CARIBOU CO-MANAGEMENT AND CROSS-CULTURAL KNOWLEDGE SHARING

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A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirement of the degree

of

Doctor of Philosophy

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Abstract

While co-management arrangements may link government management agencies directly with local resource users, this connection is rarely an "institutionalized, partnership of equals." In the case of caribou co-management in northern Canada, the work involved in creating bridges between the knowledge and governance structures of traditional aboriginal communities, and regional and national scale Canadian management agencies, is formidable. Just as aboriginal communities have resisted attempts to have governance powers unilaterally devolved from the Canadian government rather than their pre-existing rights and responsibilities recognized, so have communities resisted efforts to have their traditional knowledge defined and co-opted by outside forces. This thesis has outlined these lines of power struggle and resistance, but is primarily focused on questions of social learning. When and how have co-management efforts managed to create the space for double loop learning, learning where *all* participants have the opportunity to question their own assumptions about what they know about human-caribou systems? Are co-management arrangements succeeding in building environments where individuals and organizations, often with different views on data interpretation, social values, conservation principles and governance, can come together to make decisions?

This exploration is rooted in the author's opportunity to live and work with the Łutsël K'é Dene First Nation, where the project examined a number of themes including: the historical background of the early exchanges between Dënesǫłine peoples in the Northwest Territories and the Canadian government, and the role of co-management in local empowerment in a community with regular and direct experience with barren-ground caribou. The thesis then turns to the links between traditional knowledge, community institutions and organizations and the means communities use to ensure that these links are not broken when information is shared with organizations outside the community. A preliminary investigation of Łutsël K'é elders and hunters knowledge of changing caribou movements explores local concepts of natural versus

unprecedented changes in barren-ground caribou migrations. Finally, the thesis looks at the role of trust in caribou co-management systems, trust between people and in the knowledge employed to make management decisions.

The objectives of the thesis were to look at how cross-cultural differences can be negotiated in the co-management of barren-ground caribou herds, to examine how community-based caribou monitoring can be implemented, and to identify the mechanisms that create links between western scientific knowledge and traditional ecological knowledge and their applications to co-management. The thesis found that without first understanding that traditional aboriginal barren-ground caribou hunters, biologists and government policy-makers express the complexity and uncertainty of existing knowledge of caribou systems in different ways, it is not possible to begin to negotiate cross-cultural understandings of caribou herds. Community-based caribou monitoring must ensure that traditional caribou hunters do not solely bear the consequences of management decisions, but also build opportunities to benefit from and take responsibility for management actions. This is reflected in recent efforts to establish community-based caribou monitoring programs by the Beverly and Qamanirjuaq Caribou Management Board and within its recently revised management plan. This thinking is also reflected among those communities participating in the Bathurst Caribou Management Planning Committee. The creation of linkages, not the integration of scientific knowledge and traditional knowledge, will be possible only when discussions of the differences between knowledge systems move beyond naïve dichotomies that make unfair comparisons between whole cultures and the specialized technical knowledge of specific members of a culture. Without venues where biologists and aboriginal caribou hunters and elders can share their knowledge in direct and regular interactions, the social learning involved in linking knowledge systems is not likely. There are signs that current efforts to create multiple caribou monitoring techniques requiring collective understanding of the signs of feedback from caribou populations, may allow this kind of interaction where it has not systematically occurred before.

The thesis found that while addressing imbalanced power relationships between co-management participants is key to examining the success of decision-making processes, the conditions for double loop learning to occur (where participants examine their assumptions) do not necessarily follow from balanced power relations. The capacity for double loop learning is dependent on the building of a "safe" environment where a non-threatening dialogue between participants can take place. The capacity of co-management organizations to act as catalysts bridging differences in scale and knowledge systems are influenced by rapid outside changes as well as rapid population or cultural changes. However, developing the capacity to picture change and cope in the face of change is dependent on alternative management systems that allow innovative learning environments. Double loop learning cannot be achieved without trust between participants where multiple perspectives and learning traditions can be respected.

Preface

> *... I was left with the deep conviction that I had yet to write about that which is most important. Something lay there that eluded not just me, but many who have experienced another way of life. We write about some facets of it, some surfaces, that we make our business. But the gold we find is transformed by the reverse alchemy of our journey, from there to here, into lead. Not into nothing, not into worthlessness, but into a substance that has more weight than light, more utility than beauty, is malleable rather than of great value* (Brody 2000:4).

These words reflect the backdrop of my thinking throughout the writing of this thesis. I have been keenly aware that words on paper only give the reader a feeling for a fraction of the experiences I had during my thesis work. As a result, there is a huge responsibility associated with attempting this "reverse alchemy." The journey described from "there to here" potentially transforming "gold to lead" is an apt metaphor. The "lead" created can have a poisoning effect on the people and circumstances represented, and I hope I have avoided this.

The survival of any body of knowledge and wisdom is inextricably bound to the people who draw their lives from its lessons. The wisdom gained from knowledge and experience cannot be "conserved" by research alone. Efforts to document the knowledge of aboriginal elders are valuable exercises *if* the needs and the concerns of the communities involved are fully incorporated into the research process. However, while reflecting on knowledge, this thesis focuses primarily on the ways aboriginal peoples give voice to their knowledge (rather than the content of the knowledge itself) and subsequently shape contemporary resource management. I have looked specifically at how the knowledge and actions of a caribou-hunting community, the Łútsël K'é Dëne First Nation, shapes the research, monitoring and decision-making guiding human interactions with the barren-ground caribou (*Rangifer tarandus*) herds of northern Canada.

Initiating a research process to "gather" the perspectives of aboriginal peoples is a challenge. Peoples engaged in the lengthy historical challenge of asserting their rights to self-determination amid tremendous social upheaval can hardly afford the time to get involved in an academic research project if the research process gives nothing back to

the people. This thesis project attempted to make a contribution to on-going community-initiated research efforts in the Dëne community of Łútsël K'é, Northwest Territories, where I spent the majority of my time through my field-work. However, a *warning* voiced by Thoreau about the possible ill-effects of "*good intentions*" is a sober reminder. I would like to thank René Fumoleau for posting these words in his kitchen in Łútsël K'é:

Beware.
If you see a man approaching you
with the obvious intent of doing you good
you should run for your life.
Henry David Thoreau

Thank you, Łútsël K'é, for giving me the opportunity to learn with you. I hope I showed few "warning" signs!

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As with all efforts that last years, while my name will stand as the sole author on this thesis, the work involved was not possible without the unflagging support of many individuals. Faults in interpretation and judgement in the ideas presented here are, of course, mine alone.

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To the staff (current and former) of the Łútsël K'é Wildlife, Lands and Environment Office: I was privileged to work and learn with you about the challenges and rewards of documenting community knowledge. Of more vital and positive work it is hard to imagine. Marsi cho to Nancy Casaway, Henry, Marie, Shawn, and Tsatsiye Catholique Wally and Stan Desjarlais, Dennis Drygeese, Delphine, Gloria and Terri Enzoe, Agatha Laboucan, Jeanette Lockhart and Evelyn and Tishna Marlowe.

Over the last three years, I was lucky to work with a number of individuals that filled the remarkably tough role of translating between English and Dënesoɬine yati for a multitude of meetings, workshops and interviews that were part of my research project. Marsi cho to: Alizette Abel, Marcel Basil, Sara Basil, Bertha Catholique, Joseph Catholique, Stan Desjarlais and Evelyn Marlowe.

Sam Boucher and Walter Desjarlais did the bulk of the translation work for the interviews that made up my research project and were particularly key to the progress of the caribou interviews. Marsi cho for acting not only as translators, but as facilitators making the interviews all the more relevant for me and I believe for those individuals we interviewed as well.

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The last four years have been an important episode in my life, allowing intellectual and personal growth that I hope was reflected in my work with the Łútsël K'é Wildlife, Lands and Environment Department and in this thesis. None of this would have been possible without the following funding support:

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Chapter 1

Introduction – Caribou Co-Management and Cross-Cultural Knowledge Sharing

It is the genuine fear of losing a shared fundamental sense of values, and thus a vital base of cultural identity, over issues which other groups see basically in terms of economy, resource management and conservation, but not of identity, that gives northern resource questions aspects of intractability and sometimes desperation.

Fred Roots 1981:5

1.1 Introduction to Thesis

Caribou-hunting peoples in northern Canada moved seasonally on the land until the late 1950s. This movement was intimately tied to the migrations of the barren-ground caribou (*Rangifer tarandus*). There is archaeological evidence that in particular, Dene knowledge of "caribou country" in the Great Slave Lake area dates back at least 8 000 years (Gordon 1996). This depth of knowing, both spiritual and intellectual, is hard to fathom. It is perhaps best illustrated by the suggestion that the stereotypes of "nomadic" hunters and "settled" farmers reflect reality better when reversed (Brody 2000). Who is nomadic and who is settled in place? While Dene hunting societies moving in seasonal rounds have remained rooted within barren-ground caribou country for thousands of years, agriculturally-based societies have shifted and expanded their land use and occupancy patterns over the same time span.

Dene narratives of Denendeh, the homelands of the Dene peoples, emphasize the connections between all living things where objects considered "inanimate" by mainstream society have a living spirit in Dene thinking. The human-environment dichotomy is absent in ancient stories that relate how people, animals and elements like fire and water communicated with each other. The connection between Dene peoples and their homelands is echoed in place names and the meaning placed in landscape features an outsider would classify simply as an "island" or a "waterfall." Photographs of the "Old Lady of the Falls" are seen as often in Łútsël K'é homes as depictions of the Virgin Mary (most community members are baptized within the Catholic Church).

Box 1.1 The Legend of Ts'anTui Theda,
"The Old Lady of the Falls"
Told by Zep Casaway
Translated by Archie Catholique
(excerpt from "Łútsël K'é Dene First Nation 2001. Traditional Ecological Knowledge – Kaché Tue Study Region – Final Report")

I will tell you a true story about how it was in the beginning and how Ts'anTui Theda (the 'old lady of the falls') came to be. This story was passed on to me as it was passed on from generation to generation. The 'old lady of the falls' has been there since the earliest of times.

It started in the place called Kaché (Fort Reliance) and ?edacho Tué (Artillery Lake). It used to be called Beaver Lake in those days because there was a beaver living there. You could see the beaver's lodge if you happened to be out at ?edacho Tué. People were often in that area because that is where they went caribou hunting in the fall time. Even today Dene people still go there to hunt caribou.

In those days there used to be a man. His name was Hachoghe. He was a big man. One day Hachoghe saw the beaver's lodge. He could see it because it was on top of a small hill. He decided he wanted to kill the beaver but saw that he would have to get e beaver out of the lodge. So he started to push the dirt to one side. (Today you can even see where he pushed the dirt to one side.) He was so busy digging and moving the dirt that he didn't notice that the beaver had another lodge in the narrows close to the mainland. It wasn't far from the main route that the Dene people used when they traveled in that area.

But the beaver did not stop at that lodge. Instead he went down the Lockhart River to the main lake - Tue Nedhe (Great Slave Lake). The people there were starving. When they saw the beaver they thought they may be able to kill him. It was then that Hachoghe saw the beaver and ran after him with a shovel. He threw the shovel into the water, but the smart beaver swam away. The handle of the shovel broke and Hachoghe had to leave it there, sticking out of the water. That is why when you go to the north end of ?edacho Tué you see a rock sticking out of the water. That is the handle of Hachoghe's shovel.

After Hachoghe broke his shovel, he did not give up. He continued to follow the smart beaver back up the Lockhart River. By then the Dene people from Tue Nedhe were following Hachoghe. The river was strong and the beaver soon got tired and Hachoghe killed him. The Dene people were so hungry they went after the meat right away. There was enough meat from that beaver for all the Dene people for two or three days. But there was one woman who asked for the beaver's blood. Hachoghe told her he could not give her the beaver blood because there was not very much left. So the woman sat down at the falls and waited.

All of the other Dene people followed Hachoghe who was chasing another beaver down the river. They were heading toward the east arm of Tue Nedhe. After a while, the people noticed that the woman was still back at the falls. So Hachoghe picked two healthy people to go back and look for her. They went all the way back up the Lockhart River and they found her sitting at the falls. She had been sitting there a long time and so she was stuck in the earth. The two people told her that Hachoghe was asking for her to return to Tue Nedhe. She said, "I cannot return with you. I have been sitting here too long and now I will be here for all eternity." Then she said, "Go back to where you came from. Go back to Hachoghe and the others and give them this message." So the two people returned to Hachoghe and the others and gave them the message. This is how the Dene people learned about the "old lady of the falls" (Ts'anTui Theda). From that day forward the Dene people have gone to visit the Ts'anTui Theda to pay their respects, share their worries and to ask for help.

Internationally, there is general agreement that the ecological knowledge of aboriginal peoples is vital to global efforts to stem human-induced ecological crises. The influential Bruntland Report, *Our Common Future,* specifically mentions the importance of indigenous knowledge to efforts to protect biodiversity and achieve sustainable human resource use:

> *It is a terrible irony that as formal development reaches more deeply into rain forests, deserts, and other isolated environments, it tends to destroy the only cultures that have proved able to thrive in these environments. The starting point for a just and humane policy for such groups is the recognition and protection of their traditional rights to land and the other resources that sustain their way of life – rights they may define in terms that do not fit into standard legal systems. These groups' own institutions to regulate rights and obligations are crucial ... the recognition of traditional rights must go hand in hand with measures to protect the local institutions that enforce responsibility in resource use. And this recognition must also give local communities a decisive voice in the decisions about resource use in their area* (WCED 1987:115-116).

The 1992 Convention on Biological Diversity recognizes the fundamental rights of aboriginal peoples to control the documentation and use of their knowledge (183 countries are party to this convention):

Box 1.2 Article 8(j) of the Convention on Biological Diversity
(http://www.biodiv.org/convention/articles.asp)

Each Contracting Party shall, as far as possible and as appropriate:

(j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.

Despite these international efforts, on-the-ground work to incorporate the problem-solving skills, and ecological interpretations of aboriginal peoples into contemporary state-organized resource management settings are often hard-won or non-existent (Feit 1998). The knowledge of aboriginal peoples, labelled in the academic literature

variously, for example, as "traditional knowledge" or "indigenous knowledge" can be described as:

> *A cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission ...* (Berkes 1999:8).

Some academics have voiced their discomfort with attempts to define or construct the knowledge of aboriginal peoples separately from that of non-aboriginal peoples (Agrawal 1995, Simpson 1999). Aboriginal peoples' knowledge is often "boxed" and defined by others in inappropriate ways (Sillitoe 1998). What are the differences that academics, some aboriginal, some non-aboriginal, attempt to outline? Put most simply, the knowledge of most aboriginal peoples is deeply rooted in place. These roots are very apparent in the story-telling traditions of the arctic and sub-arctic societies that historically had an extremely high dependence on *Rangifer*, the caribou and reindeer populations of the circumpolar north.

This discussion will not try to define at length, loaded words like "traditional" or "indigenous" just yet (see Chapter 4). Instead, it is recognized that there are efforts being made to renew aboriginal cultures and to promote cross-cultural communication with peoples that have been marginalized through devastating colonial policies. These efforts can be enhanced by knowledge documentation. However, documentation also runs the risk of entrenching stereotyped images of the knowledge and practices of northern peoples. This is very apparent in the contrasting images of Dene caribou hunters recorded in the early part of the 20th century, when the Canadian government attempted to create wildlife conservation policies for the North. Treaty rights were often denied in the process, rights guaranteeing the freedom to hunt, trap and fish in traditional territories. Moreover, the institutions (laws and practices) of the Dene peoples were often over-looked. Chapter 3 discusses this history at greater length. It is apparent that non-aboriginal images of aboriginal peoples have long affected northern peoples and their abilities to define themselves and shape their ways of life.

All knowledge systems, and the "management systems" that spring from them, are embedded in world views. This research project examines co-management structures within the context of the knowledge systems and world views that shape the perceptions of co-management participants. Co-management arrangements can vary from state control with minimal attempts to inform or consult local *aboriginal* (aboriginal in the case of this thesis) resource users, through to equal and shared decision-making between the state and resource users and, rarely, community-based or "bottom-up" management:

Box 1.3 The Co-Management Ladder – Levels of Aboriginal Participation

7 = **partnership/ community control** .....institutionalized partnership of equals
6 = **management boards** .....community has the opportunity to participate in the development and implementation of management plans
5 = **advisory committees** .....some degree of partnership in decision-making and joint action
4 = **communication**.....two-way information exchange, community concerns start to make it into management plans
3 = **co-operation**.....the beginning of mechanisms to incorporate community input
2 = **consultation**.....community input heard but not necessarily incorporated
1 = **information**.....community informed about decisions that have already been made

(Modification of Arnstein 1969)

Although co-management arrangements may link government managers directly with local resource users, it is not necessarily the case that co-management is an idealized linking of state and local management systems. Co-management participants may have very different perceptions of management problems and different goals and objectives for management actions. Analysis of resource management efforts that include local communities in decision-making emphasize "the importance of building relationships as part of any citizen participation effort" (Lauber *et al.* 2002:594). This is an especially relevant observation to co-management that includes aboriginal

communities where Canadian and aboriginal processes of representation, consultation, partnership and decision-making may be very different. Chapters 3, 4 and 5 look at the history and the current reality of the struggle to define and assert those processes amid prolonged treaty entitlement and land claims talks. The (Canadian) Royal Commission on Aboriginal Peoples definition of co-management is perhaps one of the upper rungs to strive for on a ladder of co-management possibilities:

> *a blending of these two [First Nation and Canadian Government] systems of management in such a way that the advantages of both are optimized, and the domination of one over the other is avoided* (RCAP 1996:665-666).

Influence of Global Trend in State-Organized Management

The focus of world-wide state-initiated resource management in the 20th century, was on the determination and subsequent control of over-harvesting by resource users. Of course, concepts of scarcity and resource depletion existed before the 20th century, but there were no mathematical tools to establish scientifically-derived theories of over-harvesting until the 1920s and 30s (Berkes 1995). Within the last 50 years or so, western countries have placed resource management controls in the hands of specific and centralized government agencies, often with conflicting mandates (Livingston 1981, Wolfe *et al.* 1992). In many cases, government wildlife managers continue to apply mathematical models of population size projections and concepts of maximum and optimum sustainable yield along with predatory models of human hunting behaviour. Government management agencies generally adhere to Hardin's Tragedy of the Commons model, envisioning resource users as individuals ransacking common resources for their own profit with no thought of future generations or their neighbours' needs. This picturing of local resource users as "foxes in a hen-house" ignores the existence of localized resource management systems.

Early on in state efforts to conserve natural areas, there was an assumption that all human actions are ultimately detrimental to natural systems. What has become increasingly obvious is that it is the type and degree of human activity in an area that

affects biodiversity rates. In some cases, biodiversity levels are actually higher in areas where humans occupy the landscape than if they were not present (*e.g.*, high biodiversity levels in Papayo farming areas versus the surrounding country-side (Berkes 1999)). It is instances where human activity blocks needed natural changes and ignores environmental feedback that environmental crises occur.

Centralized resource management systems have conventionally manipulated ecosystems for human benefit alone. In the last two decades, ecologists have demonstrated that natural systems are dynamic processes marked by their unpredictability and marked by change brought on not only by outside influences (exogenous change) but also by change originating from within any particular system (endogenous change). These processes are described by the "science of surprise" (Holling 1998). Attempts to eliminate perturbations have frozen ecosystems at a certain stage of dynamic change, making ecosystems fragile and "brittle," lacking the resilience (the ability of a system to maintain its structural integrity) of any given ecosystem. By blocking feedback and natural perturbations, conventional management invites larger and less predictable perturbations. Examples of this include spruce budworm control and long-term forest fire suppression (Gunderson *et al.* 1995).

Indigenous knowledge systems, especially of northern cultures where often human and environmental factors are not seen as distinct entities (social and ecological systems are linked), may provide guidance on how to react to natural perturbations and feedback signals. There is evidence that cultural practices can actively modify the environment by managing feedback. However, this kind of long-standing knowledge of how to respond to changes in abundance and behaviour of animal populations or to the intensity and frequency of natural processes like fire, have generally not been acknowledged by centralized state resource management systems (Berkes and Folke 1994).

Traditional Knowledge - Ways of Thinking

In time, co-management processes can become spaces for discussion where "mutual education is a tool for re-education and re-dressing what people think they know" (Berneshawi 1997:134). Co-management can lead to a fundamental reform of attitudes about human-environment relations among participants, reforms that some argue we need to embrace globally:

> *[The] conceptual precedence over nonhuman animate and inanimate 'nature' is a cultural mutation, not a biologic one, and it has not necessarily been common to all human cultures* (Livingston 1981:64).

If the societies that retain organic views of human-ecological systems are increasingly marginalized, how are issues like the loss of the knowledge from such societies appropriately addressed? The (Canadian) Assembly of First Nations and the National (Canadian) Aboriginal Forestry Association, argue that it is not appropriate or respectful to fill scientific knowledge gaps with the "factual" traditional knowledge of aboriginal societies (AFN & NAFA 1995). Resource management partnerships must represent true collaboration with aboriginal ways of learning and institutions for making collective resource management decisions and actions.

Moreover, if it is inappropriate to use scientific data without appropriate expertise for interpretation, it does not make sense to make decisions about the loss or applicability of traditional knowledge to resource management decision-making without equivalent expertise. Appropriate peer review structures for the evaluation of TK documentation and TK use are beginning to emerge in co-management settings, but are currently few and far between. Current TK discussions in the academic world rarely acknowledge the *role* of non-academic expert systems in the production and transmission of knowledge. However, Canadian government (federal, provincial and territorial) structures and First Nations are beginning to look at the potential as well as the problems associated with creating "shared information systems" that link aboriginal and mainstream scientific expert systems using information exchange technologies. Often these technologies facilitate the "co-production" of knowledge between First

Nations, wildlife biologists and resource management decision-makers. There are feedbacks between aboriginal rights, resource management systems and such shared information systems.

1.2 Rationale, Aim and Objectives

Human ignorance of natural systems, and human behaviour that destroys or inappropriately modifies the natural systems we depend on, can be addressed in a number of ways by understanding:

a) the limitations of human descriptions of natural processes
b) how we gather, interpret, share and take action on our knowledge of natural processes (in essence, how we "manage" resources)
c) human reliance on learning and teaching as crucial adaptive mechanisms helping us to avoid ecologically disastrous behaviour
d) that there are diverse strategies for learning about natural processes (examining *how we think* is as important as knowing *what we think*)
e) that the correctives for limitations in human descriptions of natural processes may be found in metaphor or narratives
f) narratives as tools for thinking about how we gather, share, and interpret information and as aids to creating adaptive and alternative resource management institutions

This thesis tackles these issues within the setting of the cross-cultural information exchange about barren-ground caribou populations in the Canadian North, specifically within caribou co-management institutions.

General Aim of Thesis:

> To investigate the role of co-management as a process of social learning between mainstream society and the marginalized voices of aboriginal peoples, with an emphasis on the role of trust building and humility in this social learning.

Three general research objectives are followed in this thesis:

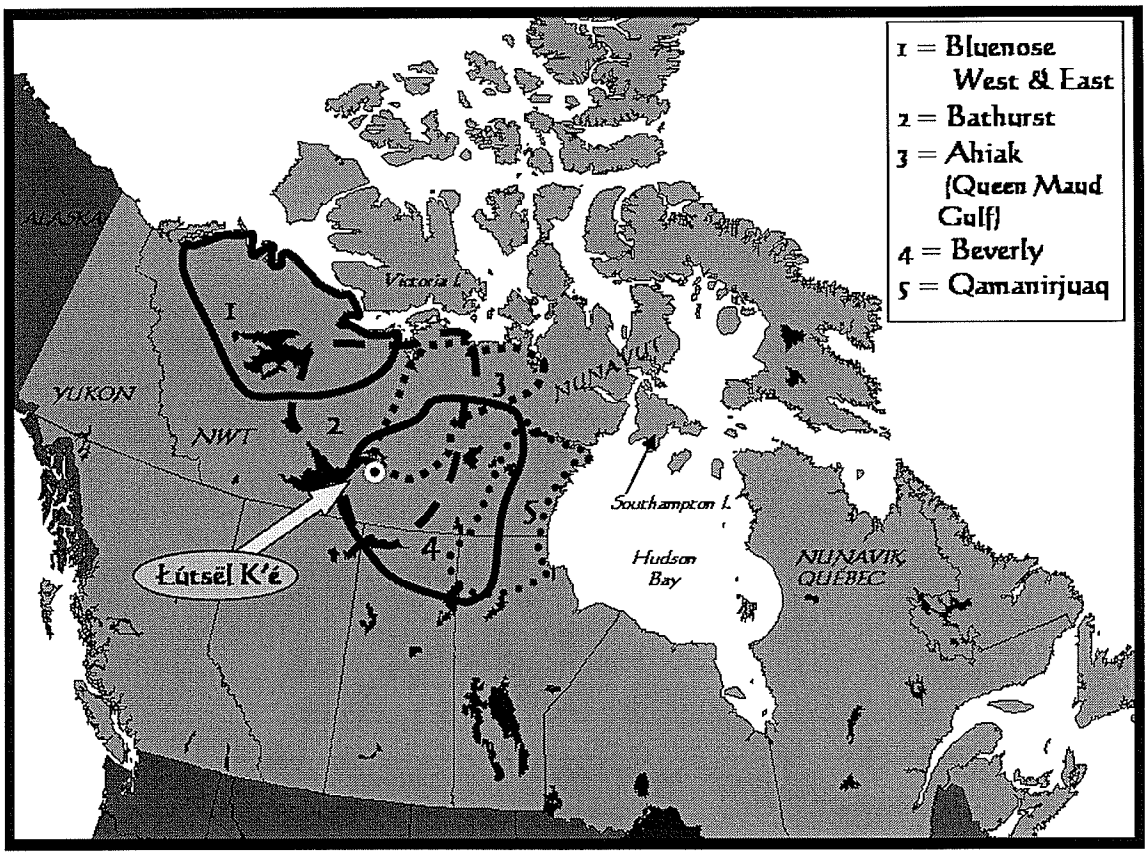
Research Objectives

1. How can cross-cultural differences be negotiated in the co-management of caribou herds (learning from the Łutsël K'e experience: the Beverly and Qamanirjuaq Caribou Management Board and the Bathurst Caribou Management Planning Committee) ?
   a) Are there mechanisms within co-management arrangements that support conceptual diversity and if so, what are they?
2. How can community-based caribou monitoring be implemented?
   a) Is there evidence that significant integrative and complex learning is occurring in co-management settings?
3. What are the mechanisms that create links between western scientific knowledge and traditional ecological knowledge and how can they be more widely applied towards co-management?
   a) What are the differences in how and what caribou managers, biologists and users learn and think about caribou?

1.3 Methodological Approach and Sources of Evidence

At the invitation of the Łútsël K'é Dene First Nation, I worked with the community on land use studies over a period of two years (March 2000 – December 2001, see Appendix 1 for Research Agreement with the community and Appendix 2 for letter of support from Chief Lockhart of the Łútsël K'é Dene First Nation). This work involved a training component to enable community members to continue to use information management tools in the long-term. The research project also provided me with the opportunity to gather information for my thesis on the collection and use of traditional knowledge and to look at the ways knowledge is shared in co-management settings. Łútsël K'é is situated in the heart of "caribou country" where the historical ranges of more than five different barren-ground caribou herds overlap – the Bluenose, Bathurst, Ahiak (Queen Maud Gulf), Beverly and Qamanirjuaq herds (Fig. 1.1).

Figure 1.1: Overlapping Ranges of Selected Barren-ground Caribou Herds in the Łútsël K'é Traditional Land Use Area



My research work was part of the community's wider efforts to increase its decision-making capacity and its use of the community's traditional knowledge in order to monitor the impacts of extensive industrial activities in the area, namely mining exploration and development. A research agreement was drafted between me and the Łútsël K'é Dene First Nation Band, outlining each party's responsibilities to the research partnership (Appendix 1). The Band's (specifically those of the Wildlife, Lands and Environment Committee) protocols for sharing and distributing information were adhered to throughout the research project. The research project was also reviewed by the Aurora Research Institute and received a scientific research licence (No. 13165N, see Appendix 3) and was reviewed and approved by the University of Manitoba's Joint-Faculty Research Ethics Board (Protocol #J2001:007, see Appendix 4). Details of the

sources of evidence and information collected can be seen in Appendix 5. The questions used to guide semi-directed interviews are listed in Appendix 6. A number of workshops with elders, public presentations and meetings with the Łútsël K'é Wildlife, Lands and Environment Committee were held between March 2000 and February 2003. These meetings and presentations initially introduced the proposed research project, then shaped the project to meet community expectations and research needs, and finally served to interpret and verify research results and to make a final research presentation. Written consent to use quotations (listed as personal communications in this thesis) and to attribute names to these quotations was obtained from each of the individuals interviewed during the course of the research project. This consent was obtained once the context of the use of these quotations was determined and the individuals involved could be informed of this context (*i.e.*, the individuals involved were informed specifically of where and how their words would be used). All raw interview material (audio-recordings and mylar sheets used during mapping exercises) remain the property of the Łútsël K'é Dene First Nation and are stored at the Łútsël K'é Wildlife, Lands and Environment Office. The author also provided the Wildlife, Lands and Environment Office with full transcripts of interviews in electronic and hard copy formats.

1.4 Assumptions Underlying Thesis Approach

We can no longer see the planet we live upon as if it were a chess-board where people just move things around
(Ailton Krenak, Co-ordinator of Indian Nations' Union,
WCED Public Hearing, Sao Paulo, 28-29 Oct. 1985 cited in WCED 1987).

There are always assumptions that mark a researcher's decisions about how to carry out a research agenda. Here are mine. There are occasional arguments made that ecological crises and the effects (or very existence) of human-induced global changes in ecological processes are exaggerated. However, it seems clear that on a global scale, human beings are not living on the earth in a manner that can be infinitely sustained.

And as a result, human societies have choices to make and responsibilities to meet in the way they choose to live.

Why are we (human societies) living in ecologically unsustainable ways? Many ecologists contend that our *unsustainable living patterns are rooted in a mismatch between human actions and the characteristics of natural processes* (Bateson and Bateson 1987). This mismatch between human behaviour and the characteristics of natural processes is characterized by:

- a lack of human understanding of natural processes, and
- broken feedback linkages between social and ecological systems

In order to address unsustainable human living patterns there is a need to:

1) better understand the connections between ecological and human social systems,
2) recognize that many mainstream resource management systems exhibit limited recognition of the range of variability and complexity of ecological systems
3) recognize that indigenous resource management systems often do not make a separation between ecological and human social systems and may provide insights into the repair of the broken linkages between social and ecological systems

There is a poverty of information about natural resources despite the emergence in this century of the "information society" (ESA 1995:1, Ehrenfeld 1986). World-wide, 1.75 million species have been identified by scientists, however, it is estimated that there are actually about 13 million species, though estimates range from 3 to 100 million (Convention on Biological Diversity publication, http://www.biodiv.org/doc/publications/guide.asp).

Resource management must become participatory in new ways (Slocombe 1992:17). There is a need to recognize diverse ways of knowing and to develop new and different kinds of data and monitoring techniques. Learning the environmental history of "place" is also crucial, but unattainable without local participation and accountability in resource management (ESA 1995). The depth of this participation must include the recognition that historically-rooted local knowledge (TK) seeks understanding of

ecological complexity often by working from a different epistemological premise than mainstream science (Freeman 1992:9).

There is " ... no single appropriate scale or time frame for management" (ESA 1995:4) since ecological, economic and social systems are hierarchically interconnected. However, local institutions are key to analyzing the interface between natural and social systems. Local institutions (rules of resource use) are often flexible, diverse and capable of self-renewal. Sustainable resource use must be innovative and adaptable, and flexible and adaptable local institutions are the building blocks of global sustainable resource use goals. Co-management, matching "bottom-up" and "top-down" resource management approaches, allows the linking of small and large scale governance structures (NRTREE 1998). Co-management approaches are ideally attempts to achieve a common vision or consensus despite differences in values. "[N]o single body in society has all the capacities, all the skills needed for the best management" (Borrini cited in Bayon 1996:3). It is through the mutual social learning achieved in co-management settings that a common vision of resource management, free of ideological impasse, can be negotiated.

1.5 Context: Local, Circumpolar and Interdisciplinary Settings

Importance of Local Focus

This thesis concentrates on achieving an in-depth understanding of how a local First Nation community ensures participation in a range of resource management institutions without co-optation. There is a risk involved for First Nation organizations participating in co-management processes. Their very participation may allow further avenues of co-optation and marginalization to be opened up rather than truly collaborative resource management to be created. Do the aboriginal communities participating in co-management arrangements have a seat as resource ***actors*** (involved in all aspects of resource management planning) or solely as resource ***users*** (solely to be informed of decision-making, educated and monitored)?

How do communities illustrate and bring about concrete recognition of customary land and resource tenure rights as well as local processes of consensus and representation? How do co-management negotiations change through time as co-management participants achieve the goals mentioned above? These changes can bring conflict and uncertainty, especially as the dynamic nature of natural and social systems is acknowledged and an increasingly pluralistic environment for resource management comes into play. Expanded participation in resource management planning can introduce escalating conflicts especially as individuals and communities interacting in the midst of other change (land claims negotiations, industrial development, *etc.*) become involved. In the Canadian North, slow processes of decentralization have increased the political space, responsibility and control of communities over their development in the last 30 years. This allows communities to pursue innovative forms of collaborative and participatory resource management.

There is a need to better understand the investment of time, resources and social capital required by communities where resource management responsibilities and authority is increasingly devolving to local levels. Communities are not only facing the challenge of reviving traditional institutions, but of designing solutions for "social landscapes that differ radically from those in which its traditional precursors belonged" (Holmes 2000:354).

Circumpolar and Interdisciplinary Context

The chance to discuss the challenges faced by a wide-ranging species (there are seven subspecies of *Rangifer* that include the North American "caribou" and European and Russian "reindeer") and the peoples intimately associated with *Rangifer*, allows a broad discussion. Any misconceptions that the North is a homogeneous place are soon dispelled when the complexity and variability of *Rangifer* and human lives in the North are outlined.

The links and barriers to interdisciplinary work have long been explored through liberal arts programmes, geographers and others exploring how we might rethink disciplinary boundaries and definitions. Immanuel Wallerstein (1997), (the *ex officio*

Director of the Fernand Braudel Center and writer on World Systems theory) argues that we need a major re-thinking of the boundaries between academic disciplines. Cross-cultural land use planning is not only a physical, but a mental journey across borders in order to understand the multi-dimensional concept of human-caribou relationships over vast geographic areas. The themes and understandings of wildlife harvesting practices and range management promoted by different disciplines, schools of thought and cultures are immensely varied.

There are questions to be asked not only about the links between academic disciplines in human understandings of natural resource management, but the links between the learning traditions of different cultures. Recent "co-management" arrangements established between aboriginal communities and state officials in Canada attempt to share decision-making about the research, monitoring and management of caribou herds in Canada's North. The level and the nature of the power-sharing occurring in these natural resource management settings is highly variable. This power sharing is greatly influenced by the political and economic situation not only of the state, but especially of the aboriginal communities involved. Depending upon the context of these power-sharing arrangements, the knowledge of local people, increasingly seen globally as vital to sustainable resource management, may remain "silent."

What is the range of perspectives on "safe" harvesting levels? Do we know enough about the natural fluctuations of caribou populations to understand when populations have hit critical minimum sizes in all cases? What is "over-harvesting"? What are "wasteful" harvesting practices? Are hunters using recently introduced technologies to engage in rates of natural resource exploitation that are not sustainable or to reduce their impacts on natural resources?

How do we determine when environmental problems are occurring, when are they imagined and why? To understand the reality of environmental problems like over-harvesting or habitat degradation, and to understand what the roots of these "problems" may be, takes an interdisciplinary and cross-cultural approach. Why does research focus on one aspect of caribou ecology and not another? Interdisciplinary and cross-

cultural work affords us the ability to look into the multiple perspectives driving resource management decisions and actions.

Beyond Disciplines: Questioning Knowledge – how is it produced and for whose benefit?

The international discourse on indigenous peoples planning and development shows how challenges to the structure of mainstream academic research are evolving. Mainstream academics are asked to think about who benefits from research work and how the benefits of research are determined. Research results are applied not only instrumentally, but strategically, symbolically, and as information. In addition, the interpretations brought to bear on research results depend upon whether the person interpreting the research results is a practitioner (*i.e.*, a natural resource user like a reindeer herder or a caribou hunter), an authority (*i.e.*, a state wildlife officer or a community elder), or a scientist. In addition, how do we go about determining cause-and-effect relationships? What is sustainability? Who and how do we decide what is "good" or "successful" management?

Karla Jessen Williamson, Executive Director of the Arctic Institute of North America, and a *kalaaleq* (Greenlander), has expressed her thoughts on the multi-dimensional nature of knowledge creation and use in northern regions:

Box 1.4 Arctic Science: Food for Thought

I am here to set forth some of the ways in which Arctic science may be carried out, but first I would like to acknowledge the fact that my own science pursuit has been greatly influenced by my Inuit cultural background. Much like other Inuit children around the Arctic, I spent long periods of my childhood with my maternal grandmother, and she introduced me to the very first – and to me the grounding — scientific inquisitiveness. Her intellectual curiosity is based on Inuit silarsuaat, a concept which includes the capacity to understand the force behind all intellect. The term refers to a consideration of how life forces have been integrated, animating the environment, the universe and the spirit. Therefore, a good intellect, according to the Inuit thinking liberates the human mind and spirit to learn that life matters in all its complexity unifying every living and non-living entity on this earth, in the universe, through spirit, silarsuami. But as an Aboriginal learner in the school context, my energies were to be invested into becoming intellectually aware in other cultural settings. I achieved this (at least I like to believe that I have largely), by crossing cultural boundaries ranging from that of being a kalaaleq to a Dane, to that of becoming a Canadian citizen, and in recent times, exploring the Scottish realities. The cultural crossings, while constituting that of being physically present in the various locations, have also been psychological and linguistic crossings, becoming appreciative of ways of thinking and being in unique cultural settings.

These are some of the qualities to consider in future for personal and professional pursuit of Arctic science in addressing the need to bring two seeming solitudes of communities together. We have, in the Arctic, Indigenous populations entering Aboriginal self-government on one hand and wanting to pursue their ways of knowing; and on the other hand, we have the Arctic scientists whose academic training is criticized for being Euro-centric and too cosmopolitan. To my knowledge silarsualerinermi, doing science with the Inuit intellect, the great concern has been that of putting food not just for the families, but for animals and the land. To me that is what the sustainability of the Arctic is about. 'Food for thought' implies that of the spiritual nurturing, and as Arctic scientists, I believe that our greatest challenge is finding ways to ground various scientific disciplines solidly in the Arctic.

Karla Jessen Williamson, Executive Director of the Arctic Institute of North America

Excerpt from Plenary address: 'Arctic Science: Food for Thought' at Arctic Science 2000 - Crossing Borders: Science and Community, Whitehorse, Yukon, Canada, Sept 21-24 2000, American Association for the Advancement of Science & Yukon Science Institute

1.6 A Story: Personal Reasons for Carrying out Research Project

After high school and a little soul-searching in first-year biology classes, I decided to pursue a bachelor's degree in ecological science. At the time, I suspect like many other students before, I was troubled by the human-nature divide that seemed implicit in our

studies and the evolutionary theories that pictured animals almost exclusively as competitive machines, slaves to their "selfish genes." Co-operative behaviour, we learned, had little evolutionary role to play. Animal behaviour classes cautioned us to be aware of our responsibility to ward against the dangerous applications of biological studies to human societies, but not to worry about how biological theories might affect animal interactions. Dene elders believe that both human words and actions that belittle non-human life (animals, birds, *etc.*) can have a profound impact on the connections between animal and human societies.

The occasional anthropology class that I enrolled in emphasized the collective, cooperative actions that characterize all human societies. My ecology classes explained that cooperative behaviour is linked ultimately to the building block of evolution; the help that you give to your siblings, parents, aunts, uncles and other relatives is ultimately motivated by the drive to improve your "individual fitness" or the survival of your genes. Life, it was explained, is driven by self-interest.

In a laboratory class I was first puzzled and later gained admiration for a Jain friend who would not participate in animal dissections. She was dismissively informed by her professor that she would have to learn to make a choice between science and her religion. Jainism, an ancient north Indian religion, does not allow its adherents to knowingly participate in the killing of a living thing. My friend argued that she could learn slide preparation techniques equally well with plant tissue and that there was no need for her to use animal tissue. She was not imposing her beliefs on anyone else, she was simply trying to find an innovative way to meet her educational requirements without betraying her beliefs. In fact, her technical challenge was probably greater than the one the rest of us faced. We had an easier time sectioning the tissue of mice, than the painstaking process involved in sectioning leaves.

My friend's persistence was a lesson in the choices we all face daily, if not always knowingly. The questions we ask ourselves, the approaches we take to answer these questions, and the actions we take on contemplation of these answers, are all influenced by our social, cultural and personal experiences.

Ernest Mayr (2000), an evolutionary biologist, wrote that "a propensity for altruism and harmonious cooperation in social groups is favored by natural selection. The old thesis of social Darwinism - strict selfishness - was based on an incomplete understanding of animals, particularly social species." And, as it turns out, Richard Dawkins (1989), the scientist who wrote *The Selfish Gene,* later introduced a concept called "memism;" contemplating the evolution of cooperative human behaviour that could play a role in our evolutionary survival. Remarkable that the self-interested genes of the evolutionary biologist had not made contact with the collective action research of social scientists before the "introduction" of memism!

Just as remarkable, the bulk of ecological studies of North American "wilderness" areas somehow ignore the lengthy ecological history of human-environment relationships in North America. Why? Perhaps because Europeans, anxious to build a New World, had declared North America *terra nullius*, a land empty of people. Europeans saw North America as an "empty landscape" waiting to be filled with immigrants' dreams and aspirations. They saw a "land of opportunity" of "new beginnings," and "untamed wilderness." Waves of immigration were aimed at establishing a New Order where an image of independent individuals in a place devoid of human history inspired new-comers' dreams. Ironically, North Americans live in a world where the hijacked images of aboriginal societies are pervasive: the Pontiac car, the Winnebago motor home, the Apache helicopter, the Cherokee Jeep, *etc.* However, most North Americans think little about the reality of the social organizations and value systems that lie behind these names.

Because I was interested in becoming more aware of the original societies of the country I lived in, and the ties between them and the landscapes they inhabit, I pursued subsequent post-graduate degrees that allowed me to explore across disciplines and cultures. The social research I engaged in often left me with a heightened self-consciousness about my role as a researcher. To a First Nation's community I was potentially a spy, or a naïve young woman whose words might be further damaging to aboriginal identities. There is a huge chasm of broken trust that must be bridged, if it is

only possible to do so partially, in order to work with First Nations communities. Invariably this trust is fragile.

Trust can be difficult to establish with someone who shares your values, experience, language and culture. What happens when all these common factors are no longer present? Moreover, what happens to trust levels between researchers and aboriginal communities when the researcher comes from a culture that has conditioned her to "explain" everything she sees. Scientific training teaches us that in order to be good thinkers we must be skeptical thinkers. Western schooling teaches children that direct questioning is fundamental to learning and a sign of healthy curiosity. Many Dene elders, on the other hand, may find this kind of learning aggressive or needlessly probing. Finally, the "expert" status we give to those with formal education often undermines the authority of the knowledge of aboriginal elders. Mainstream society believes that it is ideally the knowledge of formally-educated scientists and "experts" that should inform administrative and bureaucratic decisions, and this "expert" knowledge can threaten the autonomy of aboriginal peoples.

Traditional Knowledge (TK) studies in the Canadian North are increasingly driven by governmental policies that necessitate the inclusion of TK in decision-making. This policy requirement often forces a rethinking of the "objective facts" that drive decision-making. Politics obviously affect the weight given to the scientific information informing resource management decisions. However, TK forces a consideration of the links between the explanatory power of "facts" and the values and meaning that are attached to facts. The elders that interpret and express traditional knowledge often describe natural history "facts" in conjunction with observations about human-animal relations, as well as using the illuminating power of very old stories that link environmental history, personal experiences and social values.

There is more and more material outlining the external factors; social, political and cultural, that shape the way knowledge is gathered, and in particular science, is done (Longino 1990). A fascinating biography of Barbara McClintock, the scientist who outlined the role of transposition in genetics, illustrates her view that reason and

experiment alone cannot articulate the laws of nature (Keller 1983). Einstein expressed similar sentiments: "... only intuition, resting on sympathetic understanding, can lead to [these natural laws]; ... the daily effort comes from no deliberate intention or program, but straight from the heart" (Keller 1983:201). Many scientists acknowledge that "the scientific method," though a very powerful tool for thought, is not the only way of knowing, and that engaging in science alone does not lead by itself to real understanding.

I am very grateful for the scientific training I have received. I also feel very privileged to have had the opportunity over the last four years to think more deeply about other ways of knowing and the connections between human values and the meanings attached to "facts." It has been especially rewarding to contemplate on how all these factors come together in human decision-making where varied ways of knowing are used simultaneously in order to develop sustainable and diverse ways of life.

1.7 Thesis Organization

Chapters 2 and 3 provide the setting and theoretical background for the study, following Chapter 1 which introduces the thesis. Specific methodologies are detailed chapter by chapter. Chapter 2 outlines the theoretical constructs employed to analyze co-management institutions. Common property theory and social learning constructs are outlined for their application to understanding co-management institutions. Resilience theory and its relevance as a tool to examine (a) why cultural diversity is important to ecological survival and (b) to explain the mechanisms for resilience of interdependent social and natural systems are described. Geographical concepts of environmental perception and sense of place are also described in order to discuss the "construction" of traditional knowledge. Chapter 3 outlines the historical background of contact between Dene caribou-hunting societies and the Canadian state from the turn of the century to the beginning of the caribou co-management era. The historical development of centralized state-organized caribou research and hunting regulations

are traced to the present-day devolution of management to communities asserting self-governance structures.

Chapter 4 outlines the multi-scale co-management institutions, both legalized and informal, that touch the community of Łútsël K'é, NT., located on the barren-ground caribou range. The relationship between the mining industry, protected areas and formal co-management boards are explored. Chapter 5 looks at "traditional knowledge," and its definition, documentation, protection and dissemination through community-based institutions. The loss and revitalization of knowledge is addressed. Chapter 6 describes the knowledge Łútsël K'é elders possess of natural versus unprecedented variations in caribou migration patterns. Elders knowledge of movements is discussed specifically in reference to fire patterns in the winter range of barren-ground caribou in the Łútsël K'é traditional territory in the last 80 years and the influence of industrial exploration and developments on caribou movements. Chapter 6 sets the stage to discuss the exchange of information between aboriginal hunting communities and government resource management agencies described in Chapter 7. Chapter 7 shows how the ways that scientists, managers and aboriginal caribou hunters know caribou have changed, and how the history of these changes affect the relationship between these parties in contemporary caribou co-management arrangements. Chapter 7 also describes caribou monitoring efforts and their potential roles in "deep-seated" cross-cultural exchange. It is in the process of establishing community-based caribou monitoring that profound thinking about the differences and similarities between western scientific knowledge and TK is done. The downfalls of the sometimes naïve dichotomy described in much of the academic literature between "western science" and TK is deconstructed here.

Chapter 8, describes the thesis project's conclusions that co-management institutions can provide the space for social learning in certain conditions where human understandings of natural processes are expanded through cross-cultural exchange. Fundamental to this process is the development of the trust and humility to

acknowledge that shared knowledge can be rooted in diverse social values and meanings.

Please note that Chapters 3-8 were written as "stand-alone" pieces with the intention to submit some or all of these chapters for publication. Chapter 6 is (June 2003) under review by the journal *Arctic* and Chapter 7 was published in a spring volume of the journal *Environments*. As a result, anyone reading through the entire thesis may find the methodology sections somewhat repetitious, though the discussion presented is not all derived from the same research material.

Chapter 2

Conceptual Framework – Common Property Theory, Social Learning, Co-Management and Resilience Theory

The Power of Preconceptions: When Polar Bears Fly ...

Spring on the tundra and suggestions of winter are cause for alarm. The eye provides little sense of perspective in the flat, treeless landscape. There are no cues for judging the size or distance of any object in sight. The vista inspires a feeling of raw and endless possibility. But your mind is fixated on the white bear, and determined not to get too close, you tell yourself that every patch of snow is a polar bear, resting in the warmth of the brilliant morning light.

The white shape dead-ahead looks noticeably larger than the rest and your eyes strain to bring the bear into focus... and your heart stops momentarily as the bear bursts into flight!

You noticed earlier that the snow geese had arrived, and when they dive out of the cobalt sky to earth, they are often indistinguishable from the patchwork remnants of the melting snow pack ... or slumbering bears.

Anne Kendrick

2.1 Introduction

So much can be invested into a thought, an image or a model that we are bound and determined, whatever the reality, to find it. This chapter explores the role of selected theories in understanding co-management institutions. My struggle has been to use these predetermined theories as guides for thinking about co-management without inappropriately molding the reality of my fieldwork experiences to fit these theories.

> *... scientific understanding does not advance from untruth to truth, but shifts from one viewpoint on a subject to another. Each viewpoint of the scientific "truth" has its place in the passage of history, and each viewpoint is conditioned by and has its utility in the economic, social, and technological milieu of its day* (Speiss 1979:1).

Just as scientific understanding is shaped by historical, cultural and personal contexts, so is scientific theory-making. Theories can be broadly described as connected statements used as tools of explanation. These statements and their use are underpinned by philosophies or epistemologies including examples such as positivism, idealism or realism. This thesis uses elements of a number of different theories to better understand how co-management leads to collective action and social learning in cross-cultural resource management settings. The deeply personal nature of the human-environment relations implicit in cross-cultural resource management mean that I was not comfortable employing solely empirical methods. If different cultures conceptualize reality using different frameworks, it is vital to also understand these differences qualitatively.

Philosophers of science have long drawn attention to the dichotomy between generalizing science (nomothetic) and particularizing science (idiographic). This division is especially relevant to cross-scale and cross-cultural studies. Characteristics that may be generalized at one scale or within one cultural framework and empirically analyzed within that scale or frame may not hold at another scale or within another cultural framework. Any study concentrating on the links between local and larger-scale institutions must examine the implications of jumping scales and this is often not possible through empirical methods alone:

The nature of insight in science, as elsewhere, is notoriously elusive... [T]hose who learn to cultivate insight – learn also to respect its mysterious workings. It is here that rationality finds its own limits. In defying rational explanation, the process of creative insight inspires awe in those who experience it. They come to know, trust, and value it (Keller 1983:103).

Links across Scales of Time and Space

Co-management institutions create cross-scale linkages. They create connections between institutions both across space (such as the barren-ground caribou ranges) and across levels of human organization (local, territorial, federal) (Ostrom *et al.* 2002). Models employed in this thesis to aid thinking across scales include the recently-devised panarchy model of resilience thinking, illustrating the linkages and transformations of human and natural systems at multiple scales.

Co-management ideally aims to be "a blending of ... two systems of management in such a way that the advantages of both are optimized, and the domination of one over the other is avoided" (RCAP 1996:665-666). These systems are shaped by different frames, and these frames determine:

(a) what counts as evidence
(b) how evidence is interpreted
(c) how success is evaluated
(Meppem and Bourke 1999:396)

Cross-cultural co-management arrangements bring together participants using different frames to develop and interpret knowledge and to evaluate the success of the co-management partnership. Such arrangements are not only spaces to manage conflict between diverse viewpoints, but spaces to engage diverse approaches, leading to richer tools for flexible and adaptive responses to environmental change.

If You've Seen one Hoof, You've Seen Them All

The ease of making false or unworkable comparisons across scales or situations is well-illustrated in the beginnings of state-organized resource management in the Canadian North. Ernest Thompson Seton (1911) attempted to estimate barren-ground caribou population numbers in the early 20th century based on his comparative musings

about cattle in Illinois. Seton was a prolific naturalist writer who co-founded the Boy Scout movement in North America. He reflected on his experiences following a 2000 mile canoe journey in search of caribou, guided by the Dënesǫłine (Chipewyan) people of the Great Slave Lake area of the Northwest Territories:

> *A year afterward, as I travelled in the fair State of Illinois, famous for its cattle, I was struck by the idea that one sees far more Caribou in the north than cattle in Illinois. This State has about 56 000 square miles of land and 3 000 000 cattle; the Arctic Plains have over 1 000 000 square miles of prairie, which, allowing for the fact that I saw the best of the range, would see the Caribou number at over 30 000 000. There is a good deal of evidence that this is not far from the truth* (Seton 1911: 220).

This kind of population estimate was based on very little knowledge of the habitat, grazing and movement patterns of caribou populations. However, this and similarly derived estimates, led to conclusions in the 1920s by the "(Canadian) Royal Commission to Investigate the Possibilities of The Reindeer and Musk-ox Industries in the Arctic and Sub-Arctic Regions of Canada," that it would be possible to turn the North into a "grazing country" for significant numbers of domesticated reindeer and musk-ox. The subsequent realization that less than 10 percent of the animals estimated to roam the North (by Seton) actually existed, led to some of the wild speculations at the time about whether or not caribou had been over-harvested and by whom.

Thomas Berger, who led the Mackenzie Valley Pipeline Inquiry of the 1970s, is often quoted for his insight into the conflict of frames of those pushing the North as an unknown frontier of possibilities and those looking at the North as a homeland steeped in environmental and cultural history:

> *There are two distinct views of the North: one as frontier, the other as homeland. .... the construction of a gas pipeline is seen as the next advance in a series of frontier advances that have been intimately bound up with Canadian history. But the native people say the North is their homeland. They have lived there for thousands of years. They claim it is their land, and they believe they have a right to say what its future ought to be* (Berger 1988:31).

Conflicts of Frames – The "Us-and-Them" Discussion

When the two distinct views of the North are compared, it is possible to slip into a destructive "us-other" cycle of discussion (Fienup Riordan 1990). Mainstream society ("us") represents the "other" (northern aboriginal societies) in an objectified manner. It is argued that this kind of objectification of other cultures often originates in "our" lack of ability to understand ourselves, leading to misunderstandings of "others." We may also try to understand "others" by portraying "them" as idealized images of "ourselves." As a consequence, marginalized societies, dominated by these false images of themselves, may rewrite these images in uncharacteristic ways in order to empower themselves and recover a damaged sense of identity (Kendrick 2003).

This "us-and-them" cycle is highly relevant to discussions of "science" and "traditional ecological knowledge." International bodies now recognize that the cultural diversity that TK represents is as endangered as biological diversity (McNeely 1997). Science is "discovering" TK (Wavey 1993), while the individuals and cultures whose knowledge systems are being "discovered" are fundamentally threatened by attempts to create generic and universal definitions of TK (Brooke 1993, Simpson 1999). Numerous dichotomous lists of the differences between "TK" and "Science" exist in the academic literature (see Berkes 1999, Berneshawi 1997, Freeman 1985, Freeman and Carbyn 1988, Inglis 1993, Johannes 1989, Johnson 1992, Mailhot 1993, Nakashima 1991, Osherenko 1988, Roots 1998, Usher 1986, Wolfe *et al.* 1992). Many (though not all) of these discussions characterize TK as particularized, diachronic knowledge and Science as generalized, synchronic knowledge. One generic description does seem to hold true. Unlike "western science" that limits itself as a process of "knowing" to the production of knowledge, TK systems encompass processes of understanding and wisdom. The Dene Cultural Institute defines traditional environmental knowledge as:

> *A body of knowledge beliefs transmitted through oral tradition and first hand observation. It includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use. Ecological aspects are closely tied to social and spiritual aspects of the knowledge system. The quantity and quality of TEK*

> *[traditional environmental knowledge] varies among community members, depending upon gender, age, social status, intellectual capability, and profession (hunter, spiritual leader, healer, etc.). With its roots firmly in the past TEK is both cumulative and dynamic, building upon the experience of earlier generations and adapting to the new technological and socio-economic changes of the present* (Johnson 1992:4).

The use of the term "tradition" often brings up images of a static bank of ideas and practices, but it also illustrates deep historical connections (Berkes 1999). Perhaps it would be easier to avoid stereotyped images of knowledge and practices with deep roots in the past, by referring to customs rather than traditions to avoid the implication that traditional knowledge is static or out-dated (Usher 1986). I have chosen to continue to use the term "traditional" in this thesis because "TK" has come into such widespread usage in northern aboriginal communities and in Canadian government policy documents. The use of the word "traditional" in this thesis refers to a dynamic connection with the past, not invariant thinking or practices.

Some see efforts to require the use of TK in environmental assessment and in the development of government policy as a dangerous mix. Critics equate spiritually-derived wisdom and understanding with "religion," going as far as to berate the inclusion of TK in government policy as "flying in the face" of the Canadian Charter of Rights and Freedoms that separates the church from the state (Howard and Widdowson 1996). Aboriginal leaders, on the other hand, argue that to separate aboriginal world views and institutions from the body of factual knowledge accumulated in connection with beliefs and ways of knowing, is inappropriate and insulting (AFN and NAFA 1995). Moreover, efforts to create sustainability initiatives the world over emphasize the need to create holistic natural resource management practices that link social values and ecological knowledge.

2.2 Common Property Theory, Social Learning & Co-Management

Groups of individuals have spontaneously organized to collectively manage their use of natural resources *without external coercion* throughout human history. How does this happen? Social scientists have been intrigued by this question for many years. The

evolution of voluntary collective action is one of the fundamental drives behind common property research.

Property is defined here as an enforceable political claim to use or benefit from a resource (Alcorn and Toledo 1998). Property rights systems are therefore relationships between people rather than people and resources. These arrangements establish the rights and responsibilities of the individuals and groups participating in these systems. While resource systems are open to joint use, resource units are vulnerable to decline. Resources may be subject to one or more of the following idealized property types: open access, communal, state or private property (Berkes 1989, Bromley 1992, Feeny *et al.* 1990). Common property is subject to:

1) *Subtractability* - it is relatively difficult to stop people from using the resource (from claiming benefits) and resource use decreases the amount of the resource available to individual resource users (subtractability of the benefits available) (Berkes 1989, Ostrom 1990) and,

2) *Excludability* – the resource is large enough to make it difficult to stop individuals from using it, but not impossible, and it may not be possible to divide the resource into individual units (the resource is essentially indivisible). Common-pool resources are often characterized by their *scarcity*, because withdrawal rates are high enough that users are aware that their use of such a resource is interdependent (Ostrom 1990).

The Tragedy of the Commons

The revision of Hardin's Tragedy of the Commons (ToC) metaphor has defined the work of a large body of common property theorists. The metaphor became symbolic of Western society's unsubstantiated belief that common-property (also termed common pool) resource regimes in fact represent scenarios of open access or "free-for-alls." The ToC metaphor pictured open access systems, where resources lack property regimes, and are destroyed by selfish individuals maximizing individual welfare in the face of collective disaster. The whole-sale adoption of this metaphor in centralized state management systems around the world, in fact created a "collective-forgetting" that communally-owned resource systems have existed for a very long time and have been recognized historically by legal systems such as Anglo-Saxon and Roman law. The ToC

metaphor also led to a "collective-blindness" to the many examples of communal resource systems that exist world-wide, but that remain unrecognized within modern state legal systems (Berkes 1989:8).

Hardin's idea that rational individual behaviour (maximizing individual returns) can lead to irrational group outcomes is a re-working of long-standing debates about whether or not individuals act primarily in their own self-interest or whether individual behaviour is heavily influenced by societal norms and attitudes. The ToC parable encouraged many resource policy-makers to believe that solutions to the "dilemmas" common property appeared to represent, can only be solved through efforts to privatize or centralize resource management systems. The imposition of external authority in commons situations is still assumed vital to the survival of common property resources by many resource managers. Ironically, the very controls centralized governments attempt to implement, in settings where common property systems exist, often either destroy or de-stabilize those systems. Communal property regimes (CPRs) are resource management systems that centralized governments could not or would not recognize.

Traditional Resource Management Systems

Traditional resource management systems have been the "main means of management for millenia" (Berkes 1989:6). These systems represent the collective sharing of resources by individuals acting in reference to community. It is the historical and social context within which individuals act that Hardin's ToC metaphor does not consider. While common property theory rejects the notion that resource users are primarily selfish individualists, neither does it paint resource users as martyrs sacrificing their welfare to the cause of the greater good. Resource users are agents of choice who face a dilemma if they remain unorganized. At a minimum, resource users will gain less of a return when they continue to make independent decisions than the returns collective decision-making can achieve. At worst, resource users will experience the destruction of the common property resource they depend upon for survival if they remain unorganized (Ostrom 1990:38).

Common Property (Common Pool) Dilemmas

CPRs are defined by their "success" or "effectiveness" at solving commons dilemmas. These dilemmas are broadly divided (although they are often nested) into two types of problems; *allocation problems* - related to the flow or harvest of resource units and *provision problems* - related to stock or resource system problems (Ostrom 1990, Ostrom *et al.* 1994). Allocation problems include the assignment of property rights while provision problems include the creation of property rights systems that do not suffer from "free-riders." Essentially, resource systems must assign responsibilities to resource users so that the same individuals who benefit from resource use also bear the costs of monitoring the resource and enforcing the rules of use.

The common property literature outlines case after case of instances where resource users have succeeded in organizing themselves to bear the costs of a transformation to collective action without the aid of a centralized political authority (McCay and Acheson 1987). There are three general (provision) problems that must be addressed when individual action is transformed to collective action:

1) How will new institutional arrangements (rules of behaviour) be supplied and how are they shaped by their ecological contexts?
2) What force guarantees that resource users will make a commitment to a CP regime without the coercion of an external enforcer (and who will have the motivation to monitor users and impose sanctions if rules for use are not followed?)?
3) How will mutual monitoring work?

(Ostrom 1990:42-45)

Institutions are defined here as "the sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information [can?] or must not be provided and what payoffs will be assigned to individuals dependent on their actions." (Ostrom 1990:51).

These working rules exist at three levels and each level affects all management actions and outcomes. Self-governing or self-organizing resource users move back and forth between these levels when making decisions:

Box 2.1 Levels of Rules in Resource Management Decision-making

Levels of Rules	*constitutional* choice	*collective* choice	*operational* choice
Processes	formulation governance adjudication modification	policy-making management adjudication	appropriation provision monitoring enforcement

(Modification of Ostrom 1990:53)

Modelling the Evolution of Cooperative Behaviour

The Prisoner's Dilemma (PD) game is a basic tool that CP theorists have used to explore the evolution of collective action. The PD game illustrates the same conflict between individual and group rationality portrayed by Hardin through the ToC, but illuminates a possible mechanism for the evolution of cooperative behaviour.

In a simple PD scenario, two players face each other with no cues to determine what the other player's move (decision) will be, *i.e.*, to cooperate or to "defect" (look after his/her self-interest alone). In a simple two-by-two matrix portraying this kind of decision-making interaction, each player faces four possible pay-offs. These pay-offs are dependent on each player's independent decision to defect or to cooperate. These pay-offs vary from:

A - The temptation to defect (defecting when other player cooperates)
B - The reward for mutual cooperation
C - The punishment for defection
D - The "sucker's pay-off" (taking cooperative action when the other player defects)

The pay-off for defecting when the other player cooperates is larger than the payoff for mutual cooperation: A > B

On analysis of the various strategies that could be employed by a player, it is found that in a *finite* number of interactions, each player has no choice but to defect (to chose not to cooperate) no matter what decision the player believes the other player will make (Axelrod 1984). However, if the number of interactions between the players is *indefinite*, then it is possible for mutual cooperation to emerge (Axelrod 1984). This is an outcome that is rational from a group perspective. The simplest solution to the PD dilemma, is in fact, a simple "tit-for-tat" strategy where a player cooperates in the first interaction and then mimics the actions of the other player in all the remaining interactions. The "tit-for-tat" strategy is the most successful strategy yet discovered for scoring well against other strategies.

While a useful illustration of some of the dynamics of CP systems, the PD dilemma cannot model all types of CP systems. There is not yet a model that adequately explains why voluntary collective action evolves. Olson (1992), however, argues that individuals will not spontaneously organize for collective interests. He argues that this is the case because without external coercion, there is no way to prevent individuals that do not contribute to maintaining working rules from benefiting from the "public good" (a provision problem). It is impossible to prevent these "non-providers" from benefiting from a public good they cannot be excluded from using. This is referred to as a "second order" commons dilemma, meaning the solution to a commons dilemma becomes a commons dilemma itself.

Collective action: inexplicable, but occurs in reality ... why?

However, there is ample evidence that organization for collective action occurs nonetheless. *Theoretically, the second order commons dilemma described above is unsolvable, nonetheless, empirical evidence shows that individuals do manage to organize collectively to bring about sequential, contingent and frequency-dependent decision-making without external coercion.* Ostrom (1990) speculates that the problem of creating the institutional

arrangements necessary to overcome this second order dilemma are solved through mechanisms of **trust** and a **sense of community** among individuals. The working rules or institutions necessary will emerge if individuals perceive that the benefits of organizing for collective action are greater than the costs of creating and maintaining these institutions.

How do individuals determine whether the costs of organizing for collective action are less than the benefits of organizing? Often, common property regimes are associated with resources that are considered uncertain and unpredictable (Bromley 1992:5). In the highly variable conditions of the North, aboriginal societies are underpinned by the primacy of concepts of sharing and reciprocity.

How do individual resource users make a cost-benefit analysis when there may not be full and accurate information about a resource? Another source of uncertainty lies in a lack of knowledge of the structure of the common property regime itself. This uncertainty may be decreased by engaging in collective action (Ostrom 1990:33), however, a degree of uncertainty will always remain due to the strategizing of individual resource users and because of the unpredictable and uncertain nature of many common property resources.

What are the advantages of collective action?

Common property theorists have extensively documented why it is not possible to understand resource use and management by portraying resource users solely as "rational economic individuals." Individual resource use is markedly influenced by the historical and social contexts of the people involved (McCay and Acheson 1987:22) and there is quite a bit of material describing the social settings that influence individual resource use. There is still, however, speculation about the benefits of common property regimes (institutions of collective action and cooperation).

Box 2.2 Benefits of Common Property Regimes

- cooperation among resource users to conserve resources
- commitment among resource users to share the costs and the benefits of conservation
- greater trust and sense of control among resource users to negotiate resource use, regulation and enforcement measures
- greater potential for self-management to be assumed by resource users
- livelihood security
- access equity
- conflict resolution mechanisms
- mode of production (an interface between society and resources as well as individuals and society)
- ecological sustainability

(Berkes 1989:11-13, Pinkerton 1989:29-30)

Design Principles of Long-Enduring CPR Institutions

Current design principles of CPRs describe long-standing regimes, but not necessarily effective or successful regimes (Bromley in Berkes 1989:26, Ostrom 1990:90). Eight basic principles describe CPRs that survive over a long-time period:

1) clearly defined boundaries
2) appropriate match between appropriation and provision rules and local conditions
3) collective-choice arrangements
4) monitoring
5) graduated sanctions
6) conflict resolution mechanisms
7) recognition of local rights to organize
8) nested (not hierarchical) enterprises

Why are some of these regimes not considered "efficient" or "successful" ? Oakerson (1992) developed a framework for evaluating CPRs based upon the performance indicators of efficiency and equity. These measures are difficult to arrive at, and are always value-laden (Bromley 1992). However, using such indicators it is found that some long-standing CPRs represent equitable resource distribution while others represent multiple and conflicting values that perpetuate the interests of the powerful and the wealthy (McCay and Acheson 1987:19). CPRs may even simultaneously represent community desires for fair and equitable access as well as

favouring the interests of wealthy and powerful individuals (McCay and Acheson 1992:51). The values associated with indicators of "efficiency" and "equity" must always be identified when evaluating CPRs.

Not surprisingly, the advancement of CP theory has been slow and at times scattered (Knudsen 1995). Is this body of theory an examination of behavioural relations, a question of agents and choice, a problem of markets, or a question of institutions (Knudsen 1995: 102-103)? We know that local, self-organized resource management systems have existed for hundreds if not thousands of years. Examples of CPRs not only include very old systems of human organization but, also comprise newly created CPRs that have emerged in recent years (Berkes 1992, Ostrom 1990). Arguments that CPRs cannot withstand contemporary resource demands, technologies and human population growth rates are not borne out by the empirical evidence of case studies (Berkes 1989, Berkes and Fast 1996, Campbell and Godoy 1992).

Traditional management systems create closed access to communal property resources (wildlife in the case of this thesis). Most importantly, resource user rights are not transferable. In contrast, state management conventionally views wildlife as open access common property where every citizen has equal rights, and wildlife are exclusively owned by the state. Recent conflicts between Pacific and Atlantic aboriginal and non-aboriginal fishers in Canada illustrate the clash in perceptions of common property rights. In Canada, the exclusivity of aboriginal harvesting rights is constitutionally recognized. However, these harvesting rights are not necessarily upheld or uncontested in practice. Co-management regimes in many ways serve as safeguards to maintain constitutionally guaranteed aboriginal harvesting rights which are not always fully entrenched in practice. In this way, co-management institutions may serve as "watchdogs," actively defending aboriginal harvesting rights.

What are the differences between traditional aboriginal and conventional state-organized resource management systems? If examined solely on the basis of practice, the most apparent difference is the degree of specialization or hierarchical organization of the systems. In the majority of traditional management systems there is not

necessarily a distinction between data collection, harvesting activities and adherence to customary practices for interacting with the environment (Usher 1986). Maximum harvest levels may be based on local knowledge of catch per unit of effort, while population predictions are based on detailed behavioral observations and the principle of harvesting at a level in accordance with individual and community need (Freeman 1985).

Will co-management ever truly represent a linking or indeed a blending of state and traditional resource management systems? A number of images of co-management exist in the literature including: a devolution model (Pinkerton 1989), a convergence model (Berkes *et al.* 1991), a compromise model (Usher 1995) and a model of community burden (Netro cited in Kofinas 1998). Kofinas' (1998) exploration of co-management analyzes the transaction costs that accrue to aboriginal communities who participate in co-management institutions and how these communities negotiate these costs. It is clear that co-management frameworks often do not include appropriate means for communities to truly represent themselves at co-management tables. State managers are often unaware of the political costs communities must constantly negotiate as a result of their participation in co-management arrangements. Co-management represents a dynamic process, one where evidence of slow, cross-cultural learning is taking place, but not necessarily in an effective manner, nor in a way that ensures that both community and state equally share the costs of this transformational process.

If co-management is a set of institutions (not organizations, but rules of behaviour) in its infancy, then we are still unsure of the costs of the transformation to co-management. Co-management institutions must endure destabilizing rule changes in order to move toward and beyond (climbing the co-management "ladder" described in Chapter 1) simply a mutual recognition of state and localized resource management systems. This can be equivalent to a forced institutional crisis. It is not clear that state management is prepared to undergo such a transformation as yet. Rule changes necessarily increase the instability of any institution (Ostrom 1990). What is most troublesome about co-management's "transformation" attempts is the lack of cross-

cultural communication of the working rules of either state or traditional localized systems. Aboriginal communities are gaining a sense of both the informal and formal rule-making at work in state management systems, however, state managers may not acknowledge the legitimacy of local customary practices (Collings 1997, Usher 1986).

State and traditional localized management systems are relatively unaware of the totality of each system's working rules (informal and formal). Co-management acknowledges the continued economic reliance of resource users on wildlife. However, this incorporation often comes in the form of a kind of disclaimer. Co-management organizations may be careful to acknowledge the cultural importance of caribou to resource users, however there is little opportunity to incorporate this cultural reliance in much more than an economic valuation.

This thesis looks at caribou in particular, as a particularly cogent symbol of the relationship between Denesoline peoples and the environment. However, this should not imply that Łútsël K'é people attach any less importance to other aspects of the environment such as water, fish, moose, geese, berries; indeed people speak of the interactions between all aspects of the environment. Ridington (1982) explains the reliance of Dene people on natural systems in a broader sense by emphasizing that for many TK systems, wildlife resources are equivalent to the medium of knowledge production and transmission, e.*g.*, many Dene peoples come to know the world around them and transmit their culture to their children while engaged in caribou harvesting activities. A host of anthropologists have outlined the importance of hunting to social organization, kinship relations and cultural transmission (Brody 1981, Fienup-Riordan 1990, 1999, Stairs and Wenzel 1992, Ridington 1988).

Are caribou a common property resource?

The history of early government wildlife management, caribou research and eventually the negotiation of caribou co-management institutions, centre, to a large degree, on differences in cross-cultural perceptions of caribou populations. These issues will be explored in further chapters of the thesis. However, it can be said here that

attempts to count caribou reveal widely different estimates over the last century. Caribou are a mobile or fugitive resource, much like Atlantic cod. However, unlike cod, where government managers acknowledged belatedly that a fisheries crisis had arrived, the Canadian government hastily reacted to any information they interpreted to be declines in barren-ground caribou populations due to over-harvesting by aboriginal peoples. Dramatic re-settlement policies for many aboriginal caribou hunting peoples in the Canadian North were precipitated by purported wildlife declines or "wastage" of caribou. Even today, there are conflicting perceptions of how to read and react to changing caribou movement patterns among aboriginal peoples, wildlife biologists and government wildlife managers (Kruse *et al.* 1998, Klein *et al.* 1999).

Great uncertainties and variations in herd population estimates also beg the question of whether or not caribou are "divisible" (distinct units) for resource management purposes. There are still so many questions about barren-ground caribou herd dynamics. What is the nature of range overlap, range drift, population fluctuations, the role of transient individuals, *etc.*? In some seasons it is really not possible to determine whether hunters are taking animals from one herd or another. The extreme expense of caribou research makes the information available about herd status extremely difficult to collect. This enormously complicates any thinking about the reality of "allocation" (who and how people can harvest caribou) and "provision" (caribou research, monitoring and management decision-making) problems. Barren-ground caribou populations are subject to "subtractability;" it is relatively difficult to prevent people from harvesting animals due to the remote and extensive nature of their ranges. Barren-ground caribou are also subject to "excludability," while it is theoretically possible to estimate their numbers and population trends and regulate their use to prevent crises, often, the information available about these herds is uncertain and/or financially and technically difficult to collect.

The vast landscapes caribou inhabit also make it very difficult to exclude people from hunting them. In northern Manitoba, Saskatchewan and increasingly in the Northwest Territories, the road systems put in place to service mining operations are

opening up questions about how to define "traditional aboriginal caribou hunters." Until these questions are answered, it will become increasingly difficult to maintain contemporary "priority of access" rules that give precedence for use to aboriginal people hunting for subsistence purposes in Canada. It is clearly difficult to exclude individuals from hunting caribou and that while caribou numbers may reach critical low population numbers, it is currently not possible given the present state of knowledge, to project when population declines will occur ahead of the signals that a decline is already occurring.

We do not really have a good understanding of population trends and sizes of all barren-ground caribou herds and of the dynamics of range overlap. Like Atlantic cod populations, are barren-ground caribou essentially a resource that is perceptually indivisible. We do not know how many exist with a high enough certainty to make uncontroversial decisions about commercial allocations, for instance. Depending upon how caribou hunters and caribou managers perceive population trends, caribou populations can concurrently be seen by one party to be scarce and by another to be healthy (because there are questions about the degree and nature of herd overlap as well as what constitutes critically low population estimates). How do people concerned with the welfare of the herds and the cumulative effects of global climate change and industrial development make informed decisions about habitat protection and acceptable harvesting levels?

Co-Management and Social Learning

What is the level of recognition in wider society of the complexity of ecological systems? We need as many perspectives and as much knowledge as possible given the little we actually know about natural systems. We are beginning to realize that we face complex problems that cannot be solved through individual thinking alone or even through the tools available to one particular field of specialization (Dale 1989). There is an essential need to hone mechanisms for collective learning and to ensure that organizations are as adaptive and knowledgeable as the individuals that make up their

membership. To do this we need the tools to respect multiple perspectives as well as the means to make collective decisions (Kendrick 2003).

Performance indicators of CPRs like "efficiency" assume that all stakeholders hold the same values and beliefs. In the case of caribou management, a Man and the Biosphere comparative study of caribou management systems in Canada and Alaska shows this is not the case (Kruse *et al.* 1998, Klein *et al.* 1999). Does this mean co-management must be an instrument to homogenize belief systems? How do we resolve such "conflicts of frames" ? Why is the "evidence" of some cultures still mystified and eliminated from resource management discussions? If the ultimate goal of co-management is to ensure sustainable social and ecological systems, how is sustainability defined? Many argue that sustainability is a matter of meaning and definition. For instance, what time horizons are we using to make resource management decisions, 5 years, 10 years, 7 generations? Our ideas of sustainability are formed by our identities, sense of place, influenced by our technology, ecological literacy, ways of learning, and the symbolic significance we attach to resources.

How do we know what we know? Should our emphasis be on the "products of knowing" (the facts) or on the means and value of knowing (belief systems/ practices)? How can we truly incorporate the "precautionary principle" (making cautious resource management decisions in the light of our ignorance) into our thinking?

2.3 Co-Management and Resilience Thinking

The question of how humans learn to respect other ways of knowing is represented in this thesis as an examination of humility, a respect for diverse realities. There are multiple epistemologies outlining ethical positions of human-environment relations and human perceptions of nature (Folke, Berkes and Colding, 1998). A fundamental issue in social sciences with respect to resource management is the mistrust that can occur among stakeholders as a result of these differences. This mistrust may also stem from one thought system's domination or outright dismissal of alternative ways of knowing.

Creating a space for the appreciation of co-existing, but different ways of knowing may improve the chances of developing sustainable resource management systems. At the same time, the options at hand for interpreting and adapting to ecological change can be broadened.

Why is Cultural Diversity Important to Ecological Survival?

Building the adaptive capacity for change may hinge on the existence of varied tools for change. This section looks at the role of resilience thinking in understanding the mechanisms that support the diverse ideas and belief systems that may develop within co-management regimes. It is postulated that the trust, respect and feedback internal to co-management regimes play a role in building the adaptive capacity (resilience) to deal with change in social-ecological systems.

There are discrepancies between the attitudes and beliefs of government caribou managers, biologists and traditional caribou users within co-management regimes (Kruse *et al.* 1998). Are these differences representative of fundamental obstacles to resource management decision-making or do they represent the existence of a space for engaging multiple ways of knowing? If "efficiency" is one of the indicators used to evaluate the performance of resource management regimes, then caribou co-management systems are not "efficient." But does this kind of "evaluation" sufficiently understand the engagement needed to understand the multiple perspectives co-management actors can bring to the meta-problems they face?

There are differences in how and what caribou managers, biologists and users learn and think about caribou. The lingering differences between the beliefs and attitudes of aboriginal resource users and government managers may reveal much about humility. For instance, continued differences in perceptions of caribou population dynamics (Kruse *et al.* 1998) represent a significant epistemological problem. How can different ways of thinking about social-ecological realities be reconciled within resource management systems? Co-management may contain clues about how to overcome the human deficit of *what* we are able to know and think ecologically (Bateson, 1991), and a

tendency to homogenize *how* we are able to know and think about ecological systems. The role of narrative and the larger potential to understand the mismatch between human behaviour and ecological processes may be best reconciled in co-management settings.

There are obviously cultural differences in the ways that human societies perceive nature. There are also often discrepancies between human thinking about natural processes and their reality (Bateson and Bateson, 1987). This is not surprising, ecology is a relatively new field; the term "ecology" itself did not come into use until the last half of the 19th century (Worster 1994). Even within the field of ecology alone, fundamental understandings of natural "equilibria," or "the balance of nature" so often referred to in common parlance, have changed markedly in the last century (Worster 1994:391).

Ways of Knowing: Relations versus Facts

There is some concern that the materialist framework of knowledge dominating ecological science leads to interpretive error, and as a result helps to deepen ecological crises (Bateson and Bateson 1987). Interpretive error often lies in the simple act of equating our descriptions of natural processes with the natural processes themselves. Bateson argued that we need to examine the interaction between human descriptions and the processes described.

Bateson used a model of "mental process" - where nature has "mentality," similar in some ways to animism - to describe the interaction of structure and process by abduction, a widespread phenomenon of human thought. Abduction is evident in metaphor, dream, parable, allegory, comparative anatomy, *etc.* (Bateson 1979:142). "Abduction" is a term Bateson adopted from philosophy to describe a qualitative method of knowledge construction. Abduction permits a "lateral extension of abstract components of description" allowing formal comparisons through "contrasts, ratios, divergences of form, and convergences" (Harries-Jones 1995:177). Abduction is a process of modelling information (unlike deduction or induction) characteristic of both humans and other living organisms in their own environments. "Mental process" is a

model he created in part as a tool for comparative study, bridging the gap between epistemology and ethics, and in part because he felt that occidental (western) languages do not lend themselves easily to the discussion of process *versus* structure. Bateson metaphorically described "mental process" as very large mental systems of ecological size or larger and the mentality of a single human being as a subsystem characterized by constraints in the transmission of information (Bateson defined information as "news of difference") between the parts of the larger mental system (Bateson 1987:135).

Bateson acknowledged that every individual and every cultural, religious and scientific system has particular habits governing knowledge creation. However, he contended that most ways of knowing confuse "information," or descriptions of reality, with reality itself. Local knowledge systems usually assume that the way they receive information about reality is immanent in the nature of that which is being described (Bateson 1987:21). To Bateson, this confusion is the equivalent of believing that the "name is the thing named." We can never "know" all there is to know about an individual "thing," but we can know something about the *relations* between things.

If we accept the primacy of relationships over facts, then metaphor, not classification, is the logic upon which the biological world is built. The logic of metaphor identifies and connects all living processes classifying the world. Language is, of course, unavoidably structured by the discontinuous nature of description or "naming." One of the first steps to "new" ways of thinking about nature is to look at the limitations of any act of description (Bateson and Bateson 1987:144). There are world views that are commensurate with Bateson's thinking. *Inkonze* is a complex Dene concept that emphasizes the inferiority of human knowledge and power in comparison to nature. Living and learning are intertwined where nature is the source of knowledge and power. *Inkonze* emphasizes the limitations and uncertainty of human understandings of reality.

By studying our descriptions of ecological processes, and the ways that we interpret the information we collect, we will learn more about why there is often a disparity between our actions and our attempts to live in a sustainable manner. Integrative

thinking in ecology, such as systems approaches, combine historical, comparative and experimental approaches at multiple scales based on the premise that knowledge of the system under study is always incomplete. There is obviously always going to be an incomplete knowledge of novel interactions across space and time and novel relationships between nature and human behaviours. Resource management changes the system being managed so that systems are ever-changing targets simultaneously releasing resources for new kinds of human opportunity and revealing new classes of human risk: "Ecosystems and the human activities associated with them are inherently uncertain" (Holling 1998).

Our knowledge of ecosystems and human behaviour may be incomplete and uncertain, but we can create tools for thinking to better understand the interactions between natural and social systems. Panarchy is an integrative thinking tool designed to increase understanding of the source and role of change in social and ecological systems. It examines the role of variability and diversity in maintaining ecological systems. It also looks at human social processes, those that create novelty, and those that promote or destroy innovation. Panarchy models show how linked and adaptive human institutions and ecological systems function.

Picturing Interdependent Human and Ecological Systems

The links between social and ecological systems are represented by diverse ways of looking at human-environment relations. The continuing exchange between different ways of knowing may be crucial to integrative thought about social-ecological linkages. For many indigenous societies, the separation of social and ecological systems does not make sense. A "human-environment" divide is especially absent from the story-telling traditions of many arctic and sub-arctic cultures. How does this fundamental ideological difference play out in resource management systems that incorporate stakeholders both from "the West" (Euro-American) and from aboriginal cultures for whom a human-environment or social-ecological divide is a relatively new and foreign concept?

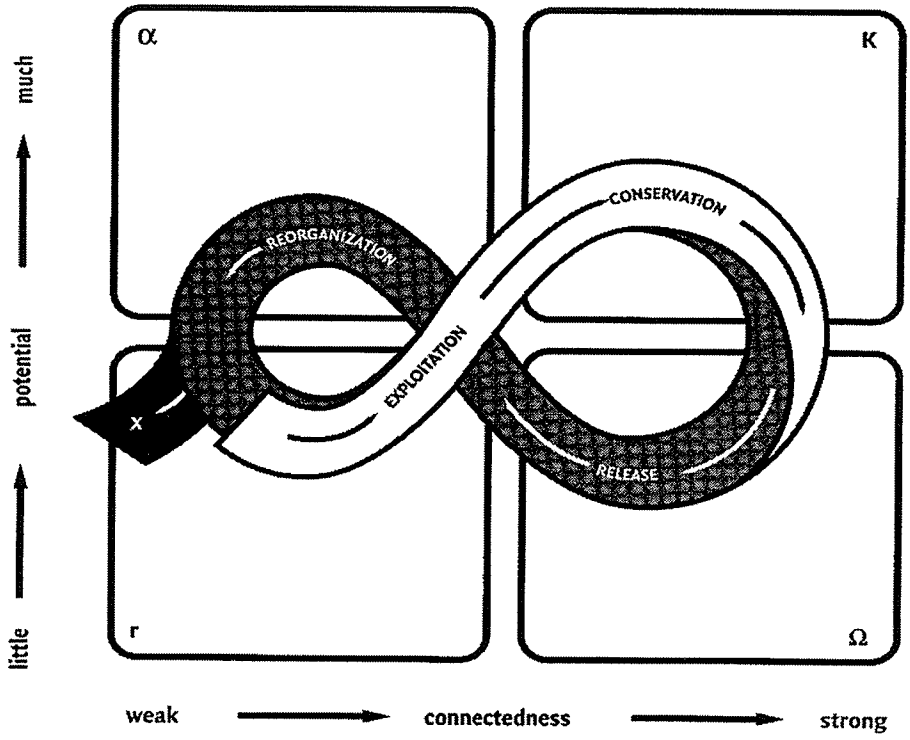
There are differences that exist in the perceptions of aboriginal caribou-using communities, caribou managers and scientists in co-management processes in arctic and sub-arctic North America. It is suggested in this thesis that these differences represent potentials to expand how we think about human-*Rangifer* (caribou) systems as much as they do obstacles to caribou research, monitoring and management decision-making. The process of negotiating these cross-cultural differences may show the potential for the growth of alternative resource management systems capable of accommodating varied ways of knowing and learning.

Chapter 7 uses panarchy thinking to examine where spaces for engagement are created in co-management arrangements where the community can share information about caribou systems and create opportunities to construct new knowledge and values about human-caribou interactions with larger scale institutions. How do existing organizations, populations and social structures affect the cultivation or the destruction of opportunities for new thinking and actions?

Panarchy

Panarchy theory pictures adaptive cycles of growth, accumulation, restructuring and renewal in interlinked space/time hierarchies. The influence of lower, larger scale cycles on faster, smaller cycles serve to stabilize those faster and smaller scale cycl es. In turn, the influence of small scale cycles on larger scale cycles provide innovations to these slower scale cycles (Fig. 2.1).

Figure 2.1: The Adaptive Cycle



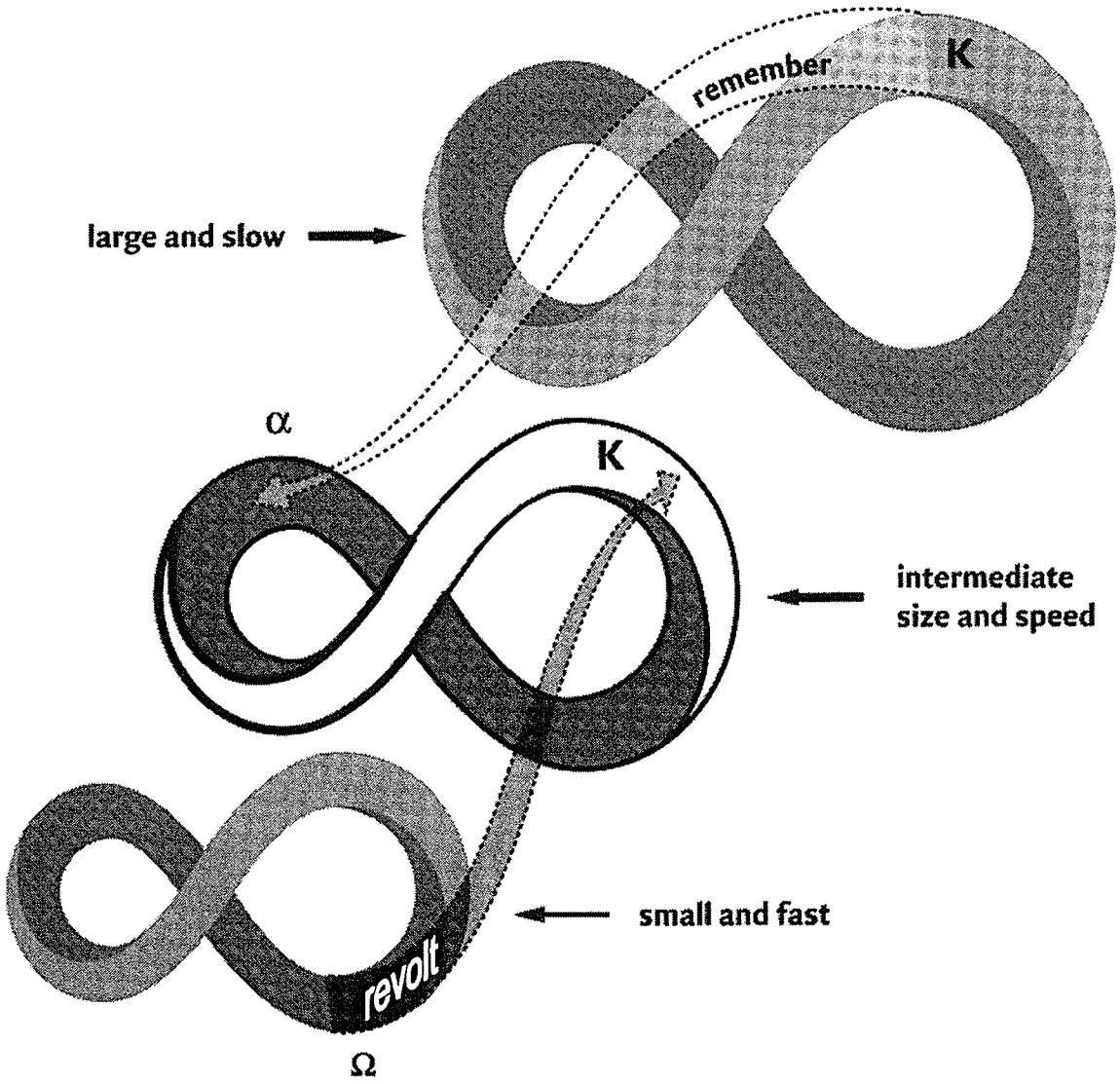
(Adapted from Berkes, F., J. Colding and C. Folke (*eds.*) 2003. Navigating Social-Ecological Systems: Building Resilience for Complexity and Change. Cambridge, U.K.: Cambridge University Press.)

A Closer Look at a Single Adaptive Cycle

The restructuring (or release) phase of an adaptive cycle is one of rapid innovation, exhibiting high resilience, low connectedness, and decreasing predictability; it is a time of both crisis and opportunity; and uncertainty increases through this phase. The slow phase of accumulation (or exploitation) of capital (ecological, economic, social, cultural) is one of increasing efficiency, predictability and connectedness. The rigidity and vulnerability of the system increases while its resilience decreases. With foresight and active adaptive methods, human systems can stabilize variability and exploit opportunity. This is particularly key in highly variable northern environments where climate change is increasing the uncertainty and variability of ecological processes. At times of change, the revolt and remember phases pictured below are important mechanisms. The revolt phase spurs innovations at larger scales due to changes in

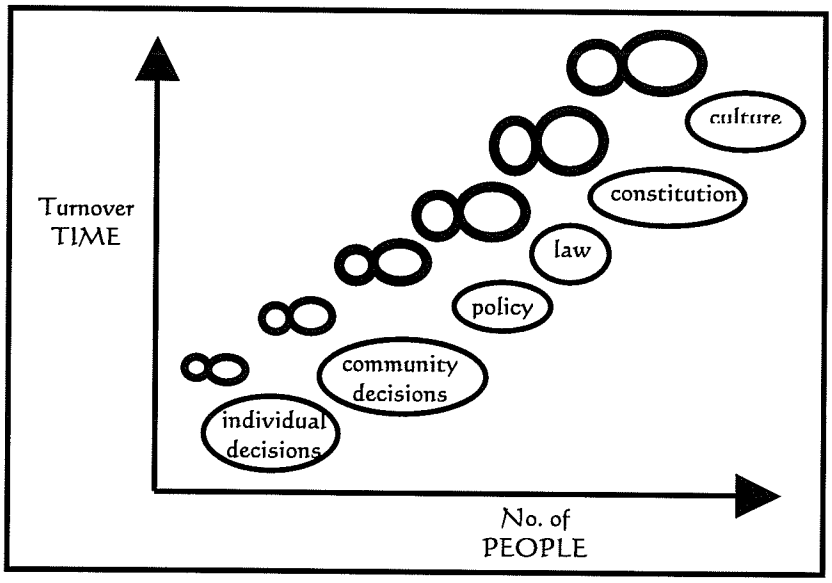
smaller scale cycles. The remember phase draws on the experience of larger and slower scale cycles to stabilize the effects of changes occurring at smaller scales (Fig. 2.2).

Figure 2.2: Nested Adaptive Cycles



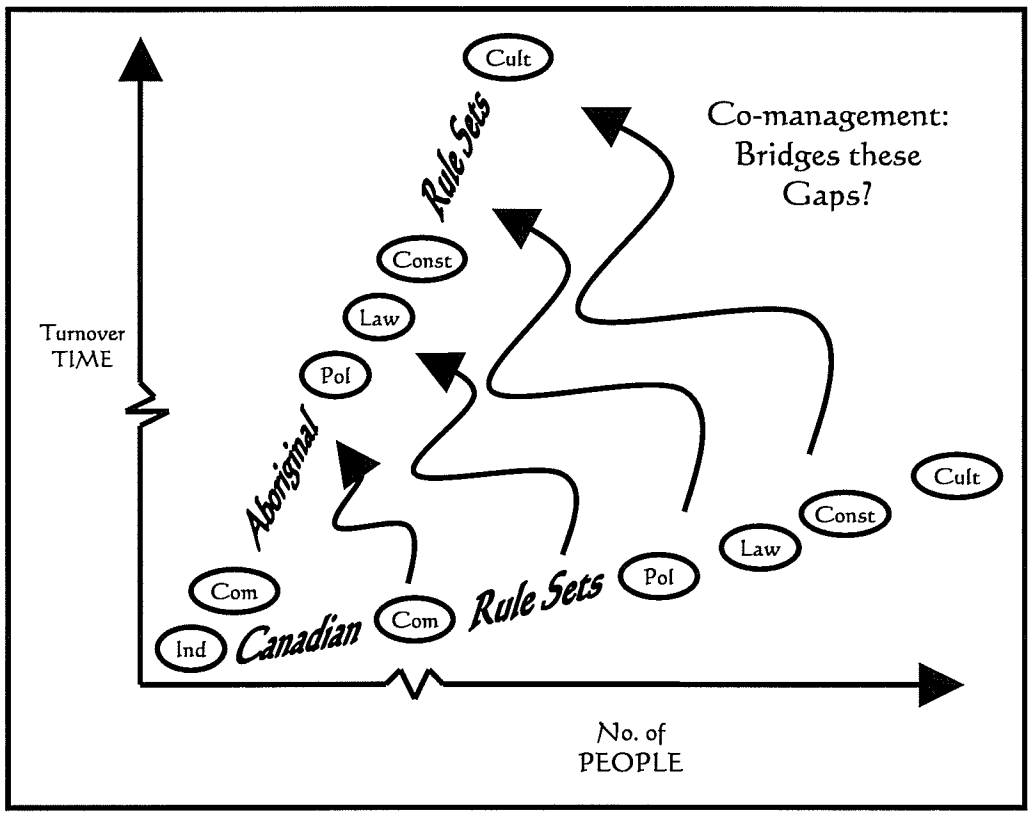
Human institutions are portrayed as a nested set of adaptive cycles, or rule sets influenced by intentionality, communication and technology (Fig. 2.3):

Figure 2.3 Nested Human Rule Sets



If this same institutional hierarchy (nested adaptive cycles) is used to represent human-caribou systems, it is possible to envision the different time and space scales at which aboriginal communities and Canadian government rule sets operate (Fig. 2.4):

Figure 2.4 Institutional Hierarchy in Human-Caribou Systems
(see Figure 2.3 for key to abbreviations)



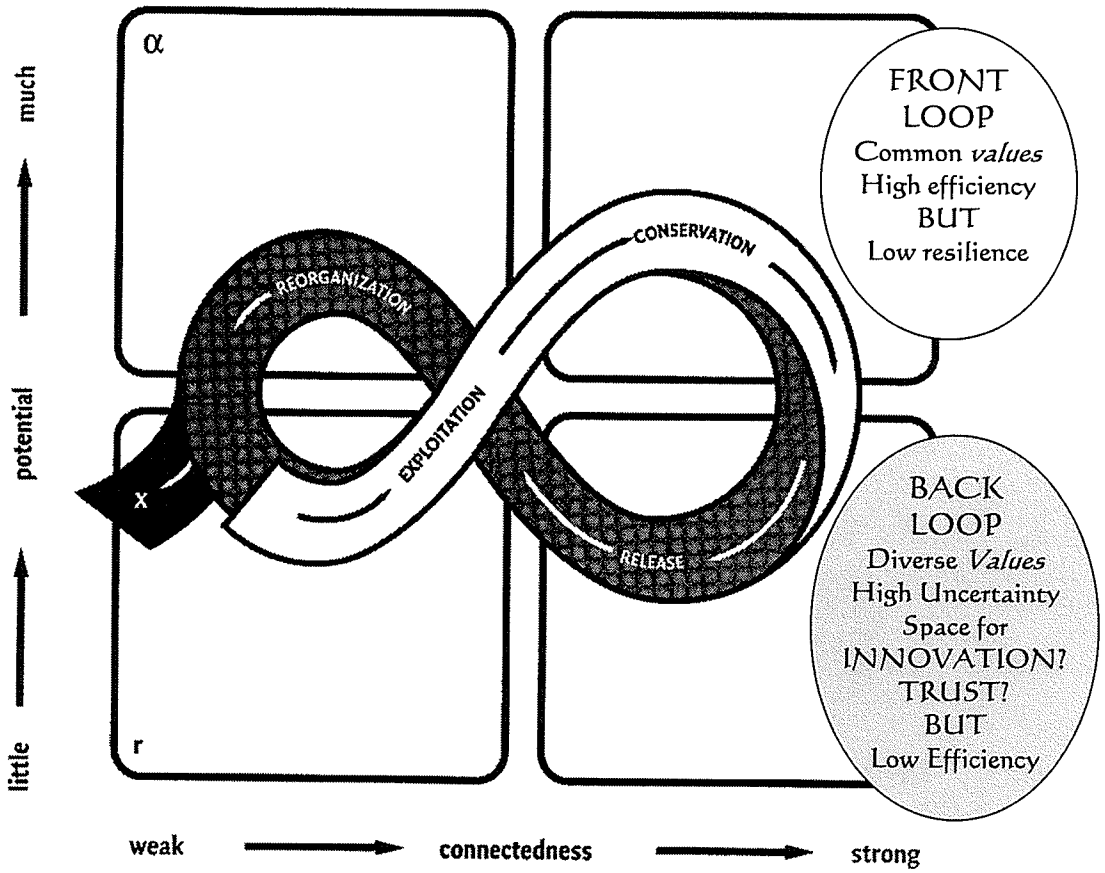
Co-management institutions are not only bridging different world views, but rule sets that function at very different scales. Co-management challenges include identifying and recognizing the time and space scales of customary land and property rights as well as the scales of community processes of consensus and representation. It must also be recognized that aboriginal decision-making and representation processes reflect the diversity of aboriginal cultures themselves. Decentralization policies and land claims negotiations in the Canadian North are increasing the political space, responsibility and control of communities, however the uncertain status of many of these negotiations adds to the difficulty of establishing workable co-management arrangements. Various forces of restructuring are providing the opportunity for aboriginal communities to pursue innovative forms of collaborative and participatory

resource management. It is necessary to better understand the investment of time, resources and social capital required by communities to realize these opportunities.

This discussion has already touched on the characteristics of "meta-problems," in this case, resource management issues that are difficult to define and comprehend without the aid of multiple perspectives and integrative thinking. The learning involved is collective rather than individual and is not limited to any particular time and space scale. This kind of learning leads to "abnormal discourse" (or pluralism) where individuals and organizations with different views on data interpretation, social values, conservation principles and governance come together to make decisions on courses of action (Dale 1989).

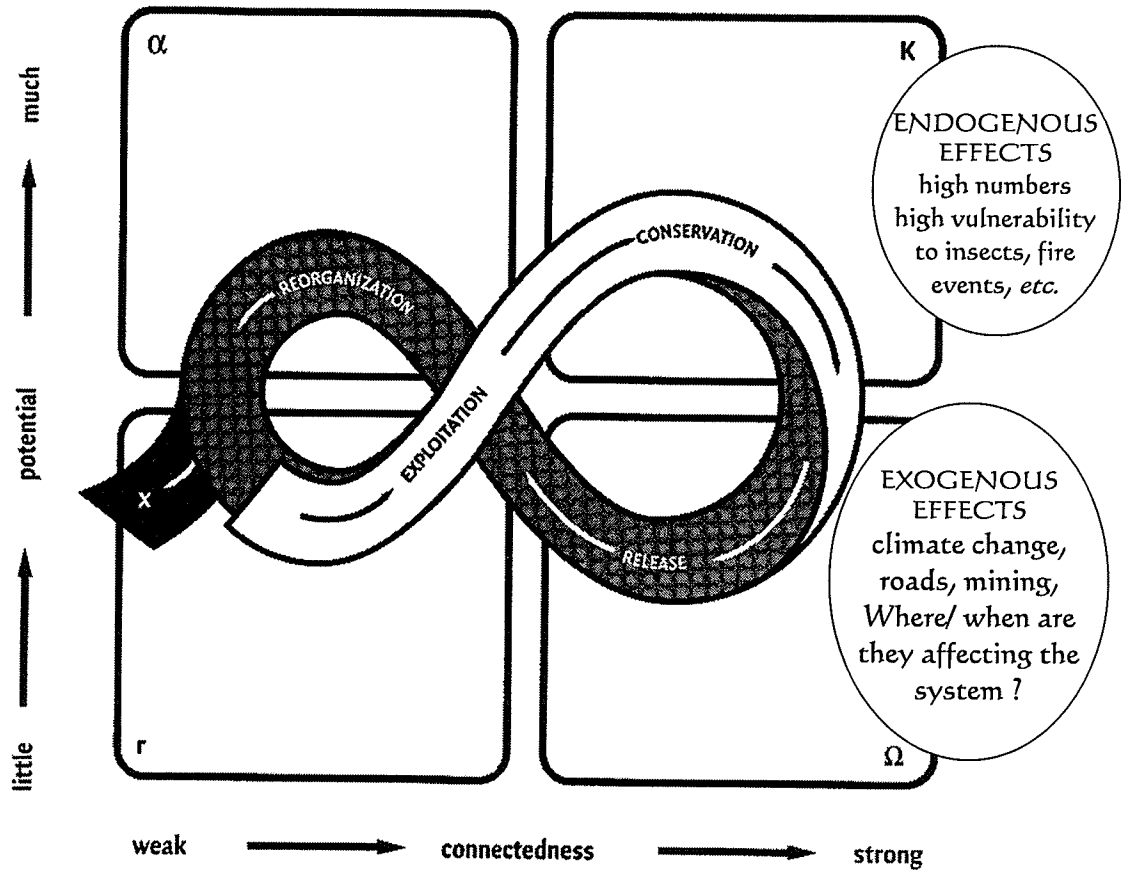
Looking at co-management as a pluralist discourse with the aid of panarchy theory, it appears to sit in the "back loop" of the adaptive cycle where high uncertainty exists, but there is a high potential for innovation, a space for diverse perspectives to exist (Fig. 2.5).

Figure 2.5 Co-Management - Pluralist Discourse in the Back Loop



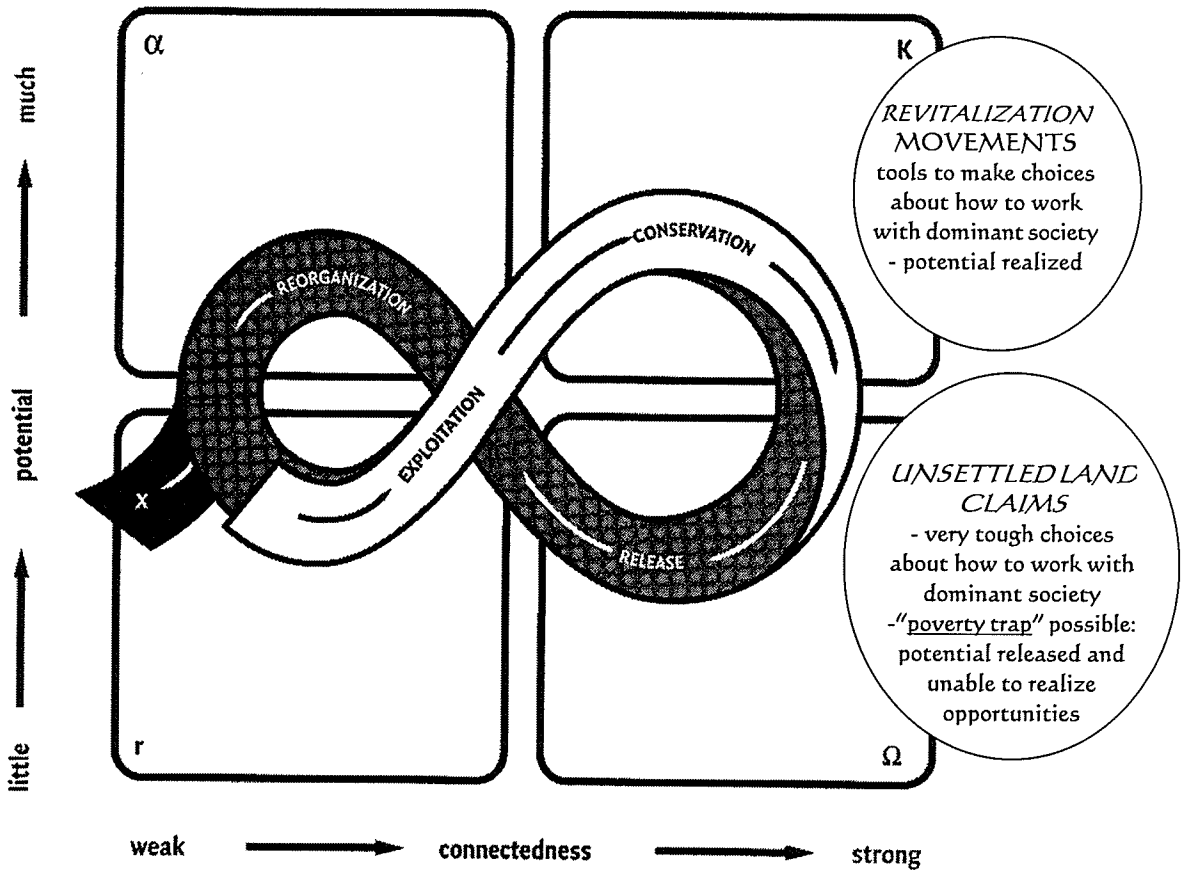
Our current knowledge of barren-ground caribou dynamics is marked by high uncertainty. We know that these populations face a number of exogenous effects including the unknown effects of climate change and industrial development (mines and road networks). If population numbers are at a peak, are populations sitting at the highly vulnerable and low resilience stage of the adaptive cycle? Where and when will exogenous effects have a more devastating impact on caribou populations in the course of the adaptive cycle of caribou population dynamics? Are overlapping herds exhibiting synchrony in the manner they enter stages of the adaptive cycle (Fig. 2.6)?

Figure 2.6 Barren-Ground Caribou Population Dynamics and the Adaptive Cycle



Aboriginal communities in the Canadian North are at different stages of self-governance and co-existence talks. Those with unsettled land claims face very tough choices about how to work with a dominant society while in the midst of a kind of '"poverty trap" where unsettled claim issues prevent communities from realizing opportunities and using potential to revitalize traditional property rights systems. On the other hand, communities with settled claims may have created a "glass ceiling" for realizing potential in their traditional territories through the extinguishment of certain traditional land and tenure rights. The risk, however, of leaving claims unsettled, is that land and knowledge bases are further eroded while negotiations drag on (Fig. 2.7).

Figure 2.7 Aboriginal Governance Systems and the Adaptive Cycle



Illustrating cross-scale issues is vital to understanding co-management challenges. However, it is important to return to describing differences in environmental perception. What are the differences in the ways time and space continuums are represented by different cultures?

2.4 Environmental Perception, and Sense of Place

> *[People] differ in their awareness of space and time and in the way they elaborate a spatio-temporal world ... [there is] the possibility that the environment itself may have an effect on the elaboration of the spatio-temporal world* (Tuan 1977:119).

When cultural conceptions of time and space differ, how can cross-cultural decision-making progress? Is human awareness of space and time a matter of choice, chance or a

dialogue with nature, shaped by the kind of environment we live in? Our environmental perceptions shape our categorization of knowledge as objective, subjective, authoritative or "value-laden" (the derogatory implication being that "value-laden" knowledge is parochial and therefore meaningless for decision-making).

The authenticity of knowledge about the environment lies in trust in how this knowledge is produced. If those people entrusted to make resource management decisions on behalf of society do not have trust in how knowledge set before them is produced, this knowledge has no authority and will not influence resource management decisions. Earlier in this chapter there was mention that trust may play a central role in the evolution of voluntary collective action. It is argued in this thesis that *trust is not limited only to the trust between the individual social actors participating in co-management institutions, but in the trust individuals and organizations place in the way knowledge of the environment is acquired and produced.* The trust placed in this knowledge is not only related to any one individual's grasp of the theories and principles involved, but to an individual's or a culture's environmental perceptions.

Our environmental perceptions shape the way we apply knowledge or place limitations on human actions in the environment at varying temporal and spatial scales. We are predisposed "...toward certain ways of seeing the world - both in a literal, physical sense and metaphorically ..." (Howett 1997:85) by our personal experiences, and our cultural backgrounds.

How do we make decisions about the relevance of knowledge at one scale or another? TK is often labelled as diachronic and scientific information as synchronic – when are these labels helpful and when do these labels blind us to the potential applications of knowledge? Knowledge is always multidimensional. Resource management is increasingly incorporating knowledge of the environment not only as a "physical system," but including the behavioural, cognitive and experiential factors of knowledge systems into decision-making.

The perspective of space as space of the physical world can be appropriate, for instance, to gain a geomorphological understanding of erosion. However, a broader

perspective requires a critique of the "taken for granted conceptions of space" and the geographical, and place-centred human conceptions of space (Pickles 1985:169). Only when we stop seeing space as "dwelling places," does the technological concept of space become the "sole genuine concept of space" (Pickles 1985:167). References to objective nature have created "technical conceptions of knowledge." Knowledge of space as an ecological concept requires a more encompassing idea of knowledge as reflexive versus absolute, and critical versus authoritative, these characteristics are lost when we concentrate only on the technical dimension of knowledge (Wright 1992).

In recent years, the "search for new ways of relating to nature" (Berkes 1999:3) has fuelled attempts to legitimate or interpret "non-science-based" knowledge within the framework of Western science. The characterization of knowledge as "pre-modern" (pre-scientific) and "modern" (scientific) has led to many discussions of the differences and similarities between knowledge systems. However, attempts to "arrive at a realization of interrelatedness" (Evernden 1985:40) or a "new vision of the Earth as a system of interconnected relationships" (Berkes 1999) remain thwarted.

The search for generalizing rules governing ecological and social behaviour no longer provide certain proof of a deterministic world. One of the major social uncertainties of modern times is the epistemology of new structures of knowledge (Wallerstein 1997:8). If the Western way of thinking about the earth "took a wrong turn" in ancient Greece (Evernden 1993:60, Glacken 1967), then questions of how and why "traditional" societies did not develop in the same way as the Western world become more profound (Hamilton 1982). The human-environment connection where "landscape evokes thought" (Tuan 1979:94) may be more fundamental than we yet recognize.

An approach that *'encloses' a 'pocket' of the world 'as it is found, with its mixed assortment of beings', in contrast to more conventional approaches that 'remove' different 'classes of beings ... from their habitats and place them in a classification system* (Gregory cited in Johnston *et al.* 1986:69) may be essential to a more contextual approach to resource management. Contextual approaches are "... concerned with space as both context and creation: as

both 'condition' and consequence' of human activity (Gregory cited in Johnston *et al.* 1986:71).

> *... in the mythical conception experience is fused with geographic context. The experience and the place become one, and thus are conceptually inseparable. In the language of science experience and geographical context are separated, and place becomes simply the location of objects and events* (Entrikin 1989:40).

Undifferentiated space then becomes 'place,' the "... intersection of geography, meaning and expression...," the fusion of location with human narrative (Ryden 1993:245).

Intentionality, one of the influences on human interactions with the environment is the "relationship of being between a person and the world which gives meaning to both." (Johnston *et al.* 1986:232). The Dene relationship to the Old Lady of the Falls described in Chapter 1 is an eloquent example of the relevance of "place" to environmental decision-making.

2.5 Towards Alternative Resource Management

It is hypothesized that innovations in resource management thinking come about when spaces for engaging multiple perspectives are created. This kind of space characterizes many co-management arrangements. These arrangements may develop novel mechanisms for solving "meta-problems," resource management issues that can only be negotiated through social learning rather than by individuals or specialized academic fields alone.

The recognition of the place of local institutions within larger resource management regimes is fundamentally important to future management initiatives. Attempts to create linkages between the social, ecological and economic aspects of resource management are related to calls for a balance between empowerment, self-esteem and belonging in local settings. Quality of life indicators include empowerment, participation, and social cohesion as critical facets of social sustainability (Goodland *et al.* 1992). These indicators outline the "need to enlarge and strengthen stable civil society which at present is only embryonic" (Robinson and Tinker 1997:72) and bring about sustainable resource use. The empowerment of local structures entails a profound

change in current definitions of "citizenship." These changes include enabling citizens to become *participants* or problem-solvers in society rather than just *critics* of current governance structures (Miller 1997:63). It is the problems of governance and culture that may be the real limiting variables to sustainable resource management (Robinson and Tinker 1997:84). The solutions to these problems are rooted in communities, or more bluntly put; unless resource management works with local people, resources are doomed (Bayon 1996:3).

There is "... **no single appropriate scale or timeframe for management**," (ESA 1995:4). Systems and subsystems (ecological, economic and social) are hierarchically interconnected (Costanza and Patten 1995:193). The majority of the existing literature on the interface between natural and social systems is at the level of the local commons (Berkes 1996:87). Local institutions are key to analyzing this interface. The sustainable use facilitated by local property rights regimes is enabled by the response of these regimes to feedback signals from natural capital (Berkes 1996:92). These institutions are often flexible, diverse and capable of self-renewal. The reversal of the decline of civic society (Robinson and Tinker 1997:72) is critical to achieving the adaptability and innovation critical to sustainable resource use. Innovative, local leadership is the basic building block for re-working governance structures and addressing imbalances in decision-making authority and knowledge legitimacy between community and state institutions.

The depth of local participation in resource management should include the recognition that historically-rooted local knowledge (traditional knowledge (TK)) seeks understanding of ecological complexity by working from a different epistemological premise than mainstream science (Freeman 1992:9). No one group has a "monopoly on truth" (Freeman 1992) especially in our attempts to understand human-environment relations (Barbier *et al.* 1994:43).

> *Combining different ways of knowing and learning will permit different social actors to work in concert, even with much uncertainty and limited information* (Kates *et al.* 2001).

A subsidiary approach – where common goals are agreed to without diminishing diverse ways of knowing – would devolve management to the lowest jurisdiction possible while simultaneously making the lower jurisdiction accountable for its decision-making (Hanson 1998:170). TK is a mechanism where participatory approaches lead to the integration of local values (Berkes *et al.* 2001). However, there is the danger that the co-optation of local knowledge by larger scale governance structures will be realized instead (Cruikshank 1998, Simpson 1999). The role of indigenous knowledge in mainstream resource management is *dependent* on the *empowerment* of communities (Gadgil *et al.* 1993:155).

Chapter 3

Historical Background – Where are Caribou Co-Management Participants Coming From?

[The] commitment to caribou hunting and the basic solutions to the problems it posed remained unchanged until the collapse of the Beverly herd in the 1940s... As late as the 1970s some Caribou-Eater Chipewyan [Dënesǫłine] would utilize wage labor to gather cash resources to take their families among the caribou, long after there was any chance of economic gain from bush life.

Sharp 1979:5

3.1 Chapter Summary

This chapter explores the history leading up to contemporary caribou co-management in the Northwest Territories. This background sheds light on why co-management institutions took the forms they did in their initial stages, as well as on the challenges co-management has faced over the last two decades.

The changing movements of caribou and Dënesǫłıne people are initially outlined in order to emphasize that the movements of the Dënesǫłıne people shifted in tandem with changing caribou population fluctuations, especially before the arrival of Europeans in the North. The distribution of Dënesǫłıne people through the year anticipated the changing migratory movements of the barren-ground caribou. Just as barren-ground caribou populations have exhibited historical shifts in range use and distribution, so have the Dënesǫłıne people. Following this description and an examination of how Dënesǫłıne peoples shared information about changing caribou movements in historical times, this discussion explores how information-sharing about caribou movements has changed among the Dënesǫłıne since year-round settlement in village sites. Finally, in contrast to the changing, but long-standing association between Dënesǫłıne people and the barren-ground caribou, scientific investigations of the barren-ground caribou have a relatively short history. The rest of the chapter describes this history and the significant changes in understandings of caribou population dynamics that have occurred in the last 50 years. The origins of government-sponsored caribou research, monitoring and management decision-making in the post World War II era are explored.

3.2 Changing Movements of Caribou and Dënesǫłıne People

Prior to contact with Europeans, the Dënesǫłıne (Chipewyan) peoples moved in and out of the barrens regularly, as far north as the calving grounds of the Beverly caribou herd and up to the mouth of the Coppermine River (Smith 1984, Gillespie 1976).

Samuel Hearne reported that a Hudson's Bay Company sloop anchored in the present day Kugluktuk area [Coppermine] traded not only with Inuit, but with

Chipewyan peoples that were in the area in the late 1700s (Birket -Smith 1930:15). Anthropologists were first unbelieving and later accepting of evidence that the Dënesǫłıne virtually managed to *actually follow* the movements of the barren-ground caribou herds they depended on:

> *...although it is true that humans cannot literally keep up with caribou/wild reindeer during their major migrations, some have come amazingly close to it* (Burch 1991).

From the early 1700s to the late 1800s, Dënesǫłıne land use gradually shifted southward. Until 1870, the fur trade had virtually no effect on the herd-following patterns of Dene movements (Asch 1988, Abel 1993). Dene peoples sustained themselves on caribou and simultaneously provided substantial quantities of caribou meat to the Hudson's Bay Company posts at Fort Rae (8 000 – 10 000 carcasses annually), old Fort Providence (near current site of Yellowknife), Fort Resolution [Deninu Kue] and Fond du Lac, Saskatchewan before steamboats arrived regularly in the North with rations from the south (Fumoleau 1975). Dënesǫłıne and Yellowknives chiefs (Matonabee, Awgeenah and Idotlyazee) guided Hearne's journey to the Coppermine River in the late 1700s. Awgeenah also travelled with Alexander Mackenzie in 1789. Akaitcho traded caribou meat at the post at old Fort Providence, controlled the copper trade in the North and guided and supplied Sir John Franklin's expedition between 1819-1822. Akaitcho regularly moved between the East Arm of Great Slave Lake and the Coppermine River. An account of the arrangement between aboriginal people, caribou and the Hudson's Bay Company forts is related below:

> *Deer are of several sorts, and very numerous, and are the chief support of the Europians and Natives for food and cloathing. They pass & repass along the coast spring and fall in herds of many thousands ... They fawn in the beginning of June, at that time they are crossing the rivers going southward where the Indians spear a great many in the water: ... I have seen the Indians bring such quantities of deer's flesh in the summer to the Forts, that we would buy no more from them after all the salt was expended, ... The deer's pelts are dressed and dryed in parchment, and we send them home to the Company under the separated denominations of buck and doe skins, and they sell from five to seven shillings each* (Hudson's Bay Company Archives E 2/5, Observations on Hudson Bay by Andrew Graham, 1768-9, Fo. 32d-35).

An elder in Łútsël K'é recalls her grandmother's memories that people walked to Churchill on the Hudson Bay coast, from the Great Slave Lake area (Alice Michel 2001). Łútsël K'é elders alive today used to travel by dog team from the east arm of Great Slave Lake north to the Thelon River's junction with the Hanbury River, MacKay and Aylmer Lakes, south to Tthebacha (Fort Smith), and west to Fort Rae. By the 1920s, Dënesǫłıne people converging at the trading post at Snowdrift (old Łútsël K'é village site) were still travelling large distances to get there:

> *Busy indeed is Snowdrift, the easternmost trading post on Great Slave Lake. Every day new people arrive. One by one the sleds appear like black specks far out on the ice. They say they have come great distances; some from Artillery Lake, others from the head waters of the Coppermine River, a few all the way from the Great Fish River [Back River] in the heart of the Arctic region* (Ingstad 1931:117).

By the turn of the 20th century, the Dënesǫłıne were experiencing the effects of game laws, treaties and game sanctuaries that marked significant changes in their ability to move freely in their ancestral hunting grounds (Fumoleau 1975, Asch 1988, Abel 1993). Severe epidemics had ravaged Dënesǫłıne populations in the late 1700s, and in the last century a devastating epidemic in 1928 killed many Dënesǫłıne leaders at the time when elders alive today were infants or small children (Fumoleau 1975). Nonetheless, the Dene Land Use Mapping Project of the 1970s compiled a picture of all living memories of Dene land use in the Northwest Territories that showed an intricate web of travel routes so extensive that it was not possible to go 10 km in any direction between Great Slave Lake, the Dubawnt River, Contwoyto Lake and Alberta without crossing a Dene trail of some kind (Raffan 1992:68).

3.3 Anticipating the Dispersal of Caribou

> *These [spatial distribution of hunting groups] facilitate a communication network which can report the direction of movement, dispersal and concentration of the caribou* (Smith 1978:68).

> *The caribou around here, it's a reliable thing he said [Herman Catholique's grandfather]. People are following it all the time, he said. The people talk about where the caribou is, all the time, might be people in Łútsël K'é, might be people*

in Fort Reliance, might be people in Timber Bay, might be people across there, might be people over there... No mobiles, no communication. Nothing. Sometimes, the way they used to help each other, my grandfather used to say, maybe make the headquarters at Fort Reliance. That's where, two of them were, Łútsël K'é too. If the caribou comes here, somebody will bring the news back. Just by dog team. OK, communication like that. As soon as it happened, these people would find caribou first, they bring the meat back and feed it to other people. All these things, they used to help each other like that (Herman Catholique 2001).

The prediction in time and place of caribou migrations was the main factor guiding Dënesǫłine settlement patterns (Irimoto 1981:15, Smith 1978). Drift fences, snares, pounds, pits and waiting places were all constructed at natural caribou concentration points (Kelsall 1968:213, Gordon 1996). Samuel Hearne's journal recounts that:

They came up to a large tent of northern Indians, who had been living there from the beginning of winter, and had employed that long interval [until Hearne met them in March] in catching deer [caribou] in a pound ... many families subsist by it, without having occasion to move their tents above once or twice in the course of a whole winter (Hearne 1809:6).

The ancestors of the Etthen-eldéli (the Caribou-Eater Chipewyan that many Łútsël K'é families are derived from) have been intercepting caribou at water crossings around Great Slave Lake and north to the calving grounds of the Beverly caribou herd since before the time of Christ (Gordon 1996). Before the 19th century, the Thelon River valley was Dënesǫłine territory. Groups of Dënesǫłine people of considerable size (800-1000) people met when caribou herds aggregated and coordinated mass harvesting activities (Smith 1978:71). A journal kept at the Prince of Wales Fort at the mouth of the Churchill River reports in 1715/16:

Northern Indians [Chipewyan] ... thare by these lake sides they Sett an Incredible Number of Deer Snares and ketch abundance of Deer in them as they walk backwards and forward for the Conveniency of even Ground and Shelter under the hills and when they have done Crossing then to there fishing ... (Hudson's Bay Company Archives, B 239/9/2, Fo. 30, May 10).

And a further account:

At the end of April ... they also take great numbers of Cariboux or Rain-Deer ... the Roads they make in the Snow are as well padded, and cross each other as often as the streets in Paris; the Natives make Hedges with Branches of Trees, and leave Openings in which they fix Snares, and this take Numbers of them.

> *When they swim the Rivers in returning Northwards, the Natives kill them in Canoes with Lances, as many as they please* (Arthur Dobbs, An Account of the Countries adjoining to Hudson's Bay, in the North-West Part of America, London, 1744:22).

People made decisions about when to move to new hunting grounds based on declining densities of animals and knowledge from previous experience of what the peoples' needs would be at any particular time of year (Speiss 1979:14). People had considerable knowledge of seasonal variations in body condition (See Speiss 1979: 27-28).

It is believed that the Inuit began moving into the barren land hunting grounds of the Dënesǫłıne (in particular the Thelon River valley area) sometime in the 1700s, around the time that the Dënesǫłıne were experiencing massive (up to 90 percent) losses of life due to European-introduced diseases. In the first half of the 19th century, the writings of European explorers and the oral traditions of Inuit and Dene peoples, recount friendly meetings between Inuit and Dene people at Contwoyto Lake, Yathyked Lake, and Dubawnt Lake (Birket-Smith 1930, Csonka 1999). The Inuit and Dene traded with each other at such meeting places and one of the items the Dënesǫłıne traded for were Inuit sled dogs (Csonka 1999). The increased speed of travel that dog teams introduced to the Dënesǫłıne would affect the flexibility hunters had to move from poor hunting grounds if the caribou migration varied from what had been anticipated. However, dog teams required hunting groups to procure substantially more meat in order to keep the teams fed.

Historical and oral traditions of caribou abundance or also counter-balanced by accounts of near or actual starvation. Absolute dependence on wintering caribou is a risky proposition because barren-ground caribou herds can show radical annual shifts in the use of wintering grounds. In order to survive, human hunters had to have strategies to determine which wintering grounds would be used in any particular winter (Speiss 1979:65). There are major shifts in wintering areas every 30-50 years or every 1-2 human generations (Speiss 1979:65, Case 1996, Kelsall 1968). Łútsël K'é elders recount times when barren-ground caribou did not move south of the tree-line for many years.

One of the respect behaviours that Łútsël K'é elders repeatedly emphasize, is the need to be very careful at caribou water crossings, making sure to butcher animals a distance away from crossings and not to erect tents or build structures that would interfere with crossings. Biologists suggest that the odour released from the inter-digital glands of disturbed caribou are detected by other caribou, and serves as a kind of warning signal (Pruitt 1960:15).

Archaeological data show a correlation between phyto-geographic change, caribou behaviour and human adaptation (Speiss 1979:51). The harvest of large numbers of caribou (with pounds, *etc.*) depended on reasonable knowledge that large groups of animals would arrive (see pounds used year after year in Saskatchewan, the Yukon, *etc.*), concomitant with the congregation of large groups of people (50-400) to carry out the labour involved. Mass harvesting events occurred in the spring, fall, and post-calving periods (Speiss 1979:135).

Dene knowledge of key geographical features to anticipate caribou is illustrated in the following writings of naturalist Ernest Thompson Seton, travelling on Pike's Portage on his way to Artillery Lake (the very name of this large lake means "big crossing" in the Dënesǫłıne language):

> *The country here is cut up on every side with caribou trails; deep-worn like the buffalo trails on the plains, with occasional horns and bones; these, however, are not so plentiful as were the corresponding relics of the buffalo. This, it proved, was because the caribou go far north at horn-dropping time, and they have practically no bones that wolves cannot crush with their teeth.*
>
> *Although old tracks were myriad-many, there were no new ones. Weeso [Dene guide] said, however, 'In about four days, the shores of this lake [Artillery] will be alive with caribou'* (Seton 1910:734, From Public Archives – MG29D108, vol.4).

3.4 Historical Shifts in Dënesǫłine Movements on the Caribou Range

The ancestors of present-day Dënesǫłine maintained a network of people moving between Churchill and the Athabasca region of northern Saskatchewan, and between the Athabasca, Great Slave Lake area and the mouth of the Coppermine River; in essence along the transitional forest zone west of Hudson Bay. Once Europeans arrived on the barren-ground caribou ranges, the Dënesǫłine began to suffer devastating population losses, particularly in the late 18th century and in the early 20th century. With a shrinking population base, the ability to maintain a widespread network of hunting camps on the barren-ground caribou range was reduced. However, the introduction of dog teams (faster travel) and technologies such as metal chisels (making it possible to set nets in new locations if camps were moved during the winter), and the pull of fur trading posts, may have compensated for the loss of a physical network of people sharing knowledge of changing caribou movements. With the arrival of permanent, year-round settlement, the challenge of monitoring and up-dating knowledge of caribou movements remained, but changed in nature. The arrival of skidoos in the 1970s has made up for the inflexibility in movement that permanent settlement brings, but the purchase of skidoos is dependent on a wage income. Over time, the flexibility and extent of the Dënesǫłine presence on the land has decreased, but simultaneously, rate of travel on the land has increased. A tradeoff is involved:

> *What is often overlooked is that ... the necessity of this technology [rifles, snowmobiles, outboard motors, etc.] for effective foraging from newly centralized communities, so that in many ways the use of the technology is a trade-off ... [there are] social constraints on acquiring and using that technology* (Collings 1997:24).

Indicators of impacts, positive and negative, on Dënesǫłine knowledge of caribou movements and ability to maintain knowledge exchange networks on the land, is illustrated below (Table 3.1):

Table 3.1: Changes in Dënesǫłine Caribou Information Network through Time			
TIME PERIOD	Pre-1770s epidemic	Late 1700s – 1930s	Present
Estimated Size of Dënesǫłine Population	4 000 - 5000 people (Smith 1981: 274-75)	Loss to Diseases of European Origin Examples: 1772 epidemic (Burch 1991:441) 1865 scarlet fever epidemic (Abel 1993:197) 1906 – population estimated at 900 (Csonka 1999:123) 1928 epidemic (Abel 1993)	1305 Chipewyan mother tongue speakers (Statistics Canada, 1996 census) (http://www.statcan.ca/english/Pgdb/demo36a.htm)
Estimated Extent of Land Occupation	Transitional forest zone between Hudson Bay and mouth of the Coppermine River (latitude) - seasonal occupation of the barren lands	Shrinkage of occupation due largely to disease and in part the influence of the fur trade	Settlements in Northern Manitoba, Saskatchewan, and the south Slave region of the NWT
Rate of Travel Possible for Caribou Hunting	By Foot: *Men, women and children* were able to maintain the same speed of travel as the spring caribou migration *Men travelling alone*: 30 km/day with some daily sprints of 68-72 km / day– two men in Hearne's party walked at least 300 km in 4-5 day period (Burch 1991:443)	Dog teams introduced - increases speed of travel, but increases need for caribou meat, therefore potentially limiting rate and range of travel	Scouting Flights Skidoos Collar Data - technology increases big picture view, but not presence on land - still cannot be everywhere at once
"Costs": Number of Caribou Needed/ Money	Almost all Needs (food, clothing, shelter, tools) met by caribou Examples: • 8 skins to make winter coat • up to 70 skins to make a teepee *etc.*	Technological Changes Affect When/ How Many Caribou Needed Examples: • # caribou needed to feed dogs, lessens with metal chisel (can now chip through winter ice to put out fish nets • caribou used as bait for white fox trapping • introduction of canvas (replaces caribou skin tents and wraps/ clothing	All Costs Require Money Examples: • Chartering caribou scouting flights • buying and maintaining Skidoo • buying gun/ ammunition

There are two main physical effects through time: the loss of time and experience on the land. However, through time, the introduction of new technologies increased the ability to move more quickly on the land, and may have made decision-making strategies (about how to anticipate caribou movements and distribution) less crucial. Hunting groups traveling by foot had to be extremely shrewd about where and when to target travel when a decision to spend four days walking in one direction might move hunters further, rather than closer to variable caribou migration routes. However, with the arrival of dog-teams and other introduced technologies, Dënesǫłıne populations were suffering from drastic diminutions of numbers through disease outbreaks that reduced the density of the "information network" that scattered hunting camps represented. A kind of revitalization of techniques to adapt to variations in caribou movements were brought about by the ability to move with increased speed (from foot to dog-team to skidoo travel to chartering reconnaissance flights before community hunts in recent years) on the barren-ground caribou range. With increasing technology, the move from one possible hunting area to another can be much faster (can cover greater area in much less time), however the monetary cost of chartering a plane is still high.

3.5 Changes in Information sharing since Dënesǫłıne Settlement

As trading posts began to play a role selling dry meat and fish back to the Dënesǫłıne people, patterns of meat storage and sharing between hunting groups were adapting to new needs instigated by the fur trade:

> *The numbers [of caribou] are not being depleted, as the native kills enough for his own use, putting up dry meat for the winter and selling the skins of the deer made into dry meat to the Company. The winter of 1923-24 the natives had more dry meat than ever before known. The Company acted as distributors for a po[r]tion of this meat, purchasing from one native and later selling to others who had depleted their supply, for the price paid* (Memo from C.H. Clarke to Fur Trade Commissioner Regarding Statements made by the Department of the Interior, Hudson's Bay Company Archives RG2/4/86, Correspondence of the Canadian Committee).

However, Łútsël K'é elders interviewed in 2001, marked a number of natural meat cache sites (rock crevices underlain by permafrost) distributed around the east arm of Great Slave Lake and Artillery Lake and still in use in their life-times. With the declining role of the Hudson's Bay posts, the Department of Indian Affairs purchased community freezers in the mid-1950s, and distribution of meat from the freezers was controlled by Indian Agents who distributed fish nets and organized summer fisheries for dog food. Perhaps in order to maintain a degree of control over meat distribution, Łútsël K'é hunters kept using natural permafrost freezers to preserve caribou meat. Only in the 21st century has the community of Łútsël K'é gained full control of the responsibility (financial and logistical) for their community freezer.

In the 1950s, Canadian government agencies were attempting to avert or stem the loss of barren-ground caribou populations that the Canadian Wildlife Service felt were reaching dangerously low levels (Banfield 1956, 1957). A magazine article in Country Life, explains the dilemma from the CWS point of view:

> *There will always be caribou in the wilderness, but the days of their greatness are gone. They will never again be estimated by the million as Seton and Anderson knew them. They will never again be a dependable food supply throughout the North-West Territories. In that sense they are as assuredly doomed as the buffalo was doomed* (Jan. 17, 1957: 107).

There was even a suggestion in the late 1950s that "Indians were not to be allowed to hunt themselves, they were to do the dressing and skinning while professional hunters, *i.e.*, game officers, did the killing" (Cranston-Smith 1995:118). This action was not taken, a move that would have been totally unacceptable to aboriginal hunters. Aboriginal institutions of use, access and distribution of caribou meat and its harvest are intimately connected; they are conceptually and practically inseparable (Usher 1986:2). See Chapter 7 for examples of how recent community-based caribou monitoring programs are recognizing this inseparability.

3.6 The Beginnings of State-Organized Caribou Management: Rooted in Guilt over the Plight of the Buffalo?

It is impossible to read the history of the Canadian government's early efforts to regulate and monitor caribou hunting without learning about dramatic shifts of political power in the North. The Hudson's Bay Company transfer of lands to the young (Canadian) Dominion Government in the late 19th century and the influence of the Depression and War Years all had heavy influences on wildlife policies. Wildlife measures were shaped by political and economic forces and often enormous gaps in knowledge of caribou population numbers, movements and distribution in the first half of the 20th century. Severe epidemics among the Dene (Abel 1993:198, 201) and simultaneous wildlife shortages, had dramatic effects on First Nation's peoples, especially during the time of the negotiation of Treaty 8 in the Great Slave Lake area, the treaty that the Akaitcho communities, including Łútsël K'é, are party to. This was also the historical period during which the young Canadian government began establishing its northern conservation policies. Government agencies responsible for conservation efforts often played a role in diluting treaty rights in their efforts to assert sovereignty in the North (Fumoleau 1975, Cranston-Smith 1995, Usher 2000).

The Dene first received indications that their rights to hunt freely would be increasingly curtailed by the Canadian government before the signing of Treaty 8 at the turn of the 20th century. A prohibition against hunting bison, targeting the wild populations in the present-day area of Wood Buffalo National Park (the park straddles today's Northwest Territories-Alberta border) was written into the 1894 *Unorganized Territories' Game Preservation Act.* Attempts to estimate caribou numbers in the late 1800s made direct parallels to the plight of the buffalo, then in severe decline. Various attempts to guess at estimates of barren-ground caribou numbers were made in the late 19th century in the Great Slave Lake area where Łútsël K'é is located.

These highly inflated estimates of upwards of 25 million, had an effect on caribou hunting regulations. Initial attempts to perform government census studies revealed that much lower numbers of caribou existed in the North than originally surmised. This chapter will explore the effects of caribou population estimates on early Canadian hunting regulations in more detail. In retrospect, it is clear that early laws and regulations limiting aboriginal harvesting activities were based on little and/or circumstantial evidence. Contemporary barren-ground caribou census surveys are still grappling with the extreme difficulty of estimating barren-ground caribou numbers in vast landscapes. Individual barren-ground caribou may cover over 4000 km, as the crow flies, over the course of their spring or fall migrations.

Box 3.1-
Ernest Thompson Seton's collected Observations of Caribou Numbers; Turn of the Century

Warburton Pike, who saw them [caribou] at Mackay Lake, October 20, 1889, says: 'I cannot believe that the herds [of buffalo] on the prairie ever surpassed in size La Foule [the throng] of the caribou. La Foule had really come, and during its passage of six days, I was able to realize what an extraordinary number of these animals still roam the Barren Ground...'

From figures and facts given me by H.T. Munn, of Brandon, Manitoba, I reckon that in the three weeks following July 25, 1892, he saw at Artillery Lake [latitude 62 ½ °, longitude 112°] not less than 2,000,000 caribou travelling southward; he calls this merely the advance guard of the great herd. Colonel Jones [Buffalo Jones] who saw the herd in October at Clinton-Colden, has given me personally a description that furnishes the basis for an interesting calculation of their numbers.

He stood on a hill in the middle of the passing throng, with a clear view ten miles each way, and it was one army of caribou... we find that the number of caribou in this army was over 25,000,000, yet it is possible that there are several such armies, in which case they must, indeed, far outnumber the buffalo in their palmiest epoch [Seton 1910, 'The Arctic Prairies,' Scribner's Magazine articles, Vol. XIviii, November, 1910, #5 [National Public Archives – MG29D108, vol.4].

The Dene of the Great Slave Lake area came to Deninu Kue (Fort Resolution) on the south shores of Great Slave Lake to sign Treaty 8 in July of 1900. Dawson City, Yukon was the largest Canadian population centre west of Winnipeg at the time (Fumoleau 1975). This treaty was signed by the Dene of the Great Slave Lake area primarily to ensure that their freedom to hunt, trap and fish would be protected, especially in the

face of encroachment by white trappers, traders and prospectors (Fumoleau 1975). Essentially, the Dene signed treaties to guarantee recognition and protection of their property rights (political and cultural claims) to the natural resources of their traditional territories. In particular, the Dene wanted to guarantee their continued access to their ancestral hunting grounds, the ranges of the barren-ground caribou. They were highly aware of the devastating effects of reserve systems on the aboriginal peoples of the prairies (Fumoleau 1975, Abel 1993). The report of the Treaty 8 Commission illustrates early on that the Dene were suspicious that their rights would not be recognized by the Dominion government (Fumoleau 1975:84).

Box 3.2 The Treaty 8 Commission and Hunting and Fishing Rights

Our chief difficulty was the apprehension that the hunting and fishing privileges were to be curtailed. The provision in the treaty under which ammunition and twine is to be furnished went far in the direction of quieting the fears of the Indians, for they admitted that it would be unreasonable to furnish the means of hunting and fishing if laws were to be enacted which would make hunting and fishing so restricted as to render it impossible to make a livelihood by such pursuits. But over and above the provision, we had to solemnly assure them that only such laws as to hunting and fishing as were in the interest of the Indians and were found necessary in order to protect the fish and fur-bearing animals would be made, and that they would be as free to hunt and fish after the treaty as they would be if they never entered into it (Official Report of Treaty 8 Commission to Minister of the Interior, 1899, cited in Fumoleau 1975:84).

There is still great controversy over the intent of Treaty 8. The Dene argue that they did not understand the treaty to be an agreement on their part to cede all rights and title to their ancestral lands, nor to abide by hunting and fishing regulations set by the Canadian or provincial governments. Signatories to Treaty 8 did request that the Canadian government implement game laws to limit access and/or control the hunting activities of outsiders (traders, trappers and prospectors) encroaching on ancestral Dene hunting grounds, but these measures were not initially enforced. When regulations *were* enforced they were applied both to aboriginal and non-aboriginal peoples. As a result, annual gatherings for treaty payments became not only meeting points for summer gatherings before dispersal to

winter hunting grounds, but a place to air complaints to the Canadian government about game laws that were eroding rather than protecting Dene freedoms to hunt, fish and trap in their ancestral lands.

Treaty 8 elder Johnny Jean Marie Beaulieu testified in 1968 that Chief Drygeese (one of the signatories to Treaty 8) told the Catholic Bishop in the area [Bishop Breynat] "that the buffalo business [closed season] is not going to happen with the caribou, because that is how the people live" (Fumoleau 1975:127). In 1914, Vilhjalmur Stefansson, then working with the Canadian Naval Service pushed for a closed season for caribou. He made a submission to the Canadian Commission of Conservation suggesting that a trend similar to the slaughter of the buffalo on the prairies was over-taking the North and was one of the first to argue for caribou conservation measures (Cranston-Smith 1995:76). Stefansson's views were based on his observations of excessive caribou harvests by whalers in Alaska and the western Arctic. That same year, Canada's Interior Minister suggested amendments to the Northwest Game Act including prohibitions on the killing of caribou cows and yearlings and the appointment of game officers to enforce caribou hunting restrictions and a closed season (spring to fall months).

In 1916, the Advisory Board on Wildlife Protection (ABWP) was created *with the mandate to advise government on treaty matters* and to suggest further changes to the Northwest Game Act. Hunting restrictions were already having such effect on the Dene of the Great Slave Lake area that by the time the ABWP was created, the Chief of Deninu Kue (Fort Resolution) was requesting an ease of hunting laws because people were going hungry (Fumoleau 1975:122). The year after the Chief's request, revisions to the NorthWest Game Act were passed in federal parliament, outlining closed seasons for caribou, moose, mink, muskrat, ptarmigan, wild geese, ducks and other animals, allowing residents to take game in closed seasons but only to prevent starvation. Incredibly, while the Dene *were* starving in some areas, the government considered over-riding the Game Act to allow the export of caribou as war-time meat supplies.

In 1919, a Royal Commission was appointed to look at the potential of the North to produce meat (reindeer) and wool (musk-ox). The Commission was made up of a

railway commissioner (there was talk of building a rail-line from southern Canada, up to Great Slave Lake and across to the Hudson Bay coast (see Tyrell)), the manager of an abattoir company, the commissioner of Dominion parks, Stefansson and others. Captain Munn (whaler) recommended that the barren-ground caribou on Coats Island be reduced to small numbers to allow them to be domesticated through the influence of imported reindeer (one of a number of suggested locations for Reindeer Experimental Stations). Southampton Island in Hudson Bay was suggested as a suitable place to raise reindeer isolated from caribou (Report of the Royal Commission to Investigate the Possibilities of The Reindeer and Musk-ox Industries in the Arctic and Sub-Arctic Regions of Canada 1922:29). In all, the Commission made 36 recommendations, prompting wolf control programs, harvest restrictions, efforts to domesticate caribou, caribou and musk-ox population surveys, Saami (aboriginal reindeer herders from northern Europe) immigration and suggestions to enculturate Inuit and Indian populations into reindeer herding techniques. Although many of the Commission's recommendations took root, most attempts to introduce reindeer were relative failures, and the Canadian government pushed ahead instead with efforts to preserve northern caribou populations. These efforts often resulted in policies that provoked the aboriginal peoples who depended on the caribou for their physical and cultural survival:

> *In the large project of preservation of game, I am certain that if we antagonize the Indians it will cause endless trouble in the future, whereas if we approach this question in a proper manner and seek the Indians' cooperation and not their hostility, much useful work can be done* (Bury to McLean, 1920 cited in Fumoleau 1975:121, Treaty 8 Officer of the Department of Indian Affairs stationed at Fort Smith writing to the ABWP).

Nonetheless, an aboriginal hunter was fined for harvesting a duck in the Fort Smith area in 1920. As a result the Treaty 8 Dene boycotted the treaty payment at Deninu Kue (Fort Resolution) that year:

> *... the Indians were very much exercised over the provisions of the Game Act ...On being asked to state their grievance the Indians said that they depended on the game for meat... and that if they were stopped from shooting game they would starve, and that they only wanted to be allowed to shoot enough to keep themselves alive. They also said that the fish were very scarce in the Great Slave Lake this year .... They shoot very little game in any case as ammunition*

is very dear and hard to get (Police Inspector George Frederick Fletcher, 1920 in Fumoleau 1975:125).

In some cases, the Canadian government set aside lands for the exclusive hunting and trapping rights of aboriginal peoples ("preserves"). However, there are indications that a number of game wardens misinterpreted these preserves to be the *only* lands on which aboriginal peoples were to be permitted harvesting rights (Fumoleau 1975:187-189), essentially creating a ghetto effect rather than a core protection for aboriginal property rights. In 1923, the Yellowknife, Slave River and Peel River game preserves were established "primarily for the conservation of wild life, but in these reserves the Indian will be allowed to hunt and trap with the same freedom as he always did" (Fumoleau 1975:246). A high-ranking federal government official later wrote that the creation of the Yellowknife Preserve (purportedly encompassing a massive area of 70 000 sq. mi. stretching northward from the northeastern arm of Great Slave Lake) was a trade-off in return for excluding Indian peoples from hunting or trapping in Wood Buffalo Park (Fumoleau 1975:257).

In 1909, a prohibition on the purchase of musk-ox hides resulted in the cancellation of a HBCo post on the Thelon River. Bishop Breynat, who had led many campaigns to see the treaty rights of the Dënesǫłıne and Dogrib peoples honoured (Fumoleau 1975) asked the NWT Council to transfer the western part of the Thelon Sanctuary to the Yellowknife Preserve (allowing hunting), however the Council refused. The Council did, however, issue Dënesǫłıne people permits to cross the western end of the Sanctuary (Raffan 1992:57).

"Billy" Hoare was hired by the Department of the Interior in 1924, to find out more about the caribou migrations and the "enemies of the caribou" (Pelly 1996:60) as a result of a recommendation by the 1919 Royal Commission on Reindeer and Musk-oxen. After traveling for two years and more than 3000 km following the migrations of the caribou on the barren lands, Hoare became the first warden of the Thelon Sanctuary in 1927. "Jack" Knox, a warden at Wood Buffalo National Park, joined Hoare. Hoare immediately began warning Dënesǫłıne peoples hunting south of Artillery Lake that

they could face imprisonment if they continued to hunt in the Sanctuary. Hoare established a camp at "Warden's Grove" near the junction of the Thelon and Hanbury Rivers. It is clear that the Dënesǫłıne faced constant warnings and occasional seizures of animals once Hoare and Knox were working in the area. Knox set up a base at Artillery Lake and remained there until 1932. A permanent warden's service was never established, perhaps because the Department of the Interior was dismantled in 1932 (Pelly 1996:72).

However, the RCMP took over the warden's function, and in 1938/9, the RCMP charged three Chipewyan people for shooting musk-ox in the Sanctuary. They were detained for one month in Reliance after being tried in Deninu Kue (Raffan 1992:57). As a result of this and other enforcement activity in the Thelon, attempts to document Dënesǫłıne land use in the Thelon were difficult in the 1980s and 1990s and land use and occupancy studies have probably suffered as a result. There is archaeological evidence that the ancestors of the Dënesǫłıne have hunted in the Thelon area for hundreds if not thousands of years (Gordon 1996).

It has been suggested that the Thelon Sanctuary was created not only in order to protect musk-ox populations that were in severe decline, but to assert Canadian sovereignty in the North. Canada was stepping up supervision and control because it appeared that unless the Canadian Government made this effort, the governmental supervision of Greenland and Alaska might become applicable in the territory of the "Canadian Eskimos." Dr. Gordon Hewitt, Dominion Entomologist and Consulting Biologist to the Commission of Conservation, had recommended that amendments be made to the NorthWest Game Act of 1917 to protect various animals including musk-ox (Barr 1991:42). These measures were enforced by RCMP stationed at various posts including a post at Fort Resolution. The RCMP patrolled the Thelon and Hanbury Rivers as early as 1908 (Barr 1991:44). Correspondence in 1917 between the Canadian Committee of the Hudson's Bay Company (HBCo) in Winnipeg and the Governor and Committee of the HBCo in London complains that the Canadian government was pushing conservation measures in the Canadian North in order to transfer the

machinery of the Department of the Interior, whose mandate had recently been transferred from the three prairie provinces, into the remaining and "unsupervised" Dominion lands in the North:

> *... we may be sure that the Department [of the Interior] have in mind the desirability, as they see it, of finding some activity and pace wherein to continue using their large organization which has been built up during the past 25 years ... It is natural therefore that the outlying or unorganized territory [NWT], which remains under Dominion control and which territory should offer some attraction to the heads of the Department of the Interior as a field in which to apply those energies which will be available ... Government regulation, control ... will be a question of large importance to our Company for some time to come.*

A Barrister with the HBCo wrote to the Canadian Committee of the HBCo revealing the Company's bias that it: *Ought to be able to take care of the situation much better than any Department of the Government, and to see that satisfactory conditions exist in the North.* (13th Mar, 1925, Hudson's Bay Company Archives, File F-217, C.C. #3108, Letter from Ed. FitzGerald to Governor and Committee of the HBCO, London, Hudson's Bay Company Archives, Mar. 18, 1925, File F-217, C.C #3108).

There was a flourishing trade in musk-ox hides from 1860 to 1915, one that the HBCo was heavily involved with. More than 17 000 hides were traded at posts including Fort Rae, Deninu Kue (Fort Resolution), Du Brochet and Fort Churchill (Barr 1991). Thousands of musk-ox hides were also traded between the Inuit, American and Scottish whalers in the Hudson Bay area. It is estimated that by 1917, only 400-500 musk-ox remained, and that same year, the federal government enacted protective legislation for the musk-ox.

Musk-oxen are characterized as a critical resource for the Dënesǫłine (Burch 1977:141). They were harvested for food only when other food sources were not available. Łútsël K'é elders confirm instances when they took musk-ox on the North Shore of McLeod Bay in past years when freeze-up arrived unexpectedly early and they could not find caribou.

The Dene refer to the Thelon area as the place "where God began when the world was created" (Raffan 1992). One of the Dënesǫłine words for the barrens used in John

Hornby's time was "God's body" (*Hoegla*) (York 1997), probably a reference to the stories of the Ice Giant that bind the Dene. Hearne described the Thelon area as the "little commonwealth" and Tyrell as the "Garden of Eden." There is evidence that as late as the 1950s Inuit and Dënesǫłine were meeting in the barrens at the Beverly, Kaminuriak and Dubawnt Lake areas (Csonka 1999).

In 1924, The Canadian Minister of the Interior made a statement in the House of Commons about the effects of non-aboriginal peoples moving into aboriginal hunting areas:

> *We are receiving constant complaints from the Indians that they are being driven off their hunting grounds. It is generally conceded that the White man ... is denuding the hunting grounds of the red man to such an extent that it is becoming a serious problem* (Fumoleau 1975:242).

Five years after the creation of the Yellowknife game preserve, Dene communities across the North suffered massive loss of life due to an influenza epidemic. Most elders alive today were small children or very young men and women during this devastating episode. An official with the Department of Indian Affairs recounted that many Treaty 8 Dene leaders were lost in the 1928 epidemic (Fumoleau 1975:265). Mineral staking activity exploded the following year; 640 claims were staked on the south shore of Great Slave Lake alone, and with this increase in mineral exploration activity came the crash of fur prices when the depression hit in 1929. Some government officials blamed game laws and closed season hunting regulations for cruelly exacerbating the hardship already experienced by the Dene due to the devastating effects of disease and the poor economic prospects brought on by the fur market crash (Fumoleau 1975:269). After the Second World War, the Dominion Wildlife Service and its successor, the Canadian Wildlife Service, began suggesting that treaty hunting rights should be truncated. Both the Yellowknife and Slave River Preserves were abolished by 1955 (other game preserves were abolished even earlier) affording little more than 20 years of guaranteed and exclusive harvesting rights to the Dënesǫłine, whose ancestors had hunted in the barren-ground caribou ranges well before the time of Christ.

As a counterpoint to the description of the changing, but continuous physical presence of Dënesǫłıne people on the barren-ground caribou ranges, the following sections will look at the relatively short history of scientific investigations of the barren-ground caribou, and the remarkable changes in understandings of caribou population dynamics that have occurred in that time period.

3.7 Early Policies and Government-Sponsored Caribou Research

Barren-ground caribou were "first described for science" by Sir John Richardson in 1829, a physician and naturalist who accompanied Sir John Franklin's expeditions (Banfield 1949:479-80). It was not until almost 100 years later that further efforts were sanctioned by the Canadian government to learn more about the barren-ground caribou, their behaviour, movements, distribution and feeding grounds. The impetus for this effort was a Royal Commission, looking toward the North as a suitable area to pasture semi-domesticated reindeer and musk-ox populations:

> *With the object of broadening the basis of subsistence of the natives, especially in the view of the rapid advance of mining into the North, the Department of the Interior has for a considerable time been looking into the possibilities of building up the numbers of the larger animals. To this end the Royal Commission on the Reindeer and Musk-ox was appointed in 1919 and since that body made its report, a number of investigations have been conducted with the Grenfell Mission reindeer, first in the Canadian Labrador and later when transferred to the island of Anticosti...*(Finnie, Director, North West Territories and Yukon Branch, Department of the Interior in Porsild 1929:6).

Eighty years ago, Canadian government authorities knew very little about the barren-ground caribou range. Guy Blanchet, a Dominion Land Surveyor, wrote to Ernest Thompson Seton in 1922, asking about his publication, "The Arctic Prairies," and whether or not he meant that there was actually a "prairie" on the barrens north of Artillery Lake (National Archives, 'ETS' MG29 D108, vol. 3, File 3-81):

> *What I am most interested in is the existence of the 'prairies'. The Indians were all emphatic in saying there was no grass on the barren lands. There is also a rather erratic Englishman named Hornby who has spent some fifteen years living alone or with the natives on Great Bear Lake and in the Artillery Lake country who assured me that he had seen no hay or grasses.*

I was able to make a short trip to Artillery Lake travelling overland and on several occasions saw what appeared to be grassy hills on the distance. On closer inspection they proved to be covered with moss and a green shrub. This became less and less as the barren lands were approached and from the lack of soil here I would only expect to see the hardiest vegetation. The caribou hunt was on when I reached Artillery lake and I had quite a pow-wow with the old Yellowknife Chief whose evidence was in support of this.

This may seem to be questioning your veracity but it is more your interpretation of prairies if grasses or shrubs and moss. Should there be actual hay lands beyond the point I reached they would warrant investigation. I should greatly appreciate any information you could give me on this subject.

Before Blanchet mapped the caribou country of the eastern arm of Great Slave Lake in the 1920s, it appeared on maps much as it had when Captain George Back (of Sir John Franklin's expeditions) pictured it in the early 1800s (Finnie 1985).

In April of 1926 the Porsild brothers were appointed by the Canadian government to carry out a general botanical investigation of the barren-ground caribou ranges with the aim of assessing its suitability as reindeer pasture. The Porsilds lived for many years north of the Arctic Circle, learned to speak Inuktitut, and collected 15 000 herbarium specimens including almost 5000 cryptogams and 1000 photographs.

The Royal Commission ultimately concluded, upon collecting the observations of government land surveyors, explorers, the police, and missionaries, that converting the Canadian north lands into an agricultural enterprise for meat (reindeer) and wool (musk-ox) production would not be feasible:

> *... the existence of leased areas, even if fenced, in the natural haunts of these animals [caribou] and the consequent interference with their freedom of movement, would be likely to prove a serious detriment to what is, even as matters now stand, a very valuable national asset, and one the value of which could be greatly increased under a definite policy of conservation and development* (Report of the Royal Commission 1922:31).

It was also as a result of the collection of such observations, that the Royal Commission advised that more stringent regulations controlling the harvest of caribou would soon need to be implemented:

Box 3.3 RCMP Observations of Abundant Caribou at the Turn of the 20th Century

At the south end of Artillery lake, countless deer were seen; the bucks and does seemed to belong to separate herds. They were crossing and recrossing at that point where the lake is quite narrow, ranging from one quarter of a mile to a mile and a half in width, For a distance of about two or three miles the hills were covered with them, and the water was bridged in two or three different places at a time. This might appear to be exaggerated; I would never have believed there were so many deer in the North, only now that I have seen them, I must. The natives that we met at that place told us that what we had seen was not the main herd, but part of it; that the main herd was a few miles up the lake on the west shore; that they had just been there in their canoes the previous day. If what we had seen was not the main herd, but part of it, I wonder how large the main herd could be (Observations of RCMP Inspector Pelletier at Artillery Lake, July 20, 1908 The Report of the Royal Commission 1922: 30-31).

There is nothing new here except the caribou, They are within forty miles of this place in tens of thousands, and the natives are getting numbers of animals and will therefore have plenty to eat this winter. The deer (caribou) are passing north, coming from the southeast, most likely from Fond du Lac on Lake Athabaska. They could not cross there on account of late frosts, and swung around towards Great Slave Lake. They say the animals are scattered over hundreds of miles and literally in millions; the further east one goes, so they say, the more there are, and the buffalo on the plains in the long ago is not a patch on this for numbers (Dec. 15, 1917, Inspector Anderson, Royal Northwest Mounted Police, writing from Fort Fitzgerald to Dr. E.M. Kindle, The Report of the Royal Commission 1922:31).

... every spring, just before the young are born, large numbers of caribou are slaughtered by the Esquimaux ... My Fry states that there is no necessity for the killing of these caribou, as there is plenty of other food available at that season of the year (Royal Commission 1922).

By the 1930s, the Canadian government heard evidence that caribou hunting along the Arctic coast had grown so intensive, especially with the introduction of rifles and in order to meet the food supply needs of whaling ships, that caribou migration routes had changed (Porsild 1929:5-6, C.H. Clarke Correspondence, Oct. 30, 1924, HBCO Archives RG2/4/86, Dragon 2002). There were even suggestions by the federal Department of the Interior that the coal fires from Hudson's Bay Company trading posts were affecting caribou migrations. However, the Hudson's Bay Company argued that the Canadian Department of the Interior had ulterior motives for suggesting that the Company was affecting caribou migration routes – a desire to assert its authority in the

northern regions. The Company also suggested that the Canadian government was probably not as familiar as it should have been with the natural variations of caribou migrations:

> *The paths of caribou migrations are always very uncertain and these movements are frequently deflected by causes entirely outside of any human agency. Caribou may be very numerous in one section of the country and equally scarce in others ... I would call to your attention the fact that caribou were, for no known cause, exceptionally numerous throughout the northern portion of the Yukon Territory and Alaska in the fall and winter of 1923/4 ... Residents of Old Crow, Rampart House and adjacent points stated, that they appeared in larger numbers then, than at any time within the memory of any of the inhabitants. Similar reports are again to hand this year from certain parts of Alaska. This in spite of the fact that all natives and trappers have been using high power rifles for many years (original emphasis)* (Letter from Ed. Fitzgerald, Deputy Chairman, Canadian Committee, HBCo, Oct 1924, HBCO Archives, RG2/4/86).

It is clear from correspondence between the Canadian Committee of the Hudson's Bay Company and the Canadian Department of the Interior, that initial investigations of the nature of caribou migratory behaviour and abundance were partially the fruit of a political struggle for control of the Canadian North. This was a struggle between a fledgling national government and a corporate monopoly with a much longer history in the area.

Changes in Caribou Survey Techniques and Data Interpretation Over Time

Current classifications of caribou populations have shifted quite a bit from initial efforts by zoologists in the 1930s:

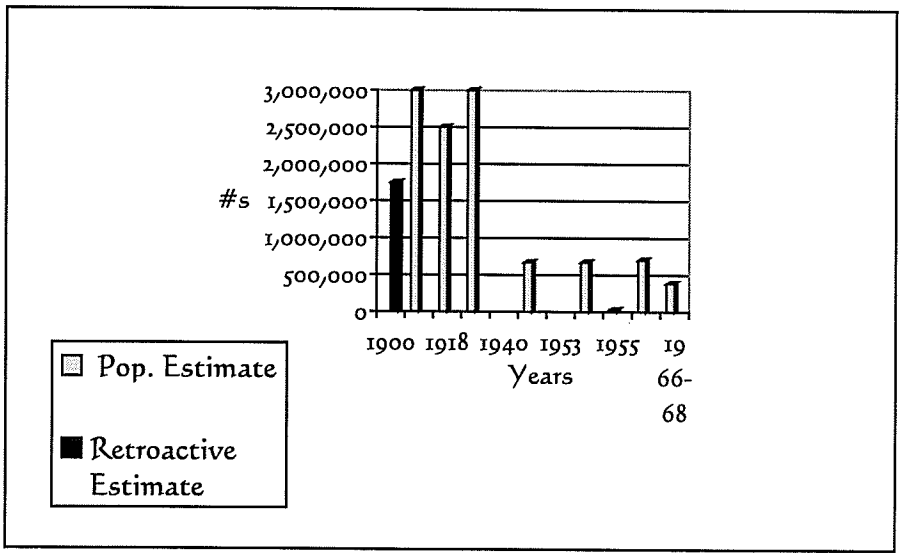
> *Zoologists have somewhat arbitrarily, but by no means unanimously, divided the caribou of North America into some eleven different groups, of which six are classed as 'Barren Land' and five as 'Woodland' caribou. The authorities appear to be far from agreement in the matter of classification, and your commissioners have therefore thought it best to refrain entirely from the use of the scientific names which have been bestowed on the various types, and to refer to them only in general terms as "Woodland" and "Barren Land" caribou* (Report of the Royal Commission to Investigate the Possibilities of The Reindeer and Musk-ox Industries in the Arctic and Sub-Arctic Regions of Canada 1922:29).

The Report of the Royal Commission to Investigate the Possibilities of The Reindeer and Musk-ox Industries in the Arctic and Sub-Arctic Regions of Canada (1922:37) listed as one of its recommendations:

> *THAT an earnest effort be made to ascertain as soon and as closely as possible the numbers and movements of the Barren Land caribou, especially those on the mainland and on the islands adjacent thereto; as also the numbers and movements of the caribou and other varieties, particularly those in the Yukon Territory and in northern British Columbia.*

Since that time, population estimates of the barren-ground caribou ranging from the Mackenzie River east to the Hudson Bay coast have varied remarkably and seemingly outside of fluctuations that could be described as natural. It became clearer and clearer that estimating absolute numbers was an enormously demanding task (Fig.3.1).

Figure 3.1: Population Estimates of Mainland Barren-Ground Caribou (between Mackenzie River and Hudson Bay)



Seton's (1911) estimate that more than 30 million caribou roamed the North just after the turn of the century (1907) has since been regarded as a huge over-estimation. In 1918, Anderson, a biologist from the American Natural History Museum, estimated that 2.5 million barren-ground caribou existed in the Canadian North west of Hudson Bay. This estimate was much closer to Banfield's (1954:10) retroactive estimate in the mid-1950s that 1.75 million caribou existed in the Northwest Territories area at the turn of the

century. Clarke, carrying out a biological investigation of the Thelon area in the late 1930s, estimated there were 3 million barren-ground caribou (Cranston-Smith 1995:91).

The Canadian Wildlife Service (established in 1947) carried out the first scientific surveys of the barren-ground caribou. The results of a survey done in the mid-1950s and a survey done in 1949, showed that according to survey results, caribou numbers had decreased by more than 60 percent (Cranston-Smith 1995:90). The caribou surveys still referred to an undifferentiated "mainland population," ranging between the Mackenzie River and Hudson Bay in the early 1960s (Kelsall 1963:2). By the late 1960s, surveys were done separately on the Bluenose, Bathurst, Beverly and Qamanirjuaq herds (Parker 1972). From the 1940s until the 1960s, counts were done in the winter and spring months, seasons when caribou are dispersed over large areas and movements and distribution can vary considerably from year-to-year. By the 1970s, surveys were concentrated on the calving grounds, when breeding females are aggregated in a much more contained area.

Early Canadian Wildlife Service (CWS) estimates and suggestions for management actions, from 1949 through the early 1960s, were criticized on a number of fronts (Table 3.2; Cranston-Smith 1995:90-115):

Table 3.2:
Criticisms of Early Canadian Wildlife Service
Barren-Ground Caribou Research

• unsubstantiated population estimates were used for comparative purposes (Porsild)
• explanations of declining herd numbers were attributed to over-harvesting; when, for example, there were no hunters resident on the coast of Greenland when caribou disappeared there (Porsild)
• charges of over-harvesting were attributed to one group of hunters, aboriginal hunters, without much regard for the effects of non-aboriginal hunters (Conn, Department of Indian Affairs)
• early estimates were really 'guess' estimates (McTaggart-Cowan)
• the reliability of strip counts on unevenly distributed populations is questionable (McTaggart-Cowan)
• a proper methodological approach would be a regional one, but the uniform regulations that would result would be ineffective unless applied so severely that 'unnecessary hardship would be caused' where regulations were unnecessary (McTaggart-Cowan)
• specific criticisms were levelled at the 1955 survey thought to reveal highly questionable results when population counts were done by a few wardens covering a very large geographical area during migratory periods (Father Brown)

3.8 Contemporary Exchanges between Caribou Biologists, Managers and Aboriginal People

It would be artificial to argue that there has not been an exchange between biologists and aboriginal communities before the development of modern-day "co-management" boards (Anderson 2000, Ferguson 2001). For instance, Linnaeus, in the development of the famous *Systema Naturae*, gleaned his knowledge of *Rangifer* (the scientific genus name for all caribou and reindeer subspecies) from the Saami, the aboriginal peoples of northern Scandinavia and Russia. The word, "*Rangifer*" is derived from a Saami term for young reindeer, and the word "caribou" is most likely derived from the Mi'kmaq word "*xalibu*." Banfield's major revision of the genus in 1961 was based on insights of aboriginal hunters' discussions with explorers from 1487 onward (Anderson 2000). The first Peary caribou specimen submitted to a museum was a gift from a Dënesǫłıne guide of Samuel Hearne (Anderson 2000). Local hunters played an active role in identifying herds or "deer that are different." Dene, Metis and Inuit people have also been hired over the years by the Canadian Wildlife Service to aid efforts such as caribou tagging and wolf control programs (Thomas 1999, http://www.arctic-caribou.com/QA99.html#brain).

There is no doubt that exchange between biologists and aboriginal caribou hunters has occurred over the years. However, these exchanges have not led to a convergence of perspectives or understandings of the barren-ground caribou herds between caribou biologists, managers and aboriginal peoples (Kruse *et al.* 1998, Klein *et al.* 1999).

One Łútsël K'é elder describes perceptions that in the 1960s, the Inuit built "a wall" between the caribou attempting to move between the barrens and the tree-line, perhaps attributable to the variations in movements that may have occurred as a result of major tagging efforts at Contwoyto Lake and on the Thelon River. In the 1960s, almost 7 000 caribou were tagged. Several hundred were tagged in a single day at the height of the migration of the Beverly herd across the Thelon River (Parker 1972).

It is clear from Dene taboos, that such activity was antithetical to Dene concepts of respect. Tagging programs did occur at Duck Lake in northern Manitoba at a major caribou crossing. The Sayisi-Dene were relocated from this crossing to Churchill where

devastating conditions led to a major loss of life (Bussidor and Bilgen-Reinart 1997). The Dene were pilloried by the Manitoba and national media for their harvests at such crossings (see Banfield 1957). Some Dene people participated in subsequent tagging programs at the very water crossing from which they were relocated in later years. However, Dene groups were doubly wounded by the negative attitudes branding them as "wanton or indiscriminate slaughterers" (Banfield 1956, Kelsall 1968) while tagging programs, that to them were highly disruptive of the caribou, carried on at the same sites (Kendrick 1994, Spak 2001). There was an extreme mistrust of the very methods biologists were using to gather information about the caribou, never mind any faith in the information itself.

3.9 Dene Concept of Caribou and People as Co-dependent Actors

> *Caribou feed people... they come around and they feed people* (Herman Catholique 2001).

> *[H]e had often, he said, been told, that if a solitary deer were beaten, the whole herd would at once abandon that part of the country where the deed was done* (George Back, member of Franklin's expedition, stationed at Fort Reliance, originally written in the 1830s, 1970:211).

> *Caribou, they have a strong mind ...the whole herd, but one caribou is the leader, the boss and is the one that's going to make the decision [when animals are making a crossing] ... They've got one mind. Whenever they're going, they say nothing stops them* (Herman Catholique 2001).

Elders in Łútsël K'é speak of caribou as a relative, as a living being that becomes as lonely for the Dene as the Dene become for the caribou after a long absence. The harvest of these animals perpetuates the relationship between the Dënesǫłıne and the barren-ground caribou, a concept hard to envision in the parlance of conventional resource management institutions that speak of "resource exploitation" and numbers of "resource units." People also speak of the consequences of handling an animal outside of harvesting activities; that there is a communication between animals that are disrespected and the other caribou in a herd. In the past, there were medicine people

who elders say were able to visualize the whereabouts of migrating caribou through drumming and dreaming (Kendrick field notes). Traditional resource management systems are part and parcel of kinship-based systems where the members of a community depend on each other to share knowledge of resources and wild resources themselves. The practitioners of these systems are community members *and* caribou (Kofinas 1998:123, Sharp 1977, Ridington 1990, Smith 1978, Bone *et al.* 1973). The rules, norms and conventions of community-based institutions that guide aboriginal peoples' relationships with wildlife like barren-ground caribou are rooted in customary laws, unspoken assumptions under-pinning thought and more recently established in Canadian law through settled land claims (Kofinas 1998).

3.10 Development of Co-Management in the Northwest Territories

In 1955, a "Caribou Committee" was created at the suggestion of the Canadian Wildlife Service (CWS) to coordinate federal and provincial caribou conservation efforts. A survey completed that year, indicated that barren-ground caribou populations were in decline. Despite the contention by a leading caribou biologist, A.W.F. Banfield, that "we [CWS] are not in a good position to explain the decline" the Chief of the CWS announced that it was clear on the cause of the decline despite a lack of data (Cranston-Smith 1995:113-121). The implication was that aboriginal peoples were over-hunting barren-ground caribou populations. While the federal government could unilaterally limit caribou harvest of aboriginal peoples in the Northwest Territories at the time, outside of the territories, control of harvest regulations fell to the provinces after the 1930 Natural Resources Transfer Agreement. However, by the late 1950s, the Department of Indian Affairs had been convinced by CWS biologists to limit the harvests of Indian and Metis peoples in the provinces to two caribou/person/year as well (Cranston-Smith 1995:117). It is doubtful, that this quota was ever enforced; and it was challenged by Saskatchewan aboriginal leaders.

By 1960, barren-ground caribou were declared in danger of extinction by a federal Order-in-Council that allowed quotas and seasonal restrictions on caribou to be applied

to native people in the NWT (Cranston-Smith 1995:126). Chapter 4 will explain at greater length the recognition through time of the limits to the accuracy of early caribou population estimates, the uncertainty of contemporary census results and the implications for co-management decision-making. For the purposes of the current discussion, the transfer of resource management responsibilities, in particular for barren-ground caribou, from federal to territorial jurisdiction, are outlined next.

The administration and enforcement of wildlife policies and laws in the NWT were not transferred to territorial governance until 1967 (Clancy 1990:77). In 1970, The Administrative Committee on Caribou Protection (ACCP) recommended that a co-operative arrangement for the management of barren-ground caribou be set up between Alberta, Manitoba, Saskatchewan and the Northwest Territories to take over from earlier CWS efforts (Cranson-Smith 1995:137). At the same time, the newly formed Game Management Service of the NWT encouraged the formation of Hunters and Trappers Associations (HTAs), with the power to define their own leadership and membership by local agreement. HTAs were envisioned as "an invaluable network of field intelligence, along with a specialized channel of political advice." (Clancy 1990:80). By 1973, there were 28 functioning HTAs in the NWT (Clancy 1990:80).

The ACCP initiative to establish a co-operative management regime for barren-ground caribou made no reference to the inclusion of aboriginal communities in such a "co-operative" arrangement. This was despite the fact that a number of biologists and Canadian government officials had long recognized, whatever their knowledge of aboriginal governance systems, that any attempts to limit perceived over-hunting would be futile without the voluntary support of aboriginal caribou hunters. As early as 1954, one of the Chiefs of the Department of Northern Affairs and National Resources had stated:

> *Probably one of the mistakes of the past has been over-strict legislation which was not practical because it did not have the support of the people and was not enforceable except at great cost ... our public relations fell down to the extent that the natives were not given reasons, understandable and acceptable to them, why such legislation was required* (Cranston-Smith 1995:110).

By the mid-1970s, the NWT Commissioner had launched a program to decentralize as many programs as possible to the local level and transformed the HTA network from an advisory to an administrative role (Clancy 1990:85). The early 1970s were clearly a time of political awakening in the NWT. In 1974, the Dene Declaration announced internationally that the Dene peoples were to be regarded as a nation. By the late 1970s, due to efforts on a number of fronts: the Berger Report, the advance of aboriginal claims, and National Parks Service and Fish and Wildlife Service activities; the concept of "joint decision-making" arrived in the North (Clancy 1990:87).

By 1981, in an effort to foster better communication, the federal government financed a video project where Inuit hunters on the Hudson Bay coast and biologists were interviewed about the state of the herds, then thought to be declining. Biologists explained that there was evidence that the mainland herds had decreased steadily since 1900, except during the 1960s when numbers were stable since aboriginal hunters had started to stay in settlements and were not hunting so many caribou, especially for dog teams. However, biologists explained that as the populations of people living in the settlements increased and people had started going farther afield on their skidoos and were using radios and airplanes to locate caribou, caribou numbers were in decline again. Biologists predicted that under 400 000 animals were left in the early 1980s, and that if harvesting rates continued, the caribou would be gone in 12 years (National Film Board 1982).

Inuit hunters in the Keewatin region (west coast of Hudson Bay) refuted claims that the caribou were declining and expressed their doubts in the capacity of biologists to accurately carry out surveys. The video project was never extended to Dene communities (although Dene communities lobbied for a similar video project in their communities for years afterward) (Kendrick 1994). Aboriginal peoples adopting technologies that essentially revitalized the information networks they once had maintained on the land, were now being told that their use of technology was harming the caribou. Some hunters questioned the rationale that they hunted more caribou in the past. There was a general agreement that there needed to be better communication

between biologists and hunters, and in 1982, the Beverly and Qamanirjuaq caribou management board was formed to achieve that goal.

At the same time the video was in production, the joint aboriginal-government management concept was under consideration in Canada's capital, Ottawa. The subsequent 1982 Beverly and Qamanirjuaq Caribou Management Agreement set a precedent as a virtual poster-child for the joint management concept, opening up "key questions" at the time about the institutional design of authority and delegation systems for wildlife management (Clancy 1990). This caribou co-management board will be discussed at further length later in the thesis. However, before looking at formal caribou co-management arrangements, it is important to understand the struggle of many First Nations, including Łútsël K'é, to assert their pre-existing rights to self-governance and management of their resources, often in opposition to Canadian government initiatives to "give" or devolve rights to First Nations.

The early history of the negotiation of hunting rights between the Dene and the Canadian government is quite a contrast with the current situation. There has been a dramatic shift in government interpretations of aboriginal (and hunting) rights from the first half of the 20th century to the post-comprehensive claims and post-Constitutional era of the last two decades. Forces of devolution and legal landmarks in aboriginal rights have shifted the balance of power existing between state wildlife management practices and responsibilities, and those of First Nations peoples. However, existing aboriginal rights were not officially recognized on a national scale in Canada until the enshrinement of the Canadian constitution in 1982. The majority of the history between Dene peoples and the Canadian government was one of the unilateral granting of rights (by a state that regarded aboriginal peoples as "wards"), and this situation lasted for generations and continues to haunt current resource management efforts. Significant in-roads in the legal recognition of pre-existing and evolving aboriginal harvesting and resource management rights have occurred only in the last 10 years. However, there is still a long distance to travel on the road to a power-shift enabling nation-to-nation partnerships between aboriginal peoples and external agencies, and this shift can be

seen in the evolution of caribou co-management institutions in the North, the subject of Chapter 4.

Chapter 4

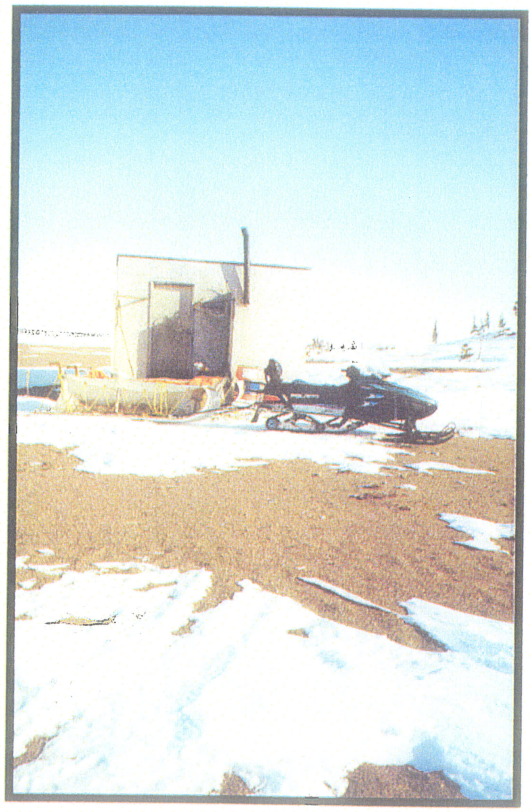
Living in Caribou Country - Co-Management and Local Empowerment

It's not what we know, but what we're willing to learn.

Mary Catherine Bateson

Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has.

Margaret Mead



4.1 Chapter Summary

Co-management can be a process of mutual learning, in the following cases, cross-cultural learning, between multi-scale resource management systems. Institutions in this discussion describe the rules of behaviour shown toward a resource, not organizations of people. Co-management systems are frequently informal institutional frameworks that support communal property regimes rooted in local environments. This chapter takes an in-depth look at co-management mechanisms from a local level where resource users (caribou hunters) literally share their home – "barren-ground caribou country" - with the resource (caribou) they depend upon economically, socially, culturally and spiritually.

Aboriginal concepts of communally-held property rights, and definitions of aboriginal cultural relationships to the land, are novel concepts with respect to Canadian common law. Widely recognized efforts to define and protect aboriginal rights, title to land and resources using *aboriginal* perspectives, are less than a decade old. This discussion first describes the historical evolution of Canadian recognition of aboriginal resource rights, and follows the varied initiatives of aboriginal communities to compel or fire up governmental recognition of their communal resource management regimes from a local level, often through means of political resistance. Local aboriginal resource management systems are agents of change rather than entities waiting for resources and decision-making power to "trickle down" from non-aboriginal political regimes. These efforts run through the history of Canadian government-Dene relations since treaty-making times, and are integrally connected to Dënesǫłine-caribou relationships (the Dënesǫłine are the Chipewyan branch of the Dene). This discussion focuses on the barren-ground caribou ranges contained within the Łútsël K'é Dene First Nation's traditional territory. As a result of resource management partnerships at varied scales, the community weaves and shapes mechanisms that support multiple perspectives of caribou-human relationships and resource management thinking, and ultimately recognition of aboriginal perspectives of communal property rights regimes.

4.2 Introduction

Co-management processes are either informally-realized (*de facto*) and/or formally-realized (*de jure*) within legal systems. Co-management institutions exhibit a range of local participation scenarios, from local resource users who are merely informed of resource management decisions, through to full participation of local resource users as "resource actors" (see Chapter 1, Box 1.3). Institutions are defined here as the working rules that determine who and in what contexts decisions can be made about resource use, what information must be provided to those subject to such institutions and the consequences of cooperating or disregarding rules of use (Ostrom 1990:51). These rules exist at a number of levels: operational, collective-choice and constitutional (see Chapter 2, Box 2.1). This discussion will not be limited to illustrations of formalized co-management "organizations," or groups of people gathered specifically to design institutions. This chapter also looks at how institutions emerge and are employed outside of legalized arrangements. Decision-making responsibilities and actions taken by local aboriginal resource "actors" may or may not be fully recognized by national and regional governance structures. Co-management processes exist at a number of different scales, and are discussed here for their origin and/or influence at a local level, seeing their connections to a community – the Dënesǫłine community of Łútsël K'é, Northwest Territories - situated in the "barren-ground caribou country" of northern Canada where as many as four barren-ground caribou ranges overlap (see Chapter 1, Fig. 1.3).

It is recognized that in recent years, both alternative adaptive resource management thinking (see Holling 1998, Gunderson *et al.* 1995), and the progress of First Nation self-governance initiatives, are changing the face of co-management regimes, described generally as "the sharing of power and responsibility between the government and local resource users" (Berkes *et al.* 1991:12). Co-management arrangements include initiatives ranging from nominal political and administrative partnerships, to fundamentally reformed governance and research frameworks. In this way, co-management links not

only Canadian government resource management structures with local First Nation resource management systems, but links evolving and diverse First Nation governance structures with each other. Co-management represents a renewal or reworking of conventional resource management systems where a lack of communication between centralized government resource management agencies and local-level management systems often led to ineffective management efforts. Ineffective management is described here as scenarios where resource users cannot or will not comply with management decisions and situations when government managers disregard the values, knowledge and institutions of resources users. Co-management mechanisms may help to synthesize an alternative resource management science open to meaningful participation by resource users. This idea will be more fully explored in Chapter 7, that in part explores community-based monitoring efforts supported by co-management regimes.

Academics have been hesitant to focus on a single definition of co-management. A number of terms refer to the same general concept: cooperative, collaborative, joint, participatory or multi-stakeholder management. Definitions in the literature emphasize: the arrangement of partnerships, the generation of local incentives for sustainable use and the sharing of power and responsibility for resource management and conservation (Berkes 1997:6). Examples of Canadian co-management arrangements range from early fisheries examples from the Canadian Maritimes (Kearney 1984) and more recently, co-management arrangements negotiated within comprehensive land claims agreements and enshrined in the Canadian Constitution (Roberts 1996).

A recent search (2002) of the Arctic Institute of North America's research project database (the search used the terms listed above), revealed close to 450 northern co-management references. Most of these references refer to claims-based aboriginal organizations or protected areas partnerships. Co-management arrangements arising outside of the latter two categories evolve almost exclusively for highly mobile wildlife populations like caribou, marine mammals and geese that migrate across a number of political boundaries. No one jurisdiction can "manage" these resources on its own and

these inter-jurisdictional co-management regimes tend to arise when there is a perceived crisis: industrial development that threatens vital habitat in the case of the Porcupine Caribou Management Board, or perceptions that population numbers were critically low in the case of the Beverly and Qamanirjuaq Caribou Management Board. This discussion concentrates on the management of barren-ground caribou (*Rangifer tarandus*), the most widely-ranging terrestrial wildlife species in the world, and the variety of co-management arrangements that have been created to understand their movements and to monitor and control their harvest.

Contemporary Dënesǫłine caribou-hunting communities are engaged in efforts to maintain and expand regional, territorial and national recognition of the Dënesǫłine-caribou relationship on many fronts. The negotiation of cross-cultural differences is examined in this chapter through all facets of the co-management of the barren-ground caribou herds. The Dënesǫłine-caribou relationship is maintained and revitalized through partnerships not only with formal co-management boards that partner Canadian government structures and traditional caribou-hunting communities, but through partnerships with industry (*e.g.*, traditional knowledge studies, design of caribou monitoring programmes on diamond mine claim blocks in the Northwest Territories), other aboriginal governance structures and multi-stakeholder protected area initiatives.

The history of state involvement in resource management in the Canadian North shapes and informs the attitudes and trust of participants in current resource management institutions. Chapter 3 outlined in part the historical changes in state-organized caribou research and management. This chapter explores the development of joint management in the North and the recent and rapidly evolving recognition of First Nation self-governance and co-existence arrangements. All of these factors shape the growth of current caribou co-management institutions.

4.3 Methods

The author attended more than 60 resource-related meetings in the community of Łútsël K'é, Northwest Territories, as well as close to a dozen resource management meetings outside the community (where community representatives were present) over an 18 month period between March 2000 and August 2001. A review of publicly available correspondence, reports and archival materials, from public registries and the Prince of Wales Museum in Yellowknife, the Hudson's Bay Company archives in Winnipeg and the National Archives and National Library in Ottawa also inform this chapter. In addition, the author worked in the Łútsël K'é Wildlife, Lands and Environment Office (a local land use research and planning organization) over the course of the time period described above (encompassing more than 42 full-time work weeks). The results of 39 semi-directed interviews with active Łútsël K'é hunters and elders about customary laws guiding caribou harvesting behaviour also guide the author's discussion of Dënesǫłine-caribou interactions.

Study Area

Łútsël K'é is a community of close to 400 people perched on a peninsula that juts into the east arm of Great Slave Lake in the Northwest Territories. 96 percent of the community's population is made up of aboriginal peoples. Łútsël K'é is made up of families with connections to the Etthen-eldéli (Caribou-Eaters) branch of the larger Dënesǫłine (Chipewyan) branch of the Dene, whose communities spread across the northern provinces from British Columbia to Manitoba, the Yukon and Northwest Territories.

Most of the families that make up the present-day population of Łútsël K'é settled into year-round dwellings in the late 1950s. A Hudson's Bay Company Post was established near the current town site in 1925. However, people did not begin building permanent homes at the present site until 1954. The community is currently the most northerly Dënesǫłine village and home to families with connections to Etthen-eldéli (Caribou Eater) peoples in other Dene communities such as Fond du Lac and Black

Lake, Saskatchewan, Fort Smith, N'Dilo, Deninu Kue and Dettah, NWT and Brochet and Tadoule Lake, Manitoba. Łútsël K'é is a member of the Akaitcho Territorial Government, comprised of four Dënesǫłine (Chipewyan) and Tłicho (Dogrib)-speaking Dene communities, and the Dene Nation which represents five Dene regions (the Gwich'in, Sahtu, DehCho, Tłicho (Dogrib) and Akaitcho), made up of 26 communities stretched throughout the Mackenzie Basin.

4.4 Joint Management and Aboriginal Governance Initiatives

> *I already* have *rights; you cannot give me rights but you can* recognize *them* (Payne and Nepinak 1990:14).

> *This land was created for us and the Creator has not changed. We already have a paper [Treaty 8] we abide by, now it's like things are being changed. We try to protect it [the treaty] for future generations and for our lifestyle. We took the treaty because of the Bishop [Breynat], it's not for the land, it was to keep the peace between the Whiteman and the Dene... The Creator gave land for each of us. I am still up-holding the terms of the treaty. Even if we are correct the government will never say we are. I already have the licence to be on this land* (Zep Casaway, Łútsël K'é Elder, at Mackenzie Valley Land and Water Board – Public Meeting on Environmental Review Board, August 18, 2000).

A number of aboriginal leaders have emphasized that there is a difference between **devolving powers to give rights** to aboriginal nations and **setting up institutions for the co-jurisdiction of resources and land that recognize existing aboriginal rights**. Most claims in the North have been settled under the federal comprehensive claims policy (originally established in 1973). However Treaty 8 claimants in the Northwest Territories are negotiating through their original treaty (signed in 1899-1900), and are unwilling to accept the terms of the "comprehensive claims" and "modern treaty-making" policies devised unilaterally by the federal government.

Łútsël K'é is one of four Dene communities that are members of the Akaitcho Territorial Government (ATG; the other communities are Dettah, N'Dilo and Deninu Kue). Over the years, the ATG has steered away from participating in any resource management process that *gives* rather than *recognizes* aboriginal resource management

decision-making rights. For example, in recent years, Łútsël K'é has not officially participated in the NWT revision of its Wildlife Act, does not recognize the authority of the Mackenzie Valley Lands and Water Board or Environmental Impact Review Board in its traditional territory, and has developed its own resource development protocol.

The conundrum for the Akaitcho communities is that if they participate in a process that *gives* them rights, then their assertions that they have *pre-existing* rights are undermined. Negotiations that imply that the federal, provincial or territorial governments are *giving* rights to First Nation peoples are seen as an inappropriate way of looking at joint management negotiations.

Ever since the establishment of the comprehensive claims process in 1973, aboriginal peoples in Canada have looked for the means to further resist any changes in resource management policies, especially those that entrench the role of the state in regulating aboriginal use of natural resources. A number of legal landmarks (the 1973 Calder case, 1982 Canadian Constitution Act, 1990 Sparrow Decision, 1997 Delgamuukw Decision, 1999 Marshall Decision, 1999 Corbière Decision) have expanded and refined Canadian legal recognition of aboriginal perspectives on aboriginal property and governance rights (Cairns 2000, Coates 2000).

Some picture joint management arrangements as two water-craft travelling down a river in the same direction (Doubleday 1993). First Nations desire co-management institutions that recognize that they have constructed, maintained and are responsible for the navigation of their own boats, boats that will occasionally pull up along-side of Canadian government boats. The Akaitcho Territory Dene First Nations prefer not to recognize a co-management arrangement that asks them to abandon their own boat or for the Canadian government to unilaterally devise a new boat of foreign design. Part of a resolution passed by the Akaitcho Dene First Nations describes this sentiment: "We the Dene continue to assert our sovereignty and self-determination over our territory through Dene governments and institutions as we define them" (June 1994, NWT Treaty #8 Tribal Council, 2nd General Assembly).

In July 2000, 100 years after the signing of Treaty 8, the Akaitcho Treaty Dene First Nations (ATDFNs) signed a framework agreement (FA) with the federal government to begin a process to implement the treaty. The Akaitcho FA does not have a provision for the extinguishment of aboriginal title or rights. Negotiations proceed on a bilateral basis between the ATDFNs and the federal government, representing the original signatories to Treaty 8, unlike the negotiation of most claims that allow provincial or territorial governments to participate rather than just observe negotiations. The FA contains provisions for the negotiation of governance structures; however, the Akaitcho Dene have explicitly avoided negotiating "self-government" because Akaitcho negotiators feel the federal government's self-government policy dictates what can and cannot be achieved under self-government ahead of negotiation itself.

In June 2001, the Akaitcho Interim Measures Agreement (IMA) was signed. The IMA is a recognition by the federal and territorial governments that the Akaitcho DFNs have "their own internal processes for determining the use of lands and water" (Akaitcho IMA, section 1.2). The IMA sets the conditions for the ADFNs to set up a process to pre-screen applications for occupation, use and disposition of land and resources in the traditional territory of the ADFNs, where Akaitcho comments on applications are based on environmental, cultural, spiritual and economic grounds (IMA, section 1.6). The IMA includes provisions for an Akaitcho pre-screening board made up of representatives of each of the Akaitcho communities.

The responsibility for pre-screening development applications in the Akaitcho Territory now lies with community organizations like the Łútsël K'é Wildlife Lands and Environment Committee (WLEC). The Łútsël K'é WLEC is an example of an organization that was originally a Hunters and Trappers Association (HTA). An HTA network was established in the Northwest Territories in the 1970s, initially dealing only with issues affecting hunters and trappers in the communities. Today, the WLEC has a staff of up to 10 people at any one time, conducting a number of traditional knowledge research projects, monitoring wildlife movements and health, responding to development proposals, organizing community caribou hunts and arranging to supply

gear and supplies to fly-in trapping camps. Just as the Akaitcho government resists any efforts to predefine its ability to define itself, so the Lutsel K'e WLEC attempts to diversify its financial support so that it does not become vulnerable to collapse from the removal of funding from a single source. Logistic and financial support over the last few years has come from private funding organizations, contributions from various mining companies, environmental organizations, government departments and universities.

The Akaitcho communities have discussed how to proceed with pre-screening and have identified resource needs. Discussions emphasize the need to communicate. Akaitcho is defining notions of "co-existence;" ways of sharing and learning about the environment, and the need for resources, in order to develop policies and processes for pre-screening development applications. Akaitcho communities have discussed the development of a traditional knowledge database and the need for a 5-10 year land use plan in the Akaitcho territory.

It is doubtful that the Akaitcho IMA could have been negotiated a decade ago. The recognition of aboriginal rights and title has come a long way in the last century, but it has been a very slow process and local communities have worked to resist changes that undermine these rights for a very long time. The influence of local efforts to continually expand recognition of communally held property rights and aboriginal cultural relationships to the land are persistent and hard-won. These local efforts are illustrated in profound ways in the evolution of caribou management structures on the ranges of the barren-ground caribou, where caribou have played a fundamental role in the lives of the Dene and their ancestors in the Great Slave Lake area for at least 8 000 years (since the time of the last glaciation) and for the Dene as a whole for at least 25 000 years (see evidence revealed at the Bluefish Caves, near Old Crow, Yukon (Cinq-Mars and Morlan 1999)).

4.5 Caribou Co-management in the Study Region

The history of the Beverly and Qamanirjuaq Caribou Management Board shows the evolution of Canada's recognition of aboriginal rights. Included in Dene efforts to assert their self-determination in the 1970s, were early efforts on the part of the Łútsël K'é Dene First Nation to initiate an aboriginal-only caribou management board. This effort was known as the "Snowdrift Resolution" (Snowdrift was the name used on maps locating the settlement of Łútsël K'é which officially adopted its Dene place name in the 1990s) and led up to the negotiation of the 1982 Beverly and Qamanirjuaq caribou management agreement.

4.5.1 Beverly and Qamanirjuaq Caribou Management Board

The ranges of the Beverly and Qamanirjuaq herds lie between Great Slave Lake and Hudson Bay. Recent population estimates show that the herds are at their highest levels since biologists first started doing census surveys: 496,000 animals in the Qamanirjuaq herd (+/- 105,400 standard error), and 276,000 caribou in the Beverly herd (+/- 111,000 standard error) (Wakelyn 1999a&b). Individual animals may travel between 2000-4000 km in a year. The Beverly and Qamanirjuaq Caribou Management Board (BQ Board) estimates that between 16 000 and 20 000 caribou are harvested in most years (Wakelyn 1999a&b). The value of the meat taken for subsistence by the 20 aboriginal communities located on the ranges of these two herds is estimated at more than $11.5 million 2002). Both herds are named after lakes located on the traditional calving grounds of each herd. Beverly Lake is about 150 km north of Baker Lake and Qamanirjuaq Lake is approximately 200 west of Rankin Inlet, both in Nunavut (Wakelyn 1999a&b).

Mineral exploration and mining activity are increasing on the range of the Qamanirjuaq caribou herd, including the calving and post-calving areas where transmission lines and roads are projected for development, running from northern Manitoba into Nunavut up the west coast of Hudson Bay. A large part of the Beverly caribou herd's calving area lies within the Thelon Wildlife Sanctuary. Lands between

the Sanctuary and Saskatchewan are primarily undeveloped. However, a hydro-generation facility has been established on the NWT-Saskatchewan border and the Talston hydro-development in the South Slave region of the NWT has had significant effects on the wintering grounds of the Beverly herd south of Great Slave Lake and west of the Slave River, and may be expanded in the future. Roads are providing new access to caribou for hunters that are not resident on the caribou range, including the new Athabasca Road from Points North to Black Lake, Saskatchewan. A number of uranium mines have been in operation in the southern part of the Beverly range in northern Saskatchewan for years. Recently, exploration for gold and diamonds has increased throughout the NWT, Manitoba, Saskatchewan and Nunavut, and exploration for base metals (zinc, copper, nickel) is also occurring. Much of the recent exploration activity has occurred northwest of the Beverly range, on the range of the Bathurst caribou herd (details of this activity will be outlined later), however prospecting permits and mineral claims are active on the Beverly caribou range, including on the calving ground.

The conflict existing between aboriginal caribou-hunting communities and government agencies prior to the formation of the Beverly and Qamanirjuaq caribou management board has been described by a number of authors (Osherenko 1988b, Cizek 1990, Scotter 1991, Thomas and Schaefer 1991, Usher 1993). In 1978, a Caribou Management Group, made up of government biologists from the provinces and the Northwest Territories was established to develop a management plan for the Beverly and Qamanirjuaq barren-ground caribou. The Group soon realized that its efforts would fail without the involvement of the aboriginal communities located on the caribou ranges. Rather than be pulled into a government-driven process, Dene and Metis groups in Manitoba, Saskatchewan and the Northwest Territories initially resolved to form an aboriginal-only caribou management board that would include both treaty and non-treaty peoples as traditional aboriginal hunters. The subsequent "Snowdrift (Łútsël K'é) Resolution" drafted in 1981, was an attempt to create a caribou management institution outside of partnership with government. Communities feared that a partnership with government would serve to erode existing aboriginal and treaty

rights and unfairly narrow the eligibility of hunters to join the management group if they were not officially recognized as "treaty" hunters (Kendrick 1994, Spak 2001:95-96).

A year later, communities agreed to a management partnership with government. The political climate of the time would not accord any authority or resources to an aboriginal-only board and aboriginal communities wanted to achieve more influence in resource management decision-making. While the Board has evolved over the last 20 years, it has maintained its structure as an advisory group to government ministries where the majority of members are representatives of aboriginal communities located on the ranges of the Beverly and Qamanirjuaq caribou herds.

The Board represents 20 traditional caribou-hunting communities. There are 9 representatives from aboriginal communities, and 5 members from provincial, territorial and federal government agencies. The Board advises government agencies in each jurisdiction, providing recommendations on caribou issues. Łútsël K'é has always had an individual from the community sitting on the Board. During the author's stay in Łútsël K'é, a number of recurring issues at the local level reverberated with the major action items in the BQ Board's management plan, emphasizing the need for an apolitical inter-jurisdictional forum for local concerns to be expressed.

Inter-jurisdictional issues can be safely discussed by members of the BQ Board despite changing degrees of government recognition of aboriginal property rights, harvesting rights and title to land. Łútsël K'é is not atypical of other communities represented by the Board, facing complex resource management issues in the area of the barren-ground caribou range where the community is located. In the Łútsël K'é traditional land use area, overlapping claims of neighboring territorial and provincial claim groups complicate land use planning and self-governance aspirations. Mining developments and government hydro-development proposals make a great deal of work for a community of less than 400 people attempting to respond to the environmental assessments of industrial projects on the range. Moreover, roads and shifting herd movements have increased the hunting pressure in the lands surrounding Łútsël K'é in the last two years. Łútsël K'é sits at the boundary of Treaty 8 and 11 and

on the cusp of the territorial division between the North and South Slave regions. These administrative divisions have left the community with a number of difficult trans-boundary issues to negotiate. Land claims processes divide families and their membership in future aboriginal jurisdictions where claims settlements or may erode treaty rights or treaty implementation remains unsettled. Zonation for fire-fighting priorities leave the community on the edge of the North and South Slave fire zones, complicating community pleas for fire suppression activities in critical Beverly wintering grounds lying both north and south of fire zones that divide the community's land use area.

The author kept track of the number of meetings the Łútsël K'é Wildlife, Lands and Environment Committee (WLEC) held on caribou-related issues in the year between March 2000 and 2001. More than half of all the WLEC meetings (n=60) discussed issues related to caribou and the effects of roads, mines, fires and increased hunter access on the herds in the Łútsël K'é area. One-third of all meetings in the same time period were meetings with mining companies operating in the Łútsël K'é traditional land use area and environmental boards associated with the mines. Almost without exception, these meetings discussed the concerns of community members with the effects of mining activity on barren-ground caribou.

The BQ Board has created a space for communities in one jurisdiction to voice their concerns about development in other jurisdictions on the caribou range. For instance, the Saskatchewan and Alberta traditional caribou-hunting communities are concerned about the effects of an inter-community trail system and all-weather road to be developed in Nunavut. All current road options meet north of Nueltin Lake in Nunavut where the caribou stage (gather) in the spring. Aboriginal communities in the territories and the provinces are concerned about road networks and winter roads that are now pushing into the wintering areas of the barren-ground caribou. It is now possible to drive to the wintering areas of the Beverly and Qamanirjuaq herds in Manitoba, Saskatchewan and the NWT. There may be options to turn over control of portions of

these roads to traditional caribou-hunting communities in these areas and allow them to restrict access to the caribou wintering grounds.

Roads create even more of a concern about increased access because treaty hunting rights now give aboriginal people who have not traditionally hunted caribou (or hunted caribou in a certain region) to hunt outside of their traditional territories without quota restrictions. The gravel to build the roads in the Kivalliq region (west side of Hudson Bay) of Nunavut will most likely come from some of the eskers that caribou use for travel and winter roads will follow different corridors than all-weather roads (increasing the impact of the road network). One of the suggested corridors to Baker Lake goes right through the calving grounds of the Qamanirjuaq caribou herd. Community representatives sitting on the BQ Board warn government representatives from the departments proposing to build roads in the barren-ground caribou range, that it is the elected Chief and Council of the aboriginal communities affected that must invite consultation with governments about roads, not the aboriginal representatives sitting on the BQ Board.

While the BQ Board's recommendations to government agencies are advisory and not binding, community representatives warn that at times governments inappropriately interpret the Board's positions and co-opt them in order to drive decision-making in the regions without properly consulting the aboriginal communities affected. For instance, Saskatchewan aboriginal communities feel that the Saskatchewan government interpreted the BQ board's support of protected areas on the barren-ground caribou range "aggressively" by interpreting the BQ Board's generic statement as a full endorsement of the Saskatchewan representative areas network (protected areas planning) requiring little further "consultation" with Saskatchewan communities.

The BQ Board has entertained suggestions to expand Board membership over the years as barren-ground caribou range use has expanded since the early 1980s and the political realities of aboriginal communities have changed with the settlement of land claims. However, no definitive changes have been made as yet. The political implications of expanding membership often get too heated. There is the question of

whether the BQ Board in future years will represent all "aboriginal users" (whose traditional land use is off-range) or just "traditional aboriginal users" (traditional land use is on-range) in future. The Board is at times divided on certain issues, such as the commercial sale of caribou meat in Nunavut. Nunavut has gone ahead with the commercial sale of caribou meat since it has the political power to do so, despite the discomfort of many Dene communities. Another on-going issue of representation relates to the capacity of community representatives to effectively present the Board to communities and the communities' views to the Board. For example, in northern Saskatchewan there are no regional wildlife organizations. It is not even possible for aboriginal Saskatchewan representatives to make visits on regularly scheduled flights to some communities (even if the finances existed to pay for such visits). The representative from Black Lake is attempting to represent somewhere between 7000-8000 people living in remote communities (The 2002 BQ Agreement now allows both Saskatchewan and Nunavut to increase the number of representatives appointed from each region to the Board from two to three members).

There is some sense of frustration among BQ Board members that they are still attempting to achieve the same action items they were 20 years ago. This may be a frustration with the Board's effectiveness, but it is also a sign of how complex and how difficult it is develop and maintain a big picture view in a multi-jurisdictional, multi-cultural and multi-lingual setting for the management of barren-ground caribou. The ranges of the Beverly and Qamanirjuaq caribou herds alone encompass an area as large as the province of Alberta and spanning two time zones. The message is, perhaps, that caribou co-management is "a bigger job than anyone expected" (Kruse *et al.* 1998).

4.5.2 Bathurst Caribou Management Planning Committee

A requirement to develop a Bathurst Caribou Management Agreement was a recommendation of the panel appointed to review the BHP (diamond mine) project, the Diavik (diamond mine) comprehensive study and a stipulation of the TłiCho (Dogrib) Final Agreement, initialled in September 2002 (TłiCho Final Agreement, Chapter 13,

section 12.9.2). The Bathurst Caribou Management Planning Committee has been meeting since February 2000, and a draft agreement was put together in the spring of 2000. The hope is that a management plan will be developed by 2003.

The co-management of the Bathurst herd is therefore partially rooted in crisis (recommended with impending mining development) and legally required through a claims-based (TłiCho agreement) scenario. Signatories to the agreement are expected to include the Nunavut communities of Cambridge Bay and Kugluktuk, the Akaitcho communities of Dettah, N'Dilo, and Łútsël K'é, the North Slave Metis Alliance, and the entire TłiCho (Dogrib) Nation. The Planning Committee has already commissioned State of the Knowledge reports on the available scientific and traditional knowledge of the Bathurst caribou herd.

A year-long satellite monitoring program of Bathurst caribou shows that this herd moves along migration corridors previously identified by Dene elders (Elliot 1997a). Bathurst caribou give birth in early June near Bathurst Inlet approximately 700 km northeast of Yellowknife. Their migration takes them towards Great Slave Lake, through the heart of the mineral-rich Slave Geological Province. Their range covers an area of approximately 250 000 square km, four times the size of Nova Scotia. The Bathurst migration route and calving grounds bring them near or through areas currently being explored or developed for diamond and metal extraction (Elliot 1997b). There is documented knowledge of the expansion and contraction of the area used by caribou herds from year-to-year, as well as evidence that the selection of calving sites shifts annually.

Where does Łútsël K'é sit in the Bathurst caribou herd management scenario? As an aboriginal group still negotiating the implementation of its treaty, Łútsël K'é is in a challenging position. It is a community participating in a process linked to the claim of a group with conflicting and overlapping boundaries with its traditional lands. An overlap in hunting areas with neighbouring communities has led to some conflicts over caribou wastage in the last few years. Łútsël K'é, as an Akaitcho community, also faces the dilemma of participating in a resource management board established under a

process (the TłiCho agreement) that Akaitcho negotiators feel threatens the Akaitcho communities' aboriginal rights in lands where overlapping use occurs. The one binding force behind all communities' commitment to the ratification of the Bathurst Caribou Management Agreement, is the stipulation that the Agreement must make community-based monitoring of the herd a priority of the management plan. Chapter 7 will look at the implications of community-based monitoring on the future of co-management. Monitoring has become the rallying cry of aboriginal communities' push for active and fundamental participation in caribou management decision-making and has quite a bit of support among caribou biologists as well.

With increased understanding in recent years of the extent of the overlap among barren-ground caribou ranges, and the effects of developments like mining and associated road networks, the need for bioregional approaches to caribou monitoring are increasing. The following section discusses the need and impetus for caribou "super-boards" linking the management of individual herds, or at the very least increasing the ties between individual caribou management organizations.

4.6 "Super-Boards": Barren-Ground Caribou Range Overlap

Discussions of the overlap of barren-ground caribou herds inevitably lead to a domino effect. Inter-connected management issues rapidly become apparent: concepts of herd intermixing are connected with concepts of herd "discreteness" that are then connected to interpretations of population survey results. The interpretation of whether declines are real or related to inter-mixing, then may have significant impacts on the ability to maintain use priorities, achieve future harvest limits if needed in the future, as well as the ability to enforce those limits. The shared allocation of limited commercial harvests is already an issue. In many parts of the range, communities are hunting from more than one herd. How are decisions about harvest allocations to be made? Overlap and inter-mixing issues are also fundamental to the progress of understandings of the cumulative effects of development on barren-ground caribou ranges. It is possible that

the viability of herds dependent on discrete calving grounds is linked to behavioural interaction between herds. These issues were discussed at greater length in Chapter 3.

Caribou biologists are concerned that caribou monitoring programs are too localized and uncoordinated to effectively note changes occurring in the barren-ground herds that are indicative of disturbance (Messier cited in Larsen 1998). Satellite collaring data have revealed that animals from the Bathurst, Ahiak and Qamanirjuaq herds have all wintered in the range of the Beverly caribou herd in recent years (see Appendix 7 for further discussion of caribou survey techniques). A number of aboriginal communities comment that they are seeing a mix of animals, probably from different herds, in their hunting areas. For example, Łútsël K'é hunters may encounter animals from the Bathurst, Beverly, Ahiak and possibly the Qamanirjuaq herds in their winter hunting areas and possibly also animals from the Southampton Island and Dolphin Union Island herds (see Chapter 1, Fig. 1.3; the Dolphin Union herd migrates from Victoria Island to the mainland).

Recognizing range overlap and inter-mixing is extremely difficult. Satellite collar data show that the Bathurst and possibly other herds are currently wintering in critical Beverly wintering grounds. However, the opposition of many elders to the use of satellite collars (there are no collars on Beverly animals) means that it is difficult to determine the status of the Beverly herd in the face of significant overlaps in wintering grounds. Despite concerns from Saskatchewan communities that the Beverly herd is displaying unusual movements and a possible decline in body condition, Nunavut sees no need for a census survey at the current time (Nunavut communities are estimated to take less than 10 percent of the total annual harvest from the Beverly herd. Mining and/or road developments are slated to be developed in or very close by the calving grounds of the Bathurst, Beverly and Qamanirjuaq caribou herds. Chapter 3 illustrated just how much the biological recognition of distinct herds and ranges has changed in the last 50 years.

The status of governance issues and responsibilities; from federal, provincial and territorial government agencies to aboriginal self-governance, is at times as mixed as the

behaviour of the caribou themselves on the ranges of the Bathurst, Beverly and Qamanirjuaq herds.

4.7 Caribou and Mining in the Canadian North

> *That the Indians know of many a [gold] deposit is also a foregone conclusion. But it is impossible to get a word out of them. The yellow metal will bring misfortune upon moose and caribou; that is what they imagine* (Ingstad 1992:28 – originally published in 1931).

Mining and mineral exploration has a long history in the Canadian North (Fondahl 1997, Keith *et al.* 1981). The accounts of early explorers, traders, missionaries and the oral histories of aboriginal peoples, record the extraction and trade of metals in the North (such as copper) by aboriginal peoples before the arrival of Europeans (RCAP 1996, Hearne 1809). However, large scale and pervasive exploration activity began soon after the Klondike gold rush in the late 1800s and by the late 1930s there were hundreds of prospectors working in the Northwest Territories, many of them in the Łútsël K'é area recognized as "caribou country" by Europeans since the early fur trade. The early 1930s were marked by a uranium exploration rush. By the late 1930s there was a transfer of interest to a different mineral and most claims were staked as potential gold finds. Early mineral exploration (and fur trade) activities were fueled by caribou meat. As many as 8-10 000 carcasses were brought to the Fort Rae post on an annual basis to supply exploration and trading activities until the arrival of steamboats in the Great Slave Lake area (Mackenzie-Scott 1998:4).

The influence of mining exploration activity on the barren-ground caribou range has accumulated since the 1930s. While the development of a mining project now requires extensive environmental review, permits for exploration work continue to be issued without any need for environmental assessment. Some argue that it may be exploration activity, "a death by a thousand cuts" that has as much accumulated affect on caribou habitat as a mine in full production. In addition, winter roads built to mine sites are significantly increasing access to the caribou range. Approximately half of all hunters

(aboriginal and non-aboriginal NWT residents) of the Bathurst herd of the use winter roads to access the animals (Case *et al.* 1996:22).

Critics argue that because Canada's northern mining legislation originates before the turn of the century, it is impossibly ill-equipped to address the scale and pace of contemporary mining activity (Bankes and Sharvit 1998, O'Reilly 1998a). It is argued that mining regulations should be based on the knowledge and needs of northern communities. First Nation communities have endured a historical relationship with the mining sector marked by a lack of consultation and consent prior to development.

In recent years, considerably more consultation is required by the mining industry with the aboriginal communities whose traditional territories include mining claim blocks or full-scale mining developments. However, federal legislation continues to allow those with mineral exploration interests to enter and stake mining claims in the traditional lands of aboriginal peoples often with unsettled land claims. Land claim negotiations are then further complicated by federal obligations to compensate such third party interests should mining claim blocks lie within land claim settlement areas. Many argue that this scenario inherently prejudices the fiduciary obligation of the Canadian government to negotiate land claims in good faith. The 1973 Paulette case resulted in the adoption of a legal *caveat* on all Crown land in the territories. Essentially, the caveat is a warning to developers that Crown land is subject to aboriginal land claims.

Despite these problems, the Department of Indian Affairs and Northern Development, the federal department responsible for Crown lands in the territories, has stated that it will not commit to any changes in northern mining legislation until after land claims are settled. Not only are lands staked and claimed by mining interests potentially removed from land selection processes, but this "free-entry" system of land disposition for mineral development affects the ranges of the barren-ground caribou.

The first economically viable diamond find in the Northwest Territories was discovered in 1989, leading to the negotiation of a deal to develop the find in 1990 (Wismer 1996). The find at Lac de Gras, NWT, precipitated the largest mineral staking

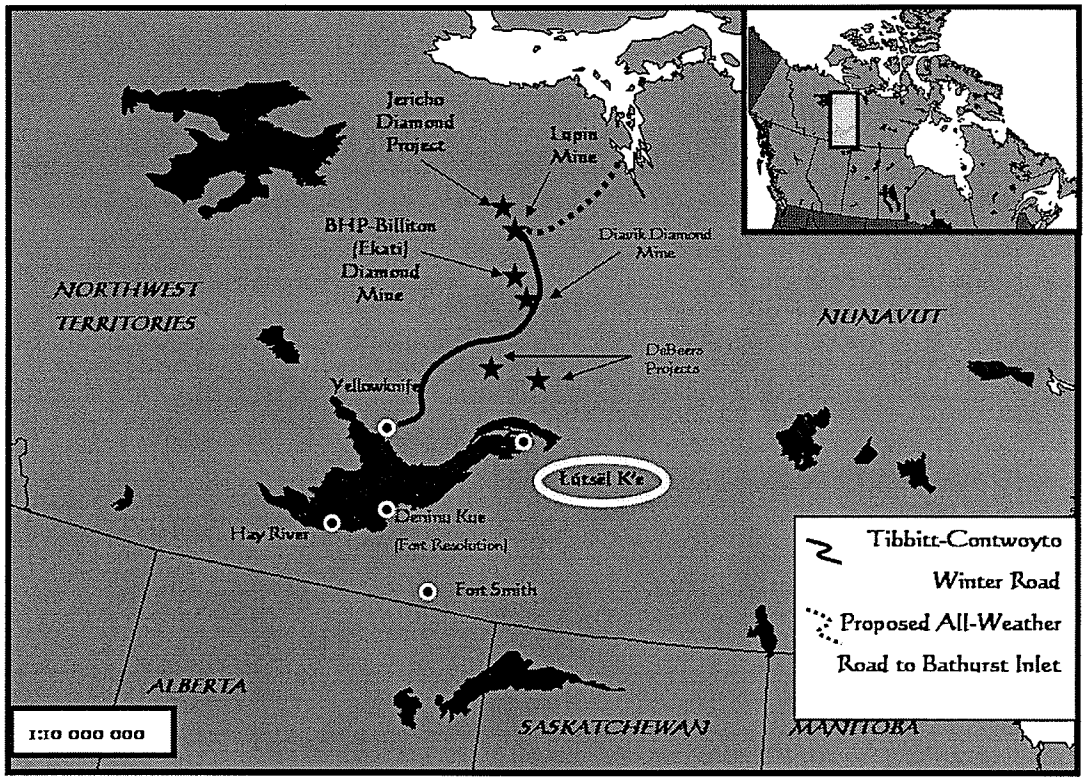
rush in world history. The 10 year period prior to the Lac de Gras find saw a yearly average staking of one million acres in the NWT. The 2 ½ year period following the announcement of the BHP-Diamet deal to develop the find saw a total of close to 50 million acres of Crown land staked for mineral development (Reynolds 1996). This massive land area stretches north from Great Slave Lake to Kugluktuk (Coppermine), west to Great Bear Lake and east to the Keewatin region with efforts focused in the Slave Geological Province. The 1973 legal caveat placed on Crown lands in the NWT was seemingly forgotten in the staking rush. The federal government stands to collect $7 billion in revenues from the Ekati mine alone while BHP-Billiton will make $40-50 billion over the 25 year life of the mine (of the original three pipes slated for extraction) (O'Reilly 1998a). The federal government has issued BHP-Billiton 21-year renewable mining leases. The federal department of Indian Affairs and Northern Development has stated that the Dene will not be allowed to select land within BHP-Billiton's 4000 sq. km claim block, an area lying within the traditional occupancy areas of a number of Dene communities (O'Reilly 1998b). In early 2003, a second diamond mine, the Diavik mine, opened for production, not far south of the Ekati mine site. Two more diamond mines, owned by DeBeers Canada, the Snap Lake and Kennady Lake projects, are projected to start production in the next several years.

The 350 000 strong Bathurst barren-ground caribou herd, already one of the most accessible herds in the NWT, migrates through the Ekati and Diavik mine sites each spring and fall. A report about the behaviour of Bathurst caribou around the Lupin gold mine at Contwoyto Lake (within 150 km of the Ekati mine) shows that Bathurst caribou use tailing ponds, roads and airstrips at the mine site because open, unvegetated areas have fewer mosquitoes and provide easier sightings of predators. In fact, "the study showed that if you build a mine, you are building spaces attractive to caribou" (Gunn quoted in Elliott 1997a). However, such studies are not evidence of the compatibility of caribou habitat needs and mining activities. Aboriginal communities located on the barren-ground caribou range fear that mining is limiting and changing herd movements. Monitoring studies have documented the splitting of the Bathurst caribou herd at the

Lac de Gras (Ekati) mine sites for the past few years. This is a phenomenon that Dene communities say is not usual (Meyers Almey 1997). Chapter 6 details Łútsël K'é hunters' and elders' observations of the possible effects of mining and exploration activity on barren-ground caribou migratory patterns.

The division of the herd, and other shifts in behaviour, are increasingly noticed by communities. A bulk exploration plant and the BHP Boston gold mine are located within 25 km and less of areas used for calving by both the Bathurst and Ahiak (Queen Maud Gulf) caribou herds, and the federal government has already contributed $5 million towards a feasibility study to construct an all-season road between the Lupin mine and Bathurst Inlet on the Arctic Ocean (Fig. 4.1).

Figure 4.1: Selected Roads and Mines on the Barren-Ground Caribou Ranges



Current and proposed road networks on the ranges of the caribou harvested by Łútsël K'é Dene include:

• the Tibbitt – Contwoyto winter road, running from the end of the Ingraham trail just outside of Yellowknife to the Lupin gold mine (length)

• proposed all-weather road from Lupin mine to deep water port at Bathurst Inlet (runs through calving grounds of the Bathurst caribou herd

Northern jurisdictions are attempting to develop their economies in isolated regions with high unemployment rates and high costs of living. They face the unenviable challenge of trying to develop mining projects that do not force a choice to be made between caribou and mineral extraction. In recent years, diamond mines developed in the NWT have had to meet legal obligations to enable traditional knowledge studies in the "caribou country" where mine sites are located and to develop caribou monitoring projects with traditional caribou-hunting communities. The following sections describe these efforts.

4.7.1 The Mining Industry, Traditional Knowledge and Caribou Monitoring

During the environmental assessment of the Ekati (BHP) mine, the federal Minister of the Environment promised that the environmental review of the mine would be carried out "in the spirit of the Canadian Environmental Assessment Act" (the BHP review was carried out under the predecessor of the Canadian Environmental Assessment Act, the 1984 Environmental Assessment Review Process Guidelines Order) (O'Reilly 1996). Perhaps as a result of this promise, the federal government took the unprecedented step of insisting that BHP meet a number of requirements before receiving all the permits they would need to begin the Ekati project:

- to formulate a legally-binding **environmental agreement** outlining the company's **commitment to environmental monitoring** programs and to the prevention and mitigation of environmental impacts;

- to **negotiate impact and benefit agreements with communities** surrounding the mining claim block; and,

- to **support** the Northwest Territories' commitment to make progress on a territory-wide **strategy to protect environmentally significant areas**

As a result of federal requirements and the concerns voiced by First Nation communities at environmental assessment hearings, the following ties between aboriginal communities and the mining industry have come about. These ties are, perhaps, an unprecedented form of industry-aboriginal community co-management in caribou country. The following discussion will focus on partnerships between Łútsël K'é and the mining companies with mine sites or proposing mineral development in the community's traditional use area.

In December 1994, a federal environmental assessment panel was appointed to review the environmental and socio-economic effects of the diamond mine proposed by BHP Diamonds Inc. and the Blackwater Group (referred to as BHP in 1994, now BHP-Billiton).

The Panel recommended that the Government of Canada approve the BHP Project subject a number of recommendations including:

Recommendation on Traditional Knowledge The Panel recommended that the federal government develop a policy on the inclusion of traditional knowledge in environmental assessment. The policy was developed in consultation with the Government of the Northwest Territories (GNWT), Aboriginal peoples and industry. The panel recommended that the most immediate need is to set out guidelines and standards for traditional knowledge that developers are expected to meet when preparing environmental assessments. There is a continued struggle to develop such guidelines, several years after the release of the environmental assessment of the BHP Diamond Project. Moreover, the role and responsibility of government and industry in this area is not clearly defined.

Recommendation on Caribou The Panel recommended that BHP be required to submit a detailed caribou monitoring and management plan for review and approval by DIAND and the GNWT prior to the commencement of mining. Monitoring at the BHP mine site has occurred since the mid-1990s. An effort bringing BHP (now BHP-Billiton), Diavik and DeBeers (all mining companies), communities and government together to set up standardized monitoring in mining block areas began a couple of years ago.

The Panel further recommended that governments consider establishing a Bathurst caribou management board. The Bathurst Caribou Management Planning Committee started work to establish a Board in early 2000.

Mining companies see contributions to TK studies as a means of setting up regional databases to use community knowledge to mitigate their impacts on cultural values. Mining companies are legally obligated to do so, but have lodged complaints with the Canadian Environmental Assessment Agency that incorporating traditional knowledge and respecting cultural values in their operations is unlikely unless peer review and

intellectual property issues are reviewed. Communities see the funding of TK studies by mining companies as an obligation to give communities the resources to monitor the activities of the companies and their effects on community values. However, without settled treaty rights, and guidelines and protocols to steer the mining industries through this process and to help aboriginal communities feel secure that their aboriginal rights and collective intellectual property rights are not at risk, it is difficult to envision how the needs of either the mining industry or aboriginal communities will be met. The establishment of the West Kitikmeot Slave Study Society made some in-roads to meet the differing and many times, conflicting needs of the mining industry and the aboriginal communities affected by mining development in the Slave Geological province stretching north of Yellowknife to the Arctic Ocean.

4.7.2 West Kitikmeot Slave Study Society

One significant result of the federal panel's review of the BHP project was the establishment of the West Kitikmeot Slave Study Society (WKSS). The WKSS received funding contributions from government agencies and mining companies toward a five-year run of baseline research in the Slave Geological District (encompassing most of the Bathurst caribou herd's range). The WKSS Society now exists as an interim organization to fill in the transition period before a permanent environmental monitoring program is implemented in the Slave Geological region.

The WKSS Society was a partnership of aboriginal and environmental organizations, government and industry. There were nine founding partners with a majority of five aboriginal members. The independent chairperson was chosen by the aboriginal members. Eleven aboriginal communities from the Northwest Territories and Nunavut in all were represented by the aboriginal members. The nine member partnership developed terms-of-reference and a five year research program design based on the value of including both traditional and scientific knowledge. This research provides data for decision-makers of Canadian, territorial and aboriginal agencies in the Slave Geological province.

The WKSS has had quite an impact on the research resources available to First Nation communities. Łútsël K'é has carried out traditional knowledge studies on the east arm of Great Slave Lake as well as a traditional knowledge study on community health. The following table outlines the traditional knowledge and caribou research carried out as a result of WKSS support and funding (Table 4.1):

Table 4.1:
Traditional Knowledge Studies and Caribou Studies Funded by the West Kitikmeot Slave Study Society

Traditional knowledge studies: habitat
Traditional Ecological Knowledge Research in the Kache Kue Study Region
Habitat of Dogrib Traditional Territory: Place Names as Indicators of Bio-geographical Knowledge
Traditional knowledge studies: community-based monitoring
Traditional Knowledge Study on Community Health
A Community Based Monitoring System in the Slave Geological Province
Final Report: Community Based Monitoring
Traditional knowledge studies: Caribou studies
Traditional knowledge on the Relationship between Caribou Migration Patterns and the state of caribou habitat
Tuktu and Nogak Project - Inuit Knowledge about Wildlife in Bathurst Inlet: Focus on Caribou and Calving Areas
Scientific Caribou studies
Bathurst Caribou Calving Ground Studies
--- Influence Of Nutrition And Human Activity On Calving Ground Location
--- Prevalence and Intensity of Gastro-intestinal Nematode Parasitism in the Bathurst Caribou Herd, 1998-99
Seasonal Movements of the Bathurst Caribou Herd
Summer Behaviour of Bathurst Caribou Herd
--- Summer Behaviour of Bathurst Caribou at Mine Sites and Response of Caribou to Fencing and Plastic Deflectors
--- Effect of Gravel Road and Tailing Pond Dust on Tundra Plant Communities near Lupin Mine, NWT

Since 1999, initiatives related to the research done by WKSS are in the works:

• establishment of a regional monitoring agency in the Slave Geological Province area (roughly the same area as the WKSS area)

• implementation of cumulative effects monitoring in the NWT under the Mackenzie Valley Resource Management Act

• set up of a Cumulative Effects Assessment and Management Framework in the NWT

The WKSS Partners agreed that any plan for extending research in the WKSS area must fit directly with these other discussions, and with on-going efforts to implement a Nunavut General Monitoring Program in the West Kitikmeot region.

An interim research and monitoring agenda and management structure has been established to cover the transition period between the WKSS projects and the operation of a permanent monitoring program in the WKSS area. The interim agenda explores mechanisms to provide information to the Nunavut General Monitoring Program (NGMP) and the Mackenzie Valley Cumulative Effects Assessment and Management Framework (CEAMF) (see Chapter 5 for further discussion).

With the completion of the traditional knowledge and biophysical studies engendered by the WKSS process, the need to develop protocols and guidelines to share information between traditional caribou-hunting communities, government and the mining industry is ever more apparent. TK studies continue in communities like Łútsël K'é, partially through the continued financial contributions of diamond mining companies. A couple of organizations have been established over the last several years as independent "watchdogs" aiding communication between communities and the mining industry, and evaluating monitoring programs.

4.7.3 Sharing Information about Change: Community - Mining Industry

Aboriginal communities on the barren-ground caribou range have, to some extent, used two independent monitoring boards set up as a result of the BHP and Diavik environment agreements, to communicate their environmental concerns to mining companies. The capacity of these organizations to express the traditional knowledge of communities is questionable, however. Moreover, the cumulative effects of increasing mining activities are a challenge that the mining industry, communities and the independent watchdog organizations (monitoring boards) currently struggle with. How

can comprehensive monitoring and cumulative effects assessment be performed for all mine sites? Government agencies, the mining industry and communities are looking for ways to standardize modeling, protocol and monitoring exercises.

Communities face a challenge; the federal government's position is that the Treaty 8 Dene took treaty in exchange for giving up land. Akaitcho Dene refute this position, but there is the continued problem of the federal government issuing permits and leases to mining companies. The Akaitcho position is that companies can retain permits as long as conditions are met to fund traditional knowledge studies, but this does not really provide control in Akaitcho lands. Impact Benefit Agreements do not give the Akaitcho government the ability to stop permitting and leasing. The BHP-Billiton and Diavik environmental agreements require environmental monitoring to occur in the companies' respective claim blocks. For the first two years, GNWT, DIAND and the companies share the costs of monitoring, thereafter, Diavik and BHP-Billiton will cover the entire costs.

4.7.4 Environmental Monitoring Agencies and the Diamond Mines

Aboriginal communities are concerned that the Ekati mine site and the winter road to the mine, are affecting the spring and fall migration of the Bathurst caribou herd. Thousands of animals pass through the BHP-Billiton mining claim block during their migrations, some right through the mine site itself. The winter road to the mine, the most northerly ice road in the world, is a joint venture of BHP-Billiton, Echo Bay, and DeBeers and extends north from the end of the paved road north of Yellowknife and extends to the Lupin mine in Nunavut. BHP-Billiton has approached Łútsël K'é and other communities to discuss the effects of the road on caribou and the potential for aboriginal participation in environmental monitoring of the road and the mine site. This road is also of concern because it is increasing hunter access to the wintering grounds of the Bathurst caribou herd.

The Independent Environmental Monitoring Agency, set up as a result of the BHP Environmental Agreement, has tried to push for a more cohesive way of addressing

cumulative effects on caribou and how to mitigate these effects. However, any single mining company is unwilling to accept responsibility beyond their claim block area. IEMA hears a lot about communities' historical knowledge of caribou movements at annual meetings where traditional knowledge studies funded partially or fully by BHP-Billiton are presented. However the Independent Environmental Monitoring Agency's mandate is to assist and not to carry out original research.

The Environmental Monitoring Agency Board is the equivalent of the Independent Environmental Monitoring Agency, an independent monitoring board created as a requirement of the Diavik Environmental Agreement. The Board is made up of representatives from the GNWT, DIAND, Diavik, Treaty 11, Yellowknives, Łútsël K'é, KIA, North Slave, Government of Nunavut and the Federal government.

In addition to the work of the independent environmental monitoring agencies, BHP-Billiton and DeBeers Canada have funded traditional knowledge studies in Łútsël K'é in recent years. DeBeers Canada owns two diamond mine projects (currently undergoing environmental reviews), located south of the BHP-Billiton and Diavik projects at Lac de Gras. Neither of these projects is slated to begin full production for several years. In a rather unique move, DeBeers funded Łútsël K'é to write a chapter of the Snap Lake Project's environmental assessment. An agreement signed between DeBeers and Łútsël K'é stipulates that DeBeers cannot unilaterally edit the community's traditional knowledge report. There is a direct connection between the rivers and streams leading from the DeBeers project sites to Great Slave Lake, representing ancient travel routes of the Dënesǫłine from the east arm of Great Slave Lake north to hunt caribou in their wintering areas. DeBeers has partially funded Łútsël K'é traditional knowledge studies of the waters of Desnedhe Che, that include the headwaters of the Lockhart River (Aylmer Lake area), an area that is an important feeding ground for Bathurst caribou if not other herds as well.

4.8 Protected Areas and Caribou

The Government of the NWT has recently initiated land use planning efforts aimed at identifying critical caribou use areas and is drafting a protected areas strategy. However, these efforts are at the very least controversial. While land claims remain unsettled, First Nations groups can feel as undermined by land protection, as they are by mining developments. In Chapter 3, a history of the ties between the curtailment of aboriginal rights and the establishment of protected areas on the barren-ground caribou (and musk-ox and wood buffalo) ranges was outlined. It is in large part because of the history of hunting restrictions in the Thelon Game Sanctuary and Wood Buffalo National Park, that the community of Łútsël K'é has been apprehensive of protected areas and in the past opposed to proposals to develop a national park in the East Arm of Great Slave Lake.

There are efforts to protect lands on the barren-ground caribou range. The Thelon Sanctuary was first established by federal legislation in 1928 and includes a large part of the Beverly caribou herd's calving area. However, since that time, protected area initiatives have been few. Protected areas have been difficult to establish given the mistrust aboriginal peoples have of the processes that led to the establishment of the Thelon Game Sanctuary and Wood Buffalo National Park. Aboriginal peoples were prevented from engaging in any kind of harvesting activities in these protected areas when they were initially established. The Dënesǫłine people of the Northwest Territories and Alberta have vivid memories of the charges laid against individuals found in violation of regulations in these protected areas (Fumoleau 1977, Mackinnon 1983, Abel 1993).

In 1999, the Government of the Northwest Territories initiated a Protected Areas Strategy (PAS). This strategy led to a number of protected areas proposals from aboriginal communities. In the barren-ground caribou range, these proposals include the Sahtu-Dogrib proposal to protect the Horn Plateau, the Tłı̨ Cho proposal to protect Mohwi Trail and the Łútsël K'é proposal to protect the Waters of Desnedhe Che

adjoining the proposed national park in the east arm of Great Slave Lake (Chief and Council voted to support a proposed protected area in the region in the spring of 2001). Responsibility for implementing the NWT-PAS is shared by the federal and territorial governments working in partnership with communities, regional organizations and land claims bodies.

First Nations in various parts of the barren-ground caribou range worry about the effects protected areas may have not only on their harvesting rights, but on their larger aboriginal rights. Saskatchewan communities are concerned that the provincial Representative Areas Network will impose a process that eats away at aboriginal treaty entitlement and harvesting rights. Representatives of the Manitoba Protected Areas Initiative emphasize that efforts cannot proceed without the full approval of aboriginal communities in the region where the protected area is proposed. In the Northwest Territories, Łútsël K'é has been very diffident toward pursuing a conventional national parks process, but has begun considering a "tribal park" model for the East Arm of Great Slave Lake, an area where an important barren-ground caribou crossing exists on Artillery Lake. There are examples in other areas of the North where aboriginal communities in the process of negotiating land claims have been told by government agencies not to worry about selecting lands in a certain area where the community wanted to protect because they would receive protection through territorial planning strategies. Upon settling a claim, the community finds that the area they hoped to protect is now "open for business." Is it possible to develop comprehensive protection of critical barren-ground caribou habitat when there is a mix and match of legislation and protection options in different jurisdictions?

4.8.1 A Protected Area in the Heart of Barren-Ground Caribou Country: The Thelon Game Sanctuary

The Thelon Game Sanctuary (later named the Thelon Wildlife Sanctuary) was originally established by a federal order-in-council in 1927 and prohibited any hunting (by aboriginal or non-aboriginal peoples). In 1930, by way of a second order-in-council the

lands of the sanctuary were removed from mineral prospecting or claims activity. In fact, it was not legal to even enter the Sanctuary without a government permit after this time. In 1956, the boundaries of the Sanctuary were changed to accommodate mounting pressure from mining exploration interests, while the Sanctuary increased in size the western portion was removed in exchange for additions to the north and southeast. Essentially, part of the traditional land use area of the Łútsël K'é Dene, was transformed from an area where all hunting and trapping had been banned, to an area completely opened up to mineral exploration. In the late 1970s, the NWT, having gained jurisdiction over the Sanctuary just after the Second World War, decided to eliminate the need for individuals to obtain licences to travel within the Sanctuary.

In 1986, a review of the Thelon Wildlife Sanctuary conducted under the federal government's Northern Mineral Policy led to an enormous outcry by aboriginal and environmental groups. The Beverly and Qamanirjuaq caribou management board lobbied hard to prevent the opening of the area to mineral exploration. The Sanctuary affords protection for a substantial portion of the Beverly caribou herd's range. In 1987, the NWT Chamber of Mines lobbied to remove the Caribou Protection Areas, designed to protect critical barren-ground caribou habitat from mining exploration activity. Both attempts were resisted, though a formal government decision confirming that the boundaries of the Sanctuary would not be changed was not made until 1990. The Caribou Protection Measures have primarily lost the support they needed to remain effective (primarily the funding to up-date information about caribou protection areas and to monitor industrial activity in neighbouring areas). There is even a proposal under consideration to expand the boundaries of the Sanctuary by connecting it to the Queen Maud Sanctuary located to the northeast of the Thelon area.

4.8.2 The Proposed Thelon Sanctuary Co-management Plan

It is clear, from both oral traditions, the living memories of Inuit and Dene elders, and historical accounts, that the Dënesǫłine and the Inuit have extensive regard for the

Thelon area and have survived in its lands for a very long time. The introduction of a hunting ban in the last 70 years, has created a tension in the ability of aboriginal peoples to maintain a connection with the Thelon area. In 1980, a failed attempt was made to open the Sanctuary to GHL-holders (aboriginal peoples with recognized treaty rights (Raffan 1992:58). In the summer of 1995, Inuit and Łútsël K'é Dene met at Warden's Grove in the sanctuary. They spoke of the regulations and restrictions on aboriginal land use that had been imposed on the Dene and Inuit peoples. Some argue that if these restrictions were to be removed, it would open the door to the arguments of the mining industry that the Sanctuary should be opened to other, including industrial, land use activities (Pelly 1996:149). This is arguable, given that aboriginal harvesting rights are legally recognized in other protected areas, such as national parks, without the incursion of industrial activities.

In 1996, both the communities of Baker Lake and Łútsël K'é established land use planning committees for the Thelon Wildlife Sanctuary. Both communities have been opposed to opening the Sanctuary to mineral development. However, both Inuit and Dene peoples would like to see the Sanctuary opened to subsistence hunting. The Łútsël K'é Dene and the Inuit of Baker Lake continue to meet to discuss the co-management of the Thelon Wildlife Sanctuary.

4.9 Conclusions

This chapter has described the institutions that have affected the relationship of the Łútsël K'é Dene to the barren-ground caribou ranges they call home. The history of the effects of early Canadian government restrictions on aboriginal hunting activities, and Dene efforts to resist these restrictions were outlined in Chapter 3 in order to describe the manner in which alternative resource management, or co-management systems, have arisen. It has been through local efforts to resist colonial efforts to break Dene ties to the barren-ground caribou, that Dënesǫłine peoples have worked within co-management systems, often informally-realized, to protect communal property regimes

and relationships to the land not recognized in Canadian legal frameworks. From the use the Dënesǫłine peoples made of discussions with treaty payment officers in the early part of the 20th century, to negotiations with mining companies and the recent aboriginal-to-aboriginal negotiations for the co-management of the Thelon Wildlife Sanctuary, the Dënesǫłine have continually forged partnerships to affirm their ancient connection to the barren-ground caribou ranges. Co-management venues are not only spaces where ecological issues are discussed, but where social and political issues are addressed. The social learning involved has not only been about ecological concepts, but about social-ecological linkages. The links between the Dënesǫłine way of life and the barren-ground caribou have been maintained in part through gradual and progressive recognition by the Canadian legal system of the communally-held knowledge and property rights of aboriginal peoples. However, these legal recognitions would have been of little significance if small and often remote aboriginal communities had not continually insisted that their links to the barren-ground caribou be respected. Dënesǫłine peoples access to the barren-ground caribou range was limited in the past through hunting regulations and protected areas legislation. This access was simultaneously threatened by industrial activity, namely mining exploration and development. The Dene have continually negotiated with and resisted such activities that threatened their links with the barren-ground caribou.

A number of conditions must be realized in order to achieve cross-cultural resource management, whether between non-aboriginal and aboriginal peoples or between different aboriginal nations. The conditions listed below will be explored at greater length in Chapter 5:

- the determination of proper and culturally appropriate representation during planning exercises

- the creation of fundamentally new institutions in order to accord equal authority to traditional knowledge (a condition that is now part of territorial policy, but that many organizations are struggling to understand and meet)

• the provision of independent cross-cultural facilitators for the development of research protocol(s)

• the means to recognize and respect the context of aboriginal knowledge, knowledge that is not purely technical, but imbued with personal and societal responsibilities and relationships

This chapter has explored co-management as a huge range of partnerships, where power relations rarely give traditional caribou-hunting communities final decision-making authority. However, many of these co-management spaces, though they may not be formal organizations with a range of financial and technical resources, represent forums where the conventionally marginalized voices of northern aboriginal communities are increasingly heard and the complex needs of the barren-ground caribou they derive their spiritual, cultural and nutritional survival from, are increasingly met.

Chapter 5

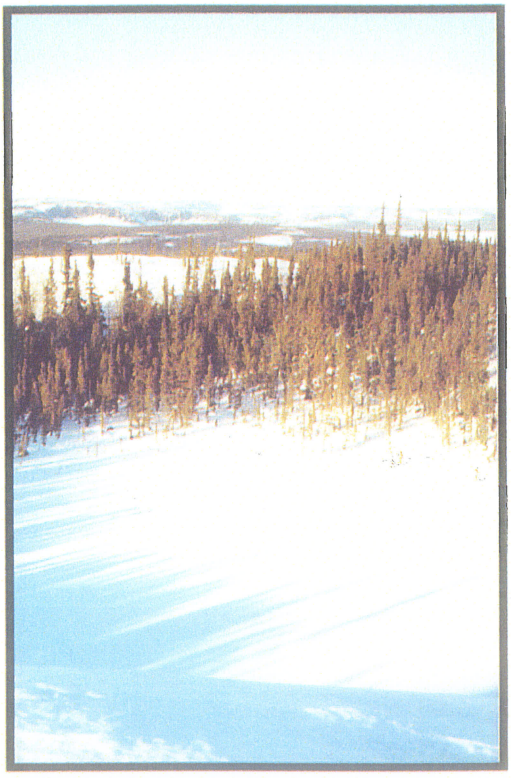
Making Connections – Community-Based Information-Sharing in the North

Everybody gets so much information all day long that they lose their common sense.

Gertrude Stein 1946

It is this apparent fixation upon facts and practices that has disenchanted Indigenous experts. They see this as a denial of IK [Indigenous Knowledge] as a flexible and constantly evolving process.

Assembly of First Nations 1995



5.1 Chapter Summary

Information-sharing within an aboriginal community and with outside organizations is explored in this chapter. Semi-directed interviews and participatory action research relating to the place-based "traditional knowledge" (TK) of the community-based institutions of Łútsël K'é, Northwest Territories, Canada, informs the discussion. The definition, documentation, protection and dissemination of TK, as well as mechanisms allowing its loss and revitalization are addressed. The connections and feedback between resources, information about resources and cultural knowledge is outlined. Human intentionality, communication and technology play a role in building knowledge sharing mechanisms. These mechanisms are examined in the context of the technologies (including oral and written communication) used by the Dene people of Łútsël K'é to share and document knowledge of the barren-ground caribou (*Rangifer tarandus*) range.

5.2 Introduction

The traditional knowledge of aboriginal communities, with cumulative and multi-generational experience in local environments, is increasingly seen as vital to sustainable resource management. However, this knowledge often remains "silent." There are a variety of reasons to explain why the knowledge of aboriginal communities is unexpressed in regional resource management settings. Northern aboriginal peoples are developing the means to articulate and share the traditional knowledge of their communities within both local and larger-scale regional frameworks. Information management systems can play a role in expressing multiple aboriginal perspectives about resource management issues. However, this is challenging if information technology is to avoid homogenizing or de-contextualizing resource information within mainstream resource management settings.

The cost of collecting and interpreting information is one of the key impediments to resource management decision-making at any spatial scale (Ostrom 1990). The sharing

of information between aboriginal communities and external parties may decrease the costs of this decision-making to everyone involved. Shared information systems have the potential to create innovative learning environments when the knowledge and institutions of the aboriginal communities involved remain linked. In this way, the context of locally-derived knowledge remains connected to the communities where it is generated rather than "mined out" of the community. A number of northern aboriginal communities are using information sharing technology to gain not only political, but intellectual empowerment. However, shared information systems are viable exchanges only when the risks and benefits to aboriginal communities of creating and maintaining these systems are carefully weighed. Communities are developing the means to ensure confidentiality and to respect the often personal nature of traditional knowledge through research protocols and community-based information access policies.

Recognition of the political power imbalance between aboriginal societies and external parties is an implicit part of understanding the effects of information sharing on aboriginal institutions (rules of decision-making and behaviour). The problems that aboriginal communities may be trying to address through information sharing are not necessarily the same problems that motivate outside forces to become involved in information sharing. The risks taken by all parties in information sharing arrangements may, therefore, not be equivalent. It is the "cultural climate" shaping the use of the information, which makes the design of information sharing systems fundamentally important (Olive and Carruthers 1998). Ultimately, it is the *resources* (not only natural resources, but cultural, political and economic resources) that support aboriginal rights and management systems *as well as the knowledge of these resources*, and all are potentially at risk in information sharing arrangements.

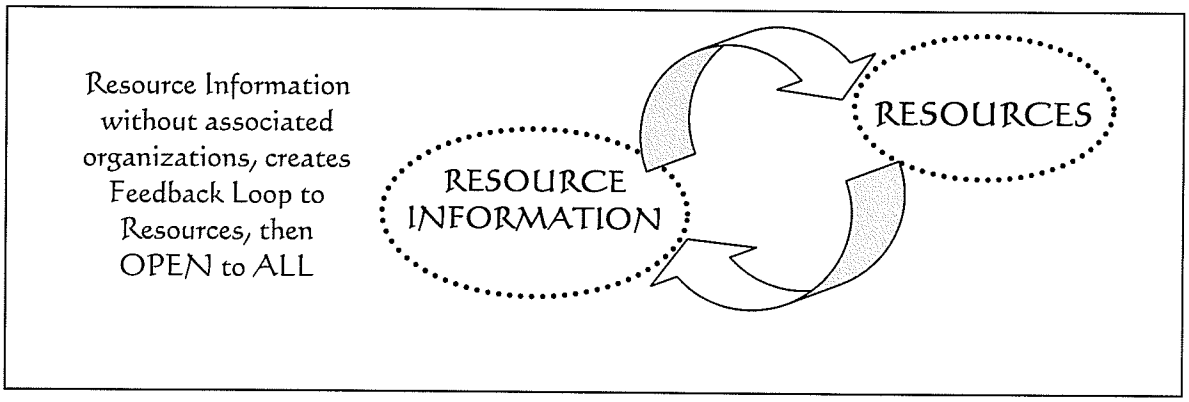
The motivation for aboriginal people to share their cumulative and geographically-rooted traditional knowledge (TK) (see Berkes 1999) as well as their land use patterns is, in many political climates, largely motivated by external pressures. Treaty and land claims negotiations, and regional land use planning prompt information exchange. Often this sharing occurs in situations characterized by contradictions due to conflicting

understandings of information and its role (Weinstein 1998). Different cultural, linguistic and preferential backgrounds have a strong influence on the information considered relevant to varied parties. These differences exist at all scales from the personal, to regional, national and international levels (Gould and White 1986).

Information sharing without links to aboriginal organizations – or groups of people acting in relationships governed by institutions (rules) – can act like roads providing virtual uncontrolled access corridors, not only to knowledge of communal property resources (CPRs), but to the resources themselves. Without links to people and rule-making, information management systems can become a kind of open access resource, intensifying third party interests in aboriginal CPRs. Open access information sharing can undermine the controlled access to traditional territories that *de facto* customary laws and knowledge formerly achieved.

When controlled entrance to customary institutional arrangements (like differentiated knowledge) is undermined, potential effects can include the decline of harvestable populations, changes to the "utility" of TK, increased disturbance of resources and increased access by competing harvesters to traditional territories (Weinstein 1998). Essentially, a positive feedback loop is formed between the information about resources and the resources themselves (Fig. 5.1). There are no links between the communities that hold traditional knowledge about resources and use of the resources themselves so that uncontrolled access to information about resources may also lead to uncontrolled access to resources themselves.

Figure 5.1: Without Links between Knowledge and Institutions, Knowledge Sharing is an Open Access Corridor



Despite formidable challenges, northern aboriginal peoples are finding ways to create voices for traditional knowledge within both local and larger scale regional frameworks. The role of information management systems in articulating diverse aboriginal perspectives about resource management issues, rather than homogenizing them within mainstream settings, also needs to be considered. The objectives of this chapter are to illustrate the mechanisms that the Dënesǫłine community of Łútsël K'é is developing 1) to maintain inter-generational communication, 2) to ensure the community's voice on resource management issues is heard at local and regional scales, and 3) to prevent co-optation of community knowledge in a way that divides knowledge from the institutions.

5.3 Methods

This chapter is based upon the author's experiences working with the Dënesǫłine (Chipewyan) community of Łútsël K'é (62°24'N, 110°48'W), located in the East Arm of Great Slave Lake, Northwest Territories, Canada (see Chapter 1, Fig. 1.1). The author spent a total of 42 full-time work weeks working with community researchers to aid the development of an information management system. Łútsël K'é is one of four Dene communities represented by the Treaty 8 Akaitcho Territorial Government. Other

methodologies included semi-directed interviews with members of the Łútsël K'é community who have worked to document traditional knowledge. A series of interviews with elders and hunters about community institutions that shape caribou hunting practices also inform this chapter. The author lived in the community of Łútsël K'é for approximately two years (2000-2001) and attended dozens of community meetings about resource management issues, many of which addressed issues of knowledge sharing.

Research Process

Interviews were audio-recorded and then transcribed at a later date. All transcripts and audio-recordings, except those that interviewees wished to remain confidential, are stored at the Łútsël K'é Wildlife, Lands and Environment Department. All but one of those community researchers interviewed by the author are fluent in both the English the Dënesǫłine languages (*i.e.*, one was not fluent in Dënesǫłine) and the majority of researchers ranged between the ages of 19 and 35 at the time the interviews were carried out. Łútsël K'é elders see these researchers as youth and are very supportive of their efforts to document the community's land use information and to conduct traditional knowledge studies. Interviews were carried out in English. Interviews with elders and caribou hunters about community caribou hunting institutions were also semi-directed. Any quotations that appear in this paper without page references are the words of individuals from the Łútsël K'é Dene First Nation who participated in the interviews described above, unless otherwise stated.

Without context, the concepts of "information," "traditional knowledge," and "community" in discussions about community-based information sharing remain impossibly abstract. This section defines these terms for the purposes of the discussion in this chapter.

5.4 The Differences between Information, Knowledge and Wisdom

Inkonze is a metaphysical concept and key to understanding the interconnected communication between the Dene, the animals, lands and waters where they live (Ridington 1990, Sharp 1997, Smith 1997, Goulet 1998). Animals have traditionally formed the most important source of knowledge for the Dene in three ways: 1) as sources of practical, empirical knowledge, 2) as models of proper moral conduct and 3) as sources of *inkonze* itself (Smith 1997:74-75). *Inkonze* is a gift that animals are obliged to share with those humans *who have maintained a proper reciprocity* with non-human persons. Within this way of knowing, Dene elders are confounded by resource management processes that give greater authority and legitimacy to knowledge of the environment that is not first-hand, but to knowledge that is abstracted and removed from experience on the land (Rushforth 1994):

> *Well, there are some things you just can't know nothing about, and I won't talk about it. If it's something I know, me I done it [that's different]* (Joe Desjarlais 2001).

Dene elders are often amazed by the authority given to abstract expert knowledge in mainstream resource management systems. Dene cultures emphasize that it is necessary to evaluate what is seen in relation to all other sensations, including emotions, and accept that there are complexities to reality that can never be completely known (Smith 1997:72).

It is only in the last century that the word "information" has lost its common sense significance in the English language as a message imbued with meaning or the equivalent of "knowledge." Information has become the equivalent of a message that can be devoid of meaning. The elements that transform "information" to knowledge and at times to wisdom - such as common sense, judgment, intuition, creativity or emotion - are value-based and shaped by culture and experience. Concepts like *inkonze* (loosely translated as "little bit know something") accept the uncertainty of knowledge, and recognize that certain things are inexplicable. "Spiritual knowledge" or "wisdom" is the

integration of knowledge and the processes of coming to know (Simpson 1999); it is simultaneously the context, content and creative process of knowledge.

Without ties between information, and the organizations and institutions that in combination transform "information" to knowledge, wise decision-making cannot follow. It is a "community," that creates and maintains these ties. Community is defined for the purpose of this discussion as a network of people that create, share and interpret knowledge. The make-up of the Łútsël K'é community is described in order to contemplate the links between the community and its traditional knowledge.

5.5 Defining Community

Traditional knowledge lives and breathes in communities. The knowledge of the land that community members hold collectively, is linked to the history of the people who make up the community. Łútsël K'é is a small village of less than 400 people living on a peninsula that juts into Great Slave Lake in the Northwest Territories. However, the geographical and temporal extent of its land use is far broader than the history of the current village site indicates. The community is made up of a mix of families, some with connections to families in northern Saskatchewan, Alberta, and Manitoba as well as other parts of the Northwest Territories.

Łútsël K'é families were organized entirely into small, mobile hunting camps up until 40 years ago. While at certain times of the year these camps were quite isolated, they were connected through trading networks, intermarriage and occasionally mass caribou harvesting activities that required dozens and sometimes hundreds of people to congregate at specific harvesting sites (Hearne 1809, Speiss 1979; see Chapter 3 for more historical details).

It is often assumed that small communities are relatively homogeneous places. However, many aboriginal settlements are fairly complex organizations of diverse people with a variety of experiences on the land. Some Łútsël K'é elders talk of hearing their grand-parents tell stories about how people in the Łútsël K'é area used to walk to

Churchill or north to Bathurst or Chantrey Inlet where the white whales (beluga - *Delphinapterus leucas*) are. Elders in their 90s or that have recently passed away, spoke of living in the Thelon area for years at a time (Raffan 1992). Historically, contact between the Dënesǫłine (Chipewyan), Tłicho (Dogrib), Cree and Inuit peoples occurred across great geographical expanses. Some contact led to hostilities, other contact led to inter-marriage as evidenced by trade patterns and multi-lingual elders (Helm 2000). Some Łútsël K'é elders remember hearing their parents speak in the Dënesǫłine, French, Cree and Tłicho languages. Many of the elder women alive today in Łútsël K'é travelled widely on the land, some giving birth on the barrens at Aylmer and MacKay Lakes. Other elders remember that their ancestors were born in the Fond du Lac, Saskatchewan area and then spent the majority of their lives on the barrens and vice versa. This is a wide range of experience across quite a large geographical area.

Archaeologists say that of the seven barren-ground caribou herds in North America with wide-ranging migratory patterns and associated people, the Dënesǫłine people are the most extreme case of "herd following" in the entire ethnographic record (Burch 1991:440). The archaeological record shows that the Beverly and Qamanirjuaq caribou herds and the Dënesǫłine peoples occupied approximately the same ranges and followed the same annual cycles of movement from at least A.D. 1400-1900 (and probably much longer). Herd size fluctuated considerably during this period (Burch 1991:441).

It is not surprising, therefore, that there is a mixed perspective on whether the Dënesǫłine peoples were peoples of the forest or the barren-lands. Mackenzie wrote in 1801 that the Dënesǫłine regard the barren-grounds and not the forests, as their "native country." (Birket-Smith 1930:14). The deep-rooted connection of Dënesǫłine people from the Athabasca region of Saskatchewan to the Old Lady of the Falls at the tree-line, is a further indication that Dënesǫłine movements were extensive and that people shifted regularly from hunting grounds well south of the tree-line to hunting grounds on the barrens depending upon inter-decadal variations in barren-ground caribou migratory patterns (Coutu and Hoffman-Mercredi 1999). The present-day settlement of

Łútsël K'é is developing ways of revitalizing the traditional knowledge of their community, rooted in varied and vast (historical and geographical) experience on the land.

5.6 Defining Traditional Knowledge

> *A body of knowledge and beliefs transmitted through oral tradition and first hand observation. It includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use. Ecological aspects are closely tied to social and spiritual aspects of the knowledge system. The quantity and quality of TEK [traditional environmental knowledge] varies among community members, depending upon gender, age, social status, intellectual capability, and profession (hunter, spiritual leader, healer, etc.). With its roots firmly in the past, TEK is both cumulative and dynamic, building upon the experience of earlier generations and adapting to the new technological and socio-economic changes of the present* (Johnson 1992:4).

> *researchers need a sound understanding*
> *of the cultural basis of aboriginal knowledge*
> (Wavey 1993:27).

The definition and use of the knowledge of North American aboriginal peoples by those outside their cultures has gone on for a long time (Anderson 2000, Ferguson 2002), though academic discussions of "TK construction" are relatively recent.

Partly because of the long history of the expression and image-making of aboriginal peoples and their knowledge by others, the expression of TK can have highly political overtones. In the parlance of world systems theory, not only does the core (mainstream society) play a role in physically and economically marginalizing the periphery (aboriginal societies), it also plays a role in re-writing aboriginal identity. As aboriginal communities revitalize their governance systems, resource management institutions and knowledge bases, "TK" does take on a political force, as a symbol for resisting and changing the conventional power dynamics between the core and the periphery (Berkes 1999, Nadasdy 1999, Usher 2000, Ferguson 2002). In this way, aboriginal communities refuse to be seen as "repositories" of traditional knowledge. TK systems are more than empirical local observations of land and landscape, they are systems to organize

observations and initiate decision-making (Gunn *et al.* 1988, Kuhn and Duerden 1996:750).

Aboriginal organizations and academics have outlined the terrible marginalization that occurs when aboriginal elders and communities are seen only as knowledge "vessels" (Bielawski 1992, Agrawal 1995, AFN and NAFA 1995, Simpson 1999, Wenzel 1999). Traditional knowledge systems include empirical knowledge of ecological processes, but they also support tools for learning about and interpreting knowledge of social and ecological systems. These tools evolve through time and are intimately linked to the belief systems and practices of the people who use them.

5.7 Transmitting Learning: Oral versus Book Knowledge

TK documentation only provides a snap-shot view of the role of the oral transmission of knowledge in the interpretation and use of knowledge (Cruikshank 1998). For example, story-telling plays a fundamental role as a "prism" illuminating the multi-dimensional nature of a situation. A story may serve as a prism through which to interpret past and present knowledge and to guide future actions rather than simply a "lens" to the past (White and Meehan 1993:31). To suggest that the documentation of a culture's knowledge in a written form is nothing but progress from the oral transmission of knowledge, negates the role of the knowledge-teller in interpreting, up-dating and guiding the use of information, leading to knowledge and wisdom.

Evolving Communication Techniques

In the case of traditional knowledge studies, the Łútsël K'é WLED staff has faced two dilemmas in the documentation of the community's knowledge:

1) searching for technologies that can best represent TK, and
2) designing research methodologies to fit the technology that will represent TK.

Contemporary communication technologies have allowed knowledge to be commodified, which has serious implications when knowledge is misappropriated or co-opted. Aboriginal communities worry that aboriginal peoples and institutions will

continue to be excluded from resource decision-making and lose ownership and control over the use and application of their knowledge if it is documented and incorporated into non-aboriginal resource management systems. It is perhaps in understanding the role of narrative in Indigenous communities that further thinking on this widespread conundrum can progress. Aboriginal leaders insist that marginalized intellectuals such as story-tellers in aboriginal communities and TK "facts" not be separated from the aboriginal institutions guiding the interpretation and use of TK.

Perhaps this is the real lesson of the politicized efforts to include TK in resource management decision-making. Aboriginal communities are not comfortable with processes that divide "the facts" from societal responsibility to interpret, use and take action on "the facts" in responsible ways. Mainstream society has created distinct and separated organizations for collecting, reviewing and disseminating knowledge as well as those for policy-making and implementation.

The following illustrations of local Łútsël K'é community researchers' fears and aspirations for the documentation and use of TK illustrates the links between information, organizations and institutions. Ultimately, TK documentation and access by outside agencies helps and hinders the protection of aboriginal lands, rights and self-determination of the use of traditional lands and resources. It is individual communities that are winding their ways through processes that can help protect their resources and institutions, but that are also riddled with obstacles that can cause harm.

5.8 - TK as a Process of Inter-Generational Communication

Elders not only play a role in retaining and interpreting knowledge, but in passing it on to future generations. With declining language retention and a decrease in the time that people spend on the land, aboriginal communities are developing new ways of passing TK on to future generations. In the case of Łútsël K'é, a local organization derived from a local Hunters and Trappers Association (HTA) organization is playing a role not only

in voicing community concerns about the impacts of mining developments in the surrounding area, but in facilitating inter-generational communication.

The Łútsël K'é Wildlife, Lands and Environment Committee (WLEC) is an example of an HTA (see description of formation of HTA network in the NWT in Chapter 3), that initially dealt solely with issues affecting hunters and trappers in the community. Today, the WLEC has a staff of up to 10 people at any one time conducting a number of traditional knowledge research projects, monitoring wildlife movements and health, responding to development proposals, providing land use information to claim negotiators, organizing community caribou hunts and arranging to supply gear and supplies to fly-in trapping camps.

The WLEC office has also become a crucial means of linking the knowledge, history and values of the elders of the community to youth. The WLEC has aided the connection between elders and youth in ways that are extremely important as the community continues to heal from the tremendous social upheaval that the Dene have experienced in the last century. The Office plays an incalculable role in stemming the loss of traditional knowledge, and in finding ways to revitalize TK in multi-media applications in ways that bind the "information" of TK to community institutions.

A number of Łútsël K'é community members were interviewed (n=11) about the experience of working in the Łútsël K'é WLEC Office. Most community-based researchers are concerned that to miss the opportunity to document community knowledge is to allow the very heritage of the community to be lost. However, the Office clearly represents more than a service to archive community knowledge. Łútsël K'é community researchers described their thoughts about the role the Office plays in the community, the time it takes to document the TK of the community and contemporary relations between youth and elders:

> *Wildlife [the WLEC Office], and research, it's like the nerve centre of Łútsël K'é. A lot of people they come in here, and they look at pictures and they find information. So this is really big. It's doing a lot of things for Łútsël K'é, this research, and I hope it carries on for awhile, even when the mines are over* (Dennis Drygeese 2001).

I learned a great deal of information since I started work here, things that I didn't know about my culture and my ancestors, I learned in here. So there's lots of information that I wasn't aware of until I got this job here. And it helps a lot, because this information that I gathered helps me, and I also tell other people about our culture and our history. People are very interested to hear stuff like that, especially coming from a young person (Dennis Drygeese 2001).

It is very important to keep the youth involved in all the goings-on in Łútsël K'é. Keep them on top of things, especially things to do with the land and the wildlife (Dennis Drygeese 2001).

The Office plays a role in rekindling knowledge of customary laws, relationships to the land, reminding youth of the stories that they may not be hearing out on the land and binding the knowledge of the elders to the youth, who increasingly are not fluent in the Dënesǫłine language. Interestingly, it is through stories that the historical and geographical scope of TK can be discussed.

5.8.1 Knowledge: Scale and Dimension

There are empirical aspects of TK tied to an individual's personal experiences on the land and related to the bush skills necessary to survive on the land. At the same time, this empirical knowledge is enveloped within the historical and spiritual breadth of stories of Denendeh (the homelands of Dene peoples) that unite the smaller scale, intimate knowledge of individual communities of peoples to the much larger temporal and geographical knowledge of Denendeh as a whole. These stories bind the mental maps of individuals to broader societal values. The collective and often differentiated knowledge of communities at various scales simultaneously organize and qualify resources in physical and cultural landscapes. Stories represent large-scale historical and geographical realities in abstract, integrated and metaphorical ways. Ecological knowledge of the land is linked by stories to larger conceptions of how to read changes in the land and guiding human behaviour on the land.

Stories are brought to life when "told" rather than "read":

I think reading legends on paper, it would bore some, but if they hear the legends told by an elder, I believe that the youth would be very interested in that. Because I remember when I was working with the kids in the school, telling stories as a traditional teacher, they were really interested. The elders

encouraged me to tell stories about the olden days. So I believe if the elders tell stories to the children, they would listen (Dennis Drygeese 2001).

Dënesǫłine peoples quickly supplemented their oral traditions by adopting written symbols (syllabics) introduced by missionaries in the early 19th century. The syllabic system introduced by missionaries was adapted and spread extremely rapidly among the Dënesǫłine. European explorers wrote of Dënesǫłine "hieroglyphics" written on tree trunks (partially stripped of their bark) as a notification that they had recently passed by and informing other hunters of the animals they had harvested (Simpson 1843 cited in Birket-Smith 1930:36). Syllabics were still in use when Ernest Thompson Seton made his trip to the barrens with Dënesǫłine guides near the turn of the 20th century:

[S]eventy-three characters are all that are needed to express the whole language. It is so simple and stenographic that the Fathers often use it as a rapid way of writing French. It has, however, the disadvantage of ambiguity at times. Any Indian boy can learn it in a week or two; practically all the Indians use it. What a commentary on our own cumbrous and illogical spelling, which takes even a bright child two or three years to learn! (Seton 1910:728, From National Public Archives – MG29D108, vol.4)

One Łútsël K'é elder remembers that when he was young, people used the lead from bullets to write messages in syllabics to each other on tree trunks.

Helge Ingstad (the Norwegian that discovered the Viking site at L'Anse aux Meadows, Newfoundland), trapped in the traditional territory of the people of Łútsël K'é between 1926-1930. Recounting the continued widespread use of syllabics at the time, he explained that older Dënesǫłine message systems were being replaced by the syllabic system, but were still in use, such as arrangements of sticks on a trail or at a camp-site, marks on trees, smoke signals, and evidence of a picture-writing system in the Talston River area (Ingstad 1992:251) prior to their adoption of the syllabics system. While the syllabic system was adopted rapidly by Dënesǫłine hunters, its use is minimal among Dënesǫłine speakers today, perhaps because it's greatest advantage was its use as a highly effective communication tool between scattered hunting groups before the advent of CB and VHF radios.

5.8.2 Cross-Cultural Literacy

Our definitions of "literacy" shape the legitimacy and authority that we give to knowledge. Just as many people without biological training have difficulties sorting through technical language, biologists unfamiliar with aboriginal story-telling have difficulty understanding the meaning and intent behind the messages aboriginal elders convey through narratives. Oral communication is a creative process, a culturally based way of thinking (Eigenbrod 1995:94) that resists fixation, following a cyclic rather than a linear concept of time and does not necessarily separate "mythology" and "history" or the "subjective" and "objective."

An ancient Dene story explaining the time "when caribou had no fear" (*Caribou News* 2(6):15) summarizes the role of oral traditions for aboriginal communities in resource management decision-making and the place of such traditions in the critique of resource management actions.

Dene elders tell a story of a time when "caribou had no fear" and caribou would travel through Dene villages allowing people to harvest them easily. One day a young woman decided to mark caribou by tying pieces of cloth on the caribou and marking their ears, noses and legs with knives. As a result, the relationship of trust between caribou and people was broken. A medicine man then undertook a long journey and negotiated with many different beings to convince the caribou to return to the people.

This story was published in the newsletter of the Beverly and Qamanirjuaq Caribou Management Board (BQ Board) in the early 1980s and retold to the author in the early 1990s when the BQ Board was consulting with communities about placing satellite collars on caribou to track their movements. This "medicine man," is an entity that elders in Łútsël K'é say is the same as the man described as *eghu* (Łútsël K'é elders workshop 2001), *bé-tsuné-yénelchian* (Łútsël K'é elders, Coutu and Hoffman-Mercredi 1999:145), "tiny tiny man" (Łútsël K'é Dene First Nation 2001, Bone *et al.* 1973:86-87) and at times as Jesus (Łútsël K'é Dene First Nation 2001, Kendrick's field notes). This figure is the centre of ancient stories the elders say are thousands of years old and continue to

be told by Dënesǫłine elders in the Northwest Territories, Alberta, Saskatchewan and Manitoba. This human-caribou entity taught the Dënesǫłine how to respect caribou (incidently, the Saami of Eurasia have stories about a similar figure, MjanDash, or Reindeer-Man, that teaches the Saami how to respect, hunt and care for reindeer).

> *People used to depend upon him quite a lot. Not only for caribou he killed but for any other thing... people used to depend on him, and this was the guy from the caribou ...Even now, he said, that little fellow still exists he's still among the caribou – he's not killed... If you start fooling with caribou, if you mistreat a caribou he said he knows it all. He seems to be the king-bull of all the caribou. He tells the caribou what to do... as far as we know, he's still out there.* (Bone *et al.* 1973:86-87).

A Łutsël K'é hunter describes how people used to use medicine to locate caribou in the past, and the changing relationship between caribou and people as technologies are used to locate caribou:

> *In the old days ... they used to know how far the caribou are by using wisdom, using magic, to look around. They even use women, pregnant women, they feel how far the caribou is, if there's a stranger, or caribou , if there's something near them. Something there, that's how they contact, keep in touch with the animals, that what my grandmother used to tell me. .. They [used to make] ceremonies for where the caribou is. And people were laughing, they laugh so much they can't think about anything... Because it's really funny the way he makes his tent, magic, eh, for the caribou. So people went inside, and they were all singing this song.*
>
> *He took a drum out, and he started doing his thing, start drumming and then [he was gone – in a trance?] and some people around him too in the teepee. And they start singing, and its gone, the vision is gone. And whatever he sees, whatever animal he sees, he copies, like a wolf, ooooo, like that, and a raven, caw, caw, caw, he says that too. Even, all kinds of animals he sees in his vision, traveling, eh? He said, it's really funny, the way he sees these things, all these things. He makes a noise, he moves too, he said. And that's why, people laugh and they can't go in there... They don't want to disturb him, or things like that. Because it's funny.*
>
> *And then finally, he said, he's travelling, and he found the caribou, and he sounds like it's right around here, Kasba Kue. And he said, they're around here, at Fort Reliance, and then he came here, with that wisdom. And then as soon as they heard that, this night and that night, people took off already, he said. And then a couple of days, even the next day, the caribou are right where he said.... There isn't anybody [who can do that now] now they use satellite collars [laughing]* (Herman Catholique 2001).

The marking or collaring of animals still strikes up a level of controversy in Dene communities. Dene elders are highly disturbed by the thought of handling caribou outside of harvesting activities, a discomfort that began with the tagging programmes first carried out in the late 1950s (Miller and Robertson 1967) and extending to uneasiness among elders with the satellite collaring of animals today.

Is the telling of this story a critique of technology? We all realize the need for expanded thinking on the ways that technology use can lead to ecologically destructive practices, and why not also look at the ways that such narratives critique resource monitoring practices? It may be that this type of practice disrespects the concept of *inkonze* described earlier and threatens the customary rules of respect or the reciprocity between humans and caribou (social-ecological linkages). The telling of this story also plays an intellectual role, linking meaning and explanation. The story links the Dene-caribou history to a sense-of-place with customary rules of behaviour for the interaction of people and caribou.

There may be more interpretations behind the "when caribou had no fear" story. It is possible that the telling of the story expresses elders' fears that contemporary monitoring methods threaten or fundamentally alter customary ways of knowing about caribou movements and exchanging information about their movements. Monitoring programmes may also threaten the revitalization of *inkonze* (represented by the medicine man who restores the trust between people and caribou in the story) and Dene concepts of knowing. It is a matter that requires a lot of delicacy. Elders, by telling this story, may be signifying that programs to mark caribou break "kosher rules" and signal a profound break with the rules of the past. There are indications that Dene once kept live caribou as decoys for caribou hunting, then abandoned the practice (Speiss 1979). This is an indication that Dene elders dislike of programs that handle live caribou outside of direct harvesting activity is not a result of a lack of experience with such matters.

Łútsël K'é researchers describe the importance of having the opportunity to record these accounts of ancient Dene stories, practices and medicine for their community. The complexities involved in communication not only among resource users and state

authorities, but about the technologies that aid human understanding of ecological processes should not be under-estimated. Whether it is the context of the telling of an oral narrative or the representation of wildlife movements on a map, the types of technologies and the ways we employ technologies, can have profound consequences on our understanding of natural processes and the actions we take as a result.

5.9 Ensuring the Community's Voice is Heard

Community-based researchers in Łútsël K'é were asked what their work meant to them as well as the challenges involved with using computerized database systems and their suitability for expressing, storing and sharing traditional knowledge:

> *It is very important to keep the youth involved in all the goings-on in Łútsël K'é. Keep them on top of things, especially things to do with the land and the wildlife. It is very important to keep the youth [involved] especially with all the computers and technology. It helps a lot since we started here, mostly working with pen and paper until computers came, it's a big help for us* (Dennis Drygeese 2001).

However, researchers also pointed out that youth need to practice traditional ways and to spend time on the land to really understand the knowledge represented in TK research projects and studies (also see Łútsël K'é West Kitikmeot Slave Study Society reports on community-based monitoring for an understanding of Łútsël K'é notions of learning and understanding):

> *When I was growing up it was different, my parents went out on the land all the time. We went in the spring, fall and winter-time, I was brought up with my grandparents. They would teach me how to set traps, how to go out, get wood, there's lots of things I was taught when I was young. Nowadays it's different, when I take some kids out on the land and ask them how to make fire, they would cut down green wood, not dry wood. For me it's different (Terri Enzoe 2001).*

Elders warn that without time on the land, not only does the body suffer, but so does the mind. The technology present in town can make people not only physically, but mentally lazy: *You exercise your mind out in the bush* (Rochon 1993:75).

5.9.1 - Why Document Traditional Knowledge?

As in so many aboriginal communities world-wide, people realize that if their knowledge and understandings of the land are not expressed in a form that can be readily shared - if it doesn't become "information" - then it is often regarded as non-existent. The tradeoff is that although the traditional knowledge may not be fully expressed through the communication technologies currently available, the process of documentation gives authority to knowledge in mainstream resource management settings, especially where development threatens the land and land uses of aboriginal communities. Łútsël K'é researchers expressed their mixed feelings about the ability of TK studies to invoke change in current development policies.

There is a tension to the process of documenting traditional knowledge. Is it too little, too late where development activity is concerned? Do aboriginal land use studies and knowledge of the land get incorporated into "values-at-risk" assessments of development projects or fire suppression programs, and if not, what can be done to remedy the situation? Community researchers express the frustration of documenting traditional ways of life, often with the financial support of mining companies, but constantly wondering if they are documenting ways of life to be archived in historical records, rather than as a means to ensure its survival. Communication bridges can break down in a number of areas; because in the past there was no legal requirement to include traditional knowledge in land use planning activities and because communities are suspicious that government or industry will use the information in inappropriate ways.

Inaccurate or incomplete traditional knowledge documentation can undermine rather than strengthen the recognition of aboriginal institutions, land uses and the legal recognition of aboriginal rights (Tobias 2000). Training and up-keep of computerized information sharing and analysis tools may also stretch the capacity of remote communities with a small population base. However, community-based research like

that occurring in the Łútsël K'é WLEC office are aiding cultural revitalization efforts in innovative ways and these efforts are increasingly vital.

A language report that is already more than a decade old reveals that the Dënesǫłine literacy skills of people in the communities of Tthebacha (Fort Smith), Denínu Kų́ę́ and Łútsël K'é are declining at an alarming rate. While over 80 percent of the respondents 45 years of age or more were very fluent in the Dënesǫłine language; only 50 percent of the respondents between the ages of 25 to 44 were very fluent; and less than 10 percent of the respondents between the ages of 5 to 24 were very fluent.

The NWT Literacy Council identifies two major challenges to increasing Dënesǫłine literacy. There are less than 1500 people in Canada who list Dënesǫłine as their mother tongue (1996 census) and this small population base is spread over a very large geographic area. In 1986, of the entire population base surveyed, 71 percent listed Dënesǫłine as a language spoken in the home or as their mother tongue; in 1996, less than 44 percent did so (Source: NWT Bureau of Statistics, http://www.nwt.literacy.ca/aborig/language/tables.htm). There are also two relatively distinct dialects spoken in this small base of fluent language speakers. The amazingly wide distribution of Dënesǫłine peoples, once a tremendous advantage to peoples so strongly associated with the movements of the barren-ground caribou, makes the retention of language in the contemporary setting of remote, isolated settlements extremely difficult. Organizations like the Łútsël K'é WLEC may not stem the loss of language, but those Dënesǫłine children who chose to maintain or return to the language of their ancestors will have a cultural record to support their efforts.

5.9.2 Knowledge Loss and Revitalization

There are a number of people, including elders in Łútsël K'é, who discuss the double-edged sword that can result when TK is recorded and then easily shared and duplicated. Communities are concerned that land use mapping can become a tool to be used by forces external to the community to limit and fix current and future land use. Often, maps are a snap-shot in time of land use. Such information may be used to

strengthen administrative and bureaucratic systems that First Nations feel threaten their ability to gain recognition for their own governance institutions. There is a simultaneous skeptical and hopeful attitude among Łútsël K'é elders about the potential of community-driven mapping exercises to strengthen recognition of Łútsël K'é land use rights. Moreover, the recognition of the legitimacy of oral traditions is only beginning to take shape in the form of recent legal decisions such as the Delgamuukw case (Persky 1998). This legal decision made the oral history of aboriginal peoples admissible in legal cases and land claims.

Mapping exercises may record information about community land use activities, such as hunting and trapping, in ways that artificially categorize knowledge and land use activities. For instance, knowledge of wildlife behaviour and habitat is connected in a hunter's mind to relationships with other species or habitat, but in GIS systems, *lines* of movement, and *polygons* of spatial use may reduce the transliteration of aboriginal concepts to linear and digital (*i.e.*, caribou travel here, but not here) representations of more integrative and cyclical thought.

Łútsël K'é elders may emphasize that they never know from year-to-year what the exact migration routes of caribou will be and feel uncomfortable with the thought of providing "snap-shot" images of their knowledge of "migration routes" especially in a landscape increasingly influenced by mining activity (see further discussion of this in Chapter 6). One hunter in Łútsël K'é described his discomfort with wildlife studies in the following way: "The caribou studies completed by environmental consultants showed that caribou were not using the area where a drilling permit was applied for. A map may show that caribou were not present in the area for the last two years, but this area is like a 'bank' for caribou. The doors may be shut right now, but this is not to say that the doors will not be open in the future." The ways that this kind of knowledge is represented (or not represented) on a map then becomes a particularly sensitive topic, especially where land use planning is concerned. The legitimacy of TK and local management regimes must be determined at a local level, with local organizations, not only through TK documentation.

5.9.3 Social and Ecological Sustainability: The Need for Knowledge Sharing

> *The sharing network, in addition to its functioning as a mechanism for distributing resources through the community, also functions as an information network* (Collings 1997:25).

Despite the risks described above, communities like Łútsël K'é are increasingly using computer technology to gain not only political, but intellectual empowerment. The roots of knowledge sharing run deep, indeed, in the case of Dënesǫłine peoples, knowledge sharing ensured survival.

Łútsël K'é is using the same technologies that may have wrested control over the use and "ownership" of local knowledge from the community in the past to ensure the confidentiality and respect of the personal nature of traditional knowledge in the future. Technologies like geographical information systems also "provide opportunities to protect and enhance constitutionally affirmed and entrenched obligations to the historical, linguistic, and cultural traditions of Treaty Indians and their rights and lands" (Makokis and Buckley 1991).

Łútsël K'é community researchers comment on traditional knowledge as collectively-held knowledge that should not be shared without the consent of the community as a whole. Highly personal and sensitive issues can be involved in decisions to share traditional knowledge:

> *Sharing's always been good for me, but some certain things, I'm not too sure what, but there are always certain things some people say we shouldn't be sharing. If you share it, they're going to twist it around and try to steal information. And if they do that, they may use it against you. But within the community I think it would be good. Better understanding of the native ways. This place (Łútsël K'é Wildlife Lands and Environment Office) may make it last and make us stronger* (Jeanette Lockhart 2001).

> *I always hear stories about that [about elders giving knowledge back to the land before they die because they haven't found anyone to share it with]. It's mostly about medicine. Before the residential school, people used to pass it on, it was a way of survival. The way to survive, to live off the land. To survive, to make it*

from one point to the other. But with the school coming in, it was changing, and they [elders] knew it, so they couldn't really give it to them [youth]. They weren't too sure if they could handle it. It was really powerful. I heard one story about that... There used to be lots of medicine people (Jeanette Lockhart 2001).

5.10 - Traditional Knowledge Policies and Protocols

While TK policies and protocols are being developed in the North on local, regional and territorial scales, their translation from paper to practice is often confused. Communities, regional land use planning organizations, co-management arrangements, industry and the territorial and federal governments have met in various forums to try to create mechanisms to clarify the confusion. It is generally agreed that the following issues need to be addressed:

Community burden – negotiating the risks of sharing

Mechanisms to share TK must acknowledge that there are relatively few individuals available to satisfy the needs of the industries, government agencies and aboriginal organizations that must meet policy requirements to include TK in their operations. Individuals who can translate between the languages and concepts of TK systems and the highly technical terminology used in land use planning exercises are few. The pressure on these individuals to represent the sacred and secular knowledge of TK systems, and to communicate indicators of change that are not familiar in scientific terms, is immense.

There are risks and benefits associated with sharing TK. Elders who cannot read or translate TK studies or understand how it is incorporated into GIS and computerized database systems are putting a tremendous trust in the people who document and mediate its dispersal:

> *Sometimes I think, they [other communities, government departments] just want to use us for our TK, that's how I feel sometime.... here are mines coming up close to us, I'm kind of worried about it. I worry about the land and the water and what's going to happen in the future. All these things, and it's the government that's doing it... I know one day we're going to [have] self-government, that's where it's heading to. We might as well go and do what we have to do right away before most of our land's gone from us* (Terri Enzoe 2001).

5.10.1 Aboriginal Rights and Resource Management - the Links between Information, Organizations and Institutions

> *The public should put more of their input into what they want to see, what they don't want forgotten* (Jeanette Lockhart 2001).

The ease of access and duplication of TK is simultaneously a tremendous aid to the community and a risk:

> *When you put information in computers people can have access to it too. But to preserve the information, the best way to preserve it is in computers. But if it's a really touchy subject, I don't think it should go on computer, just document it on tape or write it down and store it some place safe. There are some stories that would be touchy, for the elders too. Some stories that they would not want to get out of the community* (Dennis Drygeese 2001).

> *There's always concerns [that] some people might use it the wrong way. Some traditional knowledge is for your own benefit, and if you do share it, they might use it against you* (Nancy Casaway 2001).

Łútsël K'é researchers also spoke of the role TK documentation plays in increasing overall mechanisms for support and capacity-building in the community. The respect for aboriginal languages and cultural identity is simultaneously supported and at times hindered by the choice of technologies used to document TK.

5.10.2 Knowledge Sharing: "a matter of fact" ... or a matter of use ?

There is a general sense that it is possible to collect knowledge in many different ways and to develop multiple protocols for its dissemination and use. However, will these diverse approaches strengthen the links between aboriginal organizations, institutions and the resources they depend upon for their cultural survival?

In most regional and inter-jurisdictional settings there are no clear mechanisms to include traditional knowledge in decision-making. There is also no clear accountability about how to use traditional knowledge. Industry and government agencies currently grapple with legislative requirements to include traditional knowledge in their operations. The federal government may have a fiduciary obligation to protect

traditional knowledge. It is not clear what government and industry obligations are to support the collection, storage or use of traditional knowledge. These obligations must also be balanced against the need of communities to maintain control over the use and dissemination of their knowledge. This chapter has tried to examine these issues from a local level on the assumption that discussion of the collection, use and sharing of traditional knowledge, knowledge that is place-based, is most appropriately discussed from the "ground up."

Before inter-regional information management systems that include traditional knowledge can possibly include the aspirations and values of aboriginal communities in large-scale environmental decision-making, local institutions for the sharing of traditional knowledge are the first priority. Elders and youth need the support and tools to talk with one another in a world that has changed dramatically for northern people in the last century. Łútsël K'é community researchers expressed the need to address communication break-downs between individuals, between generations and as a result of overwhelming media influences from mainstream society:

> *It's always good to know where you come from. Your roots and stuff, but it's hard to keep them [children] interested in it. Most kids they don't, get out [on the land now] they've got all this negative attention around them. You go to school and they try to teach you all this stuff, and then you go home and it's not really happy. And then, when you get older, you don't really care much. I guess, when you're a child, if you don't learn it then, then you don't express it. And then they get into drugs, alcohol, all this stuff, they just happen to fall into it. They don't really realize it until they're way far into it. When you're dealing with drugs and stuff like that when you're 13, they're not going to really care, because that's what it does. It makes you not care. Maybe they think that it's [culture] always going to be there or something, but that's not the reality, it's not going to be there. If you learn something properly, you can teach others how to do it. If you just learn the basics, you can go along, but you can't really teach any other person properly. They won't have all of it, they'll only have some* (Jeanette Lockhart 2001).

The Łútsël K'é Wildlife, Lands and Environment Committee has played a crucial role in revitalizing community institutions for the sharing of TK. Łútsël K'é researchers stated that sometimes traditional knowledge is not something that can be shared with just anyone. It is not an "open access" resource, but in need of differentiated access

depending on the sensitivity and nature of its content. Traditional knowledge is part and parcel of cultural identity and values and to contemplate on it is to mourn certain losses, but also to celebrate its dynamic nature.

People have always worried whether knowledge will be mishandled or inappropriately shared. Łútsël K'é researchers are also conscious that outsiders or mainstream society may misinterpret the spiritual nature of traditional knowledge. People worry that technologies and economic forces that affect the land, will affect the ability of traditional knowledge to survive as a link between people and the land, just as the Dene means of survival is threatened by increasing industrial development.

Elders trust and anticipate that the documentation of traditional knowledge will result in actions to protect the Dene way of life, rather than gather dust in paper reports. In Łútsël K'é community meetings and interviews, older people constantly remind the community of the "power of words" and that the misuse or miscommunication of words and the way that words are shared, has led to more than 100 years of miscommunication about the content of the Treaty 8 negotiation, leading to fundamental affects on Dënesǫłine access and control over their lands. The survival of traditional knowledge and the ability of the Łútsël K'é Dene to maintain a relationship with their lands will come not just through research that "conserves" it, but through its use.

5.11 Conclusions: *Reflections on Knowledge Sharing and the Legacy of Colonization*

Just as road systems fragment landscapes, attempts to define and adopt traditional knowledge systems can damage these systems rather than perpetuate their survival. Some scholars have examined at length the non-aboriginal "manufacture" of traditional knowledge as a construct and the consequences of inserting traditional knowledge into western frameworks.

It is clear that processes for sharing knowledge that allow traditional knowledge to become an open access commodity, can endanger aboriginal communities' abilities to control development pressures on their traditional lands, but may also endanger aboriginal rights and self-governance institutions. The sharing of traditional knowledge

is beneficial when it is done in such a way that the "values-at-risk" of the aboriginal communities involved in land use planning are included in any exchange. Information sharing must be linked to community-based mechanisms to control the use, collection and interpretation of traditional knowledge. Evidence of these community mechanisms are seen in the Łútsël K'é Wildlife, Lands and Environment Office. It is such community-based organizations and the institutions that guide their activities that form a nested exchange interface guiding the creation and dissemination of information both within the community and exchanges with organizations outside of the community (Fig. 5.2).

Figure 5.2: Nested Exchange Interface between Information, Organizations and Institutions

It is only in this manner that the strength of traditional knowledge systems to answer the "why" of sustainable resource management decision-making is maintained, rather than co-opting traditional knowledge in efforts to answer only the "how" and "what" questions of resource use. Only by maintaining the linkages between aboriginal knowledge, community institutions and organizations, do information-sharing systems become mechanisms facilitating knowledge exchanges rather than opening aboriginal information to open access exploitation (Davidson-Hunt 2003).

The Łútsël K'é Wildlife, Lands and Environment Office is meeting the three-pronged challenge of 1) maintaining inter-generational communication within the community, 2) ensuring that the community has a voice on resource management issues at regional and

national scales, and 3) actively working to make sure that the community's traditional knowledge is not co-opted.

Chapter 6 outlines the experience of recording Łútsël K'é knowledge of barren-ground caribou movements. This knowledge was collected with the participation and guidance of the Łútsël K'é Wildlife, Lands and Environment Office. Indeed, the research would not have been possible without the office.

Chapter 6

Dënesǫłine (Chipewyan) Knowledge of Barren-Ground Caribou (*Rangifer tarandus groenlandicus*) Movements

This chapter was accepted for review by the journal Arctic, and co-authored with P.O'B. LYVER and the ŁÚTSËL K'É DËNE FIRST NATION. It has been reformatted here to fit the design of the thesis.

We piece our recollections together and build for ourselves a picture of the caribou and its migrations, but we never succeed in discovering the first clue to the solution of the riddle of this mysterious animal.

Helge Ingstad 1931

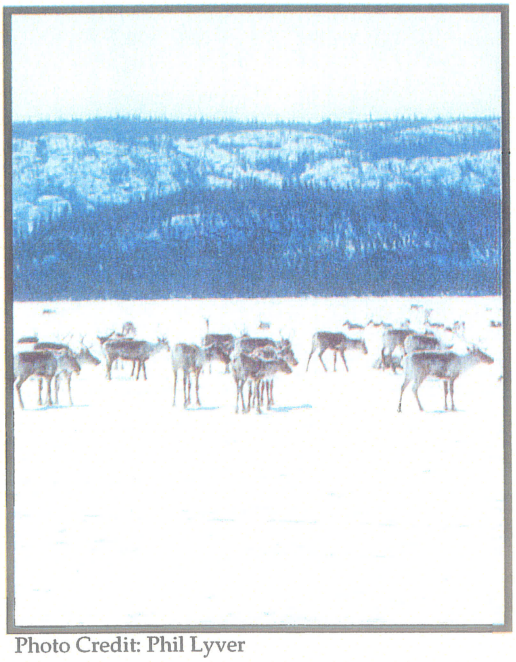


Photo Credit: Phil Lyver

6.1 Chapter Summary

Semi-directed interviews relating to the traditional knowledge of barren ground caribou (*Rangifer tarandus groenlandicus*) movements were conducted with elders and hunters from the Dënesǫłine (Chipewyan) community of Łútsël K'é, Northwest Territories, Canada. The objective was to document elders' and hunters' knowledge of past and present caribou migration patterns and record their explanations for perceived changes in movements. Elders recognized expected, unusual, and unprecedented levels of variation in caribou movements. Changes in Dënesǫłine hunting strategies (*e.g.*, change in hunting area or prey species) may reflect these different levels of variation. Local narratives show that Dënesǫłine have a fundamental awareness of caribou migration cycles. Elders are aware caribou become unavailable at times and used stories to describe the ecological system. Most elders thought fire frequency and intensity had increased over their lifetimes and that caribou numbers and distribution had been affected. The majority of Łútsël K'é elders thought mining development was affecting caribou movements in some way. Elders believe disturbance around traditional migration corridors and water crossings, and of "vanguard" animals, might be forcing animals to use less optimal routes and influencing where they over-winter. Winter roads, and especially the prospect of a permanent road through the caribou range, are of concern because elevated berms and increasing traffic densities would create a barrier to migrating caribou. It would also provide hunters and sightseers with easier access to the animals, which could increase disturbance levels and the numbers harvested. It is strongly believed that a lack of respect for caribou will cause the animals to deviate from their "traditional" migration routes and become unavailable to the people for a period of time. While the technique of tracking caribou with satellite collars is perceived by many elders to interfere with the animals, many hunters are very interested in the maps produced from collaring data. Wildlife management practices may need to further accommodate aboriginal perspectives in the future.

6.2 Introduction

Societies with access to their traditional lands and resources maintain an in-depth understanding and relationship with their local environment and its natural processes. This traditional knowledge (TK) represents a living, dynamic, knowledge system that uses historic and contemporary information to inform current thinking. Traditional knowledge and narrative is important in the lives of Dëne (commonly differentiated as the Dënesǫłine (Chipewyan), Tłicho (Dogrib), Gwich'in and Slavey language groups) in Canada's Northwest Territories. The term Dënesǫłine is used in this text to refer to Dëne peoples historically known as Chipewyan peoples ("Chipewyan" is a term still in common usage that was a semi-derogatory term thought to refer to the "pointed" style of Chipewyan dress and/ or hide preparation in the early fur trade era (Smith 1981)).

Reliance on the natural environment as a hunter-gatherer culture has meant that Dëne knowledge of wildlife populations is rich and diverse. None, more so than in the oral accounts associated with barren-ground caribou (*Rangifer tarandus groenlandicus*) ecology, movements, harvest, and holistic beliefs. As the most abundant large mammal in the North American sub-arctic and arctic zones, the caribou is of special significance in the traditional economy of the indigenous people of these environments (Berkes 1999). The abundance and migration patterns of caribou provided the basis for a successful long-standing dependency on the herds by the Dëne people.

The Dëne people recognize natural changes in caribou numbers or migratory movements because of their almost continual interaction with the animals and wealth of on-the-land experience. This places them in a favorable position for determining whether changes are related to natural variation or anthropogenic activities (Stevenson 1996). There are examples of wildlife species that similarly moved across extensive landscapes, *e.g.* prairie bison (*Bison bison bison*) and, as with caribou, there is evidence that local observations contain insights at regional and even global scales. Examples of these insights include traditional knowledge of glacial events and climate change (Cruikshank 2001), mass movement of caribou populations (Ferguson, Williamson and Messier 1998), and isostatic rebound (Spink 1969).

The objective of the research was to document Dënesǫłine knowledge relating to past and present caribou movements. Dënesǫłine TK can provide detail of temporal and spatial changes at both local and regional settings. In addition, it can expand our understanding of the differences between natural variation and unexpected changes in the behaviour or ecology of caribou. To avoid the marginalization of the belief systems that lie at the core of traditional knowledge and practice, this study engaged in community-based research efforts controlled and directed by the people of Łútsël K'é. Łútsël K'é elder and hunter knowledge of expected variations in caribou movement as opposed to variations beyond their experience is outlined. Spatial and temporal changes in caribou movements observed by the elders and hunters were recorded. Elders' perceptions of how fire, development (mine infrastructure), and some current wildlife management practices (*e.g.*, fire control and satellite collars), could be impacting caribou were also documented. As interviews were conducted, the importance of Dënesǫłine beliefs to the elders became apparent. Therefore, holistic narrative related to the caribou is discussed.

6.3 Historic Background

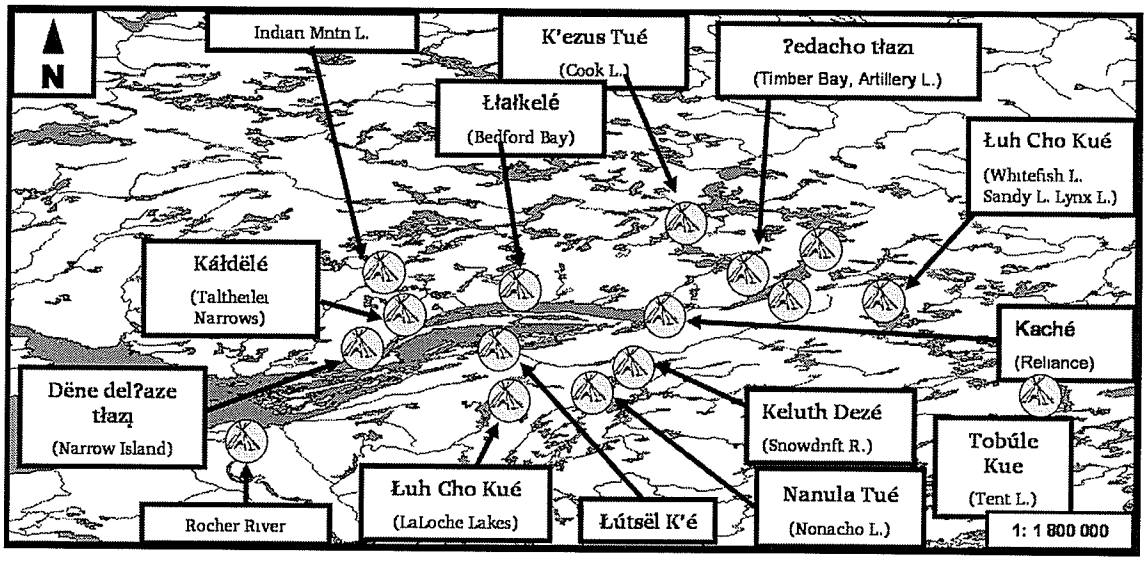
The Dënesǫłine were the most numerous and widely distributed of the Northern Athapaskan groups before European contact. They occupied boreal forest-tundra areas from near Hudson Bay north of the Seal River (in present-day northern Manitoba) in a wide arc stretching to the mouth of the Coppermine River north of the Arctic Circle in the northwest (Smith 1981:271). In historic times, this area extended westward between Lake Athabasca and Great Slave Lake (Gillespie 1976). By the 19th century, Dënesǫłine occupation of the south and central barren-lands shrank (Smith and Burch 1979) as the people died from European diseases such as smallpox, tuberculosis, influenza and measles. However, increasing participation in the fur trade as well as the adoption of European technologies such as the metal ice chisel (making mid-winter fishing with nets possible) and dog teams as the main form of transportation in the late 19th Century, affected Dënesǫłine land use and occupancy patterns as well (Smith 1981). There is also

evidence that the land use and occupancy patterns of the Dënesǫłine people exhibited historical expansion, reduction, and shifts just as the movements and ranges of the barren-ground caribou herds they relied upon varied (Gillespie 1976, Smith 1981).

Most (currently about 2 million) of the barren-ground caribou in North America live in seven large herds, which migrate seasonally from the tundra to the taiga. In order, from Alaska to Quebec, these are the Western Arctic, Porcupine, Bluenose, Bathurst, Beverly, Qamanirjuaq and George River herds. Other barren-ground caribou live in smaller herds that spend the entire year on the tundra. In spring, barren-ground caribou cows head toward traditional calving grounds to which they show a high degree of fidelity; as a result, most herds are named for their calving grounds.

The distribution of Dënesǫłine bands and hunting groups was historically linked to the peoples' knowledge of the anticipated dispersal and movements of barren-ground caribou. Caribou movements were tracked using highly mobile spatial communication networks of families and bands linked across a broad front (Smith 1978). In late summer the front would advance north out on to the barrens, and in winter withdraw into the taiga country and come together in larger camps to share information (Smith 1978). Using this system the people could expect to remain reasonably well-informed regarding the whereabouts of caribou at any one particular time. Essentially, this network of communication served as a "reconnaissance system," informed by the experience of collectively held and multi-generational knowledge of caribou movement patterns. Dënesǫłine hunters used their knowledge of migration routes and key water crossings that caribou used to access wintering grounds, to focus their hunting efforts and position themselves on the caribou range. Therefore, the ability of groups to intercept caribou relied on the strategies used by hunters and their knowledge of migration routes, and the efficiency of communication networks between hunting groups (Smith 1978). Hunters from Dënesǫłine communities reminisce about the manner that people in scattered and numerous camps helped each other by sharing information about caribou movements and distribution (Fig. 6.1).

Figure 6.1: Network of Selected Hunting Camps described by Łútsël K'é Elders - these camps shared information about changing caribou movements



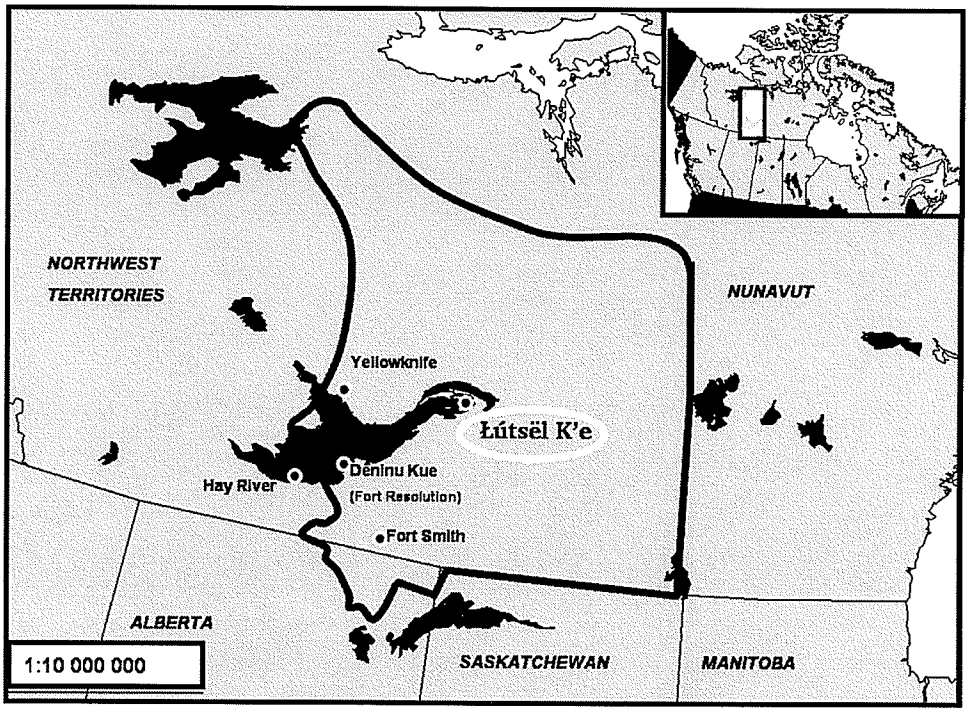
Observations of "normal" versus "unexpected" variations in movement through these areas would have been noted and potentially linked with environmental anomalies such as early or late winter freeze-up and/or spring break-up.

The Dënesǫłine people moved over large geographical distances in order to accommodate the widely varying migratory movements of barren-ground caribou populations. Prior to contact with Europeans, people moved in and out of the barrens regularly, virtually as far north as the calving grounds of the Beverly herd and almost as far north as the mouth of the Coppermine River (Smith 1981, Gillespie 1976). Archaeologists surmise that with major population shifts of caribou every one to two human generations (30-50 years), "emigration" or starvation events did occur among caribou-dependent peoples (Speiss 1979). However, starvation is not part of Dënesǫłine cultural narratives as it is in other cultures. Although the absolute necessity of elder's knowledge of caribou ecology and metaphysical human-caribou relations for purposes of survival has diminished, its role in the management of caribou and cultural identity and spiritual well-being is recognized by community members as still relevant and important.

6.4 Methods

The study was conducted in the Dënesǫłine community of Łútsël K'é (62°24'N, 110°48'W), located in the East Arm of Great Slave Lake, Northwest Territories, Canada. The reference area for this chapter includes those land areas that elders hunted in through the course of their life-times and those areas described in elders accounts of their ancestral land use. We have included the traditional territory defined by the Treaty 8 Akaitcho Territorial Government, the land claim organization to which the community of Łútsël K'é belongs (Fig. 6.2).

Figure 6.2: Akaitcho Territory



Descriptions of land use in this chapter do not claim to represent the full extent of present-day or historical Dënesǫłine land use. This research did not ask for, nor set out to comprehensively map all aspects of the Łútsël K'é Dëne First Nation's current and past land use. These matters are currently under negotiation within land claims processes. We used individual elder and hunter interviews, group workshops, and participant observation during the 2 years that we (the individual authors) lived in Łútsël K'é (2000-2001).

Interview process

Thirty-eight elders (26 men and 12 women) from the community were interviewed using a semi-directed approach. From this group, 24 elders were interviewed at least twice (at least once by each researcher). A person was generally considered to be an elder if they were over the age of 60, however this was not always the case. One community member describes elder community roles in the following way:

> *[t]he elders ... give a lot of advice and guidance, like that. They try to give direction to the leadership. So they have been really helpful. It doesn't really go by age. It goes by how you can get people to work together, how to follow a way of life that has already been set. They call it 'dun-chun-yeh' [Dëne ch'anie] it's like culture, our culture, that's what it is* (J.C. Catholique quoted in Raffan 1992:105).

The first set of interviews was recorded using a VHS system in the homes of the elders and transcribed at a later date. Four interpreters fluent in English and Dënesǫłine were employed for the interview and transcribing process, although one interpreter worked approximately 80% of the time. Each interview was translated into English and usually transcribed by the same interpreter who had conducted the interview. Providing a response was left to the elder's discretion, therefore not all questions were answered. Interviews with Łútsël K'é hunters that were over the age of 25 years and regularly participated in hunting forays were conducted immediately following the spring hunting period. Thirty hunters were surveyed in May 2000, and 39 in May 2001. Interviews were conducted in English and in the home of the hunter, independent of other hunters.

A second set of interviews was documented using an audio-recorder and knowledge of caribou movements was recorded on a set of 1:250 000 maps. Interviews were generally carried out in the homes of the participants. A translator/facilitator fluent in English and Dënesǫłine and familiar with community place names was present (the same individual filled this role for all but two interviews). Again, all interviews were translated into English and transcribed. Sound recordings were transferred to CDs for storage. Mapping information was recorded on transparencies to be digitized and

incorporated in the Łútsël K'é Dëne First Nation's geographic information system (AutoCAD 2000, ArcView 3.1), textual information will be incorporated in the community's text-based databases (Access 2002, AskSam 4.0).

The interviews primarily focused on themes such as traditional caribou crossings and sites where caribou were harvested, observed temporal and spatial changes in caribou behaviour or migratory patterns, and elders' perceptions of the effects of development (contamination and disturbance caused by mining, and winter roads) and two of the current management practices (fire suppression and the use of satellite collars) on caribou. These two issues were identified as community concerns during workshops that preceded the interviews.

Community guidance

Each author obtained clearance from the Łútsël K'é First Nation's Band Council to first visit the community and then to design research projects that were both of practical relevance and ethically acceptable to community members. Workshops were held in the Łútsël K'é Lands, Wildlife, and Environment office and an Elders Committee guided and shaped research designs. It was agreed that primary research material will be held by the community and publications based on this material must be authorized by the Łútsël K'é Lands, Wildlife, and Environment Committee.

Participant observation and action research

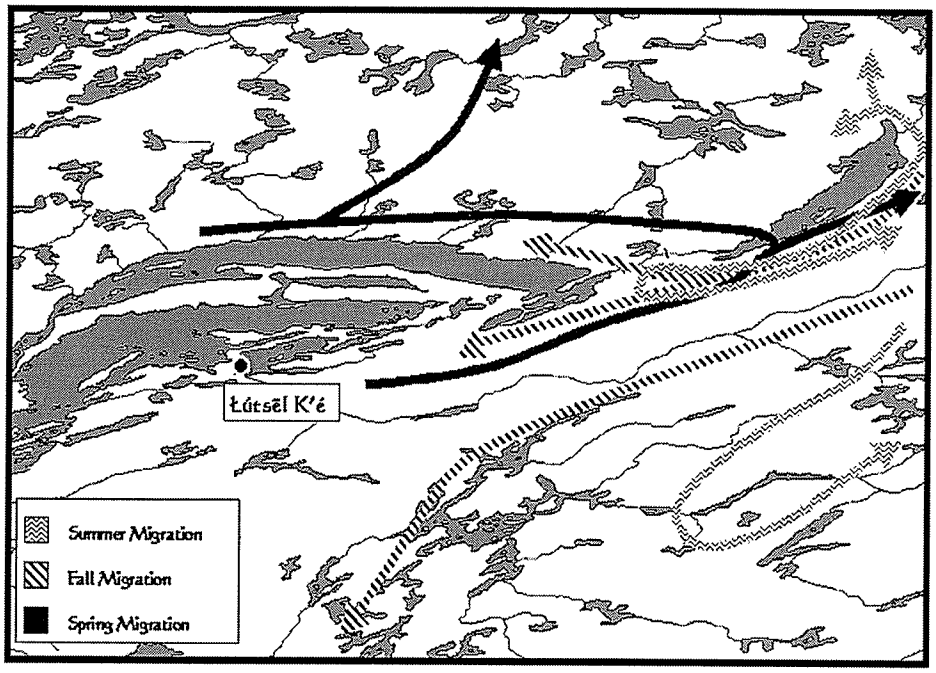
While this chapter is informed specifically by the individual interviews and workshops described above, each author spent extensive amounts of time learning about community perspectives from other community-based projects. Regarding the division of labour between the two individual authors, Phil Lyver and local researchers recorded hunters' knowledge of caribou and impressions of caribou body condition during the 1999-2001 fall and spring hunting seasons. Anne Kendrick worked with community researchers aiding efforts to incorporate traditional knowledge into computer systems in 2000-2002. This time was exclusive of the workshops and interviews carried out to map elders' knowledge of caribou movements.

6.5 Łútsël K'é Elders Knowledge of Caribou Migration Patterns

Łútsël K'é elders describe geographic and temporal variation in caribou migration patterns. However, the ability of Łútsël K'é elders to observe patterns in caribou movement is complicated by the vast ranges these animals utilise, and the overlap of three, or even four herd ranges (Bathurst, Beverly, Qamanirjuaq, and Ahiak) in their traditional hunting area (see Chapter 1, Fig. 1.1). It would likely take more time to fully understand elders' knowledge of movement patterns than our interviews allowed for. Most elders are hesitant to acknowledge they have a comprehensive knowledge of migratory movements probably because it violates their sense of humility about presuming to "know" caribou.

Accounts from Łútsël K'é hunters suggest range overlap may not be an insurmountable problem when attempting to identify animals from particular herds. Well over half of hunters (59%, n= 39) advised that they could recognize caribou from particular herds based on an aspect of morphology and/or the direction animals are coming from, or travelling toward, at particular places and times of the year. For example, hunters report it is possible to distinguish between Bathurst and Beverly caribou migrating north through the Reliance area in April. At this point and time Bathurst animals will generally turn and travel on a more north-westerly bearing, while Beverly caribou continue on a north-easterly track through the Artillery Lake region (Ernest Boucher 2001; Fig. 6.3). Elders and hunters state that this identification technique is reliant to some extent on where the caribou have over-wintered.

Figure 6.3: Barren-ground Caribou Migratory Movements near Łútsël K'é, NWT



There are many hunters who will say that they cannot differentiate between Beverly and Bathurst animals. It is also difficult to ascertain what hunters mean when they refer to a "herd." The recognition that animals from one "herd" are in better or worse condition than animals from another "herd" may change from year-to-year or season-to-season. Morphological characteristics used by hunters to identify caribou from different herds (Bathurst vs. Beverly caribou) include pelage and antler colouration, the size and shape of animals, and body condition. Quite often a number of these characteristics were used in conjunction with location or the direction the animals were traveling at the time of interception. Beverly caribou were generally described as shorter, stockier animals with a paler (whitish) pelage on their heads and along their flanks than Bathurst caribou.

> *You can tell which herd animals may belong to based on their hide colour, size and body shape, and the direction the cows are migrating to* (James Marlowe 2001).

> *Some herds will be in better condition than animals from other herds. The animals towards Yellowknife (McKinley Point) are skinnier and darker in colour, than those caribou over by Łútsël K'é* (August Enzoe 2001).

Some Łútsël K'é elders have noted that the foetuses of caribou cows harvested during the winter and spring months are less developed in recent years. They have found it is not possible to make the same clothing and equipment from unborn calf hides, since the fetuses are relatively hairless and small compared with past years.

Very few of the Łútsël K'é elders interviewed said that they had noticed changes in the abundance of caribou in their traditional area over the years. However, virtually all the elders interviewed spoke of geographic and temporal changes in caribou migration patterns.

> *Caribou have a large range and do not migrate using the same routes year after year. Some years they use different routes. They go where the food is. The caribou don't always travel using the same route. In some years they use different routes to go south* (Joe Desjarlais 2000).

> *The caribou don't migrate through this area (Łútsël K'é) any more. Some people say the caribou don't migrate towards us now. Some also say the caribou have decreased in numbers, but I still think there is plenty of caribou. If people don't see caribou for a while, the caribou will come looking for the people. To this day the caribou are still like this. The problem is now the mines interfere with their migration and stop the caribou coming to the people. Another problem is all the land that has been burnt around Łútsël K'é and this also keeps the caribou away. In the past when there were forest fires the land would burn just to a certain point, but now the fires burn out of control. In the past there were not that many areas that were burnt so the caribou were everywhere. Now there are many large burn areas and the caribou stay away. They do not migrate through those areas because there is nothing to feed on* (Madeleine Drybones 2000).

It is difficult to define elders' knowledge of expected (?edo), unexpected (?edo ?aja) and unprecedented changes in caribou migration routes. Elders recognize that there is always inter-annual variation in caribou movements. The winter and spring of 2000/2001, the years that the interviews occurred, was the first time caribou had concentrated around Łútsël K'é since 1997. The cycles of caribou wintering around, or moving through a particular area in some years, but not in others, is considered to be "standard migratory behaviour" by the elders. They discuss the range of routes and wintering areas caribou may use from year-to-year. It is clear that migratory routes, wintering areas, and fall and spring staging areas (areas where large aggregations of

animals come together before splitting into smaller groups) are always somewhat variable. In contrast, elders considered an unusual movement to be when caribou swam relatively large distances instead of crossing water bodies at a narrows. Elders have also mentioned that caribou used to regularly wash ashore in the Reliance area after drowning in the Lockhart River, but this is rarely seen anymore.

> *Caribou still migrate using the same routes. There has been no change. In the past caribou migrated from here all the way up to the barrens. They don't move through this area (Łútsël K'é) any more, not like they used to* (Joe Michel 2000).

Initially it seems that this elder is contradicting himself by saying that caribou still use the same migration routes, but do not migrate through the Łútsël K'é area like they used too. The elder could be aware that although the caribou had not migrated through Łútsël K'é recently, or in the same numbers that they used to, they are still using a recognized alternative migration route. It is also possible the time spans between these shifts in migratory routes are not long enough to be considered a "change" by the elder. Elders may have a greater perception of multi-year patterns in variations, not just of year-to-year variations.

Evidence from community mapping interviews shows that Łútsël K'é people have "back-up areas" (places where caribou are likely to be if they are not in the area they were expected to be) and "back-up strategies" including resorting to harvesting other foods, like fish, moose, or muskox. Burch (1977) has discussed the use of muskox as a "backup" by the Dënesǫłine when caribou and fish were unavailable.

> *There's no caribou some years so they [people] stay here (Meridian Lake). If it's a bad year for caribou then they could get moose there* (Pierre Catholique 2001).

Łútsël K'é hunters and elders discussed the variability of winter movements and the decision-making strategies of when and where to move hunting camps when caribou did not migrate through or winter in certain areas as expected. There is a general recognition with respect to large bodies of water (like McLeod Bay and Artillery Lake) that if caribou that normally were seen in the area in a certain season were not on one side of a lake, they would almost certainly be found on the "other side." Elders

explained that if caribou did not winter in the relatively accessible (to people) areas recognized for their "good" hunting it was then worth the effort to travel to areas that were less easily accessed, but highly dependable for the presence of caribou. Perceptions of accessibility are dependent on the areas where family groups were living on the land. Elders also speak of spans of time (many years in length) that caribou stayed north of the tree-line throughout the winter. Such a period occurred during the height of the white fox trapping era in the barren-lands.

There were times when caribou did not winter in the Łútsël K'é area for a number of years. People coped in a number of ways:

> *During 50s, 60s, people used to stay around there [McKinlay Lake area], [because] there's no caribou on the south side. They go north. I remember they haul some meat from here [McKinlay Lake] with a single engine plane. Around McKinlay Lake. Used to haul meat from here [McKinlay Lake] to Snowdrift [Łútsël K'é]. They did that a few times and then 70s, same thing, there was no caribou on this side [at Łútsël K'é], 70s there was lots over here, north shore [of McLeod Bay], people used to go across. I was trapping at McKinlay Lake, not only me, there was some people they went hunting fall-time, December, they went across by dog team ... Most of the time there was caribou around there. Most of the time there was caribou at McKinlay Lake. Used to be no caribou around here* (Ernest Boucher 2001).

6.6 Role of Narrative in Describing Caribou Movements

In many instances when caribou are difficult to locate, narrative and legend may be used to explain the phenomenon. Much of the content in these stories reveal the human-environment relationship that exists between the Dënesǫłine people and wildlife. In many sub-arctic and arctic cultures, observations that certain animal populations occasionally "disappear under-ground or under-water" are an illustration of the expected variable and fluctuating nature of the movements of wide-ranging northern wildlife populations. Animals may disappear for a length of time from a given region, but they are not gone in an absolute sense, rather they may be temporarily utilizing another area of their range. Dënesǫłine elders narrated these accounts to provide explanations for the disappearance of caribou or changes in their movements:

> *All of a sudden the caribou [?etthen] were gone and the people were starving. There were no caribou tracks to be found. However, a small bird called a*

whiskey-jack (jize) was flying around and saw something encircling the caribou. The whiskey-jack saw that the raven (datsa) had the caribou surrounded by the stomach fat (ʔechayu) The raven had used the stomach fat to net the caribou. The raven just sat there eating pemmican (a mixture of ground dry meat and fat) and keeping guard. All around the raven were lots of caribou moving. The raven was chasing other animals away from the caribou to keep them for himself. While the raven was doing this the jize broke through the fence and freed the caribou and that is how the caribou were found again (Mary-Rose Enzoe 2000).

When you skin out the head of the caribou you will find writing on its forehead. No one can actually read this writing. However, in the past some elderly women would say it meant, wherever the people are, that is where the caribou will go. The caribou would always eventually migrate towards the people. That is what they said was written there (Madeleine Catholique 2000).

6.7 Reasons Postulated by Elders for Changes in Migration Routes

Elders suggested a variety of natural, anthropomorphic and ideological reasons for caribou altering their migration routes. Reasons were related to fire effects, mining development (contamination and disturbance issues, winter roads), current caribou management practices (use of satellite collars), and cultural beliefs (respect for caribou).

6.7.1 Fire

Łútsël K'é elders were asked to comment on their impressions of fire in the winter caribou range. When asked directly for comment on whether or not burn rates had changed throughout their lifetimes, almost all elders stated that the frequency and intensity of fires had increased in recent times.

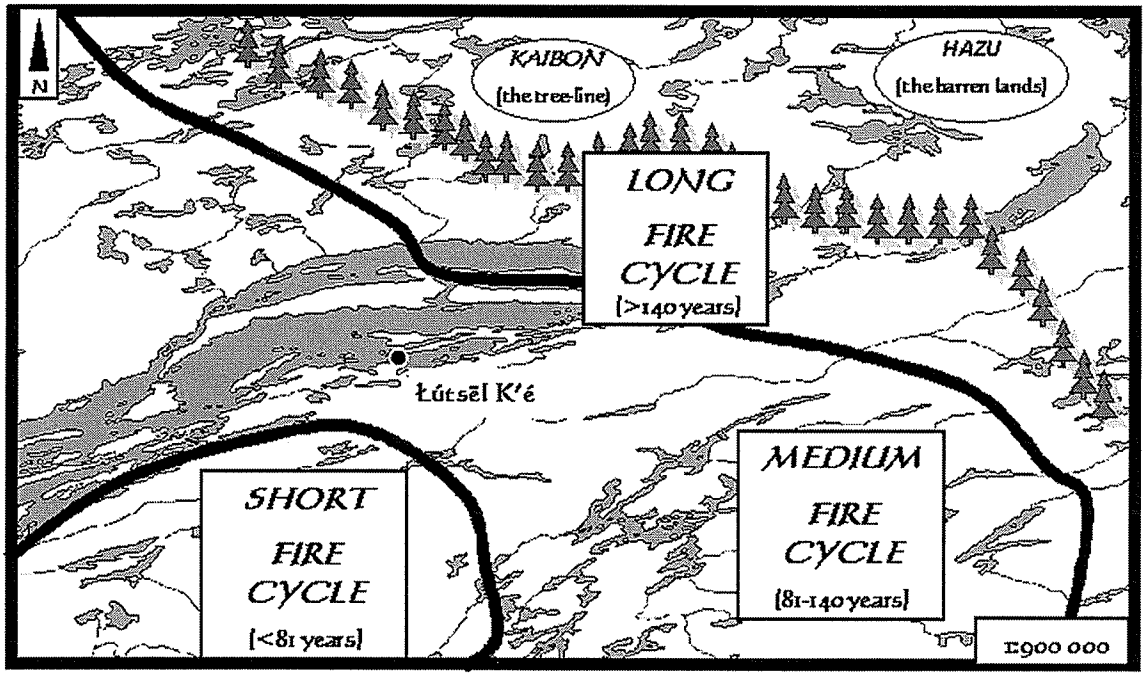
Forest fires are more severe now than in the past. In the past there were so many caribou, but now there are not as many because of the forest fires. Forest fires also kill a lot of the wildlife like insects, birds, and small fur bearing animals. A lot of things have gone. There were not as many forest fires in the past (Maurice Lockhart 2000).

Some elders indicated that the number of fires fluctuated annually, but it was difficult for them to determine whether the trend in fire frequency was increasing or decreasing. Elders have noted that the recovery rate of forest around Łútsël K'é and

Nonacho Lake is lengthier than in the Fort Resolution or Fort Smith areas. Elders felt that current fire fighting policy does not properly account for this variability in forest recovery rate (Fig. 6.4).

Figure 6.4: Fire Cycle Map, Łútsël K'é area

(Adapted from: Beverly and Qamanirjuaq Caribou Management Board 1994 Fire Management Recommendations for Forested Range of the Beverly and Qamanirjuaq Herds of Caribou, Management Report #1, Appendix 3)



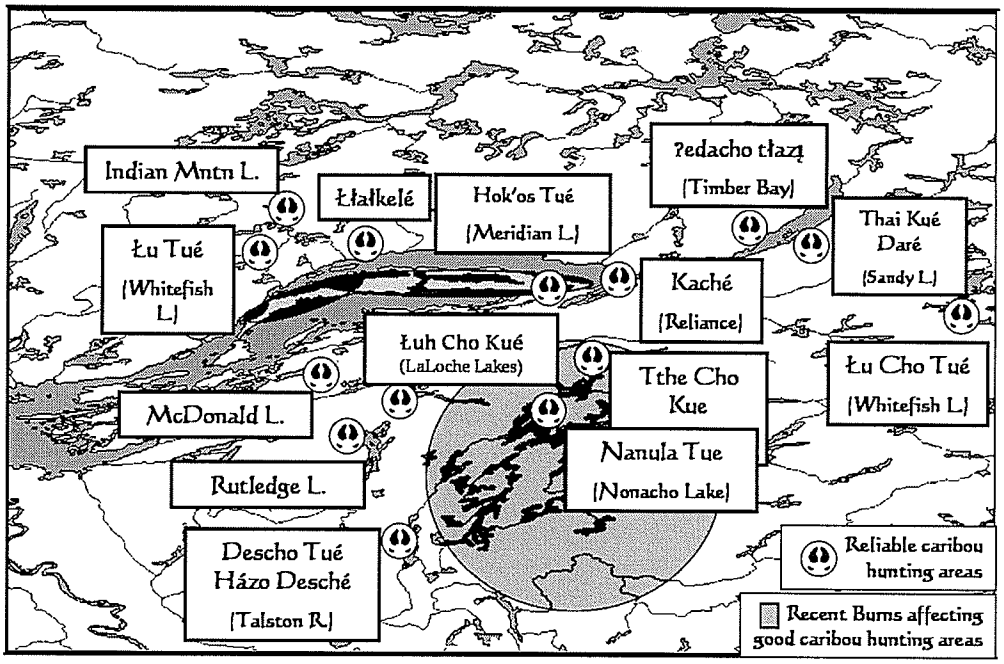
Elder knowledge of caribou responses to burns

Just over half of the elders interviewed in the first round (52%; n= 29) reported that caribou would move straight through a burnt region without stopping to feed, while almost a quarter of elders (24%) thought that caribou would alter their migration route to avoid burnt areas. The remaining elders either believed caribou were capable of both behavioural responses to burnt areas or did not comment on this aspect. Elders (24%) believe that the size and the number of burnt areas caribou have to negotiate each winter and spring can determine the body condition status of those particular animals.

A mapping exercise was carried out during the second round of interviews during which elders identified areas where they had been consistently successful at intercepting the caribou migration (*e.g.*, ?edacho – Artillery Lake, Kaché- Reliance, Nanula Tue –

Nonacho Lake, McDonald Lake, Łuh Cho Kué - LaLoche Lakes, Hok'os Tué – Meridian Lake). Elders reported when and how caribou negotiate around or through burns of a variety of sizes and ages and in some cases the length of time that elapsed before caribou returned to "good hunting areas" that had experienced fire events (Fig. 6.5).

Figure 6.5: Effects of Recent Fires on Selected Reliable Caribou Hunting Areas



Elders explained that depending on how large a burn was and where it was located relative to migration routes and feeding areas, caribou would travel through burns or avoid burn areas altogether. The discussion was unavoidably complicated, however, by the effects of hydro flooding in the caribou wintering grounds south of Łútsël K'é. Caribou and human movements naturally influenced by fluctuating ice conditions and winter forage are now also affected by flooding events in the Nonacho Lake area south of Łútsël K'é. This area (Rocher River, Talston River, Nonacho Lake) was recognized as "caribou country" in Hudson's Bay Company records dating before the establishment of Canadian government agencies in this part of the north (Bone *et al.* 1973).

> *The caribou migrate straight through the burnt areas. They do not stop to feed. If the ground and vegetation has been all burnt what is the use of them hanging around because they cannot eat anything. They do not turn back instead they just keep going. That is why some of the caribou are very thin. Caribou stick to their migration routes. If there was a green area just off*

> *their route they would not deviate to forage there. They would continue straight on until they found palatable vegetation. In that area (Rocher River) the land has been burnt so bad that there is no food for the caribou so they don't migrate there anymore. Soon this will happen around here. The caribou will just migrate to the treeline. The caribou know where the ground has been burnt* (John Catholique 2000).

Many of the Łútsël K'é elders voiced their concern about the detrimental short-term impacts (< 50 years) where fire has destroyed winter caribou forage, thus reducing the forest's ability to support caribou, especially around communities. As a result, the availability of caribou to some communities has been reduced through the effects of fire (*e.g.*, Black Lake, Saskatchewan; Tadoule Lake, Lac Brochet, Manitoba). The need to develop a fire management plan taking into account the "values-at-risk" of caribou hunting communities was a high priority of the Beverly and Qamanirjuaq Caribou Management Board for many years. Elders often focused on the politics of fire policy and fire-fighting methods that they did not believe met their needs. Loss of property (cabins), trap-line areas, and particular plants and trees used for medicinal and craft purposes were of concern. In general, elders indicated they have observed an increase in the number of fires from the late 1950s through to the 1970s. When elders were asked directly about fire rates, almost all said that burn rates have increased through their lifetimes.

6.7.2 Mining Developments

Mining and other industrial activities such as petroleum exploration and extraction, hydroelectric development, tourism, and associated infrastructures are increasing in the Arctic (Walker *et al.* 1987; Wolfe *et al.* 2000), especially in the Northwest Territories of Canada. The expansion of industry in the Northwest Territories can be largely attributed to recent discoveries of mineral deposits (*e.g.* diamonds) and recent advances in operational technology. The impact of these developments on wildlife populations, such as caribou, is debated among industry, scientific, and aboriginal representatives. Łútsël K'é elders concentrated their discussion of industrial development on the effects of mining activities.

The majority of elders expressed some form of concern regarding the impact of mining activities on the environment, the wildlife, and their lifestyle. The primary concern for elders was the effect of blowing particulate matter (*e.g.* kimberlite, granite, and schist dust) from the mines entering waterways and covering vegetation. The detrimental flow-on effects through the food web to fish, waterfowl, caribou, and subsequently themselves, were postulated by many of the elders. Half of the elders made reference to potential contamination issues. The direct effect of mining activities on caribou migration routes, caribou welfare (*e.g.*, caribou damaging limbs when crossing road berms), and caribou becoming habituated to human activity were also suggested as potential impacts.

Infrastructure avoidance by caribou

Łútsël K'é elders are concerned about the effects mining activities may be having on caribou and other wildlife. Many elders suggested that mine infrastructure could be affecting caribou migration patterns (*i.e.*, routes used and time taken to reach the tree-line).

> *The mines are on the caribou migration route. For me the way the caribou migrate is different. It takes longer for the caribou to migrate to the tree-line now that the mines are there. It was not like that before. The caribou used to come to the bush very quickly. It is taking longer for them to come to the trees* (Jim Fatte 2000).

Transport corridors servicing the mines within the Bathurst caribou range is of special concern to the Łútsël K'é community (see Chapter 4, Figure 4.1). A permanent road is under consideration for construction between the Lupin Mine and Bathurst Inlet on the coast of the Arctic Ocean, near the Bathurst caribou calving area. Each winter (beginning on about 10 December) a 500 km road is constructed between Yellowknife, Ekati, and Echo Bay's Lupin Mine operation. Collision risk, disturbance of traditional migration routes and annual distribution by heavy traffic densities, the visual barrier of an elevated road, and the ease of access to the caribou herds by hunters along winter road networks are potential effects that are of concern to elders.

> *Not too long ago [approximately 1997] two big herds used to come around*

Łútsël K'é and people came from all over to hunt the caribou. In the years following the herd began coming towards us, but then turned away. Now that there are mines with roads and high snow drifts on the sides the caribou won't cross and their migration route is disrupted. The old people said if you pile up snow into drifts the caribou would not cross them. They just move along-side of it. This is what is happening with the winter roads. They don't teach kids about this any more. The white man does not know this. The way the caribou migrate has been disrupted. The roads bisect the migration routes and disrupt the natural behaviour of the caribou (Liza Enzoe 2000).

The possible effects of human activity on caribou migration are recognized in Dënesǫłine taboos. The Dënesǫłine were mindful of these taboos when they first began constructing log cabin villages in the 1930s. For example, many Łútsël K'é elders lived at a site known as ?edacho tłazi (Timber Bay, Artillery Lake), located slightly inland from a major caribou water crossing (?edacho). Elders recall that they were told never to pitch tents or build cabins too close to these water crossings. They also recall a time when someone disregarded this taboo, and recount how the caribou changed their migration pattern through the Artillery Lake region.

Another traditional practice was to allow the first group of animals that arrived at a water crossing like ?edacho to pass undisturbed, ensuring that vanguard animals were not killed. Caribou speared at water crossings were dragged away from crossing sites before they were butchered.

Potentially, the greatest impact on caribou of transportation corridors is the facilitation of hunter access. Łútsël K'é elders recognize that the ease of hunter access to caribou herds along transport corridors could directly affect caribou numbers through increased harvest opportunities. They also acknowledged the potential for greater disturbance, especially if the proposed all-weather road from the Lupin mine site north to Bathurst Inlet bisects the Bathurst calving grounds.

Location of mine sites with respect to caribou movements

The degree of impact mining development has on caribou movements may depend largely on the location of the mine(s) with respect to migration routes. The location of mines with regard to caribou migration corridors and crossing points of lakes should also be considered. Many elders specifically mentioned the location of current mine

sites on migration routes as a problem. Corridors are regularly used by caribou to pass through areas of "rough" terrain, while crossing points are usually located at constrictions in many of the lakes. In many instances the locations of these corridors and points are common knowledge to local aboriginal people. The regularity with which caribou use these routes means it is highly likely that changes in the number or the frequency with which caribou use these traditional corridors and crossing points are noticed by aboriginal elders or hunters who hunted in this area. Monitoring would necessitate the elder(s) observing the caribou movements once the mine became operational. A change in caribou numbers could be attributed to an absolute decline/increase in the population; or a temporal or spatial shift in migration routes.

> *By observing the mines I've seen that they are not good for the caribou. In the past the caribou used to migrate and stop in the Dathi kue (Walmsley Lake) area. Very few caribou move through that area now. People also do not go up into that area now. You go to the mines to observe the caribou. I've been up to the mines three times and have observed the caribou there. You just see a few caribou here and there. For me the mines have changed the way caribou behave, although I am not all that sure how much they have changed. I know the main caribou migration trails are still there. In the past you could see caribou trails all along the landscape, even in the summer. You could see their tracks everywhere. Now you do not see them that much. Just some of the main migration routes remain. These are only the tracks you see. In the past you could see where the caribou have played when they've stopped, but now you do not see these signs of caribou playing. You only see the migration trails. After they put the mines up in the barrens the caribou have changed for me. The meat however still tastes the same. The way I hunt I know how far the caribou are from my house. These days the caribou are further. These days the caribou are much further than what they used to be. In the past it was not like that* (Noel Drybones 2000).

It is expected a mine located on or close to important migration corridors and crossing points would impact more frequently on a greater proportion of the herd, than if it was located away from these points. Elders suggest that mining activity could have the effect of deflecting caribou away from these migration routes. Caribou use these corridors and crossing points to minimize the time and energy expenditure migrating to wintering grounds. If animals, especially caribou cows and calves, are forced by development to use less optimal routes, productivity and survival could be adversely

affected. The importance of particular trails running past mine sites may be greater if the surrounding terrain is very uneven. Comments from elders implied that rough terrain could pose problems for caribou. Some elders stated that animals are "driven" to move quickly at certain times of year or at certain stages of migration, and more prone to get injured at certain sites. Animals forced onto rough ground to by-pass mines may also be more prone to injury, especially if disturbed by mining or predator activity. When elders talked about the effects of waste rock piles on caribou (injuries and deflection of movements) they often compared it with an area known as the "very rocky area" (near Healey Lake, north of Artillery Lake) that is virtually impassable. This is an area that elders have noted caribou avoiding.

Just over a third of elders stated that the number of caribou with leg injuries has increased based on observations from mine sites and reports from hunters. The elders have suggested that these injuries may have been sustained while negotiating road berms and waste rock dumps (50 m high) after being disturbed by mining activities (*e.g.*, trucks and blasting).

> *I think the mines are no good for the caribou. This fall [2000] the hunting lodges [the* Dënesǫ³ine *guides] saw more caribou limping and caribou with sore legs. The mine roads have huge boulders on the side of them. Even though the roads are constructed through the caribou's migration, the caribou knows it has been through there before and must migrate through. The boulders are the reasons why caribou have injured legs. When people make roads they should fix the sides of the roads properly. The mine people said they would watch out for the animals out there but they're not doing their job properly* (Joe Desjarlais 2000).

6.7.3 Cultural Beliefs

A relationship based on respect is an especially important part of Dënesǫłine-caribou beliefs. Almost all of the Łútsël K'é elders and hunters in discussions have emphasized the importance of respect and have postulated lack of respect as a reason for changes in caribou behaviour or migration. It was often stated that it is important for the people to respect caribou so that they will continue to return. Failure to do so would result in the

caribou deviating from their usual migration routes and becoming unavailable to the hunters for a number of years.

Respect is shown by: (i) the hunter using as much of the animal as possible; (ii) removing the tip from the caribou heart; (iii) sharing meat with community members; (iv) not beating or poking the caribou with a stick; (v) not chasing caribou down with snow machines and running them to exhaustion; (vi) women not being involved in the hunting process while menstruating; (vii) women not stepping over the caribou's blood or the hunter's equipment; (viii) treating the meat and animal products with respect once it is inside the home (*i.e.* not having blood on the floor or letting meat go bad), and (ix) not leaving animal remains (*e.g.* bones) lying around outside. The failure of caribou to winter around Łútsël K'é between 1997 and 2000 was attributed by elders to a number of "respect" related violations.

> *The caribou don't migrate through this area any more not like they used to. The people have no respect for the caribou. The women go out and shoot and skin caribou and don't watch out for the caribou blood and the way they skin it. Nowadays, when meat is brought into the home people do not watch out for blood being spilt on the floor. They don't wipe it up and step right over it. Another reason why caribou don't come round any more is because people have no respect for them and they chase them on skidoos. Some hunters from outside the area were hunting around here a few years ago and left a lot of dead caribou around the community and on Stark Lake. I was very sad. Many of the bodies were left to decompose slowly* (Joe Michel 2000).

Elders commonly used the story of "hitting a caribou with a stick" as an explanation for the failure of caribou to appear around Łútsël K'é. The belief that if you disrespect caribou in this way they will not return to your area for 3-7 years is widely held by many Dëne people. Wastage of meat is considered to be a marked show of disrespect to the caribou. This form of violation was also considered by some elders to be one of the main reasons for caribou altering their migration routes and over-wintering areas. Dënesǫłine people believe failure to correctly treat animal remains causes offence to the remaining population of that species, and these animals can make themselves unavailable in the future. The elders understood that the other animals in the population could sense inappropriate treatment intuitively. The animals did not need to

witness the act or observe the results of the disrespectful behaviour. Correct treatment and proper disposal of animal remains (*e.g.* caribou bones) is the appropriate show of respect. The prescribed treatment means (i) not leaving caribou carcasses lying all over the lakes in winter and spring, but rather taking them up onto the shore and disposing of them in the trees; (ii) covering the remains with the skin and/or snow, and (iii) burying or burning left-over bones from around homes, camp sites and points where dogs are tied. In the past bone fragments were disposed of in lakes.

> *After the people crushed up the bones to make lard and grease they would throw all the remaining bone fragments into a small lake. In the past the people would leave no trace of passing. People mainly used caribou for everything. Now if you go out on the land you don't see any evidence of where the old people stayed. You don't see piles of hair where the women have shaved the hides or the piles of old bones. You see old sites that are very clean. It's hard to find evidence of the old camping sites now* (Madeleine Drybones 2000).

As with many traditional beliefs it is possible though not always just to attribute functional explanations to the prescribed treatment of animal remains. These practices may be strongly symbolic of spiritual and cultural values rather than indicative of environmental management. However, removal of rotting caribou remains and bones from around campsites would have aided hygiene and reduced the risk of attracting predators and scavengers such as black bear, barren-ground grizzly, and wolverines around camp. While hunting on the barren-lands during fall, elders would tell the younger members of the group that the caribou bones were not to be burnt because the resulting smell would attract barren-ground grizzlies into camp.

The use of satellite tracking collars by the NWT Department of Resources, Wildlife, and Economic Development (RWED) scientists to monitor the migratory movements of Bathurst caribou cows is considered by many elders to be interfering with the caribou. Over three-quarters (80%, n = 30) of the elders interviewed disagreed with the practice. Almost one-fifth (17%) of the elders did not mind collars being used on caribou, while 3% did not hold any particular position. Age related differences in attitudes were detected between elders in Łútsël K'é. The average age of elders (71 years, SD = 7.3, n =

26) that disagreed with the practice was higher (t = 6.02, df = 27, p< 0.0005) than those elders (62 years, SD = 1.2, n = 6) that agreed with or did not mind radio/satellite collaring.

> *Satellite collars are no good. They should not put any collars on caribou. All the collars do is make the caribou suffer. Things should not be put on animals. Even you would not want anything heavy put around your neck. When caribou bend over to eat the collar slips forwards and really irritates them. We should be against using collars on caribou. I am not even sure why they put collars on the caribou. Probably to tell the scientists where the caribou go up north, how far the caribou migrate, and where they calve. The white people do not live off caribou. So why should they put things on them. The Dëne people live off caribou and some do not appreciate what they (the wildlife biologists) are doing. I don't think satellite collars should be put on caribou. All the scientists do is ruin the caribou and make money off doing it. The caribou do not like the satellite collars and all the scientists are doing is bothering the animals* (Noel Abel 2000).

The satellite collaring issue is complex. While the majority of Łútsël K'é elders oppose the use of collars, the community as a whole supports the collaring program. Some of the reasons elders had for opposing this management practice were: (i) the large weight and size of the collars; (ii) hair loss caused by the collar rubbing which could increase the animal's susceptibility to frostbite during winter; (iii) the collars interfering with the animal's feeding; (iv) the collar causing irritation and potentially strangulation if it slips down the animal's neck and; (v) the collars having the tendency to ice up. Elders believe these problems could cause the animals to suffer and lose condition. In an effort to address these concerns biologists have attempted to make satellite collars smaller and lighter (with the development of smaller batteries) and incorporated "drop-off" programming so caribou do not have to be recaptured to remove the collars. In the Bathurst herd collaring program only adult cows are fitted with satellite collars, helicopter pursuit times are limited to one minute to avoid stressing the animal(s) excessively, and "vanguard" cows are not collared to avoid influencing herd migratory behaviour (Gunn pers. comm. 2002). Biologists have also observed no incidents of icing around collars or hair wear beneath collars on any of the caribou sampled in recent times.

6.8 Defining Variations in Caribou Movements

Dënesǫłine elders appear to recognize differences between short-term fluctuations and long-term shifts in caribou movements. There seem to be three different kinds of variation in caribou movements observed by Dënesǫłine elders: (i) "expected" variation which are movements seen regularly in an individual's lifetime; (ii) "unusual" variation in movements which are changes seen once in a generation or less and; (iii) "unprecedented" variation which is ominous or dangerous change, never witnessed before or recounted by an individual's predecessors. It is important to determine the scale of the variation to understand how elders perceive the change in caribou movements. Dënesǫłine elder Joe Michel reported that caribou were still using the "same" migration routes, although they did not migrate through the Łútsël K'é area like they used too. This could be an example of "expected" variation in caribou movements, especially when the caribou returned to the Łútsël K'é area for the first time in three years, two months after the interview took place. The early arrival of caribou cows in spring in the Łútsël K'é area (measured from the level of development of the caribou fetus) and the lack of regularity of drowned caribou being washed ashore at Reliance could indicate "unusual" or "unprecedented" temporal and spatial variation in caribou movements. Knowledge of "back-up areas" to harvest caribou may have been a Dënesǫłine response to expected changes in caribou movements. The use of "back-up strategies" or the changing of food species entirely, may have been a response to an unusual or unprecedented change in caribou migration routes.

The ability of Dënesǫłine hunting groups to intercept herds each year may have been affected by the nature of migration as it passed through their region. The chances of hunters intercepting a herd would have been greatly reduced if the animals passed by as a thin highly concentrated stream. As a result, there are documented instances of people missing huge migrations by a few miles.

Dënesǫłine people have historically exhibited wide-ranging movements. This has implications for the spatial and temporal scope of their traditional knowledge.

Traditional knowledge is often perceived to be highly "localized" knowledge. There is a general assumption that all traditional knowledge is diachronic (long time series in one localized area). Łútsël K'é elders' knowledge of caribou movements illustrates that traditional knowledge may encompass a much larger geographical area than first assumed. It is possible that some aspects of traditional knowledge operate on a long time series and over a large area. It is important to account for the ecological context from which a particular traditional knowledge base is derived. Dënesǫłine people according to Burch (1991) may have had the most wide-ranging movements of any peoples on the planet. This is not surprising given that the barren-ground caribou Dënesǫłine peoples were highly dependent on also have one of the most wide-ranging terrestrial migrations of any wildlife species.

6.9 Interpreting Traditional Knowledge Narratives

Stories narrated in Dënesǫłine society and other sub-arctic and arctic cultures that describe animal populations occasionally "disappearing underground or underwater" are possibly a means of describing the variable and fluctuating numbers and/or movements of barren-ground caribou. Animals may disappear for a length of time from a given region, but they are not gone for good, rather they may be temporarily utilizing another area of their range. Translating cultural understandings of migratory concepts is an involved process. For instance, when animals "disappear under-ground" people may be describing phenomena of mass "immigration" to another area or "emigration" episodes that may or may not be regular fluctuations. It is important to distinguish this kind of movement from (seasonal) "migration" (Ferguson *et al.* 1998).

The local stories of caribou going under-ground or under-water may be a metaphorical reminder of this appearance and disappearance of caribou populations. People understood that caribou would on occasions be unavailable, but would always return. In many cases the stories reflect this perception. Traditional narrations can reflect a culture's attempt to explain a complex natural phenomenon such as irregularities in caribou movements. In all of the discussions pertaining to respect, no

elder or hunter stated that caribou would stay away indefinitely because of their actions. It was generally accepted that a violation of respect would result in the caribou only becoming unavailable for a period of time. It was always maintained that the animals would return.

> *The old timers say if the caribou don't see people for a long time they will become lonely for humans. Caribou eventually will migrate towards where the people are* (Pierre Catholique 2000).

The Dënesǫłine have a fundamental understanding of variations in migratory movements. Hunters knew that there would be periods when the caribou would disappear, but they would always return to use traditional travel routes and wintering grounds. The strong ties between humans and caribou meant the caribou would always return because they would become "lonely" for humans. Elders would also state that this feeling was reciprocal and they too would become "lonely" for the caribou after a long-term absence. The intense nature of this relationship may reflect just how dependent Dënesǫłine were on the caribou and their continued return. Elders' comments about changing caribou migratory behaviours are often entwined with comments about their beliefs. When an elder says that caribou are no longer at a certain place, it may be explained that this is so because people are no longer at that location. Understanding the circumstances that lead to one or another story being told by an elder is as important as deriving meaning from the story itself. If such stories are read using lines of rationalization that don't make sense in Dënesǫłine culture, or without the context in which they were told, meaning will be lost. In addition to serving as critiques of contemporary management actions (for example, collaring caribou to learn about movement patterns), narratives may also depict concepts of population dynamics in metaphoric language. There is a large literature on the significance of animal-human transformation stories among indigenous cultures (Cruikshank 1998, Bringhurst 2000), and these narratives may play a role in describing ecological concepts.

An important aspect highlighted by narratives is that traditional knowledge can be relatively strong at identifying a problem or change, but that does not make sense to

expect a story to outline the exact mechanisms that drive ecological or natural systems. This is not the "language" or the logic that stories employ. Stories act as reminders that life and circumstances change through time. Stories also serve as tools for problem-solving in contemporary situations (Cruikshank 1998).

6.10 Use of Dënesǫłine Traditional Knowledge in Fire Management

Fire is generally accepted to be a natural part of the "taiga" (boreal forest) ecosystem. Łútsël K'é elders reported that fire events have increased in frequency and intensity through their life-times. Winter movements and distribution of caribou are unpredictable which makes it hard to gauge the direct influence of fire events. Fire has been one of the largest topics of discussion for the Beverly and Qamanirjuaq Caribou Management Board (Kendrick 2000). There is data to suggest that there have been increased incidences of forest fires across Canada in the last 50 years (Wotton and Flannigan 1993). However, not all regions have kept statistics on all fire incidents, only on those incidents where the fires were fought. It is only recently that fires (especially in remote areas) have been tracked by satellite. Therefore, it is unknown whether there has been an increasing trend in fire incidents, especially in more remote areas and at smaller spatial scales where the tracking and monitoring of fires has traditionally been difficult. The Beverly and Qamanirjuaq fire cycling maps support Łútsël K'é elders observations that it takes longer for an area to recover from fire in the Nonacho Lake area than it does in the Fort Resolution or Fort Smith area.

Dënesǫłine people historically travelled through areas varying greatly in fire cycle length. Warburton Pike (1917) reported the effect of fires on caribou migration routes in the 1870s in the Great Slave Lake area. After a large fire in the Deninue Kue (Fort Resolution) area, caribou stopped using the Rocher River/ Deninue Kue region as a wintering area:

> *... great stretches of the country have been burnt, and so rendered incapable of growing the lichen so dearly beloved by these animals. The same thing applies to Fort Resolution, where, within the last decade, the southern shore*

of the Great Slave Lake has been burnt and one of the best ranges totally destroyed (Pike 1917: 50).

Pike's report is reminiscent of elders' accounts of the effect of fires in the same area about 60 years ago (in the 30s and 40s). Caribou are only now starting to winter in that area again. The impact of fire on the Dënesǫłine way of life may be greater now that the people have become increasingly sedentary in communities. In the past, camps could be easily relocated to account for caribou responses to burns. The establishment of permanent, year-round settlements in the Northwest Territories means that the people now have to travel large distances to hunt if the forest around communities is burnt. This effect could be felt over a large part of a person's life, or the time it takes for the forest to recover enough to support over-wintering caribou.

Łútsël K'é hunters and elders have reported changes in caribou distribution and numbers in response to fire. Elders recognize that caribou respond differently to burns of varying size and age. They also observed that caribou movements in response to burns could differ depending on the season. For instance, during spring migration, caribou cows may move straight through smaller burns because of their drive to reach calving grounds. In contrast, caribou in winter become increasingly stationary because they require areas that will provide them with stable feed. As a result, it has been observed that caribou attempt to avoid burn areas.

6.11 Dënesǫłine Knowledge of Mining Impacts

Involvement of, and consultation with, aboriginal organizations in the NWT with regard to mining development in the past has been limited, if not absent. Progress in land claim agreements and the emergence of the diamond industry in the NWT over the last decade has resulted in greater accountability to local aboriginal communities by the mining sector. Under legally binding agreements (*e.g.*, BHP Environmental Agreement 1997, Diavik Environmental Agreement 2000), mining companies like BHP and Diavik are required to provide opportunities for aboriginal organizations to express their concerns and give traditional knowledge full consideration in the development of

environmental monitoring programs related to the mines. Much of this information is recorded through community working groups, site visits by elders and aboriginal representatives, and independent environmental monitoring agencies and boards.

Dënesǫłine elders have the potential to predict impacts from the mines through their traditional knowledge of caribou migratory behaviour. Elders know that disturbance near traditional corridors or water crossings cause caribou to deviate away from these crucial points. If caribou are forced to use less optimal routes, the increase in their energy expenditure could begin to affect the survival of some animals (*e.g.*, calves). Similar outcomes may occur if vanguard animals are disturbed.

The role of barriers as a means of altering caribou movement is clearly understood by the Dënesǫłine people. Therefore, elevated roads and increasing traffic densities through the caribou range are of special concern to elders. The increased risk of collision was also proposed as a problem, especially if recreational traffic on the winter road remains uncontrolled. In an attempt to mitigate the effect of mine-pit access roads, berm heights have been minimized (< 3 m in height along 90% of its length) and caribou crossings have been constructed at sites where caribou trails bisect the roads. However, these measures do not apply to the 500 km winter road that bisects the Bathurst caribou herd's spring migration route. To minimize collisions, wildlife awareness is included in driver training at the mine. Fencing of the entire mine site was suggested by some elders as a means of keeping caribou clear of hazards and reducing habituation. An effort to deflect caribou movements away from a mine site has been attempted with limited success using streamers tied to wires. Easier access to herds was recognized by elders as an issue if an all weather road is constructed through the caribou range. Elders realize the potential for increased harvest and disturbance from hunters and sightseers, as access would be difficult to control.

6.12 Cultural Beliefs and Wildlife Management

In arctic and sub-arctic cultures there is an obligation on both humans and animals to support and complement each other. Harvested animals are perceived as providing a "gift of life," and thus should be treated with respect. It is perceived that a lack of respect will result in chastisement and reduced hunting success because animals can respond by becoming unavailable to the hunter(s). Therefore, through a series of protocols, rituals, and practices specific to each aboriginal group, a certain level of respect is maintained at all times.

For Łútsël K'é elders the belief that humans should not "play" or "interfere" with wildlife is still very relevant. Cultural beliefs and community concerns regarding the use of modern technologies in wildlife management are issues biologists must now account for when working in the North. Placing radio or satellite collars on caribou is a scientific technique that is perceived by many aboriginal people to be "interfering" with the animals; therefore it is an act of disrespect. For some elders the use of satellite collars on caribou was responsible for a change in caribou migratory behaviour. In 1992, scientists sought support from the Beverly and Qamanirjuaq Caribou Management Board to radio collar a sample of Beverly caribou. However, the aboriginal representatives, on the basis that the scientists are "interfering" with the caribou, denied their request. Adherence to this belief is still very strong with some aboriginal people. Until recently, further requests by NWT government scientists to place satellite collars on Beverly animals have been denied. There are signs, however, that communities are more accepting of satellite collars than they were 10 years ago.

This study found that younger Łútsël K'é elders and hunters are more accepting of the technique than older elders. Hunters use the Bathurst caribou herd satellite collar data to determine the location of caribou for hunting. The benefit of using this data is hunters can locate herds more easily saving time, effort, and travel costs that would otherwise have been spent finding the herds.

The percentage of aboriginal users that disagreed with the use of radio/satellite collars was higher in our study compared with research conducted by Klein *et al.* (1999).

Their survey showed that 60% of the Beverly and Qamanirjuaq herds and 38% of Western Arctic herd traditional users found the practice unacceptable. The differences are most likely because of cultural and age class sampling variation between studies. However, it is also important to consider that the politics in the Canadian and Alaskan situations are different. Canadian traditional users may be freer to talk about their discontent because they know they can influence research practices, whereas Alaskan traditional users may not take a stand on this issue since they do not have the same legally-recognized political authority. Moreover, our survey includes impressions mostly from "elders," rather than a broad sample of "adult" aboriginal users.

Respect for wildlife and the environment is central to the beliefs of aboriginal hunter-gatherer cultures. This largely arises from the holistic perceptions that humans have an intimate kindred relationship with the natural world and that all animate and inanimate forms are involved in a social network. For many aboriginal groups there is no conceptual separation between humans and the environment. "Objectivism" is rather a principle that seems to dominate the ecological philosophy of euro-centric cultures originating to a large degree in the philosophy of Rene Descartes and Francis Bacon. Cartesian dualism, dividing "mind" and "body" led to a major shift in scientific thinking in the 17th century. The resultant focus on positivist and reductionist thought is premised on a split between "subject" and "object" (Berkes 1999). As Livingston (1981) phrases it, the subject-object split also emphasizes a "one-sided divorce" between people and nature. This divide between human beings and "the environment" obviously has an ancient history in the Western world, before the advent of modern science. The divide can be traced back as far as ancient Greece (Glacken 1967). Further understanding the cross-cultural differences this divide creates may be crucial if traditional and scientific knowledge systems are to be used in co-operation for wildlife management. Monitoring programs that recognize these differences may facilitate broader learning about barren-ground caribou dynamics.

6.13 Conclusions - Understanding Cross-Cultural Differences through Monitoring

Ecological studies usually collect data of few variables and within specific geographical areas for short periods (data collection is expensive). Therefore, there are large problems generalizing to broader spatial and temporal scales (Ferguson *et al.* 1998). Not only is it difficult to generalize to broader scales but in the North, regional variations are becoming accentuated. For instance, the year-to-year variability in the timing of freeze and thaw events in one region are not necessarily applicable to the situation in a neighboring region (Brydges 2000).

Beyond such differences in variability, monitoring programs attempt to address differences in regional approaches to monitoring in order to bridge inter-jurisdictional fragmentation. This is especially crucial for the monitoring of overlapping barren-ground caribou herds. Monitoring must address the delay between the collection of information and the speed with which this information is fed back to management organizations and policy-makers who can act on the results of monitoring programs. Most (80%) of current ecological monitoring programs last less than three years and are so dependent on the scale at which the monitoring was done that the information collected does not scale up very well in time or in space (Vaughan 2000). There are tensions inherent in developing standards or protocols that allow monitoring data to be compared across regions, and this is especially crucial where caribou are concerned. How will monitoring programs in the North address these challenges, and what kind of monitoring efforts will include the traditional knowledge of aboriginal caribou-hunting communities?

Community-Based Monitoring in the North

> *...the informed network of communication which is a dynamic part of contemporary community life provides a system by which wildlife condition, numbers, distribution, etc. can be monitored with unequal efficiency* (Nakashima 1991:339).

Aboriginal communities dependent for their survival on wildlife species have always had to monitor their movements in one form or another and adapt to any changes they observed as a result. This chapter has explained some of the knowledge held by Łútsël K'é elders and hunters of changing caribou movements. Elders in Łútsël K'é described how it is possible to project possible variations in caribou movements based on point of arrival or timing of arrival into a given area through accumulated experience of past movements. In addition, Dene hunters project winter hunting patterns based on caribou behaviour at bifurcation points, for example, which direction they deflect to at a particular crossing (Parlee *et al.* in prep.) Elders were aware that caribou were more or less likely to use certain water crossings in a given year, or were able to gauge where caribou were most likely to be wintering after freeze-up, based on their presence or absence in certain areas.

Rangifer (caribou and reindeer) continue to be the most important terrestrial subsistence resource for northern aboriginal peoples. Traditional caribou-hunting communities in the Canadian North are bound in their relationship to caribou to many other circumpolar societies, including more than two dozen aboriginal cultural groups in Eurasia and North America (UNEP 2001). There are on-going efforts to form coalitions between and among these groups to protect *Rangifer* populations from encroaching industrial development as well as to monitor and act on changes that aboriginal peoples are seeing in *Rangifer* populations (Kofinas *et al.* 2000). Many aboriginal communities perpetuate links between their communities, their institutions and ultimately the bonds between people and the "resources" they depend upon. Moreover, aboriginal caribou-hunting communities voice the importance of monitoring and collecting information about changes local people are seeing on the barren-ground caribou ranges themselves.

Chapter 7

The Flux of Trust – Caribou Co-Management in Northern Canada

This chapter appears as an article in a spring 2003 volume of the journal Environments. It is reformatted here to fit the design of this thesis.

To a large extent we cope with complexity, ambiguity, and risk because we trust each other. Life is a boundless set of social interactions made possible by trust between and among people and, because that trust is precarious, sometimes made desperately complicated and tense by distrust and a lack of trustworthiness.

Trudy Govier 1997:3

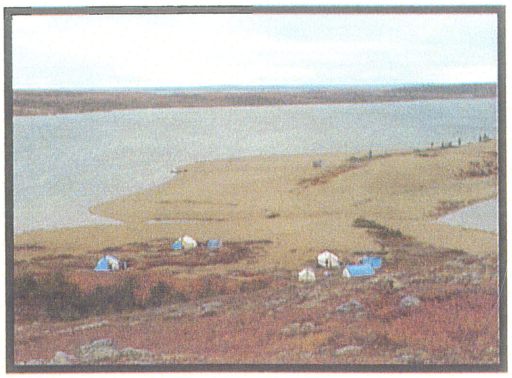


Photo Credit:
Łútsël K'é Wildlife, Lands and Environment Department

7.1 Chapter Summary

There is a presumption that the primary goal of creating alternative resource management systems is to increase the efficiency of the management decisions made. However, changing the rules of resource management leads to institutional uncertainty, and such instability is an integral part of developing alternative management systems. In the case of barren-ground caribou management, these rule changes include adding the voices of resource users to decision-making, in particular, the marginalized voices of aboriginal caribou-hunting communities. Trust-building is an important process in the development of new management institutions in such cross-cultural situations. Trust develops under conditions where the multiple perspectives of diverse stakeholders are addressed, so that the information for management decisions is clear, accountable and legitimate to all parties. The trust put in the knowledge of linked and dynamic social and ecological conditions changes through time. In this chapter, the fluctuating trust put in the knowledge of caribou ecology and behaviour is examined with the aid of panarchy thinking and common property theory. This analysis is grounded in the relationship between barren-ground caribou (*Rangifer tarandus*) and people in the Dene community of Łútsël K'é on the eastern arm of Great Slave Lake, in Canada's Northwest Territories.

7.2 Introduction

Traditional aboriginal caribou-hunting peoples in northern Canada moved seasonally on the land until the late 1950s and this relationship is thousands of years old (Gordon 1996). Archaeological evidence in the Yukon shows that the relationship between humans and caribou in some parts of the Canadian North is up to 25 000 years old (Cinq-Mars 2001). The distribution of many Dene peoples anticipated the changing migratory movements of the barren-ground caribou, especially before settlement. A recent (2001) economic valuation of just two of these barren-ground herds (the Beverly and Qamanirjuaq herds) found that the domestic hunt of the more than 13 000

aboriginal peoples living on the ranges of these herds has an equivalent economic value of 11.5 million dollars or the cost of replacing the caribou harvest with store-bought meat (Beverly and Qamanirjuaq Caribou Management Board 2002). The ranges of each of these herds extends at least 1000 km from north to south and more than 500 km from west to east. A single animal may travel thousands (as many as 4 000 km) in a year. Currently, more than three million barren-ground caribou range the North American North. Human-caribou systems may be thought of as complex adaptive systems – as systems that display unpredictable dynamics, shifting stabilities and require multi-scale thinking. Complex systems problems are difficult to define (Ludwig 2001), requiring multiple perspectives and collective learning (Dale 1989, Gunderson and Holling 2002, Lauder *et al.* 2002).

Caribou co-management represents joint management scenarios between traditional aboriginal caribou hunters, government managers and biologists and subsequently provides a potentially suitable approach for such complex systems. In addition, many aboriginal communities want their knowledge and perspectives to be included in decision-making without compromising their aboriginal rights to self-determination. Yet these rights can be undermined when aboriginal organizations cooperate with state organizations that may not recognize these rights. The drivers and incentives for these diverse parties to pursue joint management include the mutual need for: 1) mechanisms to make sure that the benefits and costs of maintaining management systems fall to the same parties, 2) monitoring systems that are accountable to and/or carried out by resource users (Ostrom *et al.* 1994), 3) the re-working of the ties between aboriginal and Canadian governance structures.

Trust among co-management parties plays a key role in creating space for innovation and mutual education to occur. Without it, joint management can mask multiple perspectives rather than benefit from the opportunities they offer for collective and innovative learning. Such social learning is possible when diverse ways of knowing are represented at the management table – and when the table provides the conditions for its emergence. The conditions for trust, however, are continually changing as processes

for generating knowledge, sharing knowledge and learning about linked human-caribou systems change. The space for trust to develop is connected to the ability of joint management institutions (working rules) to adapt to the changing knowledge of the diverse parties involved in caribou co-management. The objective of this chapter is to describe how changing trust levels affect rule changes in co-management systems.

Changes in technology and land use create a dynamic tension in the trust levels that aboriginal caribou hunters, biologists and managers have in their own observations – and in the exchange of their knowledge with each other. Fluctuating trust in the legitimacy of different kinds of knowledge plays a major role in the ability of co-management organizations to take decisive management actions. There is never a clear linear transition in caribou co-management activities from collecting information about caribou populations, to negotiating, monitoring and enforcing rules for caribou harvesting activities. These phases are better pictured as circular and simultaneous. The trust involved in negotiating this dance is a dynamic and on-going process, it is not an end in itself.

Changing trust catalyzes changes in the institutions (rule sets) that guide management decision-making. In the case of co-management involving aboriginal and non-aboriginal governance systems, mechanisms of change must recognize how knowledge, stakeholder representation, and resource rights are held individually and collectively. Trust is multi-faceted, bridging gaps between aboriginal and Canadian governance and knowledge systems.

Adapting Ostrom's (1994) insights to the case of caribou co-management, the work involved in creating viable management systems should include:

1. the repatriation of lost information,
2. the creation of rules about the ways in which information may be shared, and
3. the guarantee that all those involved in making decisions about a resource are aware of and trust the information used to make these decisions.

The efforts of aboriginal communities to document traditional knowledge and revitalize culturally relevant institutions amid tremendous forces of colonization are efforts to regain "lost" or marginalized information about caribou-human systems. The creation of rules for sharing information that avoids the co-optation of aboriginal knowledge systems by mainstream society also plays a role in revitalization efforts (*e.g.* community-designed research protocols). This chapter concentrates on the third challenge: creating viable resource management systems; making sure that all co-management decision-makers are not only aware of the information used to make decisions, but have trust in the information. It is argued that this trust is not meaningful unless co-management parties find a way to share with each other the means of acquiring and interpreting knowledge about the environment, possibly driven by the co-production of knowledge through innovative ecological monitoring programs. It should be emphasized here that further references to monitoring in this chapter refer primarily to observations that document the state of barren-ground caribou populations and their habitat and not to the monitoring of harvesting activities. This chapter first describes information exchange in formalized co-management organizations and how uncertain information is handled. It is then argued that community-based monitoring is central to any fundamental knowledge exchange between aboriginal caribou-hunting communities and government agencies. Finally, the chapter discusses mechanisms for social learning in caribou co-management arrangements through the co-production of knowledge and the mutual recognition of knowledge limitations.

7.3 Theoretical Background

Panarchy thinking (Gunderson and Holling 2002) provides useful models for thinking about connected social and ecological systems. The panarchy model is applied here to human-caribou systems to examine the role of variability and diversity in maintaining these systems. Human social processes that create novelty, and promote or destroy innovation are also described. Panarchy thinking searches for an understanding of how

linked and adaptive human institutions and ecological systems function. The basic unit of the panarchy model is the adaptive cycle (see Chapter 2, Fig. 2.1).

The restructuring (or release) phase of an adaptive cycle is one of rapid innovation, exhibiting high resilience, low connectedness, and decreasing predictability. The release phase is a time of both crisis and opportunity and increasing uncertainty. The slow phase of accumulation (or exploitation) of capital – including ecological, economic, social, and cultural – is one of increasing efficiency, predictability and connectedness. The rigidity and vulnerability of the system increases, while its resilience decreases through the exploitation phase. With foresight and active adaptive methods, human systems can stabilize variability and draw on opportunity. At times of change, the revolt and remember phases are important mechanisms interacting across scales. These are illustrated as nested adaptive cycles (see Chapter 2, Fig. 2.2). The revolt phase spurs innovations at larger scales due to changes in smaller scale cycles. The remember phase draws on the experience of larger and slower scale cycles to stabilize the effects of change occurring at smaller scales.

Human institutions can be portrayed as cross-scale, nested sets of adaptive cycles, or rule sets influenced by intentionality, communication and technology. The social learning of co-management systems can be pictured through the models of panarchy theory (see Chapter 2, Fig. 2.3 and 2.4).

It is the role of co-management organizations to develop mechanisms to bridge, not dissipate, the divide between aboriginal and Canadian governance systems. There are obvious challenges in bridging the differences in scales such as time frames and numbers of people involved. For instance, aboriginal leaders emphasize the differences between aboriginal and Canadian representations of individual and collective rights and responsibilities. Aboriginal cultures are rooted to landscapes through time in ways that Canadian institutions are not. For these reasons, it is important to look not only at the trust developed between individuals and organizations of individuals, but to look at the trust that exists in the diverse knowledge bases of these multi-scale interactions.

Aboriginal communities are currently involved in the lengthy historical process of recovering from the exogenous shock that European colonization represented to their social systems. In the language of panarchy thinking, colonization led to a loss of potential through loss of knowledge, population base, lands, *etc.*; to low connectedness through loss of societal organizations, institutions; and to low resilience, represented by a "poverty trap." Northern aboriginal societies are working to revitalize their institutions by re-building and recovering lost potential by documenting traditional knowledge, fashioning alternative resource management organizations, gaining legal recognition of aboriginal rights, recovering control over traditional lands, *etc.* It can be argued that aboriginal efforts to resist colonization and to revitalize damaged systems – for example, by building new institutions – are mechanisms of "revolt" and that efforts to recover language, cultural practices and traditional knowledge are mechanisms of "remember" (Chapter 2, Fig. 2.2). In contrast, early Canadian government bureaucracies in the North were maladaptive, displaying high potential, connectedness and resilience, but ultimately leading to a "rigidity trap."

Management strategies adopted from Europe, regarded hunters purely as "exploiters" in need of control, and invested heavily in molding aboriginal communities to European notions of individual rational resource use in ways that began to circumvent linked Dene-caribou systems (Abel 1993, Cranston-Smith 1995). Contemporary Canadian governance organizations – in the midst of realizing the complexity and variability of northern ecosystems– are looking for ways to break out of "rigidity traps" where conventional resource management systems – ignoring the complexity, uncertainty and variability of northern ecosystems – led to questionable resource management decisions in the past (Fumoleau 1975). The role of co-management institutions in bridging rather than entrenching this challenging divide is one of flux, constant transformation and learning. There is no archetypal model for co-management, but trust-building is critical for its success.

7.4 Methods

The author worked with the Dënesǫłine (Chipewyan) community of Łutsël K'é, one of four communities situated in the Akaitcho Territory of the Northwest Territories. The village site of Łutsël K'é is located in the East Arm of Great Slave Lake and is home to approximately 400 band members. The author lived in the community for two years (2000-2001), attending more than 5 dozen resource management-related meetings and working full-time in the Łutsël K'é Wildlife, Lands and Environment (WLE) Office for several months. A research agreement negotiated between the Łutsël K'é Dene Band and the author laid out the terms and conditions of the author's work with the community (see Appendix 1). The author worked with youth in the community's land use planning office for 12 months at the request of WLE committee's board members and elders, to help develop an information management system. The thoughts of community-based researchers on the advantages and disadvantages of documenting traditional ecological knowledge and sharing it with organizations outside of the community were recorded as were elders' thoughts on Dene rules of respect toward caribou and understandings of caribou herd dynamics. The research for this chapter is also informed by the author's attendance at more than a dozen meetings of the Beverly-Qamanirjuaq Caribou Management Board, Bathurst Caribou Management Planning Committee, and other co-management and ecological monitoring meetings in 2000-2001. This research also involved an analysis of selected documents housed at the Public Registry of the Department of Indian Affairs, as well as conversations with government caribou biologists, mining industry representatives and monitoring agencies.

7.5 How Co-management Boards Handle Uncertainty

> *There is a kind of frustration that the Beverly Qamanirjuaq [caribou management board] members are asking the same questions that still have no answers. There must be more local involvement... An educated person only looks in one direction, a profession only looks at a branch of a tree. Local people with education [on the land] look everywhere; they look at the whole tree* (Beverly and Qamanirjuaq Caribou Management Board, Chair, Nov. 2001).

Despite the formation of the first formal barren-ground caribou co-management board (the Beverly and Qamanirjuaq Caribou Management Board) more than 20 years ago, there continues to be a struggle to include the knowledge of aboriginal communities in co-management decision-making. It is important for political and social capital to be developed in order to encourage traditional caribou hunting communities and Canadian government agencies to engage in a genuine exchange of knowledge about barren-ground caribou herds. This cannot be achieved through formal management meetings alone (Kruse *et al.* 1998). As a way to achieve this, co-management boards are beginning to become forums that support – or at the least recognize – local initiatives that document and share traditional knowledge of the barren-ground caribou ranges. However, this co-management institutional capacity has developed recently.

In less than 50 years, significant advances have been made in understanding how to estimate caribou populations, define herd discreteness and decide upon taxonomic classifications. However, the uncertainty of the information available to understand fluctuations in barren-ground caribou population numbers means that it is not possible to project when significant changes in many barren-ground herd populations will occur (Kruse *et al.* 1998).

Aboriginal communities are relatively unaware of how and why information gathering techniques used by biologists have changed through time. For example, even in the last few years new techniques for calving ground surveys, photo surveys and statistical analysis have been developed. However, even with these new techniques biologists have to make assumptions about general population trends in order to choose appropriate survey techniques. What seems most fundamental to exchanges between aboriginal caribou-hunting communities and government biologists and managers attempting to make allocation and research decisions, is how the uncertainty of the information that exists about barren-ground caribou populations is communicated cross-culturally, and ultimately how information affects access to and use of the herds.

While elders, hunters and biologists may come to similar conclusions about what they observe on the barren-ground caribou ranges, elders worry about how and where

resource management policies are made. Caribou co-management efforts have recently started looking toward community-based monitoring as a means to actively include the knowledge of elders and active hunters in management decision-making.

7.6 Key to Fundamental Cross-Cultural Exchange - Community-Based Caribou Monitoring

Much is gained by the wide view of the aerial camera
but something is lost,
matters which are important to those that dwell there
(Blanchet 1949:9).

There is very little understanding of temporal and geographical fluctuations in the numbers of barren-ground caribou sub-populations. Little documentation of aboriginal communities' knowledge of long-term range use and movement patterns has occurred (exceptions include Thorpe and Kadlun 2000, Łútsël K'é Dëne First Nation 2001, Whaèhdôö Nàowoò Ko (Dogrib Treaty 11 Council) 2001). There are signs that caribou movements and distribution are becoming increasingly variable. This means that decision-making about the capacity of caribou to cope with change cannot be properly gauged without the historical interpretation and ground-truthing afforded by the traditional knowledge of aboriginal caribou-hunting systems. Aboriginal communities are beginning to insist that community-based caribou monitoring become a priority of future management efforts and that it be linked to local research efforts.

The inevitability that caribou co-management boards support community-based monitoring efforts is more than a matter of adding another layer of information to the increasingly complex information needs of decision-makers. Indeed, many jurisdictions are weary of attempting to make management decisions without adequate information. Ecological studies of barren-ground caribou movements and fluctuations in population size have been done over a relatively short-time frame and comparisons between surveys are often not possible (Bergerud 1996). The traditional knowledge of caribou-dependent communities extends over a very long time period, in the case of the Dënesǫłine in the Great Slave Lake region, it extends for thousands of years.

The expression and exchange of traditional knowledge outside of its cultural context, however, is not easy – just as it is difficult for scientists to explain results without the technical terms and jargon of specialized knowledge when they attempt to relate information to lay-people. Often, traditional knowledge is expressed in ways that are difficult for biologists and resource managers to comprehend. Recollections of historical patterns of movement and distribution are often intimately tied to the personal recollections of hunters (Ferguson *et al.* 1998, Thorpe 2000). Explanations of abundance may be tied to grim memories of need in times of scarcity. The observations of young, active, aboriginal caribou hunters are often interpreted through the eyes of experienced elders. In these circumstances, some questions – such as "What is "normal" change and what is "dangerous" or unprecedented change?" – become central. Aboriginal elders often emphasize the importance of understanding ecological relationships. For example, focusing on whether or not these relationships are being sustained rather than on whether a critical number of animals exists. Elders not only share their knowledge of changing caribou movements, but insist on the notion that animals "monitor" and react to the changing movements and distributions of people – for example, by approaching people, not just avoiding people as a source of disturbance – as much as their movements are externally altered by people (see Chapter 6 for accounts of Łútsël K'é elders and hunters knowledge of variations in caribou movements).

The collection of information that will be useful to management decision-making is becoming more complex due to increasing variability in caribou movements and distribution resulting from climate change, expanded range use and the effects of industrial development. While there are endogenous effects integral to caribou systems that cause variability, there are increasing exogenous effects – and little understanding of where and when caribou populations are affected by them. For example: What are the effects when numbers are high versus low? What is the period of time between regular fluctuations in numbers (the length of time between historically low and historically high numbers)?

Caribou co-management organizations are revisiting the frequency and type of monitoring done on barren-ground caribou ranges. Significant changes are occurring on the barren-ground caribou ranges as a result of changing weather patterns. Barren-ground caribou herds in the Northwest Territories and Nunavut are currently much larger (in population numbers) than they were 20 years ago when co-management boards were first established. In addition, their range use has expanded and overall knowledge of their range use has changed. Herds that were previously marginal in numbers are experiencing population increases and expanded range use. Without grounding the scientific knowledge of long-term range use patterns through the use of the traditional knowledge of aboriginal caribou-hunting communities, it will be hard to determine whether human-induced or natural variations in caribou movements are occurring and to decide how to go about ensuring the survival of barren-ground caribou herds in the face of these changes. It appears that if caribou surveys are not supplying the information needed to make management decisions, especially in increasingly variable conditions, then feedback from aboriginal hunters' observations is all the more important.

7.7 Collective Learning Leading to Institutional Change

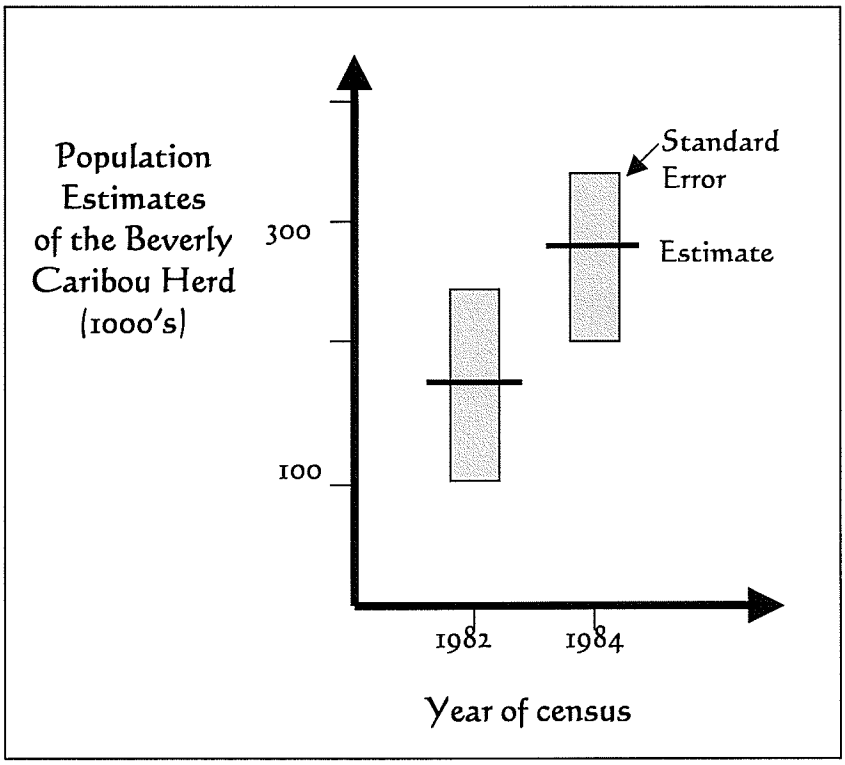
It is difficult to gain first-hand knowledge of barren-ground caribou migrations. This is primarily because barren-ground caribou move the furthest distances and at the greatest speeds during periods of snow melt and snow accumulation. In addition, the timing of migration events may change with changes in abundance; seasonal locations may also vary with changing numbers. Not only is there limited scientific knowledge of caribou movements, but there is limited time depth to scientific observations about caribou and the length of time between regular population size fluctuations, which are thought to occur anywhere between 35-100 years. Given the uncertainty of the information available about barren-ground caribou, how do people come together in co-management scenarios to understand range assessments (vegetation studies of forage availability and productivity) and caribou monitoring observations in a way that is accessible to all co-

management participants? Is it possible for all parties – no matter what their perspectives – to have trust in the knowledge used to make management decisions? There are a number of barriers to overcome in order to build co-management arrangements. These include: resolving conflicts over the control of biological or harvesting data, achieving consensus decisions on harvest allocations that incorporate societal values and goals into decision-making about sustainable resource use, and overcoming a lack of institutional capacity for developing alternative solutions to management problems (Pinkerton 1999).

7.7.1 Example: Beverly and Qamanirjuaq Caribou Management Board

At the autumn 2002 meeting of the Beverly and Qamanirjuaq Caribou Management Board a pivotal decision was made to manage the herds based on multiple indices to be collected and formulated not only by scientists, but also by traditional caribou hunters. The work to develop such indices is set to proceed in 2003. In the past, government departments made management decisions based on the results of population estimates thought to provide enough information to make sound decisions. A survey that revealed low numbers (even if there was a large confidence interval associated with the estimate) would have left the Board in the difficult position of recommending potentially unnecessary restrictions based on the lowest level of the population estimate range (Fig. 7.1).

Figure 7.1: The Uncertainty of Caribou Survey Census Results



Until 1988, the calving ground surveys were conducted every two years. After 1990, due to the expense and level of precision of the surveys, a decision was made to carry out surveys every 6 years. The last survey was completed in 1994. Because surveys have been carried out every 5-7 years since the late 1980s, the Board would then be committed to use a number that would determine their management recommendations for several years, potentially not revealing anything different about the herd's status than the estimate done years previous to that (Fig. 7.1), and still not have any information about actual domestic use levels. The Board's recent discussion of a revised management plan reflects the long-standing need for: 1) new means of collecting information about the herds and, 2) alternative management actions.

The Board has acknowledged that it cannot make effective management decisions when information about population levels and harvest rates is lacking. The only way to address this lack of information is to develop multiple methodologies for collecting

information about herd status from the multiple perspectives and knowledge sets that are held by people sitting at the co-management table.

Community-based monitoring is to be made a priority of the management plan and more emphasis is to be put on incorporating traditional knowledge into decision-making. The Board will continue to base its decisions on the precautionary principle especially when there is a lack of information available about a given issue.

While census surveys in the past were carried out roughly every six years – unless there were extenuating circumstances – population surveys will now be triggered by multiple indices (yet to be determined) monitored annually. This new approach will ensure that population surveys are done when they are needed instead of every 6 years. Caribou use categories will still prioritize traditional domestic hunting over sport hunting or commercial meat sales. However, allocations will be based on the ability of the herds to sustain use. This will be assessed by using the findings from monitoring population trends such as signs of decline or increase as well as the body condition of the animals monitored.

The revised plan also addresses risks associated with different types of use. For example, the assignment of commercial quotas on the calving grounds in the spring is considered a high risk allocation. Degrees of control on use will also be context-dependent are also now relative under the new plan, allowing, for example, a high degree of control on the allocation of tags for sport hunting to be maintained. In addition, if a proposed use is determined to be high risk and little control over the use can be exercised, then the Board can recommend that an allocation for that particular use not be granted. The Board hopes that this kind of revised thinking on hunting allocations may allow more liberal allocations for some uses, while maintaining traditional domestic use as the highest priority. However, there is some tension and conflict over the ties between different use priorities. Aboriginal representatives argue that by lumping aboriginal commercial or sport hunting aspirations alongside non-aboriginal commercial allocations, they are denied the opportunity to support domestic community hunts through revenues obtained from aboriginal commercial hunts.

Commercial quotas already allocated to non-aboriginal commercial enterprises necessarily pre-empt further commercial allocations that could benefit aboriginal communities.

Setting a herd population crisis level has always been a contentious issue given the high uncertainty associated with the accuracy of population counts. At the current time, the crisis level set for both the Qamanirjuaq and Beverly herds is 150 000 animals. The Board aims to make recommendations that limit harvest rates to a level that can be supported by the herds so that when a decline in numbers occurs, the time lag between a decline and a recovery in numbers is reasonable, and does not impinge on traditional domestic use needs. The "decision-making tree" of the Beverly and Qamanirjuaq Caribou Management Board's management plan has now been rewritten so that in the event of a crisis – such as low caribou population numbers – it is the traditional aboriginal hunter's observations and perspectives, rather than the views of scientists, which will have final authority on actions to be taken. Regular monitoring by both traditional caribou hunters and scientists, however, is key to making the revised management plan work.

The Board will standardize the evaluation of development projects to be used across all jurisdictions on the barren-ground caribou ranges so that they can take positions on the impact of development based on what has a higher impact from the "herds' perspective." The sensitivity of caribou to development will be based on factors like the location of a development project and on the range and the timing of the development activity in relation to caribou movements. The Board also has recognized that there must be better inter-jurisdictional links to enable effective fire suppression efforts on the caribou ranges. The plan is to up-date fire history maps annually. The effects of fire on the wintering ranges of the caribou have long been emphasized as a top management priority by aboriginal community representatives sitting on the Board. The Board is also concerned that protection measures will require information identifying inter-annual variations in the use of calving and post-calving areas and has taken measures to obtain this information.

7.8 Linking Co-Management Participants and Their Trust in Knowledge of Barren-Ground Caribou Herds

The social systems of traditional caribou hunting societies and caribou populations are linked. Aboriginal representatives continually draw attention to this relationship at co-management meetings. While co-management arrangements have opened a window to aboriginal communities about resource management decision-making processes in wider society, they have rarely adopted aboriginal decision-making structures into their make-up. There is an irony, therefore, that in recent years, aboriginal representatives have found themselves arguing that conventional population surveys are needed – even though they may not actually trust the information collected through these means. However, if there is no other way to ensure the protection of a herd they observe to be declining, or to gather arguments allowing for increased commercial quota allocations, then pushing for a population survey that gives decision-makers the mandate to say that harvest rates do not surpass sustained yield becomes a necessity.

The connection between commercial allocations, the support of local aboriginal economies, and the ability to finance domestic harvests is increasingly expressed by community representatives. A recent study in the Northwest Territories reveals that the rather rigid line drawn in management planning between domestic and commercial caribou harvests may be far more blurred than allocations reveal. For example, there has been a study to quantify the informal sale of caribou meat between General Hunting Licence holders (Dragon 2002). The latter can only be held by status Indians, Metis and Inuit in the Northwest Territories (GNWT 2001). Community representatives make connections between allocation rules – who has access – and provision rules – who has the authority and the responsibility to regulate use – for caribou management. They point to the inability of communities to maintain linked aboriginal-caribou systems without modification of allocation and provision rules. Aboriginal representatives cannot understand why many government agencies and industry do not see the ties that they are trying to maintain between local health, traditional economies and caribou populations.

There is also the problem of herd range overlap and the question of how to allocate use levels in these situations – in particular, since particular herd use can only be determined retroactively by performing DNA analysis on skin samples from animals after they are harvested. The problem of herd range overlap means that allocation decisions in overlap areas can only be based on historical use rather than on future need. The danger is that allocation decisions can come to be seen as purely administrative matters rather than as tools to prevent over-harvesting.

Another significant challenge is the relationship between the current state of knowledge of critical caribou habitat and the need to achieve protection for such areas. There are 23 calving grounds in the Northwest Territories and Nunavut. Currently, only Nunavut actively uses the Caribou Protection Measures (CPMs), however, the information used to implement the CPMs include areas that were identified as critical caribou habitat in the 1980s and this information has not been up-dated since that time. Of primary concern is what happens when there is a conflict between development activity and caribou that are not using the "traditional" ranges identified 20 years ago. Barren-ground caribou herds have significantly shifted and expanded their range use in the last 20 years. This includes changes in the areas used for calving, which have been considered relatively stable. The problems of identifying critical caribou habitat with static boundaries are well-illustrated through the CPMs and indicate that 25 years of documentation about the use of the barren-ground caribou ranges is not enough. To successfully implement the CPMs, information must be continually up-dated.

Applying the concept of resilience may be particularly apt for thinking about the impacts of development activity on caribou systems (Gunn 2001). The resilience of caribou systems is described as the ability of caribou populations to buffer changes in their environment. When natural conditions are favourable, caribou have an increased ability to cope with human disturbances. However, if caribou spend more time near a development in a severe insect year, they may be in poorer condition and have less resilience to human induced disturbance. It may be possible to start separating the effects of industrial development – such as a mine– from natural changes and,

subsequently, to begin ranking the uncertainty of what we know about the effects of human industrial activities on caribou populations.

When contemplating the effects of development, information about a variety of factors – in addition to critical habitat considerations – must be gathered. This information should include consideration of caribou condition between seasons, between year classes as well as inter-annual variation. If caribou are in good condition, they can handle a certain amount of disruption, but if they are compromised, they may not be able to absorb the stress induced by development activities. For example, if cows are in poor condition when they get to the calving grounds, then protection of these areas may be immaterial. Focusing only on critical habitat may also ignore the importance of protecting spring staging areas or winter feeding grounds. Without a broadened perspective, factors such as the movement of wolves into post-calving areas at post-calving time, or the effects of summer browsing on the resilience of plant biomass, may also be lost. With changes in range use, there are changes in migration patterns and changes in physical condition. Understanding these changes will involve multiple knowledge sets and will require a space for multiple knowledge-holders – including hunters, elders, biologists – to exchange ideas with each other and to continue learning about caribou populations as adaptive and complex systems.

7.9 Chapter Conclusions

The foregoing discussion indicates that existing knowledge about caribou is frequently uncertain. The social learning involved in making management decisions, subsequently includes mutual acknowledgement among co-management participants of the limitations of what is known about caribou systems. In response to address this challenge caribou co-management participants work toward the development of learning processes that allow people to share multiple perspectives on what is known about caribou systems and to establish thresholds of acceptable change in linked caribou-hunting systems. At the local scale, biologists and traditional aboriginal caribou hunters are looking at ways to measure changes in caribou body condition and to map

their migration routes over time – and to do this in ways that are legitimate in their respective learning traditions. At regional scales, aboriginal leaders and Canadian government policy-makers have the task of identifying the kinds of changes that are culturally and socially acceptable to traditional caribou hunting societies and the wider Canadian society. Ultimately these cross-scale choices must be combined so that changes measured on the ground shape decisions made about evolving social and cultural values. Through time, trust in the range of knowledge possessed by caribou co-management participants is built around the ways caribou can buffer and respond to environmental and human-induced changes, if not in other areas of contestation including the potential need to limit harvests in the future, suitable indicators of changes in population dynamics, caribou body condition, *etc.*

Through the establishment of community-based monitoring programs, co-management systems may produce better ideas about the convergence and/or complementarity of multiple spheres of knowledge. Community institutions – for knowledge collection, interpretation, and use – would be rooted at a local level. Co-management systems that support such community institutions would truly be espousing the subsidiarity principle – where larger scale decision-making structures exist to support local needs. Such enactment of the subsidiarity principle can help to avoid hypocritical scenarios – which are documented by co-management scholars – who often observe forums where traditional knowledge is given stature at the international level, but little acknowledgement at local and regional levels (Feit 1998) – which is where traditional knowledge lives.

Ultimately, co-management systems must establish the space and the humility to acknowledge the importance of trust between participants as well as trust in the knowledge that is employed to make management decisions. This trust will not be created unless there is agreement that it is the responsibility of aboriginal co-management participants to determine when and how to include traditional knowledge in the co-management process. Without trust, between people, and in the knowledge

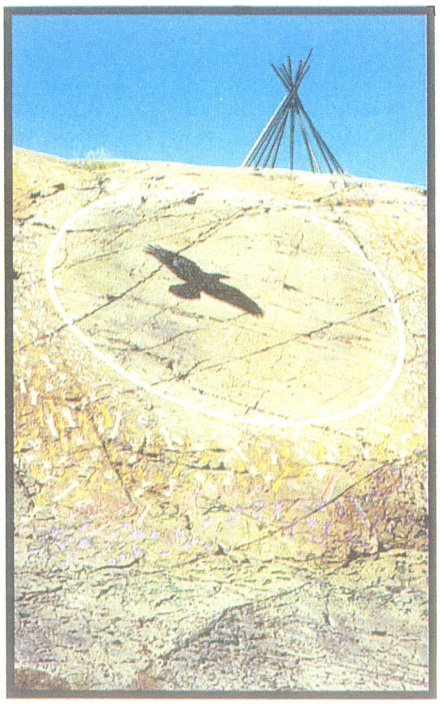
that shapes decisions and actions, it is impossible to supply alternative institutions that recognize changing resource management settings.

Chapter 8

Conclusions – Linking, not Integrating Traditional Knowledge and Science

Without caribou we will become pitiful.
Dene Elders,
comment made by many individuals at various public meetings

Our experience in northern societies has illustrated how mechanistic science must be instilled with a new attitude. That attitude will arise from a new humility, a broader awareness, and a refined sense of responsibility. From that will emerge a new kind of knowing and a fresh wisdom on our mental as well as our geographic frontiers.
Gamble 1986:23



8.1 Introduction

This thesis has described Dënesǫłine caribou hunters as members of a culture that conceptualizes caribou as a source of knowledge, spirituality and mediation of human resource use itself. Conventional state-organized caribou management is often focused on monitoring the number of caribou available for harvesting. However, there is a growing realization, especially in the management of barren-ground caribou, a mobile and wide-ranging species, that current understandings of population numbers are often highly uncertain. It therefore makes more sense to concentrate on reading the feedbacks that indicate the state of caribou systems than to concentrate on deriving counts of entire populations.

Alternative adaptive management and "sustainability science," suggest that rather than continuing to pour enormous resources into population studies that exhibit low accuracy and high uncertainty, it makes more sense to work with resource users (Ludwig 2001, Kates *et al.* 2002), especially those rooted in hundreds and sometimes thousands of years of experience with local and regional environments, to develop feedback signals of resource health. Caribou co-management organizations have begun this transformation.

However, elders in aboriginal communities that participate in co-management often see "management" as inappropriate manipulation of human-environment (*e.g.* Dënesǫłine-caribou) relations. Traditional caribou hunters may be ideologically opposed to western-based conservation ideas. In such cases, where do co-management efforts lead? How do aboriginal communities perceive invitations to participate in resource management processes where colonial government agencies have the ultimate authority to decide when management actions may be subject to the conservation principles defined outside of aboriginal communities? "Conservation" in elders' eyes may be akin to arrogance, and a lack of respect for the animals to be "conserved" (Nakashima 1991, Berkes 1999). Only by looking at the history of how aboriginal

communities and outside government agencies have worked together, is it possible to understand how these questions have been negotiated through time.

This chapter looks at caribou co-management as space for a diversity of management participants, working within different frames of reference to come together to think "outside the box" and move beyond first order learning (conceiving and adapting to change within one frame of reference) to engage in double loop learning, where participants cope and innovate in the face of changing conditions and where basic assumptions may be questioned. First, the general thesis findings are outlined, the correspondence of the findings with the original thesis objectives is examined and the thesis contributions to theory are considered. Finally, caribou co-management is discussed for its role as a "safe space" catalyzing the bridging of difference: in world views, scale and amid rapid change and disturbances in the transmission of knowledge.

Integrated Resource Management

There is the pre-text that newly emerging alternatives to conventional resource management will increase the "efficiency" (shorten the time it takes to make decisions and reduce the conflicts involved in making decisions) of resource management decision-making. A divide in the attitudes, values and beliefs of aboriginal caribou hunters, government biologists and managers toward caribou harvesting practices and management actions exists (Kruse *et al.* 1998, Klein *et al.* 1999). However, the differences in attitudes and perspectives may represent a diversity of experience and ways of learning about caribou-human systems rather than an impasse in caribou management systems (Kendrick 2003). Respecting the diversity of perspectives sitting around a "co-management table," seems a common sense approach. Without this respect it is not possible to build the levels of trust needed to make management decisions that can be accepted and complied to by aboriginal caribou hunters (Kendrick 2003). Still, if co-management participants do not have the tools or motivation to trust each other's knowledge about caribou systems, all is lost.

8.2 Summary of Thesis Findings

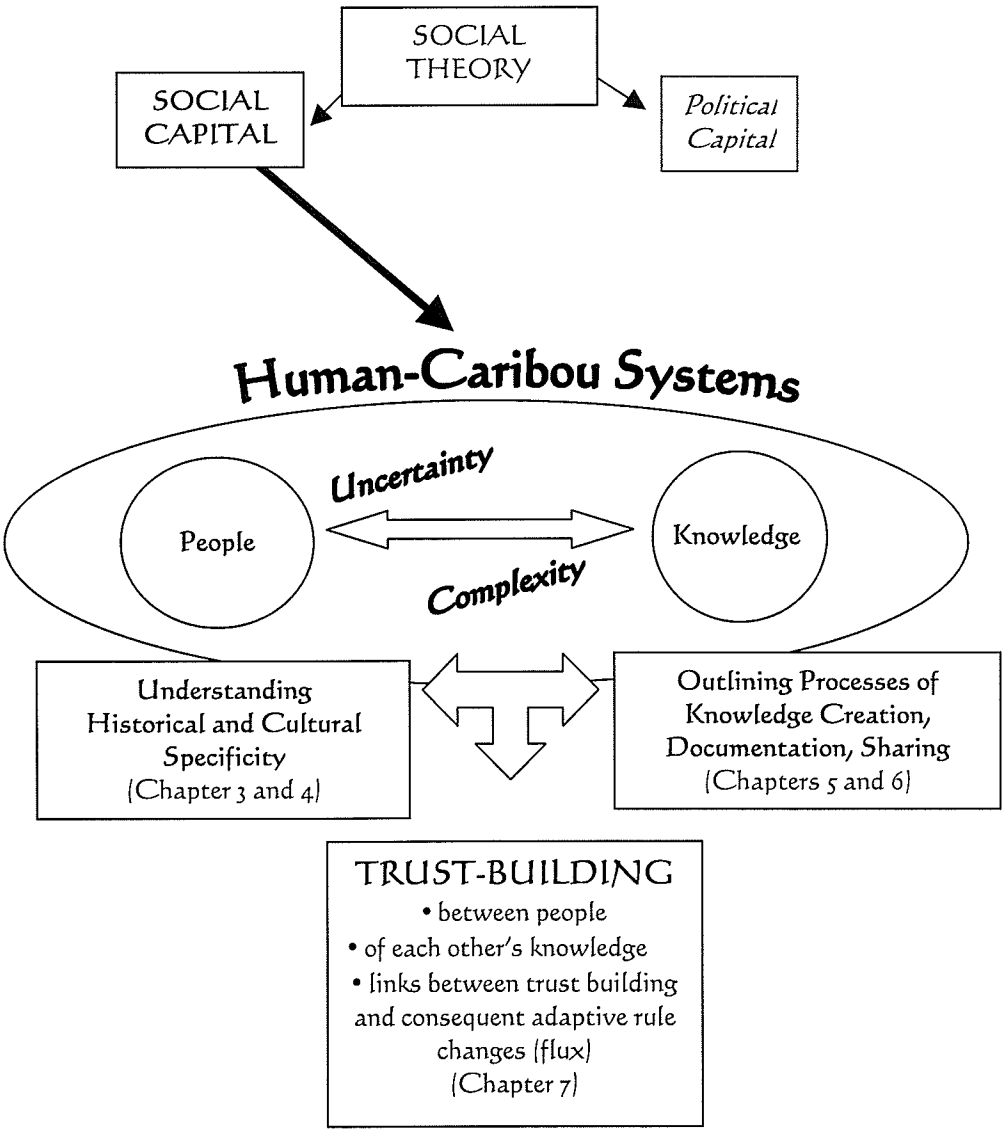
Chapter 3 outlined the history of resource management relations between Dënesǫłine communities and Canadian government agencies in the Northwest Territories before the creation of co-management structures. Chapters 4 and 5 examined processes for including the marginalized knowledge and institutions of aboriginal communities into mainstream resource management. Chapters 5 and 6 explored the creation of rules for the use of traditional knowledge in newly emerging alternative resource management settings. Chapter 7 showed how co-management organizations are constantly redefining themselves, existing in a state of flux driven by changing trust levels. Co-management is still-born without trust and while it *may* exist between individual co-management participants, individuals may not trust each other's knowledge. Getting to the roots of the legitimacy and trust put in knowledge is a massive undertaking necessitating a degree of institutional uncertainty in management arrangements. There is a flux involved that some say is akin to seeing "resource management as jazz" (Blann *et al.* 2003)

Chapters 4, 5 and 6 illustrated that knowledge sharing within aboriginal communities and with outside bodies like government management agencies or industry is connected to the "sense-of-place" of caribou hunters. A politics of identity, where traditional caribou-hunting communities resist changes to Dene-caribou relations imposed by outside forces, expresses the ties between aboriginal-hunting communities' survival and continued social, nutritional and cultural dependence on barren-ground caribou populations.

This thesis has taken a "thick" rather than a "thin" approach (Geertz 1983) to exploring co–management issues in order to pay attention to the cultural and historical specificity of resource systems. The thesis outlined some of the causes and consequences of varying trust levels in co-management regimes, and this required "pushing out in space and back in time" in order to resist *a priori* definitions of causes and units of action (McCay and Jentoft 1998). The author wanted to look not only at the

ecological aspects of human-caribou systems, but to also concentrate on recognizing the ways that these systems are differentiated with respect to their social relations. There is a lack of theory development of social dynamics to complement emerging theories of ecosystem dynamics. This is a real deficit if sustainability thinking aims to understand the links between social and ecological systems. This thesis has looked at co-management situations as places where social learning (learning by a collective) can occur, examining social theory not from the aspect of power and interest, but looking at the trust-building involved in profound social learning. Figure 8.1 outlines the lay out of the thesis:

Figure 8.1: Caribou Co-management Thesis Synthesis



8.3 Revisiting Thesis Objectives

The research objectives followed in this thesis were:

Research Objectives
1. How can cross-cultural differences be negotiated in the co-management of caribou herds (learning from the Łútsël K'é experience: the Beverly and Qamanirjuaq Caribou Management Board and the Bathurst Caribou Management Planning Committee) ? **a)** Are there mechanisms within co-management arrangements that support conceptual diversity and if so, what are they?
2. How can community-based caribou monitoring be implemented? **a)** Is there evidence that significant integrative and complex learning is occurring in co-management settings?
3. What are the mechanisms that create links between western scientific knowledge and traditional ecological knowledge and how can they be more widely applied towards co-management? **a)** What are the differences in how and what caribou managers, biologists and users learn and think about caribou?

Objective 1

The primary lesson of Chapters 3-6 is that it is not possible to negotiate cross-cultural understandings of caribou herds without understanding that traditional caribou hunters, biologists and government policy-makers express the complexity and uncertainty of existing knowledge of caribou systems in different ways. Recent efforts to ensure that traditional caribou users not only bear the costs of management decisions, but benefit and take on responsibility for management actions, outline the practical realities of negotiating cultural differences. The negotiation of the use of satellite collars and assessing the values-at-risk in fire management planning are prime examples of efforts to respect and accommodate these differences. Traditional caribou hunters are increasingly active participants in solving provision and allocation problems reflected in recent revisions of the Beverly and Qamanirjuaq caribou management plan, and aboriginal representatives' efforts to change the management plan to allow a flexibility in use allocation that reflects the social-ecological linkages between Dene and Inuit

cultures and barren-ground caribou populations. It is only in recent years that traditional aboriginal caribou hunting communities have seen results in their historically-rooted efforts to have Canadian governance systems recognize existing aboriginal governance systems, rather than the unilateral devolution of responsibilities to aboriginal communities. In addition, it is now aboriginal communities that are deciding when and where traditional knowledge is relevant to co-management processes.

Objective 2

Without the existence of community capacity to link community knowledge, organizations and institutions, community-based caribou monitoring is inadvisable. However, communities like Lútsël K'é have built up community-based systems for managing knowledge exchange both with the community and with outside organizations. Community-based caribou monitoring is a priority of those aboriginal communities willing to sign on to the Bathurst caribou management agreement. Community-based caribou monitoring has become a key activity in the management plan of the Beverly and Qamanirjuaq caribou management board. There are signs that fundamental learning will be enabled through the sharing of traditional knowledge and scientific knowledge, facilitated by monitoring projects. The motivation and trust for all co-management participants to share and interpret knowledge together (Kofinas' (1998) "co-production") is taking form in such settings.

Objective 3

Links between western scientific knowledge and traditional ecological knowledge are possible only when the people attempting to make these links get beyond "apples and oranges" comparisons of "traditional knowledge" and "science." Often, these comparisons represent naïve dichotomies that make unfair comparisons between a whole culture and the specialized technical knowledge collected by certain members of a culture.

Moreover, in these comparisons scientific knowledge is often represented in generalized, highly abstract forms while the traditional knowledge of aboriginal elders is often transmitted within a personal context that may leave non-traditional knowledge holders to conclude that it is relevant only in very localized circumstances. Differences in the expression and transmission of knowledge reveal different traditions of learning, some concentrating on the personal and meaningful context of knowledge, and others on the abstract explanatory power of knowledge. It appears that without venues where scientists and traditional aboriginal caribou hunters and elders can share their knowledge through direct social interactions, the social learning involved in linking, but not amalgamating "science" and "traditional knowledge" is not possible. The development of multiple caribou monitoring techniques necessitating collective understanding of the signs of feedback from caribou populations, may allow this kind of interaction in ways that have not been systemically available before.

8.4 Contribution of Thesis to Theory

The primary contribution of this thesis is its outline of the dynamics and context of social learning in caribou co-management systems. Understanding social dynamics and their links to ecological dynamics is vital in a world facing extreme ecological crises. How will cultural groups come together to make decisions about their use of resources in ways that foster learning from a diversity of perspectives rather than the domination of marginalized perspectives?

More specifically this thesis:

- identified tools for facilitating adaptable and flexible resource management decision-making and actions
- described mechanisms for building trust, respect and feedback in co-management institutions
- examined the relationship between cross-cultural values and the creation of alternative sustainable resource management strategies

This thesis found that while addressing power relationships between co-management participants is key to examining how well decision-making processes work, the conditions for double loop learning to occur (learning where participants examine their assumptions) do not necessarily follow from balanced power relations. The capacity for double loop learning to occur is dependent on building a space where political and legal posturing is not necessary, and a non-threatening examination of assumptions can take place.

Resource management science is facing profound changes with the growing rediscovery that the sustainable use of natural resources cannot be achieved without understanding the connections between ecological and human social systems. The growing body of theory developing within "adaptive resource management," an applied field of ecology, stresses the interconnections between social and ecological systems and the existence of true uncertainty and unpredictability within these systems (Berkes and Folke 1998). However, the development of this field is hampered by inadequate knowledge of the dynamics of the social institutions that govern the interaction of human beings with the environment. Conversely, property rights research is an interdisciplinary field of study made up predominantly of social scientists working within the areas of anthropology, institutional economics and political science. Much property rights research has focused on human social systems without much regard for the environmental feedbacks between social and ecological systems.

Attempts to advance nascent co-management theory are linked to developments within common property resource theory (Ostrom 1990). In recent years, common property resource theorists have discussed and documented traditional communal resource management systems. Caribou co-management presents the potential for western resource science and traditional ecological knowledge to complement forces to create alternative resource management systems. These alternatives may provide the guidance society requires to maintain the resilience of ecological and social systems. This interdisciplinary approach to the study of co-management has synthesized

knowledge from a variety of fields to understand the exchange between fundamentally different knowledge bases.

These disciplines include the fields of natural resource management, biology and human geography. The rationale behind selecting these areas of knowledge lay in their aid in understanding the social dynamics involved in the linking of western science and traditional ecological knowledge in the management of a common property resource, caribou.

8.5 Co-Management: Present and Future Challenges

Co-management institutions are not only bridging different world views, but institutions (rule sets) that function at very different scales. Rule sets can be of different types, some emergent and informal and others deliberate and formal (Parson and Clark 1995). There are three functional scales at which rule sets operate:

- macro level: constitutional choice and myths (see Chapter 2, Box 2.1)
  - rules at this scale work at cultural and societal scales, exhibit slow turnovers and are subject to little political influence

- meso level: – collective choice rules and strategies
  - policy-making and management – turnover rate of decades (and subject to considerable political influence) – inevitability of uncertainty must be recognized at this level – subsequent pursuit of selective risk taking

- micro-level – routine, programmed actions

(Parson and Clark 1995)

Co-management's role in spanning the differences in scales at which aboriginal and Canadian rule sets operate is not just a matter of matching scales, but of translating across scales. For example, the turnover time and number of people involved in making changes of rule sets at macro-, meso- and micro- levels differs between aboriginal and Canadian governance systems. However, resource users (traditional caribou hunting communities) are key to bridging these scalar differences and can act as a "pool" of creative and adaptive solutions where conditions of trust exist.

The capacity of co-management organizations to act as catalysts bridging differences in scale and knowledge systems are influenced by a number of factors including:

1) **rapid exogenous changes**, such as changes in technology, resource availability and the heterogeneity of participants

2) **transmission failures** – rapid changes of population or culture leading to "a circumstance in which the general principles involved in the effective community-governed institutions are not transmitted from one generation to another" (Ostrom 1998:42-43)

When human-caribou systems experience rapid change originating from outside or rapid societal or cultural changes leading to internal institutional failures, problems can result. These problems may arise, for example, when co-management institutions do not have the time or resources to match changing management needs with the capacity to deal with such changes (Riseth and Vatn 2000).

Developing the capacity to conceive of change, especially change that is unprecedented, and to establish new anticipations, requires the capacity to cope and to innovate (Speiss 1979:5). Alternative management systems examine ways to move beyond first order learning (doing the right thing in context) and to develop mechanisms to achieve second order learning – dealing with changing context. Conventional resource management systems have concentrated on first order learning and increasing the efficiency of dealing with easier technical problems rather than striving to achieve second order learning, learning that involves at times difficult moral and social dilemmas. Second order learning can only be achieved through collective decision-making and learning processes where multiple indicators of the state of resource systems inform the learning involved.

8.6 Creating Alternative Management – Building from the Ground Up

Second order learning cannot be achieved without trust between participants – will the participants learn from each other? Will multiple perspectives and learning traditions

be respected? The danger is that rather than maintaining diversity and variable ways of thinking, the richness of tools available to think through changing social and ecological circumstances may be lost:

> *When all you have is a hammer, everything else in the world looks like a nail*
> (Japanese Proverb).

Co-management is cited as a means to match "bottom-up" and "top-down" resource management approaches, allowing the linking of small and large scales of governance. In northern Canada, co-management structures include non-conventional actors in resource management, *i.e.*, resource users themselves. The resultant sharing of power, responsibility and accountability is leading to new governance structures. The ability to achieve a common vision or consensus despite differences in values, is centred on the manner in which resource management institutions or rule-making (North 1990) are devised, cross-scale linkages are made and public participation accomplished. Systems of people and nature have co-evolved in an adaptive dance (Walters 1986), but uncertainty is pervasive in complex resource issues (Gunderson 2003). What is most critical to resource management issues is how technical, stakeholder and political communities manage uncertainty in an integrated fashion (Gunderson 2003:39).

Many argue that societies need to rethink how science is applied to help people deal with urgency and the unprecedented nature of present-day environmental and social changes. A new social contract for science calls for society to begin a dialogue on research priorities, new institutional arrangements to improve the means of sharing knowledge and to do so more quickly (Lubchenco 1998). In the North, this dialogue is increasingly instigated by aboriginal communities questioning the learning traditions and types of knowledge that are used to make critical resource management decisions. It is more and more apparent that "no single body in society has all the capacities, all the skills needed for the best management..." (Borrini cited in Bayon 1996:3). It is through the double loop learning characterizing some co-management processes, that the

negotiation of a common vision of resource management attuned to feedbacks from nested social and ecological systems may be achieved, free of ideological impasses.

Personal Communications

Abel, Noel 2000. Łútsël K'é Elder, interviewed in Łútsël K'é, Northwest Territories, interview transcript archived in the Łútsël K'é Wildlife, Lands and Environment Office, permission obtained from individual to use quotation.

Boucher, Ernest 2001. Łútsël K'é hunter, interviewed in Łútsël K'é, Northwest Territories, interview transcript, audio-recording and accompanying mylar (1: 250 000) archived in the Łútsël K'é Wildlife, Lands and Environment Office, permission obtained from individual to use quotation.

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Appendix 1

Research Agreement
Information Management Project

This Research Agreement, hereinafter known as the "Lutsel K'e Research Agreement (Interim-001)" is made this 19th day of October, 2000.

BETWEEN

The Lutsel K'e Dene Band which is directing the Information Management Project, hereinafter referred to as the:

The Band
OF THE FIRST PART

AND

Anne Kendrick
OF THE SECOND PART

Hereinafter, referred to as the "Researcher."

Whereas the Band and the Researcher agree to undertake a research project concerning Information Management.

THIS AGREEMENT NOW WITNESSES, THEREFORE, that the parties agree as follows:

General Terms and Conditions:

1. The purpose of this research project, as discussed and understood by the Band is to develop an information management system and the Researcher will address three research questions in conjunction with her work with the information management project:

a) How can cross-cultural differences be negotiated toward future co-management of the Bathurst caribou herd?

• Understanding these differences is crucial for co-management, and the researcher's work will follow up on the major cross-cultural differences revealed by a Man and Biosphere comparative study of the management of the Western Arctic and Beverly-Qamanirjuaq caribou herds.

b) How can community-based caribou monitoring be implemented?

• The researcher will help with the coordination of proposed caribou community-based monitoring work in Lutsel K'e, both for the monitoring of the Bathurst caribou herd and the monitoring pilot project proposed by the Beverly-Qamanirjuaq caribou management board.

c) What are the mechanisms that create links between western scientific knowledge and traditional ecological knowledge and how can they be more widely applied towards co-management?

• An analysis of questions about the linking of 'scientific' knowledge and traditional knowledge will be completed. A needs assessment of the Lutsel K'e information management system will help explore these issues.

2. The scope of this research project, as discussed with and understood by the Band is the community of Lutsel K'e and the community's concerns and priorities for the dissemination and sharing of local knowledge.

3. Methods to be used, as agreed by the Researcher and Band, are:
   a) interviews, discussion groups, workshops, and related activities to gather community input and;
   b) on-going public meetings, workshops, displays and related activities to communicate information from the research project.
4. Community training and participation, as agreed, is to include,
   a) Two Community Researchers (Trainees) hired from the community of Lutsel K'e and trained by the Researcher.
   b) Broad community participation will be sought throughout the research process to ensure that the information management system is useful and appropriate for the community.

5. Information collected is to be shared, distributed and stored in these agreed ways.
   SHARING AND DISTRIBUTION:
   a) Information gathered for the purpose of developing the information management system will be available to the public through the discretion of the Lutsel K'e Band.
   b) The researcher will be available to answer any questions regarding the information collected, or to assist the community should they decide to use this information for purposes beyond the project.
   c) While the researcher is resident in Lutsel K'e periodic reports will be written and presented to the Wildlife, Lands and Environment Committee and the Band Council when the Committee and the Council meet.
   d) Information collected will only be distributed after the researcher has verified the information and received approval of the Band.
   STORAGE:
   e) Information will be stored in Band Office files and will be kept confidential unless written consent is obtained from the Band.

6. Informed consent of individual participants or communities is to be obtained in these agreed ways.
   a) Consent for information gathered and recorded will be obtained through a written form letter in the language preferred by the individual participant.

b) A copy of the consent form will be left with the participant, along with the address of the researcher, should the participants wish additional information.
c) Formal community consent and approval of all aspects of the research project will be sought through the Band.

7. The names of participants and the community are to be protected in these agreed ways.
a) Where written consent is given:
The researcher will ensure that all participants and the community are acknowledged by name in all material or public statements generated from the information collected.
b) Where written consent is NOT given:
The Researcher will ensure that any material or public statements generated from the information collected from the participants does not contain statements or quotes that are attributable to individual participants and that names of participants and/or the community do not appear on the material.

8. Project progress will be communicated to the community in these agreed ways.
a) The researcher will provide reports to the Wildlife, Lands and Environment Committee and the Band Council as the research progresses.
b) The researcher will present regular updates of the Research Project at Public Meetings.
c) Final results of the Research Project will be presented in a Public Meeting.

9. Communication regarding the project with all other parties (including funding agencies) outside of the named Band and the Researcher will be handled in these agreed ways.
a) All Research Reports, including the Final Report, will be approved by the Band before being distributed to other parties.
b) The Researcher will fully acknowledge the community/ participants involved in the research project (depending on the level of protection and acknowledgement agreed to in parts 7 and 12).

10. The "Researcher" and the "Band" will cooperate to analyze the information collected in these agreed ways.
a) The Community Researchers (Trainees) will be trained by the Researcher to assist in the creation of a community-based information management system.
b) The Researcher will integrate the community in the analysis by facilitating small group discussion in each phase of the research.
c) The Researcher will facilitate a large Community Workshop to present and verify the analysis done in small groups during each phase of the research.

11. The results of the Research Project will not be released until verified in these agreed ways:
a) The Researcher presents the information at a public meeting to include participants in the project and the information is discussed and verified.
b) The "Band" gives written approval of the documents.

12. Notwithstanding part 7, contributions of people to research projects must be fully acknowledged in all reports and public statements in these agreed ways:
a) Where Written Consent is given:

The researcher will ensure that the names of all participants appears on all material generated from the information collected during the research project.

b) Where Written Consent is NOT given:
The Researcher will ensure that the names of all participants are kept confidential.

13. In the event that the Band has reason to believe that the terms and conditions of this Agreement are not being met by the Researcher, the Band may terminate this Agreement and the research project upon giving such period of notice as the Band deems appropriate.

14. In the event this Agreement and the research project is terminated in accordance with part 13 or part 21, the Researcher shall return all originals and copies of raw data, including video, audio, and written materials collected or prepared for the purposes of the research project, to the community.

15. The Researcher has acquired funding and other forms of support for her research from:
    a) The Walter & Duncan Gordon Foundation
    b) University of Manitoba Doctoral Fellowship
    c) Canadian Northern Studies Trust Award
    d) Clarence Bogardus Memorial Scholarship
    e) Northern Studies Training Program Grant
    f) University of Manitoba Student Union Award

16. The Funding Agency has imposed the following criteria, disclosures, limitations and reporting responsibilities on the Researcher.

    a) Six month and final (one year) reports must be presented to the Walter & Duncan Gordon Foundation.
    b) The research must meet the requirements of the University of Manitoba's Ethics Review Process for the conduct of research involving human subjects and the Aurora Research Institute's licensing process.
    c) The Canadian Northern Studies Trust requires a brief report and bibliography outlining the progress of the project.

17. The Researcher wishes to use this research for benefit in producing unpublished and/or published articles and/or reports and/or lectures and/or interviews and will seek consent for such benefits from the Band in the following ways:
    a) A written draft of published and unpublished material will be sent to the Band for revision and approval.
    b) Approval will be sought from the Band before the research is presented in interviews or lectures.
    c) A copy of any unpublished/ published material will be sent to the Band for their approval.

18. Benefits likely to be gained by the community through the research project are:
    a) A Community Based Information Management System.
    b) Financial contribution toward a Community Researcher (Trainee) position ($12 000).

c) The Researcher's coordination of information and database work / resource person for the Wildlife, Lands and Environment Committee (3 months @ 40 hours/week and 6 months @ 24 hours/week).

19. The Band undertakes to:
a) participate in and support the project (workshop discussions, feedback on the project and the information gathered).
b) approve final reports for distribution outside the community.
c) continue to support the Community Researcher (Trainee) in gathering information according to the terms and conditions set in the Research Agreement.
d) support the project according to the Terms and Conditions set out in this Agreement.

20. The Researcher undertakes to:
a) proceed with research according to the goals and the objectives set out in this agreement.
b) work under the direction of the Lutsel K'e Band through the Wildlife, Lands and Environment Committee and the Band Council.
c) act as a resource person to answer questions related to the theme of the research topics.

21. The Researcher agrees to stop the Research Project under the following conditions:
a) by consensus decision of the Band.
b) if the Researcher is not able to adhere to the terms and conditions of this Agreement.
c) If the Band terminates the research pursuant to part 13.

Chief Felix Lockhart

Signed: Date: Witness:

Community-Based Information Management Research Advisor – Anne Kendrick

Signed: Date: Witness:

Appendix 2

Letter of Support for Research Project from Chief Felix Lockhart of the Łútsël K'é Dene First Nation

Łutsel K'e Dene Band
Post Office Box 28
Lutsel K'e, Northwest Territories
X0E 1A0

Telephone: 867 370-3051
Fax: 867 370-3010

Chief Felix Lockhart
Lutsel K'e Dene First Nation
Box 28
Lutsel K'e, NT.
X0E 1A0

November 21, 2000

Anne Kendrick
c/o Dr. Fikret Berkes
Natural Resources Institute
University of Manitoba. R3T 2N2
Tel: 204-474-6731
Fax: 204-261-0038

Dear Ms. Kendrick,

We would like to confirm our continued support of your work with the Wildlife, Lands and Environment Committee of the Lutsel K'e Dene First Nation. On November 3, 2000 the WLEC passed a motion to approve a research agreement outlining your future work in the community. Your work over the last few months to aid the creation of an information management database and your training support of two of the WLEC's employees in our community, has assisted us in our land use planning efforts. Your commitment to continue to aid the WLEC's efforts over the next several months to help implement community-based caribou monitoring is also valued.

A good deal of the WLEC's work is currently funded through the WKSS whose mandate terminates in the spring of 2001. We are anxious to build the capacity of the WLEC to continue its work. We are also aware that the Government of the Northwest Territories has scaled back the funding available to finance the monitoring of barren-ground caribou herds, animals of crucial nutritional, social, economic and cultural significance to the community, and under heavy pressure from increased mineral resource development in our traditional territory. The WLEC would like to see increased monitoring of these herds by the community itself.

We look forward to continuing to work with you in the future.

Sincerely,

Chief Felix Lockhart, Lutsel K'e Dene First Nation

Appendix 3

Notification of Research Licence issued by Aurora Research Institute

AURORA RESEARCH INSTITUTE - AURORA COLLEGE
P.O. Box 1450 Inuvik NT X0E 0T0
Phone: 867-777-4029 Fax: 867-777-4264 E-mail: Jim_Wall@gov.nt.ca

12-410-118
09-Mar-01

NOTIFICATION OF RESEARCH
Scientific Research Licence No. 13165N

I would like to inform you that Scientific Research Licence No. 13165 has been issued to:

Ms. Anne Kendrick

Lutsel K'e, NT X0E 1A0
( )
Email:

to conduct the following study:
"Beyond Control: Caribou Co-management and Cross-Cultural Information".

Please contact the researcher if you would like more information.

SUMMARY OF RESEARCH:

The study is designed to improve the understanding of cross-cultural differences in the co-management of the Bathurst caribou herd. This study will follow up on major differences revealed in a Man and Biosphere High Latitude Ecosystems Directorate comparative study of the management of the Western Arctic and Beverly-Qamanirjuaq caribou herds. The researcher will assist with the coordination of the proposed community-based monitoring program in Lutsel K'e, as well as complete a needs assessment as it relates to the dessimination and sharing of local knowledge. Community members will be consulted about their aspirations, as well as their concerns, about the process of documenting oral traditions and traditional ecological knowledge into electronic databases. Methods to be used include semi-directed interviews, workshops, displays and related activities to communicate information collected through the research project, which will include training and participation of two Community Researchers hired from Lutsel K'e. The researcher recognizes the rights of individuals to withhold information at their discretion. All information gathered will be kept confidential.

The study will be conducted in Lutsel K'e and Yellowknife, NT between 09 March 2001-31 Dec 2001.

Sincerely,

Jim Wall, M.Sc., P.Ag.
Manager, Scientific Services

DISTRIBUTION:
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Director, RWED, GNWT, 600, 5102-50th Avenue, Yellowknife, NT X1A 3S

Appendix 4

Research Approval Certificate from University of Manitoba's Joint-Faculty Research Ethics Board

UNIVERSITY OF MANITOBA | Office of the President

Office of Research Services
244 Engineering Building
Winnipeg, MB R3T 5V6
Canada
Telephone: (204) 474-8418
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APPROVAL CERTIFICATE

28 February 2001

TO: **Anne Kendrick** **(Advisor F. Berkes)**
Principal Investigator

FROM: **Wayne Taylor, Interim Chair**
Joint-Faculty Research Ethics Board (JFREB)

Re: **Protocol #J2001:007**
"Beyond Control: Caribou Co-management and Cross-Cultural Information Exchange)"

Please be advised that your above-referenced protocol has received human ethics approval by the **Joint-Faculty Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

Appendix 5

Sources of Evidence

Respecting the Community's Research Burden

Łútsël K'é community researchers have carried out an impressive amount of work in the last few years. I considered it very important to become as familiar as I could with the results of the traditional knowledge, land use and community health monitoring studies already carried out in the community. It is important not to become a part of a process where community members start to feel "interviewed to death." The community has worked very hard to establish a Research Office (the Wildlife Lands and Environment Committee's research arm) and it would only have undermined their work, if my interviews or workshops led people to ask whether the Research Office was listening to their responses to earlier studies.

The time I spent working on the WLEC's information database and the hours I spent in the WLEC office were invaluable. Learning about the history of the people currently living in *Łútsël K'é* (some elders were brought up on the barrenlands, while others grew up south of the treeline), the variation in the Chipewyan literacy skills of community members (for instance, a young person in his 20s may have greater Chipewyan skills than a woman in her 40s and vice versa) and other complexities of the community, probably made me a much better listener than I might have been if I had not spent many months in the community. The opportunity to participate in the community's research work not only allowed me to become familiar with the overall community, but to visit and to chat with individual community members in a comfortable manner that I could not have achieved easily with early door-to-door visits.

Łútsël K'é insists that outside researchers make a commitment to carry out work that leads to tangible benefits for the community. The chance to aid in the creation of an information management database and to support the training of two young community researchers has been a tremendous boon to my learning as well. I was able to reach a stage where I could design workshops and interviews that fit within the needs of the

community's current research. I hope my interview process benefited from knowledge of the results of interviews and workshops previously carried out in the community, as well as a familiarity with the interview and workshop formats that have been used in the community over the last few years.

The community-based efforts of the project included the following activities:

1) Aiding *Łútsël K'é* in its efforts to *document Dëne rules* of environmental behaviour (*resource management*), namely toward caribou: What kind of behaviour (respect) does the community expect from hunters and researchers interacting with caribou in the *Łútsël K'é* traditional territory?

2) Looking at the differences between mainstream science and *Dënesoline traditional knowledge understandings of caribou herd dynamics*, especially herd range overlap. I looked specifically at the kinds of knowledge of caribou movements and behaviour that the community thinks it is important to document in order to address land use planning and community-based caribou monitoring.

3) Participating in the *Łútsël K'é information management project* in order to look at how the community is linking traditional knowledge with mainstream science in order to respond to land use permit applications and environmental impact studies of the mining developments in the community's traditional territory. The thoughts of community-based researchers on the advantages and disadvantages of documenting TEK and sharing it with peoples outside the community were recorded.

4) In addition, I provided on-going *technical support* of the *Łútsël K'é* Information Management Project for a number of months.

(A) Participant Observation in the *Łútsël K'é* Wildlife, Lands and Environment Office

I worked in the *Łútsël K'é* Wildlife, Lands and Environment Office with youth at the request of the WLEC and Elders for 6 months at 40 hours/ week and a further 6 months at 30 hours/ week.

During this time I learned about:
· community documentation of local knowledge
· the relationship between technology and knowledge
· concepts of community monitoring and community-defined constructs of TK

(B) Attendance of Community Meetings: more than 60 WLEC meetings, Elders meetings, Public meetings over a 12 month period

During this period I gained a sense of:
· how a community imparts and requests information about resource management issues

(C) Attendance of Co-Management Board Meetings/ Caribou and Ecological Monitoring Conferences

Conference and Meeting Attendance
Bathurst Caribou Management Board Planning Meetings, NT.
Beverly-Qamanirjuaq Caribou Management Meetings, Winnipeg, Yellowknife
10th Arctic Ungulate Conference, Tromso, Norway
Minary Meeting: Circumpolar *Rangifer* monitoring planning session, New Hampshire, US.
Ecological Monitoring and Assessment Meeting – focus on community methods
Rangifer Workshop: CAES network PhD course
Arctic Science 2000 - Crossing Borders: Science and Community, Whitehorse, Yukon, Canada, Sept 21-24 2000
Cumulative Effects Assessment and Monitoring Workshops, Yellowknife, NT.

(D) Individual Interviews and Workshops in *Łútsël K'é*

Individual interviews - themes	description
Traditional Knowledge Documentation	10 interviews with community-based researchers to look at the benefits and challenges of documenting oral knowledge - see appendix 6 for questions that guided these semi-directed interviews)
Caribou Respect	25 Interviews with elders and hunters about Chipewyan "protocols" for respecting caribou - see appendix 6 for questions that guided these semi-directed interviews
Caribou Movements	39 Interviews with elders and hunters mapping community knowledge of caribou movements - see appendix 6 for questions that guided these semi-directed interviews

All interviews were audio-recorded, simultaneously translated and later transcribed. All interviews were guided by the spirit of the research agreement signed between myself and the *Łútsël K'é* Dëne First Nation (see appendix 1).

The caribou movement interviews used 1:250 000 maps. These results of these interviews were then digitized and incorporated into the community's GIS system (ArcView 3.2).

All raw material from interviews are retained by the WLEC office.

Workshops

2 workshops to set questions used to guide caribou movements
3 meetings to verify results

(E) 5 interviews with individuals working with community outreach programmes at various mining companies and members of the Independent Environmental Monitoring Agency.

(F) Archival/ Public Registry Research

Various materials were researched at the National Archives of Canada in Ottawa, The National Library of Canada in Ottawa, The Hudson Bay Archives in Winnipeg, The Prince of Wales Heritage Museum in Yellowknife and the Department of Indian Affairs Public Registry in Yellowknife.

Appendix 6

Questions Guiding Semi-Directed Interviews

Questions Guiding Traditional Knowledge Documentation Interviews - asked of Community-Based Researchers of the Łútsël K'é Wildlife, Lands and Environment Office

1. What do you think of the mapping work done at the WLEC?
   a) What kind of knowledge would you like to see included in maps?
   b) What kind of knowledge about the land do young people miss if they only look at maps?
   c) How will these maps help with community decision-making in the future?
   d) What kind of maps would help the community with its work on:
      mining issues, land claims, protection of sites that are important to Łútsël K'é people, wildlife harvesting, education of youth about the land, hunting, trapping education of youth about the land
   e) What do you think are the good and the bad things about storing information on: paper or on computers?
   f) Is there information that you think should not be stored on computers?

2. Would it be a good or a bad idea to share these maps with people outside the community and why?
   a) Do you trust that the information will be respected? If not, why?
   b) Do you trust that the information will not be misused?
   c) Do you trust that people (in the community and outsiders) looking at the TK studies collected by the WLEC have the knowledge and understanding to do so?
   d) What is the difference between knowledge you have from personal experience, knowledge you learn from other people in town/ people from outside the community/ from TV/ from books?

3. What is the role of dreams, story-telling, dancing, drumming in learning about the Dene Way of Life?

Questions Guiding Caribou Respect Interviews –
aimed at documenting Łútsël K'é Protocols for Respecting Caribou directed at youth/ researchers and hunters coming to the Lutsel K'e area from outside

1. How can you tell when a caribou has been bothered by people, mines, *etc.* ?

2. What are the differences you see in meat when a caribou has been stressed? How does it affect the meat someone will eat later?

3. Do you hunt caribou differently depending on where you find them?

4. What is important to remember when:
   - when approaching them
   - when butchering them
   - when caribou are near town
   - when handling meat

5. What do you think are the differences between the way biologists or researchers know the land and Chipewyan know about the land?

6. What are the best ways to teach people from outside the community, like researchers, how to respect Dene land and especially caribou?

7. Do you talk to caribou? How is this important for the way you respect caribou?

8. Are there any other stories that help explain how people and caribou should respect each other? (that have not already been recorded)

Caribou Movements - Interview Questions

The interviews were guided by the following general questions.

a) Experts outlined areas that have been good hunting spots throughout their lifetimes.
b) Experts were asked about times in their lives that they remember a lot more animals appearing in the areas outlined in a)
c) Experts were asked about times in their lives when there was a scarcity of animals in these areas (*i.e.*, dogs lost due to hunger) and what they did to cope.
d) Experts were asked how burns had affected their ability to hunt caribou and whether or not they felt there was a change in the frequency of burns in the Łútsël K'é land use area throughout their life-times.
e) Experts were asked whether or not water levels had changed in the areas they travelled in throughout their life-times.
f) Experts were asked whether mines (Ekati/ Diavik/ DeBeers sites) are changing caribou movements/ health, and if so, how.
g) Experts were asked whether or not they had ever seen woodland caribou or small, white caribou (mainland Peary caribou) mixed with the caribou they normally see in the Łútsël K'é land use area.
h) Experts were asked if they were seeing caribou with any external injuries/ whether they were seeing any changes in caribou meat in recent years that they had not seen before.

Appendix 7

Barren-Ground Caribou Survey Techniques

There are currently a number of caribou population survey techniques in use, they are briefly described in this appendix along with explanations of their strengths and weaknesses.

Biologists first suggested in that radio-collar tracking should be used on the Beverly and Qamanirjuaq herds in 1983. In 1984, the results of aerial photographic surveys showed that visual observer estimates had under-estimated caribou numbers by half. In 1986, the Beverly-Qamanirjuaq Caribou Management Board (BQ Board) decided to use the results of photographic survey results instead of visual observer results to inform their management recommendations.

The traditional calving grounds of the barren ground caribou herds are now recognized as the most effective area to concentrate census efforts, though these areas can be very challenging to survey. Breeding females are most aggregated and have the most fidelity to certain geographic areas for calving. The Beverly herd's traditional calving area, covering all the land area used for calving over a 23 year period from 1957 – 1994, is 38,400 sq. km (Wakelyn 1999b). This area is three-quarters of the land area of Nova Scotia. Biologists hoped to use radio and subsequently, satellite collaring programs to pinpoint where to concentrate their census surveys in any particular year. Unlike the tagging programs of the late 1950s and 1960s, the collaring programs requested the approval of the aboriginal communities on the range and involved the handling of far fewer animals.

The BQ Board and the government of the Northwest Territories have proposed that satellite radio-collars be used to monitor the movements and distribution of Beverly caribou, and several agencies have made funding commitments in past years for a satellite-monitoring study. However, the study will not proceed until support from all aboriginal communities located on the range of the Beverly caribou herd is obtained (this support may be forth-coming in 2003). Chapter 4 explored the reasons for this

opposition in some detail. Information from a collaring study could help to identify seasonal ranges, migration routes, and areas that are used by more than one caribou herd (*e.g.*, Beverly, Bathurst and Qamanirjuaq).

Biologists currently conclude that more than two annual surveys are needed to estimate a trend leading to shifts in management actions. It is currently not possible to know what the power of calving ground surveys is to predict declines without reviewing all previous data. There are instances when calving ground photo surveys have provided unusually low estimates that were due to a delay in the return of breeding females to their calving grounds.

Calving Ground Surveys

Calving ground surveys estimate the abundance of breeding females as an index of total herd size (barren females, calves and males do not necessarily return to calving grounds). Survey results have varied in accuracy. Some low estimates in the past are thought to have reflected the fact that not all females had returned to the calving grounds at the time of the survey, rather than actual low numbers. Surveys done before the switch to aerial photographic techniques show a large variation in observer bias.

Many of the survey results show precision levels below that considered useful for management decision-making. Biologists try to optimize their allocation of "strata," or to balance the time they spend counting caribou where densities are higher (determined during reconnaissance flights before surveys are carried out), rather than recording information for as many strata as possible in order to make credible estimates of standard error (SE) (the less strata surveyed the higher the SE). If animals are moving between strata in the lee time between stratification and photo surveys (caribou distribution and density is changing), then the survey results will suffer from a strata effort that was poorly allocated. Biologists are continually looking for ways to make decisions about when to change strata boundaries in as objective a manner as possible (to only change strata boundaries for major changes in aggregation patterns).

Post-Calving Census Method

This method is not always feasible for every barren ground caribou herd, especially herds like the Bathurst, Qamanirjuaq or Beverly herds that aggregate at post-calving over a very large area. Without collars, biologists find it is difficult to locate animals (there are currently collars on animals from the Bathurst, Qamanirjuaq and Ahiak herds, but not on the Beverly). Finding all post-calving aggregations for all herds is very difficult. Population estimates from post-calving censuses depend heavily on the number and representativeness of collared animals. Biologists have discussed using infra-red photography and high resolution remote sensing, but these techniques are not currently in use.

Methods to Monitor Population Trends

Spring Calf-Cow Ratios

This ratio is calculated in order to monitor population trends between calving surveys, that are generally not carried out more than once every 6-7 years. This technique is relatively inexpensive and the results can be used to estimate when next to do a calving ground survey (*i.e.*, if there is a pattern of successive low ratios than it is probably advisable to do a calving ground survey sooner than later).

Composition Survey

This survey can be performed fairly often and done quite precisely. Composition surveys may help to project population declines well before calving ground surveys pick up on such a trend. Composition surveys are thought to be a more accurate index of recruitment since the ratio of calves is determined against all members of the population, not just breeding females, and it is not possible to assume a stable age distribution when looking at all members of the population as you can when only looking at adult females (spring cow: calf ratios).

The Key Weaknesses of Surveys According to Biologists

(Mowat and Boulanger 2000):

1) A delay between stratification and photo play when carrying out calving ground surveys (significant costs involved in redoing stratification photoplays).

2) Precision of surveys can be increased by increasing coverage, but the increase in precision does not increase linearly: *i.e.*, increasing coverage by two times will not double precision, it is more important to concentrate resources on photographing high versus low density strata.

3) There has been a lot of inconsistency over the years in choosing distance strata.

4) Comparing surveys may be beyond what is technically possible. One solution may be to recalculate past surveys using post-stratification, thereby increasing confidence in past surveys, but to do this recalculation would take a lot of resources away from the need to plan future surveys.

5) A lack of precision in surveys can be a result of trying to look at the entire herd. It may be advisable to concentrate on recruitment rates; current management plans stipulate that decisions about harvest rates and commercial tag allocations must be made with knowledge of whole herd numbers.

6) If biologists continue to use current methods, whole herd numbers will continue to be underestimated since they lack precision and with a lack of precision, management decision-making bodies are required to take a conservative tact, possibly resulting in frozen or decreased allocations quotas as a result.

7) Spring calving surveys hinge on all breeding females being at the calving grounds. There is only a window of two weeks to do this survey, and if the weather is bad, the chance to do the survey is lost (current survey costs for the Beverly herd are estimated to cost $160 000).

8) With the levels of SE around spring calving survey estimates, it would currently require a change of 20% in herd size, to detect any change in herd size at all. It is possible that after spending significant resources on calving surveys that co-management boards are still in a position after spending a lot of time and money that they still do not know if the estimate of standing stock has changed, and are no further ahead in collecting the information needed to increase or decrease commercial quotas for instance. Concentrating on efforts to discuss aboriginal community observations that a change in abundance is occurring may be more relevant and useful to management decision-making.

Management Actions are currently triggered by a number of factors including:

- the number of breeding females (calving ground surveys)
- total population size

There have been efforts to avoid mistaken conclusions as a result of inaccurate survey results by consulting with aboriginal communities (see 1993/ 1994 survey results of BQ herds). Hunters may notice "stragglers" moving between winter and calving grounds that surveys will not detect. Years when late springs occur need careful ground-truthing that aerial surveys do not always provide. Radio collars may help provide vital additional information about changes in distribution and variations in movements that aerial surveys cannot detect. Survey coverage is usually as low as possible because the costs of aerial photography are high. Mixing photo and visual observer methods may help to bring costs down in the future by using photography in high density strata and visual observations in low density strata.