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Ways we respect caribou: Hunting in Teetł'it Zheh (Fort McPherson, NWT)

by

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ABSTRACT

The Porcupine caribou herd is the focus of multiple stakeholder groups, all of which have different ways of understanding and valuing caribou. This thesis focuses on the knowledge and perspectives that the Teetł'it Gwich'in of Teetł'it Zheh (Fort McPherson, NWT) bring to Porcupine caribou co-management. This paper-based thesis has two major aims: first, to explore how the Teetł'it Gwich'in construct knowledge about caribou; and second, to explore Teetł'it Gwich'in rules-in-use with respect to caribou hunting. A comparison is made between Gwich'in methods of knowledge construction and rules-in-use with those of the Government of the Northwest Territories (GNWT), and the Porcupine Caribou Management Board (PCMB), with the intent of understanding difficulties in co-management. The thesis offers the concept of the Gwich'in Knowledge Complex, a knowledge complex created from multiple sources of information about caribou, including scientific information (mainly from the PCMB and the GNWT) as well as Traditional Knowledge.

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ACRONYMS

ARC: Alberta Research Council
ARI: Aurora Research Institute
CBPR: Community-Based Participatory Research
CWS: Canadian Wildlife Service
GNWT: Government of the Northwest Territories
GRRB: Gwich'in Renewable Resource Board
GSCI: Gwich'in Social and Cultural Institute
GSR: Gwich'in Settlement Region
GTC: Gwich'in Tribal Council
IK: Indigenous Knowledge
INAC: Indian and Northern Affairs
NWT: Northwest Territories
PCH: Porcupine Caribou Herd
PCMB: Porcupine Caribou Management Board
TGRRC: Gwich'in Renewable Resource Board
TK: Traditional Knowledge

1.0 INTRODUCTION

1.1 Introduction

There are multiple parties involved in Porcupine caribou management, and each have different ways of approaching, understanding, valuing and knowing caribou. These differences can cause friction when the groups attempts to manage caribou together. This research examined the question *how do the Gwich'in of Fort McPherson, NWT, construct knowledge about caribou and what are rules-in-use with respect to caribou harvesting? Further, what role does this knowledge and rules-in-use play in caribou management?* The Gwich'in are one of many user communities of the Porcupine caribou herd. Together with the Government of the Northwest Territories Department of Environment and Natural Resources (GNWT ENR), they are involved in the Porcupine Caribou Management Board (PCMB). For a better understanding of how these three groups work together, I also examine the methods used by the Government of the Northwest Territories (GNWT) and the PCMB to create knowledge about caribou and the rules and regulations with respect to harvesting that these bodies present. An examination of the differences between these methods and rule-sets suggests why there may be difficulties in attempts to co-manage caribou together.

I found that Gwich'in Knowledge is not polarized or completely separate from western science as it is often presented in the literature and by wildlife managers, biologists, and Aboriginal communities. Rather Gwich'in Knowledge is a complex of multiple sources of information (including western science) about caribou that harvesters access from a variety of places and make use of in caribou harvesting. I also found that the knowledge of elders and the community harvesters is considered the most important of all information sources in forming understandings about caribou and directing hunting activities. The thesis also discusses western wildlife management as being strongly number-based and critiques its claims to make use of Traditional Knowledge (TK) in caribou management. With respect to Gwich'in rules-in-use, people were aware of local rules-in-use to a much greater extent than the regulations of the GNWT or the recommendations of the PCMB. A compare and contrast exercise was carried out between Gwich'in rules-in-use, GNWT regulations and PCMB recommendations. It was found that the differences lie not in the content of the rules, which are quite similar, but on a deeper cultural level, in the ways in which Gwich'in and western cultures approach

and relate to animals as well as the level of knowledge and autonomy granted to individuals in each society.

This thesis is written in a paper-based style in that it is centered on two main chapters (3 and 4) which have been written with the intent of future publication. Attempts have been made to fulfill the needs of a traditional narrative-style thesis by including much more detail and depth of information in each of these two papers, with the expectation that these will be altered and shortened somewhat for future publications. Owing to this paper-based style, there is information presented in multiple places in the thesis, as it is relevant to both papers. In addition to Chapters 3 and 4 is this introductory chapter, a methods chapter (Chapter 2) and a conclusion (Chapter 5). Each chapter is followed by its own bibliography; six appendices follow the bibliography of Chapter 5.

This introductory chapter serves two purposes, first, to place my work within the relevant literature and to present the concepts and theories used in this thesis. Second, the chapter introduces the interaction between the Teetł'it Gwich'in of Fort McPherson and the Porcupine caribou herd through elder's comments about living with caribou over their lifetimes. The literature review describes my theoretical influences, introduces the concept of TK and the history and controversy around it, as well as describing the concept of Gwich'in Knowledge that is offered by this thesis. The sections on Human–Caribou Relationships and Primary and Secondary Knowledge are attempts to describe some aspects of Aboriginal culture relevant to this thesis. Again as a concession to the organization of this thesis, this literature review deals with information relevant to both papers, while each paper offers a literature review focusing on literature specific to that paper.

Chapter Two, Methods, contains four major sections: theory and methodology, research activities, data management, and limitations. The first section, theory and methodology, describes the methodology (Community-based Participatory Research), licensing requirements, research partners and their contributions to the work, and the sources of funding I received. Second, the research section discusses scoping and data collection activities, research assistants, instruments for data collection, interviewee recruitment methods, and honoraria given to interviewees. Third, the data management section describes the storage of research data, and the verification and data analysis processes.

The fourth and last section highlights two limitations of the research: my attempts to use the English language to understand a culture best described and communicated through *Dinjii Zhu' Ginjik*, the Gwich'in language, and not observing caribou or caribou hunting during my fieldwork.

Chapter Three is the first of two papers, entitled "Knowledge Construction of Porcupine Caribou". This paper explores Gwich'in ways of constructing knowledge about caribou as well as western scientific methods for understanding caribou, the interaction and change between the two systems as they come in contact with each other, as well as how this interaction is manifested in attempts to co-management caribou. The present population decline is discussed in context of the historical "caribou crises" that have occurred over the last century. A methods section describes the research methodology, research activities, interview questions, and challenges to the research. This is followed by a description of the results, presented in terms of knowledge holders, knowledge sources, types of information passing along each source, and Gwich'in perspectives ofcaribou population, distribution and health. The chapter concludes with a discussion of Gwich'in Knowledge as a complex of TK and science.

The fourth chapter, the second paper, is entitled "Ways we respect caribou: Gwich'in hunting ethics". Caribou hunting in Fort McPherson is introduced by describing one year of Porcupine caribou migration and the corresponding Fort McPherson hunting seasons. The literature review considers aspects of how mainstream biology and wildlife ecology approaches caribou population change, as well as the role of autonomy in Gwich'in culture and how that concept relates to rules-in-use about caribou hunting. The methods section considers methodology, research activities, and the focus of questions relevant to the subject matter of Chapter Four. The results section presents elder and harvester perspectives on rules-in-use, and a compare and contrast exercise between the three groups of rules. Further examination of the outcomes of the compare and contrast exercise is done with two case studies: a look at a complementary rule (waste of caribou meat) and a contrasting rule (hunting of caribou cows). Both of these case studies include Gwich'in perceptions of the rule (using both qualitative and quantitative data) on each subject. This is followed by a discussion on the strengths and limitations of Gwich'in rules-in-use and why people follow them.

Lastly, Chapter 5, the Conclusion to the thesis, provides an overview of the major points of the thesis, as well as linking together the two major papers (Chapter 3 and 4). This is followed by a discussion on the significance of the research and suggestions for further research.

1.2 Literature Review

This literature review includes a discussion of the theoretical placement of this thesis as within the Rural Sociological and Environmental Sociological literature as well as the ways it draws upon Native Studies, Anthropology, and Conservation Biology. Concepts presented include TK; its movement into public awareness and its increasing importance to northern peoples (both Aboriginal and non-Aboriginal) and to natural resource managers. Multiple definitions of TK are examined as well as some of the controversy around the concept of TK itself. The unique concept of Gwich'in Knowledge is introduced. Human and caribou relationships from a northern Athapaskan perspective are presented, as well as the categories of primary and secondary knowledge (Rushforth 1992). The chapter views the Teetł'it Gwich'in from a political perspective, highlighting the Gwich'in land claim, as well as describing life in Fort McPherson through the words of elders and harvesters who live there and who participated in this study. Lastly the chapter offers a selection of comments by elders and harvesters about caribou hunting in the present and how it has changed over the last century.

1.2.1 Theoretical Placement

This thesis is interdisciplinary, and is guided by the literature of Native Studies, Rural and Environmental Sociology, Northern Anthropology and Common Pool Resource Theory. This thesis was developed in the Rural Sociology program and looks at a specific local example of a group of people and their interactions with a valued resource (the Teetł'it Gwich'in and the Porcupine caribou), it has a local/rural focus, considers a resource population where conservation is a main context, and focuses on exploring past, present, and future management policies. Rural Sociology and Environmental Sociology are subfields of Sociology. Both examine the social interactions between people and societies with their environment and natural resources; this includes both "the impacts of humans on the environment as well as the effects of ecological constraints on human societies" (Dunlap & Catton, 1994:7). Rural Sociology and Environmental Sociology have different origins of inquiry, conceptual and theoretical perspectives, and problem

solving methods (Field, Luloff & Krannick 2002). The most significant differences are the definition of the environment, the scale of research or unit of analysis, and the "overarching problematic" (Buttel 2002:209). Rural Sociology, or Natural Resource Sociology, was recognized in the 1960's as a discipline, and looks at issues of effective resource management, the creation of socially responsive policy, and resource conservation. Rural Sociology focuses on local ecosystems and landscapes, community and regional level scales, has a non-urban perspective, and is applied with less emphasis on social theory (Buttel 2002; Field, Luloff & Krannick 2002). Environmental Sociology emerged in the late 1960's and early 1970's in response to the environmental movement, examining problems of pollution and environmental degradation, and the ways in which these issues are unevenly distributed throughout the population (environmental justice and environmental racism) (Dunlap & Catton 1979). Environmental Sociology includes questions of resource scarcity, and the impacts of production processes and political systems on the environment (Buttel 2002, Field, Luloff & Krannick 2002).

Environmental Sociologists critique classical Sociology for conceptualizing humans as masters of the environment; people were not subject to the limits of the environment (Dunlap & Catton 1979). This was referred to as the Human Exceptionalism Paradigm (HEP). Durkheim socicologists, insisted on only social facts to explain other social facts (Dunlap & Catton 1979). The limitations of HEP have been recognized and the early 1990's showed a "call for a reorientation away from [the] traditional disciplinary assumption that the biophysical environment is irrelevant to modern, industrialized societies" (Dunlap & Catton 1994:15). Environmental Sociology's distinction from Sociology is its recognition that environmental variables are meaningful to sociological understanding (Dunlap & Catton 1979).

The thesis stretches the limits of Rural Sociology in looking at Aboriginal resource use, considering Aboriginal conceptions of relationship to the environment and ways of knowing caribou that is different from the western model. While most of the Rural Sociology literature focuses on conservation behaviour, I focus on knowledge of the resource and knowledge creation, specifically Traditional/Aboriginal knowledge, and the ways in which this knowledge mediates the relationships between people and resources. The thesis fits the Environmental Sociology model in that it recognizes that environmental variables are very relevant to the well-being of the Teetł'it Gwich'in and

other Porcupine caribou herd user groups. Caribou herd declines, the causes of which are little understood, though they are recognized to be affected by both anthropogenic and ecological factors (Vors & Boyce 2009, Usher 2004), can cause hardship to the people who rely on them for food.

The history of research and theory on the theme of northern peoples and caribou is diverse and well developed in the disciplines of cultural anthropology (Anderson and Nuttall 2004), economics (Winterhalder 1981), political science (Kulchyski 2000), and environmental history (Sandlos 2007). The work in these fields touches on diverse themes of meaning and identities, social organization, values, use, knowledge and governance. Of particular interest in this interdisciplinary body of work is research on the relationship between social organization and environmental change, specifically the role of social norms in guiding human-environment relations and resource use.

Academic research began to focus on the question of social norms and how they shift in the context of environmental threats and hazards such as contaminants, flooding and emergent issues of climate change. Of particular interest has been on the relationships between behaviours, norms, values, perceptions and communication of risk. Within Environmental and Rural Sociology, though there is a strong focus on risk, little consideration has been given to the flexibility and adaptability of social norms to variability in environmental conditions such as caribou population change. It is on this theme that I aim to contribute to the Rural Sociology literature. I do this by drawing on the literature of common pool resource theorists such as Agrawal (2003), Berkes (2009), Feeny et al. (1990), Kofinas (1998), National Research Council (2002), Ostrom (2003; Ostrom et al. 2007), and Parlee (2006). As well there is a rich body of anthropological work on northern Aboriginal peoples that I draw on. Slobodin's (1962, 1981) work on the Peel River Kutchin (Teetł'it Gwich'in), and Osgood's (1936) work with the Gwich'in. More recent anthropological work with northern Dene people has been done by Guédon (1994), Nadasdy (2003a, 2005, 2007), and Rushforth (1992). These Anthropologists discuss many aspects of how people know and relate to the animals and environment, as well as issues around co-management (Nadasdy 2003b, 2003c).

The thesis is about different ways of understanding rules and rules-in-use. There are rules and rules-in-use, Elinor Ostrom (E. Ostrom, October 1, 2010)[1] states that these are different, rules-in-use being what people actually do in practice, and rules being the stated, formal ideals. Further illumination can be found in considering the relationship of the rule-maker to the resource. Regulations of the Canadian state reflect an exploitative relationship with caribou, as they are a resource held under a *state property* property-rights regime to be exploited for the benefit of the state and the people (Feeny et al. 1990). The work of Sandlos (2007) and Usher (2004) on the history of caribou management in the NWT describe how this was historically carried out. They describe the singular focus on quantitative population data by caribou managers, the tendency to respond to caribou population decline (real or imagined) with a crisis mentality, and the criminalization of Aboriginal subsistence hunting. Dene people consider caribou to be "non-human persons" with whom we have social relationships and responsibilities (Nadasdy 2007). Thus *relationship* underlies Aboriginal rules-in-use with respect to caribou hunting. As well there is a Dene cultural emphasis on personal experience as the primary way of gaining and validating knowledge as discussed by Nadasdy (2003b), Guédon (1994), and Rushforth (1992). With respect to interpreting and enacting rules-in-use, there is no one way of doing things, but rather people find what works for each individual (Guédon 1994) and Dene practice autonomy in decision making and (Guédon 1994, Rushforth 1992,). The above comments touch on some of the theories I will be working with throughout this thesis.

1.2.2 Traditional Knowledge

Recognition of TK has increased since the 1970's (Bocking 2005). During the early part of this decade northern Native organizations such as the Indian Brotherhood and the Metis Association of the NWT initiated the negotiation of land claims with Canada. A part of their strong negotiating position was land use mapping and occupancy studies demonstrating past and present land use (Bocking 2005). An example if this is the Inuit Land Use and Occupancy Project (Milton Freeman Research 1976) done in 1973 for the Inuvialuit Final Agreement (1984) and the Dene Mapping Project (1972-1989) done by the Dene Nation to support their comprehensive land claim negotiations (T. D. Andrews, personal communication, July 2009). Also during this time (1974-1977), Justice Thomas

[1] Elinor Ostrom, October 1, 2010, Opening Address to the North American Regional Meeting of the International Association for the Study of the Commons September 30 – October 3, 2010.

Berger's Mackenzie Valley Pipeline Inquiry travelled to the majority of the Mackenzie Valley communities seeking the opinions, perspectives, and knowledge of community members facing the prospect of the proposed gas pipeline. The feedback offered by community members across the Mackenzie Valley fundamentally shaped Berger's final comments and recommendations (Mackenzie Valley Pipeline Inquiry & Berger 1977). Perhaps the appearance of TK on the September 1991 cover of *Time* magazine (Time 1991) marked its official entrance into non-indigenous society.[2]

Many variations of the term are found in the literature: traditional environmental or ecological knowledge (TEK), indigenous knowledge (IK), local knowledge, and references to the knowledge of a particular group such as *Inuit qaujimajatuqangit*, which literally means 'that which has been long known by Inuit' (White 2005). Many discussions on TK focus on what it consists of, why it is valuable, and how it is different from western science (White 2005). Despite this there is little apparent understanding about what TK is or how to document, integrate, and use it (Huntington 2005, Nadasdy 2003a). Dualistic comparisons with western science are common, and the two are often presented as incommensurable. TK is often described as qualitative, intuitive, holistic and oral; western science is qualitative, analytical, reductionist, and literate (Nadasdy 2003a). One of the few, if not the only, published critiques of TK in North America,[3] Frances Widdowson and Albert Howard, explain their view of the difficulties of incorporating TK into science: "TK's interpretations of natural occurrences tend to be incommensurable with scientific theories such as evolution because they are either spiritually based or not applicable outside the confines of aboriginal subsistence" (Widdowson & Howard 2008:242). Within the published literature this is an isolated view, as the majority of the literature suggests that TK is valuable (Agrawal 1995a, 1995b, 2002; Berkes 2008; Ellis 2005; Huntington 2000; Kofinas 1998; Nadasdy 2003a, 2003b; Parlee 2006; White 2005, 2006) and that the two paradigms are potentially complimentary (White 2005:2). Unlike the majority who write about the differences

[2] The cover story, called "Lost tribes, lost knowledge", was written by Eugene Linden and discussed the importance of indigenous knowledge and its disappearance along with indigenous cultures and languages (Linden 1991)

[3] Frances Widdowson and Albert Howard have written multiple pieces with regards to traditional knowledge (Howard & Widdowson 1996, 1997; Widdowson & Howard May 1997, August 1997, 2002, 2006, 2008) which they equate with "junk science", a term used by John E. Dodes, president of the New York Chapter of the National Council against Health Fraud. "Junk science results when conclusions are drawn using low-quality data such as testimonials, anecdotes and case reports rather than randomized, controlled clinical experiments" (Dodes, J.E. 2001:31).

between TK and science, Fred Roots describes a system where TK and science are two complementary parts of one knowledge system, which he calls the "staircase of knowing" (1997:43). In Root's system, no comparison or dichotomy between TK and science exists. With the emerging emphasis on including TK in wildlife management, in particular caribou, there has been much discussion around the nature of TK and the role it can play in caribou management.

Discussions of a dichotomy between TK and science date back to early anthropologists. Claude Levi-Strauss described primitive knowledge systems as being different from modern ways of knowing (Agrawal 1995b). For example, Claude Levi-Strauss described primitive knowledge systems as being linked to local environments, less likely to use analytic reasoning, and as closed to new ideas (Levi-Strauss 1966). IK[4] theorists today describe IK in the same way (Agrawal 1995a). For a concrete division between knowledge systems to actually exist, the following conditions must be met: they must be separate (independent), must be fixed in time and space (as stationary and unchanging), and they must have "totally divorced historical sequences of change" (Agrawal 1995a:422). This is not the case, as Levi-Strauss points out the long history of contact and the "intimate interaction" that has been occurring between indigenous and western knowledge since the 15th century at least (Agrawal 1995a:422). "In the face of evidence that suggests contact, variation, transformation, exchange, communication, and learning over the last several centuries, it is difficult to adhere to a view of indigenous and western forms of knowledge being untouched by each other" (Agrawal 1995a: 422). "Philosophers of science have abandoned any serious hope for a satisfactory methodology to distinguish science from non-science" (Agrawal 1995a:424). Further, the false dichotomy between the modern and the indigenous results in a "politics of derogation", which refers to attempts to "deny validity to the knowledge and values of indigenous peoples" and for IK supporters to "downplay" science (Agrawal 1995a:427).
Academics, researchers, and those who use both TK and science in their work have a range of perspectives on how TK and science work together. These perspectives range from being fundamentally different and incommensurable (Nadasdy 2003a), potentially complementary provided the "Eurocentric biases about the inherent superiority of Western science are set aside" (White 2005:2), or as two parts of the same process of

[4] Agrawal uses the term indigenous knowledge instead of traditional knowledge (Agrawal 1995a, 1995b, 2002).

knowledge creation and application (Roots 1997). Roots' "Staircase of Knowing" (1997:43) deserves some explanation as it is a unique view in the TK literature. Roots suggests that both TK and science are methods of knowledge construction that utilize the same general process: observing and measuring the world, translation of this into data and information, synthesizing data and information into knowledge, understanding, and wisdom. A key difference between the two methods of knowledge construction is with regards to the weight they put onto the different parts of the process. Science focuses on the first four steps of the staircase: observation and measurement, data, information, and knowledge creation. Science answers the "how", not the "why", and it is up to others in society to turn the knowledge creates into understanding and potentially wisdom. TK, on the other hand, "collapses the first three steps as part of living and learning in the environment itself, and focuses on the relationship between the top three steps": knowledge, understanding, and wisdom (Roots 1997, p. 44).

1.2.3 Defining Traditional Knowledge

There are many definitions for TK in the literature yet little consensus among them (Johnson 1991:3-4). Berkes (2008:7) definition for TEK is often used in the literature: "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment." The current NWT Traditional Knowledge Policy defines TK as: "knowledge and values, which have been acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another" (GNWT 2005:2). Finally, the Gwich'in Tribal Council (GTC) Traditional Knowledge Policy (GTC 2004:3) defines Gwich'in TK as

> That body of knowledge, values, beliefs and practices passed from one generation to another by oral means or through learned experience, observation and spiritual teachings, and pertains to the identity, culture and heritage of the Gwich'in. This body of knowledge reflects many millennia of living on the land. It is a system of classification, a set of empirical observations about the local environment and a system of self-management that governs the use of resources and defines the relationship of living beings with one another and with their environment.

Similar elements are found in the definitions above, such as: knowledge that is held by a group of people, people who have lived in a particular geographical area for a significant

amount of time, the passing of knowledge through generations, knowledge that is rooted in the local landscape or a land-based life, and the knowledge reflects cultural values. All of the definitions above contain most, if not all, of these aspects.

Huntington (2005) suggests that the variety of terms and acronyms used to refer to Aboriginal knowledge, mentioned above, may be problematic in that they suggest divisions non-existent in TK systems, within which there is no "pattern or custom of dividing knowledge into categories or disciplines" (Huntington 2005:30). Rather, distinctions are "imposed from without by the various academics and their disciplines that pursue TK in relation to their particular field" (Huntington 2005:32). Considering the long contact between western and indigenous cultures, discussed above, the definitions make no mention of external or non-Aboriginal knowledge (western science) as having a role in forming TK.

Some scholars caution against traditional knowledge being uncritically sought and incorporated into structures of resource management defined by the state (Agrawal 2002, Cruickshank 2004, Ellis 2005, Nadasdy 2003b, Sandlos 2007). The definition and recognition of narratives and data in the thesis as traditional knowledge is highly contestable. The definition of TK, particularly vis a vis complex resource management issues such as caribou population decline is sensitive and politicized in many regional and community contexts.

1.2.4 Gwich'in Knowledge

In this thesis, when referring to data or information from research informants, I will use the term *Gwich'in Knowledge*. I will use TK to refer to the concept as it is used in the literature and elsewhere. Taking cues from Agrawal (1995a, 1995b) and Levi-Strauss (1966) this work considers Gwich'in Knowledge about caribou as having a root source in a non-Aboriginal worldview, specifically western science, which is presented through wildlife managers, biologists, government representatives, and co-management boards.[5] Gwich'in Knowledge about caribou will refer to a blend of knowledge acquired from on the land activities, elders knowledge, and the oral tradition; and also from North

[5] Historically the scientific perspective would have been presented, directly and indirectly, by trappers, traders, explorers, missionaries, schools, and law enforcement officers.

American wildlife science and management.[6] This thesis supports the idea of a non-dualistic knowledge system, using Roots (1997) knowledge model as a referent.

1.2.5 Human – Caribou Relationships

There are significant differences between western and Aboriginal understandings of animals, humans, and human-animal relationships. These differences are relevant as they underlie western and Aboriginal interactions with caribou, hunting practices and management, and western and Indigenous approaches to knowledge about caribou. The perspectives discussed here include human control over nature, the question of the personhood of animals, and cultural recognition of the importance of an animal to the continued survival and wellbeing of people.

In the western tradition, nature is subject to human control (McOuat 1998). By using the scientific method humans learn how to get the best results from nature, and how to manipulate it to human ends, values and goals (McOuat 1998, Nudds 1988). Thus, animals, being a part of nature, are controllable and manageable. They are managed by the theories of wildlife science, particularly population ecology which seeks to understand population fluctuations in order to understand how to retain sustainable yields of particular animal resources over time (Nudds 1988).

A conceptual distinction between humans and animals is actively maintained in western culture in that animals are considered to be non-sentient, lacking consciousness, not self-aware, and are not considered persons (Nadasdy 2007). Animals are not granted agency to interact with humans in an intelligent manner. If animals are not persons, we do not enter into social relationships or have social responsibilities towards them as we consider ourselves as having with other humans. When making decisions about the environment or about our actions that may affect animals, this worldview does not require us to consider that animals have perspectives (and preferences) on how things should be, and thus we don't have to consider any perspective but our own when acting in the world. In western culture, interactions between humans and animals are a one-sided relationship which considers animals either as food or having symbolic value only (Nadasdy 2007). Perceiving animals as objects rather than subjects is linked to the tendency to seek understanding of caribou in quantitative, or number-based ways. The Athapaskan view,

[6] Gwich'in Knowledge conceptualized as a blend of knowledge will be discussed more fully in Chapter 3.

however, does consider animals to be persons. They are "other-than-human persons" or "persons who engage in reciprocal social relations with humans" (Nadasdy 2007:25). As a part of being persons, animals have personality, emotions, communicate with each other, and understand human language and behaviour. Animals speak to northern hunters in human languages and convey important information such as how they want to be treated (Nadasdy 2007). "Many elders also speak of a time when people and animals could speak the same language and communicate with each other. These beliefs are not entirely lost to the Gwich'in" (GRRB 2001:24). Nadasdy was told by hunters in Kluane country (Yukon Territory) that animals likely cannot speak English, but they "most definitely can 'speak Indian'" (Nadasdy 2007:34). The human-animal relationship is one where animals offer themselves to humans (GRRB 2001).

> Hunting in such societies should not be viewed as a violent process whereby hunters take the lives of animals by force. Rather, hunting is more appropriately viewed as a long-term relationship of reciprocal exchange between animals and the humans who hunt them (Nadasdy 2007:26).

The idea that "…animals, not people, control the success of the hunt" (Berkes 2008:97) is a complete reversal of the western belief that humans have ultimate control over nature. Animals control hunting success, and hunters have certain obligations towards animals to fulfill (Berkes 2008:97) or in other words, to show respect. Respect is shown by an attitude of humility, and by following particular methods when killing, butchering, consuming, and disposing of animal bodies (Berkes 2008). Acting disrespectfully will result in retaliation: the animals will not offer themselves to the hunter again (Berkes 2008:97).

The Gwich'in explain their relation to caribou by saying that they have a "particular affinity with caribou" and people lived in "peaceful intimacy" with the caribou, and they hunted other animals for food (Slobodin 1981:526). When the people and the animals became separated, people began to hunt caribou.

> Long ago, vadzaih and men were much closer. Any person, not just a Medicine Man, could talk with vadzaih. When people and vadzaih separated, it was agreed that people could hunt vadzaih; however, a sign of the old relationship remained. Every vadzaih has a bit of *ezi*, human heart, in him, and every human has a bit of vadzaih heart. People will always know what vadzaih is thinking and feeling, and the vadzaih will have the same knowledge about people. This is why hunting vadzaih is at times very easy, and at other times very difficult (GRRB 1997:37).

This way of knowing and understanding underlies the way Gwich'in relate to caribou. Caribou are understood in a qualitative way that arises through living with them, observing them, and relying on them.

1.2.6 Primary and Secondary Knowledge

Nadasdy (2003b) and Guédon (1994), out of their work with Dene people, both observe that personal experience is the main way one gains and validates knowledge about the land and about animals. Primary knowledge and the legitimation of knowledge through personal experience are highly valued in Dene culture (Rushforth 1992). Rushforth describes primary knowledge as knowledge that derives from direct personal experience. Rushforth suggests that "many [Dene or *Sahtúot'ịne*] consider experiential knowledge more likely than other forms of knowledge to be accurate, reliable, and therefore useful" (1992:484). Secondary knowledge sources can include oral literature, in/formal instruction, gossip, hearsay, and written materials. Through communication, the primary knowledge of one person can become the secondary knowledge of another. The above does not mean that people don't value secondary knowledge, or that they get most of their knowledge from direct experience, or do not abstract and generalize from experience. "Reference to primary experience is simply the culturally preferred mode of legitimation for knowledge. People who speak from primary experience, all else being equal, are granted greater credibility and authority than others" (Rushforth 1992:486).

1.2.7 Addressing Gaps in the Literature

This section addresses the main gaps in the literature, first with regards to the dualistic approach to TK and western science, and second, the examination of how indigenous community level rules-in-use about caribou harvesting are evidenced in a time of caribou scarcity.

In the literature, there is no concept of TK that includes or recognizes scientific knowledge as being a part of it, except for Agrawal (1995a, 1995b), who discusses the error in conceptualizing TK in this way. This thesis offers the concept of Gwich'in Knowledge and the Gwich'in Knowledge Complex, both of which recognize the scientific and western influences within a Gwich'in hunter's understandings of caribou. Setting forth this concept makes possible a new approach to the continued attempts to understand and co-manage caribou. The Gwich'in Knowledge Complex goes further in

that it details the different parts of Gwich'in Knowledge and so may be helpful to scientists, biologists, and managers in their approach to Gwich'in Knowledge, as it presents a visual interpretation of the multiple components of Gwich'in Knowledge.

The second paper (Chapter 4) looks at caribou management and caribou hunting from a common property perspective with the concept of rules-in-use. There has been documentation of Gwich'in rules-in-use by others with respect to caribou hunting (GRRB 1997, GRRB 2001, Kofinas 1998, Sherry and Vuntut Gwitchin 1999). Contributions to common property theory include the following. This is the first caribou population 'crisis' to occur since the bulk of common property theory has been written. Up to this point, scholars have merely theorized about the ways in which local management institutions (rules-in-use) operate within a situation of resource scarcity. This thesis looks at how rules-in-use of a valued resource are working within a context of actual resource scarcity. The common property body of work is weak in considering how local institutions fare within situations of resource variability (Parlee 2006, Parlee et al. 2006). Next, a direct comparison between local rules-in-use and government resource regulations offered by this thesis has not been done before. Common property theory holds that there is a big gap between local rules-in-use and government rules, but this research found a high level of commonality. This is interesting given that common property theory advocates for the strengthening and use of existing local management institutions as a viable option to centralized government resource management regimes.

1.3 The Gwich'in

The Gwich'in Nation was made up of nine regional bands at the time of contact (GSCI n.d., a) (See Figure 1-1). Today the Gwich'in live in fifteen communities in the Northwest Territories (NWT), the Yukon, and Alaska. They live in the Canadian communities of Inuvik, Aklavik, Fort McPherson, and Tsiigehtchic in the NWT and Old Crow in the Yukon.

The Gwich'in people are of the Athapaskan language family. They speak *Dinjii Zhu' Ginjik*, the Gwich'in language, with different dialects among the communities (Slobodin 1981). The Gwich'in language is considered endangered (GSCI n.d., b). Together with

other people of the Mackenzie Valley, Gwich'in[7] people representing Fort McPherson and Tsiigehtchic (then Arctic Red River) signed Treaty 11 in 1921 (INAC 1993).

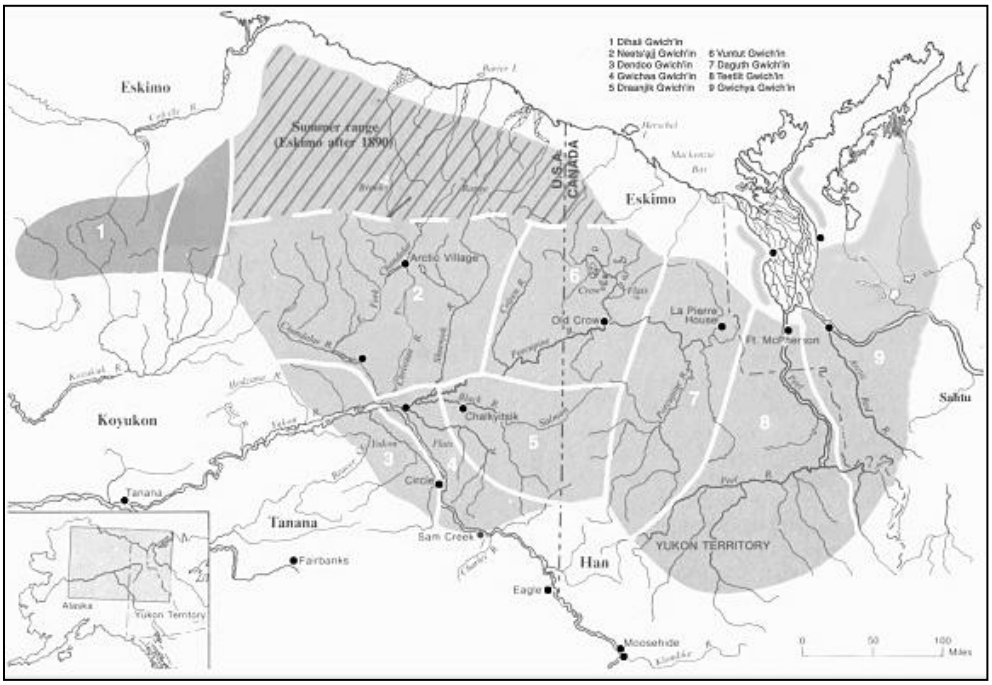

Figure 1-1: Gwich'in groups at the time of contact (GSCI n.d., a)

Although the treaty terms included reserves this provision was never fulfilled because it was thought that "the Indians did not want reserves" (INAC 1993). Discontent with Treaty 11 arose around unfulfilled promises for land and protection of hunting and trapping rights, increased industrial activity in the north, the Mackenzie Valley Pipeline Inquiry[8], and disagreement with the federal assertion that the Mackenzie Valley people had given up rights and title to their land. This led to the 1976 Dene/Métis Comprehensive Land Claim process, a single joint claim for all of the Mackenzie Valley people negotiated throughout the 1980's. The process was abandoned in 1990 due to internal disagreement regarding the terms on the part of the Mackenzie Valley groups. At the request of the Mackenzie Delta Tribal Council (the Gwich'in) and the Sahtu Tribal Council, Canada agreed to negotiate individual agreements with each of the five regions based on the framework of the abandoned claim. Gwich'in negotiations begin November

[7] At the time of treaty signing, the Gwich'in were known as the Loucheaux, and they are also referred to in the anthropological literature as the Kutchin.

[8] The Mackenzie Valley Pipeline Inquiry was led by Justice Thomas Berger and began in 1974. The commission visited 35 communities in the Mackenzie Valley to explore potential social, environmental, and economic impacts of the proposed pipeline.

1990 and the Gwich'in Comprehensive Land Claim Agreement was settled in 1992 (INAC 1993).

In the agreement the Gwich'in received fee simple title to 22,422 km^2 of surface land in the NWT and 1,554 km^2 in the Yukon, and subsurface rights to 6,158 km^2 of the settlement in the NWT (INAC 1993). They have rights to harvest wildlife and participate in wildlife, land, water, and environment co-management structures within the NWT settlement area (See Figure 1-2). Similar rights and participation guarantees exist within the Yukon portion but with a lesser scope. Hunting, fishing and trapping rights from Treaty 11 were replaced by those of the new agreement (INAC 1993). The GTC was set up to manage the lands and resources, and represent all NWT Gwich'in beneficiaries (GTC 2006), while the Gwich'in Renewable Resource Board (GRRB) manages wildlife, fish and forests in the Gwich'in Settlement Region (GSR). The GRRB is set up as a public co- management board consisting of the following partners: the GTC, Fisheries and Oceans Canada, the Canadian Wildlife Service, and the Department of Environment and Natural Resources (GNWT).

Figure 1-2. The Gwich'in Settlement Area (GSCI n.d. c).

1.3.1 Life in Fort McPherson

Fort McPherson, a Hudson's Bay Company trading post, was established in 1850 at the present location of the community. At that time the hunting and fishing territory of the Peel River Kutchin was 100-200 miles above (upriver) the Fort (Slobodin 1962). Between 1860 and 1898, people lived within a territory of "very approximately" 12,000 square miles. People spent winters in smaller family groups and then came together each summer in larger groups at particular summering spots which were abundant in resources for trading and visiting. People began building cabins in town by 1925 (Slobodin 1962:37).[9] The movement and creation of the town as the permanent base from which people moved into different parts of their territory occurred during the lifetimes of elders alive today. Some of the elders' I spoke with talked about living on the land for most of the year, only coming into town for the holidays.

> *We lived south, 50 miles, that's where my parents lived year round. And the only time we came into town was Christmas, Easter, and July 1st. The rest of the time we were out there. Because we had to make our living, and we had maybe 10 or 15 dogs to feed. So we had to be out there on the land all the time (A. Jones, 2007).*

At the time when Abby Jones was young, people spent the majority of the year on the land. Caribou hunting took place in larger groups, requiring a high level of coordination and planning. As people travelled with dog teams, there was a limited amount of space available to carry things and weight had to be considered. There was prior discussion about how the hunt was going to be undertaken.

> *And so maybe the chief would get the guys together and, or the guys would get together and decide. Not just one person would just up and go. There was communication was good in those days, you know they didn't have phones or anything and so when there was a meeting everybody would gather (A. Jones, 2007).*

> *That's the way we used to hunt. Everybody knows where everybody is and...set up a little meeting, and we plan. And we say "you take the campstove, and you take the tent, I'll take this and you'll take that. We would plan (T. Folmer, 2007).*

At this time, most people travelled with dog teams and walked with snowshoes in the winter, and walked and canoed the rivers in the summer. These transportation methods required much more time to travel distances that are quickly covered today.

[9] For a more detailed history and description of the seasonal round, its changes with the interactions with the Euro-American fur trade, the Klondike gold rush, and missionary activity see Slobodin (1962), and Osgood (1936).

We used to have to travel 2 or 3 days, out on the land (T. Folmer, 2007).

With dog team that time, they used to be gone sometimes about a week, sometimes longer, depending on how soon they were successful, wherever they seen caribou and that (A. Jones, 2007).

There is always an element of uncertainty as to the location of caribou, and decisions had to be made as to where to look for caribou. The uncertainly of location is still a major factor in caribou migration movements today, but it is somewhat offset by the presence of the Dempster highway that crosses much of the winter range, increasing the likelihood of crossing paths with the caribou.

If the mens were going to hunt, they would just go… With dog teams. Either through Stony or Vittrekwa Creek…. They'd take tents and stove and they'd camp and make trail. Sometimes they were lucky they bump into caribou. Way up on the Richarsons. They used to come back with a big load of frozen meat… (E. Colin, 2007).

I remember before the highway, it was really hard times, a lot of times, hard times, and nobody knew where the caribou was. And I remember after New Years, people just went. Either through Stony or up past...20 miles, there's a creek there, Vittrekwa Creek, they go there. Until they bump into caribou. They didn't even know where the caribou was. And so one time I remember they went a long ways, never seen caribou. And they'd get the odd moose. Everybody would get a piece of meat for themselves and for their dogs. Even the dogs had nothing to eat too. But today it's good, because look how long this highway is that they can go long ways to hunt (E. Colin, 2007).

It is most often women who work with caribou once it has been killed. However, there is some crossover in roles in that some women hunt caribou and some men work with meat, either men helping their wives or single men who must do the work themselves. There is a tremendous amount of work involved in working with caribou which includes preparing, preserving, storing, and distributing meat.

Because we stay on the mountain and we work with meat in the tent. You just have to be real active, you know, to be right with it. Because if you don't, it is going to pile up on you. And there is so much work with meat. I mean we can't even throw a little piece of bone away without chopping it up and pounding it just to get grease out of it… (E. Colin, 2007).

The Richardson Mountains are a significant part of the Gwich'in hunting territory. Many trails lead from the Fort McPherson area into and through these mountains.

Back then, not only the men went hunting in January is when you had to go on the mountains because you have a dog team and you have to follow the caribou in order for the dogs to eat and for us to have meat to make dry meat, and to have

> *meat for the month, for Easter, until Spring? And I remember a bunch of families used to live on the mountainside, sometimes about five, six families (A. Jones, 2007).*
>
> *Every morning I get up there I look up there all the mountains. All the animals, climbed all those mountains when we had dog teams. We had to, that was the way we used to hunt. We had to climb mountains to get caribou. We were up there sometimes 3 months. We lived up there. See big change now. So, when you talk to young people, you have to tell them you've been there. Now, young people see me? They don't know, they think I've been here all my life. In here, at 8 mile.[Laughter]. They don't know I've been all over. [My wife] too, has been all over. Mountains (T. Folmer, 2007).*

Northern caribou hunting is often a team effort between women and men, as both have important roles to play in getting caribou from the bush and into the freezer (Bodenhorn 1990). Both women and men have had different pressures on their available time for hunting. There has been a long shift over time into to the wage economy which began with the fur trade. This affected men first as they were doing work such as fur trapping, providing meat, wood chopping, and working on transportation vessels, while women entered wage economy more slowly. Women worked as laundresses and made clothing for non-Aboriginals (Slobodin 1962). Women were often the first to permanently settle into settlements because their children were required to go to school year round. Integration into the wage economy and settlement into communities required people to continually negotiate hunting and working schedules.

> *Maybe because sometimes it is people that are working that maybe get a day off, there is caribou, they will take a day off, and go up, but then they have to be back at work the next day. Whereas with me, if I went up with [my husband], I'd like to stay up there and set tent, and if he get caribou, bring it to the tent and work with it up there, because it is, I always say it is better to work with meat, like if it is not too cold, it is good to cut up all your meat and then bring it down. Whereas if you bring the caribou back… We have a place at the ferry crossing where he takes his caribou and he brings it in. If we have enough cardboards boxes we skin it in here, but it's easier out there. Because I experienced staying in a tent, I experienced being out on the land with my mom and dad, following the caribou. And now, because you know, with the changes you have to work now, and we had kids going to school, so I had to stay in town all the years that my children were going to school. And so now, right now, if he wasn't working, I am not working, we could have gone hunting, and we could stay up there, and get caribou and not have to rush back. Could make dry meat and prepare all the meat up there (A. Jones, 2007).*

Dog teams were quickly replaced by snowmobiles in the late 1960's and early 1970's. Some of the changes this brought included drastically reduced travel times, "going a

longer distance faster" (*T. Folmer*, 2007), and easier travelling as people did not have to walk or run beside the dogs for long distances or break trail for dogs through heavy snows. Snowmobiles also increased the likelihood of hunting success for those people with jobs and smaller amounts of time available to spend on the land, because snowmobiles allowed them to make trips faster. Negative impacts of snowmobiles include breakdowns, and not mentioned by the elders interviewed but definitely an ongoing issue is the high costs of fuel and machine parts that are expensive to transport into the community.

> *I remember in '64, '63, around that time, the skidoo slowly started coming out. And there was one or two, and then more and more. Things were changing to where people were starting to work. Before then, it was people made their living out on the land, hunting, fishing, and trapping. And there were just one or two local people who had jobs in the community and those people were rich. My mom and dad, his parents, had to make their living out on the land, hunting, fishing, and trapping. And so it was about the 70's, skidoos started slowly coming and people were doing away with dogs... (A. Jones, 2007).*

> *But I'll never forget, in the New Year, like when we were going to go back up. We lived south, 50 miles, that's where my parents lived year round. And the only time we came into town was Christmas, Easter, and July 1st. The rest of the time we were out there. Because we had to make our living, and we had maybe 10 or 15 dogs to feed. So we had to be out there on the land all the time. But I always remember, we are going to be going back up to our camp. And you can't one or two days, now with skidoo it will take you three hours to get up there. To Rock River, if you go there now, it will take you an hour, it used to take people 2 or 3 days. Anyway, I remember, we were going back up the river, and no trail. But the dog in the lead, he stayed on the trail. You can't see, but the dog kept the trail. Once in a while, he'd miss it and be running around and once he get on the trail…. But I remember we were going up no trail, and it wasn't easy. Sometimes when you had dog teams and dogs would get tired. All of a sudden the dogs were looking, and wondering what was going on. I looked behind, skidoo was coming. And that was his uncle. And he lived further up. Anyway this skidoo came and went right around us and just stopped and just wanted to know how we were doing. And he said I am going to go ahead, and then I'm going to come back and help you. And the skidoo just took up. And even that, for him to make the trail ahead made it a lot easier for us. And we are going and next thing he was coming back down and he took some of our stuff and that made it even easier! You know, so (A. Jones, 2007).*

> *When the skidoo came out it made things easier because we used to have to walk ahead of our dogs. Hard. Walking with snowshoes. Skidoo took over and made things easier so people started getting skidoos, going a longer distance faster, until you broke down, then its' slow again, you have to walk. [Wife: With dog team, you never break down.] Last winter I was trapping and I walked 22 hours, it broke down. I had to. So things like that, it made it easier. Machines made things easier. Trucks and skidoos (T. Folmer, 2007).*

1.4 Conclusion

This first chapter introduces the thesis and gives an overview of the chapters that make it up. The literature review presents information and theories relevant to the thesis as a whole including TK and the introduction of the concept of Gwich'in Knowledge. This thesis adds to the literature on TK by its recognition of Gwich'in Knowledge as drawing on knowledge sources generated by non-Aboriginal people, particularly western science and quantitative information about caribou. It also compliments the common property literature by looking at rules-in-use and how they are informed by knowledge creation methods. The community of Fort McPherson is introduced, as well as the Teetł'it Gwich'in who live there. Elders involved in the research have experienced many changes to caribou hunting over the last century, and they describe what life was like before there was a town, a highway, and when caribou were found by walking and travelling by dog team. Caribou hunting has gendered aspects in that women and men have different but overlapping roles in the search, pursuit, killing, preparation, distribution and storage of caribou meat. The annual movements of the Porcupine caribou herd have been described along with the corresponding hunting activities of the Gwich'in throughout the year. Lastly this section has introduced the Gwich'in Nation, spanning territorial and international borders with communities in the NWT, the Yukon and into Alaska. Some information has been provided on the Gwich'in land claim, the land base and the increased responsibilities in resource management including participation in caribou co-management. This introductory chapter is followed by Chapter 2, detailing the methods and methodology used in this research.

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2.0 METHODS

2.1 Introduction

This chapter reviews the theory, methodology and methods, the research, data management, and project limitations. The project is set in a rapidly changing context with regards to the value of Aboriginal knowledge. It is recognized that research can be beneficial to both parties, if done with the goals of each in mind and a willingness to explore new ways of relating to each other's knowledge. The research used mainly a qualitative methodology.

2.1.1 Methodology

Past northern research projects and researchers have suffered from a variety of shortcomings. These include failure to: attain community permission to collect information about its members, their activities, or the surrounding environment; consult with communities with regards to study appropriateness and potential modifications that could decrease stress on people and their environment; inform the community on research progress; and fulfill promises that may have been made to provide copies of the study results (Freeman 1977). Freeman describes this as the experience of many northern peoples, the result being that "scientific research is viewed with a somewhat jaundiced eye by many long-time northern residents" (Freeman 1977:72). I refer to Freeman (1977) here because forty years later his observations are still a valid concern and it is these particular issues that are the source of some of the ethics requirements northern researchers now have to meet. Expanding on the issues Freeman (1977) presents, Linda Tuhiwai Smith (1999) discusses how academic research is a fundamental part of the colonial experience for Aboriginal peoples and offers methodologies for "decolonizing" research. As well she suggests methods for ensuring that communities have a place in the planning, conducting, validating of research, and ensuring the retention by the community of the research results in useable form.

Kaler & Beres (2010) outline a basic opposition within the social sciences, especially in Sociology and Anthropology, between social activist researchers and those more conservative researchers who emphasize 'neutrality' and 'objectivity' in knowledge creation. Conservative researchers argue that the activist stance "politicizes what should be disinterested pursuit of knowledge" while the activist position is that "all knowledge

creation is already inherently political" and thus a researcher must decide where "they will situate themselves within the workings of power" (Kaler & Beres 2010:98). Working with Aboriginal communities in Canada makes it difficult to avoid some aspects of the activist stance, as academic research in Canada is actively responding to issues discussed by Freeman (1977) and Smith (1999). This interest is demonstrated at the national level by the inclusion of Aboriginal Research in Chapter Nine of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (CIHR, NSERCC & SSHRCC 2010). On an institutional level, Peter Kulchyski (2000) describes the discipline of Native Studies as fundamental to re-approaching research with Aboriginal people: "...Native Studies may be seen as a part of a broader movement within academia to question the now dominant standards for inquiry that were laid down in large measure by the western enlightenment tradition" (Kulchyski 2000:15). Further, Kulchyski sees Native Studies as involving "an active, ongoing reconfiguration of the relation between universities and Aboriginal communities..." (Kulchyski 2000:16).

Cognizant of the ethical issues described above, I did four things. I consulted the Community-based Participatory Research (CBPR) methodology for guidance. As a northern researcher I was required to obtain licensing; from the Aurora Research Institute (ARI) for each year I did research in the Northwest Territories (NWT) as well as undergo an ethics review by the University of Alberta. Lastly, I engaged the community of Fort McPherson (represented by the Gwich'in Renewable Resource Council or TGRRC), the Gwich'in Social and Cultural Institute (GSCI), and the Gwich'in Renewable Resource Board (GRRB) as research partners. A research agreement was created between the three research partners and the University of Alberta, represented by Dr. Brenda Parlee and myself. As a researcher working in the Gwich'in Settlement Region, the guidelines of the GTC Traditional Knowledge Policy (GTC 2004) applied to this research.

2.1.1.1 Community-based Participatory Research

CBPR methodology offers suggestions for researchers who want to attempt to avoid the shortcomings listed above (Fletcher 2003). CBPR is one of many offshoots of Participatory Action Research, which focuses on participation, community development and change, and knowledge exchange between the researcher and the community. The CBPR approach emerged from post-colonial awareness in the 1970's. In North America the approach has been applied to research with marginalized groups, ethnic communities,

and Aboriginal peoples. Fletcher's (2003) model is adapted specifically to the northern Aboriginal research context and particularly those research designs that are based around a working relationship with a community. Working in the NWT requires balancing a high degree of flexibility and responsiveness to the cross-cultural situation, while keeping in mind the unequal power relations entrenched in the research context. Thus the CBPR approach is appropriate as it is "characterized by a flexibility of thought and action" and the framework is "an open ended model to be reviewed and modified as each situation requires" (Fletcher 2003:38).

2.1.1.2 Northern Research Licensing

All research in the NWT requires a license or a permit pursuant to the Scientist Act (R.S.N.W.T 1988a). Licensing is monitored by the ARI, whose objectives are to "licens[e] and coordinate research in accordance with the NWT Scientists Act" and to "promot[e] communication between researchers and the people of the communities in which they work" (Aurora Research Institute 2008b). ARI circulates license applications to those communities affected and/or implicated by a research project allowing for community review and comment (Aurora Research Institute 2008a). For this project, License #14201N was granted July 21, 2007, under the working project title *Community perspectives on changing caribou populations: Traditional knowledge networks of Gwich'in caribou hunters*; this license was granted an extension to February 29, 2008.[10] ARI License #14289R was granted February 28, 2008 for this project, now entitled *Ways we respect caribou: Hunting in Teetł'it Zheh.*[11]

This project underwent ethics approval from the Faculty of Agriculture, Forestry, and Home Economics Human Research Ethics Board.[12] The date of the first project application to the Ethics Board occurred on May 1, 2007, and revisions were completed during June of 2007. Approval was awarded for the project #07-25 for *Community perspectives on changing caribou populations: Traditional knowledge networks of Gwich'in caribou hunters* on June 11, 2007. Approval was extended for one year, the

[10] ARI licenses expire at the end of the year they are granted in.
[11] Project name change came with refining of the scope of the project.
[12] The Faculty name changed to the Faculty of Agricultural, Life and Environmental Sciences in late 2007, and the Research Ethics Board reorganized and is now known as Faculty of Physical Education and Recreation, Faculty of Agricultural, Life & Environmental Sciences, Faculty of Native Studies Research Ethics Board.

extension being granted on March 28, 2008 for the project now entitled *Ways we respect caribou: Hunting in Teetł'it Zheh.*

The Gwich'in Tribal Council (GTC) Traditional Knowledge Policy was created to direct research undertaken throughout the Gwich'in Settlement Region (GTC 2004). The Policy requires researchers to use collaborative research methodologies, defined as approaches where the researcher and the community together consider local socio-cultural values, decide on appropriate research topics, and the best ways to complete the research. Direct benefits to participants and the community are provided through training and education in research skills, capacity building, elder-youth interaction and employment opportunities. A collaborative methodology ensures that TK is used appropriately and ensures that all involved in the research are satisfied with the process (GTC 2004). The GSCI oversees all research in the GSR and is responsible for ensuring the GTC Traditional Knowledge Policy is followed. As explained more fully below, the GSCI is a partner in this research project.

2.1.1.3 Research Partners and Research Agreement

There are three research partners on this project, the GSCI, the GRRB, and the Gwich'in Renewable Resource Council (TGRRC). The GSCI, the GRRB and the TGRRC are all bodies created with the guidance of the Gwich'in Comprehensive Land Claim Agreement (GRRB 2009). The mandate of the GSCI is to "document, preserve and promote the practice of Gwich'in culture, language, traditional knowledge and values" and its objective is to "conduct research in the areas of culture, language and traditional knowledge so that programs appropriate for Gwich'in needs can be developed" (GSCI 2003). GSCI executive director Sharon Snowshoe is based in Fort McPherson, and she provided ongoing support throughout the research project. The GRRB is a public co-management board made up of representatives from the GTC, Fisheries and Oceans Canada, Canadian Wildlife Service (CWS), and the Government of the Northwest Territories (GNWT) Department of Environment and Natural Resources (ENR). The Board deals with the management of wildlife, fish, and forest resources in the Gwich'in Settlement Region (GRRB 2009). GRRB Executive Director Melody Nice-Paul and Environmental Biologist Amy Thompson[13] provided feedback on media materials and on questionnaire and survey design. The Gwich'in Renewable Resource Council works with

[13] Amy Thompson is, at the time of writing, the GRRB Executive Director.

the GRRB on local resource management projects and Georgina Vaneltsi, the Gwich'in Renewable Resource Council Coordinator, provided consultation and advisory support throughout the project, as is mandated in the GTC TK Policy (GTC 2004).

Doing research in the GSR requires a research agreement between the researcher and the GSCI describing the parameters of the research (GTC 2004) and stipulating the terms and conditions for collecting, sharing, and the long term storage of project data. The research agreement for this project was adapted from the Research Agreement developed in 2003 between Brenda Parlee, the GSCI, and the GRRB for Parlee's doctoral research (Parlee 2006). The research agreement for this project was originally with the GSCI only, it being the designated research body for the GTC and the most appropriate body to hold the research data (the GSCI is a private organization and the data is confidential while the GRRB is a public body and information held by them is part of the public domain). However, with the change in GRRB Executive Director from Jari Heikkila to Melody Nice-Paul in 2007 the GRRB decided it wanted to be a signatory. Hence the GRRB was added as a signatory and it was agreed that the GSCI would hold the final project data due to its confidential nature. The research agreement was signed by all parties by January 9, 2008 (see Appendix A1).

2.1.1.4 Funding Sources

Funding for the research was obtained from Indian and Northern Affairs Northern Scientific Training Program, the Social Sciences and Humanities Research Council, the Canada Research Chairs Program (Tier 2), the International Polar Year (2007-2008), the Faculty of Native Studies at the University of Alberta, and the Department of Rural Economy at the University of Alberta.

2.2 Research

This thesis pushes the boundaries of regular ethnographic studies which present the words of a select group of elders, sometimes one or two, and characterize that as the community position. In this way, communities are presented as homogeneous in their perspectives. This research began with the assumption of heterogeneity and complexity in community perspectives on caribou and hunting ethics, and found it among people of different age groups within the community. This heterogeneity within communities is

supported by Agrawal (2001, 2002). This work demonstrates that community members share values but interpret them differently.

The following research section describes the activities involved in carrying out the research project. Research activities are divided into scoping activities and data collection. To collect data a set of questions for elders and set for harvesters was created and a research assistant was hired from the community to assist in the gathering of data with these instruments. People were recruited mainly through word of mouth, and participants were provided with honoraria in exchange for their time and expertise.

2.2.1 Scoping Activities

I spent the month of July 2007 research scoping in Inuvik, NWT. I explored the relevance of my preliminary research ideas while speaking with a variety of people such as the GRRB Environmental Biologist Amy Thompson, outgoing GRRB Executive Director Jari Heikkila, GSCI Heritage Researcher Alestine Andre, Fort McPherson Chief Wilbert Firth, and Environment and Natural Resources (ENR) Superintendent (Inuvik Region) Ron Morrison. At this point all four communities in the area (Inuvik, Aklavik, Tsiigehchic, and Fort McPherson) were potential research communities. Dr. Parlee and I went to went to Fort McPherson on July 25, 2007, where I was introduced me to some of the women Dr. Parlee had worked with on her doctoral project. We took them out berry picking and the berries were later distributed to community elders. This was an effective and culturally correct way for Dr. Parlee to introduce me to some of the elders she had worked with and for me to begin to establish a relationship with them. Dr. Parlee is well regarded in the community for her past work and it was helpful to me later in my research to be known as her student. As a result of this trip I decided to work solely with the community of Fort McPherson. The last scoping activity before beginning my research was to present my research plan to the Porcupine Caribou Management Board (PCMB) at the annual meeting in Whitehorse, YT, from September 22-24, 2007.

2.2.2 Data Collection

There were two data collection periods, October 10 - November 19, 2007, and February 25 - 27, 2008. In total 51 people were interviewed during the two research periods: 27 harvesters, 19 elders, and 5 others. The main bulk of the interviews took place during the first period (October - November 2007), when I interviewed 31 people: 10 elders (3

female, 7 male), 17 hunters (1 female, 16 male), 4 others (2 female, 2 male). In February 2008, 20 people were interviewed: 9 elders (3 females and 6 males), 10 hunters (2 female, 8 male), and 1 other (male). 6 of the 9 elders (3 female, 3 male) participated in an elders verification workshop that took place during this week. Age ranges for elders were not documented, but age ranges for harvesters interviewed were recorded and fell between 19 and 71 (see Table 2-1 below). During the February 2008 research period the focus was on interviewing younger harvesters aged 19-29.

Table 2-1. Ages of Harvesters Interviewed

Age	19-29	30-39	40-49	50-59	60-69	70-79
Number	7	5	7	6	1	1

2.2.2.1 Community Research Assistants

Two research assistants were hired during the research. For the period October – November 2007 Christine Firth assisted. Christine was recommended by Dr. Parlee as she had been her assistant during Parlee's doctoral project. Firth's strengths included her past experience working 2.2n a research project, as well as being an active caribou hunter and having familiarity with the Fort McPherson caribou hunting scene. Christine gave initial feedback on the questionnaire, set up and accompanied me on some initial interviews with elders and harvesters, and did some hunter interviews on her own.

During the second research period, February 25-27, 2008, Dr. Parlee hired Effie Jane Snowshoe as a research assistant, as Christine Firth was not in town at the time. We were focusing on youth during this research period, and Effie Jane was very helpful in suggesting younger hunters and setting up interviews with them for us, as well as assisting in the organization of an elder's verification workshop.

2.2.2.2 Instruments for Data Collection

The instruments for data collection reflect a combination of qualitative and quantitative social science methods. As TK is information orally transmitted from person to person, the semi-directive interview, questionnaire, workshop or focus group, and collaborative field work are mainly used in TK research (Huntington 2000). For this project, two types of interviews were used, semi-directed qualitative interviews with elders and a combination of qualitative semi-directed and quantitative survey questions for harvesters. In addition an elder's workshop was held for the purposes of validation. See Table 2-2

for participants, their age (elders were not asked for their age), and the type of interviews they participated in. Some participants did not want their name used so pseudonyms were created. These names are marked with an asterisk.

There are two streams of influences for the two types of data/instruments used in this thesis. The quantitative survey is functional and economic in orientation, such as done by Berkes (2008), Boxall & Adamowicz (Haener et al. 2001, Adamowicz et al. 2004), Collings & Wenzel (Collings, 2009; Collings et al. 1998, Condon et al. 1995), Parlee (2006), and Winterhalder (1981). As well there is a rich body of work in cultural research in the north and the open ended style of the Elders interviews follow the examples of Julie Cruickshank (2004), Tim Ingold (2000), Alise Legat (2007), and Joan Ryan (1995, 1998).

Interviews with elders were semi-directed with 5 guiding questions (see Appendix A6). Elders were mainly interviewed in their homes, while some interviews took place at the band office. Two sets of couples were interviewed together to increase their comfort level. A downside to interviewing couples is that in both situations, one spouse dominated the conversation. With this choice I may have forgone more input from the quieter spouse that may have come out in an individual interview. All interviews with elders were conducted in English. The length of time for an interview with an elder was one to two hours. Those interviewed were encouraged to discuss whatever issues about caribou were important to them. These interviews were very instructive for me as to what caribou hunting entails and the changes in hunting over the last 50 years that have come with changes in hunting technology (mainly the use of snowmobiles, trucks, and Dempster Highway-based hunting). The nature of the semi-directed interview allowed a free-ranging discussion that was held within the bounds of the research topic by the guiding questions. Comparison of the content within these interviews was possible as I used a method where if a topic was raised in one interview, I would raise it in another to find out what others thought of it.

Harvester interviews consisted of a 50 question survey (see Appendix A5) with 37 quantitative questions and 13 qualitative questions.[14] Interviews occurred in the

[14] Some of the questions have multiple parts.

Table 2-2. Research Participants, Age, Interview Type and Interview Method

Participant	Age	Interview Type	Interview Method
Abby Jones*	N/A	Elder	Semi-directed qualitative
Abe Stewart	N/A	Elder / Elder's workshop	Semi-directed qualitative
Alice Blake	N/A	Elder's workshop	Semi-directed qualitative
Alyn Charlie	19	Harvester	Survey qualitative/quantitative
Aryn Charlie	19	Harvester	Survey qualitative/quantitative
Brodie Black*	N/A	Harvester	Survey qualitative/quantitative
Cheryl Charlie	34	Harvester	Survey qualitative/quantitative
Clifford Vaneltsi	44	Harvester	Survey qualitative/quantitative
Denny Gordon	47	Harvester	Survey qualitative/quantitative
Desmond Koe	19	Harvester	Survey qualitative/quantitative
Douglas Vaneltsi	23	Harvester	Survey qualitative/quantitative
Effie Jane Snowshoe	61	Harvester	Survey qualitative/quantitative
Elizabeth Colin	N/A	Elder / Elder's workshop	Semi-directed qualitative
Emma Kay	N/A	Elder	Semi-directed qualitative
Florence Nelson*	N/A	Harvester	Survey qualitative/quantitative
George Brown*	N/A	Harvester	Survey qualitative/quantitative
Glen Alexie	44	Harvester	Survey qualitative/quantitative
Glen Koe	42	Harvester	Survey qualitative/quantitative
Hannah Alexie	N/A	Elder's workshop	Semi-directed qualitative
Henry Sand*	N/A	Other	Semi-directed qualitative
James Andre	57	Harvester	Survey qualitative/quantitative
Johnny Kay	55	Harvester	Survey qualitative/quantitative
Joseph Kay	N/A	Elder's workshop	Semi-directed qualitative
Kelvin Koe	28	Harvester	Survey qualitative/quantitative
Ken Martin	59	Harvester	Survey qualitative/quantitative
Lennie McDonald	48	Harvester	Survey qualitative/quantitative
Michael Pascal	N/A	Harvester Elder's workshop	Survey qualitative/quantitative Semi-directed qualitative
Neil Colin	N/A	Elder	Semi-directed qualitative
Neil Owens Snowshoe	70	Harvester	Survey qualitative/quantitative
Partick Colin	24	Harvester	Survey qualitative/quantitative
Percy Kay	N/A	Elder	Semi-directed qualitative
Peter Kay	N/A	Elder	Semi-directed qualitative
Rick Wilson	58	Harvester	Survey qualitative/quantitative
Robert Alexie	N/A	Elder	Semi-directed qualitative
Robert Mantla	31	Harvester	Survey qualitative/quantitative
Ron Morrison	N/A	Other	Semi-directed qualitative
Steven Tetlichi	35	Harvester	Survey qualitative/quantitative
Tyler Folmer*	N/A	Elder	Semi-directed qualitative
Walter Barda*	N/A	Harvester	Survey qualitative/quantitative
Wanda Pascal	N/A	Other	Semi-directed qualitative
Wendy Johnson*	N/A	Other	Semi-directed qualitative
Wilbert Firth	51	Harvester	Survey qualitative/quantitative
William Charlie	37	Harvester	Survey qualitative/quantitative
William Kunnizzie	N/A	Elder	Semi-directed qualitative
William Store	19	Harvester	Survey qualitative/quantitative
Woodie Elias	N/A	Elder	Semi-directed qualitative

participant's home, the band office, or in the Peel River Inn Café. All interviews were conducted in English, and lasted from a half an hour to an hour and a half. The harvester's questionnaire was reviewed by all the research partners. Dr. Parlee and I met with GRRB Executive Director Melody Nice-Paul and Environmental Biologist Amy Thompson in Inuvik, and they reviewed and commented on the harvester questionnaire. This meeting occurred in mid-October 2007. Revisions were made to accommodate these suggestions. A conference call took place between Dr. Parlee, Melody Nice-Paul, Amy Thompson, GRRB TK Communications Manager Bobbie Jo Greenland, Ingrid Kritsch and Sharon Snowshoe of the GSCI, Georgina Vaneltsi of the TGRRC, and myself on October 23, 2007, to discuss the revised harvester questionnaire. During the period October 25-28 two trial interviews with harvesters were done.

An elder's workshop took place October 30 to discuss the questionnaire. The meeting focused on the purpose and goals of the research, and obtaining feedback on the harvester questionnaire. Four of the elders involved in scoping interviews attended, along with three people recommended by the research assistant who were new to the project. Representatives from the GSCI (Sharon Snowshoe) and TGRRC (Georgina Vaneltsi) attended. Feedback from the workshop was positive. The initial interviews with the first four elders as well as the initial elder's workshop helped to focus the research and refine and finalize the elder questionnaire and the harvester survey.

Before beginning each interview, each participant signed a consent form that dealt with the participants understanding of what the interview and research was about, audio recording and note taking, the right to stop the interview or to decline to answer questions, the use of interview results, the use of their name in public documents, and the final storage of data (see Appendix A3).

2.2.2.3 Recruitment methods

Snowball sampling was used to select participants. This type of sampling relies on social contacts between people. Contact is made with a group of people who are relevant to the research and these people then identify others who may be willing to participate in the project (Bryman 2004). During the October - November 2007 research term, I had three initial sources of participants, most of who provided other contacts: Dr. Parlee's contacts from her previous research project, Christine Firth (research assistant), and Rev. Sue

Oliver, the local Anglican minister with whom I was boarding. Having three sources for initial contacts was successful as all three have access to people of different ages and socio-economic status. Sampling during the February 2008 research period used the snowball method as well, with Effie Jane Snowshoe as research assistant suggesting potential youth to interview, and those youth interviewed also suggesting friends.

I used two media sources to advertise my project and solicit participants, an announcement on the community radio station (CBQM) and posters. The radio announcement described the research, the partners, and called for interested participants. The poster (see Appendix A4) was put up in four places around town with a high amount of traffic: the bulletin boards of the two grocery stores (Northern Store and Co-op), the radio station/hamlet office, and the band office. I am unsure as to the efficacy of these methods as I did not hear the radio announcement (I had left the text of the announcement to be read on the next show) and no one mentioned that they had heard it, nor did anyone mention that they had seen the posters, which were quickly covered up by other notices on the busy bulletin boards.

2.2.2.4 Honoraria

Elders were presented with a $100.00 honorarium for giving an interview or participating in either of the workshops (planning and/or verification). Harvesters were presented with a $60.00 honorarium for their participation in an interview. Honoraria were provided in cash at the close of an interview or workshop.

2.3 Data Management

This section deals with three aspects of data management: storage, verification, and analysis. Verification includes the interviewees review of their interviews, an afternoon workshop with elders involved in the project to review the data and the researchers understanding of it, and meetings with project partners. Analysis discusses the way the answers to interview questions were organized for my viewing.

2.3.1 Data Storage

A digital voice recorder was used to record the interviews, and the audio files were stored on my laptop while in the community with backup copies on Sharon Snowshoe's (GSCI) computer in the band office. Transcription occurred during February and March of 2008

and was done by myself and another University of Alberta student who was hired to do the work.

Hard copies of interview transcripts, harvester surveys, and consent forms are kept at the University of Alberta, two sets of copies in Dr. Parlee's office and one copy in my office. The digital files are kept on my laptop in my office, one set on my USB key and one set on Dr. Parlee's computer. When the thesis is completed, all data will be transferred to the GSCI as per the research agreement.

2.3.2 Data Verification

Transcripts, and in the case where recording was not allowed and no transcript existed, a copy of the harvesters survey or written interview notes, were sent to interviewees for comment in April of 2009. Considering the significant amount of time that elapsed between the time of the interview and the receiving of the transcript, a letter was sent with the transcript re-introducing the research project, the transcript, and the instructions for review and comment. Interviewees were asked to contact Dr. Parlee or myself if there was a concern with the transcript or any of the contents. It was emphasized that it was possible to remove sections of the data if people had concerns such as about confidentiality. We received no replies.

A data verification workshop occurred on February 27, 2008, and took place at the Fort McPherson elder's home. There were six elders present, two TGRRC representatives (Georgina Vaneltsi and Joseph Kay), and Effie Jane Snowshoe assisting Dr. Parlee and I as the research assistant. Dr. Parlee and I went through the data and the elders confirmed that it reflected their understanding of the situation. Further discussion on some of the topics yielded more qualitative data.

During February 2008, Dr. Parlee and I were able to meet with all of the research partners and update them on the project. While in Fort McPherson, Dr. Parlee and I met with GSCI Heritage Researcher Alestine Andre and GSCI Research Director Ingrid Kritsch, and on February 28 we travelled to Inuvik and presented the data and project results at the GRRB Board Meeting.

2.3.3 Data Analysis

The data consists of both qualitative interview data and quantitative survey data. To organize the qualitative data I used a charting method[15] with the Microsoft Word program. This method consisted of identifying major themes that arose during the data collection process, and then going through the interview transcripts and noting which sections corresponded to each theme. During this process new themes emerged. Charts were created for each theme. I then transferred all the dialogue into its respective chart. Some sections of the interviews fell into more than one theme, and when this occurred the section was put in both charts. The major thematic sections are *hunting methods*, *hunting technologies*, *sharing*, *conservation methods*, *migration movement and monitoring*, *respect for caribou*, *caribou information sources*, and *caribou population*. Each major section is broken down into smaller sections, for example the hunting technology section is divided into trucks, snowmobiles, highway, trails, snowshoes, dog teams, freezers, and other. This method ensures that all comments relating to these themes can be grouped together and found easily. It also allows me to look at all the comments about a topic and look for commonalities or differences within it. Quantitative survey data was transferred to a Microsoft Excel chart. Similar to the Microsoft Word charting method, the Excel chart provides data organization and allows me to look at the entirety of answers to each question and to tabulate the results.

2.4 Limitations of Methods

In this section is a discussion of the barriers to research caused by language and by my lack of observations of people caribou hunting.

2.4.1 Limitations of Language

Given the importance of language in understanding Gwich'in culture, conducting the research in English seriously hampers the attempt to understand Gwich'in rules in use. It is recognized that "the culture is embedded in the language" (Wilson 1996, p. 48). Wilson quotes Senator Eli Taylor, a Dakota Elder:

> The Native message is in the language....In it are embedded a value system and a system of human relationships—between age groups—among family members—among a wider kin group. The language reflects social structure, how people relate to one another. If you destroy the language you not only break down these relationships, but also those pertaining to Man's connection with the

[15] Thanks to Peter Redvers of Crosscurrent Associates Ltd. for this method.

> Great Spirit, Nature, and the order of things. Language, therefore, is intertwined with the maintenance of social order (Wilson 1991).

Anthropologist Marie Francoise Guédon quoted a Dene student from the University of British Columbia as saying that "English is not adequate to talk about what really matters…" (Guédon 1994, Note 17:69). Hugh Brody suggests that translations between agriculturalist languages (such as English) and a hunter-gatherer languages (Gwich'in) do not work well as the languages are created around the people's relationship and interaction with the land, which are fundamentally different. Thus English is an inferior substitute for discussing Aboriginal relationships with the environment. A Nisga'a informant describes why: "...meanings disappear in English language. Not like when we use our own Nisga'a language; meanings come out crystal clear when you are speaking" (Brody 2000:178).

An example from this research where the use of English was a barrier is in the use of the term *personal observations* or *your observations*. The term was meant to indicate those things that people saw, heard, and experienced while on the land, and it was used in question #38 of the harvester survey: *where does most of your knowledge about caribou come from* (see Appendix A5). Responses to this question suggest that the question was not communicated well in that only 11/27 said that yes, they get information about caribou from this source. Technically every respondent (as harvesters) get information about caribou from this source. I discussed this matter with Peter Redvers of Crosscurrent Associates in Yellowknife, NWT who has done much work with Aboriginal communities in the Deh Cho region of the NWT. Redvers agreed that the terms used were likely confusing to interviewees. Guédon's Dene teachers have commented on the difficulties in translation from Dene to English (Guédon 1994: Note 17:69). Despite this difficulty, the English language is used as it is the only option, given the severe decrease in Aboriginal language transmission to younger generations and the pressing need to communicate information from elders to youth. This acceptability of English as the only option carries over to research partnerships with academics, despite the formidable challenges in conceptual translation discussed above.

2.4.2 Observation of Caribou Hunting

There were no caribou in the area during the time I was in Fort McPherson, and as a result I was not able to observe caribou hunting practices. I had to get a sense of these

practices from the verbal descriptions people gave me and from the literature. Available literature and elder accounts mainly focus on hunting methods practiced after the advent of dog teams and up to 1970, when the snowmobile and the Dempster highway were introduced, radically changing hunting methods. Harvester descriptions focused mainly on hunting with snowmobiles and along the highway. As a result of not being able to observe actual hunting practices, I was not able to get a sense of what it meant to "chase caribou with skidoos", which was often mentioned as a thing was not supposed to do when caribou hunting. Despite this rule, most hunters use snowmobiles to hunt, and it seems there exists a threshold level where some "chasing" was okay. Thus I was not able to make the distinction between "okay" and "not okay" chasing as I did not observe the variations in snowmobile usage. The second issue that arose from the lack of caribou hunting observation was that I had to rely on interviewees accounts of their hunting methods. When I began the research I was aware that "chasing" was an issue, and I was under the impression it was a sensitive topic, and so I was hesitant to ask interviewees if they chased caribou with snowmobiles. The result of this is many people told me that you aren't supposed to chase, but I don't know how many actually do this. In one of the last interviews a younger hunter mentioned the rule of not chasing, and I asked if he did that, to which he replied quite candidly that he did. As a result, I don't really know to what extent the rules spoken by people are translated into behaviour, because of a hesitation on my part to ask direct questions about behaviour around sensitive issues.

2.5 Conclusion

This chapter discussed the research methods and the methodology used for this project. This research occurs during a time of changing attitudes towards research with northern peoples and changing ideas about the right of Aboriginal peoples to ownership over their knowledge, to participation in research, and researcher accountability and responsibility. These issues increase the complexity of research in northern areas and make them more time consuming, but ultimately the research is more rewarding and the potential for usefulness to communities is increased.

The issues around language discussed above bring into question the quality of the research done when different languages are involved. One wonders whether any research with Aboriginal communities should be done in English if the quality of understanding and the communication and translation of concepts is problematic. This, however, may

be a moot point as the Gwich'in language, *Dinjii Zhu' Ginjik*, spoken in different dialects among the communities (Slobodin 1981), is considered endangered (GSCI n.d., a) as are most other Aboriginal languages in Canada (Norris 2007). English is increasingly the main language spoken by younger generations of Aboriginal people.

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3.0 Knowledge Construction of Porcupine Caribou

3.1. Introduction

The Porcupine caribou herd is managed by multiple interests. In Canada, those interests include (but are not limited to) the Gwich'in of Fort McPherson, the Government of the Northwest Territories (GNWT), and the Porcupine Caribou Management Board (PCMB).[16] These three groups each bring a different way of approaching, understanding, valuing and knowing caribou to the management process. This paper explores the ways in which the Gwich'in construct knowledge about caribou and what information sources are most valued and relied upon. Knowledge about caribou is examined through the lens of understanding Porcupine caribou population change.

This paper challenges the polarized notions of traditional knowledge (TK) and western science. Based on primary data from Fort McPherson, Northwest Territories (NWT), I offer an alternative understanding of the nature of Gwich'in Knowledge with respect to caribou population change. Sources of Gwich'in Knowledge include oral history, local knowledge, western science, and a variety of popular media sources (e.g. television). Elders and hunters of Fort McPherson access information about caribou from a variety of sources, but mainly from on the land experience and from other hunters and elders. Another important source, but less so than the qualitative information previously mentioned, is scientific, qualitative information from the GNWT and the PCMB. The community brings this complex of knowledge to bear when harvesting and co-managing caribou. Despite the many influences over Gwich'in Knowledge, the research affirms the importance of elder and hunter perceptions of caribou population change, caribou health and well being. The GNWT constructs knowledge about caribou differently than Gwich'in harvesters, using photocensus and post-calving surveys to provide a body of quantitative population data. Lastly the PCMB, as a co-management board, attempts to make use of both TK and scientific knowledge.

[16] The PCMB is a joint management board that was created under the Porcupine Caribou Management Agreement in 1985. There are eight board members who represent six signatories: Governments of Canada, Yukon, and the Northwest Territories, the Inuvialuit Game Council, the Gwich'in Tribal Council, and the Council of Yukon First Nations (PCMB 2009b).

The paper begins with a discussion of the ways in which the Gwich'in, the GNWT, and the PCMB construct knowledge about caribou. Research methods and results follow, and lastly a there is a discussion about how Gwich'in hunters access both TK and scientific knowledge in comparison to the GNWT and the PCMB, organizations which do not access both types of knowledge, but in fact rely heavily on quantitative-based knowledge despite claiming to use TK in their decision-making about caribou.

3.2 Gwich'in Knowledge Construction of Caribou

The paper deals with concepts and theories around Gwich'in Knowledge and knowledge construction. This section builds on definitions of Gwich'in Knowledge provided in the introductory chapter. I argue that Gwich'in Knowledge about caribou refers to a blend of knowledge acquired from on the land activities, elders knowledge, and the oral tradition; and also knowledge acquired from over a century of contact with North American wildlife science and caribou management (Sandlos 2007, Usher 2004).

In the introduction I discussed how the Gwich'in Tribal Council (GTC) (2004:3) definition (as follows) describes what Gwich'in Knowledge consists of.

> That body of knowledge, values, beliefs and practices passed from one generation to another by oral means or through learned experience, observation and spiritual teachings, and pertains to the identity, culture and heritage of the Gwich'in. This body of knowledge reflects many millennia of living on the land. It is a system of classification, a set of empirical observations about the local environment and a system of self-management that governs the use of resources and defines the relationship of living beings with one another and with their environment.

The definition above captures the complexity of Gwich'in Knowledge, however it also makes a point of defining Gwich'in Knowledge as arising solely from the interaction of the Gwich'in with their land over time and excluding knowledge gained through contact with non-Aboriginal people. The understandings that the Gwich'in have about caribou developed in part through on the land lifestyles, as described below.

> In the old days, people did not stay in town. They travelled all over the land hunting *vadzaih* up in the mountains, down in the Delta, or up the Arctic Red River. Every fall, people moved to the mountains to hunt *vadzaih*. They moved through the mountains all winter long, following and hunting the *vadzaih* (GRRB 1997:25).

The Porcupine caribou more or less continuously move between two points on their ranges: the fall/early winter movement to the wintering ground and the spring/early summer migration to the calving grounds (Kofinas & Russell 2004). Prior to life in town, people did not follow the herds all year from one end of the range to the other; they intercepted the caribou during the two main seasonal movements through the Gwich'in traditional territory (Burch 1972). The two main movements of the caribou are movement away from the calving grounds and towards the winter range, and away from the winter range towards the calving ground and summer ranges. These movements were integrated into the Gwich'in seasonal round as people must intercept the migration and take enough to provision them until the next meeting, which could be up to six months away[17] (Burch 1972). As a result of living in one area for multiple generations, "people do not find vadzaih herds at random. They know where to find vadzaih at different times of the year" (GRRB 1997:25). For successful caribou hunting people required specific and detailed knowledge about caribou migration patterns, responses to environmental conditions, and prey species behaviours and habits. These understandings and knowledge about caribou has been passed to more recent generations through the oral tradition.

Being an oral culture means that information is stored in the collective memory in that it is encoded into stories, ceremonies, and practices (Edge & Fox 2002). This information is passed from the adults and elders to the youth of Aboriginal society. Youth were taught through demonstration, stories, or by what is today called TK (GRRB 2001:21). Elders are important because they "provide corporate memory for the group, the wisdom to interpret uncommon or unusual events, and they help enforce the rules and ethical norms of the community" (Berkes 2008:118). Thus one way people know caribou is through stories. (Some stories about caribou are discussed in the Gwich'in laws section of Chapter Four).

People still know caribou through on the land observations, though hunting is different in some ways than in the past in that snowshoes and dog teams have been replaced by a different mode of travel, trucks and snowmobiles. Today, most respondents travel south from the community of Ft. McPherson along the Dempster Highway corridor to hunt.

[17] In some cases the animals stay in an area for the winter, allowing people living nearby to take less at a time (Burch 1972).

People shoot off the road or they will take a snowmobile or walk into the bush to find and kill caribou. People will also go by snowmobile to non-highway accessible areas on trails once travelled by dog team and snowshoe. The hunting season in Fort McPherson runs from August until May, peaking in September and in March/April. Most hunters hunt 1-3 times in both the fall and spring seasons. Most people go for short periods of time, a few hours to one day, however snowmobile trips to non-highway destinations can be between two and five days. Observations of caribou made while hunting and carrying out other activities on the land are a major source of information about caribou for Fort McPherson hunters.

I consider non-Aboriginal or scientific sources of caribou knowledge as adding another dimension to the complexity of Gwich'in Knowledge about caribou. The interaction between the Gwich'in and the Department of Environment and Natural Resources (ENR) of the GNWT[18] and the PCMB is the source of this little discussed dimension. Before discussing that interaction, I will describe some of the early interactions between Aboriginal people and the predecessors of today's wildlife managers.

3.2.1 Aboriginal Exposure to Western Science Ideas

In the Canadian north, early contact between Aboriginal and western cultures occurred between explorers, missionaries, and fur traders who lived, travelled, traded, and learned from Aboriginal peoples. Those travelling and living in the north learned how to survive in the new and unfamiliar 'new world' from Aboriginal people. Newcomers participated in caribou hunting and observed associated cultural practices. Many, such as Samuel (Hearne 1958 [1795]), Alexander Mackenzie (MacKenzie 1971 [1801]), and Warburton Pike (1917) recorded their impressions and opinions about what they saw. These written observations about caribou populations, natural history, and Aboriginal hunting practices remain a resource for wildlife managers up into the present (Campbell 2004).[19] As well, involvement in the fur trade required Aboriginal people to acquire European knowledge, specifically pelt preparation techniques and understandings about relative values of fur (Slobodin 1962:22-23). Slobodin (1962) mentions the many references in the literature

[18] The Department of Environment and Natural Resources is the GNWT department responsible for caribou management.

[19] References to these writings can be found in wildlife management literature up to 1983 (Campbell 2004) and potentially even later. One legacy of early contact is that many of the cultural biases of these early writers have been carried into the present wildlife management and conservation agendas (Campbell 2004, Sandlos 2007).

regarding early European-Indian relations to the giving of instructions by fur traders to native trappers of how to trap, trade and prepare pelts.

Hunter education programs have been and still are a direct attempt of western wildlife managers to influence Aboriginal hunting practices and have been used since the early thirties (Sandlos 2007). Aboriginal hunting practices have been historically targeted by western wildlife managers as a significant, if not the main, threats to caribou populations. Prior to the 1930's, federal policy makers took a regulatory approach to wildlife conservation, setting a variety of regulations with the aim of restricting Aboriginal hunting. These regulations became impossible to enforce given the lack of available personnel due to the depression and the war years. After the 1930's, the focus shifted from restriction to modification of Dene and Inuit hunting practices. Hunter education was a generally coercive method of educating and supervising Aboriginal hunters in the "proper" hunting methods. An example of this is targeting the widespread northern practice of using caribou meat for sled dog food. This was seen as a major source of waste by non-Aboriginal wildlife managers. Managers attempted to convince Dene and Inuit people to use fish for dog food. This was seen as the logical choice but little effort was made to understand the "social or ecological conditions governing Dene and Inuit subsistence practices" (Sandlos 2007:185) or why people preferred using caribou meat rather than fish for dog food. "…Informal efforts to limit the amount of caribou used for dog feed remained a key pillar of the caribou conservation program until snowmobiles came into widespread use three decades later" (Sandlos 2007:185). It is considered unlawful to feed caribou meat to dogs to this day (GNWT 2009). Hunter education programs continue in the present and are a major part of PCMB and GNWT management efforts, and this is one of the main ways that the community of Fort McPherson is exposed to the ideas and agenda of the GNWT and PCMB, and more broadly to western scientific information about caribou.

The GNWT and the PCMB actively disseminate information relating to caribou into the community of Fort McPherson (among other communities). A main conduit through which information moves into the community from these sources is through the RRC. It is part of the RRC's mandate to act as a conduit for information flowing in from non-local sources. The purpose of the RRC as stated in the Gwich'in Land Claim is "to encourage and promote local involvement in conservation, harvesting studies, research

and wildlife management in the local community" (Canada & Gwich'in Tribal Council 1992). In fulfilling this mandate RRC members attend PCMB meetings 2-3 times a year and report back to the RRC board. This information may then be disseminated further to the community through different means, potentially through the local radio station, but more often through word of mouth, community meetings, and posters displaying the PCMB messages. The RRC office has both PCMB and GNWT posters on its walls that relay messages such as "Shh…don't spook the caribou" (PCMB et al. n.d.), and a GNWT notice of amendments to harvesting regulations. The RRC office also collaborates with GNWT/ENR, liaising with various ENR representatives such as the local Renewable Resource Officer and the Superintendent of the Inuvik region. During my fieldwork the RRC and the local Renewable Resource Officer were working together on the Porcupine Caribou Body Condition Monitoring Program.

Although western science and TK are often polarized in definition, this dichotomy may obscure the realities of Gwich'in Knowledge about caribou as being influenced by many different kinds of information from media (TV, radio, and newspapers), caribou management organizations (GNWT, PCMB, and the TGRRC), and local people (personal observations of hunters and of other hunters, and the knowledge of elders). These ideas of knowledge generation provide perspective on how and why the perspectives of western scientists – caribou biologists – may differ from those of the Teetł'it Gwich'in, more specifically users of caribou or Gwich'in harvesters.

3.3 How Many are There? Western Scientific Knowledge Construction of Caribou

The western scientific way of understanding animal populations is heavily focused on numbers and is a mainly quantitative understanding. Knowledge of the animals and the changes occurring with them is based on answers to questions such as such as how many animals are there now, how many were there in the past, and how many there are likely to be in the future. Population change is understood in the context of the numbers of births and deaths in a population and how these change over time. A variety of counting methods, statistical analyses, and computer models are used to answer these questions. Biologists and managers traditionally attempt to understand quantitative population changes in terms of a variety of ecological influences such as human and animal (mainly wolf) predation, climate (deep snow or ice conditions), fire on the winter ranges as it affects food availability, the effects of severe weather on calving, and insect harassment

(Banfield 1954a, 1954b, Kelsall 1968). See Table 3-1 for an example of the type of data that is sought by those involved in wildlife management. Numerical analyses and inquiry form the basis of western scientific understanding of caribou and management decisions.

Table 3-1. Data of Priority Interest (Adapted from LeBlond 1979:51-52)[20]

Population statistics	Behaviour patterns
Herd size and density	Migration paths: where, why, timing, alternatives
Age and sex compositions	Response to artificial barriers such as roads pipelines, buildings and to moving objects such as traffic and aircraft
Births and deaths/recruitment rate	Tolerance of cumulative impacts (road and pipeline corridor etc.)
Calf survival rates a different ages	Effects of harassment

The present scientific understanding of the Porcupine caribou herd is that it is experiencing a declining trend over the last two decades. Figure 3-1 below visually describes this way of understanding the state of the Porcupine caribou. The textual way of explaining this is that in 1972 the herd was at a low of 102,000, growing by 5% per year to 178,000 in 1989, and then began declining by 3-4% per year from 1989 to 1998, and 1.5% decline per year between 1998 and 2001 to a final number of 123,000 in 2001 (PCMB 2004-2010a). The current population of the Porcupine herd is estimated to be between 110,000 and 112,000 animals (PCMB 2004-2010a). Both the visual and/or the textual explanation of the population are used by the GNWT and the PCMB to represent the state of the herd.

In addition to the numbers of the herd itself, comparisons are made with the numbers of other herds. Eight herds (including the Porcupine) have all or some of their range in the NWT. Five are considered by the GNWT to be declining, and the status of three others are unknown since the early 1990's[21] (GNWT 2006). All of the NWT herds are increasing and decreasing at about the same time and rate but the Porcupine herd is understood to be a increasing and decreasing at a rate slightly different from the rest of the herds. The Porcupine herd has the lowest growth rate (4.5% per year) and was the first to peak and decline (Kofinas & Russell 2004:26).

[20] LeBlond's (1979) list includes significantly more types of quantitative inquiry than is shown here.
[21] The Porcupine, Cape Bathurst, Bluenose-West, Bluenose-East, and Bathurst herds are considered to be in decline; and the status of the Ahiak, Beverly, and Qamanirjuac herds is unknown (GNWT 2006:5).

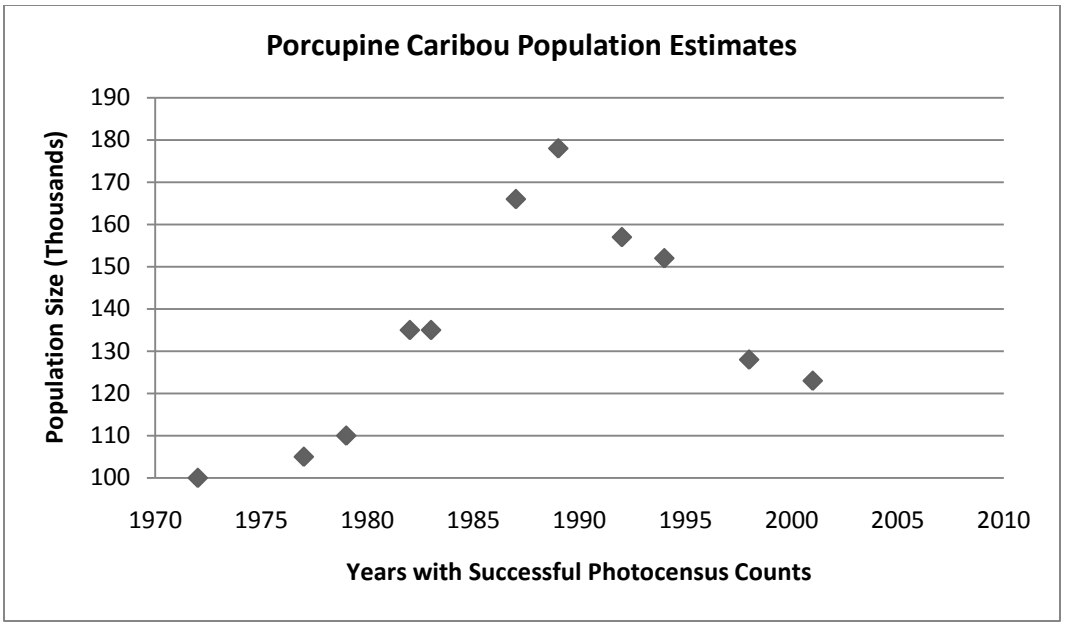

Figure 3-1. Porcupine Caribou Herd Population Estimates 1970 – 2010. Adapted from USGSASC (2009).

Western scientific ways of understanding caribou have always been mainly quantitative, though the methods have undergone changes over time due to the advent of the bush plane. Early population estimates were provided by naturalists, explorers, adventurers, and government personnel (Sandlos 2007) and trappers and traders (Allison 1978) working and travelling in the NWT from the 1700s to the 1900s (Banfield 1954a). Early observers were awed by the numbers of caribou, so vast that it was "useless to try to estimate the number that passed" (Pike 1917:89). If a number was attempted, it was often in the millions. Ernest Thompson Seton suggested the caribou herds he observed numbered 30 million (Sandlos 2007). At this time, "informed speculation" of population figures through visual reconnaissance was the only option (Kelsall 1968:143) as only ground surveys were possible (Bocking 2005). The use of bush planes after World War II opened up the caribou ranges to new types of observation, and through aerial observation, population estimates of whole caribou herds became possible (Bocking 2005). The Canadian Wildlife Service (CWS), led by A. W. F. Banfield and later John Kelsall, undertook a series of caribou studies using aerial observation methods during the period 1948-1957. Banfield's major study in 1948-1950 was the first caribou study to provide an overall population estimate for herds in mainland NWT, northern Alberta, Saskatchewan, and Manitoba (Banfield 1954a, 1954b).

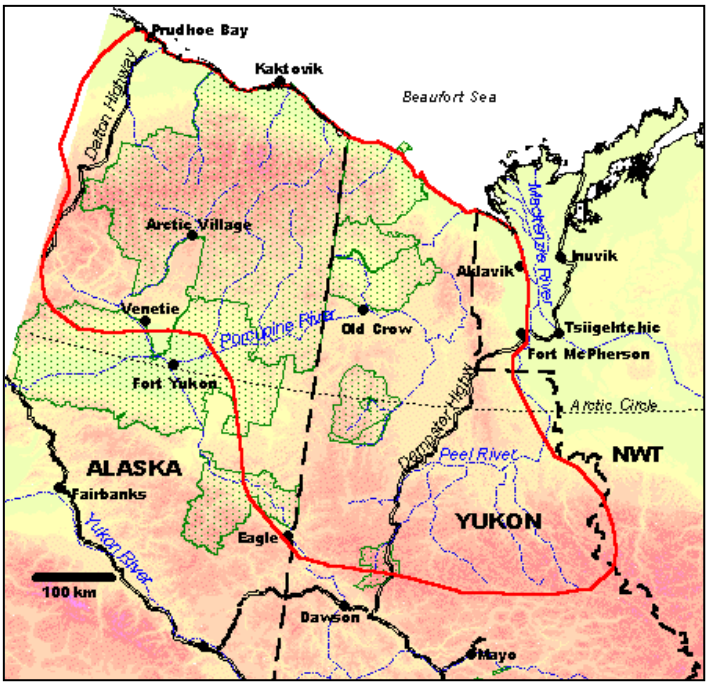

Figure 3-2. Porcupine caribou herd range (PCMB 2009a).

Currently two main methods are used to count the Porcupine caribou herd, the photo census and calving surveys. The Alaska Department of Fish and Game and the United States Fish and Wildlife Service lead the census fieldwork including aerial post-calving photo surveys, birthrate studies, and calf survival censuses (PCMB 2004-2010a). The photo census method, used since 1972 (PCTC 2007), makes use of radio collars to track a small number of caribou. Biologists follow radio signals to gauge when caribou have formed into tight aggregations on the Alaska coast just after calving in the Arctic National Wildlife Refuge or northern Yukon. A plane with a belly mounted large format film camera flies transects over the aggregation, and takes photos. At the same time smaller planes search the foothills and mountains for caribou not in the large aggregations on the coast. An assumption of this method is that a large proportion of the herd is found within these big groups (PCTC 2007). Photos are developed and researchers count the number of caribou in the photos. The population estimate is the result of the count from the photos added to the number of caribou spotted by smaller search planes. Since 2001, census attempts have been stymied by failure of caribou to aggregate in open spaces, decreased visibility due to smoke from wildfires, and by difficulties distinguishing caribou from shadows in photos (PCTC 2007, PCMB 2004-2010a). Next, calving surveys have been done every year since 1987 (PCMB 2004-2010a, PCTC 2007). Calving surveys track a sample of cow caribou observed to be

pregnant or to have given birth, and from this the parturition rate, a June calf survival rate, and the post-calving survival rate are calculated (PCMB 2004-2010a).

3.3.1 Caribou Crisis

The caribou crisis of the 1950's, described by Usher (2004) and Sandlos (2007), is an early example of managing caribou from population numbers that were considered to be questionable (Usher 2004, Sandlos 2007). Sandlos and Usher both point out that management decisions were also based on value judgments with regards to Aboriginal hunting methods and western cultural ideas about what constituted appropriate and inappropriate hunting methods (Sandlos 2007).

Population counts from early aerial surveys came in much lower than previous on the ground observations. The difference between a population count set in the millions, such as Seton's, and the results of aerial counts set in the hundreds of thousands caused a shock that likely touched off the crisis (Sandlos 2007, Allison 1978). This was despite it being known that early estimates were not just unlikely but a "clear impossibility" (Kelsall 1968:144) as they were made by untrained observers from ground positions (Allison 1978), and affected by the "the tendency of the human mind and eye to exaggerate"[22] (Rutherford et al. 1922). Banfield's study in 1948-50 estimated the herds to be at 668,000 animals, with the annual mortality rate at 168,000, which exceeded the annual birthrate by 23,000 animals (Usher 2004:174). These numbers suggested a crisis, despite ignorance about the overall population trend (Usher 2004) as well as criticisms of Banfield's methods and final population estimate[23] (Sandlos 2007).

John Kelsall continued caribou survey work for the CWS, and studies between 1951 and 1953 "revealed no clear evidence of a dramatic decline in their population" (Sandlos 2007:202). In 1955, Kelsall found that the herds were at 278,900, down from Banfield's estimate of 670,000 six years pervious (Sandlos 2007:203). Another study in 1957 concluded that the entire mainland caribou population had declined to 200,000 (Sandlos 2007:204, Usher 2004:175; Kelsall 1968:150). Kelsall made the suggestion that caribou

[22] Quote taken from Sandlos (2007:148). Sandlos Note 21: Rutherford's quote in the Royal Commission hearing transcripts, Appendix I, Evidence before the Commission, May 12, 1920, RG 33-105, vol. I, Library and Archives Canada (LAC).

[23] The critique was made by Ian McTaggart-Cowan, leading zoologist at the University of British Columbia. Banfield did not respond to this critique (Sandlos 2007:197).

could be completely eliminated by 1969 at the present rate of harvest (Sandlos 2007:204, note 48). Despite faults, these studies were accepted by northern administrators and federal wildlife officials. The caribou crisis was declared with the assertion of a decline of caribou from countless millions in 1900 to less than one quarter million by the end of the 1950's (Sandlos 2007). The sense of crisis petered out and the sense of panic was somewhat assuaged as scientific data was generated that suggested calf numbers were increasing by the early 1960's (Sandlos 2007). John Sandlos'(2007) study of caribou management during this time concludes that due to coarse methods and little baseline data, Banfield and Kelsall "reveal little about whether the caribou population in the 1950's was stable, had suffered a moderate downturn since the turn of the century, or was in a state of precipitous decline" (Sandlos 2007:205). As Sandlos and Usher describe, caribou crisis management was based on population counts, but also closely tied with value judgements about the inappropriateness of Aboriginal hunting methods. Condemnations of hunting practices such as the killing of pregnant cows, large kills, and the practice of taking choice parts of caribou and leaving the rest are generously sprinkled throughout caribou management literature. These authors also refer back to early writings of explorers and missionaries as they observe, judge, and comment on Aboriginal caribou hunting practices. The terms 'wanton slaughter' and the 'love of killing' are terms applied to Aboriginal people throughout these writings.

3.4 Methods

This section describes the research methodology, research activities, major thematic questions of the interview guides, and challenges to the research.

3.4.1 Methodology

For guidance on methodology I consulted the Community-based Participatory Research (CBPR), an offshoot of Participatory Action Research. CBPR was adapted by Fletcher (2003) to relate to research with Aboriginal people in northern Canada. CBPR emphasizes involving the community in the research as partners rather than objects of research, community and skill development, and knowledge exchange (Fletcher 2003).

3.4.2 Research Activities

With regards to licensing, I had responsibilities toward the Aurora Research Institute (ARI), the Faculty of Agriculture, Forestry, and Home Economics Human Research

Ethics Board at the University of Alberta, and to the GSCI. I obtained a research license from the ARI for each year I did research in the NWT (2007 and 2008), as well as undergoing an ethics review in 2007 through the University of Alberta with an update a year later (2008) on project changes and the progress. Dr. Parlee and I drafted and signed a research agreement together with the GSCI and the GRRB that addresses research purpose, scope and methods, obligations to the community and the role of the GSCI/GRRB, issues around consent, ownership and storage of data (see Appendix A1). There are three partners on this project, the GSCI, the GRRB, and the Teetł'it Gwich'in Renewable Resource Council (TGRRC), each of whom provided guidance to the project.

Data collection periods occurred during October 10 - November 19, 2007, and February 25 - 27, 2008. Research activities included gathering primary data from elders and harvesters, as well as secondary data with regards to the GNWT and the PCMB. 51 people were interviewed: 27 harvesters, 19 elders, and 5 others. 11 of the participants were female, and 40 were males. Interviewee ages ranged between 19 and 71. See Table 3-2 for the age ranges and the number of people in each category. Interviews with elders were semi-directed with 5 guiding questions, and harvester interviews consisted of a 50 question survey with 37 quantitative questions and 13 qualitative questions. Secondary data collection for the PCMB came from the PCMB website content (PCMB 2004-2010c), attending the annual meeting on September 22-24, 2007, and written promotional material such as reports, posters, and pamphlets. GNWT secondary data was accessed from the GNWT ENR website (ENR n.d.), GNWT hunting regulations (GNWT 2009), and the Wildlife Act (R.S.N.W.T. 1998b).

Table 3-2. Ages of Harvesters Interviewed

Age	19-29	30-39	40-49	50-59	60-69	70-79
Number	7	5	7	6	1	1

3.4.3 Questions

With the elders question I aimed to get a sense of what it meant to respect caribou, and what was considered to be acceptable and non-acceptable methods of caribou hunting. Interviews with elders were done first, and provided a valuable context within which to base the research and to understand the content of the harvester interviews to follow. Elders were specifically asked about Gwich'in relationships with caribou as well as their perceptions of caribou health and well being. Harvester interviews were completed after

the elder's interviews, and they focused on harvesting activities and behaviours, perceptions of caribou health and wellbeing generated from experiences and observations made while hunting and being on the land, and exploring the multiple sources from which hunters get information about caribou. As described above, hunter interviews were much longer than the interviews with elders. Thus I was able to learn about the perspectives of the active generations of hunters, and to root these in the elder's perspectives and descriptions of the changes in hunting and living.

3.4.4 Challenges

I have often heard it said that *Aboriginal culture is embedded in the language*. As a monolingual speaker I do not understand this fully, however, this idea was made clearer to me by a difficulty I had with one question in the harvester survey: *where do you get your information about caribou from*. *Personal observations* was one of the sources suggested to interviewees. The term *personal observations* caused some apparent confusion, as well as producing results that seemed irrational. Of those who answered this question, 2 out of 27 people said that their personal observations changed where or how they hunted caribou, and 10 said it did not. The response rate to this question should have been very high, as what one sees when on the land is a primary source of information informing decisions made about caribou hunting (Rushforth 1992, Guédon 1994). After reflection and discussion with colleagues, a better phrasing would have been "what do you see when on the land". This research experience and the link between culture and language brings into question the overall quality of Aboriginal research that is done solely in English. How much meaning is missed, or misinterpreted? Whatever the potential losses, considering that it is expected that all Aboriginal languages in Canada except Inuktitut, Cree, and Ojibway, are considered endangered (Norris 2007), research in Aboriginal languages or in a combination with English is highly unlikely. Awareness of the potential miscommunications through language is a priority for northern researchers.

3.5 Results

Gwich'in Knowledge is complex, and it is presented below in four categories (see Figure 3-3). These categories include demographic information about individual Fort McPherson knowledge holders (hunters and elders), knowledge sources (the multiple institutions and people who are invested in knowing about caribou), knowledge content

(the variety of types of information people have about caribou), and the various media through which information flows.

3.5.1 Knowledge Holders

Fort McPherson interviewees all hold knowledge about caribou. They differ due to age, gender, and employment status. Age divisions are youth (19-29), adults (30-59), and elders (60-70). The majority of active caribou hunters are men, if the definition of 'hunter' is the person who goes out on the land to harvest caribou and bring it back to the community (Bodenhorn 1990). Employment status includes full-time, part-time, and seasonal employment; unemployment includes those just out of high school, retired, and those who serve on a variety of committees and boards.

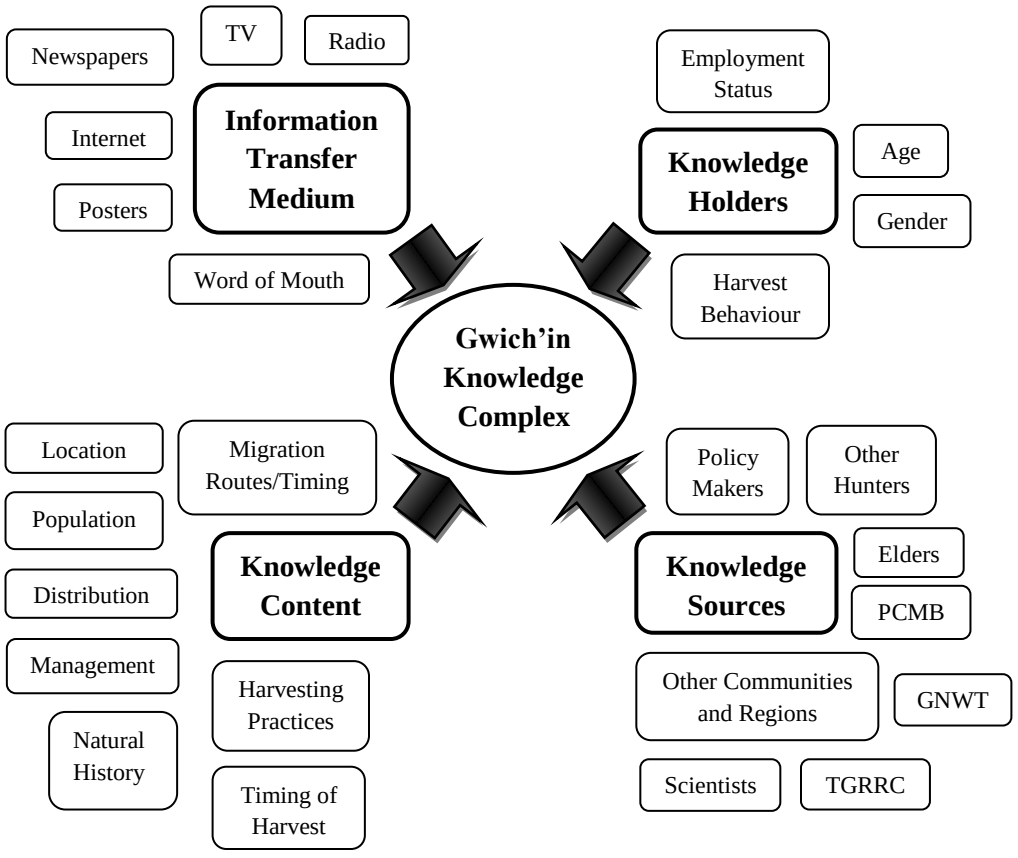

Figure 3-3. Gwich'in Knowledge Complex

3.5.2 Knowledge Sources

Harvesters were asked about the variety of sources they get information about caribou from (see Table 3-3). Respondents cited other hunters (19) and elders (17) as information sources, TV (16), from the local TGRRC (12), personal observations[24] (11), and from local and regional radio stations (10). Some mentioned the GNWT (7) and the PCMB (8). Harvesters get the least information about caribou from newspapers (3) and the internet (3).

Table 3-3. Information Sources

Information source	Number of harvesters accessing information from each source
Other hunters	19
Elders	17
TV	16
RRC	12
Personal observations	11
Radio	10
PCMB	8
GNWT	7
Newspaper	3
Internet	3

3.5.2.1 Types of Information Passing Along Each Source

There are also important learnings to be had from exploring the quality or kind of information that harvesters perceived to be available from different sources. The following table (Table 3-4) provides a summary of the different kinds of information provided by different agencies in the region. The table provides two sets of information, first what particular things about caribou are being discussed (for example caribou location, when to harvest, and migration routes), and second, information about which channels the particular types of information about caribou are moving through and being accessed by Fort McPherson hunters. For example, hunters get nine different types of information about caribou from elders (for example location, heath, and respectful behaviour), and only one type of information about caribou from TV (natural history). This differentiation in the kind of knowledge perceived as available from different sources speaks to the complexity of the local knowledge system and the roles of different actors within this system.

[24] See discussion on the category *personal observations* in the Methods (Chapter 2), section 2.5.1.

Respondents gave many specific types of information that they hear from each source which are detailed below. From television people access general information about caribou, such as news and documentaries that are potentially about any caribou herd. On the radio (local radio CBQM, CBC, and Yellowknife station CKLB) information is locally relevant and often is in regard to the Porcupine caribou. CBQM is the local radio station, and it is the heartbeat of the community (S. Oliver, personal communication, February 3, 2010). Subjects discussed over CBQM include updates from community members out on the land regarding river conditions etc., personal messages to other community members, and community events. When caribou are close to the community and hunting is imminent, the TGRRC representatives and Fort McPherson elders speak

Table 3-4. Sources and Types of Information About Caribou

Information Type	**TV**	**Radio**	**Newspapers**	**Internet**	**TGRRC**	**PCMB**	**GNWT**	**Elders**	**Other Hunters**	**Personal Observation**	**Total**
Caribou location		X		X	X		X	X	X	X	**7**
Timing/When to harvest		X		X	X		X			X	**5**
PCH population/Decline			X			X	X	X			**4**
PCH health						X		X	X	X	**4**
Harvesting practices					X	X	X	X			**4**
Migration routes						X		X	X	X	**4**
Not enough information			X		X	X	X				**4**
TGRRC heard through		X			X			X			**3**
PCMB heard through			X		X						**2**
Elders heard through		X						X			**2**
Natural history	X						X				**2**
Quotas			X				X				**2**
Outfitters			X				X				**2**
Respect/Take what you need						X		X			**2**
Long term perspective								X			**1**
GNWT heard through…			X								**1**
1002 lands						X					**1**
PCH information						X					**1**
Total	**1**	**4**	**6**	**2**	**6**	**8**	**8**	**9**	**3**	**4**	

on the local station to encourage people to avoid hunting for one week to allow the leaders to cross the highway[25] and to stay within the 500m corridor when hunting in the Yukon. Newspapers such as *News North*, the *Inuvik Drum*, and the *Yellowknifer* are rich sources of information about caribou. People read about population declines, the setting of harvest quotas, the actions and concerns of outfitters, the potential effects of the Mackenzie Gas Pipeline on caribou, and information about other herds. Also more local concerns such as the 500m corridor, Territorial government (both NWT and the Yukon) actions with respect to wildlife regulations (for example the decision of the Yukon Territorial Government not to enforce the 500m corridor in the winter of 2007/08 and the perceived lack of consultation with communities with regards to this decision), and PCMB activities (for example the activities surrounding the creation of the Harvest Management Strategy). Popular internet sites include the sites of the PCMB, the community of Old Crow, weather forecasting, and radio collar information sites. Though information on the locations of radio collared animals was no longer offered at the time of the research, multiple respondents mentioned it as something they had accessed in the past. The TGRRC provides information about preferred hunting methods and activities. These include hunting less cows, respecting the voluntary one week closure, and taking less caribou. PCMB information is funnelled through this source as TGRRC representatives regularly attend PCMB meetings and workshops. Information from the PCMB that is mentioned by harvesters includes herd health, estimated population size, recommendations for respectful caribou harvesting, decline statistics, migration routes, the effect of oil development on calving grounds, and actions relating to the1002 lands. The GNWT provides information about hunting regulations (for example the six-inch snow rule[26]), legislation, yearly census counts, declines of other herds, potential quota setting for the Porcupine Caribou and other herds, and news about outfitters. Also caribou wintering locations, how to harvest caribou, caribou behaviour and caribou scouts. From the Fort McPherson Renewable Resource Officer (as the local GNWT ENR representative) people hear about the importance of gutting caribou where it is killed, the

[25] It has been recognized that immediate hunting of the leaders of the migrating group as soon as they approach to cross the Dempster Highway can have negative results. The herd may turn back and away from the highway and seek a more southern crossing point further away from the community, or it may cause a general disturbance to the social makeup of the herd, the leaders are the caribou with knowledge and experience of the migration routes.

[26] The six-inch snow rule requires there to be at least six inches of snow on the ground before skidoos and ATV's are to be used. This is to protect the tundra from being torn up by running these machines directly on the surface.

need for a gun license, and enforcement of the 500 m corridor.[27] Some respondents said they heard nothing from the GNWT or that they did not hear enough information. Lastly elders provide varied information about their past and present experiences hunting caribou: of past declines, migrations routes, weather, and changes in all of these. They speak of hunting methods and procedures (proper cleaning, gutting, and cutting), the many uses of caribou parts, recipes and caribou cooking methods, and encouragement to eat caribou. Dog team trips, where caribou can be and have been found, and signs of caribou. As shown in Table 3-5, elders have the most caribou related subjects (9), and the PCMB and the GNWT are close at (8) each, newspapers and RRC at (6) each, radio and personal observation yields (4) different subjects, and other hunters at (3). The information from other hunters may be the most important in determining where others go to hunt, but some of the other sources have a much greater variety of information they are discussing.

Table 3-5. Number of Subjects From Each Information Source

Information source	Number of subjects from each source
Elders	9
PCMB	8
GNWT	8
RRC	6
Newspaper	6
Radio	4
Personal observations	4
Other hunters	3
Internet	2
TV	1

3.5.3. Gwich'in Perspectives on Porcupine Caribou Population, Distribution and Health

Many harvesters (17/27) said they saw a change in caribou population, while some (10/27) either didn't perceive a change or didn't notice. All of those who perceived a change in the population said it has decreased, except one respondent who perceived the population to be growing. Population change was attributed to a variety of factors (see Table 3-6): climate change (10) and predation by wolves and grizzly bears (8), and by a few to overhunting by other communities (6), pollution (3), natural population variability

[27] The 500 meter corridor refers to a no hunting zone on either side of the Dempster Highway. It is law in the Yukon, but recommended in the NWT. The corridor was put in place as a safety measure and arose out of recommendations made by PCH user communities and the PCMB.

(3), distribution/migration route change (3), hunting methods and management (3), non-Aboriginal overhunting (2), disturbance from resource and industrial development (2), local overhunting (1), and tourism disturbance (1), helicopter disturbance (1). One person said the population was not declining.

Most respondents (21/27) noticed a recent change in caribou distribution and they gave a variety of reasons for why they think this has occurred (see Table 3-7). 10 people mentioned food availability as a major factor in changes in caribou distribution, and three of these people mentioned fire as it affects food availability. Climate change and natural variability are the next most common reasons given for the change (7). Overhunting, by both Aboriginal (from other communities) and non-Aboriginal people were each

Table 3-6. Causes Attributed to Porcupine Caribou Population Change

Causes	Number
Climate change	10
Predation	8
Overhunting (non-local Aboriginal)	6
Pollution	3
Natural population variability	3
Distribution/Migration route change	3
Hunting methods/Management	3
Overhunting (non-Aboriginal)	2
Resource/Industrial development disturbance	1
Overhunting (local)	1
Tourism disturbance	1
Helicopter disturbance	1

Table 3-7. Causes Attributed to Porcupine Caribou Distribution Change

Causes	Number
Food availability	10
Climate change	7
Natural variability	7
Fire (effects on food availability)	3
Overhunting (non-local Aboriginal)	2
Overhunting (non-Aboriginal)	2
Hunting methods	2
Overhunting (local)	1
Ecosystem change	1
Predation	1
Highway traffic disturbance	1

mentioned twice. Lastly, overhunting by Fort McPherson residents, general ecosystem change, predation and highway disturbance each were mentioned once.

Climate change and natural population variability were both stated by 7 people. The climate change discourse often suggests that changes are attributable to human activities, while "natural population variability" suggests change occurring irrespective of human activity. Compared to the question about causes of population change where climate change was at 10, and natural population variability at 3, more people potentially attribute population change than distribution change to human-affected causation.

One of the factors determining "where caribou go" is grazing opportunities. Caribou eat lichen which take many years to grow, and once the food has been grazed down caribou will often not return to an area for many years, returning only when the lichen has replenished itself. 3 of 10 people mention food availability specifically mentioned the role that fires playing a role in food availability. It is both Yukon and NWT policy to let fires burn in areas away from people and built infrastructure. This policy results in many areas within the caribou range becoming burned out and unfit for caribou grazing, thus caribou will not go to these areas or will bypass them. Territorial fire management regimes can profoundly affect caribou migration routes and wintering locations.

Respondents were asked about their perceptions of caribou health and the majority (24/27) said that caribou were in either good or very good health. There were a few exceptions where someone would discuss seeing individual caribou that they judged to be sick. People were also asked whether they were concerned about caribou population and health generally, and the majority answered that yes they were (21/27). Given the high number of respondents that said the health of caribou was good, the responses to this question were interpreted as a general concern for caribou that reflects the incredible importance of caribou in the lives of the Gwich'in. A common answer to the question "why is caribou important?" that I have heard in this study and in other parts of the north is "because it is our food". This is answer seems simple and obvious, but further thought reveals its significance and depth.

> *It's all I live by. Just what I need, don't live out of the store (R. Wilson, 2007).*
>
> *This is our livelihood, this is my food I eat every day (G. Koe, 2007).*

Other comments reflect the reality that Fort McPherson hunters have families that rely on the herd as a food source, and the concern exists that they will be able to harvest from the Porcupine herd in the future.

> *It's our livelihood, the next generation's traditional food source and subsistence. Our younger generation thrive on it, have a taste for it (R. Mantla, 2007).*
>
> *It's our food for the future. I have a kid of my own, and he has to have his caribou with him too (D. Koe, 2008).*

So rather than interpreting the answer to this question as meaning that people think the caribou in general are not in good, health, I see the answers reflecting people's continual high level of concern with the wellbeing of caribou given that caribou is so important.

3.6 Discussion

This study started with an assumption that there are many different kinds of information that inform Gwich'in harvesters; as such "Gwich'in Knowledge" is not simply made up of knowledge from hunting but draws on many different sources including the GNWT/ENR, news media, radio, and the PCMB. As shown in Table 3-5, however, harvesters reported that most of their knowledge about caribou was attained from other hunters and elders. Such emphasis on peers and elders within the knowledge-practice complex reinforces previous research and literature on the significant role that local knowledge systems play in local behaviour and resource management decision-making. This finding is significant given the breadth of information about caribou being shared through other government and popular sources.

3.6.1 Gwich'in Knowledge Complex

Tables 3-3, 3-4, and 3-5 above support the idea that Gwich'in Knowledge about Porcupine caribou is a complex entity created from both Gwich'in and western knowledge and ideas. The fact that other hunters and elders were cited most often as the source for caribou information suggests the importance of local knowledge (Table 3-3). Elders provide a wide variety of information about caribou from proper meat preparation to stories of past interactions with caribou, while other hunters generally provide information about their harvest experience such as where and when caribou were harvested (see Table 3-4). Of the organizations of the RRC, the PCMB and the GNWT, the RRC is accessed more readily than the GNWT and the PCMB. However, few

harvesters approach these organizations about issues related directly to hunting caribou. Rather, elders and hunters are most often sought to provide information to harvester interviewees about caribou. The data suggests that both community elders and the GNWT/PCMB are equally rich sources of information about caribou for Fort McPherson people.

There is apparent consensus on the decline of the Porcupine caribou herd by the GNWT, the PCMB, and the community of Fort McPherson. The GNWT and PCMB's official position is that the herd is in decline, and this perception is held by a little more than half of the research respondents. A deeper examination of the interviewee's responses, however, reveals a complexity in their understanding of population change, by both those who initially said they perceive the population to be declining and those who saw no change. Multiple questions were asked around population, migration, and distribution route change that allowed the complexity of perspectives behind a yes or no answer to emerge. The examples below demonstrate that some respondents are aware of and consider both scientific information as well as Gwich'in Knowledge simultaneously, as well as how these can be in conflict with each other. Both of these knowledge sources are valued in that together they contribute to constructing knowledge about caribou population change. The examples below discuss some observations that conflict with GNWT/PCMB census counts and claims that the Porcupine caribou is in decline. These are visual observations of the size of caribou herds, the lack of a successful population count since 2001, the understanding that caribou populations cycle, and the possibility that caribou may not have declined but simply have "gone elsewhere" (Cizek 1990:20).

J. Andre said "the hills were black with caribou last year." Until someone showed him numbers suggesting population decline, he would say the numbers of the herd are healthy. J. Kay said that sometimes he disagrees with the idea of a decline because of what he sees when on the land. He said it would take a lot to convince him of decline and suggests that people have to go out in the bush and see the caribou. He suggests that people who claim the herd is in decline sit in offices looking at computers and rely on satellite tracking data, and are not out on the land, actually seeing what and how many caribou are out there. Lastly, two elders, E. Colin and E. Kay have differing perspectives on decline, both based on the visual experience.

> *Hard for me to believe…because every year...every year it seemed to be the same amount of caribou… And you know when it is migrating and you go up, there's just all over that caribou. I seen it one time, you know, and that's where it's hard for me to believe it's declining (E. Colin, 2007).*

> *When we were kids, there used to be so much caribou… It was just black and moving like that. Now when you go on the highway you hardly see anything. Here and there are just little bunches. That's why it is really declining [inaudible words] getting nothing. There used to be lots of caribou and now it is not like that with us...(E. Kay, 2007).*

Another factor that causes doubt in the decline story is the lack of a successful photo-census since 2001 and the particular counting methods that are used. One respondent (W. Charlie) said that the counts are not as accurate as they are represented to be. This is because researchers use radio/satellite collars to locate caribou and they do not come to the community to ask people about caribou locations, thus groups of caribou that may not migrate to the coast with the rest of the herd are excluded from the count. W. Charlie referred to a group of caribou northwest of Fort McPherson that exhibited this behaviour and thus would have been excluded from the count (if it had been successful that year).

> *The people that say that they, like the government say it is declining. The only way they know is if they, some few caribou have collars on them, eh? And they are here and there. There's not many that they collar. Not all the caribou. And they don't know. Because some people kill them while they have collars on them too I guess and, that way they say they are declining. But they don't see it. They don't see the herd. Like we do (H. Alexie, 2008).*

Similar to this, M. Pascal suggested that the tendency of the caribou herd to separate and travel in groups is a challenge to the ultimate success of the photocensus method.

> *I don't believe it's declining, how do they know it is declining?... I don't know why they say it is declining… Yeah, hell of a lot of caribou, but it's hard to tell because it, eh, it don't travel in one big group like that, eh? Say some leaders go way ahead, and then another big herd is way behind. It don't travel all together, I don't think you can tell (M. Pascal, 2008).*

Another respondent (J. Andre) said that it wasn't right to assume that the Porcupine caribou herd is declining just because other NWT herds are, and further that this assumption is not supported by recent census data. Lastly, some respondents suggest the possibility that alterations in the caribou migration routes may be confounding population counts, and thus the population of caribou may not actually be in decline. During an elders meeting, M. Pascal and E. Colin told us that Arctic Village, AK, is now, after

many years, seeing caribou around their community again, and those could be the 'missing' caribou.

> *Arctic Village, they haven't seen caribou for how many years now. Now they say there's all kinds of caribou there. What they're talking about, what they mean, declining? Half of that caribou is down in that country. Not very many come up this way. I don't think it is declining (M. Pascal, 2008).*

Changes in migration routes are further linked to locations of caribou food (lichen). There is also an understanding of the cyclical nature of caribou populations, so calling the situation a decline may not be accurate because it freezes the understanding of the cycle in a particular phase. Terming it a decline excludes the other parts of the cycle.

Considering the comments above, the strict dichotomies between western science and TK for communities like Fort McPherson seem inappropriate given the availability and potential influence of scientific information about caribou. Rather than two discrete positions on the population (in decline or not in decline) the research shows there are variations in perspective that fall on a gradient between the two positions. Community harvesters vary in the weight they place on direct observation, or ground truthing, and quantitative survey data, but it is clear that both types of information are considered and weighed by individual harvesters. It is for this reason that this study aimed to learn more about the kinds of knowledge and information that most influence harvester perceptions of caribou well being and harvesting behaviour in the Gwich'in region.

3.6.2 Western Knowledge About Caribou

The official position of the GNWT and the PCMB is that the Porcupine caribou herd is in decline. It is the claim of both the PCMB and the GNWT that they use TK in management decision making. This from the GNWT caribou management strategy:

> Managers do not only rely on the estimates of herd size to determine if caribou are increasing, stable or declining. Reports from hunters and elders, as well as information on trends in harvest levels, harvest sex ratio, predator abundance, adult female and calf survival, fall condition, pregnancy rates, disturbance during hunting seasons, effects of resource development activities, and range condition are also used. All this information helps caribou managers and users to identify declines and diagnose their causes and to understand the potential impacts of human activity on the population dynamics of the herd and mitigate those impacts (GNWT 2006:8).

Co-management bodies, such as the PCMB are tasked with reconciling differences in how knowledge about caribou and caribou population change is generated by western scientists and users (harvesters) of caribou. The PCMB "recognizes scientific research as well as TK. This ensures the Board is guided by the best, most comprehensive information available from all its members as well as outside organizations" (PCMB 2004-2010d). One of the stated aims of the Board is to "review technical and scientific information relevant to the management of the Porcupine Caribou Herd and its habitat and make recommendations on its adequacy" (PCMB 2004-2010d). Different strategies and challenges around integrating these two knowledge systems within the co-management context have been discussed by Nadasdy (2003b, 2003c), Agrawal (1995a, 1995b), Berkes (2008), Berkes et al. (2005), Usher (1993) and Cizek (1990) with regard to the Beverly Qamanirjuak Caribou Management Board,[28] and Kofinas (1998, 2005) with regard to the Porcupine Caribou Management Board, Manseau et al. (2005), and Parlee (2006). Within this context, however, it is well recognized that there is far more western science than TK documented about caribou population change in the Porcupine range.

The numerical data that form the basis of the western understanding of caribou and the decisions we make with regards to managing caribou is based on quantitative type of information and inquiry, and not TK. Thus the primary focus is on understanding, and thus managing, caribou quantitatively, and this results in an exclusion of other ways of knowing and understanding caribou, despite claims to seriously consider TK. Exclusion of other ways of knowing caribou from management weakens our overall understanding of caribou, which both biologists and Gwich'in elders readily admit is incomplete. As well it allows non-Aboriginal society to avoid confronting deep challenges to the primacy of the western worldview. Unlike Gwich'in Knowledge, which this thesis shows to have incorporated aspects of western knowledge and processes of knowledge construction, western knowledge has not incorporated or even seriously considered Aboriginal perspectives.[29]

There is some controversy over the population numbers and the counting methods that form the basis for ENR and PCMB management decisions. Management options for

[28] At the time Cizek (1990) wrote this paper, the name of the herd was spelled *Kaminuriak*.
[29] Acknowledgement to Peter Redvers for suggesting the relational model of Aboriginal and non-Aboriginal people in Canada.

declining herds have always prioritized managing the human impact through harvest restrictions (Sandlos 2007, Usher 2004, Kelsall 1968) and this has included reducing quotas for commercial outfitters. Commercial outfitters in the NWT have recently "questioned the validity of ENR's evidence for a caribou decline and ENR's caribou research and management techniques in general" (Fisher et al. 2008:6). The Alberta Research Council (ARC) was invited by the Environment and Natural Resource Minister to do an independent peer review of the ENR barren-ground caribou management (Fisher et al. 2008). The final report concludes that for all herds, data collection has been "infrequent and irregular" (31) and so "it is difficult to judge the putative declines of other barren-ground caribou herds, as population estimates were not collected consistently enough to reliably monitor trends in all herds" (31). Based on existing ENR data, the ARC concluded it "can not definitively state whether a decline has occurred in other herds" (32). The trend lines for some of the herds tend to support declines, and ENR manages on this basis (Fisher et al. 2008).

In response to concerns about the accuracy and precision of counting methods, the Porcupine Caribou Technical Committee (the scientific arm of the PCMB) characterizes population counts as "conservative estimates that are probably accurate to within approximately 5,000 caribou", and claims that any potential shortcomings of the methods are offset by the repeated use of the same method resulting in confidence "that the censuses accurately reveal the population trend over time" (PCTC 2007). The PCMB states that they rely on population estimates to guide decisions, as well as looking to TK for support. They recognize that multiple factors affect population in each year, and so "trends over the longer term are more important than the findings in any particular year" (PCMB 2004-2010a). But the fact is that there is no long term data to base long term trend analysis on. Caribou population cycles are now believed to follow approximately forty year cycles (Kofinas & Russell 2004, Berkes 2008), and some suggest that the cycles may be as long as 80-90 years (F. Berkes, Pers. comm., October 2, 2010). Population data has been collected for the Porcupine herd since 1972, almost one full population cycle. This data shows what seems to be only one increase and one decrease phase, and there is no data showing earlier population cycles with which to compare this data set. [30] Despite this lack, the PCMB claims that the Porcupine herd is experiencing a

[30] I say "seems to" because data prior to 1972 could alter the perception of an increase.

decline “in excess of normal fluctuations”, but does not explain what this claim is based on (PCMB 2004-2010a).

There are other issues with a number-based management style. The population is often described with a single population number. This does not encourage the development of an understanding of the continual flux and change of caribou populations. There is long term data available for the Porcupine caribou herd (a set of increase-decrease but not a full set of increase-decrease-increase) that is not represented or referred when the herd is represented with a single number. Also presenting the population trend as a decline ignores the other half of the available data set, the long period of increase that occurred between 1972 and 1989. This withholding of information forces an audience to accept the view of the decline that the GNWT and the PCMB hold because the audience does not hear about the rest of the data, and can’t put the decline statistics into this perspective. Next, numerical descriptions of a herd do not represent the health and well being of a herd of caribou, nor does it include the human element of human-caribou systems, and the health and well being of that system. Traditional (and Gwich’in) knowledge is more concerned with the health and well being of the human-caribou system than wildlife management is in that the human element is inseparable from considerations of caribou populations. The reality is that there is great uncertainly about caribou, and animals in general. The PCMB website answers the question “what are the causes of the herd’s decline? It is impossible to say for certain” (PCMB 2004-2010a). It is not understand why caribou do what they do. Animal sociality and explanations of caribou behaviour that follow from this is one aspect of Traditional/Gwich’in Knowledge that scientists and thus managers hesitate to consider as reality. Following from the question of caribou sociality is the potential of a moral responsibility toward caribou animals on the part of humans which would put into question many of our actions with respect to land and resource use. Accepting TK fully would require western culture and western science to grapple with some questions it has up until now pointedly classed as impossible as well as reconsider the approach to land and resources.

If it is so that “wildlife management is...essentially goal-oriented” and is “an institutional means for manipulating the elements and interactions between habitat, wildlife, and man in order to achieve specific social goals and objectives” (LeBlond 1979:50), then what are the goals of Porcupine caribou management? The GNWT and the PCMB have

declared the Porcupine caribou to officially be in a state of decline (PCMB 2009b, GNWT 2006, Fisher et al. 2008) and thus "in immediate need of conservation" (PCMB 2009b), and the herd is now managed from this position of a declining population trend. Management options for declining herds have always prioritized managing the human impact through harvesting (Sandlos 2007, Usher 2004, Kelsall 1968) and strongly focus on aspects of Aboriginal harvesting as needing to be changed. Thus the focus is on regulating Aboriginal hunting and not on other recognized human-caused impacts on caribou population such as loss of habitat due to ever increasing resource development in the NWT and the Yukon or the effects of climate change on weather patterns.[31] The focus on Aboriginal hunting allows attention to be focused *away* from resource development and climate change. Focusing on these areas could bring up some difficult questions such as the need to limit industrial development in the north and to rethink consumption behaviours. This would mean a general loss of profits to members of non-Aboriginal society, challenges to the goals of unlimited economic growth, as well as challenging the deeper held colonial perception of the right of non-Aboriginal society to exploit the resources of the north and of this land in general.

3.7 Conclusion

In this paper I examined how the Gwich'in, the GNWT, and the PCMB construct knowledge about caribou. The paper offers the concept of Gwich'in Knowledge, one that goes beyond both the GTC's own definition and one that goes beyond the distinction between TK and western science commonly presented in literature and in practice. I suggest that Gwich'in Knowledge is a complex that incorporates western science, owing to the long interaction between the two knowledge systems. Knowledge exchange occurred historically through Aboriginal interactions with trappers, traders, explorers, and missionaries. The Gwich'in are still being actively exposed to non-Aboriginal ideas about what is considered the right way to hunt and interact with caribou, mainly through exposure to scientists and biologists through the PCMB and the GNWT. In addition to these sources, Gwich'in harvesters access information about caribou from elders, other harvesters, and through the media. Of all the sources of information about caribou, people mainly rely on elders and other hunters for information about caribou, and less so on the GNWT and the PCMB. With respect to caribou population there are multiple perspectives within the community, and these perspectives are informed by a variety of

[31] The perspective of climate change as being caused by humans.

information sources, including on the land observations and the results of caribou surveys and surveys.

Western knowledge about caribou is mainly quantitative. This perspective imagines a caribou herd as a group of individuals that shifts and changes quantitatively, but it also attempts to understand the effects of weather, predation, and habitat on the number of animals quantitatively. This way of understanding the herd does not consider humans in the system except as predators (humans have a relatively minor effect compared to wolves). Understanding the herd through numbers is integrally linked the development of the caribou crisis of the 1950's, and together with value judgements made about Aboriginal people and their harvesting methods, led to the restrictive and socio-culturally damaging management decisions that followed (Sandlos 2007).

The effect of seeing large numbers of caribou is powerful, as described by early observers of caribou such as Seton (Sandlos 2007). Early observers made estimations of numbers of animals from the ground, and these have been long understood to be inaccurate, subject to human error, and thus unreliable (Sandlos 2007). Counting methods used today attempt to eradicate this human observational error by taking photographs of caribou and counting the animals represented there. Gwich'in harvesters, on the other hand, do not take photos of caribou when they observe them, and they provide a source of information about caribou populations based on observations. They see caribou on the land as well as communicate with other communities as to the observed locations and numbers of caribou. There has not been a successful photo-census for almost a decade. This seems to have weakened the influence of this particular information source, and maybe into this breach other sources of information about caribou, such as the individual observation, may be more heavily relied upon in forming individual hunter perspectives of caribou populations.

The research suggests that Gwich'in hold different, and seemingly contradictory, pieces of information about caribou population simultaneously. Harvesters must navigate these multiple perspectives when considering their own hunting behaviours. They may see many caribou pass through the community or hear from people in other communities that there are many caribou in another area, and yet be informed by biologists and managers that caribou are in decline. This is indicative of the Gwich'in Knowledge Complex, a

concept/figure demonstrating the ability of Gwich'in hunters to incorporate multiple and sometimes contradictory perspectives and information about caribou, and utilize it in decision-making about hunting behaviours.

3.7.1 Further Research

Gwich'in harvesters incorporate information about caribou from multiple sources including scientific quantitative perspectives on population status. Both the GNWT and the PCMB have publicly stated that they are dedicated to incorporating Aboriginal knowledge and perspectives into decision-making; the GNWT through its Traditional Knowledge Policy (GNWT 2005), and the PCMB by its nature as a co-management board and stated on its website (PCMB 2004-2010d). Success in this area is questionable, understandably as the conscious acceptance and incorporation of the ways of valuing and constructing knowledge of another culture is difficult. Further research is needed on why this goal has not yet been achieved. These difficulties can be examined from a colonial perspective, a perspective I have not touched on directly in this thesis, but one that certainly underlies it. In the Canadian colonial context, western European culture is dominant over Aboriginal cultures, and thus does not *have* to incorporate ideas from the dominated culture. There are actually barriers set up to prevent this. A small but powerful example is the use of the phrase "going native" which is perceived to be negative and is used by members of the dominant society to control other members who are judged to be getting to close or sympathetic to the colonized group. Aboriginal people, in order to survive in the dominant culture must do things "the white man's way" to survive and succeed. Thus Aboriginal acceptance of non-Aboriginal ideas is more likely to occur than the opposite, non-Aboriginal culture incorporating Aboriginal ideas.

Does Gwich'in Knowledge draw on aspects of western knowledge because Gwich'in hunters recognize the potential value in other ways of understanding caribou and thus take advantage of all the tools available to them? Or have Gwich'in people been successfully colonized by the attempts of the dominant society to alter Aboriginal culture? Or is it merely human nature to incorporate the knowledge of ideas of other groups? Again, though this thesis does not discuss these perspectives, it leans heavily towards the first perspective, that Aboriginal people are resourceful and autonomous in the face of colonization. With respect to caribou it can be argued that Aboriginal people are stronger for this because they are more willing to consider multiple ways of knowing,

and are more willing to draw on multiple sources of information and use them as tools to understand caribou. For non-Aboriginal people to achieve the goal of including TK in resource management processes, the weighty bias of the superiority of science as the method to acquire knowledge, and within science the power of the quantitative model has to be overcome.

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4.0 WAYS WE RESPECT CARIBOU: GWICH'IN CARIBOU HUNTING ETHICS

4.1 Introduction

This paper discusses rules-in-use with respect to hunting caribou from the perspective of elders and harvesters from Fort McPherson, Northwest Territories (NWT). The community is involved in co-managing the Porcupine caribou herd together with the PCMB and the Government of the Northwest Territories (GNWT). All of these organizations have particular ideas about what constitutes acceptable hunting behaviour which are institutionalized in various ways: Gwich'in local rules-in-use, GNWT regulations and legislation, and PCMB recommendations. While the rules themselves can be easily identified, the enforcement of these rules is more challenging and complex; as such enforcement is not dealt with to a great extent in this paper. This paper features an exploration of Gwich'in rules-in-use and an attempt at direct comparison of rules-in-use with hunting regulations of the GNWT and recommendations of the PCMB. This comparison is made more complex by historical changes undergone and still occurring, by the community in the last century and since contact. Exposure to western ideas of conservation and management, recent changes in hunting technology, and a fundamentally different cultural understanding of wastage, population dynamics, and what is acceptable hunting practice complicates comparisons. In particular, the paper focuses on exploring the initial observation that people may speak a rule but apparently don't always follow it, the practical realities of relying on a migrating ungulate as a main food source, and differences in worldview that support different hunting behaviours.

Gwich'in rules-in-use are compared and contrasted with GNWT caribou hunting regulations and PCMB recommendations. There are some areas of commonality such as prohibitions against wastage, wounding loss, and the unnecessary disturbance of caribou and areas of difference such as the definition of waste or what parts of the animal it is acceptable to leave behind, the feeding of caribou meat to dogs, and the practice of hunting female caribou. One area of conflict and one of agreement is examined in more detail, in particular hunting caribou cows and the prohibitions against wasting meat. The point of this exercise is to explore the cultural rules underlying both the Aboriginal and non-Aboriginal approach to caribou management and thus to understand some of the difficulties in the co-management of caribou.

4.2 Background Information

This background section introduces the Porcupine caribou by describing one full year migration cycle, noting where and when they come into contact with Fort McPherson harvesters and what caribou hunting in Fort McPherson entails. The subject of rules-in-use about caribou hunting is introduced, beginning with a discussion on the feasibility of a comparison between Gwich'in and GNWT rules. Do the Gwich'in even have *rules* as the concept is understood in a western sense? I conclude that making a comparison is acceptable. To clarify, the term 'rules-in-use' will be used exclusively to refer to the Gwich'in resource management institutions, and 'rules' to refer to the GNWT regulations. This distinction arises from the common property literature where rules-in-use refers to what people actually do in practice, which may or may not correspond to the accepted or "official" rules. As Elinor Ostrom, the 2009 Nobel Prize winner for Economic Sciences for her work on common property resource regimes, emphasized, "rules on paper are not rules-in-use" (E. Ostrom, October 1, 2010).[32] This difference between rules and rules-in-use will be discussed in greater detail below. The paper continues with the Dene Laws, aspects of Dene cosmology, and some of the stories about people and caribou that establish the importance of the relationship between people and caribou: its social nature and all of the responsibilities that implies. Lastly, this background section examines the scientific population model; in particular its quantitative nature.

4.2.1 The Porcupine Caribou Year: Description of One Migration Cycle

The Porcupine caribou, and are also known scientifically as *Rangifer tarandus granti*, barren-ground caribou in English, and *vadzaih* in the Gwich'in language. The Porcupine caribou herd range covers northwest NWT, north-central Yukon and northeastern Alaska (see Figure 4-1). The calving area is along the Yukon/Alaska coastal plain within Ivvavik National Park (Yukon) and the Arctic National Wildlife Refuge (ANWR) in Alaska (Sherry and VGFN 1999:190).

The annual cycle of the Porcupine caribou is divided by biologists and managers into nine phases: early, middle, and late winter; spring, spring migration and pre-calving; calving; post calving and movement; early summer; midsummer; late summer and fall

[32] Elinor Ostrom, October 1, 2010, Opening Address to the North American Regional Meeting of the International Association for the Study of the Commons September 30 – October 3, 2010.

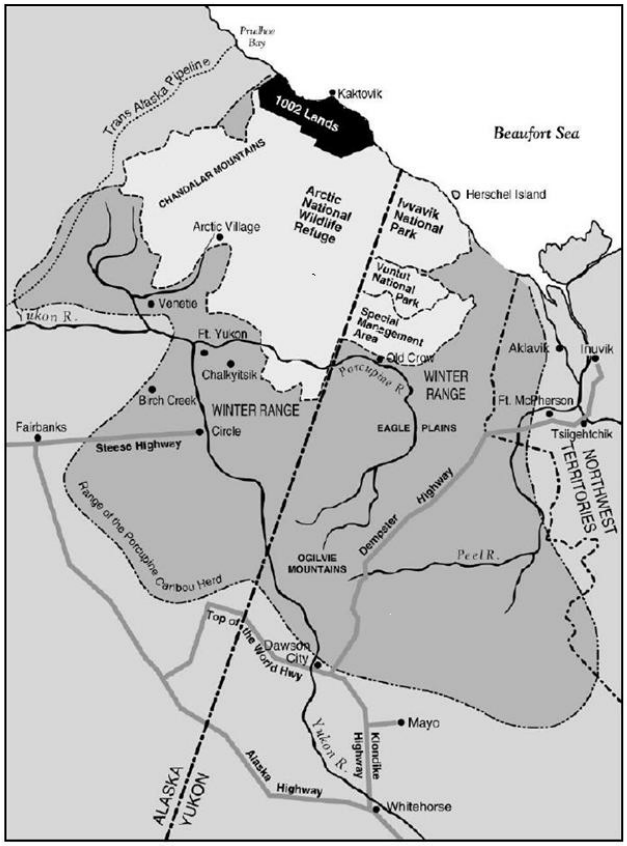

Figure 4-1. Porcupine Caribou Herd Range.
Modified from Journey North, http://www.learner.org/jnorth/images/graphics/c/caribou_rangemap.jpg
Retrieved August 13, 2007

migration; rut (mating period when the males are active); and late fall (Porcupine Caribou Herd Satellite Collar Project 2009a, 2009b; PCTC 1993). Seasonal habitat requirements vary throughout the year as caribou look for appropriate food, safe places, escape from biting and parasitic insects, and shallow snow (PCTC 1993:3). Habitat choices are affected more specifically by snow conditions and snowmelt patterns, food type and availability, predator abundance and protection from them, insect relief, weather conditions and other factors (Sherry and VGFN 1999:188). The late fall and winter range is occupied from October to April. Caribou, in low densities and in small groups, prefer a combination of spruce-lichen forests or boreal forest for eating, and open areas for resting and predator avoidance (Sherry and VGFN 1999:185). Pregnant females travel to the summer range in early April. Bulls, non-pregnant cows, and juveniles come later, following the "green-up" of the landscape (Sherry and VGFN:190). Cows give birth in early June to single calves, who are standing, nursing, and following their mothers within minutes of birth (GRRB 1997:21). Post calving aggregations occur in early summer.

During this time caribou spend their time eating, resting, and regaining body condition. During late summer to early October the migration to areas south of the tree line begins. Rutting occurs during October and November, and the caribou then move to chosen wintering grounds. Exact routes and locations vary from year to year due to alterations in the factors described above.

4.2.2. The Hunting Year in Fort McPherson

The purpose of this section is to describe caribou movements during the year along with the hunting activities of Fort McPherson hunters. The point is to demonstrate to readers how these two are interconnected, and the extent to which Fort McPherson people's activities are integrated with caribou movements.

Presently, the majority of hunting takes place in areas adjacent to the Dempster Highway, south of the community (See Figure 4-1). Some hunting occurs in non-highway accessible areas, where people follow old dog team trails into the Richardson Mountains. The hunting season in Fort McPherson runs from August until May, corresponding to the presence of Porcupine caribou in the area. Fall caribou hunting begins in August when caribou return to the area seeking their fall and winter range. Hunting activity peaks in September. At this time before the rut, bulls are preferred due to prime body condition. Hunting slows during early October and late November, during which time the male caribou are rutting (PCMB 2009b). During rutting the older bulls become inedible due to hormones present in their tissues which render the meat bad tasting and smelly, as well they experience rapid weight loss. Younger males are unaffected during the rutting season and are good to hunt. Cows are not as fat in fall as they are recovering from calving and are nursing their calves. Summer is the best time to get caribou skins as the caribou hair is short and ideal for making clothes and tents (GRRB 1997:27). Hides are usable until December when the hair is thicker (Sherry and VGFN 1999:224). After this time warble fly larvae underneath the skin make holes in the hide rendering it unusable (GRRB 1997). Some hunting occurs during December and January, rising to a peak again in March and April, during which time the caribou are beginning the trek back to their calving grounds. During the winter and the spring cows are preferred, as they have regained their body condition. During the summer, the Porcupine herd is back at the calving grounds, and not in the Fort McPherson area. In August, when the herd returns,

the bulls are once again the best choice as they are fat from summer feeding, while the cows have recently given birth and are feeding their new calves so their body fat is low.[33]

In both the fall/winter and spring seasons, most people hunt 1-3 times per season, depending on the availability of caribou in the area, free time, money for gas and shells, and available transportation. For the most part, trips are of short duration, a few hours to one day. The highway and its location through the heart of the winter range makes these shorter trips possible and creates opportunities to hunt despite varied employment status exhibited by interviewees.[34] Many people have to fit hunting around their jobs which affects how often and how long they can spend hunting. Snowmobile trips tend to be longer, two to five days, and occur more rarely, compared to highway hunting trips. Transportation by truck and snowmobile is often shared between families and friends. Most respondents hunt in small groups of one to three, mainly consisting of family and friends. Elders and youth are a component of many hunting groups.

4.2.3. Gwich'in Laws

The late Sahtu elder George Blondin held that there are nine Dene laws that discuss how people relate to each other, in addition to many other "common sense" Dene laws. The laws are to share what you have, help each other, love each other as much as possible, be respectful of elders and everything around you, sleep at night, work during the day, be polite and don't argue with anyone, young girls and boys should behave respectfully, pass on the teachings, and be happy at all times (Blondin 1997: 71-72).[35] These laws and the stories that follow, though voiced by Sahtu elder George Blondin, are shared in slightly different forms by all the Dene of the north including the Gwich'in. Yamoria, the "one who travels around the earth", "came along and established law and control so people could improve their lives" (Blondin 1997:47). Yamoria is a great medicine man who is known all over *Denendeh* and down to the Beaver people in northern British Columbia (Blondin 1997:70).

[33] Hunting preferences in this section was compiled from interviews.
[34] Types of employment include full and part-time, unemployed, seasonally employed, retired, and recent high school graduate.
[35] Some of these laws are understood more readily when it is understood that in the past almost everyone had varying amounts of medicine power, and you often did not know who had how much or what they could do with that power. Some of these laws, such as be polite and don't argue with anyone, reflect the realities of living in that context (Blondin 1997).

> When the world was new, animals and humans held a conference to see how they would relate to each other. Yamoria used medicine power to control everyone's mind to arrive at a fair resolution. The meeting lasted a long time and involved humans and every bird, fish, and animal that lived on the earth. All agreed that humans could use animals, birds, and fish for food, providing that humans killed only what they needed to survive and treated their prey with great respect. Humans must use every part of the animal and never waste anything. It was also made law that humans take the bones of the prey and place them in a tree or scaffold high above the ground. And finally, humans were told to always think well of animals and thank the Creator for putting them on the earth (Blondin 1997:48).

There are also stories about the foundations of the relationship between people and caribou that form a basis for understanding the relationship between them today. The following story about people and caribou explains how people relate to caribou.

> Long ago, vadzaih and men were much closer. Any person, not just a Medicine Man, could talk with vadzaih. When people and vadzaih separated, it was agreed that people could hunt vadzaih; however, a sign of the old relationship remained. Every vadzaih has a bit of *ezi*, human heart, in him, and every human has a bit of vadzaih heart. People will always know what vadzaih are thinking and feeling, and the vadzaih will have the same knowledge about people. This is why hunting vadzaih is at times very easy, and at other times very difficult (GRRB 1997:37).

Emma Kay refers to the story of people and caribou when discussing different ways of respecting and not respecting caribou. In Emma's story, it is a gland and forearm meat that is shared. *Gwich'in Words About the Land* (GRRB 1997:37) mentions several places in a caribou leg and *ungwal*, or neck, that look like human flesh and that this remains from the time when *vadzaih* were people.

> *You know, many years ago, maybe weren't even born, way back, you know they say we used to be caribou? We changed with the caribou. Caribou used to be like us…and they say they changed. That's why they say when you kill caribou and you cut the legs off like that, right in here, there's some meat, that is human meat. [Points to inner mid-forearm] My grandmother show us that. You can't eat that, ah? When you kill caribou you work with that head, there is glands in there that is human glands they say. I believe that (E. Kay, 2007).*

In addition there are stories that tell of people who went to live with animals and these people gained valuable knowledge about caribou.

> Legends tell of people who went for a time to live among the animals. This gave them great knowledge of the land. In the case of the caribou, vadzaih and humans traded places. Each learned the difficulties and rewards of the other's life. When they changed back and separated, it was agreed that people could

> hunt caribou. Because of the exchange, people will always know what caribou are thinking and feeling, and caribou will have the same understanding of people. This explains why it is sometimes very easy and at other times very difficult to hunt caribou (Sherry and VGFN 1999: 214).

The quotes above demonstrate that the nature of the relationship between caribou and people is a social one. Caribou, along with other animals, are considered to be "other-than-human persons" or "persons who engage in reciprocal social relations with humans" (Nadasdy 2007:25). Along with this social relationship come certain obligations such as the rules-in-use discussed later in this chapter.

There are negative outcomes for people who do not meet the obligations to respect caribou. For example there are correct and incorrect ways to kill caribou; an oft-heard statement throughout *Denendeh* warns against hitting caribou with sticks. In cases where this occurs, results include the caribou avoiding the person and sometimes the community of those who did the deed.

> People who have caribou medicine power say that the herd meets with their leader before a long journey, looking into the future with their powers and checking on the attitudes human beings have toward them in the areas they are going to pass through. Sometimes they avoid areas where people who failed to show them proper respect are living (Blondin 1997:123).

The ideas discussed above have become important principles guiding management organizations such as the Gwich'in Renewable Resource Board. There are many more Dene laws and stories that lay out the relationship between Dene and caribou, but what about "rules"? Do the Dene have "rules" or "rules-in-use" as the term is understood in western culture? The basis of this paper is a comparison between caribou hunting regulations of the GNWT, the recommendations of the PCMB, with those of the rules-in-use of the Gwich'in. The question arises as to whether it is it appropriate to contrast these three because the differences between them may make this endeavour impossible, or even irrelevant.

4.2.3.1 Do the Gwich'in Have "Rules"?

The first consideration as to whether a comparison of rules is appropriate is to explore whether the Gwich'in have "rules" as the term is understood in western culture. "Rules" falls into the category of English terms used by both western and Aboriginal cultures, but actually refer to quite different cultural concepts. An oft-used term that falls into this category and is also very relevant to this discussion is the term "respect". As Paul

Nadasdy (2003b, 2005) shows, when Yukon First Nation people use the term "respect" in the context of wildlife management, they are referring to "a complex set of beliefs about the proper relationship between humans and their spiritually powerful animal benefactors" (2005:303). Nadasdy points out that the "Yukon First Nation people's concept of respect is far more complex and culturally dependent than most Euro-North Americans are aware" and that "most Euro-Canadian Yukoners completely misunderstand what Yukon First Nation people mean by 'respect' as they use it in debates over wildlife management" (2005:302-303). Respect is understood by most Euro-Canadians as "little more than shorthand for a moral injunction against wasting meat" (2005:302). It is little recognized, if at all, the cultural differences embedded in the terms used in wildlife management. Thus when we approach a discussion about comparing rules, we must keep in mind that the western understanding of "rules" may be quite different than the Gwich'in approach to the concept. In Parlee's (2006) doctoral work on berry harvesting with Gwich'in women, she found that people preferred not to use the term "rules", rather they said "ways we respect each other and the berries" (176). Similarly, the title of this project and the wording used in the research questions was negotiated with project partners to be "ways we respect caribou" rather than "caribou hunting rules". Anthropology has had a strong focus on Aboriginal taboos. In Guédon's (1994) work with Dene menstrual taboos, she "began to understand the taboo not as a rule to be obeyed, not as a general principle of conduct, but as the expression of [her] personal relationship with streams, paths, door-steps, men, food, and even [her]self as a woman" (Guédon 1994: 42).[36] Through the course of her fieldwork, Guédon's (1994) search for Dene taboos or 'rules' shifted to a focus on the Dene understandings of the personal relationships that exist between people and the world around them (including berries and caribou). Paul Nadasdy discusses how animals in Aboriginal culture are understood to be "non-human persons" with whom humans relate to socially and thus have social responsibilities toward (Nadasdy 2007). The language used by Gwich'in elders of "ways we respect the berries/caribou" points to two things, first to the relationship between people and caribou, and second, to the existence of multiple ways of relating to caribou. The Gwich'in do not so much have rules with respect to caribou than they have personal and social relationships with caribou.

[36] Guédon is talking about taboos relating to being female, and she begins to understand it as "being a woman was not a state of being or even a biological fact. It was a process, an act of participation" (1994:43).

The use of the terms *rules* and *rules-in-use* both arise out of a particular relationship to the environment and the resource. Rules set out by the state reflect a different relationship to the resource than do rules-in-use of a user community. Community rules-in-use reflect the relationship and knowledge people have with their environment, arising out of long-term use of the resource and a subsequent build-up of knowledge about it. State rules over resources, on the other hand, have a different basis. Governments are particularly interested in resources that are economically valuable and thus significant, and there are government rules around those that are considered important (for example caribou) and none around those that are not (for example berries) (Parlee et al. 2006). Government rules are made in places often geographically distant from the resource, by people who do not have first-hand knowledge of the resource or the environment the resource resides in. Sandlos (2007) discusses caribou management that was based in Ottawa, historically, and other southern centres of wildlife management. I have repeatedly heard harvesters and northern people invite biologists and resource managers, people who are involved in making decisions about caribou, to spend time on the land and get to know caribou. Local rules-in-use are more of a reflection of knowledge of ecological conditions and a personal relationship to the resource, rather than the power and authority over resources that characterize state rules.

At the heart of NWT government wildlife regulations is a view of caribou as a resource to be exploited for the benefit of humans. Drawing on the common property literature, the Canadian state relates to caribou as resources "held under public trust for the citizenry" under a *state property* property-rights regime, where "rights to the resource are vested exclusively in government which…makes decisions concerning access to the resource and the level and nature of exploitation" (Feeny et al. 1990:5). Benefits from the caribou as a resource are allocated by the state to the individual citizen in accordance to proper behaviour such as purchasing hunting licenses and following particular practices as set by the state in the GNWT hunting regulations (GNWT 2009) and the Wildlife Act (R.S.N.W.T. 1988b). Under this regime, the state holds coercive powers of enforcement over such resources (Feeny et al. 1990:5). Differences arising from these two different ways of relating to caribou are that this relationship aspect between caribou and people does not figure in western culture-based hunting regulations as animals are not considered 'persons' or entities with whom we have relationships and social obligations.

To further explore the appropriateness of comparing Gwich'in ways of respecting caribou with GNWT hunting regulations and PCMB recommendations, an understanding of the importance of autonomy in Dene culture is required. Personal autonomy in decision-making is highly valued. Primary knowledge arising from direct personal experience is a foundation for decision-making. Nadasdy (2003b), Guédon (1994), and Rushforth (1992), in their work with northern Aboriginal people, all observe that personal experience is the main way one gains and validates knowledge about the land and about animals. Dene culture values primary knowledge and the legitimation of knowledge through personal experience (Rushforth 1992). Rushforth describes primary knowledge as knowledge that derives from direct personal experience and suggests that "many [Dene or *Sahtúot'ı̨ne*] consider experiential knowledge more likely than other forms of knowledge to be accurate, reliable, and therefore useful" (1992:484). Secondary knowledge sources can include oral literature, formal and informal instruction, gossip, hearsay, and written materials. Through communication, the primary knowledge one person can become the secondary knowledge of another. And through experience, secondary knowledge (originating from others) becomes primary knowledge (once validated by knowledge holder). The above does not mean that people don't value secondary knowledge, or that they get most of their knowledge from direct experience, or do not abstract and generalize from experience. Rather, "reference to primary experience is simply the culturally preferred mode of legitimation for knowledge. People who speak from primary experience, all else being equal, are granted greater credibility and authority than others" (1992:486). "Nothing is validated on the strength of the authority or the status of the person giving the information" (Guédon 1994:51). The experience of the source is always considered, but "personal experience is always the final test for the validity of the knowledge" (Guédon 1994:51).

Guédon (1994) attempted to find a community wide "way of doing things" such as tanning solutions and moccasin patterns, or hunting and trapping. This was not possible as no one does anything quite the same, and people described their own techniques "from an individual point of view as a personal experience" (49). When she asked how to do something, people would tell her what they did, but not what she should do. It was voiced as "that's the way I do it" and not "that's how one should do it" (49). "A method or 'way' is pronounced adequate for its proponent on the only criterion of its

effectiveness" (49). Similar how people do things, people have their own personal versions of myths/taboos (Guédon 1994:67, Note 11, italics mine).

> It was equally difficult to reach some kind of agreement on the details of hunting ritual prescriptions. While my informants more or less agreed most of the time on the principles behind the observances, principles in keeping with and validated by the myths used as references for the animals concerned, *they each had a personal version of taboos and rituals which would be followed on different occasions.*

With regards to the relationships between animals and humans, all of Guedon's teachers "agreed on the necessity for respect", and there are many "taboos and prescriptions concerning handling of game and consumption of meat" that are "numerous, detailed and varied" (note 11:67). But "the normative aspect of these rules was weakened by the fact that they could be interpreted differently by different people or according to the situation; they could be tested and revised according to the people's experiences." Guédon's summary of the Dene ways are as follows. First, Dene ways are processes, and do not refer to a "reified series of descriptive or normative statements"; second, there is a "lack of a need for consensus when validating one's own knowledge or value judgment" and this is a "facet of Dene individualism"; and third: "this individualism is accompanied by a weak development of formal rules (Guédon 1994:61).

As discussed above, there are some real differences in how the Dene and Euro-Canadians approach and understand *rules*. It is important to recognize these cultural differences underlying rules. This understanding will help in the discussion of the case studies, one rule that is different (caribou cow hunting) and one that is agreeing (wastage), as well as understanding difficulties in the greater co-management project. We will see that what seems to be straightforward agreement or disagreement may not be. I continue with the comparison because it is a starting point for understanding these deeper undersides and complexities.

4.2.5 The scientific population model

"Nobody knows the way of the wind and the caribou". This phrase, attributed to the Chipewyans (Munsterhjelm 1953), brings to mind the laughter of elders as I asked them why the caribou do what they do or why they go where they go. Caribou migration patterns and the sex and age patterns of the travelling groups are not well understood by humans. The accepted biological model of caribou movements is based on population surveys, computer simulation studies, and knowledge of other cycling species, "but the

science of caribou cycles is still uncertain" (Berkes 2008:122). Population increase and decrease is a "scientific problem yet unresolved" as there are no long-term quantitative data sets in existence on this subject (Berkes 2008:121). A lack of data in this area means the conventional biological view does not include population cycles (Berkes 2008). "Many ecologists are reluctant to refer to caribou as a cycling species for the lack of hard data. Western science has simply not recorded a full cycle of increase-decline-increase" (Berkes 2008:122). Data on the Porcupine herd includes one increase and one decrease, from 102,000 in 1972 to 123,000 in 2001 (PCMB 2004-2010a). Estimated at 100,000 by computer program based on indicators gathered since 2001 (see Figure 4-2), as there has not been a successful photo-census since 2001 (PCMB 2009b:10). Kofinas and Russell (2004) suggest a 40 year cycle for North American caribou herds, recognizing differences in rates of growth and decline.

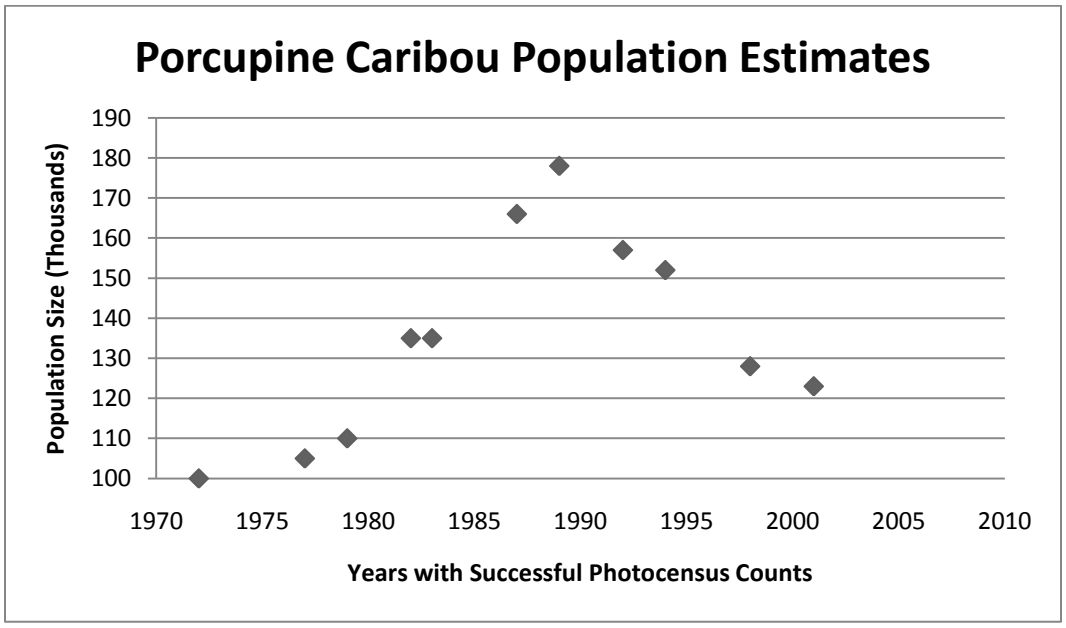

Figure 4-2. Porcupine Caribou Herd Population Estimates 1970 – 2010. Adapted from USGSASC (2009).

Some ecologists think caribou numbers fluctuate because of the result of complex and interrelated processes including the slow growth of lichen as winter food (50-100 years). Good conditions for caribou are when they have a high fat content and extra energy reserves, they are healthy and have a high reproduction rate, and calf mortality is low. In this situation, population increases fast (exponentially) while predator numbers are slower to respond. Once the numbers are up, the range becomes overgrazed and caribou

health decreases (Ruttan 1966). Eroded health, an overgrazed range, and high predation then causes a decrease in caribou population to low levels, where it can stay for a long time, until lichen re-grows and favourable conditions return. Other factors which make this general pattern more complex include hunting pressure, climate change, fire, and calf mortality which can be affected by wind, weather, climate, and predators (Berkes 2008). There is also suggestion that population fluctuation is linked to the Arctic Oscillation in western North America and North Atlantic Oscillation in Greenland and eastern Canada (Kofinas & Russell 2004:26).

4.3 Methods

This section describes methodology, research activities, major thematic questions of the interview guides, and challenges arising from language that came up during the research.

4.3.1 Methodology

For guidance on methodology I consulted the Community-based Participatory Research (CBPR), an offshoot of Participatory Action Research. CBPR was adapted by Fletcher (2003) to relate to the specific context of research with Aboriginal peoples in northern Canada. CBPR emphasizes community involvement in research as partners, community and skill development, and knowledge exchange (Fletcher 2003).

4.3.2 Research Activities

With regards to licensing, I had responsibilities toward the Aurora Research Institute (ARI), and the University of Alberta Faculty of Agriculture, Forestry, and Home Economics Human Research Ethics Board, and to the GSCI. I obtained a research license from the ARI for each year I did research in the NWT (2007, 2008), as well as undergoing an ethics review through the University of Alberta with yearly updates on changes and progress of the project. Dr. Parlee and I drafted and signed a research agreement together with the GSCI and the GRRB that covers (among other things) research purpose, scope and methods, obligations to community and the role of GSCI/GRRB, issues around consent, ownership and storage of data. There are three partners on this project, the GSCI, the GRRB, and the Teetł'it Gwich'in Renewable Resource Council (TGRRC), each of whom provided guidance to the project.

Data collection periods occurred during October 10 - November 19, 2007, and February 25 - 27, 2008. Research activities included gathering primary data from elders and harvesters, as well as secondary data with regards to GNWT and the PCMB. With regards to primary data collection, 51 people were interviewed: 27 harvesters, 19 elders, and 5 others. 11 of the participants were female, and 40 were males. Interviewee ages ranged between 19 and 71. There were the following number of people in each age category: 7 (19-29), 5 (30-39), 7 (40-49), 6 (50-59), 1 (60-69), and 1 (70-79). Interviews with elders were semi-directed with 5 guiding questions, and harvester interviews consisted of a 50 question survey with 37 quantitative questions and 13 qualitative questions. Secondary data collection for the PCMB came from the PCMB website content (PCMB 2004-2010a), attending the PCMB annual meeting in September 22-24, 2007, and written promotional material such as reports, posters, and pamphlets. For the GNWT secondary data I accessed the GNWT ENR website (ENR n.d.), GNWT hunting regulations (GNWT 2009), and the Wildlife Act (R.S.N.W.T. 1988b).

4.3.3 Questions

The focus of the elders question set was to get a sense of what was considered to be the acceptable and non-acceptable ways of doing things with respect to caribou hunting. Elders interviews were completed first, and provided an idea of how life has changed for the community over the elders lifetimes. They provided a valuable context within which to base the research, and to understand the content of the harvester interviews to follow. Elders specifically gave me two things, first an understanding of how people lived, hunted, and related to caribou when they were young, and how they viewed how people live and hunt now. Elders did not always agree with how things are now done by younger harvesters and an understanding of what life was like in the past helped me to understand their position. Second, and a more general idea regarding human well-being, is that life today is both good and not good. A sedentary life in town, access to trucks, snowmobiles, the grocery store, and the highway connecting Fort McPherson to the south and to Inuvik makes life easier for people. However, there is value in having to work hard and struggle as they did in the past, and that has been lost, and that is somewhat regretted. Similar to the pros and cons of the present situation, there is not a black and white set of rules, but rather rules shift according to the context of changing human needs and values.

Harvester interviews were completed after the elders interviews. They focused much more in depth on harvesting activities and behaviours, perceptions of caribou health and wellbeing generated from experiences and observations from hunting and being on the land, and exploring the multiple sources from which hunters get information about caribou. From these interviews I was able to learn about the perspectives of the active generation of hunters, and to root these in the elder's perspectives and their descriptions of the changes in hunting and living over the last century. As well the perspectives of the elders and harvesters are one aspect of the complex caribou management scenarios hunters are directly involved in.

4.4 Results

This section is divided in two sections, the first dealing with community perspectives on rules-in-use with respect to caribou harvesting, and the second presenting the results for a case study on the harvesting of female caribou and a case study on waste.

4.4.1 Community Perspectives on Rules-in-Use

Respondents were asked about local/traditional rules with respect to caribou hunting and also what people perceive government rules around hunting caribou to be. This data is qualitative and arises from two sources; from harvester interviews where the questions asked were *what kind of traditional practices do you think are important to remember in caribou hunting* and *what kind of government regulations do you think are important to remember in caribou hunting;* and from open-ended interviews with elders, where the questions asked were *what are traditional practices for respecting caribou*. Discussions around rules-in-use were informed by follow-up questions *have these practices changed since you were young* and *how has the Dempster highway, skidoos, and trucks changed how people respect caribou.*

4.4.1.1 Harvester Perspectives on Rules-in-use

Table 4-1 displays the answers to the question "what are traditional rules around caribou hunting" and Table 4-2 displays the answers to the question "what are government rules around caribou hunting". The questions were asked to 27 harvesters.

Table 4-1. Harvester Perspectives of Rules-in-Use

Rule-in-Use	Mentions	%
Take and use everything	15	56
Take what you need	12	44
Hunt safely*	12	44
Respect caribou	7	26
Where to get caribou	7	26
Reduce waste	6	22
Get wounded caribou	5	19
Prepare meat properly	3	11
No chasing with skidoos	2	7
Don't hunt cows	1	4
Total**	**83**	**N/A**

* Hunt safely is a grouping of various comments relating to hunting safely.
In addition to the entries in the table,** the following rules were also mentioned once: "don't hunt in the 500 metre corridor", "leave shot injured meat for animals", "have communal versus individual hunts", "continue the harvest survey", "teach youth", "let the leaders pass", "use common sense", "use proper hunting techniques", "learn by watching", "avoid the rutting bulls and take younger males instead", "don't kill out of season", "don't shoot caribou for fun", and "what I learned from my father".

Table 4-2. Harvester Perspectives of GNWT Rules

Gun safety	7
500m corridor	4
Firearms Acquisition Certificate (FAC)	4
Take bulls not cows	3
6 inch snow rule	2
Hunting safety/Education	2
Respect the law/Use hunting regulations	2
Don't overkill	1
Don't leave a mess	1
Gut caribou at site	1
Road closure	1
Don't know	1
Total	**29**

Community members gave significantly more and a wider variety of local rules-in-use (83) than government rules (29). Some respondents gave up to 7 different examples of community rules-in-use, while for government rules, the most suggested by one person was 4. For community rules-in-use, the majority (27) have to do with taking what you need, and using all that you take. Hunting safety was mentioned by many as well (12). This category includes not shooting towards people or the highway as well as other habits of safe hunting such as being aware of your surroundings, knowing who is around you, knowing the terrain, and taking your time during on the land activities. The majority of

government rules that people spoke of had to do with safe use of firearms (7), the 500m corridor (4), and the legal requirement to have Firearms Acquisition Certificates to hunt in the NWT (4). The majority of GNWT rules regarding safety refer specifically to gun safety: no loaded guns in the boat or truck, don't carry a loaded gun, and don't shoot towards or along the highway.

4.4.1.2 Elders Perspectives on Rules-in-use

The following responses presented in Table 4-3 are drawn from 14 qualitative interviews with elders. Elders were asked about traditional practices for respecting caribou, the changes in these practices over their lifetimes, and the effect of changing technologies on hunting such as the Dempster Highway and snowmobiles. Rules governing caribou harvesting practices are complex. Deduction of these complexities into simple principles is problematic; the following collection should therefore be seen as symbolic of individual stories and narratives which have different meanings to individuals.

Table 4-3. Rules-in-Use as Spoken by Elders

Don't chase caribou with skidoos.
Don't shoot rutting bulls. Know/have knowledge/information about when the bulls are rutting and inedible so they are not shot and wasted.
Don't leave wounded caribou behind.
Take all the guts and parts home, clean up the site, can use all of the parts. Leaving it on the side of the road is a problem.
Let caribou cross the highway, the highway is closed when caribou are crossing.
Don't hunt in the 500 corridor.
Don't laugh at or "talk smart" about animals.
Meat sharing.
Don't throw out meat or waste meat.
Work with caribou meat immediately upon receiving it.
Wait for each other when hunting.

The majority of the respondents for the harvester survey are men, while there is a stronger female voice in the elders interviews. Women dominate some aspects of caribou hunting such as the preparation and distribution phases, and thus 'work with meat immediately' is mentioned here and not in the harvesters rule set. There is also evidence of the older pre-Dempster highway hunting methods in the comment that hunters should wait for each other when hunting. (Before truck and highway hunting, groups of up to ten hunters would go together on hunting trips, while the average today is a group of one to three.) Also the rule of not "talk[ing] smart about animals" reflects the Gwich'in worldview where caribou, and animals in general, are sentient beings who are aware of

and respond to the actions and words of humans. The majority of the rules voiced by the elders were also mentioned by the harvesters.

4.4.1.3 Complementary and Contrasting Rules-in-use

The Gwich'in, the GNWT, and the PCMB all discuss various aspects of caribou hunting methods. There are major areas of overlap in the subjects discussed and this allowed a compare and contrast exercise (see Table 4-4) to be carried out with the intent to explore the degree to which they are similar or different. Community rules-in-use as spoken by harvesters and elders from this research is compared with GNWT Hunting Regulations 2009 – 2010 (GNWT 2009), and PCMB recommendations found on printed posters and pamphlets, the PCMB website, and the Harvest Management Plan for the Porcupine Caribou Herd in Canada (PCMB 2009b).

Comparison of the rules-in-use of the community and those of the GNWT and the PCMB in my research reveal few apparent conflicts. Conflicting rules, what is considered waste and feeding caribou meat to dogs, is becoming less of a conflict over time. The younger generation of hunters use less of the caribou, for example the guts, than do the older generation, and so is more inclined to have the same perspective as the GNWT on what is acceptable to leave behind than elders may have. Similarly, feeding caribou meat to dogs is less of a conflict in the present than it was fifty years ago. Since the advent of highway hunting very few, if any, people use dog teams and thus are no large teams of dogs to feed. As there is little apparent conflict to be found in the above comparison of spoken rules-in-use with government and co-management board rules, the differences between spoken rules and actual hunting behaviours is explored in the area of hunting caribou cows.

Table 4-4. Complementary and Conflicting Rules-in-Use for Caribou Hunting of the Gwich'in, the GNWT, and the PCMB.

Complementary Rules					
	Disturbing Caribou	Waste	Wounding Loss	Rutting Bulls	Hunting Safety
Teetl'it Gwich'in	"Don't chase caribou with snowmobiles."	"Take what you need, use all that you take, don't waste."	"Don't leave wounded caribou."	"Don't shoot rutting bulls."	"Don't shoot toward people, watch where you shoot, and never shoot toward the highway. Know who is around when you are shooting."
GNWT	"No one may chase, harass or molest wildlife." (GNWT 2009:5) "Subject to subsection (3), no person shall without a permit entitling him or her to do so (a) persistently or repeatedly chase, weary, harass or molest wildlife without intending to capture or kill it; (b) engage in any activity that is likely to result in a significant disturbance to a substantial number of wildlife animals." (R.S.N.W.T. 1988b)	"It is an offence to waste, destroy, abandon, or allow to spoil: the meat of big game, other than bear, wolf or wolverine…" (GNWT 2009:5)	"A person who wounds wildlife shall make every reasonable effort to retrieve it." (R.S.N.W.T. 1988b)	Does not address the issue.	"No one shall hunt wildlife without due regard for the safety of other people and property. No person shall hunt or discharge a firearm from, or within, a motorized vehicle. In addition, no person shall have in, or on, a vehicle a firearm that has any propellant powder, projectile or cartridge that can be discharged in the breech or firing chamber. No one shall discharge a firearm from, along or across a public road." (GNWT 2009:5)

Table 4-4 (Continued)

	Complementary Rules (Continued)				
	Disturbing Caribou	**Waste**	**Wounding Loss**	**Rutting Bulls**	**Hunting Safety**
PCMB	"Don't buzz wildlife: It stresses them and causes injuries." (PCMB et al., n.d.) "…Reduce stress to caribou…the use of snowmachines to hunt caribou is the biggest factor in spooking caribou…ensure caribou meat is the best quality possible and prevent injury to other caribou." (PCMB 2009b:26)[37]	Recommends meat care methods, proper firearms and ammunition, sex and age selection. (PCMB 2004 - 2010b)	"A wounded animal should be immediately shot again to kill it." (PCMB 2009b:30)	"**…**Avoid hunting Porcupine Caribou between October 18 and November 21. Hormones released by bull caribou during that time can make the meat stinky and foul tasting, and most people can't tolerate eating that meat." (PCMB 2004 - 2010b) "Take any bull until October 8 when the rutting season starts…During the rut until mid November, take small antlered bulls." (PCMB 2009b:31)	"Take the time to notice other hunters or other caribou around your quarry before shooting." (PCMB 2009b:29) "Never shoot toward a road or down the travelled portion of a road." (PCMB 2009b:29) "Wear blaze orange clothing for visibility." PCMB (2009b:29)

[37] Chart entries referenced as (PCMB 2009b) are drawn from the Draft Harvest Management Plan for the Porcupine Herd in Canada released in June 2009, which has been updated with a final report as of June 28, 2010.

Table 4-4 (Continued)

Conflicting Rules			
	Defining Waste	**Caribou as Dog Food**	**Hunting Caribou Cows**
Teetl'it Gwich'in	"Bring everything home, can use all parts of the caribou, especially guts and head, shot injured meat can be fed to dogs."	"Caribou meat and guts fed to dogs, especially in the past when dog teams were relied on for transportation."	Multiple perspectives for and against.
GNWT	"With regards to ungulates, the following are not considered waste if they are left behind; the head, the legs below the knee joints and the internal organs. Bones, including rib bones, that are stripped of meat may also be left behind. The shot damaged parts of the carcass may also be cut away and left behind." (GNWT 2009:5)	"It is an offence to feed the meat of big game, other than bear, wolf and wolverine, to domestic animals." (GNWT 2009:5)	"The Gwich'in have the right to harvest all species of wildlife within the settlement area at all seasons of the year subject to limitations which may be proscribed in accordance with this agreement." (Canada & Gwich'in Tribal Council 1992:44) The "importance of harvesting bulls, not cows" is one of the messages the GNWT communicates to the community. (A. Heerschap, Pers. comm., Nov 6, 2007)
PCMB	Recommends meat care methods, proper firearms and ammunition, sex and age selection. (PCMB 2004 – 2010b) "According to tradition, all parts of the caribou are used; there is no waste. To this day, the skins are used to make traditional clothing from head to toe – from hair pieces to moccasins – and ornamented with beadwork. Furs line mukluks and parkas for warmth and decoration. Bone and antler are fashioned into tools. The caribou heads are roasted over a fire and eaten. For special feasts, a delicacy of head soup is served. Bone marrow is extracted, cooked and eaten. Even the hooves are jellied and eaten." (PCMB 2004 – 2010d)	Does not address the issue.	"We have also requested that all hunters voluntarily avoid hunting female caribou so that the herd's declining population has the best chance to recover." (PCMB 2004 – 2010b) "Spare the cow – if a hunter chooses one bull instead of a cow each year for 10 years, there will be 23 more caribou in the herd. This isn't enough of a change to reverse the population's downward trend." (PCMB 2004 – 2010b)

4.4.2 Case Study One: Caribou Cow Hunting (Conflicting Rule)

Convincing hunters to not hunt cows is a major part of the conservation agenda of the PCMB and the GNWT, and has been a major part of historical education programs put on by various manifestations of Canadian wildlife management agencies (Sandlos 2007). However, the Gwich'in hunt cow caribou at particular times of the year for practical reasons. This discussion looks beyond the stated rules-in-use to show how they attempt to respond to the changes in the environment (mainly caribou availability). The topic of the acceptability of caribou cow hunting was one that emerged during the fieldwork, rather than being a topic that was anticipated before the research began. As a result, respondents were not asked direct questions about their perspectives around hunting female caribou. This section draws on responses to a variety of other questions and includes quantitative and qualitative data on cow hunting from hunter surveys as well as Elder's perspectives.

4.4.2.1 Quantitative Data on Hunting Cows from Hunter Surveys

In this research there were several survey questions that provided insight into the sex of caribou harvested, particularly cows. The relevant questions fall into two categories, those that directly refer to harvesting activity of respondents and those that focus on awareness of the tenet of "do not hunt cows". In the first category, the initial survey question asked the 27 respondents to discuss their last caribou hunting trip and to describe harvesting success in terms of how many caribou they killed. Of the 11 people that specified sex of their harvest, 6 of those took cows. Next, when asked about the sex of the fall and spring harvest, the majority of respondents said they target bulls (fall: 18/27, spring: 14/27). However cows are taken in both seasons, with more being taken in the spring (fall: 3/27, spring: 9/27). The data suggest that cows are harvested regularly by the community, though less so than bulls. Next, questions that explore harvester awareness of the PCMB and GNWT's attempts to dissuade hunters from taking cows include "*what information about caribou do you hear from this source (TV/radio, newspapers, internet, RRC, PCMB, GNWT)"* and the second two-part question, "*what kind of traditional practices do you think are important to remember in caribou hunting*" and "*what kind of government regulations do you think are important to remember in caribou hunting*". In response to the first question 2 respondents answered "do not hunt cows" or in response to what they hear from the sources of TV/Radio, Internet, Band/RRC, PCMB, and the GNWT. Not hunting cows was mentioned once in response

to what are the traditional rules around hunting caribou (1/83) [1.2%], and it was mentioned 3 times (3/29) [10.3%] in response to what are government rules about caribou hunting. The data shows that some people are aware of the encouragement coming from the PCMB, the GNWT, and the RRC not to hunt cows; however, they do also regularly hunt them.

4.4.2.2 Qualitative Data on Hunting Cows from Hunter Surveys

This section contains summaries of the qualitative responses to the questions discussed above. The comments were arranged into four categories: preferred sex through the year based on body condition, take bulls not cows, taking cows when there are no bulls, and traditions and hunting behaviour change.

Preferred sex through the year based on body condition

In the fall before the rut, bulls are preferred because they are fat. When rutting begins (October 8 to November 20) (PCMB 2009b) the older bulls become inedible due to the hormones present in their tissues and rapid weight loss from rutting. Younger males are unaffected this way during the rutting season and are good to hunt at this time. Cows are not as fat in fall as they are recovering from calving and suckling calves. During the winter and the spring cows are preferred, as they have regained their body condition. During the summer, the Porcupine herd has moved back to the calving grounds, so they are not in the Fort McPherson area. In late summer, August, when the herd returns, the bulls are once again the best choice as they are fat from summering and feeding, while the cows have recently given birth and are feeding their new calves so their body fat is low.

Take bulls not cows

There were a variety of reasons people gave for supporting the injunction to take bulls and not calves. These included: "to get the population up" (R. Wilson, 2007), "because the cows have calves" (J. Kay, 2007), and "not wanting to bother the cows as they are heading back in the spring, pregnant after winter with a long walk ahead" (C. Vaneltsi, 2007). Some people said that they limit the number of cows they take because they "respect what the board [PCMB] says" (R. Wilson, 2007), and because "the cows have calves" (J. Kay, 2007). Lastly one respondent said to "leave the bigger bulls for the gene pool" (W. Firth, 2007).

Taking cows when there are no bulls

The following responses demonstrate the acceptability of the practice of taking cows when there are no bulls in the area. If there are only bulls around, one has to take cows "because you have to have something to eat" (J. Andre, 2007). Migration patterns of bulls and cows, who don't always travel together, mean one can't always rely on bulls to be in the area when food is needed. "In the last 2 years, the bulls have come late...usually the males and females are a lot closer together in space and time" (J. Andre, 2007). Sometimes the bulls are near when the cows are not. Bulls wintered near the community in 2006, but the cows wintered somewhere else, so C. Vaneltsi shot bulls (C. Vaneltsi, 2007). "Get what you can, they are spread out, sometimes only cows or only bulls are available" (S. Tetlichi, 2007).

Traditions and hunting behaviour change

Caribou fetus is considered a delicacy (C. Charlie 2008, J. Kay 2007). One respondent mentioned that elders like to get two or three pregnant cows in the spring as they like the tender meat of the fetus (C. Vaneltsi, 2007). One respondent from Old Crow, Yukon, and said that there, if someone shoots a pregnant cow, the fetus usually goes to an elder or a sick person (C. Charlie 2008). Another respondent described a way in which the population decline was causing changes in hunting behaviour. He hunts less now than he did when he was young, in part because of the decline and the importance of not hunting females in the spring. He described the conflict between the elders traditions of eating fetus and the herd being in jeopardy as being "caught in between generations" (J. Kay, 2007).

4.4.2.3 Elders Perspectives on Hunting Cows

With respect to sex of caribou harvests, the 14 qualitative interviews with elders focused on understanding the seasonal round of caribou, specifically which sex was preferable to hunt at different times of the year. Along with practical information about where caribou are what shape they are in at different times of the year, elders discussed some of the issues of concern to them around sex selection. First, one elder told me about how she sees and don't like people 'getting picky' about what sex and age of caribou they get as in the past you appreciated and took what came (*A. Jones*, 2007).

> *"…People are starting to get picky. Like sometimes you'll hear "I don't want bull caribou I want cow". What's the difference? [My husband] go and get bull*

> *caribou. It's bigger, it's got more meat, you know? But people, I don't like to hear people saying that because way back you never heard our elders and our parents saying "oh, we saw a bull but we didn't want it, we were looking for a cow" (A. Jones, 2007):*

People made a lot of effort to find caribou as they had to walk around on snowshoes looking for them, so they were happy with what they got (*A. Jones*, 2007).

> *And back then, you never heard the hunter say "Oh I seen a bull moose but I didn't want bull I want cow". You didn't hear stuff like that. Whatever came their way, they shot and they appreciated. Now, the young people will come back and say "oh, I seen a bull moose on the highway, but I don't want bull I want cow". That don't sound right. Long ago our parents they walk with snowshoes when they hunt. And sometimes I remember my dad going, leaving about seven in the morning sometimes eleven twelve at night he come back. With snowshoes they walked to get, sometimes they weren't successful, sometimes they were successful in getting moose or caribou and that (A. Jones, 2007).*

'Take what you can get' was voiced multiple times.

> *"…All depends on what's coming... You might not see caribou again so you gotta get what you can get, eh? I would anyways (M. Pascal, 2008).*

An elder was asked what she thought about the idea that not hunting cows is good for the population and she did not see why this was so, she saw males as being as important to making babies as are females. She also mentioned that a lot of people today cannot pick out the young bulls from the rutting bulls.

> *I don't agree with that they should say they, it's ok to kill bulls. I mean it is ok to kill females. Bulls you know are the ones that make the babies... So you see why are they saying not to kill the cows? What if there was no more bulls, then what? But you know that's a good one there, because some of the...you people they don't know the difference between the bull, the old bull and the young bull. Right now the young bulls are ok, some of them are, I think. But the old bulls, arrg, you can't even go near them because they really stink, you know. And you can't eat the meat, you can't! And some young people don't know that. And there is hunters, some really good hunters they know what is good caribou too. My brother was like that, when he shoot caribou he just choose amongst it (E. Colin, 2007).*

Lastly, two elders voice that it is okay to hunt females as well as males (E. Colin 2007; E. Kay 2007).

> *You could kill bulls. They are really fat. But this year it wasn't really like that you know… You kill cows too. Cows and males. Bulls they mostly after because they are just fat in August (E. Kay, 2007).*

> *So the young bull is good now, even that some of them are. So the main one they are getting right now is the small little ones and the cow (E. Colin, 2007).*

4.4.3 Case Study Two: Waste (Complementary Rule)

Prohibitions against waste are common to all parties. All three, the Gwich'in, the GNWT, and the PCMB, appear to agree that wasting caribou meat is not acceptable. All three communicate this idea differently. The responses *take what you need* and *use all that you take*, as well as *don't waste* (Table 2), were all chosen to represent the Gwich'in perspective on waste. The PCMB also has two entries, and this is because they do not (on their website) actually say "don't waste", but rather they give many suggestions for hunting methods that if followed, avoid waste.

4.4.3.1 Quantitative Data on Waste

The answers to the survey questions "*what kind of traditional practices do you think are important to remember in caribou hunting*" yielded (6/83) [7.2%] responses of *do not waste*. The response *take what you need* ranked at (12/83) [14.5%], and *use all that you take* at 15/83 [18.1%] responses. These last two responses were the two most mentioned rules-in-use, and *don't waste* was sixth (Table 1). When asked "*what kind of government regulations do you think are important to remember in caribou hunting*", respondents did not mention either waste or anything relating to the use of caribou.

4.4.3.2 Qualitative Data on Waste

Respondents in the hunter surveys mentioned waste four other times in the surveys, in the form of qualitative answers. One person mentioned waste twice, in response to the types of information he heard from Elders and the RRC about caribou: D. Vaneltsi (2008) said that the RRC does not like people to waste caribou.

> *Don't like people to waste caribou, or when people go out there and leave all their guts out all over the place, caribou heads and all that up there. When you are not supposed to waste when you hunt. Some people take too much RRC watched those who take too much, what they don't need (D. Vaneltsi, 2008).*

Vaneltsi also said that from Elders, he learns recipes for cooking meat, traditional ways, how not to waste anything. C. Charlie, in response to a question about the changes she perceives in caribou populations, said that *"ten to fifteen years ago caribou was something you took for granted, now, you have to treasure them. You can't waste it, it is getting harder to get*" (C. Charlie, 2008). Last, D. Koe said that he cuts up and stores caribou for his grandfather, and doesn't waste anything.

4.4.3.3 Elders Perspectives on 'Using Everything' and 'Waste'

Elders spoke of a variety of concerns around usage of caribou meat, including descriptions of the ways that people used the parts of the caribou in the past and in the present.

> *And when they kill caribou, way back in our days? In the 40's, 50's, if our elders went out hunting, they cut all the meat, and they even bring the skin home for their wives to tan. They clean it and then they bring it back to town. And wherever they kill caribou, you know the blood? They said they cover it with snow too, and then they cover the guts, you know the stomach? What they don't eat they, but they don't, even the legs…wouldn't throw that away those days they collect it… They don't throw nothing away… Skin the feet and the guts and then they use that skin for, they make later something out of it too (E. Kay, 2007).*

> *And make sure they use everything. And even bones, bones they collect and they pound it up. And they make bone grease out of it… Yeah, drymeat...you have to pound it (E. Kay, 2007).*

One female commented that hunters today do not always bring back all of the caribou parts that the women would like, and that they have a use for. "*I always ask them to bring that home for me ...but you know they leave all of that behind" (E. Colin, 2007).*

> *The stomach part, not long after they clean it while it is still warm they could just clean the thing out, clean the thing out and then with all that they stomach content they could…and I always ask them to bring that home for me because I store my meat in it. I cut up meat, like backbone, rib bones, leg bones, arm bones, all that I shove into it and it tenderizes it, the stomach content. There's not much in there they just emptied it. And it just get big round thing like that, and I freeze it that way. Then I'll put it in the deep freeze and it is good for the summertime. It tenderizes the meat you know. And then the guts there is certain parts that is good for eating. But you know they leave all of that behind (E. Colin, 2007).*

> *And from the guts too you can get really good fat if it is a really good fat caribou. You get lots of lace, they call it lace fat. And then there is a big, I don't know how they call it, but there is a big fat in there that you just clean too, and you know, we used to be...to eat all that but I am a diabetic now I can't eat anything like that now. When they go hunting, when they first come back it's always a [inaudible] back there with the guts, the ones that you eat. So I wash it, I wash it and then I boil it, all. Guts and the ribs, I don't know why the ribs, but the ribs go in the oven too, that's when they first come back from hunting. Or heart. You can have heart too. So the heart is good from the inside too, and the kidneys too (E. Colin, 2007).*

> *It's [guts] the best part. Because the [Gwich'in word], they call it [Gwich'in word], the caribou, whatever it's got in its stomach, if you rub it on it'll keep the caribou fresh. And plus it makes it taste better. It's a type of seasoning. Similar to that. But it makes the caribou taste better (F. Nelson, 2007).*

Different parts of the hunting process have different ways that one can waste. These quotes discuss parts of the women's process and how they avoid wasting meat. (Leaving caribou parts on the land can be interpreted as 'waste' or as 'cultural change' as people use less of the caribou in general)

> *What I mean work with it meaning cutting it up, ready for, put them in plastic bags, you know those little wrap for food? How big I going to cook for meals so that way I don't waste when I going to cook things. Just taking a big piece out and cutting it. So I put it away that way. And I try to make use of the whole caribou, the whole caribou, either by making dry meat or grinding or dicing you know, and then wrapping them up (E. Colin, 2007).*

Not everyone uses or appreciates all the parts of the caribou. E. Colin suggests that animals will eat parts left in the bush, and that that is okay. It is not being wasted, because something alive is drawing sustenance from it. This is considered waste from a western point of view, however, crows and wolves eating meat that is fit for human consumption. It is acceptable for only guts and organs to be left behind according to the GNWT regulations.

> *Like if [my husband] brought all the caribou back, he's not going to leave the caribou legs, the skins he brings back. I go as far as cleaning the legs, all the legs. I know how because my mom taught me. And we make use of the whole caribou, and then when you go out to the garbage dump sometimes and you see certain parts of the caribou there, sometimes you see heads there. It just really upsets me, because caribou head you can roast it, or you could dice it up and make head soup. You go to the dump and you see caribou heads there, it's just so upsetting. And then they make it bad for people like us so that, make use of everything, we don't waste (A. Jones, 2007).*

> *Apparently hardly anyone like liver. They don't eat it some of them….I like liver and I always get liver. Somebody is always giving me liver… Don't know why they leave that liver behind… And they just think it's, I don't know if they know if it is good for eating… But crows are the one that clean up, crows or wolves clean up when they leave. So it is not going to waste (E. Colin, 2007).*

> *They (chiefs) talk about it but they don't go out onto the land and see what's happening… They don't kill caribou so much they can't handle it. Now you see they kill so much meat, ah?... You never see no meat go to waste those days, that's when we had those older chiefs, way back (E. Kay, 2007).*

> *Just don't bother it because I know there were some times when the young people didn't know, and they shot bulls and all that is wasted… So they need...it don't taste good. And so there again, respect, you need all this information (A. Jones, 2007).*

4.5. Discussion

The outcome of the comparison of Gwich'in, GNWT, and PCMB rules (despite the caveats) is a general agreement about what is acceptable and not acceptable in the practice of caribou hunting. Two examples of conflict, feeding caribou meat to dogs and the definition of waste, may be characterized as historical examples of conflict, in that they seem to be less of a conflict as the lifestyle of the community changes. The decline of the fur trade and changes in hunting technology over the latter part of the last century made dogs and dog teams unnecessary, and the movement into the community and the availability of other reliable food sources (store food) made the need to use every part of the caribou less of a survival requirement. The exercise of comparing and contrasting spoken and written rules and rules-in-use revealed relatively little conflict. Other research that has been done on Gwich'in rules (Kofinas 1998, GRRB 1997, Sherry & VGFN 1999, GRRB 2001) and these sources show agreement in rule content with the ones that we found.

However, a closer look at two of the rules, the hunting of caribou cows and the waste of caribou meat, reveal a complexity that was not apparent in the original comparisons. In the next section I discuss those complexities in the rules and look at why they aren't always followed. This leads to an understanding of Gwich'in rules-in-use as having an inherent flexibility to respond to changing contexts, as well as an authority structure that accords final decision making power to the individual hunter. This flexibility and granting of autonomy is something that the GNWT rules do not have, rather its rules are inflexible in that they aim for specificity and by their nature deny interpretive power to the hunter. This is followed by a discussion about what the differences in the three sets of rules could mean for the success of co-management arrangements.

4.5.1 Form

Looking at the way the rules are written reveals some initial impressions. Within the three rule sets, the main difference is with respect to the level of explanation within the rule. The Gwich'in rules are stated in short, simple phrases. They are heavily nuanced and refer to a great underlying body of information and ways of doing things that is not communicated within the phrase itself. As discussed above with respect to the terms 'respect' and 'rules', these nuances are understood mainly by the Gwich'in community and less so by those external to it. The GNWT regulations and sections of the Wildlife

Act (R.S.N.W.T. 1988b) are very specific. It is important to a government that its wording allows as little room for interpretation as possible. It wants people to do and to not do very specific things. The PCMB, on the other hand, makes statements about what it would like people to do and then explains why or how people should do this. For example, when discussing reducing stress to caribou, they point out that snowmobiles stress caribou and result in lower quality meat. They describe behaviours and the methods they would like people to take. For example, rather than say "do not waste meat" they provide a description of hunting methods that lead to less meat wastage. Their interests are stated more clearly (high quality meat, safety, conservation). The PCMB is very explanatory with respect to why it is making particular suggestions, while the Gwich'in and the GNWT rules do not do this. I suggest this is because the PCMB is an advisory body that makes recommendations and thus has little sanctioning power over people as does the GNWT which has a whole legal framework to support its rules and the community which has social sanctions. In this sense the Gwich'in community and the GNWT do not need to explain *why* the rules are what they are, you just follow them because they are the rules.

4.5.2 Gwich'in Rules: Benefits and Disadvantages

Though the content of the rules was found to be relatively similar, the rules-in-use themselves have some attributes that can be a both help and a hindrance to caribou management. This section looks at some benefits and disadvantages of the Gwich'in rules-in-use and discusses the ways in which these positive and negative aspects can play out in caribou management.

Table 4-5. Benefits and Disadvantages of Gwich'in Rules-in-Use

Gwich'in Rules-in-Use: Benefits	Gwich'in Rules-in-Use: Disadvantages
Embedded in socio-cultural milieu	Too flexible to be enforceable
Flexible and adaptive	Culture shift decreases legitimacy
Grants autonomy to the individual	Individual autonomy without being balanced by community enforcement could lead to "maverick management"

The first benefit is with regards to the rootedness of traditional rules-in-use within the culture of the Gwich'in. Rules-in-use reflect accepted ways of doing things and have the legitimacy of past practice and acceptance. When asking younger hunters about what they should and shouldn't do while caribou hunting, they spoke about the need to respect caribou, to use all that you take, and to not waste. The voicing of the same rules-in-use

by young harvesters as well as by elders demonstrates the legitimacy of the rules-in-use. This rootedness and legitimacy is demonstrated by the use of the wording 'respect', 'take only what you need', and use all that you take' by the Yukon Government. On the Yukon Government webpage for Hunter Education and Ethics Development (HEED) one of the statements is "before you head out on a hunt, remember… Respect Wildlife. Take only what you need. Use all that you take" (Yukon Government 2010). Here the Yukon government uses the same wording the Gwich'in themselves use, thus attempting to draw upon the acceptance embedded within these Gwich'in rules. Next, rules are adaptive in that they can adapt to changing ecological contexts and to changes in the environment. As mentioned earlier in this paper, bulls are not always available and sometimes cows are the best option in that they are healthy and fat. This flexibility according to environment has been noted by other scholars. Berkes (2008:135) in his discussion of the eastern James Bay Cree, and drawing on Heffley (1981) and Nelson (1982), says that the Cree and Chipewyan Dene "did not have a prohibition against waste when caribou were abundant". As well, Nelson (1982) tells us the Koyukon people of Alaska "often violate their own rules on limiting harvests when they hunt caribou" (Berkes 2008:117). Berkes (2008) discusses at length an example of a wasteful hunt by the Cree which caused a disappearance of caribou for 70 years, and when they returned, as predicted by elders, a management redesign was considered necessary by the community. Another example of this is the acceptability of killing cows under certain situations, discussed above. The third and final benefit to Gwich'in rules-in use is that they recognize and give space for the autonomy of a hunter to make individual decisions based on the context as understood and experienced by that hunter. For example the rule "take what you need" allows for the fact that some hunters hunt for more people and take more caribou than other hunters who may hunt just for themselves. As well it allows hunters themselves, rather than an external authority, to define what their individual need is. There are historical examples of wildlife managers calculating how many caribou an Aboriginal group should need for the year and attempting to get them to take only that amount and censuring them if they took more (Sandlos 2007). However, harvest limits are often set by co-management boards that include Aboriginal representatives of user communities (thus they participate in setting limits on their own caribou take). Despite efforts of these organizations to 'suggest' hunting behaviour, it is ultimately up to the individual to decide what they do. The harvester has to make the best decisions as s/he judges it. These three positive attributes to Gwich'in rules-in-use, embeddedness in the socio-cultural milieu, flexibility

and adaptiveness, and granting autonomy to the individual, increase the workability of indigenous management systems.

The first disadvantage of Gwich'in rules-in-use arises from the tendency for culture and rules-in-use to shift at a different rate. This occurs when rules-in-use that were established around a previous cultural practice exist in a context with different practices and thus have less relevance and legitimacy. Gwich'in culture has been shifting continuously over the period of interaction with European culture (Agrawal 1995a). As culture shifts, so do practices with respect to caribou hunting. Slobodin (1981) lists particular hunting technologies and practices and the time periods they came in and out of use. Past technologies include caribou surrounds (used up to early 20th century), bows and arrows (used up to 1840), and breech-loading rifles (usage period 1840-1950). Technologies are intimately linked to practice and process and thus changes in technology necessitates new practices. For example certain aspects of hunting methods changed as the dog team was replaced with the snowmobile, the Dempster highway, and trucks. One example was the 'compression of space and time' that these vehicles brought. People could go significantly long distances in a very short time.

> *When the skidoo came out it made things easier because we used to have to walk ahead of our dogs. Hard. Walking with snowshoes. Skidoo took over and made things easier so people started getting skidoos, going a longer distance faster, until you broke down, then its' slow again, you have to walk (T. Folmer, 2007).*

> *But I always remember, we [were] going to be going back up to our camp [50 miles south of Fort McPherson]. And you can't one or two days, now with skidoo it will take you three hours to get up there. To Rock River, if you go there now, it will take you an hour, it used to take people 2 or 3 days (A. Jones, 2007).*

New practices arising from new technologies and old rules-in-use may exist simultaneously. The conflict, or the non-fit, between the spoken rule and the new practice may decrease the legitimacy of the rule. This could occur as people become aware of the non-fit and the fact that there is a new way of doing things that does not fit the rule-in-use. Rules can lose their meaning and become increasingly vague when they are separated from the reality of present behaviour. Hunting caribou by using snowmobiles is a new practice that makes different behaviours in relation to caribou possible that were not possible with the earlier technology of dog teams. For example the level of interference with caribou that was acceptable, or even possible, with dog teams is

far outstripped by the level of disturbance possible with snowmobiles, thus one often hears about (the rule) of not chasing caribou with snowmobiles.

> *We never had skidoos those days. You know they are just chasing them with skidoos. That's not good because they used to go by dog team and they walk after the caribou with snow shoes, you know. You don't see skidoo chasing them. It does something to the meat when they chase them around… It does something happen to them when they are forever chasing them, and they shoot them. The meat is not like, it is (E. Colin, 2007).*

> *And so, the young people, they think it is easier chasing, sure, it's easier to get caribou with skidoo, but they don't realize that the animals are smart too. They know, they get chased, so they could find another route, where we might have a long ways to go (A. Jones, 2007).*

The fact is that hunting with snowmobiles is now the norm, and though interviewees spoke that rule when telling me what not to do when hunting caribou, at least one person, when asked directly, said that he did chase with snowmobiles as that is the way that people hunt now.

KW: How do you feel about people who chase caribou with skidoos?
PC: Long ago, when elders hunted they used to take their time and they say the meat tasted better. When people chase with skidoos, their heart is just pumping and their blood is just flowing, so it tastes different.
KW: So do you chase with skidoos?
PC: (pause) Yeah.
KW: Do you notice the taste of the meat?
PC: No, because that's how we hunt. Elders hunted with dog teams and it was much quieter (Kristine Wray, P. Colin, 2008).

There is also an ambiguity in what exactly entails chasing or disturbing caribou and what level of chasing is acceptable, as some degree of chasing and disturbance is inevitable when hunting. On the other hand, though the rule seems contradictory, its remaining legitimacy may rest in its intent not to unduly disturb caribou, which seems to be agreed upon by most respondents.

The second disadvantage is that the rules may be too flexible or adaptable to changing contexts to be enforceable. If too flexible means that anything goes, then there is no actual rule. Any rule has limits to what is acceptable. A more flexible rule has wider limits, but if the limits are so wide there is ostensibly no rule. There are goals to rules, and if the limits are too wide, those will not be reached. There are other rules that act to limit behaviour, as well as community sanction. A hunter may have the ability to make decisions about how many caribou to kill, but there is also the 'don't waste', and 'use all

that you take' value that may be considered. I can take as many caribou as I need, but I also need to use all that I take. So this may limit the original take.

The third disadvantage is that individual autonomy without being balanced by community enforcement could lead to "maverick management". Maverick management refers to actions taken by individuals (or potentially by a single community), in the name of management, without consideration for other Porcupine caribou users and user groups (who also participate in its management). This could occur because as self-governance is a concern of some communities, but how to embody it is not so clear. One way to embody self-governance is to claim that one is following local rules-in-use and drawing on local management institutions when making their own decisions and acting autonomously. Maverick management by one individual or community, without the regulation of community sanction, may infringe on other user groups by affecting access to available animals. There is some evidence that community methods of self-enforcement have been eroded due to the effects of colonization and residential schools. Outside authorities involved in wildlife management and their enforcement structures have somewhat replaced local methods of rule enforcement. The existence of the potential negative aspects of rules-in-use, that they are too flexible to be enforceable, the loss of legitimacy due to cultural shifts, and maverick management can make co-managing caribou more difficult.

4.5.3 The past doesn't go anywhere and other reasons: Why people follow rules

There are definite advantages to following rules. This section explores these advantages first by considering the rule "don't hit caribou with sticks" in conjunction with the tendency for people in small communities to remember events for many years. Next, the rule "don't chase caribou with skidoos" is directly related to meat quality and the amount of effort expended to successfully harvest caribou. Last, general rule following is related to being considered a good hunter, and this increases access to opportunities for travel.

There are some realities of northern community life which have a bearing on the discussion of rule following. These realities are how "the past didn't go anywhere" (Phillips & DiFranco 1996) and the power of anecdotes. First, stories and past history live forever in small communities in that everyone remembers what happened before and past event tend to be applied to new situations. Certain events live on forever in TK. An example of this is the observations made by early explorers/managers about Aboriginal

hunting methods, interpreted as wasteful, were repeated in multiple sources and became a part of the general understanding of Aboriginal hunting methods. Craig Campbell explores how the term "wanton slaughter" is carried through key wildlife biology literature (from 1948 to 2001) and becomes an "unquestionably accepted assumption" by biologists using the literature for their studies (Campbell 2004:155). Similarly in Aboriginal life, being labeled a bad hunter, or the person who hit the caribou with a stick can be a stigma that lasts a lifetime. The importance of not hitting caribou with sticks is voiced throughout *Denendeh*. Hitting caribou with sticks results in the caribou going away and not returning to the area, or to the community where this occurred. Nor will the caribou continue to offer themselves to a hunter who treats a caribou in this disrespectful manner. Given the power of anecdotes and the tendency of the past to be continually present, one would follow the rules to avoid the risk of acquiring the socially-unfortunate label of being the person who hit the caribou with a stick and caused them to disappear for long periods of time and bringing hardship to the community.

Many people spoke about the inadvisability of chasing caribou. It is well known that a caribou killed while running or when it has been is 'spooked' results in a lower quality meat due to hormones building up in its muscles while running. Chasing caribou is also thought to cause changes in migration direction away from the disturbance. Caribou may move further away from the community requiring hunters to exert more effort and resources to harvest them. Avoiding excessive disturbance of caribou decreases the chances a hunter will have low quality meat and expend a lot of energy to harvest successfully. Another reason a hunter may avoid chasing caribou is the awareness of his behaviour by others, particularly women and other hunters who may have observed chasing behaviour. Women interviewed said they immediately knew the circumstances of a caribou's death upon skinning the animal and observing the meat. As gossip is an often used as a sanctioning device in Aboriginal cultures, women's awareness of meat quality and the observations of other hunters may be the gateway for this information to move through the community. It is this way that people come to be aware of what others are doing. The 'moccasin telegraph' is a phrase well-known in the north, a term which describes the incredible rapidity with which news travels within and among remote communities.

Lastly following rules is important to ensure access to a variety of opportunities. There is a social and economic necessity for hunting in a group such as sharing transportation and gas. Some people interviewed mentioned that they do not have trucks or snowmobiles of their own, and they use ones belonging to friends or family members or they go on hunting trips with others. In northern communities, hunters may be seasonally employed or unemployed and thus sharing transportation costs is an economic necessity. Not following rules and risking being labeled as a 'bad hunter', may decrease one's opportunity for accessing transportation and hunting opportunities with others, making it harder to secure caribou meat. Another economic and social opportunity available to those known as good hunters is the extensive travel opportunities to represent the community and speak about caribou in the many management meetings and workshops that occur. Those community members who are considered good hunters are generally chosen to represent the community with respect to caribou management issues. Given the high cost of travel in the north, opportunities to travel outside the community are highly valued. Acting in ways different than accepted behaviour could result in lessened chances to partake in these opportunities.

4.6 Conclusion

This paper has discussed rules-in-use with respect to caribou hunting from the perspective of Fort McPherson elders and harvesters. Hunting is examined within the context of co-managing caribou with the GNWT and the PCMB. The Gwich'in, the GNWT, and the PCMB each have accepted ways of hunting and relating to caribou. Despite a shared mandate of ensuring the continued survival of the Porcupine caribou herd, there are differences in practice and thought that makes this a challenging endeavour. GNWT western wildlife management is rooted in the primacy of science as a system for acquiring knowledge, western sport hunting ethics with links to aristocracy and ideas of class and entitlement, as well as direct colonial roots. The PCMB has arisen from the increased demands of northern Aboriginal people in the 1970's for Canada to fulfill land entitlements of Treaty 11 and to include Aboriginal people in northern resource management. The PCMB is made up of both Aboriginal and non-Aboriginal groups but relies mainly on quantitative science to make management decisions, similar to the GNWT.

This paper explored Gwich'in methods of determining appropriate hunting behaviours and decisions (rules-in-use), and compares and contrasts those with the GNWT and PCMB stated rules, regulations and recommendations. It was found that there is general agreement between the three sets of rules. This was an unexpected result, so a further case study on the hunting of caribou cows was done to find the source of the conflict that arises from the more subtle cultural differences in how people approach caribou. Caribou are a continuously migrating ungulate around which Fort McPherson hunters shape their lives to ensure access to them. This is followed by an introduction to the traditional laws of the Gwich'in, including references to the many stories about how people are related to caribou and how to maintain this relationship in a healthy way. I then questioned whether it is appropriate to talk about Gwich'in *rules-in-use*, as many concepts that are attributed to both western and Aboriginal culture have can have radically different meanings, the subtleties of which are not always grasped, potentially causing confusion and misunderstanding. I then introduced the scientific population model and its reliance on quantitative analyses to understand caribou.

The examination of caribou cow hunting showed that underlying the rule-in-use that suggested caribou should not be harassed and people should not waste was a very practical process of decision making as to whether to harvest a cow. The research shows that if cows are the only animals in the area, or they are the fattest, healthiest option for people and hunters are in need of meat, the majority of hunters will take cows. Aboriginal culture does not revere the female animal as western sports hunting ethics and wildlife management seem to, nor does it consider the avoidance of killing cows as necessary to population management. As the Gwich'in did not traditionally approach animals as objects to be counted, they do not automatically consider the following equation as being obvious: hunting cows removes all potential future calves from the future population. When people voice the rule "take what you can get" and "take what you need", it allows people to take cows if that is what they can get and what they need. In addition, taking what comes provides a randomized harvest or a removal of random ages and sexes from the population.

A significant difference between GNWT regulations and Gwich'in rules-in-use is the level to which the rules encourage personal autonomy, allowing hunters to make decisions based on context as they understand it. Gwich'in rules-in-use are high in this

regard, while GNWT regulations are quite low. GNWT regulations do not encourage individual interpretation of the rules according to context, while Gwich'in rules-in-use contain flexibility to adapt to changing environmental contexts. GNWT regulations are inflexible and it is difficult to alter them as the context around them changes. These differences underlying the types of rules brought to bear on caribou hunting and underlying the actions of Gwich'in caribou hunters may be a source of some of the difficulty in the attempts so far to manage caribou together.

4.6.1 Further Research

Areas for further research include looking at community methods of enforcing rules, of self-regulation with respect to caribou harvesting and what forms punishment of rule breaking takes. This research suggested some ideas about what causes people to follow rules such as the importance of maintaining a reputation for being a good and a respectful hunter. One method used to enforce rule following is scare tactics and use of 'the other'. In Fort McPherson an elder regularly speaks on local radio reminding people that hunting within 500 meters of the Dempster highway is against the law in the Yukon. He reminds people of others who have had guns and meat confiscated by Yukon Environment Conservation Officers, and risked fines and charges. This can be an effective scare tactic to prevent people from enacting certain hunting behaviours. Another scare tactic, used historically (Sandlos 2007) and in the present by wildlife managers including the PCMB, is the suggestion that if Aboriginal hunters don't "shape up" in their hunting methods, the caribou will diminish to extinction or to bare remnants of the herd. Research into the ways that 'the other' is used by both western wildlife managers and by Aboriginal communities to ensure particular hunting behaviours would be an interesting aspect to research on rule enforcement. Paul Nadasdy (2003b), in his work with Kluane people of the Yukon, has looked at management practices and points out that people were not specially appointed to monitor and enforce rules. Rather this is the job of everyone in the community, and enforcement is achieved through "gossip, joking, and other indirect means". Nadasdy concludes that "such forms of indirect criticism remain crucial for teaching and 'enforcing' appropriate behavior toward animals" (Nadasdy 2005:306-307).

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5.0 CONCLUSION

5.1 Review of the Thesis

This thesis considers the ways in which the Teetł'it Gwich'in construct knowledge about caribou, as well as how this knowledge is linked to rules-in-use with respect to caribou harvesting, and the role both of these play in caribou co-management. TK is significant in northern resource management. Aboriginal land claims are being settled and with them come increasing chances to participate in the management of the resources that are so important to Aboriginal livelihood. Though Aboriginal people do not have final decision-making power in this area (this power has been carefully preserved by the federal government), strides have been made in that it is now a requirement to incorporate TK into resource development and wildlife decision making (for example the Government of the Northwest Territories (GNWT) Traditional Knowledge Policy, and the requirement to use TK in environmental assessments for resource development projects). TK is steeped in controversy; however, there is pressure to incorporate TK into many aspects of decision-making in the NWT, but people (mainly non-Aboriginals) are unsure what this entails. As a result of the lack of clarity as to what TK is, there are multiple definitions of TK in the academic and grey literature. Various organizations present and use different definitions that are tailored to their particular purposes. Of the many definitions, my understanding is that TK is 'what the Aboriginal people who have been living here for a long time know about caribou'. This knowledge can include a variety of things: facts about caribou migration patterns and habitat, or that older male caribou have been seen atop a particular mountain with a younger caribou, ahead of the herd, scoping out the trail ahead, the older teaching the younger the paths through the landscape (F. Nelson, 2007); or simply that people feel good when they have caribou to eat. Aboriginal organizations such as the Gwich'in Tribal Council (GTC) (2004) present their own definitions of what TK is, and here I offer an expanded definition of Gwich'in Knowledge than the one presented by the GTC. This definition includes knowledge that is gained from non-Aboriginal sources, specifically scientific quantitative understandings. The Gwich'in Knowledge Complex incorporates science as one of its inputs. The research shows that 'what Teetł'it Gwich'in know about caribou' includes some aspects of population science. Many harvesters across the north, not only in Fort McPherson, are involved in various aspects of caribou co-management, which can involve going to

community meetings about caribou, being involved in the TGRRC and the PCMB, travelling outside the community to represent the community in workshops and meetings, or listening to the news and reading the newspaper about recent developments with the Porcupine caribou herd and its multiple user groups. As population science is the main information source on caribou and the basis for much of the decision-making about the Porcupine herd for the GNWT and the PCMB, harvesters hear and incorporate aspects of this science and integrate it into what they know about caribou. Communication between harvesters is one of the highest sources of information movement about caribou, and scientific information moves through these channels together with on the land observations and elders knowledge about caribou, forming a hunters overall understanding of what is going on with caribou. I call this understanding the Gwich'in Knowledge Complex.

The Gwich'in traditionally relate to caribou differently than western people do, and consideration of the human-caribou relationship of both cultures is important background information when considering rules-in-use and for theorizing about particular hunting behaviours. Relating to animals as persons is a significant aspect of Gwich'in culture. Western culture does not perceive animals in this way, rather it sees animals as objects to be used by and benefited from by humans, and thus there is no *social* relationship with caribou, and no moral obligations. The western view of animals is one of the many non-Gwich'in ideas that hunters are exposed to. It is important to mention that the degree to which people consider either this traditional belief and the western viewpoint on animals varies from person to person. It is important to stress that Fort McPherson, and all communities, are varied in the perspectives they hold about these issues and the amount of integration and acceptance of the ideas they are exposed to. Aboriginal communities are not homogenous in their views on caribou population, caribou personhood, or the amount of "western vs Gwich'in" thoughts they hold. Rather, there is blending of the knowledges, and the point of this thesis is to show that this occurs, rather than to quantify how much it occurs.

The importance of primary knowledge and how this supports individual autonomy in decision making is another key point in the discussion of hunting behaviours, knowledge construction, and rules-in-use, as well as understanding potential responses of harvesters to scientists and the primacy given to scientific information. Science and scientists are

held in high esteem in western culture and are credited for holding the keys to create and access knowledge. This view is not always shared by a Gwich'in hunter who highly values and gives authority to knowledge that he himself gains on the land through his own experiences.

Gwich'in elders were vital to the research in explaining the ways in which life has changed over the years. Technology changes have made caribou hunting easier, but it has also brought new conflicts with respect to the appropriateness of the new ways of hunting caribou (hunting on the highway with trucks and snowmobiles). Elders also emphasized the important role of women in caribou harvesting. Female elders emphasized the sheer amount of time and effort they spend with the caribou once they are back in the community or camp, getting the meat ready for distribution and storage. Also there are rules-in-use around this aspect of the harvest that are less discussed due to the over-emphasis on the killing, or acquiring aspects of hunting. Bodenhorn's (1990) point deserves reemphasis in that the concept of hunting or harvesting needs to be broadened to include the work of women in preparing, cutting, distributing, and storage of meat as it is an essential part of harvesting.

The first paper, (Chapter 3), is entitled "Knowledge construction of Porcupine caribou", and it explores the ways in which Gwich'in create knowledge about caribou. We know that this occurs through experience on the land, being with caribou, seeing caribou, hunting, eating and sharing caribou, and hearing stories about caribou. My research supports this, in that people said they get most of their information about caribou from being on the land, by talking to other hunters (who have been on the land) and by talking with elders about their past experiences and the stories they were told by their elders. The study began with the idea that science is also a part of Gwich'in knowing, that Gwich'in people access information from scientists and wildlife managers and that this information is integrated into their overall knowing about caribou, which I designate as the Gwich'in Knowledge Complex. This complex is also informed by TV and radio, both popular media in northern communities and the source of much information (radio specifically) about what is going on with caribou throughout the northern communities.

As people interact through the process of caribou co-management, they come into contact with population science which is highly quantitative. Caribou are understood by the

number of animals existing on the range at one time, how many calves are born and have died, and the trends in how these numbers change over time. This quantitative knowledge source complements Gwich'in qualitative understandings, enriching the Knowledge Complex and making it a valuable source of understanding about caribou population dynamics. The existence of the Knowledge Complex has not been recognized before, as both scientists and the Gwich'in themselves seem to have reasons for not recognizing it. As mentioned previously, the GTC's (2004) own definition of Gwich'in Knowledge excludes any mention of knowledge gained from any source but the land, and scientists and managers do not recognize any aspect of the scientific method in the methods of Aboriginal decision-making. Roots (1997) however, does see that both systems of knowledge construction arise from a comprehensive method of knowledge construction that all humans share.

My second paper, the fourth chapter, is entitled "Ways we respect caribou: Gwich'in hunting ethics". Gwich'in interviewees spoke about a large variety of "things to do and not do" while caribou harvesting which ranged in subject matter from hunting practices, meat usage and preparation, respect, and safety. The research showed that harvesters of all ages are very aware of community caribou hunting ethics. The major exercise within this paper was to compare and contrast Gwich'in rules-in-use, GNWT regulations, and PCMB recommendations. It was found, against my expectations, that there is high level of agreement between the three sets of injunctions. This is significant from a common property perspective in that this literature assumes a distinction between the rule-sets of local communities and governments. When it comes to management, common property theory advocates for the use and support of local management systems, and it is a surprise that the rule-sets appear to be similar. Looking more deeply into cultural assumptions with respect to animals and hunting reveals that this is where some differences exist. The case study into caribou cow hunting, which was the only relevant conflict (the other two having become relatively benign due to technology changes and subsequent changes to hunting practices), highlighted the role of autonomy accorded to the individual Gwich'in harvester in decision-making, the practical realities of decision-making (if there is a cow and you need meat...), and the importance attached to the female of the herd with respect to population.

This led me to the conclusion that strengths of Gwich'in rules-in-use include their inherent flexibility and adaptive nature, embeddedness in the culture which grants legitimacy, and the tendency to accord autonomy to the individual. On the other hand, negative aspects to rules-in-use include the possibility of being too flexible to be enforceable, the fact that culture can shift faster than the rules-in-use resulting in a loss of legitimacy, and the potential for maverick management without strong community methods of enforcement. I considered the reasons why it is advantageous for people to follow rules. People remember things in small communities and tight knit groups such as the Fort McPherson community have a long memory of the actions of other people. Rule breaking could affect future events, future opportunities for travel, and loss of other potential benefits. Practical reasons for rule following include participation in hunting groups, ensuring the best meat quality, and keeping hunting efforts and energy expenditure low, and ensuring survival.

5.2 Linking Paper One and Two

Knowledge generation and rules-in-use are linked in the practice of caribou hunting. The decisions people make about harvesting are directly related to the information they have about the health, distribution, and population of caribou. People in Fort McPherson almost unanimously agree that the Porcupine caribou are healthy. People will harvest healthy caribou to eat, whereas observations of sick caribou may result in a decision not to hunt, or to kill the animal precisely because it is sick. Information about caribou health is shared with the community and affects other hunter's decision-making processes. Knowledge of caribou distribution can determine hunting decisions in that people need to decide where to look for caribou. This is less of an serious question these days because the Dempster Highway crosses a large part of the winter range, so it is more likely that driving south on the highway will bring a hunter into contact with caribou. In the past, however, when people were walking across the landscape, making the decision about which direction to travel was much more crucial, and people relied on information from others, past knowledge of caribou locations, and elder's knowledge of caribou migration patterns to make these decisions. Understanding of population is a more recent concern, and a new consideration for hunting behaviours. As explained earlier in the thesis, the consideration of caribou as a group of animals that can be decreased though hunting is a relatively new idea in Aboriginal hunting culture (Berkes 2008). However, some hunters are simply not convinced by the GNWT and PCMB case for population decline. Some

harvesters said that they have decreased the amount they hunt because of the concerns about population, while others have not done this. Applying rules-in-use is supported by knowledge. People generate knowledge about caribou, and this is used in determining how people enact the rules, their hunting behaviours, and decisions made while on the land.

5.3 Importance of the Research

This thesis discusses Gwich'in knowledge generation and rules-in-use within the context of population decline, and the present population decline is discussed with reference to the historical "caribou crises" that have occurred over the last century. This is done because it is important to remember what has gone before (Usher 2004, Sandlos 2007). The past caribou crises have looked very similar to what is happening today, with doubt around counting methods and government claims of population decline, and management responses that point the finger at Aboriginal hunting. Focus on Aboriginal hunting as the cause of decline justifies quotas and restrictions to Aboriginal harvests. This diverts the focus away from reducing or controlling northern development, which is potentially a more significant cause of long term population decline and threats to caribou than is the Aboriginal subsistence harvest (Usher 2004, Vors & Boyce 2009). Increased involvement of Aboriginal people in caribou management is necessary, and by increased involvement I mean a real attempt by caribou managers and wildlife scientists to take the knowledge and perspectives of Aboriginal user groups seriously. One way to achieve this is to accept the invitation to spend more time on the land learning about caribou in a non-quantitative way.

5.4 Further Research

There are many avenues for further research. First, this work looks at the ways in which Aboriginal harvesters make use of other sources of knowledge generated by non-Aboriginal people using different knowledge construction methods. To continue this one would look at whether there has been any transfer of knowledge from Aboriginal culture to western culture or western knowledge systems. A related question could consider the difficulties for the dominant culture in Canada to consciously recognize, value and incorporate ideas of the colonized culture. Research in this area would draw on colonial and post-colonial theory. Second, research into the ways in which Gwich'in communities enforce rules-in-use would complement this work. There are traditional ways of

enforcing rules that existed before government management agencies got involved in caribou management. To what degree have these methods been eroded and what forms do they take now? Lastly, research into the role of women in caribou harvesting is necessary for increasing female participation in very male-dominated area of caribou management. Women have a specialized knowledge about caribou that arises from their specialized role in caribou harvesting that men do not have. I have written about how caribou management is weakened with the exclusion of Aboriginal knowledge, but it is weakened further from the total exclusion of Aboriginal women's knowledge. With respect to rules-in-use, there are likely a whole set existing around women's role in harvesting, that are ignored due to the over-emphasis on the male aspects of hunting.

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APPENDIX A

Research Agreement

The Research Agreement hereinafter known as the **Research Agreement**" made this 19th day of November in the year of 2007.

BETWEEN

Gwich'in Social and Cultural Institute and the Gwich'in Renewable Resources Board (GSCI/GRRB)
OF THE FIRST PART

AND

Kristine Wray / Brenda Parlee (Supervisor)
OF THE SECOND PART
hereinafter, referred to as the "**Researcher.**"

Whereas the **Researcher** (Kristine Wray under the supervision of Dr. Brenda Parlee) is carrying out this research project as part of the requirements of a Master's degree from the Department of Rural Economy, Faculty of Agriculture and Forestry at the University of Alberta, and as part of these requirements, and subject to the terms set out in part 1-8 of this Agreement, the results will be included in the following public documents:

a) A Master's Thesis;
b) Academic and other publications and presentations or any other product resulting from this research in any media form and;

Whereas the **GSCI/GRRB** and the **Researcher** agree to undertake a Research Project concerning the **Gwich'in hunter/community knowledge of barren ground caribou** as defined by the Project Summary (Attached) submitted to **GSCI/GRRB** in October 2007. This research project is hereinafter described as the **"Research Project".**

THIS AGREEMENT NOW WITNESSES, THEREFORE, that the parties agree to the following:

1. The purpose of this Research Project, as discussed and understood by the **GSCI/GRRB** and the **Researcher** is to document **Gwich'in hunter/community knowledge of barren ground caribou**

2. The scope of the Research Project, as discussed with and understood by the **GSCI/GRRB** relates to **Gwich'in hunter/community knowledge of barren ground caribou**

3. Methods to be used, as agreed by the **GSCI/GRRB** and the **Researcher** include:
   a) Interviews, discussion groups, and workshops with community members willing to participate in the study as defined by the consent form (forthcoming).
   b) Meetings with the **GSCI/GRRB** and other individual / agencies with an interest in the research

4. Capacity building and community participation, as agreed, is to include:

   a) Employment and "training" of a community research assistant;

b) Community participation through interviews and workshops;
c) Communication and knowledge sharing with **GSCI/GRRB**;

5. Ethics:
   - This Research Project was reviewed and approved by the University of Alberta, Agriculture and Forestry Ethics Committee. The Researcher will adhere to the recommendations of the Ethics Committee as well as the "Tri-Council Policy Statement of Ethical Conduct for Research Involving Humans."

6. Interviews and Informed Consent:
   a) Interview
   - A combination of semi-directed and open-ended interviews will be carried out with elders and caribou harvesters.
   - Questions/guiding statements will be used to facilitate the interview. These questions/guiding statements may be adapted by the **GSCI/GRRB** or the **Researcher** in order to focus the interview on information that is needed to meet the goals and objectives of the study;
   - The person being interviewed will be encouraged to speak in the language in which they feel most comfortable, either in their indigenous language or English;
   - Should they choose their indigenous language, a translator the participant is comfortable with will be required;
   - The interview will be scheduled at a time and place convenient to the person being interviewed, and at the location of their choosing.

   b) Consent to Conduct Interview:
   - Prior to interviews being conducted interviewees will be asked if they wish to take part in the project;
   - A Research Summary and Consent Form (see attached) will be presented to the interviewee(s) to ensure that they are aware of the nature of the Research Project;
   - If the interviewee does not want to participate in the Research Project and Interview Process, the interview will not take place.

   c) Consent to use Results of Interview in Thesis and other Publications:
   - Verbal or written consent to use the interview results in a publication will also be obtained from the interviewee;
   - Where verbal or written consent to use the interview results in publication is given, the **Researcher** will ensure that the interviews are acknowledged by name in all material or public statements generated from the information collected. Where written consent to use the research results in publication is NOT given, the **Researcher** will ensure that any material or public statements generated from the information collected from the participant does NOT contain statements or quotes which are attributable to the interviewee and that names of interviewee does not appear in the material.

   d) The **Researcher** will verify interview results (present the results back to the interviewee) within 6 weeks of the interview to ensure that the information is accurate.

7. Information collected is to be shared, distributed and stored in the agreed ways:
   a) Raw data (results interviews and workshops, audio and video tape) gathered for the purposes of the Research Project will be made available through the **GSCI/GRRB**.

Copies of all raw data including but not being limited to audio and video tape and written notes will be deposited with the **GSCI/GRRB**;

b) Should any of the research material from this project be used or made available for use in future for the purposes of and production of any publications or videos or any media format, then the **GSCI/GRRB** will be contacted prior to any project beginning to enlist their involvement in same;

c) Activity reports and summaries of results of the Research Project will be presented to the **GSCI/GRRB** twice yearly beginning January 15, 2008 and ending March 31, 2009.

d) A final project report will be developed for the **GSCI/GRRB** before December 31, 2008.

8. Communication regarding the project with all other parties will be handled in these agreed ways:
   a) All reports of the Research Project (including publications and presentations) will be *reviewed* by the **GSCI/GRRB** or their representatives before being distributed to other parties;
   b) The Researcher will fully acknowledge the **GSCI/GRRB** and interviewees involved in the Research Project (depending on consent as discussed in part 5).
   c) A poster will be prepared summarizing the goals and findings of the study. A one-page summary of the goals and results of the project will be provided to all participants.

9. The **Researcher** and the **GSCI/GRRB** will make best efforts to resolve any disagreement related to this agreement and/or the Research Project. In the event that the **GSCI/GRRB** has reason to believe that the terms and conditions of this Agreement are not being met by the Researcher, they may terminate this agreement and the Research Project upon giving such period of notice as the **GSCI/GRRB** deems appropriate.

10. In the event that this Agreement is terminated, in accordance with part 8 or part 14, 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 **GSCI/GRRB**.

11. The Researcher has acquired funding and other forms of support for this Research Project from Social Sciences and Humanities Research Council.

12. The **GSCI/GRRB** agrees to:
    a) Participate in and support the project (workshop discussions, feedback on project and information gathered) and;
    b) Review any reports and materials intended for public communication and distribution;
    c) Support the Researcher in gathering information as set out in parts 1-6.

13. The Researcher undertakes to:
    a) Proceed with Research Project according to the goals and objectives set out in the project summary (See attached) and according to the terms and conditions set of in this Agreement;
    b) Work under the direction of the **GSCI/GRRB** and Steering Committee if one is formed;
    c) Act as a resource person with respect to the Research Project and its topic.

14. The Researcher agrees to stop the Research Project under the following conditions:
    a) By consensus decision of the **GSCI/GRRB**;
    b) If the Researcher is not able to adhere to the terms and conditions of this agreement;
    c) If the **GSCI/GRRB** terminates the Researcher pursuant to part 9.

GSCI (Sharon Snowshoe) Date: November 19, 2007

GRRB (Robert Charlie) Date: January 09/2008

Researcher
Kristine Wray Date: Nov 27/2007

Researcher (Supervisor)
Dr. Brenda Parlee Date: Nov. 27/2007

APPENDIX B

PROJECT SUMMARY INFORMATION SHEET
"Ways We Respect the Caribou": Hunting in Teetł'it Zheh

Dear Participant,

You are invited to participate in a research project entitled "Ways We Respect the Caribou: Hunting in Teetł'it Zheh". This is the project of Kristine Wray, a Rural Sociology Masters student from the University of Alberta and Dr. Brenda Parlee of the University of Alberta. The purpose of the research is to document the knowledge practices and informal institutions or traditional practices in local communities that maybe useful in buffering, coping with or adapting to changing caribou populations (Refers to Objective 1a/1b – of SSHRC Research Proposal). Individual and small group interviews will be carried out with Gwich'in hunters/families in the Gwich'in community of Fort McPherson. Specific work will be done to understand:

- Elder/hunter perceptions of caribou health and population;
- Traditional practices for respecting caribou (for comparison with government regulations / co-management hunting recommendations)
- The extent to which harvesters draw upon local knowledge, traditional knowledge and/or scientific data or other information (ie. from government or media) to make their decisions about where, when and with whom to harvest.

Individuals who participate in the research will be asked to share information about their land, caribou hunting, and knowledge sharing practices. The researchers do not anticipate any risks to individuals or communities from participating in this research project. There is a confidentiality agreement as a part of the consent form so you can decide what you want shared with other people. Benefits of participation include knowledge sharing between the researchers and the community and the creation of research tools for the community and local school.

As a potential participant, you have the right **NOT** to get involved in this study. If you do decide to participate, you have the right to withdraw from the study at any time, without penalty. As per the Consent Form, if you want the information you provide to be anonymous, your name will be removed and replaced with a code (for example A001). Access to data collected, including the coding list, will held by Kristine Wray and/or Dr. Brenda Parlee during the study. When the study is completed, data will be permanently held by one or all of the following organizations: the Gwich'in Renewable Resource Board (GRRB), the Gwich'in Social and Cultural Institute (GSCI), and/or the Gwich'in Renewable Resource Council (TGRRC).

The information you provide may be accessible to the public in the future in the form of Kristine Wray's Masters Thesis and/or research papers published by Kristine Wray and Dr. Brenda Parlee. As well, the above mentioned organizations (GRRB, GSCI, TGRRC) may use the data for their own purposes unless you (the participant) do not wish this to occur.

If you decide to participate, you will receive a $60 honorarium to compensate and thank you for your time.

Kristine Wray and Dr. Brenda Parlee

In the case of any concerns, complaints, or consequences, contact Helen Steinke, Administrative Support to the AFHE Research Ethics Board, 2-14 Ag/For Centre, University of Alberta, Edmonton AB T6G 2P5, Ph. (780) 492-8126, Fax (780) 492-8524

INTERVIEWEE PARTICIPANT CONSENT FORM

"Ways We Respect the Caribou": Hunting in Teetł'it Zheh

NO: _____
Interviewee / Workshop Participant: _____
Address for Sending Transcript:
_____
_____
Researcher: _____
Date: _____
Location: _____
Others Individuals Present:
A._____ B. _____ C. _____

PLEASE INDICATE YOUR ANSWERS TO PART A-E
BY INITIALLING IN THE SPACE PROVIDED

A. Consent to Interview:
I have read and/or understand the attached project summary and I agree to participate in the interview / workshop relating to this project. I understand that I can choose not to answer any or all of the questions that are asked and can stop the interviews or withdraw (quit) the project at any time without prejudice or consequence.

I DO _____consent to the interview.

I DO **NOT** _____ consent to the interview.

B. Consent to Audio Recording:
I understand that the researchers will be using an audio recorder.

I DO _____consent to the interview / workshop being audio recorded.

I DO **NOT** _____ consent to audio recording and would prefer that the researchers only took hand written notes

I DO **NOT** _____ want any audio recording or note taking during the interview / workshop.

C. Consent to Use of Interview Results:
We are working with the Gwich'in Renewable Resource Board (GRRB), the Gwich'in Social and Cultural Institute (GSCI), and/or the Gwich'in Renewable Resource Council (TGRRC) to carry out this research. We would like to use the results of your interview in a report to these organizations. If there is any information that you would not like to share publicly, please let us know. To keep our agreement with the funding agency, we would also like to use the results in our work at the University including the development of Kristine Wray's Master's Thesis and in academic publications (published papers).

I understand and DO _____ consent to the researchers using the results of my interview in public documents as outlined above.

I DO **NOT** _____ consent to researchers using the results of my interview in the public documents outlined above.

D. Consent to Use your Name in Public Documents

I would like to acknowledge you by name in all research documents and materials, or if you prefer the results of your interview can be coded to Person A or 001 etc. so that the public does not know who shared the information.

I DO ___ want my name to be shared in public documents/ presentations.

I DO **NOT** ___ want my name to be shared in public documents/ presentations and would prefer that the researchers attribute my interview data to an alias or coding system

E. Consent for Storage of your Interview Results

You will receive a written copy of the transcript of your interview. After you receive a copy of the transcript of your interview, you will have 14 days to decide if there is information from your transcript that you would not like to be used in the research project.

The researchers will keep a copy of any audio recordings and / or transcriptions for the purposes of reporting and publication. To ensure that your information is valued over the long term, we would also like to store copies with the Gwich'in Renewable Resource Board, the Gwich'in Social and Cultural Institute, and/or the Gwich'in Renewable Resource Council.

I DO ___ want my information stored with the above organization.

I DO **NOT** ___ want my information stored and would prefer that it be destroyed once the research project is completed.

If you have answered all of the questions in Part A-E, please sign below.

Interviewee _____ Date: _____

Witness _____ Date: _____

If you require additional information or have any concerns about this project, please contact:

Kristine Wray or Dr. Brenda Parlee.
Department of Rural Economy University of Alberta
Tel: (780) 492-6825 Fax: (780) 492-0527
e-mail: brenda.parlee@ualberta.ca

APPENDIX C

"Ways We Respect the Caribou"
Hunting in Teetł'it Zheh

Kristine Wray is working with the Gwich'in Renewable Resource Council, the Gwich'in Social and Cultural Institute and the Gwich'in Renewable Resource Board on a research project with elders and caribou hunters in Fort McPherson.

This project focuses on understanding more about Teetł'it Gwich'in Knowledge and perceptions of Porcupine caribou. The Gwich'in have been living with change in the population of Porcupine caribou for many generations. Stories about "when caribou did not come" can be found in Gwich'in oral tradition. This body of knowledge and experience can be an important source of information for communities currently facing uncertainty about the abundance and distribution of caribou. Elders can provide culturally meaningful perspectives on why and how populations have changed. We hope to learn more about what kinds of knowledge and information influences where, how, and when people hunt.

Our project aims to answer the following questions:

- What are some traditional ways of respecting caribou?
- What are elder and hunter perceptions of caribou health and population change?
- What kind of traditional knowledge, scientific knowledge and other information do hunters use to make decisions about where, when and with whom to hunt?

The project will take place in the fall and winter of 2007/08. Anyone interested in participating in the project or anyone looking for more information can contact:

Kristine Wray, (867) 952-2783, kewray@ualberta.ca

Dr. Brenda Parlee

Faculty of Native Studies & Department of Rural Economy & Faculty of Agriculture, Life, and Environmental Sciences, 507 General Services Building, University of Alberta, Edmonton Alberta T6G 2H1, Tel: (780) 492-6825

Georgina Vaneltsi
TGRRC Coordinator
Gwich'in Renewable Resource Council
P.O. Box 30, Fort McPherson, NWT
X0E 0J0
Phone: (867) 952-2783
Fax: (867) 952-2212

Sharon Snowshoe
Executive Director
Gwich'in Social and Cultural Institute
P.O. Box 30, Fort McPherson, NWT
X0E 0J0
Phone: (867) 952-2524
Fax: (867) 952-2238

Gwich'in Renewable Resource Board
105 Veterans' Way
Inuvik, NWT
X0E 0T0
Phone: (867) 777-6600
Fax: (867) 777-6601

APPENDIX D

Interview Guide for Harvester Interviews

Project: Ways We Respect the Caribou: Hunting in Teetł'it Zheh

Kristine Wray and Brenda Parlee, Researchers
Christine Firth, Research Assistant

PART A – Hunter Information

Name _____ Age _____ Gender _____

Employment Status FT / PT **Type of Employment** _____

Date _____ Researcher _____

1. Can you tell me a little bit about your last caribou hunting trip? (where did you go, when, who did you go with, how did you get there, were you successful?)

_____
_____
_____
_____
_____

Most Common Hunting Area:

2a. Where are your most common hunting area(s)?

Hunting Area	Number of Trips to Area in Fall/Winter	Number of Trips to Area in Spring	Nearest Landmark to Hunting Area and Place name
Area 1			
Area 2			
Area 3			
Area 4			
Area 5			

Hunting Area	Total Nights Stayed	Number of years hunting in this area	Total number of days (column 2 + column 4)
Area 1			1
Area 2			2
Area 3			3
Area 4			4
Area 5			5

2b. Other areas you hunted in:_____

Hunting Activities

3. During what months of the year do you hunt caribou?

September	1
October	2
November	3
December	4
January	5
February	6
March	7
April	8
Other	9

4. On average, how many times do you go hunting caribou in the fall/winter?

Once	1
2-3 times	2
4-6 times	3
7-10	4
More than 10 times	5

5. On average, how many times do you go hunting caribou in the spring?

Once	1
2-3 times	2
4-6 times	3
7-10	4
More than 10 times	5

6. How long do you spend on each hunting trip?

1-5 hours	1
1 day	2
2-5 days (overnights)	3
6-10 days (overnights)	4
More than 10 days	5

Mode of Transport

7. What is your most common means of transportation?

My own skidoo	1
My own truck	2
Someone else's skidoo	3
Someone else's Truck	4
Other	5

8. If you use someone else's skidoo/truck, what is your relationship to that person?

_____

_____

Hunting Groups

9. Do you usually hunt with other people and if so, how many?

Hunt by myself	1
With 1-3 other people	2
With 4 -6 other people	3
With 7-10	4
More than 10	5

10. What is your relationship with the people you hunt with?

Family	1
Friends	2
Acquaintance	3
Other	4

Hunting with Elders

11. Do you hunt with an elder(s)?

Hunt with an elder(s)	1
Hunt without an elder(s)	2

12. What is your relationship with the elders you hunt with?

Family	1
Friends	2
Acquaintance	3
Other	4

Hunting with Youth

13. Do you include a youth in your hunting trip?

Hunt with Youth	1
Hunt without Youth	2

14. How old are the youth you hunt with?

0-6	1
7-12	2
13-18	3

15. What is your relationship with the youth you hunt with?

Family	1
Friends	2
Acquaintance	3
Other	4

Information/Communication Technology

16. Do you use any communication technology when you are hunting? (Read each option and circle if yes)

Bush Radio	1
Cell Phone	2
Satellite Phone	3
GPS	4
Caribou Collar Maps	5
Internet	6
Other	7

17. What do you use it for?

Tell/ask others where caribou are	1
Safety	2
To say "hi"	3
Other	4

Harvest: Number of Caribou Usually Harvested in Fall/Winter

18. How many caribou do you usually harvest in the fall/winter?

1-3	1
4-6	2
6-10	3
More than 10	4
Did not get any caribou	5

19. How many of these are bulls and how many are cows?

Number of Caribou Usually Harvested in Spring

20. How many caribou do you usually harvest in the spring?

1-3	1
4-6	2
6-10	3
More than 10	4
Did not get any caribou	5

21. How many of these are bulls and how many are cows?

Caribou Needs

22. Did you get enough caribou to fulfill your needs last winter?

23. In the last five years, was there a year when you did not get enough caribou to fulfill your needs?

Harvest Reporting

24. Do you report your harvest?

All the time	1
Sometimes	2
Never	3

25. Who do you report your harvest to?_____

26. Would you report your harvest if the RRC said you had to?

Yes	1
No	2
Maybe	3

Sharing of Caribou

27. Who do you share caribou meat with?

Individual use only	1
Share with family	2
Share with extended family/friends	3
Share with elders	4
Share at community gatherings	5
Share with other communities	6
Do not share	7

28. If you share meat with people in other communities, what communities are they?

_____

_____

PART B – Perception of Caribou Population & Health

Perception of Caribou Health

29. What is your perception of the state of health (body condition) of the caribou you harvest?

Very poor	1
Poor	2
Good	3
Very Good	4
Don't really think about it	5

Perception of Caribou Population Change(s)

30. Do you think that the population of caribou has changed in recent years?

Changed in recent years	1
Not changed in recent years	2
Didn't really notice	3

31. How has it changed?

Very low compared to previous years	1
Low compared to previous years	2
Same as in other years	3
More caribou than in previous years	4
Many more caribou than previous years	5
Didn't really notice	6

Cause of Population Change(s)

32. If you think the population has declined, why?

Overhunting by local people	1
Overhunting by other Gwich'in / Inuvialuit communities	2
Over-hunting by non-Aboriginal people	3
Disturbance from tourism	4
Disturbance from resource development	5
Climate Change	6
Natural Population Variability	7
Predation	8
Pollution/Contamination	9
Other	10

Perception of Caribou Distribution Change(s)

33. Do you think that the distribution of caribou (*where caribou go*) has changed in recent years?

Changed in recent years	1
Not changed in recent years	2
Didn't really notice	3

34. If you think the distribution has changed, why?

Overhunting by local people	1
Overhunting by other Gwich'in / Inuvialuit communities	2
Over-hunting by non-Aboriginal people	3
Disturbance from tourism	4
Disturbance from resource development	5
Climate Change	6
Natural Variability	7
Predation	8
Pollution/Contamination	9
Other	10

Level of Concern

35. Are you concerned about the population or health of the caribou?

Very concerned	1
Somewhat concerned	2
A little bit concerned	3
Not Concerned at all	4
Don't really think about it	5

36. If you are concerned, why?

_____
_____
_____

Part C - Knowledge Networks

Knowledge and Information – Story Form

37. Are there any issues about caribou? If so what are they?

_____
_____
_____

Knowledge of Caribou Population Change

38. Where does most of your knowledge about caribou come from? (Read options and circle if yes)

TV/Radio	1
Magazines/newspapers	2
Internet	3
Band/RRC	4
PCMB	5
GNWT	6
My elders	7
Other hunters	8
My own observations	9

Media (Radio, TV)

39a. Do you listen to the radio? Which station(s)?

_____
_____

39b. What kind of information do you hear on the radio/TV about caribou?

_____
_____
_____

39c. Has information about caribou from the radio/TV changed where and how you hunt?

A lot	1
Somewhat	2
Not at all	3
NA (I don't listen to radio/tv)	4

39d. How:

_____
_____

Media (Newspapers/Magazines)

40a. Which newspapers do you read? Which magazines do you read?

_____
_____

40b. What kind of information do you read in newspapers/magazines about caribou?

_____
_____
_____

40c. Has information about caribou from newspapers/magazines changed where and how you hunt?

A lot	1
Somewhat	2
Not at all	3
NA (I don't read newspapers/magazines)	4

40d. How:

_____
_____

Internet

41a. What internet sites do you look at for caribou information?

_____
_____

41b. What kind of information do you get from these internet sites about caribou?

_____
_____

41c. Has information about caribou from the internet changed where and how you hunt?

A lot	1
Somewhat	2
Not at all	3
NA (I don't go on the internet)	4

41d. How:

_____
_____

Band / Renewable Resource Council (RRC)

42a. What kind of information do you hear from the Band / Renewable Resource Council about caribou?

_____
_____

42b. Has information from the local Band / Renewable Resource Council about caribou changed where and how you hunt?

A lot	1
Somewhat	2
Not at all	3
NA (I haven't seen any information from the Band/Renewable Resource Council)	4

42c. How:

_____
_____

Porcupine Caribou Management Board (PCMB)

43a. What kind of information do you hear from the Porcupine Caribou Management Board about caribou?

_____

_____

43b. Has information from the Porcupine Caribou Management Board **(**PCMB) about caribou changed where and how you hunt?

A lot	1
Somewhat	2
Not at all	3
NA (I haven't seen any information from PCMB)	4

43c. How:

_____

_____

Government of the Northwest Territories / GNWT

44a. What kind of information do you hear from the GNWT about caribou?

_____

_____

_____

44b. Has information from the GNWT about caribou changed where and how you hunt?

A lot	1
Somewhat	2
Not at all	3
NA (I haven't seen any information from GNWT)	4

44c. How:

_____

_____

Elders

45a. What kind of information do you hear from your elders about caribou?

_____

_____

45b. Has talking to your elders about caribou changed where and how you hunt?

A lot	1
Somewhat	2
Not at all	3
NA (I don't talk to my elders)	4

45c. How:

_____

_____

Other Hunters:

46a. What kind of information do you get from other hunters about caribou?

_____

_____

46b. Has information you've gotten from other hunters has changed where and how you hunt?

A lot	1
Somewhat	2
Not at all	3
NA (no information from other hunters)	4

46c. How:

_____

_____

My Observations

47a. What observations have you made about caribou?

_____

_____

47b. Have your observations of caribou population / health changed where and how you hunt?

A lot	1
Somewhat	2
Not at all	3
NA (no observations)	4

47c. How:

_____

_____

Traditional Practices

48. What kind of traditional practices do you think are important to remember in caribou hunting?

	1
	2
	3
	4
Don't know of any traditional practices	5

Government Regulations

49. What kind of government regulations do you think are important to remember in caribou hunting?

	1
	2
	3
	4
Don't know of any regulations	5

Hunting and Gender Roles

50. Are there different traditional hunting practices for women and for men? Can you describe them?

Guiding Questions for Elders Interviews

1a. What is the relationship of the Teetł'it Gwich'in to the caribou?

1b. Why are caribou important?

2a. Do you think the caribou are healthy or unhealthy? If so, why?

2b. Have you heard the claims that the caribou population is in decline? What do you think about this? Do you agree or disagree? If so, why?

3a. What are traditional practices for respecting caribou?

3b. Have these practices changed since you were young?

3c. How has the Dempster highway/skidoos/trucks changed how people respect caribou?

4. Are there specific ways that women should respect caribou?