this operation every day, twice a day with the skidoo. He lost 700 reindeer in the process. In the end, the caribou went north but kept going to back to his range. The main herd was deflected but some still made it.

From the perspective of reindeer herders, caribou leaders arrive first in the fall in small numbers and are the ones to lead the reindeer away. The interview with the active caribou hunter indicates that this definition of leaders changes significantly when taken in a different context. Both ways to perceive caribou leaders may be valid but exist for different purposes. These interviews also indicate that perceptions and definitions of caribou leaders vary greatly depending on the experience and traditions of each person.

7. Acknowledgements

We extend a big thank you to all the people who offered their time and shared their knowledge with us during our interviews. In alphabetical order, thanks to Neil Colin, Art Christiansen, Woodie Elias, Amos Francis, Donald Frost, Percy Henry, Ronald Johnson, Angie Joseph-Rear, Roberta Joseph, Peter Josie, David Harvey Kassi, Danny Kassi, Peter Kay, Peggy Kormendy, Irwin Linklater, Peter Nagano, Robert Rear, William Teya, Wanda Pascal, Abraham Stuart, Abraham Peterson, Michael J. Pascal, Ernest Vittrekwa, Joel Peter, Randall Tetlich, Peter Tizha, George S Moses, and others who did not wish to be mentioned in this section.

We wish to thank all those who assisted Elisabeth during interviews - May André, James André, Cheryl Charlie, James McDonald, and Ryan Peterson. Also, many thanks

to Joe Tetlichy for his extensive support and to his family and extended family for opening their homes, and providing Elisabeth a place to stay and food to eat. Elisabeth is also grateful to her graduate studies advisor, Gary Kofinas, for his extensive help on this project, as well Dorothy Cooley, Deana Lemke, Bill Schneider, Brad Griffith, Greg Finstad, Barney Smith, and others.

This project was supported by the Porcupine Caribou Management Board, Vuntut Gwichin First Nation, The National Science Foundation (Grant No. 0531200), Tetlit Gwich'in First Nation, Tr'ondëk Hwech'in First Nation, Environment Canada, the Resilience and Adaptation Program at the University of Alaska Fairbanks (NSF Grant 0654441), the CircumArctic Monitoring and Assessment Network IPY Project, the Institute for Global Awareness, and the Aurora Research Institute.

8. References

- ADFG (Alaska Department of Fish and Game) Division of Wildlife Conservation. 2005. Western Arctic caribou trails 7.
- Benn, B. 2001. Fall movements of the Porcupine Caribou Herd near the Dempster Highway, August 2000. Gwitch'in Renewable Resource Board Report 01-07.
- Berkes, F. 2008. Sacred ecology: traditional ecological knowledge and resource management. 2nd Ed. Taylor & Francis, New York.
- Davis, A., Wagner, J.R. 2003. *Who* knows ? on the importance of identifying « experts » when researching local ecological knowledge. *Human Ecology* 31:463-489.
- Ferguson, M.D.A., and Messier, F. 1997. Collection and analysis of traditional ecological knowledge about a population of arctic tundra caribou. *Arctic* 50:17-28.
- Folke, C. 2004. Traditional knowledge in social-ecological systems. *Ecology and Society* 9:3. <http://www.ecologyandsociety.org/vol9/iss3/art7/>. (June 26, 2010)
- Government of the Northwest Territories. 1993. Traditional Knowledge Policy. Yellowknife: Government of the Northwest Territories.
- Government of the Yukon. 2002. Wildlife act, revised statutes of the Yukon.
- Gubser, N.J. 1961. Comparative study of the intellectual culture of the Nunamiut Eskimos at Anaktuvuk Pass, Alaska. Doctoral Thesis. University of Alaska Fairbanks.
- Gunn, A., Arlooktoo, G., Kaomayak, D. 1988. The contribution of the ecological knowledge of Inuit to wildlife management in the Northwest Territories. In: Freeman, M.M.R., and Carbyn, L.N., eds. Traditional knowledge and renewable resource

- management in Northern regions. Traditional knowledge and renewable resource management. Boreal Institute for Northern Studies, Edmonton, Alberta. Occasional Publication 23: 22-29.
- Gwich'in Language Center/ Gwich'in Social and Cultural Institute. 2005. Gwich'in language dictionary (Fort McPherson and Tsiigehtchic dialects), 5th ed. Northwest Territories: Teetl'it Zheh and Tsiigehtchic.
- Hart, E. 1995. Getting Started in Oral Traditions Research. Occasional Papers of the Prince of Wales Northern Heritage Centre 4.
- Huntington, H.P. 2000. Using traditional ecological knowledge in science: methods and applications. *Ecological applications* 10:1270-1274.
- HyperRESEARCH™. <http://www.researchware.com/products/hyperresearch.html> (June 26, 2010).
- Kofinas, G. 1998. The costs of power sharing: Community involvement in Canadian Porcupine Caribou co-management. Doctoral dissertation. The University of British Columbia. Pp. 498.
- Krippendorff, K. 2004. Content Analysis: an introduction to its methodology, 2nd ed. Thousand Oaks: sage publications.
- Moller, H., Berkes, F., Lyver, P.O.B., and Kislalioglu, M. 2004. Combining science and traditional ecological knowledge: monitoring populations for co-management. *Ecology and Society* 9:2 <http://www.ecologyandsociety.org/vol9/iss3/art2/> (June 26, 2010).

- Perecman, E., and Curran, S.R, eds. 2006. A Handbook for social science field research: essays and bibliographic sources on research design and methods. Thousand Oaks: Sage Publications.
- PCMB (Porcupine Caribou Management Board). 1995. Ninth Annual Report.
- PCMB (Porcupine Caribou Management Board). 2000. Summary minutes September 20th and 21st 2000. Whitehorse, Yukon.
- Schneider, W., Kielland K., and Finstad G. 2005. Factors in the adaptation of reindeer herders to caribou on the Seward Peninsula, Alaska. *Arctic Anthropology* 42:36-49.
- Sherry, E. and VGFN (Vuntut Gwitch'in First Nation). 1999. The land still speaks: Gwitch'in words about life in Dempster country. Whitehorse, Yukon: Vuntut Gwitch'in First Nation.
- Smith, B., and Cooley, D. 2003. Through the eyes of hunters: how hunters see caribou reacting to hunters, traffic, and snow machines near the Dempster Highway. Whitehorse, Yukon: Department of Environment, Yukon Government.
- Statistics Canada. 2006. Canadian census, Ottawa, Ontario.
- Stevenson, M.G. 1996. Indigenous knowledge in environmental assessment. *Arctic* 49:278-291.
- Stewart, A.M., Keith, D., and Scottie, J. 2004. Caribou crossings and cultural meanings: placing traditional knowledge and archaeology in context in an Inuit landscape. *Journal of Archaeological Method and Theory* 11:183-211.

Appendix



Porcupine Caribou Management Board

Box 41723, Whitehorse, Yukon Y1A 6L3
Phone: (867) 653.4243 • Fax: (867) 693.2904 • Email: pcmb@tfgovt

May 29, 2006

To whom it may concern:

Re: Caribou "leaders" research project

The traditional ecological knowledge on caribou is of great interest to the Porcupine Caribou Management Board (PCMB) and its local user communities. The study project proposed by Gary Kofinas and Elisabeth Robins of the University of Alaska Fairbanks addresses the traditional knowledge on caribou "leaders" and speaks directly to questions we regularly face regarding the current rules and practice for Dempster Highway hunting. This project should provide important information about the ecological dynamics of the Porcupine Caribou Herd and complement science-based research.

Research of this nature is of particular interest to us, in that it would provide systematically gathered community-based knowledge that would supplement the information we regularly receive. Because we use traditional and scientific information to guide our management decisions, we expect this project will be a great resource to us.

The PCMB has worked with Gary Kofinas for twelve years in a variety of successful projects. The PCMB fully supports the proposed project and recommends that you assist Gary and Elisabeth in their efforts in this project.

If you have any questions about the PCMB's support of this project, please contact me.

Sincerely,

per: Joe Tettich
Chair