THE COSTS OF POWER SHARING: COMMUNITY INVOLVEMENT IN CANADIAN PORCUPINE CARIBOU CO-MANAGEMENT

by

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Abstract

Co-management arrangements are commonly framed with the theoretical assumption that community management systems function with a minimum of transaction costs and government-community power sharing lowers overall costs of management. Commonly overlooked both practically and theoretically are costs to communities. This dissertation investigates the involvement of three northern indigenous communities in a wildlife co-management arrangement to delineate community costs of power sharing. The subject of the study is the internationally migratory Porcupine Caribou Herd, Canada's three primary Porcupine Caribou user communities (Old Crow, YT, Aklavik, NT, and Fort McPherson, NT), and the resource regime established by the Canadian Porcupine Caribou Management Agreement and The Agreement between the Governments of Canada and the United States for the Conservation of Porcupine Caribou.

Using multiple sources of evidence and drawing on the ethnographic method, the study documents emergent communication linkages between co-management boards and communities, analyzes locals' perceptions of caribou management information and scientific research activities, identifies patterns of interaction between researchers and hunters, and illustrates the constraints of choice available to hunters of the Canadian Porcupine Caribou co-management system. Presented is an account of the "1993 Caribou Crisis," a critical co-management incident in which hunters confront caribou researchers and face the dilemma of violating cultural traditions in order to stop proposed hydrocarbon development.

Fundamentally, the study examines the consequence of interfacing authority systems and power dynamics of a formal co-management arrangement. The study also points to the limitations of rational choice perspectives when conducting institutional

analysis, and the need to consider group identity, perspectives on uncertainty, and styles of learning when delineating transaction costs. From a more applied perspective, delineating anticipated and incurred community transaction costs of power sharing brings attention to the impediments to local involvement, how community members invest their energies in a co-management process, and who and by what method they bear the costs of shared decision making.

Porcupine Caribou user communities make sacrifices when seeking to exercise authority in shared decision-making. The transaction costs of co-management associated with community involvement come at the price of time commitments and imposed schedules, restructuring of former traditions of leadership, and engaging with government agencies in bureaucratic processes. Internalizing authority in caribou management means that community members and leaders must decipher new information, interact with a host of players, engage in lobbying, and become involved in conflicts which are at times turbulent and controversial, as well as divisive to community. In some cases, the costs of power sharing are perceived to violate customary and traditional institutions regarding human-human, and human- caribou relations and in turn, undermine the well-being of the caribou resource and the relationships of those who depend on it.

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Acronyms appearing in the dissertation

BQCMB	Beverly Qamanirjuaq Caribou Management Board
CAH	Central arctic Caribou herd
CYI	Council of Yukon Indians
GFN	Gwich'in First Nation
GRRB	Gwich'in Renewable Resource Board
HTC	Hunter and Trapper Committee
IACPC	Agreement Between the Governments of Canada and the United States for the Conservation of Porcupine Caribou
IFA	Inuvialuit Final Agreement
IGC	Inuvialuit Game Council
IPCB	International Porcupine Caribou Board
MOU	Memorandum of Understanding
NOGAP	Northern Oil and Gas Assessment Project
PCH	Porcupine Caribou Herd
PCMA	Porcupine Caribou Management Agreement
PCMB	Porcupine Caribou Management Board
PCTC	Porcupine Caribou Technical Committee
RCMP	Royal Canadian Mounted Police
RRC	Renewable Resources Council
US	United States of America
VGFN	Vuntut Gwitchin First Nation
WMAC(NS)	Wildlife Management Advisor Council (North Slope)
YTG-RR	Yukon Territorial Government Department of Renewable Resources

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Dedication

This dissertation is dedicated to community elders who contributed to this project. I am sadden that some of them are no longer with us, and give thanks for the knowledge and wisdom they have shared.

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1. A RESEARCHER'S WELCOME TO CO-MANAGEMENT

1.1 Ethnographic Sketch #1: "Affirming" The Study

It is December 15, 1992, 9:15 AM. Canadian Porcupine Caribou Management Board (PCMB) members assemble in a conference room at the Yukon Inn in Whitehorse, Yukon. Outside it is dark and the mercury hovers at -40. Inside people mingle, sip coffee, eat muffins, and chew caribou dry meat. Representatives present include an Inuvialuit, two Vuntut Gwitchin, and three government employees of the Northwest Territories, Yukon Territory, and Canadian Federal governments. Also present are the acting board chairperson- a Northern Tutchone- and the board's secretary, who is a half-time employee of the board and former caribou biologist. Absent are the board's chairperson, also a Northern Tutchone; who is off negotiating his First Nation's land claim, and a Tetl'it Gwich'in representative, an elder who dislikes airplane travel and is stranded on the Dempster Highway because of severe winter driving conditions.

Board members find their seats. I choose one at the center point of the rectangularly arranged tables. To my left sit three natives and the newest member of the board, a government representative. To my right are all other government representatives, along with the acting chair and the board's secretary. One native member has a briefcase with him. Another has a stack of printed materials. The remaining two native people appear to have no paper or notebooks. All government representatives have briefcases and from them remove printed material. There are no women present. Three people wear baseball caps. No one wears a tie.

I am attending a Canadian Porcupine Caribou Management Board (PCMB) meeting. Ten months prior, I phoned the board's secretary, explained my interest in

studying Canadian co-management, and requested a letter of support for my proposed dissertation research. A month later, I received a letter of support, stating that board members had discussed my proposal at their May, 1992 meeting, noted the advantages of having an "objective" outside evaluator, and passed a motion supporting my study (PCMB 1992). The following November, I received a call from the secretary informing me that the PCMB was about to begin its next three-year planning cycle, making the coming December meeting an ideal time to begin the research.

The meeting opens with a prayer, delivered in the Athabascan language of Gwich'in. After the "call to order," the chairperson asks that I introduce myself and state why I am attending. I launch into my prepared presentation. Seconds into my talk, I am interrupted mid-sentence. Without apology, the chairperson tells me that I had said enough. For a fleeting moment, I am overwhelmed with confusion and embarrassment. In time I realize that I have misread his instructions and that my full presentation is to come later in the agenda. The event marks the first of many trial and error attempts at decoding native board members' verbal and nonverbal messages, adjusting my own vocabulary in hopes of being understood better, and realizing that while I may improve my inter-cultural communication skills, by virtue of my western way of thinking, my efforts will forever remain flawed.

Within the hour, I am again asked to tell my purpose for attending the meeting. This time I am informed that all those addressing the board for their first time are asked to wear the "Horn Hat" -- a baseball cap complete with sewn-in Porcupine Caribou Management Board badge and large floppy felt antlers. Donning the hat, I experience it as a leveling device; all feelings of self importance vanish. (Two days later at this same PCMB meeting, a public health doctor is asked to address the board on human health issues related to contaminants in Porcupine Caribou. When he refuses to wear the Horn

Hat , a native board member leans over and whispers, "If they don't wear the hat, what they say isn't too important.")

I distribute a two-page brief describing my research plan, and make available copies of a twenty-page project description for those interested. Two government managers are the only people to take the longer edition. I lay out my objectives, methods, and my willingness to adapt to the needs of the board and communities. I explain that the project is funded by two United States Government agencies and read a portion of my two-pager.

> The objective of this project is to evaluate the effectiveness of Porcupine Caribou Herd (PCH) co-management. "Effectiveness" is defined here as the degree to which current management meets local caribou users' needs and supports the sustainability of human-caribou relationships.
>
> The project is organized around three questions:
>
> 1) How have the Canadian Porcupine Caribou Management Agreement (1985) and the International PCH Conservation Agreement (1987) changed caribou management decision-making for communities?
>
> 2) How are communities currently involved in caribou management? What influences the process and outcomes of co-management?
>
> 3) How do caribou user community members evaluate caribou co-management?

Reaction to my presentation and handout comes first from community representatives. It is immediate, blunt, and, as later described by a non-native board member, hostile. "Not another study!" is the response of a native representative who offered no smiles. Another native board member notes his community's bad experiences with academic researchers and goes on to say that the name Porcupine caribou herd was originally mistranslated from his language and should, by right, be called the "Quill River Caribou" or *Tyso Denjik Vutzui.* He suggests that perhaps I can do something about the error. The acting chairperson tells a story of his own research in university libraries where he located documents which misrepresent his people's history. A government board member counters the comments of community representatives with

the question, "Don't you want to know if the board is doing a good job?" There is no reply. The only mention of the board's previous endorsement of my project is made in passing by a government representative. Board members' discussion then takes what I perceive to be an abrupt topic change. The comments of the community representative who offers no smiles shift directly from concerns about my co-management study to village hunters' concerns regarding the collaring of caribou for biological research. Discussion on caribou collars and caribou research activities ensues with community representatives reporting that local hunters are observing that caribou wearing collars are being shunned by fellow animals, and moves to conversation among and explanations from biologists. A biologists responds that no research has been completed on the impact of radio-collars on the social behavior of caribou and that there is no evidence to indicate that their use is a problem. It is agreed that further study of the problem will be made.

This discussion consumes the remainder of the time allotted for my project. In my first thirty minutes of addressing the board, I note that for some, the difference between researching caribou and research involving people is, at best, vague if not indistinguishable; both activities are perceived by some caribou hunters as intrusive, disruptive, and potentially disrespectful. A call for a motion to support my research is postponed by the acting chairperson until later in the day.

The Inuvialuit representative sitting to my left remains silent throughout the entire discussion. In a one-on-one chat during the coffee break, while most other board members socialize and play a coin-toss game for loonies at the back of the room, he quietly tells me that he will support the project in his home community.

After lunch, the board secretary requests that I help him take notes. I also serve coffee and copy materials. The agenda topics and discussions range widely from

planning a Washington lobbying strategy to stopping oil development on the herd's calving grounds in Alaska, to an update on the recent herd population census which falls short of biologists' predictions by 18,000 animals, to brainstorming sessions for youth hunter education programs, and finally to expressions of frustration by a native representative whose community members chose to play bingo rather than attend public meetings. Throughout the course of the three-day PCMB meeting, I volunteer my services, share meals, have informal conversations with board members, and get better acquainted.

In the final hour of the meeting, the PCMB chairperson re-introduces the question of my co-management research and makes a motion to "affirm" the study (PCMB 1992). The motion is moved and seconded by native members, and "passes by consensus." (*ibid.*) The "action item," assigning responsibility for the motion and appearing in the meeting minutes reads:

> Board members will introduce Gary Kofinas in their home communities and explain how his work will benefit the management of the Porcupine Caribou Herd. (*ibid.*)

The meeting is adjourned. Members disperse. The community representative who had offered no smiles meets me in the hallway, extends a handshake, and informs me that I have been "adopted." I am not sure what he means and do not ask. What is clear from the events is that I am not to be a passive side-line observer. In the two years of field work and ten domestic and international caribou management board meetings that follow, I walk the line between observer, agent of change, and servant, and am allowed into many of the backstage areas of the board's co-management process.

In February and March of that winter, I travel to three Canadian caribou user communities to request local permission to conduct the research. At the first community, I meet three local leaders who usher me into their private office and tell of social

problems within the community, the heavy demands of their jobs, and their desire for ways of improving community involvement in decision making. At the second, I am unable to meet the schedule of a regular meeting of a key local resource management organization. Instead, I make house-to-house visits to local leaders and eventually receive a letter with formal community approval. Arriving at the third community, I believe I have arranged a meeting with the Chief through a phone call to the local PCMB representative. There I am told that the local leader is not aware that there was a December PCMB meeting, he has not been informed of my arrival, and has heard nothing of my project. I describe the objectives of the study and walk him through my informed consent statement. He goes on to express dissatisfaction with the level of communication between the Caribou Board and local leadership and describes what he perceives as problems of procedural formality at board meetings and limited access to board-level decision making for local leaders. I share a copy of my two-page brief, describe my research plan, and am told I can return to the village the following summer to begin the field work.

Six months later, the same local leader and I camp by the river's edge at an historic site which his people have used continuously for hunting and community gatherings for over 1800 years (McClellan 1987). With us are villagers who have traveled to the spot by boat for their First Nation's annual general assembly. Hiking the near-by area before breakfast, I find ancient flint chips scattered on a bluff called *Thou Kut* (Caribou Lookout), scan the landscape for caribou, and conjure images of meetings held long ago. Later I sit by the fire with a group of men, watch caribou soup boil, and share time. The conversation is intermittent with periods of thirty to forty five seconds of silence passing between verbal exchanges. As Welch-Acheson (Acheson 1977) has written and I subsequently discover, "simply being in close proximity, being aware of

each others' moods and actions, and observing the same happenings is a social event" or type of "communicative transaction" in this society.[1]

The general assembly opens with a prayer, delivered by an elder. The Chief thanks people for attending and explains how their presence gives him strength as a leader. With no mention of me or my project, he then announces that all visitors are to give their name and tell why they are attending. There is a moment of silence as I realize that am the only visitor present. I make a brief presentation about the co-management research and ask if there is a need for clarification. No questions are asked or comments offered; I join the group as an observer. On the advice of a local, I spend my first month in that community listening, sharing time, joining men on their caribou hunts, and volunteering labor *before* conducting any formal interviews.

1.2 Reflections on the Decision to "Affirm the Study"

The events and unspoken assumptions of the decision "to affirm the study" were confusing to me as an outsider and newcomer. Why had the PCMB re-evaluated its initial endorsement of my proposal? What was the connection between concern about this research and collared caribou? Why was local leadership not aware of the December PCMB meeting? Why hadn't the Chief or the PCMB representative in attendance at the general assembly publicly introduced me to the community and told of our previous discussions? And what was the significance to community of a board-level decision to affirm a particular activity?

Monitoring my own level of frustration while grappling with the practicalities of this project became my signal to revisit and compare my own cultural biases with those I

[1] Ann Welsh Achenson's (1977) dissertation, entitled *Nomads in Town*, focuses on issues of hunters' adaptation to settled life. As such, it serves as a good background document for understanding some of the issues of this study.

encountered.[2] After reevaluating my own assumptions, what had appeared as dysfunctional was now understood as part of the another system's rules, obligations, and internal logic.

- The quick response of the board's secretary had been delivered in the western tradition of efficiency.
- The Caribou Management Board serves as an organizational stage for interfacing cultural systems which hold distinct identities but together are bound by their need for a shared resource.
- Board members function as specialists of and interpreters for their respective systems, while also acting as agents of the co-management board.
- The response of community reflects its institutions of communication, leadership, and decision making protocols.

Seen as a whole, shared experiences illustrate what Turner (1964) terms "social dramas and social enterprises... sequences of social events organized primarily through relations in time rather than in space." As will be shown in the pages that follow, the "drama" or transactions of the decision "to affirm" this study follows patterns similar to others in the enterprise of community-government power sharing. Discovering and unraveling these patterns and their dynamic qualities are, in part, objectives of this study.

1.3 Brief Objectives Statement

This dissertation is a study of community involvement in co-management. In this dissertation I investigate community costs of involvement in co-management as occurring in activity areas of Porcupine Caribou management. Using a grounded theory approach (Glaser and Strauss 1967; Strauss 1987; Strauss and Corbin 1990), anticipated and incurred community costs are assumed to be situational and multi-dimensional. Community dilemmas of co-management and underlying transaction costs

[2] Anthropologists refer to this method as "the reflexive process." See Hammersley and Atkinson (1983).

are delineated. Cost are manifested in three conditions; the lack of specificity in community caribou management rights, limited community resources for use in management , and the disparity in underlying cultural assumptions. While traditional aspects of local systems of management gain legitimacy in state resource management and the terms of the co-management arrangement are broadened, Porcupine Caribou user communities concurrently incur costs in the process of power sharing. Dilemmas reflect community choice sets defined by the institutional environment.

Multiple sources of evidence are used in the study, with ethnography serving as the unifying method of analysis. The study draws on Porcupine caribou co-management activities related to community board representation, caribou studies, habitat management and impact assessment, and enforcement and community compliance. These activities are later compared to identify cost-occurring conditions and their significance to management.

1.4 Organization of the dissertation

This chapter and Chapter Two introduce the study, state the objectives of the dissertation, and provide the key concepts and assumptions and a framework for analysis. Relevant benefits of co-management, as assumed in theory and discovered in case study research, are described, along with the transaction costs concept and its applications to the analysis of co-management. A discussion of research methods, challenges of this research, and sources of evidence follow.

Chapters Three and Four outline the context of Porcupine Caribou co-management, including ecological, historical, and legal dimensions. Chapter Three provides an introduction to the case study, including an overview of the ecology of the Porcupine Caribou resource, the jurisdictional complexity that is found across the range

of the herd, and the terms of co-management agreements. Historical aspects of Porcupine Caribou management and state-community relations are also presented briefly in Chapter Three and referenced throughout the dissertation.[3] Chapter Four examines local systems of caribou management, including a discussion of the culturally defined power relations of the hunter, community and caribou.

Chapters Five to Eight focus on the co-management process and examine several activity areas of the Porcupine caribou case study. Chapter Five examines the linkages of community and its co-management board, reviewing communication strategies implemented by co-management board and non-native assumptions of community-board communications. The chapter also analyzes the processes of community representation as occurring in the co-management regime, public meetings as the venues of decision making, and where and how often community members receive information on caribou management,. Networks of information exchange of communities to the board are defined in this chapter. In Chapter Six, community perceptions are documented to determine locals' views on the need to conduct research on caribou, the appropriateness of caribou research methods, and the reliability of various information sources. Chapter Six also presents data on hunters' expectations of local compliance and trust in the management system. Chapter Seven provides a review of literature on the topic of science, local knowledge and their use in co-management, and an ethnographic account of the "1993 Caribou Crisis." This critical incident, the result of local concerns regarding the activities of caribou biologists which lead to resolutions of the domestic level co-management board, serves to ground the study of co-management and illustrate the dynamics and complexity of the management

[3] A thorough retrospective analysis was undertaken as a part of the co-management research project, tracing community-government Porcupine Caribou relations from early contact until the signing of the Porcupine Caribou Management Agreement. While aspects of this research are referenced in the dissertation, the full manuscript (75 pp.) is not included here..

process. Chapter Eight then draws on the 1993 Caribou Crisis and other findings of the study to delineate further community costs associated with co-management. In the final chapter, conclusions are presented, community costs and dilemmas as discovered in this study are listed, and their implications to caribou management are discussed.

2. THE STUDY

2.1 Co-Management and the New Canadian North

Forty years ago, the suggestion that northern hunting communities should share legal authority with state agencies in management of caribou would have been considered heretical in many government quarters. At that time, the conventional wisdom held that southern-based governments create law, government agencies implement policy, scientists establish fact, and wildlife officers police hunters. Underpinned with modernist prescriptions of material progress and economic development, southern governments regarded northern indigenous peoples as wards of the state and their interest in killing caribou as anachronistic.

Today, many of the espoused state wildlife policies stand in contrast to that era. At the international level, the 1991 United Nation's World Conservation Strategy Report, *Caring for the Earth*, asserts that sustainable living depends upon the commitment of individuals to environmental care, and this commitment is best expressed through people's communities. The report adds that communities must be provided with secure access to resources, an equitable share in managing them, and enhanced participation in conservation efforts (IUCN 1991). Similar statements arguing for the inclusion of community in resource management processes are voiced in the now historic "Bruntland Report" (World Commission on Environment and Development 1987). Chapter 26 of Agenda 21, adopted by the United Nations Conference on Environment and Development is entitled "Recognizing and strengthening the role of indigenous people and their communities" and states the need for, "[I]nvolvement of indigenous people and their communities at the national and local levels in resource management and conservation strategies..." The Convention of Biological Diversity, signed by over 160

heads of state, establishes a similar directive.

At the federal, provincial, and territorial levels in Canada, a host of new policies has recently been adopted, proclaiming the innovative benefits of aboriginal community participation in resource management, with terms like "traditional knowledge" and "local control" commonly incorporated into the lexicon.[4] Accepted at face value, these initiatives represent a shift in paradigms in the business of resource management, indicating a departure from former top-down approaches and movement towards an orientation that is resource-user sensitive. From a more critical angle, these same shifts can be interpreted as state government efforts to appease traditional resource users, and as evidence of incremental stages in the bureaucratization of northern hunting communities.

Since the early to mid 1980's the Canadian Government along with Canadian Arctic and sub-Arctic indigenous peoples, has been part of the international vanguard, adapting agency-dominated resource management with formal agreements that provide a legal basis for community-government partnerships in natural resource management. These alternative systems are called "co-management" or "cooperative" arrangements (Usher and Banks 1986; Pinkerton 1987; Osherenko 1988a; Osherenko 1988b; Pinkerton 1988; Pinkerton 1991).

Co-management has been defined as power sharing in the exercise of resource management between a group or groups of resource users and the state (Pinkerton

[4] An example is the *1990 Wildlife Policy of Canada*. Endorsed by Canada's Wildlife Ministers and providing a framework for federal, provincial, and territorial, and non-government wildlife policies and programs, managers have called to involve aboriginal people "wherever appropriate". . . "establish[ing] cooperative management," "involve[ing] aboriginal peoples in planning and implementing programs," "ensure[ing] that [aboriginal peoples'] special knowledge [be] reflected in management," . . . "encourage[ing them] to take a lead role in management professions" (Wildlife Ministers' Council of Canada 1990).

1992). Providing a more legalistic definition which assumes the state's ultimate responsibility in conservation, Osherenko (1988b:13) defines co-management as:

> [A]n institutional arrangement in which government agencies with jurisdiction over resources and user groups enter into an agreement covering a specific geographical region and make explicit:
>
> 1) a system of rights and obligations for those interested in the resource,
>
> 2) a collection of rules, indicating actions that subjects are expected to take under various circumstances,
>
> 3) procedures for making collective decisions affecting the interests of government actors, user organizations, and individual users.

Also, as previously observed in "The decision to affirm this study" (Chapter One), northern co-management functions as a nexus of highly complex cultural and ecological relations in which collective action and conflict operate concurrently across differing cultural perspectives.

Co-management arrangements vary in structure, legality, and cultural diversity. In the Canadian North, where living resources are shared amongst several communities and formal co-management agreements are established, coordinating organizations (e.g., boards, committees, councils) commonly implement the objectives of negotiated agreements and serve as loci for resource-related transactions. Decision making by these bodies has been described as "consensus based" (Peter and Urquhart 1991), and board-generated recommendations regarded as advisory. In this respect, the influence and authority of formal co-management arrangements are achieved through the redistribution of rights and duties as set out in formal agreements as well as the perceived legitimacy and trust of these systems by governments, community organizations and communities of resource users.

The recent negotiation and settlements of Canadians native land claims have, in the past ten years, resulted in a ground swell of formal co-management arrangements.[5] Internationally, new bilateral and circumpolar resource agreements have also been established, many of which explicitly state that local communities of resource users have a role in policy-formation and operational decision making. With the globalization of economies, the presence and growth of government budget deficits, and the impetus to devolve federal responsibilities to territorial and local levels, the trend towards co-management in governance of natural resources, both in the Canadian North and beyond, is not likely to abate.

2.2 A New Set of Questions

In 1983, at the Third National Workshop on People, Resources, and the Environment North of 60, the chair of the Canadian Arctic Resources Committee, Everett Peterson (1983), mused about transformations which had occurred in the Canadian North over the previous two decades. The state of affairs, he reflected, had shifted from a focus on methods of mitigating the social and environmental impacts of northern mega-projects to an emphasis of the role northern peoples might play in formulating and implementing resources management policy. "In the past decade," he said, "Canadians sought to answer *how* to manage development... , in the present one, we shall debate *who* will have that responsibility" (p. xiii).[6] Nearly fifteen years later, Peterson's line of reasoning can be extended into the present with the question, *What* is the consequence of responsibility reallocations that come with co-management?

[5] The Yukon Government's renewable resources department has recently identified thirty six co-management arrangements. For examples and descriptions of the diverse range of northern co-management arrangements see Roberts (1996).

[6] Italic highlights are my own, inserted for emphasis.

The establishment of co-management as a common feature of the northern political landscape does raise an important set of questions. These questions are substantive to the extent there is a practical need to understand better the overall effectiveness of co-management in achieving sustainable use of resources, by identifying those conditions which facilitate success, and providing insight into the every-day problems encountered by those directly involved in these systems. Related are the questions of what has co-management achievement done to resolve historic cultural conflicts, to establish better community-agency cooperation, and to build trust amongst parties who are radically different, while legally bound.

These questions shift to a more theoretical perspective with the problem of power-sharing. Is it possible for isolated communities, whose members have limited formal education, whose membership is small, and whose local organizations have little infrastructure and limited financial support to co-manage natural resources in partnership with state governments which are staffed with cadres of full-time professionals and whose purse strings are ultimately tied to southern interests? Where several communities and governments are partners in the same co-management arrangement, can boards be responsive to concerns of all partners? Can board-level recommendations be fulfilled by sincere local and government cooperation? And when disputes involve two or more sovereign powers, can bilateral institutional arrangements provide a meaningful role for small local communities?

Just as important is the related question of costs of power sharing and their implications to community culture. Is it possible for small communities to engage state bureaucracies in some semblance of power sharing while at the same time maintaining those elements of traditional local culture which for generations are said to have fostered stewardship of natural resources? If community-state power sharing is possible, then

under what conditions is it achieved?

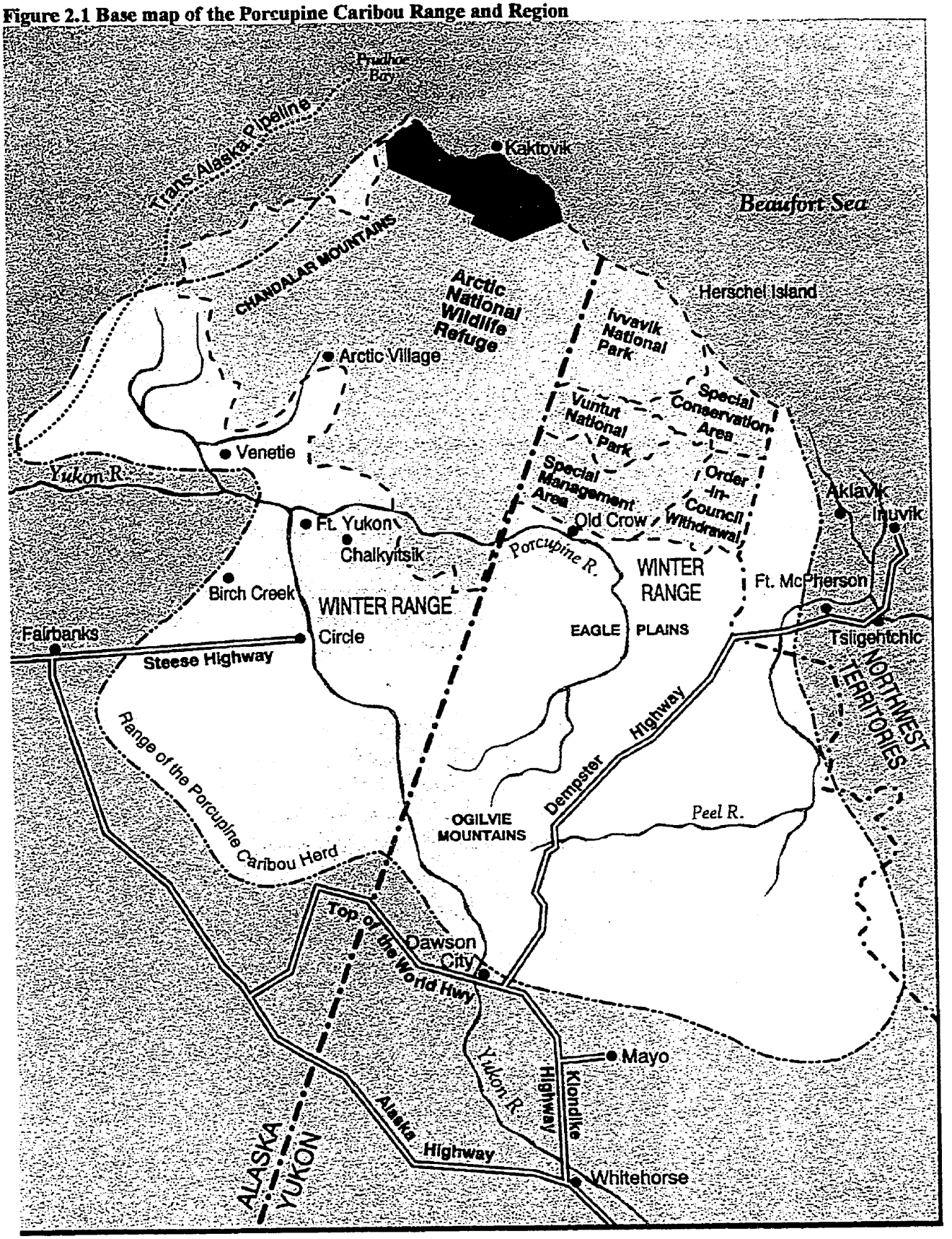
And finally, such questions pose the research conundrum. Given the complexity of cultural- ecological and political-economic forces at play in the northern resource management environment, with what theoretical orientation and by what method can an analyst assess community involvement with sensitivity and rigor?

2.3 The Goals and Objective of this Study

This dissertation is a study of community involvement in co-management. It is an investigation into the co-management experience of three small northern aboriginal communities which for millennia have sustained a relationship with caribou for subsistence uses and cultural value, and today are partners with governments in arrangements that recognize rights and provide resources for shared decision making in wildlife management.

Serving as the case study for this research is Canadian community involvement in management of the Porcupine Caribou Herd. The subjects of this case study include the internationally migratory Porcupine Caribou herd, the international- and domestic-level Porcupine caribou management instruments and organizations, state/territorial- and federal governments, and the aboriginal communities of Old Crow of Yukon Territory, and Fort McPherson and Aklavik in the Northwest Territories, which are Canada's primary Porcupine Caribou user communities. (See Figure 2.1).

Figure 2.1 Base map of the Porcupine Caribou Range and Region



Species such as migratory barren-ground caribou pose difficult management challenges to communities wishing to sustain their use of such resources. These animals typically observe no political borders, vary in annual and seasonal distribution, and elude the best efforts of humans to predict their behavior with certainty (Klein 1987; Klein 1991). As classified by the policy scientist, these resources are "common property" or "common pool resources," and defined as public goods associated with high costs for excluding public access and where the consumption of one unit of the resource subtracts from the consumption of others (Feeny, Berkes et al. 1990). In this study, the problems of sustaining the use of common pool resources involve grappling with issues of culturally defined perspectives on resources and their control, together with related processes of defining the terms of excludability and subtractability.

Common pool resource management problems and prescribed solutions to them have been the topic of heated debate in recent decades, giving rise to an interest in institutions or "rules of the game" as policy instruments for responding to such problems (Young 1982; McCay and Acheson 1987; Acheson 1989; Feeny, Berkes et al. 1990). In this study, property relations are assumed to be a kind of social institution which defines rights and duties to resources as well as the relationships of resource users and the greater community (Piddocke 1985). Property relations define the stock and flow of resource benefits (Bromley 1989). In this respect, the study of institutions and property is a fundamental component of the analysis of power (MacPherson 1978). How groups cooperate when making decisions about the uses of and relations with common pool resources is central to the study of power sharing.

One stream of the common property research has devoted particular attention to the conditions facilitating local management of shared natural resources (Panel on Common Property Management 1985; Ostrom 1987; Berkes 1989b; Pinkerton 1989a;

Ostrom 1990; Bromley 1992; Ostrom, Gardner et al. 1994). A parallel stream has focused on the potential success of community-government power sharing arrangements (Usher 1983; McCay and Acheson 1987; Pinkerton 1987; Osherenko 1988b; Pinkerton 1988; Berkes 1989b; Feit 1989; Jentoft and Kristoffersen 1989; Pinkerton 1989a; Pinkerton 1989b; Berkes, George et al. 1991; Caulfield 1993; Taylor and Singleton 1993; Pinkerton 1994; Usher 1995).

This study contributes to the on-going discussion by analyzing community involvement in a long-standing, legally-based, formal northern co-management arrangement that is regarded by some as "a model" for engaging locals in a wildlife management process.[7] More specifically, this study focuses on local culture as a sub-component of a wildlife co-management system, and investigates the cost to community of co-management involvement.

At a fundamental level, this study explores the dynamics and consequence of a co-management interface through the interaction of two differing authority systems, one bureaucratically organized and southern based; and the other locally oriented and intimately tied to its surrounding landscape (Usher 1986; Bromley 1992). At another level, the dissertation investigates community participation in a power-sharing regime as a form of feedback to community. Viewing co-management as a force of community transformation, the study investigates the implications of the specification formal community caribou rights as occurring with domestic- and international-level wildlife management agreements, the roles communities assume in the co-management

[7] The Canadian Porcupine Caribou co-management has been described as a "model" arrangement for involving caribou user communities. I observed this claim made at the 1994 North Slope Conference in Dawson, Yukon, the 1994 Science, Caribou, People Conference in Arctic Village, Alaska, the April, 1996 Porcupine Caribou Board meeting in Old Crow, Yukon, and the August, 1995 Arctic Ungulate Conference in Fairbanks, Alaska. References to the PCMB as model were also made informally by those directly and indirectly involved in the process at the community and agency levels.

process, and the concurrent development and erosion of local trust in a region-wide caribou management regime.

As one means of explaining community involvement in co-management, I delineate a typology of community transaction costs and their related conditions, contributing to the development of common property theory by providing insights into the choices and challenges facing local communities participating in a power-sharing arrangement.

2.4 Rationale for Delineating Transaction Costs

Transaction costs is an analytical concept which has traditionally served economists seeking to explain the behavior of actors in economic and political markets. Commonly considered as the "cost of doing business" (e.g., search costs, information costs, negotiation costs, monitoring costs, enforcement costs), the transaction costs concept has also been described as "friction in any exchange" – a type of mechanistic analog to the expenditure of human energy in decision making. Williamson (1993) defines transaction costs as:

> The *ex ante* [i.e. anticipated] costs of drafting, negotiating, and safeguarding an agreement and, more especially, the *ex post* [i.e. incurred] costs of maladaptation and adjustment that arise when contract execution is misaligned as a result of gaps, errors, omissions and unanticipated disturbance.

The study of transaction costs as applied to management of natural resources has received the attention of students of common property theory (Demsetz 1967; Alessi 1983) and those interested specifically in resource regimes (Young 1982).[8] Recently, the significance of transaction costs in collective action investigations has become a

[8] The term "resource regime" will be used here to refer to a set of specific arrangements for management of a shared resource. To refer to the Porcupine Caribou resource regime is to refer to the that cluster of mutually observed rules which govern actions around resource use. For detailed discussion see Young (1982; 1989) .

focus of "new institutionalism," a field of scholarship which endeavors to draw on the strengths of economic analysis while accounting for the function of social institutions in social, economic, and political processes (Acheson 1994; North 1995).[9]

The effort to bridge economic and anthropological perspectives can be traced to several on-going theoretical conflicts (Granovetter 1985; Miche 1994), with several on-going tension found in the normative prescriptions of efficiency vs. equity in markets, as well as other tensions of localism vs. centralism in governance and positivism vs. phenomenology in science.

Driving much of the attention on transaction costs among institutionalists, and more specifically, common property theorists, has been a reorientation of rational choice assumptions of human behavior with the recognition that imperfect information or "bounded rationality" (Simon 1957a; Simon 1957b) is of significance when assessing individual and collective choice.[10] Equally important has been the recognition that costliness of information is a key impediment in decision making (Coase 1960). Said another way, the conditions of uncertainty and the mere existence of social institutions challenge the sweeping generalizations of neoclassical economics' utility maximizing assumption. According to the transaction costs economist, bounded rationality establishes the need to account more fully for the cost avoidance behavior of the human actor and the function of social institutions as constraints on human choice.

[9] Among those advancing theoretical interest in transaction costs is Williamson, whose theory is focused primarily on market exchanges. While I draw on Williamson's definition of transaction costs, I do not follow his theoretical tradition of institutional economics.

[10] Simon (1957b) writes, "The capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behavior in the real world - or even for a reasonable approximation to such objective rationality." In this respect the human condition bounds us to be intentionally rational, rather than objectively rational (Brunner and Ascher 1992).

Moving the focus from markets of economic exchange to political systems, North (1990) makes the point that "formal political rules, like formal economic rules, are designed to facilitate an exchange, but democracy in the polity is not to be equated with competitive markets in the economy. The distinction is important with respect to the efficiency of property rights." Identifying weaknesses in the assumptions of instrumental rationality and notions of efficient markets as applied by conventional rational choice models, North calls for the development of a "transaction costs theory of politics" which incorporates the symbolic relationship between institutions, consequent organizational shape, and the direction of political and economic change. Exploring opportunities for advancing common property theory, Feeny (1995), echoes this interest in transaction costs, acknowledges the limitations of formal models in policy-relevant analysis, and encourages research focused on qualitative and quantitative assessment of transaction costs as observed from empirical research.

As will be demonstrated in this study, a focus on transaction costs offers a useful method of explaining emergent relations in a co-management process. As argued here, however, restricting the analysis of transaction costs and institutions to conventional rational choice (i.e. cost-benefit) frameworks limits the scope of decision analysis (Johnson 1980); greater explanatory powers become available when also appreciating institutions and their respective cultural processes (Douglas 1986).

In this dissertation, the study of community transaction costs in co-management is a qualitative assessment, with such costs serving to analyze several dimensions of a co-management process. First, identifying transaction costs highlights northern communities' social construction of caribou management and the incongruities between local management systems and those with which they interact. Second, understanding the conditions of avoided community transaction costs draws attention to the

impediments to local involvement and the achievement of a democratic process. Third, recognizing willingly incurred transaction costs helps to identify where and how community invests its energies in a co-management process. Coupled with an accounting of consequences, community transaction costs and their respective conditions function as indicators in understanding the overall dynamics and power relations of community-government decision making.

For some social scientists, applications of the transaction costs concept in issues of culture conflict will be viewed as overly focused on the mechanistic assumptions of economics. These scholars may prefer to remain confined to anthropology's classic treatments of ideology and symbolism. Yet, to purse this route is to invite a replay of the divisions which classically segregate academic traditions and limit interdisciplinary studies.[11] The motivation here is geared towards building bridges rather than constructing walls. As articulated in a challenge made by Brox,

> If [those interested in common property problems] want to change the unhappy state of affairs, it is necessary for *all* disciplines, "schools," or theoretical traditions engaged in the problem to find language that makes interdisciplinary discourse possible. If not, the present state of affairs will prevail... (Brox 1990:227)

2.5 Co-management as Power Conflict and Power sharing

> *"...[T]he world of humankind constitutes a manifold, a totality of interconnected processes, and inquiries that disassemble this totality into bits and then fail to reassemble it falsify reality. Concepts like "nation," "society" and culture" name bits and threaten to turn names into things. Only by understanding the names as bundles of relationships, and by placing them back into the field from which they were abstracted, can we hope to avoid misleading inferences and increase our share of understanding."* (Wolf 1982: 3)

Scholars, seeking to improve our "share of understanding" of co-management, have framed power-sharing regimes and the changes associated with them with several

[11] Among those classic debates is the conflict between substantivists and formalists in economic anthropology (Schneider 1974; Miche 1994). Miche contends that the outcome of that debate led to few breakthroughs in ways of commonly framing problems.

images or mental models. These models set in motion each analysis, and begin the process of casting the conclusions that follow from them.

Among those images used, Pinkerton describes co-management as a process in which state authority is decentralized to local communities of resource users with balance achieved between local preferences for self determination and the state's need for assurances that resources are well managed (Pinkerton 1989b: 12 -15). From a somewhat different perspective, Berkes *et al.* (1991: 5-6), portray co-management as a process of "convergence," pointing up the benefits gleaned when indigenous ways of knowing and deciding are melded with the more hierarchically organized, scientifically based, efficiency oriented institutions of western management. Using yet a third frame, Usher (1995: 197) refers to northern co-management as a process of "compromise," and draws a distinction between a co-management system and those intended to support aboriginal self determination. Common to all three is the image of co-management as "community burden," a perspective offered by Gladys Netro, a Vuntut Gwitchin Caribou user of Old Crow.

These four images, correspondingly, reflect differing assumptions of power sharing. Power sharing, presented as movement from central control to decentralized decision making, falls within co-management as a process of democratization. With it comes the achievement of improved equity, a more functionally appropriate allocation of roles and responsibilities, and systems of accountability. Together these conditions, it is argued, lead to greater likelihood of sustaining shared natural resources. Power sharing as convergence, assumes an opportunity for collective problem solving, innovative solutions, and the emergence of a unique "third system of management" which is neither state nor indigenous in character. The image of co-management as compromise explains power sharing with the proposition that for each decision made there will be

some that dominate and some that are dominated. In this sense, power is understood as a force used to impose. Netro's locally perceived image of power-sharing as a community burden reflects an historical appreciation of the northerners' political and geographical encapsulation, the jurisdictional fragmentation of a landscape once sustained with soft political borders, and the encumbrances locals assume when interacting with a myriad of new bureaucracies.

Each model provides an interpretation of the shared experience that is co-management. None offers an all inclusive hold on truth, but together, they can offer insight into the problem of community costs of power sharing.

2.6 Beyond Co-management as Solution

To date, much of the co-management literature has focused almost wholly on the potential benefits of power-sharing arrangements to governments, to communities, and the achievement of sustainability. Theoretical development in this area of study has been centered largely on the generation of propositions that make explicit those conditions that facilitate co-management success (Pinkerton 1989b; Pinkerton 1990).

Much of this work has been conducted through case-study research and based on the models of participatory democracy. Albrecht's (1990) study in Alaska demonstrates how Yup'ik Eskimo fisherfolk with traditional knowledge and agency researchers shared management responsibilities and resolved resource questions. Acheson (1989) describes how communities of lobster fishers in Maine self regulate the distribution and number of traps in prime habitat with para-government arrangements. Dale's (1989) research indicates how co-management facilitates social learning and conflict resolution. Co-management, as documented in the case of the Alaska Whaling Commission, illustrates how science can support the establishment and management of

traditional harvests (Freeman 1989). Berkes *et al.* (1989:22), reviewing conditions for the Cree of the James Bay agreement, indicate how, "Co-management will help to reverse the erosion of traditional leadership among the Cree, and to restore these leaders to positions of greater influence. In a more strictly economic sphere, co-management arrangements will likely give Cree greater scope for making successful applications on behalf of resource-based business opportunities."

Other case study research illustrates how conservation attitudes can shift when local communities share in decision-making on harvests quotas and habitat enhancement, resulting in a greater sense of resource stewardship (Pinkerton 1989a). In some cases, it is demonstrated that co-management is translating into agency budget savings, a greater degree of equity among resource users, and a greater realization of self-determination (*Ibid.*). (See Table 2.1).

Table 2.1 Consequences of Co-Management

Co-management results in:

- Cooperation between government managers and local harvesters
- Creation of new relationships and partnerships between government managers and local harvesters
- Increased communication about resources and species populations
- increased trust and respect between resource users and government
- Minimization of resource conflicts
- Improved ability to manage and protect resources
- Increased support for indigenous knowledge and management systems
- Development and implementation of species management plans
- Improved data collection and analysis

(Roberts 1996)

This focus on co-management's potential benefits is understandable. As noted at the outset of this chapter, in the Canadian North as well as other regions, the potential effectiveness of co-management has been argued and advocated in response to long-standing community-government inequities, and articulated in the policies of southern-

based governments which have historically marginalized the role of small-scale hunting societies from the functions of resource management.

From a political economic perspective of the Arctic and Subarctic context, Osherenko and Young (1989: 56-60) describe past community-state relations as "internal colonialism," a set of tightly linked conditions which include:

1) A flow of economic rents (i.e. surplus of economic benefits) to southern-based consumers derived from exploitation of Arctic resources,
2) A prevalence of economic volatility manifesting boom-busts cycles in exploitation of nonrenewable resources,
3) An inability to influence political process and economic markets on which arctic residents become reliant,
4) Regularly occurring economic dislocations and developed dependence on transfer payments from central governments.

Condition #3 highlights the relationship of northern native communities with the state in the absence of co-management, and communities' limited ability to shape exogenously driven interests. Commonly referenced as citizens on the "The Fourth World," aboriginal peoples of the North have thus been characterized as sharing the distinction with third world people of being marginalized minorities with limited power to influence superpower democracies. The important distinction is that Fourth World people hold limited-to-no international standing as sovereign powers, and are thus relegated to a subordinate role in the political process of southern-based democracies.

Recent interest in community-state power sharing and the changing political status of indigenous peoples suggest that the image of periphery-core transformations, classically explained with the literature of political economy (Wolf 1982), be expanded to include a more "political ecological" perspective (Greenberg and Park 1994). Feit (1973) and others (also see Caulfield (1993)) convincingly make a similar argument, noting that questions regarding the transformation and dependency of northerners are framed better not with respect to whether hunters will be acculturated to become industrialists, but by

examining how social, political, and economic factors facilitate hunting peoples' choices in shaping a new northern reality. This political-ecological perspective augments the former emphasis on externally-driven world systems theory with the assumption that local-level systems can be affected both by external forces, while at the same time transforming the external environment in which they are embedded.

As is evidenced in many cases, imposed policies on local communities have not only failed to recognize the viability and potential contributions of local systems of resource management, but also threatened the very resources on which communities depend, while undermining the authority of local management systems (Grima and Berkes 1989: 49-52; Bromley 1992). Pointing to alternatives to conventional top-down approaches to resource management and focusing specifically on the classic stages of colonial exploitation, boom-bust economic cycles, and the accompanying erosion of communal property systems, Gibbs and Berkes (1989: 49-53) emphasize the presence of pre-existing indigenous authority systems and a process of "sequential exploitation," defined as a series of conditions in which communal property relations are supplanted with open-access (i.e. the absence of recognized specified rights) and a subsequent free-for-all, leading to an eventual collapse of the ecological resources. Expanding Hardin's (1968) policy prescriptions of privatization or state control, Gibbs and Berkes argue that the problems of sequential exploitation can be addressed with at least three alternative solutions:

1. Market solutions in which a regime is based on the capitalist exchange of goods to achieve efficient and equilibrium conditions,
2. Full government control in which bureaucratic agencies assume the primary role in decision making, or
3. The redevelopment of communal property systems in which community members take the challenge to reconstruct an authority system in new conditions

In this respect, co-management is advanced as a workable solution for communities, seeking a meaningful role in management of natural resource, yet not

aspiring to the full status of statehood.

2.6.1 The Need for Community Involvement

Frequently accompanying arguments supporting the co-management alternative is the assertion that high levels of community involvement are a necessary (but not sufficient) condition for success. Reviewing subsistence hunting regimes in Alaska, Huntington (1991) concludes that,

> Effective management of local hunting... requires intensive local involvement. At present, cooperative regimes best provide this. By involving local hunters in all phases of management, cooperative regimes ensure responsiveness to local concerns and instill in local hunters a sense of ownership in the regime. (208).

He adds that "the future effectiveness of all regimes... depends on the ability to gain and use the full cooperation and involvement of local hunters." (*ibid.*) Berkes *et al.'s* (1991) evaluative framework for co-management, based on Arnstein's (1969) ladder of participation is gauged on a similar measure.

Others expand this discussion further, basing the rationale for involvement on the "educative function of participatory democracy" (Pateman 1970; Pateman 1975). Reviewed in the context of northern subsistence-based communities, high community participation is linked to local control in resource management, subsistence hunters' symbolic and economic relations with the land, and the community's future health and welfare (Berger 1977; Berger 1985; Lonner 1986).

2.6.2 The Notion of Community as Efficient Unit

Sometimes accompanying this argument, either explicitly or implicitly, is the assumption that community is a low cost environment for decision making. One expression of this assumption is found in Berkes's and Farvar's (1989) "Introduction and Overview" to *Common Property Resources*, in which they write:

> Common-property systems normally provide mechanisms for the equitable use of resources with a minimum of internal strife or conflict. Rules mutually agreed upon by all members of the group provide an efficient means of conflict resolution and reduce 'transaction costs' in enforcement of these rules. Often, users themselves point out that their local rules serve primarily to reduce conflict in resource use, over and above other possible functions. (p. 11)

Taylor (1982) and later Taylor and Singleton (1993), who assume a more formalist, rational choice perspective than Berkes, paint a similar picture and arrive at the same conclusion. In Taylor's model, however, community is defined as those conditions in which one finds homogeneity of preferences and beliefs, multi-sided and face-to-face relations, and stability of relations with expectations of longevity. From this operational definition, he arrives at the conclusion that "community economizes on the need for transaction resources" (Taylor and Singleton 1993: 203). Therefore, the "more community there is in a group [all things being equal], the lower the transaction costs its members will face" (*ibid.,*). Following from this view, social institutions function as instruments of efficiency. The actors are economically rational in making investments in social contracts, thus lowering the costs of future transactions.

Taylor's economically rationale view of community and its low transaction costs assumptions provide a limited explanation of the functions of social institutions and dynamics of community. Douglas's (1986) critique of Taylor's economic understanding of collective action offers a contrasting perspective, pointing to the high discrepancy between community as framed in rarified theory of rational choice and as documented in empirical findings (Douglas 1986:25). Noting the rationalist's assumption that "smallness of scale fosters mutual trust" and "mutual trust is the basis of community," she muses, "Has no one writing on this subject ever lived in a village?" Douglas's point is not, however, to dismiss fully Taylor's framework, but to place actors in a set of relations that are, in part, cultural in context, and acknowledge that institutions are, by

and large, the product of collective experience.

Grounding theory with history, Douglas goes on to make a point that is important in understanding community and transaction costs as related to co-management – the point being that today's hunting societies evolved from conditions that are radically different from those of the present day. In a former time these social units functioned with scarcity of population, low resource needs, "an abundance of the wherewithal to satisfy wants at a low level," and movements between social units which served as a means of conflict resolution. When considering the co-management arrangements as a policy instrument in resolving problems associated with sustaining common-pool resources, Bennett's (1976) discussion of the "ethnographic fallacy" is of some relevance here. Recognizing the situationally-specific conditions in which societies evolve, adapt and are transformed, he warns of the tendency of seeking solutions to today's environmental ills with the strategies of those which evolved in dramatically dissimilar situations.[12]

Broadening the view of community's "thought collective" in a manner which is more inclusive of cultural processes while pointing to the limitations of rational choice perspectives, Douglas argues that institutions are commonly founded on analogy, confer a group's identity, and, with the boundary markers of membership, select and categorize information to shape a local culture's cognitive maps. Thus, the inclusion of identity and its implications to framing community's relationship with resources is central to the study of institutions.

[12] As Julian Steward (1950) writes,

> A deepened recognition of cultural relativity means that one knows enough about foreign cultures to understand that each has a self-consistent and distinctive pattern, that each has developed its own solution to live out of a unique past, and that none is or inherently superior to others. Such understanding gives the scholar an objectivity which will help him avoid the methodological fallacy of ethnocentrism, that is, of using the presumptions of his own culture in dealing with other cultures.

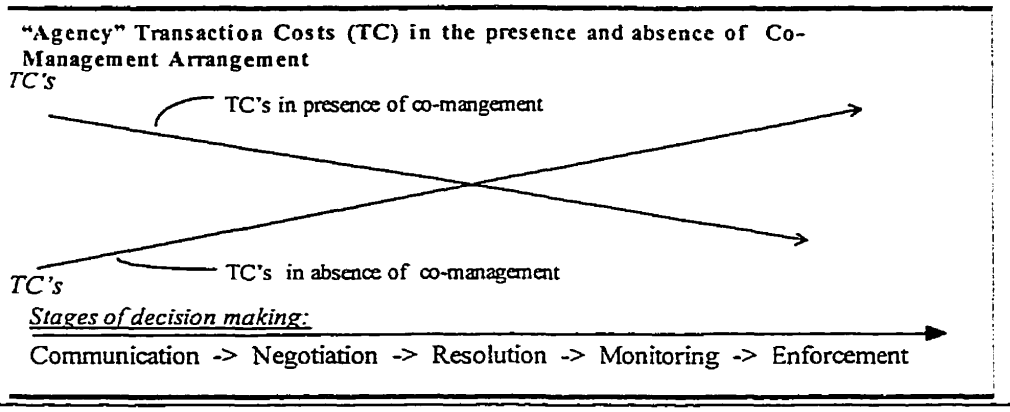
Among anthropologists, human-animal analogies of hunting societies have classically been framed under the guise of "animism." [13] In this study I extend that the human-animal analogy of hunting people to encompass Douglas's analysis of social process, and go on to examine its implications to our understanding of agencies and caribou researchers, finding parallels with the social constructionist's perspective of Kuhn (1962) in his writing on scientific paradigms.

2.6.3 Co-management Transaction Costs

Writing specifically about co-management and transaction costs, Hanna (1994) draws on the work of institutional economics to model phases of co-management process by comparing the *ex ante* transaction costs of information gathering and the coordination of groups with the *ex post* transaction costs of monitoring and enforcement. Comparing hierarchically organized arrangements with those that are more lateral, she argues that "co-management is associated with higher levels of *ex ante* transaction costs as a broader sphere of experts is brought into the program design and development stages." She goes on to conclude that "the benefits of co-management are realized in lower *ex post* transaction costs" (Hanna 1994:6). (See Figure 2.2.)

[13] Animism is defined by anthropologists as a religious perspective common among hunting societies in which animals are ascribed with human-like characteristics (see Lee and DeVore 1968; Lee 1979)..

Figure 2.2 Agency Transaction Costs in Co-management



This assessment, however, needs to be qualified, and viewed from a "management" (read agency costs) perspective. Apart from a general discussion of vulnerabilities, no specific discussion of community cost is explored. Similar to many macro-level assessments of efficiency, there is little discussion of where costs are located. As Bromley (1989) presses the analyst to ask, "Efficiency for whom?" Perrow's (1986) writing on complex organizations and assessment of institutional economic theories of transaction costs takes a similar approach, noting that cases in which vertical integration and decentralization of management functions are assumed to increase efficiency are better understood as a simple reallocation of costs. As he notes, "The sum total of transaction costs remain; their location is different" (p. 242). Bromely's and Perrow's critiques raise a question that is central in the study of power sharing and the assessment of community transaction costs. To what extent is co-management simply a process of off loading transaction costs from state management to the community? And from the local perspective, what dilemmas arise when facing the alternatives to assuming those costs?

2.6.4 Manifestations of Costs

Several analytical distinctions of transaction costs under co-management are helpful in this assessment. As already described, costs can be understood with a temporal frame -- as in *ex ante* and *ex post*; and correspondingly they can be perceived as beforehand or anticipated; or as those already incurred. Costs can also be understood as being concentrated or diffuse. For example, there are costs anticipated by community as a whole and others which are concentrated on specific individuals (e.g., a local leader or the community's co-management board member).

The manipulation of costs is, of course, key in any power dynamic. Government inactivity on the implementation of programs, community or state failures to respond to a co-management board's recommendations, and the reorganization of decision making which limits access to the policy process illustrate this class of costs. In this respect, transaction costs can be purposefully amplified or manipulated as a type of political behavior with the objective of engineering a specific outcome. Following North's call for a political theory of transaction costs, Twight (1994) has explored this class of transaction costs as manipulated by governments, and distinguishes them from "natural costs," or those which occur when all parties make their best efforts to cooperate.

Community transaction costs are identified in this study as manifested by at least conditions that fall within three overlapping categories. These include conditions of

- *institutional ambiguity*,
- *resource limitations*,
- *cultural incongruity*.

Those community costs arising from institutional ambiguity are generally caused by the absence of specified rights (e.g., no rules providing for local membership in a decision making body, inadequate habitat protection from critical lands, no accountability

of agencies to the co-management body.) Among common property theorists, such conditions are termed open access, and in the literature these have commonly been associated with vulnerability to resource exploitation (in conditions of sufficient resource demand) and a potential undermining of local cultural systems.

Costs manifested by limited resources are related to a deficiency in supply of human capital and material assets, which in turn limit participation in a task (e.g., limited infrastructure, time, financial resources, talent pool).

Finally, another set of transaction costs are found to arise from a community's cultural orientation and its incongruities with other societies' perspectives (e.g., differing ideologies, values, norms of behavior, sense of duty and obligation). From the rational choice approach to institutional economics, it is this last category that is generally ignored or minimized (Martin 1993).

2.6.5 Costs and Co-management Literature

The problems of community costs associated with co-management have not been completely neglected in the literature. Using the political economic approach of world systems theory (Wolf 1982), Caulfield's dissertation (1993: 4) on Greenland whaling argues that power sharing regimes create internal conflicts and contradictions within indigenous communities, and give rise to incipient indigenous elite and bureaucratic structures.

Hensel (1992) and Morrow and Hensel (1992), much in the tradition of Douglas, focus on problems of language and cultural identity to argue how community involvement in Alaskan subsistence management with its legally contested terminology (i.e. "subsistence, " "conservation," "customary and traditional use") pressures indigenous participants to defend traditional practices and in linguistic patterns seek

approval from western discourse and logic. The result, they argue, is one that narrows and codifies customary practices.

Feit's (1989: 89-90) research on the James Bay Agreement and Cree self-governance makes reference to the impacts of that co-management agreement, stating that while there has been an increase in hunting and maintenance of traditional social organization of hunting,

> ... At the community level, there have also been several changes in social organization, most related to the emphasis on coordinated decision-making caused by the growth of hunting activity. As a result of the greater need for coordination, community level decisions concerning hunting and wildlife have become more formalized.

He adds, "Interviews in communities suggest that hunters are often not satisfied with this [decision-making] process. In this area, the [James Bay] agreement has changed decision-making, creating some Cree participation but without assuring the full and effective participation of the full-time hunting sector of Cree communities."

Berkes (1989c:203), also writing about the James Bay Agreement, provides an incomplete list of "problems and issues" associated with implementation of co-management, classifying them as

1) those related to clarity in formal agreements,
2) conflicts and inconstancies between the agreement and government polices,
3) "inherent" problems in which he includes scientific uncertainty, the profusion of languages, and geographic distances.

Clearly, an assessment of community co-management costs is strategic in evaluating the effectiveness of co-management community-state cooperation, in understanding the future of community, as well as acknowledging the limitations and future development of power-sharing regimes. With a rather mechanistic image, Catherine Bateson (1991:71) provides an image of small-scale societies that speaks to community cost expenditures and their potential cumulative impacts.

> Under pressure from the outside, the self-correcting mechanisms in a

> system make those internal changes that allow the maintenance of crucial constancies, and yet these changes may be so extensive as ultimately to change the nature of the system or threaten its survival.

On the other hand, costs also have the potential of being transformation by re-enforcing local cultural perspectives and motivating actions which in the end lead to greater conviction, and new or stronger social networks. In this respect costs are viewed from a descriptive analysis approach, and not as negatively normative.

How, then, are community costs to be incorporated into a theory of co-management?

Past attention on co-management's potential effectiveness, along with the proliferation of co-management arrangements mentioned earlier, makes for several problems from the perspective of theory development. These problems arise from a lack of in-depth and comparable northern co-management case studies (Jentoft and Kristoffersen 1989: 355; Berkes, George et al. 1991: 9), and are compounded by the limited picture of northern co-management as provided by studies in which community perspectives are reported solely or primarily from the perspective of co-management board representatives.[14]

As already noted, blurring the picture further is the language of common property literature, much of which remains steeped in epistemologies that are closely tied to rational choice theory and/or views of community as modeled in "the grand narrative" of classical sociology (Giddens 1990).[15] Carrying this baggage, it is as if the analyst is locked into a urban-rural framework for describing communities. These images, if applied carelessly, confuse theoretical elegance with empirical complexity, and in the

[14] Two examples of include Therrien (1988) and Roberts (1994), both of which are outstanding analyses, but provide limited observations of in-community process.

[15] "The Grand Narrative" as referenced here assumes a unidirectional process of change from the primitive to the modern, and folk to the urban. Empirical evidence suggests is a much more non-linear process of change. For a discussion of these assumptions and an alternative approach see Giddens (1990)

process, idealize and distort the image of community life in the North. Use of the terms "state" and "indigenous" wildlife management systems (Usher 1986; Usher 1987), while exceedingly important as theoretical typologies, have the potential of setting up unrealistic expectations of communities and co-management and not recognizing that both are both highly complex and situationally unique.

Writing about changes in the status of co-management, both in theory and practice, Pinkerton (1994) points to similar problems. As she notes,

> The documentation of co-management and folk [i.e. community] management may have outstripped the development of a theory that places these paradigms in perspective. The theory exists within different disciplines, but has not been connected systematically to the description of these community-based regimes (p. 317).

With several high-profile northern co-management arrangements now approaching the end of their first decade of implementation, there is today an opportunity to separate more clearly policy advocacy from theoretical development, to broaden the co-management research agenda to account for costs as well benefits, and to ground theoretical discussions with "thick description" of local-level, as well as more macro-level processes.[16] This study of community involvement in Porcupine Caribou co-management strives to meet these objectives, using transaction costs to explain community actions and assess processes of community-state power sharing.

[16] The qualitative methods of thick description are primarily ethnographic, as described by Geertz (1973).

2.7 Key Constructs and Assumptions

2.7.1 Community and Local Culture

> Man is an animal suspended in webs of significance he himself has spun. I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law, but an interpretive one in search of meaning. It is explanation I am after, construing social expression on their surface enigmatic (Geertz 1973)..

Use of the terms "community," "user community," "local community," and "local culture" require some clarification in this dissertation. The term "user community" will be used to denote those social collectives who have traditionally resided in and around the range of the PCH and use the resource for subsistence purposes. Local culture and local community will be used broadly to highlight the unique membership and experiences of collectives at the local level, their ecological relationship with their environments, and the social, political, and economic conditions from which they have evolved. Local culture will be used interchangeably with "user community," and is intended to distinguish it from the more urban conditions of small community life. In the context of Canada, the term "user community" is legally defined by the Canadian Porcupine Caribou Management Agreement as those aboriginal peoples of eight designated communities who are determined by "appropriate" local governing bodies to be traditional users of the Porcupine Caribou Herd or the descendants of those users. These users are generally regarded as beneficiaries of the land claim agreements signed by native organizations which are also PCMA signatories. I use the term "village" to denote human settlements as geographic localities.

2.7.2 Institutions and Organizations

"Institutions" are defined here as rules of the game – codes of conduct that serve to define social practices, assign roles to participants in these practices, and guide the interactions among occupants of those roles (Young 1994: 3). Institutions take several forms. Institutions can be formally stated, as in membership rules of Porcupine Caribou Management Agreement, or informally, as in customary law of the local caribou hunters (Usher 1981; Caulfield 1983). Institutions, when defined as a set of rules, are distinct from governing bodies as organizations, with the later being social collectives of memberships with materials resources (Young 1989). Following from the definitions above and this distinction, we find that a community is a unique kind of organization, bound by landscape, kinship, history, and identity; and a co-management board is an "interface organization" distinct from communities and agencies.

Writing about organizational interfaces and the conflicts which are a part of those processes, Brown notes that "continued interactions between interdependent social units produce interactions that are social units themselves" (Brown 1983:19). Said another way, through continuity of interactions, co-management bodies become sub-systems of the complex organizational arrangement of co-management, and thus create a culture of their own.

This distinction helps to clarify the difference between the actions, recommendations, and policies of a co-management board, a local community, government agencies and resource management systems as a whole. While institutions can transcend organizations (Young 1989), the internal processes of organizations are subject to capture, bureaucratization (Weber 1960), manipulation by the decision making elite (Michels 1960), and are permeable to communication efforts by varying degrees (Brown 1983). Much has been written about the inevitability of these processes; in this

dissertation, it is assumed that these conditions are not predestined, but situationally determined.

Taking this thinking a step further, a set of analytical relations can be established, distinguishing those rules adopted wholly or primarily from the internal process of an organization (or community) and those imposed. These distinctions are presented in the Table 2.2. Theoretically, a co-management relationship may blur these distinctions.

Table 2.2 Community and its relationship to institution types with examples

	internal	***external***
informal institutions (de facto)	• Non monetary exchange of caribou; • Kinship and other systems of redistribution; • Experiential and inductive learning styles; • Leadership based on skill and experience; or on dominant personality and/or family power. • Oral tradition for transferring knowledge and wisdom through stories; • Taboos, customary law, ecological justification for practices	• Pre-historic obligatory agreements with caribou; • Reciprocal relations of luck and the hunter's intimate powers with animal; • Communicative exchanges through dream world and other signs; • Personal relations with agency personnel (i.e. conservation officers, fellow co-management board members and staff) • community-to-community kinship relations
formal institutions (de jure)	• Constitutionally stated by-laws which dictate overall governance system resulting in broad operating procedures. • Operational procedures which guide local organizational functions; such as in the selection of leadership, decision making, budgeting, rules for quorum of local meetings, etc.; • codified by-laws or initiatives which define activities of membership.	• Federal and Territorial laws governing use and conservation of caribou (i.e. Wildlife Act); • Land Claim Agreements with Federal and Territorial Agreements; • Community-to-community and community-to native agency relations as defined by land claim agreements • Porcupine Caribou Agreement • International agreement for the conservation of Porcupine Caribou.

Brown (1983) identifies four elements which require identification when studying organizations designed to interface between two differing organizations. These include (1) the interface environment, (2) the parties of the interface, (3) the parties' representatives, and (4) the larger context. With respect to formal northern co-management, these occur at three levels of analysis – the individual board member (native elder, government biologist, resource manager), parties of the interface (agencies, first nations); and context, both immediate (board-level activities) and greater (the caribou commons and Canadian society, citizen of North America). Identifying these multiple levels and acknowledging that they are constantly interacting is a requisite for understanding the multiplicity of casual relations that shape these processes *(ibid.)*.

2.7.3 Rationality

The term "rationality" has been the topic of considerable debate among social scientists (Zeh 1992). In this dissertation, I follow sociological and cultural ecological perspectives that highlight institutions as features governing human behavior, and concurrently assume that membership to an individual's group and perceptions of scarcity and risk on both the individual and collective levels affect human choice. As I discuss in Chapter Four, a universal definition of rationality is dismissed; instead I look to caribou hunters for an explanation of the assumptions and functions of their local systems. Also considered are structural features and matters of organizational size to contrast "value rational" behavior of small collectives with the "instrumental rationality" of large bureaucracies (see Rothschild and Whitt 1989).

2.7.4 Trust

"Trust" is an expectation that arises within a community where there is

continuity, cooperative behavior and commonly shared norms among members of that community (Fukuyama 1995). "Social capital" is related, and defined here as a product of sustained trust; and those features of social organization which provide for coordinated action (Coleman 1990). As used here, social capital shares similarities with what Berkes and Folke (1994) describe as "cultural capital," a more expansive term that is applicable here to the extent that it is assumed to be the product of historical habit, tradition, and established values.

2.8 Framework and Method of Analysis

The objective of this study is achieved through documentation and analysis of Canadian community involvement in several activity areas of Porcupine Caribou management. These activity areas serve to address related and overlapping co-management problem areas (see Table 2.3). These problem areas include the community-board communication, local representation in the co-management processes, the "melding" of indigenous and scientific traditions of knowing caribou, issues of enforcement and compliance, and non-local exploitation of northern resources and its potential impacts to caribou.

In the chapters that follow, transactions of these co-management activities with power-sharing problems are explored. Case studies are presented as ethnographic sketches, telling the story of unfolding events, their historical context, board-level decision making, and community- and government-level communication patterns. Highlighted are the events and co-management board response to the "1993 Caribou

Table 2.3 Activity and problem areas serving as the basis of research analysis	
Management activity areas of PCH co-management subject of study ⟶	*Related problem areas*
Community-board communication	Inter-cultural communication and notions of representation and consensus
Collection and analysis of biological and ecological data	The interface of indigenous and scientific ways of knowing caribou
Habitat protection and impact assessment	Coping with forces of disturbance and expropriation
Monitoring and Enforcement	Compliance

Crisis," a critical incident in the evolution of functional co-management on the Porcupine Caribou Herd range. Multiple sources of evidence (Yin 1982) are used to deconstruct events and delineate related community transaction costs.

Treatments of *ex ante* and *ex post* transaction costs are considered within several frames in this study. Community costs are viewed with an historical frame, examining costs in the absence and presence of co-management. Costs are considered as a sequential set of stages. These stages include the *ex ante* phase of communication, information analysis, decision making, and the *ex post* phase of monitoring, and enforcement. In the third frame, transaction costs are considered with respect to how transaction costs are distributed; whether they are concentrated on an individual or a specific organization, or diffusely distributed across the system as a whole.

Evaluation of co-management "effectiveness" is defined here by the way in which the co-management regime meets community caribou management needs and objectives, and how the current regime has affected community trust in the caribou co-management system. Measures of effectiveness guiding this analysis

include:

i.) the congruity of community institutions with the co-management process

ii.) levels of trust in community-state relations

iii.) the maintenance of traditional institutions that foster caribou stewardship

Communication is central to the co-management process, and essential both to investigating community transaction costs and evaluating power sharing. Communication of a co-management process is also multi-dimensional, encompassing cultural issues beyond the simple transfer of information between parties. Figure 2.3 outlines some of the hurdles of a community-to-board communication process which are explored in this study.

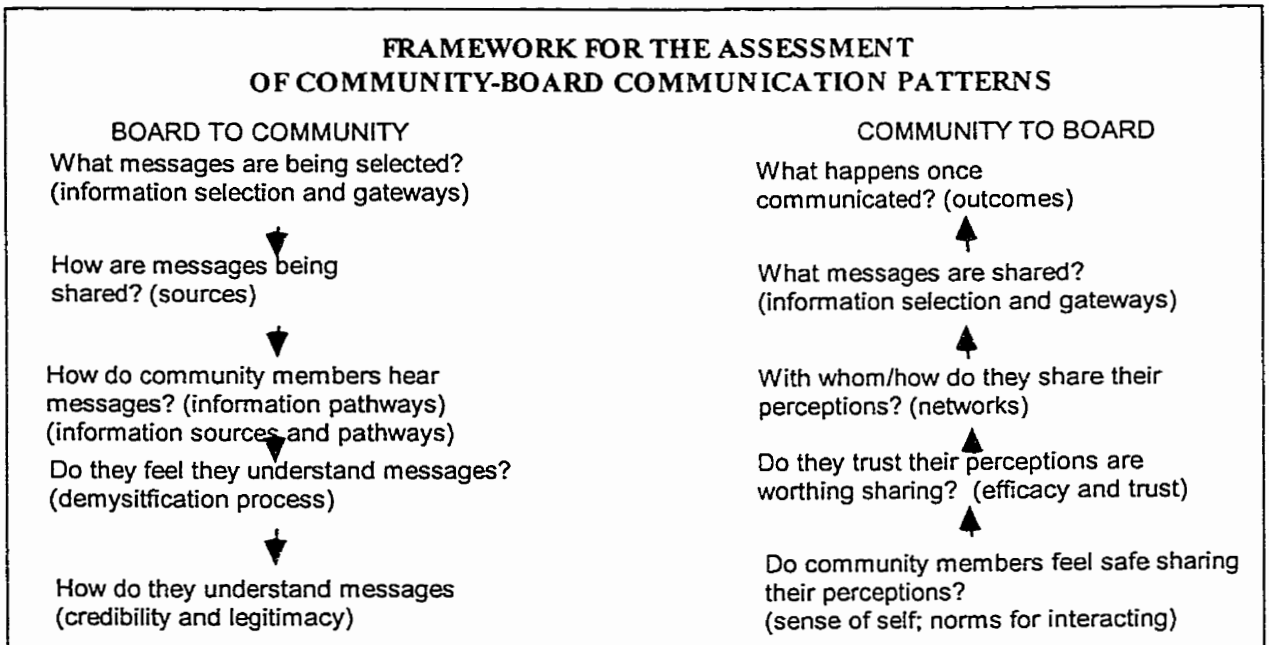


Figure 2.3 Hurdles in the co-management communication process with communities

Transactions (i.e. interactions or exchanges between parties) with their attendant *perceptions* experienced by various actors directly and indirectly involved in the co-management process, serve as the two primary modes of this analysis. Five types of transactions examined include:

i.) community-caribou transactions

ii.) community-board transactions

iii.) inter-community transactions

iv.) community-state transactions

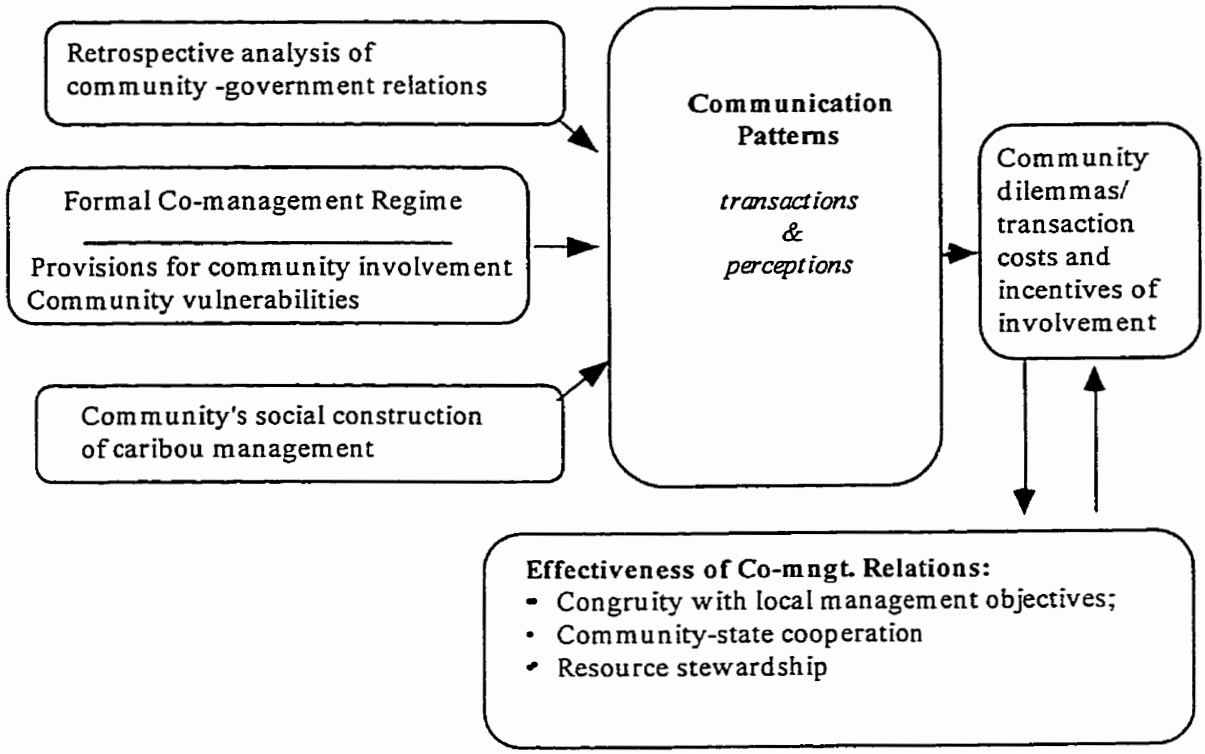
v.) extra community transactions

This research is informed with common property theory, drawing on elements of cultural ecology, organizational democracy, and new institutionalism. In this respect, it is applied interdisciplinary research (Eddy and Partridge 1987). In this work, I seek to draw links between the co-management themes of these literatures and empirical data with the goal of producing policy-relevant conclusions. No effort is made to develop or test formal theory. Rather, I employ the grounded theory method (Glaser and Strauss 1967; Strauss 1987; Strauss and Corbin 1990).

Grounded theory is comparative in nature and assumes complexity of all social phenomena. Following from a long-tradition of community studies, the method employed in this research is based on interpretation, and "grounded" with participant observation. In this study, the analysis draws both on theoretical insights and empirical evidence to generate a typology of community transaction costs, along with middle-range substantive propositions that relate conditions of community involvement to co-management effectiveness. Together, these data and their analyses are used to identify impediments to community participation in a co-management process and emergent power relations among communities, state caribou management, and caribou.

The basic elements of the dissertation and their relationships are presented below in Figure 2.4 This diagram is not intended to illustrate causal relationships, but to display graphically topic areas and their relative linkages.

Figure 2.4 Key components of this study



2.9 Challenges of and Reflections on the Research Process

> This inside information is, of course, just that, and should be guarded. It took me several evenings and a few bottles of scotch to get my informant to reveal all that goes on in [the community].
>
> (letter from northern researcher)

The student conducting dissertation research in small aboriginal communities faces a considerable challenge. Among academics, the student is expected to produce work that meets the criteria of validity, reliability, and replicability, that is conducted with high ethical standards, and that makes an original contribution to "the knowledge of the academy" as it is perceived by its judges. On the other hand, the student researcher, if he or she achieves any success, will also gain a better appreciation of community perspectives, and in doing so, may encounter community expectation that the outcomes of the research should benefit those that live there. As one young local hunter put it to me, "Gary, make good words for us, okay?" And as a regional leader said, "We like to charge people to come here and do their studies, but its okay, you'll make us look good."

Historically, much of the work of southern-based social-science researchers focused on small northern communities has proven to be of limited success on both of these counts from both the academic and the community expectations. Balikci's (1968) article about Old Crow, entitled "Bad Friends," is a case in point. In the analysis, a Durkheimian model of social anomie is applied wholesale to explain apparent modern-day individuation of the community, with little appreciation for local cultural institutions of respect and reciprocity, and overall community process. In retrospect, one discovers that not only is Balikci's contribution to "theory" limited to non-existent, but that locals of that community take offense to Balikci's methods of acquiring data, his misinterpretation of those data, and his sole focus on the negative

aspects of village life (Netro 1988). This example, and the many others like it, reflect the current sentiment of communities on research.

These perceptions are best placed in the context of a changing social and political environment of northern community research; part of the on-going transformation which has its roots in the work of the solo researcher/explorer (e.g., Steffenson and Slobodin), which, in the 60's and 70's, was supplanted with teams of social science researchers arriving as part of the modernization effort with the intent of facilitating communities' transition from subsistence- and trapping-based economies to wage employment (Brizinski 1993). Today, the environment of northern community research has shifted again, changing towards more collaborative approaches (Cruikshank 1993) with recent interest aimed at the of application of participatory action research methods (Kirby and McKcKenna 1989; Whyte 1991).

There are several implications of this metamorphosis to this project. In Aklavik, which has seen more researchers than the other two communities, I learned quickly that the visiting scientist is commonly referred to as a "*siksik*" (i.e. ground squirrel in Inuvialuit); both creatures having been found to come up only in the summer. It is, therefore, not surprising that the work of the project was met with suspicion, in spite of my endorsements from local leaders and the co-management board. As touched on in Chapter One, completing the research and simply being offered an opportunity to share in the events of community life required learning something of local systems of reciprocity, gauging the appropriateness and inappropriateness of questions, and accepting that externally driven agendas are met with a resistance.

Dyck (1993) notes that the goal to be both sensitive, as well as honest to

one's observations, sets up the problem of striving accurately to portray conditions, while at the same time accounting for the internal and external political conditions in which locals function. The problem is more difficult when working in an area of research that has policy implications. Consequently, there is a no-go area in northern research; few authors are critical of aspects of local systems of political representation that today link native communities to agencies, nor are they critical of institutions that link community with the Canadian state *(ibid.)*. As Dyck writes,

> The hesitation to identify and analyze how these social and political problems are connected to the administrative and funding arrangements that have underwritten the operations of native organizations and band and tribal councils at the local, regional, and national levels amounts to a form of self-censorship. In not exploring or writing about matters we know to be important - and not merely to us, but also to members of native communities - anthropologists give short shrift to awkward but pressing social and political problems at the reserve and settlement level. This is a situation that most intellectuals would, in principle, be unwilling to tolerate in any other context... Whatever the short-term motives for censoring or limiting our accounts, the inevitable result will be the production of work that is not what it purports to be. (p. 195)

These issues are not unique to anthropology, but, according to Dyck, are particularly common where participant observation and ethnography serve as primary research methods, and where the first allegiances of the researcher are to community well-being.

> Having cast ourselves in the role of the expert, we are now haunted by the possibility that we - like a friendly giant who does not know his own strength - might inadvertently misuse our powerful knowledge. (p. 198)

In my own struggles to address these problems, I sought the council of a local community chief who described the best form of balance as a method which both appreciates the conditions in which community members function, while at the same time constructively pointing out weaknesses in the system.

Regardless, the idea that a North Carolina-born, middle-aged white male of Greek extraction can, with any semblance of accuracy, interpret issues of native

community involvement in co-management is, at best, presumptuous. Social science is highly interpretive. In reading the dissertation, it is requested that the story presented here (data, methods, frameworks, conclusion) be understood as just that -- the product of a learning experience as told by a respectful but none-the-less non-local student of community.

2.10 Sources of Evidence , Methods of Data Analysis, Feedback Sessions

Multiple sources of evidence are used for this analysis. They include:

1. Intermittent periods of participant observation in co-management activities and community life from December, 1992 to May, 1995;
2. Attendance at 10 caribou board meetings (6 domestic and 4 international level meetings), one co-management workshop, and one co-management-sponsored conference;
3. Structured interviews with local caribou users (n=220);Unstructured interviews with co-management board members (n=13), Agency personnel (n=~20)some of which were PCH biologists (including caribou technicians) of Canada and the US (n=11), community elders[17] (n=14) and local leaders (n=15), and other key community members (n=38;).
4. Discussions of local hunters in two focus group sessions (n=12 hunters/session);
5. Caribou management documentation;
6. Archival documents.

Details about each are provided below.

2.10.1 Participant observation

Field research for this project involved being a participant observer in community life for an intermittent period of two years, with seven months of that time spent living in the communities of Old Crow (three and a half months) , Aklavik (one and a half months), and Fort McPherson (two months). As indicated, participant observation also

[17] The term community "elder" generally means any First Nation's person over 55 years of age. Here I am referring to those senior locals who were asked a specific set of questions about caribou traditions.

occurred at the board level. From August, 1992 to April 1995 I attended ten formal co-management board meetings of the international and Canadian caribou boards. As well, I participated in several workshops, including a political lobby training workshop for community members. Participant observation requires balancing one's role to achieve good integration while not directing the process on which one is focused (Hammersley and Atkinson 1983). I sought to achieve that balance, at times offering support in various activities where solicited; and at other times purposefully avoiding direct intervention in process where I felt that intervention would dramatically alter the course of events. Although the formal research period of data collection ended in 1995, I have remained involved in activities of caribou management.

2.10.2 Semi-structured Interviews

Over 220 structured interviews of community members were conducted. The questionnaire was adapted and modified from a survey developed by Kruse for co-management research of the Man the Biosphere Research High Latitudes Directorate Core (MAB 1995), with the overall focus of that instrument informing the focus of this project. My interviews included open and closed questions, providing data on characteristics of the subject and touching on a range of caribou use and management topics. A copy of the questionnaire form and informed consent statement is in Appendix 11.2. Community members' responses were coded, keyed into a Microsoft Excel spreadsheet, and cross tabulated. Following Strauss, (1987), subjects were selected with the objective of sampling a representative cross section of each community; with age, employment status, ethnic group, and traditional hunting experience serving as the guiding characteristics. Because of varying local conditions, the direction of local leaders on who should be interviewed, and cultural norms regarding the role of women in hunting, the sample achieved represents a wide spectrum of community, but is limited

to mostly male hunters.

While there was a less than five percent direct refusal rate to participate in interviews, some of those community members who expressed a willingness to be interviewed, were either busy or did not show at the time of pre-scheduled date. As needed, the interview format was adapted to accommodate the needs and communication styles of interviewees. In all cases interviews were taped or detailed notes taken and coded. In some cases, open-ended interview questions were asked instead of the more structured regimen, allowing the subject to respond with narrative-like answers. As needed, specific follow-up questions were posed for clarification. Time constrains meant that some questions were not asked of all subjects. Interviews lasted from 45 minutes to six hours. In some cases, several visits were made to community members to develop necessary rapport before the structured interview was introduced. Participating community members were given a children's alphabet book about caribou as a thank you for their participation.

In all three communities, local field workers were hired and trained to help with the research. In Old Crow and Fort McPherson some interviews were conducted by the field worker without me.

2.10.3 Unstructured Interviews

An interview schedule of unstructured interview questions and topics was used when interviewing community elders about caribou traditions and when interviewing board members and agency personnel. Thirteen current and former board members and staff (Chairperson and Secretary/treasurer) along with approximately twenty agency personnel (e.g., biologists, wildlife enforcement officers, wildlife managers, community nurse, chair of another co-management body, school principal) were interviewed, with

most interviews taped and transcribed. Selection of agency personnel was based whether or not they were associated with PCH co-management activities. Key members of community (e.g., local leaders, local historians, informal opinion leaders, active hunters) were also interviewed.

These were later coded using an inductively generated code list through HyperResearch (a HyperCard-based qualitative analysis tool). Reports were produced, reviewed, and quotes selected as applicable to the case study.

In this dissertation I use the term "board members" to refer to actors of the co-management process. I am including appointed representatives, the board's chairperson, and its secretary/treasurer. I make further distinctions specifically to help articulate conditions or make a special point in the analysis.

2.10.4 Focus Group Research

Focus group research allows an opportunity to validate findings made in individual interviews and introduce the element of social process dimension into the findings (Morgan 1988; Morgan 1993; Agar and MacDonald 1995). Two formal focus groups with ten locals in each group were conducted as a part of the research. A set of pre-determined questions was posed to each group, with me serving a facilitator in the discussions. These questions generally paralleled topics which were included in the structured interview, allowing for a more interactive dimension to the research. Additional follow-up questions were posed to clarify additional topics that were raised or to assist the group in their own discussions. Focus group sessions lasted four and a half hours (Two and a half before lunch and two hours after lunch.) Individuals were given a $100 honorarium for participating.

2.10.5 Co-management Board Activity Documentation

Access was provided to Porcupine Caribou Management Board files, with key documents selected and copied for analysis. These included board minutes, tapes from board meetings held during the first five years of the board's operations, and general publications and correspondence. While attending meetings, I made detailed notes and my own audio recordings.

Board minutes and field notes served as the basis for coding board-level transactions(Cohen 1979; Bernard 1988) and content analysis. Several topics were the focus of various content analyses of board-level transactions. These include caribou radio collars, body conditions studies on Porcupine caribou, contaminants in caribou, board-level involvement in land-use planning and habitat protection efforts, the Dempster Highway hunting recommendations of the PCMB, the antler sales issues, Trade and Barter recommendations, and board discussions about its role in the research approval process. Of course not all are presented, but these studies did inform the overall analysis. It must be noted that PCMB minutes, while going through an internal review and approval process of board members, also include a bias since all are written by the board's secretary. Where possible, tapes were reviewed to cross-check their consistency of printed minutes.

Documentation on territorial-level PCH management activities, the International Porcupine Caribou Management Board, the Porcupine Caribou Technical Committee, and Alaskan State caribou management activities were obtained through the helpful support of the Canadian Wildlife Service, the Alaska Department of Fish and Game (Wildlife and Subsistence Divisions), the Yukon Government and Northwest Territories Government Departments of Renewable Resources.

2.10.6 Archival Search

An intensive search was conducted and an extensive archival collection of materials about the history of Porcupine Caribou management was assembled. These efforts were greatly enhanced by the support of the government agencies listed above, community organizations, the Inuvialuit Joint Secretariat, and Mr. Robert Childers of Anchorage Alaska. Additional archival research was conducted at Yukon Archives of Whitehorse and the University of Alaska Fairbanks.

2.10.7 Management Literature Review

A search and review were undertaken for literature on Old Crow, Aklavik, and Fort McPherson. A bibliographic database complied of 955 citations of literature about these and other PCH user communities was compiled.[18] An additional literature review on historical aspects of Porcupine Caribou Management was also completed.

2.10.8 Feedback Sessions

At the conclusion of the preliminary data analysis stage of the research, feedback sessions were conducted in each of the three study communities and at a PCMB meeting. These sessions included a slide show in which I orally presented questionnaire results, described my analysis of some of the case study material, and answered questions. The presentation of several feedback sessions generated discussion which helped to sharpen the analysis, clarify explained topics, and validated study findings.

In this chapter and the one that precedes it, I have introduced my co-management study, the theoretical foundations of the analysis, and the sources of evidence used. In the next chapter I introduce the context for Porcupine Caribou co-management by describing the caribou resource, the three study communities, and the

[18] This work was conducted in conjunction with a contract from the Canadian Wildlife Service.

Canadian and international-level caribou agreements that provide for community involvement.

3. A CONTEXT FOR NORTHERN WILDLIFE CO-MANAGEMENT

This chapter provides an overview of the context for studying Porcupine Caribou co-management. Here I present background about the resource and its user communities, the formal institutional arrangement of Porcupine Caribou co-management, and relevant attributes of the management situation. I also provide profiles of the three communities which are a part of this study.

3.1 Accounting for Context and Its Importance

Resource regimes that provide for community involvement in management of living resources vary widely in their cultural, ecological, and political characteristics. These regimes differ in the kinds and number of organizations that are part of the arrangement, the ecology of resources that are the focus of management, and the legal provisions provided for local involvement. Co-management arrangements also differ with respect to the levels of state government involved, the orientation and diversity of culture groups that are part of the arrangement, and the significance of resources to users. As well, the interaction of parties in these arrangements are likely to be affected by the presence and nature of third party interests, the kind of threats perceived by various actors, and the activities mandated by management agreements.

As evident in the Porcupine Caribou case study, co-management arrangements also differ with respect to the rights conveyed to community in various functions of management, the extent to which user-state power-sharing is balanced across the range of the resource, and the degree to which that range is jurisdictionally fragmented. Consequently, co-management arrangements are not neatly classified and when undertaking a study of them, it is critical to be explicit in describing a resource regime's context. (See Table 3.1)

Table 3.1 Dimensions of Co-management Context
• Ecology of the resource(s)
• Orientation of culture groups involved and heterogeneity of communities
• Significance of resource to local users
• Levels of government and types of agencies participating
• Number and size of organizations which are part of arrangement
• Presence and nature of third-party interests
• Degree of jurisdictional complexity and ecological fragmentation
• Types of rights conveyed to co-management bodies and user groups in various functions of management
• Extent to which community-state power sharing occurs across the entire range of resource

Context is defined by Strauss and Corbin (1990:96) as a "specific set of properties that pertain to a phenomenon" or "a particular set of conditions with which action/interaction strategies are taken." A discussion of context in the study of community involvement in co-management helps to identify conditions unique to the arrangement and, thus, delimits the application of findings to other management situations. Further, a review of cultural and historical conditions provides important insight into institutional path dependence, or the manner with which institutions, formal and informal, shape organizations, and thus establish current and future choices.[1]

The review of context for this study is presented by first giving an overview of the management conditions, then focusing on the resource that is the subject of management; then describing PCH user communities, and the three study communities. I also review relevant aspects of the structural and legal characteristics of the co-management arrangement. Here I focus specifically on the in-Canada Porcupine Caribou Management Agreement (PCMA) and the Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of

[1] For a discussion of path dependency and institutions see North (1990).

Porcupine Caribou (referred to in this dissertation as the International Agreement on the Conservation of Porcupine Caribou (IACPC). In the following chapter, I present a study of "local systems" of Porcupine Caribou management.

3.2 An Overview of Conditions

The co-management arrangement for the Porcupine Herd which is the subject of this study is a single population of a single-species regime, focused on an internationally migratory, mammalian resource. Jurisdictions of government and their agencies which are a part of PCH management are complex, and include state-, local-, and federal-level agencies, as well as First Nation governments. The cultural diversity of this wildlife management situation is complex as well. It involves the cultural groupings of descendants of western colonialists and several indigenous groups. Native caribou users are both of Inuit, Athabascan, and Metis (i.e. mixed blood) ethnic groups. Some have long-standing ties to the region and the herd, while others are more recent arrivals as immigrants from the west, moving to the area at the turn of the century, in part, due to the scarcity of caribou in their former homelands (Gubser 1965).

Caribou users today live in 15 communities, most of which are small (populations less than 1000). Of these, Gwich'in hunters have close cultural ties with PCH and comprise the majority of the herd's native users. Non-native PCH hunters are few in number, living in more urban centers like Inuvik and Whitehorse.

Formal co-management arrangements with provisions for community involvement have been implemented at two levels, international and Canadian domestic. With respect to the regime's symmetry in east-west power sharing, the full PCH regime is "incomplete" (Richard and Pike 1993). While Canadian government and native organizations have signed and implemented a co-management arrangement, no legally-based arrangement exists in Alaska in which a broad range of PCH management

functions are addressed collectively by PCH user communities and governments. Adding to this asymmetry are differences in US and Canadian demographics (with Alaska having a greater proportion of non-natives than Yukon or Northwest Territories). As well, there are differences in the constitutional-level provisions granting aboriginal peoples guaranteed rights to their subsistence way of life and a role in management of natural resources. Canada has such provisions and the US does not.

From an historical perspective, the bio-cultural region defined by the range of the PCH has long been the subject of southern-driven interests in resource extraction, with caribou perceived to be a threatened resource in activities proposals. At the turn of the century, the harvest of caribou, both by American whalers fishing the eastern Beaufort Sea for bowhead and over wintering on Hershel Island at the turn of the century (Bockstoce 1980; 1986), along with the wild meat market created by the rush of gold seekers to the Dawson area (McCandless 1985), resulted in a perceived decline in caribou and concern among Canadian Mounties and early-day caribou biologists alike. It is from these early perceptions of decreasing caribou numbers, along with fear of native over hunting, that the "Caribou Crisis" of the 1950's and 1960's, discussed in more detail later in the this chapter, finds its roots.

Interest in whales and gold shifted after the turn of the century and focused on what some believed to be enormous oil and gas reserves (Page 1986). Among several efforts to move these resources to southern markets was the Arctic Gas Project of the early to mid nineteen seventies, calling for the construction of a gas pipeline which would transect the Porcupine Herd's range, and via one proposed route, which would cross the herd's calving grounds. Central to that proposal's environmental assessment were the potential impacts on Porcupine Caribou, a topic which became a major theme when reviewed by the now famous Berger Inquiry (Berger 1977). The anticipation of future exploitation of the region's hydrocarbon resources brought an associated but different kind of resource extraction problem –a government initiative to open the North

to industry while providing northerners with more access to goods and services. In the Western Canadian Arctic, Prime Minister Diefenbaker championed this effort in 1959 with his "The Road to Resources" program, and launched construction of the 250 kilometer Dempster Highway, a gravel two lane stretching from the Klondike Highway to Inuvik, NT. Completed in 1979, the Dempster transects the eastern portion of the winter range of the herd, leading conservationists, agency biologists and enforcement officers, and some native communities to express concern that highway disturbance and increased hunter access to caribou could significantly reduce caribou numbers. For other local hunters of the region, public concern surrounding the Dempster's impact on caribou resulted in their enduring enforcement policies that did not recognize native traditional uses of the region and locals' aboriginal rights to hunt caribou.

Among the current conflicts of the region is the proposal for gas and oil exploration and development in the "1002 area" of the Arctic National Wildlife Refuge (ANWR) of Alaska (see Figure 2.1) , a portion of the Arctic coastal plain which is also the location of the "core" or "concentrated" calving habitat of the Porcupine Caribou Herd (USFW 1986b; USFW 1986a).[2] Perceived potential impacts of proposed ANWR development to Porcupine caribou and other wildlife (i.e. waterfowl, polar bears, muskoxen), a loss of wilderness values and, their implications to native caribou user communities of the region have resulted in a controversy of international proportions, one which is today among the most, if not *the* most contentious and well publicized environmental debates of the United States.[3] Centrally involved in this conflict have been various groups of

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2 «1002" (said "ten-o-two') references Section 1002 of the Alaska National Interest Lands Conservation Act (signed in 1980) which states that before development can occur on the coastal plain of the Arctic National Wildlife Refuge, base line studies must be completed together with a legislative environmental impact assessment process exploring alternative actions completed. It also requires an act of the United States Congress to authorize development before it can occur.

3 Articles featuring the "oil vs. wilderness" ANWR debate and describing possible impacts on Porcupine Caribou have been featured in the *New York Times*, the *New York Times Magazine*, *Globe and Mail*, the *Washington Post*, *Newsweek*, *National Geographic*, and numerous publications of Canadian and United States environmental NGOs. As well, in 1997 President Clinton vetoed the US Congresses budget reconciliation, in part because it included an ANWR development amendment.

Canada's native PCH users and the Porcupine Caribou Management Board, both of which have formally stated positions against development and advocated wilderness designation for the 1002 area.[4] Endorsing the development plan and potentially benefiting from cash economic returns are several of Alaska's largest oil companies (e.g., British Petroleum, ARCO, EXXON), the State of Alaska, and Iñupiat communities of the North Slope Borough (including Kaktovik which is the only Iñupiat Porcupine Caribou user community) and its Arctic Slope Regional Corporation. (See Table 3.2.)

The nature of this conflict sets up a co-management condition in which Canadian communities and government agencies make caribou management decisions in the presence of a perpetual external threat (i.e. foreign-based expropriators who are perceived to threaten the future health of the Porcupine Caribou resource.). As represented in this study, such an external threat shapes and to some extent limits the choices made in Canada at the individual, community, and regional and national levels as well as effectively increases the solidarity of those who are involved in the power-sharing process. It also creates a context for co-management in which community-to-community alliances develop and are strengthened by formal positions on regional policies

[4] Also a part of the conflict of numerous non-government organizations which have periodically formed coalitions to lobby for wilderness designation of the 1002 area.

Table 3.2 Native communities and differing formal positions on ANWR oil development

native organization/First Nation /(Community)	Position on ANWR 1002 development	Potential economic benefits of oil development
Vuntut Gwitchin First Nation (Old Crow)	No development	Few to none
Inuvilauit (Aklavik)	Inuvialuit Regional Corporation holds "no position" while Inuvialuit Game Council is formally against	Possible indirect benefits through corporate contracts of Inuvialuit Regional Corporation and locals' employment
Gwich'in First Nation (Aklavik and Fort McPherson)	No development	Little to none
City of Kaktovik	Pro-development, with proviso of local control	Potentially significant (North Slope Borough taxes real estate)
Venetie Indian Tribal Reservation (Arctic Village and Venetie)	No development	Indirect benefits through Alaskan state revenues

To date, no large scale development in Alaska's portion of the PCH range has occurred, and in Canada only one industrial development of significance has been completed within the range of the herd. That development is the construction of the Dempster Highway, a two-lane gravel road which transects the winter range of the herd.

Because of the abundance of Porcupine Caribou since the 1970's (as perceived by managers), issues of hunting quotas have, unlike for some other caribou herds of North America, not been considered by state managers. As a consequence of Canadian laws specifying aboriginal hunting rights[5] and corresponding land claims, there now exist two sets of rules regulating two types of hunters; native hunters retain their subsistence rights and are free to hunt caribou as needed, whereas non-native hunters must comply

[5] These are the *1763 Royal Proclamation* which established the legal foundation and principles for future relationships between native hunters and the British Crown, the British North America Act (now called the Constitution Act of 1867) which stated that the Dominion was to hold fiduciary responsibility for "Indians and Lands reserved for Indians," and the *Constitution Act, 1982* which recognized existing aboriginal title (Matakala 1995). Additionally, the *Yukon Act of 1898* specified Indian rights to hunting (McCandless 1985) and subsequent court cases (e.g., *Sparrow* in 1984) helped to established a basis for aboriginal participation in resource management (Usher 1991).

with seasonal and specified limits. All hunters are subject to laws of general application concerning safety, wastage, and conservation. Thus, in Canada, the burden of proving a need for a harvest quota applied to aboriginal people rests with government agencies, and that proof must be based on conservation of the resource. This open-access condition for aboriginal people to caribou resources as used for subsistence needs is modified by the Canadian Porcupine Caribou Agreement. In the terms of the International and Canadian PCH agreements, no commercial sale of Porcupine Caribou meat is permitted.

Among the Porcupine Caribou issues that have faced caribou users and managers since the establishment of management agreements (and in addition to the ANWR oil development issue noted above) are the establishment of Barter and Trade guidelines for native users, native and non-native hunting from the Dempster Highway and the imposition there of a no hunting corridor, the commercial sale of caribou antlers by native users, methods for conducting scientific studies on caribou, the hunting of caribou bulls during their rut, and human health concerns regarding the presence of contaminants in caribou.

3.3 Resource Ecology of the Caribou Commons

3.3.1 The Porcupine Herd - A Circumpolar Species

The Porcupine Herd[6], or the Porcupine Caribou Herd (PCH) is one of 184 wild *Rangifer* herds (102 in North America), the seventh largest herd in North America (Williams and Heard 1985), and the largest shared migratory herd of mammals of the United States and Canada. Members of the *Cervidea* or deer family, caribou are ruminants, or four-stomached creatures, and the only species of ungulate in which both males and females produce antlers.[7] Worldwide, the range of caribou and its Eurasian counterpart, reindeer, extends across circumpolar regions. (See Figure 3.1.)

Commonly referred to as *vutzui* in the language of the Gwich'in[8], as *tuktu* to the Inuvialuit, and as *Rangifer tarandus* by biologists, the word "Caribou" or, more accurately, "*xalibu*" is of Micmac[9] origin, meaning "pawer" or "shoveler" of snow. As its aboriginal name suggests, caribou have adapted to the extremes of the northern environment (Bergerud 1978; Kelsall 1980; Urquhart 1989b).

The Porcupine Herd or Porcupine Caribou takes its name from the Porcupine River or *Tyso Denjik* (Quill River) which transcets much of the northern Yukon, and is regularly forded by portions of the herd during seasonal migrations.[10] While no Athabascan or Inuit term has been identified which references the Porcupine Caribou herd as a distinct

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6 Use of the term "Porcupine herd" has been problematic. As Urquhart (Urquhart 1989b) points out, this name often creates confusion among the unknowing, raising images of a herd of quilled porcupines. Such musings recently occurred in a high-level briefing about the oil development conflict with Secretary of State Warren Christopher, leading to a bout of belly-aching laughter. Immediately after this event, Christopher was admitted to the hospital for stomach ulcers!

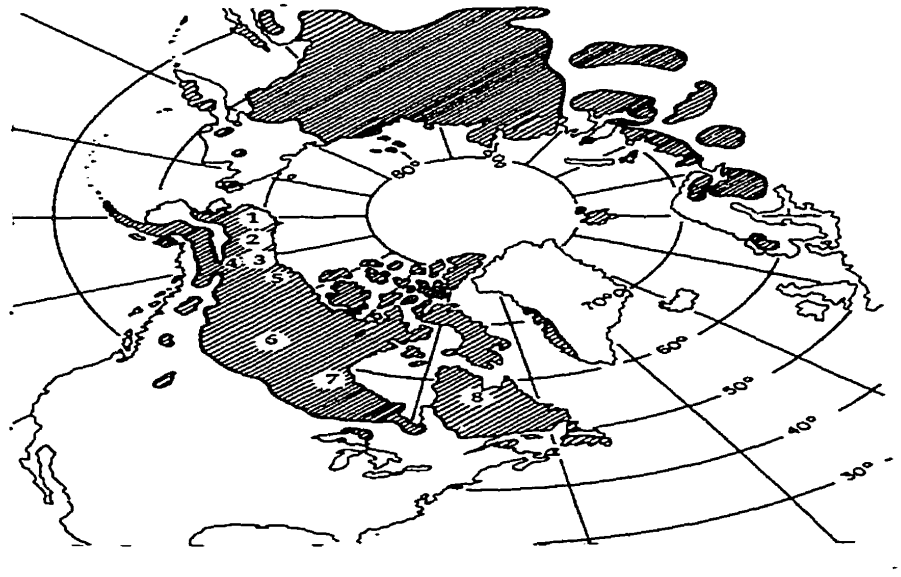
7 The presence of antlers in both sexes suggests that these members of the deer family are highly social animals, or maybe just horny.

8 The Gwich'in Indian's language has been referred to as "Kutchin," "Loucheux," and "Tuhgah"-- There are several dialects.

9 The Micmac are Indians of eastern Canada.

10 The name of the Porcupine Herd was given to the PCH by biologists completing that first survey of the resource in the early fifties. As noted earlier, the English interpretation of Tsyo Denjik Vutzui as Porcupine Caribou is erroneous; a proper interpretation is "Quill River Herd." While I advocate the renaming of the herd to the *"Tsyo Denjik Vutzui"*, the name Porcupine Caribou Herd will be used in the dissertation to avoid confusion. The use of the *vutzui* will be used interchangeably with caribou.

stock, these animals are recognized by many of the region's indigenous hunters as unique.[11]



Circumpolar distribution of caribou (i.e. wild Reindeer) (cross-hatched area). Numbers refer to herds mentioned in the dissertation: (1) Western Arctic, (2) Central Arctic, (3) Porcupine or *Tsyo Denjik*, (4) Forty Mile, (5) Bluenose , (6) Beverly, (7) Qamanirjuaq, and (8) George River herds. Map adapted from Klein (1991)

Figure 3.1 Circumpolar distribution of caribou (i.e. wild Reindeer; cross-hatched area).

Local hunters report that these caribou are smaller in size than caribou to the east, and superior in flavor from herds to the east and west.[12] Local hunters have also long distinguished Porcupine Caribou from *tutchun tut kwuvutzui* (caribou of the woods) or woodland caribou which are found in the southern portions of the herd's range and do not migrate north. Biologists have acknowledged members of the PCH to be a subspecies of caribou, anatomically distinct from barren ground caribou of north central and eastern Canada, and, in terms of evolution, more aligned with caribou of western

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[11] Kenneth Frank, a Gwich'in historian of Arctic Village reported to me that the Gwich'in word *naanttii* refers to an entire herd and that those people who previously traveled and lived in the area were aware of the differing stocks of animals. I explore this question in more detail later in the dissertation.

[12] East of the Porcupine Caribou's range, from east of the Mackenzie River Delta, are Bluenose Caribou (See Map 3.1). To the west of the Porcupine Range is the Central Arctic Caribou Herd, with summer habitat overlapping with that of Porcupine Caribou in the vicinity of the Canning River Delta.

Alaska (Murie 1935; 12). Taxonomically speaking, Porcupine Caribou are identified as *Rangifer tarandus granti,* or Grant's caribou.[13]

A herd of caribou is defined here as those animals that have an affinity to a particular calving area, making it distinct from other stocks or herds (Skoog 1968). The range of the Porcupine Caribou Herd defines an ecosystem of 249,000 km (96,100 square miles)(USFW 1986c), covering far northeastern Alaska and northern Yukon and Western Northwest Territories, and divided by the US - Canadian border (see Figure 2.1) . The range of the PCH is in the Yukon-Alaska Refugium, a region considered by geologists to have been unglaciated throughout the four glacial epochs. Paleontological evidence suggests that caribou have continually inhabited the Alaska - Yukon Refugium for over 400,000 years, through Wisconsin Glaciation. (Kelsall 1968; Urquhart 1986). As Banfield believed, "[Caribou] were present throughout the Wisconsin Glaciation in the Alaska-Yukon Refugium and probably in the Penultimate Illinois Glaciation as well" (Kelsall 1968:25).

Caribou are today one of the most wide-ranging terrestrial mammals. Analysis of radio-telemetry of Porcupine Caribou find that individuals may exceed 5000 miles of travel per year (Fancy, Pank et al. 1986). Although seasonal ranges and migrations vary from year to year, the PCH generally winters south of the Brooks Range and migrates each spring to North Slope to seek calving and insect relief habitats in Ivvavik National Park of Canada and the Arctic National Wildlife Refuge of Alaska (USFWS 1987). This annual cycle is described below. (See Figure 3.2-3.5)

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[13]Citing measurements of the weight of adult males as found in 1983 Yukon Wildlife Branch Studies and those of Bergerud (1978), Urquhart's (1986:3) analysis of PCH literature recognizes *Rangifer tarandus granti* as among the smaller of *Rangifer* subspecies of North America.

Figure 3.2 Satellite Radio Collard Caribou Map (Spring). Seasonal movements and distribution of Porcupine Caribou as indicated by satellite radio collars represent the cumulative movement of approximately fifteen bulls and cows from 1985 to 1990. Maps courtesy of Brad Griffith, US Fish and Wildlife Cooperative, University of Alaska Fairbanks.

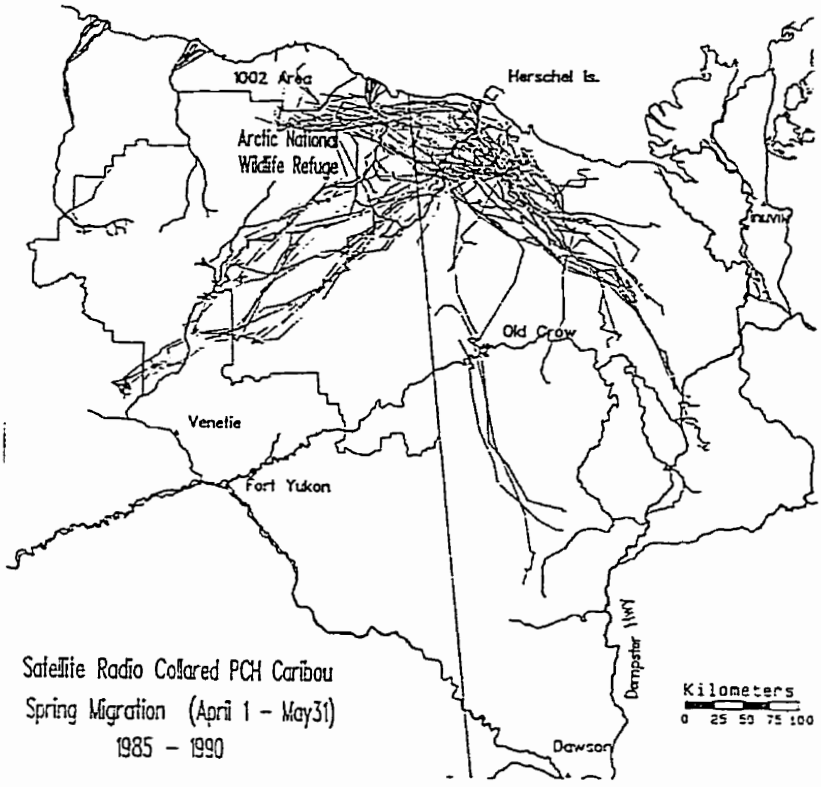


Figure 3.3 Satellite Radio Collard Caribou Map (Summer)

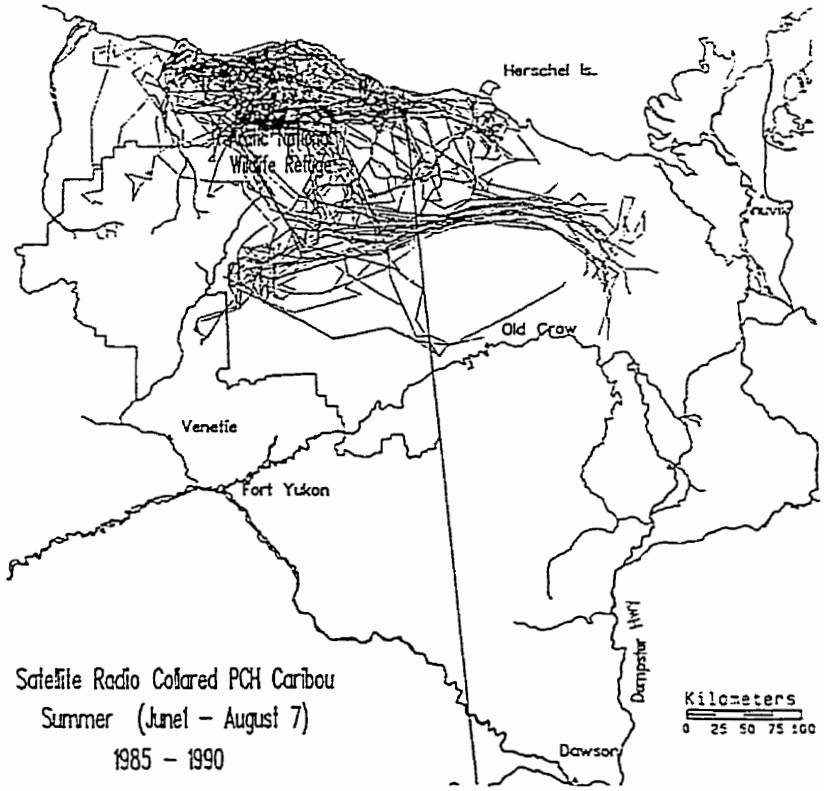


Figure 3.4 Satellite Radio Collard Caribou Map (Autumn)

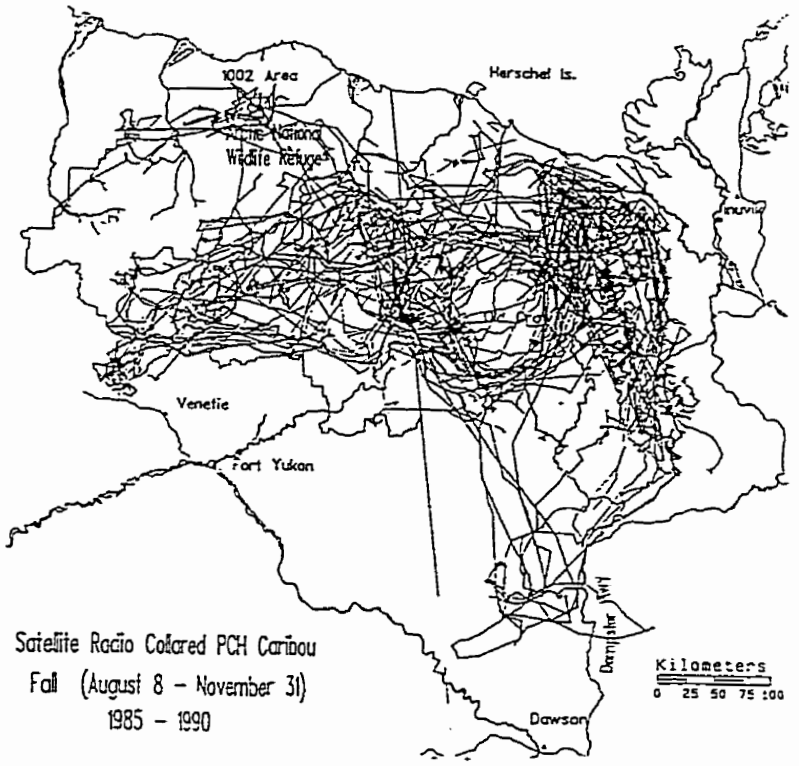
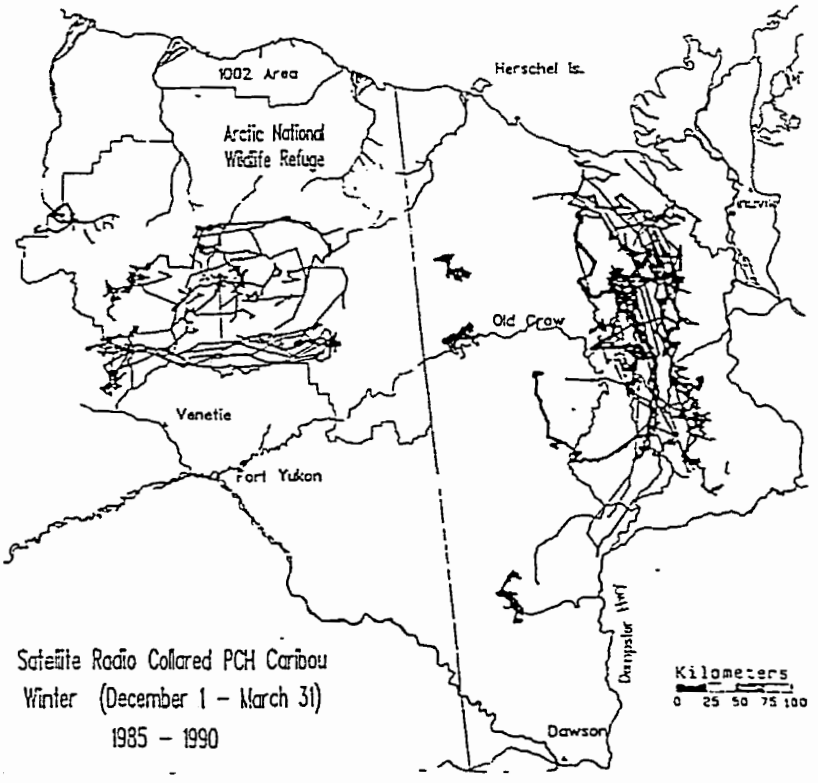


Figure 3.5 Satellite Radio Collard Caribou Map (Winter)



3.3.2 Annual cycle of Porcupine Caribou - A Fugitive Resource

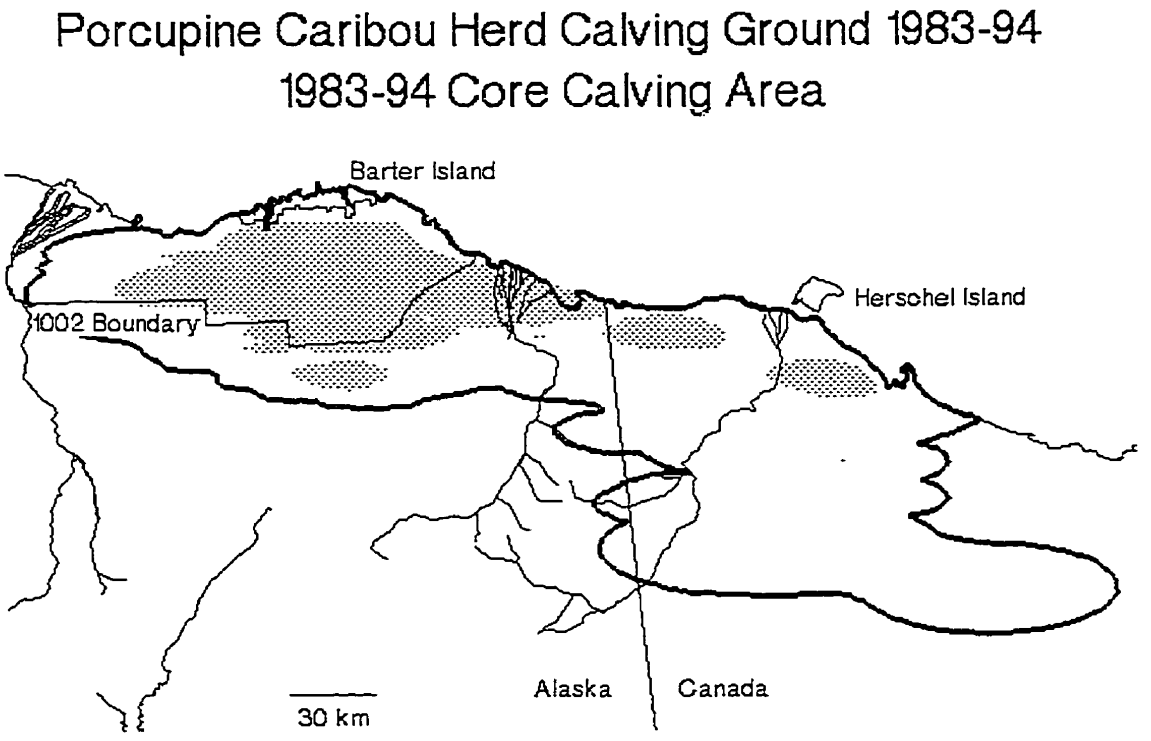
In spring, pregnant females of the Porcupine Herd initiate a journey of about three-hundred-miles from the forested *Taiga Cordillera* south of the Brooks Range in Alaska and wintering areas in Yukon and Northwest Territories, towards the herd's traditional calving grounds. Their journey begins anywhere from March to May (Russell 1982; Fancy, Pank et al. 1986) and is coincidental with increasing photo-period and impeded by snow conditions that influence travel and foraging (Eastland 1991). One local hunter described cow caribou's northern travels to calving grounds as being initiated by elder members of the herd, who, like hunters traveling on snowshoes, move in single file with the younger and more robust members of group taking turns breaking trail.

The routes followed by northbound caribou depend on the last occupied winter use area (Urquhart 1986; Russell, Martell et al. 1993). Caribou wintering in Canada commonly traverse the crest of the Richardson Mountains north, following valley bottoms and avoiding deep snows. (See Figure 3.5). Animals wintering south of the Porcupine River have been observed to follow an Old Crow route which crosses the Porcupine river and Crow Flat to intersect with the Richardson Route. Caribou wintering in Alaska head in a northwestern direction in what has been referred to as the "Chandalar Route," climbing ridges of the Brooks Range to reach the coastal plain of Alaska's North Slope.

Elders in communities have explained the incentive of caribou to head north as following from the need to escape insects of summer forested areas, graze on the new growth of plants, and revisit their birthplace. Driven by what might possibly be an age old instinctual understanding, cow caribou's arrival on the coastal plain appears to coincide with the availability of quality forage (*Eriophorum*) of new plant growth. If arriving too early, the area will be snow covered. If arriving late, nutrient-rich vegetation

will be past its peak. Calving occurs during a ten-day period in early June with traditional parturition grounds located west of the Canning (Alaska) and east of Blow Rivers (Yukon) on the coastal plain (Russell, Martell *et al.* 1993). Areas of calving vary, and intensive research over the past twenty years indicate an affinity of cow caribou to a "core" or "concentrated caribou area" in the Arctic Coastal Plain (USFW 1986a; USFW 1986b). (See Figure 3.6) In years of deep snow, Porcupine caribou have alternatively calved on the northern foothills and or south of the Brooks Range, though they regularly complete the journey to the coastal plain for the post-calving portion of the cycle.

Figure 3.6 PCH Calving Grounds.



Map illustrates historic calving locations of PCH (i.e. what biologists perceive to be 90% of the region utilized by the herd) and areas (shaded) of highest calving concentrated calving. (McCabe and D. D. Young in press)

Calving is followed by a period in which cows and calves imprint, after which, nursery groups of cows and calves are commonly joined by yearlings, dry cows, and bulls that typically migrate later than cows. The herd's time on the coastal plain is brief, and spent foraging, while coping with insect harassment. Nixon found that caribou behavioral responses to insect harassment are the consequence of a function of wind and temperature (Nixon 1991). When there is little wind and insects are abundant, harassment is high. Animals typically respond in two ways to insect harassment; aggregating in dense groups, or moving across the coastal plain to the shoreline areas where seaward breezes offer relief. From a bio-energetic perspective, the period of lactation is identified by biologists as a physiologically low point in caribou's annual cycle (Parker, White et al. 1990; Russell, Martell et al. 1993); animals form dense aggregations to escape insect harassment and tend not to feed. Having arrived on the coastal plain in their poorest body condition, these animals depart having begun the process of putting on the weight needed to withstand the winter. Recent research points to a correlation in cow nutritional levels at the post-calving phase of the cycle and subsequent reproductive success (Cameron and Hoef 1994).

Dispersal from coastal areas generally occurs in late July to August (Surrendi and DeBock 1976) and is observed to coincide with coastal snowstorms, cooling temperatures, reduced forage quality, and shortened photo-period (Eastland 1991). The initiation of autumn migration is the most varied of the herd's annual movements. According to local hunters, migrating Porcupine Caribou in autumn are led by the most learned members of the herd; vanguard caribou of both sexes, who through experience develop a collective knowledge of the landscape, sense the severity of the approaching winter, and select migratory routes and winter destinations for their band of followers accordingly. Eastland (Eastland 1991) points out, and local hunters concur, that caribou do not use a specific set of trails, but follow corridors throughout their fall-to-winter range until wintering areas are selected.

By October, dominant bull caribou have generally ceased migration, and have begun to assemble harems, spar with other bulls, and rut for several weeks. By mid-November, bands of PCH select wintering grounds. Animals have historically wintered across the entire range of the herd, although they commonly utilize three areas; 1) the Richardson Mountains, 2) Alaska's Chandalar area, and 3) the valleys of the Ogilve Mountains. Remaining relatively stationary for the winter period, caribou forage lichen and other plants until spring and the beginning of the next annual cycle.

PCH calving and post-calving habitat have been identified as the most "sensitive," or important (IPCB 1993).[14] (See column one and two in Table 3.3 for a listing of habitat values, phases of the annual cycle, and the respective land management regimes in which they occur.)

Table 3.3 Relative Habitat Values of Porcupine Caribou Herd
adapted from *Sensitive Habitat Report* , (IPCB 1993)
* 1= highest value.
** Land management regimes and issues of jurisdictional complexity are addressed later.

Habitat value *	*Phase of annual cycle*	*Land Management Regime* **
1	Calving; post-calving to summer dispersal (cows)	Arctic National Wildlife Refuge - 1002 area; Ivvavik National Park
2	Early to mid summer	Arctic National Wildlife Refuge, Ivvavik N.P., Inuvialuit Settlement Region
3	Spring, spring migration, and pre-calving	Land use regulations, Withdraw Lands; ANWR
4	Early, mid, and late winter	Land Use Reg., Withdrawn Lands; ANWR

14 Criteria for habitat value are based on energy balance, reproductive contribution, tolerance to disturbance, escape requirements, intensity of use, available alternatives. Also see Russell *et. al* .(1993). As will be discussed later in the dissertation, this evaluation represents a consensus of the International Porcupine Caribou Board and members of the Porcupine Caribou Technical Committee. The issue of habitat value is an on-going debate which drives much of the PCH co-management agenda.

3.3.3 Communities of Users

Equally a part of the Porcupine Caribou ecosystem and its life cycle are approximately fifteen human communities which maintain relations with the resource for subsistence purposes and cultural value. Uniquely dispersed across the landscape, each community has its own local perspective of the herd, knowledge of the resource and view of the animals' seasonal rhythms.

With respect to ethnicity and language, these communities are of two major cultural groups. To the north are the Inuit people whose traditional territories are located north of the Brooks Range and east to the Mackenzie Delta. These groups are referred to as Iñupiat in Alaska and Inuvialuit in Canada[15] To the south of the Brooks Range and also extending east to the Delta region of the Western Canadian Arctic dwell several Athabascan (sometimes referred to as Dene in Canada) groups. These include various local cultural groups (or communities) of Gwich'in as well as Northern Tutchone Indians.

In addition to native user communities, the Porcupine Herd is harvested by non-native hunters and outfitter guided trophy hunters, most of whom reside in more urban areas, such as Whitehorse in Canada and Fairbanks and Anchorage in Alaska.

In Canada there are eight native PCH user communities totaling 7755 residents; PCH user communities located in Alaska have 1315 residents (PCMB 1991). Canadian Porcupine Caribou user communities include Old Crow, Dawson City, Pelly Crossing, and Mayo in the Yukon plus Aklavik, Inuvik, Ft. McPherson, Tuktoyaktuk, and Tsiigehtchic (formerly called "Arctic Red River") in the Northwest Territories. Members of these native user communities hold local community, land claim, ethnic group, kin

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[15] Both of these names mean "the people" with the term Inuvialuit being used for political purposes through that group's land-claims process.

group, moiety affiliations and identity.[16] In this study, I am particularly concerned with local community, and political affiliations.

This research project is based on the involvement in PCH co-management of Old Crow (pop. 281), Aklavik (pop. 801), and Fort McPherson (pop. 759), all three of which have historic links to the region and Porcupine Caribou. A more detailed description of the three study communities follows at the end of this chapter. A discussion of local systems of caribou management is presented in Chapter Four.

3.4 Archeological Links with the Past Communities[17]

Porcupine Caribou and human communities of the region have an ancient relationship. Archeological evidence of human habitation in this region is among the oldest excavated in North American. While somewhat controversial artifacts have been used to suggest the presence of humans in the area 25,000 to 29,000 years ago (Morlan 1977), confirmed findings at the Bluefish Caves, located on the Bluefish River southeast of Old Crow, Yukon have been dated 17,000 to 12, 000 years old (McClellan 1987: 44-51). Bluefish artifacts consisted of a pounding stone, stone chips, and two bone tools (speculated for use in fleshing game). Also found with them were animals bones, including those of caribou.

Archeological evidence of early human presence north of the continental divide does not offer the same evidence of longevity as those to the south. Studies on the coastal plain of Yukon suggest that hunting peoples occupied this area as far back as 6000 B.C (Neufeld and Adams 1993: 10/28). Given the long history of caribou in this region, it can be assumed that caribou were a part of the culture of these people.

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[16] Identity with moiety (i.e. clan group), followed by Athabascan groups is still referenced by some Gwich'in PCH users. In Old Crow the traditional clan systems includes Crow and Wolf.

[17] The use of terms (i.e. band, tribe, community) in describing social collectives of the north has been a subject of some discussion among anthropologists (Helm 1981). Following Slobodin (Slobodin 1962) and the people of this region, I use the term "community."

Archeological research linking proto Gwich'in with the present-day hunters identifies a complex of sites on the Porcupine and Crow Rivers, and indicates continual human inhabitation of the region and use of Porcupine Caribou for approximately 2000 years (McClellan 1987). Many of these sites are situated at present-day caribou crossings, with material culture and subsistence patterns closely related to the caribou resource. Ethnological studies of Porcupine Caribou users document the central role of caribou in community life (Osgood 1936; Slobodin 1962; Balicki 1963; McKennan 1965; Slobodin 1969; Acheson 1977; Slobodin 1981). This long-standing relationship of caribou and people cannot be understated. Leechman's (Leechman 1954) description of former Vuntut Gwitchin childbirth, as described to him by Old Crow residents in the 1950's, graphically illustrates the point.

> In childbirth, the woman sits on a caribou skin on the floor. One woman sits in front of her and holds her up under the arms. Another woman sits behind to support her and delivers the child when it is born. The woman in labor pulls on the shoulders of the woman in front. The umbilical cord is cut with scissors, it is tied a couple of inches above the baby's body (with caribou skin in the old days, blackened with charcoal so that it would not slip) and tied again an inch above that. The placenta is burned. The child is put in a bag of caribou hair, loose; the hair is changed whenever necessary. Some moss is mixed with the hair, and this part alone gets wet and has to be changed. The child is put to nurse at once. An artificial nipple is cut from the cartilage of a caribou's knee, fastened to a stick to prevent its being swallowed. If a woman has no milk, a soup is made from a boiled caribou head and the child fed with the forefoot of a rabbit. (pg. 28)

Inuit peoples of the Mackenzie region have been described in terms of their close association with marine resources (McGhee 1988; Freeman, Wein et al. 1992) . In the coastal areas of the PCH range and within the region occupied by today's Inuvialuit, archeological research by McGhee (McGhee 1988: 91) suggest continual inhabitation of the region by Mackenzie Inuit for at least a century. Nagy's (1990) research argues that previous archeological investigations of whaling villages (pointing to McGhee 1974; Stromberg 1986) overlooks the significance of caribou in the subsistence patterns of former people in this region, and provides evidence for the importance of caribou-human relations. Nagy's (1990) research at the Trail River of north Yukon (in the area that is now Ivvavik National Park) along with documented oral histories of Inuvialuit

elders (Nagy 1994) supports her assertion that caribou were hunted in late spring/early summer when ice-pack conditions limited access to marine mammals, and thus were of importance both as food source and as providing important tool-making materials (i.e. antlers and bones), both of which were key to survival.

Like that of the Gwich'in, the indigenous Mackenzie Inuit caribou hunting patterns shifted seasonally from more individualized strategies of hunting and gathering to various forms of collective hunting and fishing. Drawing on the work of Acheson (1977), which summarized early Vuntut Gwitchin hunting, Nagy's study of early Inuvialuit hunting, and my own field data, these seasonal patterns of caribou hunting are presented in Table 3.4.

Table 3.4 Pre and early-contact Porcupine Caribou Hunting Patterns

Season	***Vuntut Gwitchin*** (Acheson 1977)	***Hunting of Trail River area*** (Nagy 1990)
Late spring-early summer	Caribou hunting at river crossings and using spring fences	Small group and individual hunting
Summer	Little to no caribou in territory; concentration on fishing	Communal hunting; whaling and fishing activities after receding of ice pack.
Early Fall	Communal caribou hunt using caribou corrals	Communal caribou hunt using corrals
Late to early winter	Small group and individual hunting	Few to no caribou in territory

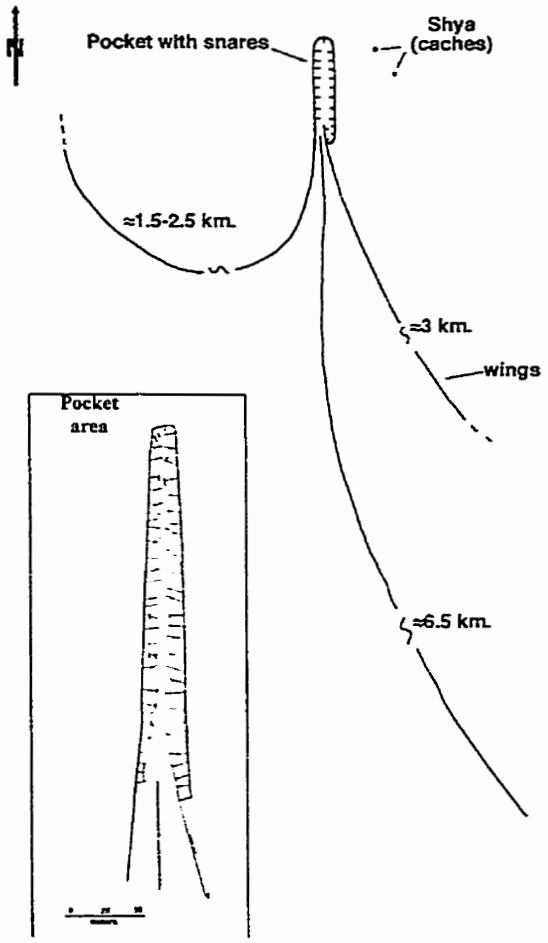
3.5 *Vutzui Tthulh* (The Caribou Corral)

> Perhaps nothing is more certain to create astonishment than the first sight, in his native haunt, of a barbarian— of man in his lowest savage state. One's mind hurries back over past centuries, and then asks, "Could our forefathers have been like these?... – men whose very signs and expressions are less intelligible to us than those of the domesticated animals; men who do not possess the instinct of those animals, nor yet appear to boast of human reason, or at least of arts which result for that reason? I do not believe it is possible to describe or paint the difference between savage and civilized man. It is the difference between a wild and a tame animal (only greater, because in man there is a greater power of improvement)...
>
> from *What Darwin Saw* (Darwin 1879: 92-93)

Charles Darwin's comments on the hunter's "human reason" and influence on westerner thinking (i.e. competition and natural selection) is justification for elaborating further about early communities of PCH to establish and validate the rich and sophisticated culture of that time.

Figure 3.7 *Vutzui tthulh* of the PCH Range

Based on the Black Fox Creek Corral #1 and the *Choo kwaa* (pocket). Adapted from (Warbelow, Roseneau et al. 1975). (1975) and McFee (no date given).



One of the most remarkable aspects of prehistoric technology is the *vutzui tthulh* (caribou corrals). These linear structures were employed seasonally by groups of hunters to direct, entrap, and dispatch caribou, with staging areas used for caching stored meats. While no extensive research has been completed on *tthulh* of the PCH range, approximately 50 have been catalogued across the range of the Porcupine Herd (Warbelow,

Roseneau et al. 1975) with 11 in the Crow Flats area alone (Greer and LeBlanc 1992). Varying in designs,[18] *vutzui tthulh* have been found to be as long as 7500m in length with wings extending 1500 meters (McFee, no date). (See Figure 3.7)

McFee describes the *vutzui tthulh complex* as a "tended facility," containing an average of 50 sets or snares in each pocket, with the *tthulh* made of black spruce *(Picea marinana)* willow *(Salix arbusculoides),* and flat slabs of limestone to stabilize fence sections. In his assessment he finds a uniformity in all fence orientations traversing low, shallow valleys, presumably as a means of deflecting and eventually directing caribou which migrate on ridge tops. His review, somewhat consistent with other ethnographic work on the Gwich'in, finds that up to 150 caribou could be taken in a single event, meaning that a single capture of this scale would net approximately 11,250 lb. of edible meat![19]

According to the ethnographic record, the operation of each *vutzui tthulh* was managed by a *gwitshid* (head person) of the caribou corral (Balicki 1963; Haleigh-West 1963; McKennan 1965; Greer and LeBlanc 1992). McKennan (1965) refers to the system by which ownership of the facility is transferred from the *gwitshid* (head person) to a family member. Approximately twelve families resided at a *tthulh* seasonally. Although fences were the property of individuals in that they could not be stolen, their use and thus the leadership of the *vutzui tthulh gwitshid* was dependent upon the cooperative support of the group (McKennan 1965).

McFee notes that young men would be sent to the *tthulh* to maintain the structures each season, before the arrival of the family. Mary Vittrikwa, a Tetl'it Gwich'in elder from Fort McPherson, reported that a hunting leader, working with hunters and other

---

[18] Far north of treeline, such structures are commonly constructed of stone by Inuit hunters. As well, Gwich'in corrals varied, depending on the local topography and locals' understanding of herd movements.

[19] Caribou produce approximately 75 pounds of meat per average animal.

community members, would direct the activities of collective hunts, assigning positions and roles in caribou herd-directing activities. A study of the use of fences by the Dogrib describes how traditional hunters of a group used various forms of flagging (e.g., in the form of spruce bowls and other vegetative materials) to direct caribou movements (Legat, Zoe *et al.* 1995) Various *tthulh* designs are reported to have been created for differing seasons. When a particular group proved to be unlucky in intercepting caribou at its corral, it was common practice to move to a successful corral and share in the take of other families. Cooperation in the effort of directing of herds, handling of large quantities of caribou meat, and accommodating unsuccessful groups were part of a complex form of early Porcupine Caribou management organization. As pointed out by others, this "economic cooperation" should be understood in the context of family alliances, political rivalries, and moieties.

Neetisi Gwich'in elders of Alaska stated that fences in their area were built before their childhood and more contemporary construction efforts were limited to maintenance (Warbelow, Roseneau et al. 1975). This description corroborates observations of explorer Sir John Richardson, who stated that caribou corrals appear to have been constructed at least one hundred years before he found them in the early 1800's. Oral history accounts indicate that Gwich'in *vutzui tthulh* were in operation during the early part of this century (Murie 1935; Greer and LeBlanc 1992; McFee) and continued after the arrival of firearms. It has been speculated that the fluorescence of corral use may have followed from the introduction of iron axes which facilitated construction compounded by the demands for caribou by non-native trading posts. Mary Vittrikwa described her hunting parties using a modified form of a caribou fence in 1927. An elder in Old Crow told me of using caribou snares in her early youth, being reprimanded by wildlife officers for being "cruel" to animals, and then discontinuing their use. I was also informed that snaring of caribou has been used by locals as recently as the late 1980's.

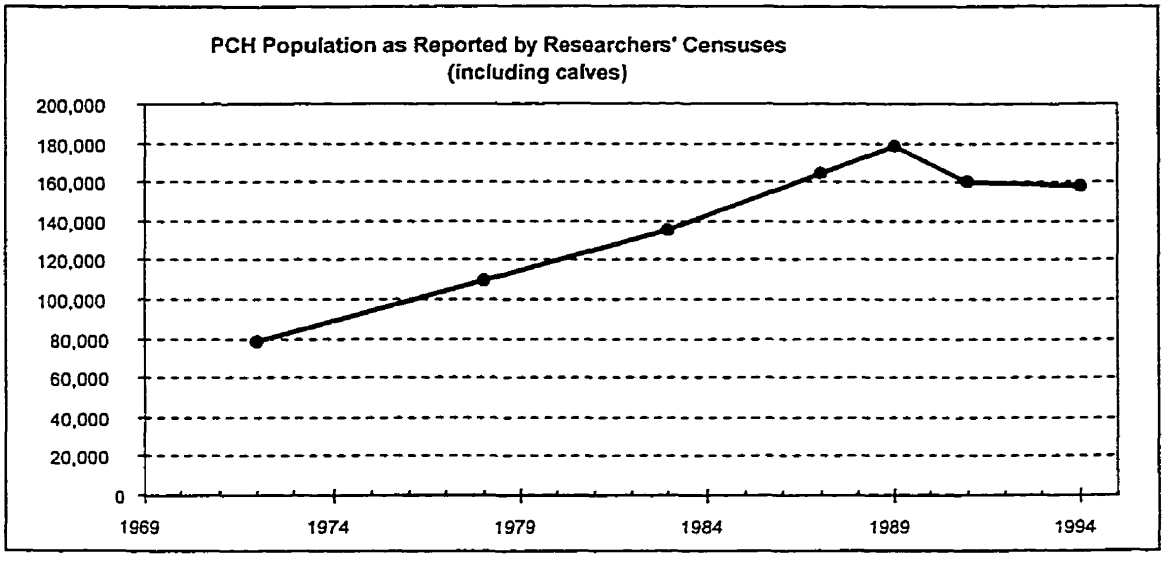
The design, tenure system, level of effort, maintenance regime, and overall knowledge of animals necessary to successfully sustain humans with the *tthulh vutzui* is reason to pause and reconsider the image of caribou hunters as "nomadic," "spontaneously opportunistic," and limited in long range planning (Ingold 1996). This brief description of the *vutzui tthulh,* provided at the outset of the discussion of communities and caribou, is intended to counter Darwin's influential notions of the "primitive" caribou hunter, and instead forge the link between property and cooperation while qualifying the term "wildlife." The question of how to best frame communities of caribou hunters and their systems of caribou management will be addressed in Chapter Four.

3.6 Resource Abundance and Human Predator Control

Conventional resource management has typically focused on the impacts of predation resources and uses of scientific methods of management historically based on the concept of maximum sustained yield (MSY). The literature of wildlife management has characterized caribou herds as highly unstable populations (Banfield 1961; Kelsall 1968; Klein 1987); and imposition of quotas on native peoples has been a controversial topic in agency management of these ungulates.

Since the mid-1900's, however, there have been no perceived periods of (i.e. decadal or greater) of range-wide Porcupine caribou scarcity. Historical records and locals reports do, however, indicate periodic changes in regional availability of this population. The first aerial census of Porcupine Caribou was completed in 1960, but only became reliable with better methods employed in 1972. Since 1983, photo census methods have been employed with increasing accuracy (McEwen 1985). The PCH's affinity to a relatively confined calving area improves the quality of counts.

Figure 3.8 PCH Population as Reported by Researchers' Censuses

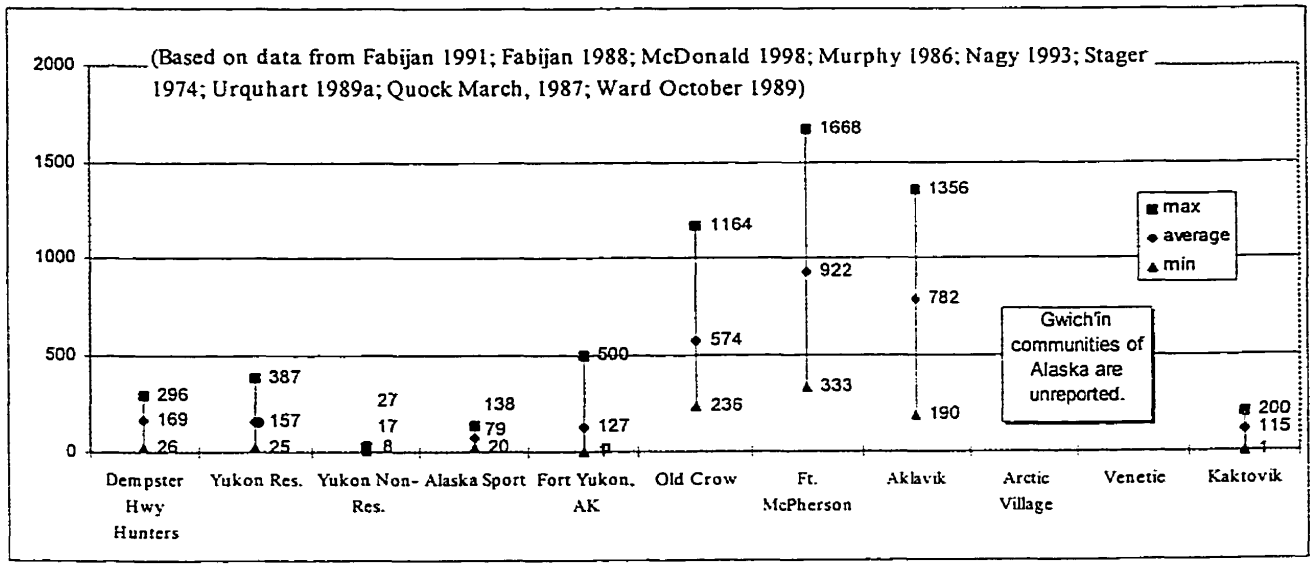


Interpretation of the aerial censuses indicate that the herd has increased 5% annually from 1972 to 1991 (PCMB 1991). Reported increases in population during early years of counting PCH may be attributable to improved census methods (Urquhart 1986). Census data show that the total population of the herd increased to 186,000 in 1991 and decreased to 160,000 in 1993. In 1995, the PCH census calculated a population of 158,000 animals. (See Figure 3.8)

Changes in caribou herd size and the attribution of cause have been the subject of much controversy in caribou management (Klein 1991). Some argue that various forms of predation are a driving determinant in herd population (Bergerud 1979; Bergerud 1984). Others look to more complex explanations which account for quality of habitat (Klein 1991). More recent studies have examined climate as a determinant (Griffith, Douglas et al. 1998). Understanding the role of human harvest in relation to population fluctuations in caribou herds is confounded by incomplete and inaccurate measurements. For a number of reasons, it is difficult to achieve reliable reports of human harvest (i.e. limited recall, political threats, differing reporting methods, jurisdictional communication (Usher and Wenzel 1987).

The annual kill of the Porcupine Caribou herd varies from year to year, depending on the distribution of animals, communities' access to animals, and community need. The total documented annual harvest ranges from 3000 to 7000 caribou. Approximately 60% of the annual harvest is taken in Canada (PCMB 1990-91). Figure 3.9 presents available data from the annual maximum, mean, and minimum harvest by various user groups.[20]

Figure 3.9 PCH Reported Harvest by Community and Annual Variation in Take.



Drawing from these data and the material presented above, two important conditions of Porcupine Caribou co-management can be described. First, total annual take of Porcupine Caribou has consistently fallen below a generally accepted 5% annual allowable harvest of total population (as calculated by Kelsall (1968)). Second, the competition for caribou allocation between small subsistence-based communities and non-native hunters is low. Consequently, these conditions have tempered the efforts of state managers in Alaska to impose harvest quotas on community users. While there are no imposed harvest quotas on natives hunters in Canada, the concept of maximum sustain yield (MSY), the reliance on "scientific management," and the

---

[20] Accounting of PCH harvest data has been problematic in part due to duplication of counting with native and non-native surveys, inter-jurisdictional communication, and inconsistency of survey schedules.

need for human predator control have historically a part of the ideological perspectives of Canadian government PCH managers and caribou biologists.

This context for co-management differs from several other caribou herd management regimes in Canada and Alaska. In the case of both the Western Arctic (Alaska) and the Beverly and Qamanirjuaq (Canada) herds, agencies perceived dramatic declines (and more recently subsequent increases) in population size, and attributed past decreases to native hunting. In 1964 the perceived "Caribou Crisis" in Canada centered on barren ground caribou herds of the Central Arctic (Beverly, Qamanirjuaq , and George River Herds), led to considerable concern among government managers, and a closed meeting of the Administrative Committee for the Preservation of Caribou.

The proceedings, as documented in minutes, provide an indication of how government managers of that day viewed wildlife management as an agency-exclusive enterprise, and insight into the managers' perceptions of native hunters.[21] Moreover, the transactions of the meeting illustrates how "northern development" was viewed at that time as a solution to the problem. The statements of Munro, a caribou biologist who in the 1950's directed the first comprehensive Canadian PCH studies and the 1964 was Chair of the Administrative Caribou Committee, are especially telling. Referencing biologists' perceived dramatic decrease in caribou population (based on recent aerial transect data), he noted that, "There is evidence that use by Indians, Metis and Eskimos is a major factor inhibiting the recovery of caribou herds," and went on to say that,

> ... conservation of caribou is not simply a matter of stopping the hunting of them. Many Indians, Metis and Eskimos depend upon the caribou for food and clothing. It would be unthinkable to deprive those people of caribou without providing them some other support.

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[21] "Draft " minutes of the Administrative Committee's meeting and an announcement memo, indicating that the sensitive nature of the meeting required that the gathering be "members only" were located in my archival search. Quotations come from that document.

He proposed that

> Two programs, one short-term and one long-term, must begin quickly to prevent further depletion of the Barren ground caribou... [C]aribou should no longer be considered as an unlimited source of "country food," even when they are at hand. . . [and a] long–term program. . . the development of work programs, the search for and development of alternative resources, and education....Work programs would benefit caribou in two ways. They would provide the natives with cash for the purchase of supplies, and by keeping them on the job, they would divert them from hunting.... One of the basic problems has been the attitudes and values inherited in the cultures represented by the aboriginal inhabitants. It seems that they were all improvident and wasteful with difficulty in relating their actions to the consequences that followed. they know of no other codes than feast and famine; take all you can while is available and starve when it is gone. Basically the people who descended from those primitive hunting societies have retained much of that ancient code, and those from other social structures who have lived among them have found it only too easy to adapt their attitudes and habitats. Such habits are difficult to change...
>
> It is not beyond the realm of possibility that the last of the great herds that once trod the barren will wander into a settlement in northern Saskatchewan and be shot from someone's doorstep.

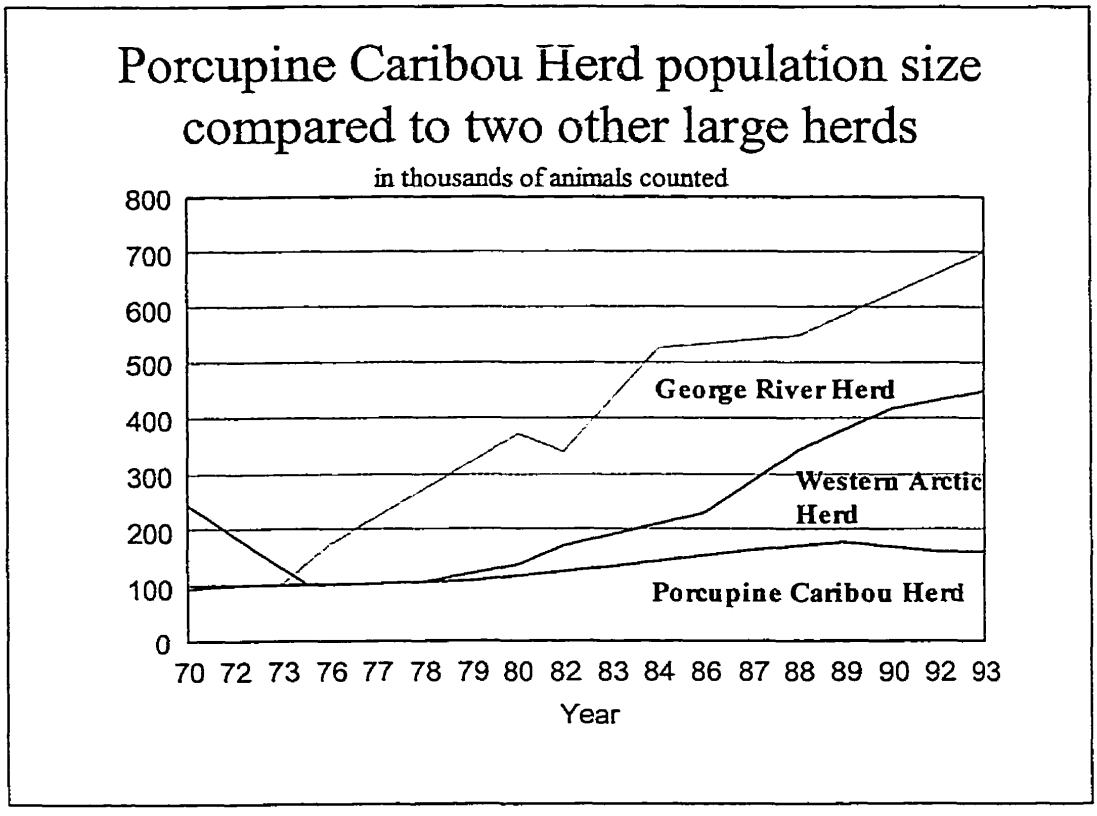
Thus, the "Caribou Crisis" of the 1950's and 1960's spread to the broader question of the development of northern resources and the social engineering of hunting people's acculturation into a wage economy.

The population decreases of the Crisis were denied by many native hunters, and engendered skepticism about the validity of scientifically-based censuses (Banfield 1956; Klein 1991), perceptions that were reinforced when unexplainable increases in caribou populations were later documented. Threats of imposed quotas led to heated conflicts and feelings of distrust (Osherenko 1988). In response to these conditions, native caribou users and governments negotiated and later implemented the Beverly and Qamanirjuaq co-management system, which later served as a model for the Canadian Porcupine Caribou co-management system.

Figure 3.10 helps to contrast perceived changes in various caribou populations and make the point that caribou herds, much like co-management arrangements and local cultures, evolve in a specific landscape, and have ecological characteristics that

time and place dependent. As well, it illustrates the Porcupine Caribou Herd's relative stable population.

Figure 3.10 Porcupine Caribou Herd population size compared to two other large herds



3.7 Jurisdictional Complexity of the "Arctic Borderlands"

The region of the Porcupine Caribou Range has been referred to as "the Arctic Borderlands" for good reason. By the time the Porcupine Caribou Herd completes its annual round in most years, its collective membership will have crossed the international boundary of two nation-states, entered the jurisdictions of three state or territorial governments, and traveled through the homelands of seven aboriginal land claimant groups (five of which view themselves as sovereign First Nations).

Viewing jurisdictional complexity of the PCH range from the local perspective, it is worth considering the implications of a hypothetical hunt by a resident of Old Crow. This hunter visits extended family in Aklavik, goes hunting while he is there, and shoots a caribou. The animal has migrated from its place of birth in Alaska and "Area 1002 "of

the Arctic National Wildlife Refuge, considered by industry as the most promising on-site oil prospect in North America. While hunting, the hunter tells his relative of a letter his son has written to a US Senator in which the boy expressed his views on the development and the fact that the US Congress has ultimate authority in making the decision on development.

Leaving town and taking the meat with him, the hunter drives south on the Dempster Highway and is stopped and questioned by a Wildlife Enforcement Officer of Northwest Territories Department of Renewable Resources who inquires if the hunter has a legal right to shoot the caribou. After entering Yukon Territory, he is stopped and questioned by a conservation officer from the Yukon Department of Renewable Resources for the same reason. Further south he is stopped yet again, this time at a hunter check station of the same agency to conduct its count of harvested caribou. Along the way, the hunter stops and talks with caribou researchers from the Canadian Wildlife Service and the University of Alaska.

Later that year, the hunter receives a mailed questionnaire from Yukon's Department of Renewable Resources, again to count the same animal. Later that month, he receives a visit from a local conducting his First Nation's harvest survey and is questioned about the number of caribou he has taken this year. Later that season the hunter decides to travel by boat to Alaska and deliver meat of the same caribou he shot outside of Aklavik to his half brother who lives in Fort Yukon, Alaska. Prior to departure, Yukon regulations require that he obtain an export permit for crossing the territorial boundary with meat. There is no conservation officer living in town, so he obtains the permit from the Royal Canadian Mounted Police. Upon entering Alaska, the hunter is questioned by a US customs agents. If going by the book and following federal meat import laws, those agents would not permit the same caribou, previously born in Alaska, to re-enter the state and be delivered to the hunter's kin.

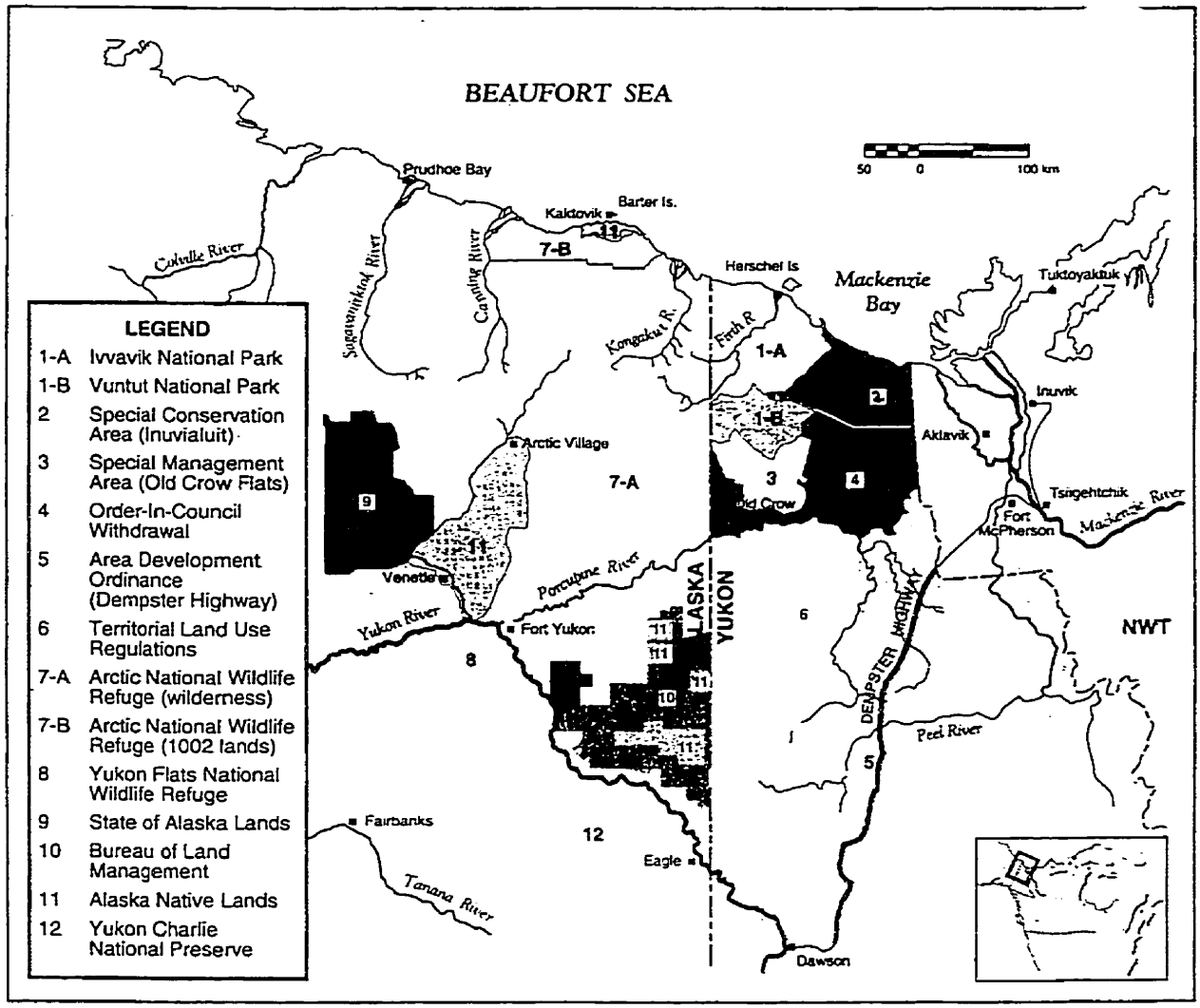
Young (1982) shows how jurisdictional complexity of resource regimes is a multidimensional problem, and points out the complications associated with assessing the economies and diseconomies of scale. Jurisdictional complexity across the range of PCH is also a matter of politics and a consequence of imposed borders, native people's efforts to assert their authority in the face of foreign powers, and a hierarchically segmented approach of state wildlife management. Jurisdictional complexity has implications for co-management to the extent that it affects the costs of community to influence management, requires all parties to communicate and coordinate activities, and is dependent on trust in the management activities and policies.

For the purposes of providing a context for the study of Porcupine caribou management process, jurisdictional complexity is viewed here along several dimensions. The first dimension includes the range from local to state, territorial, federal, bilateral and international arenas in which management decision making occurs. Another dimension is the range in various activity areas or functions of management (e.g. , communication, data collection and data analysis, habitat project including impact assessment, and enforcement) and the ways in which various organizations (including agencies) are linked (and segregated) to address these areas. Finally, an additional dimension includes the many decision making arenas, including organizational structure (s) and those institutions that coordinate their domains.

Two hundred years ago, a hunter camping on the banks of the Porcupine River was most likely not concerned with the total take of all users of the PCH range. Today, the effort to coordinate agencies charged with management of the PCH and the mosaic of land management regimes within the herd's range (Figure 3.11) is formidable, even without the efforts to share power with the state. Appendix 11.3 provides a listing of organizations (agencies, First Nations, co-management bodies) and sub -regimes (e.g., land management) that are involved in various aspects of co-management.

Figure 3.11 Land Management Regimes of the PCH System

Adapted from *Sensitive Habitats Report of the Porcupine Caribou Herd.* Report accepted by the International Porcupine Caribou Board from the Porcupine Caribou Technical Committee. January 1993.



3.8 Porcupine Caribou Agreements and Provisions for Community Involvement

This study focuses on two agreements which were established to ensure conservation of Porcupine caribou and its habitats, and which provide for community involvement in PCH management. These are described below.

3.8.1 Agreement between the Government of Canada and the Government of the United States of America on the conservation of Porcupine Caribou:

International PCH issues are addressed through the International Agreement for the Conservation of Porcupine Caribou (IPCB) which was signed by the US and Canada in 1987. The agreement has the following four "Objectives":

> a. To conserve the Porcupine Caribou Herd and its habitat through international co-operation and coordination so that the risk of irreversible damage or long-term adverse effects as a result of use of caribou or their habitat is minimized;
>
> b. To ensure opportunities for "customary and traditional"[22] uses of the Porcupine Caribou Herd by:
>
> > (I) in Alaska, rural Alaska residents in accordance with 16 U.S.C. 3113 and 3114, AS 16.05.940(23), (28) and (32), and AS 16.05.258(c); and
> >
> > (2) in Yukon and the Northwest Territories, native users as defined by sections A8 and A9 of the Porcupine Caribou Management Agreement (signed on October 26, 1985) and those other users identified pursuant to the process described in section E2(e) of the said Agreement;
>
> c. To enable users of Porcupine Caribou to participate in the international co-ordination of the conservation of the Porcupine Caribou Herd and its habitat;
>
> d. To encourage co-operation and communication among governments, users of Porcupine Caribou and others to achieve these objectives.(1987)

Implementing the terms of this international agreement is the International Porcupine Caribou Board (IPCB) whose membership comprises four members from

---

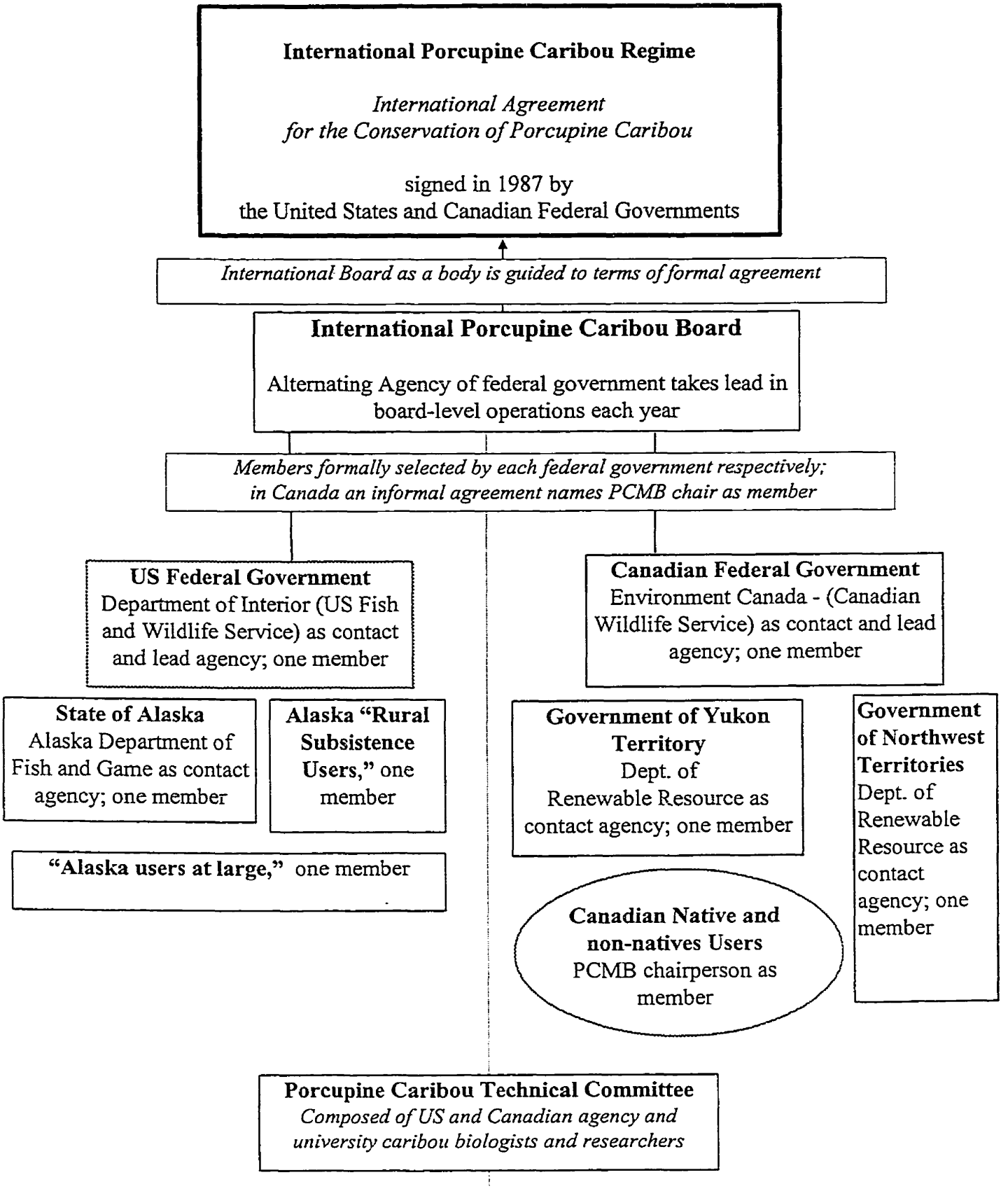
[22] The terms customary and traditional are legal definitions in Alaska, used for qualifying communities' allocation of subsistence resources.

each country. Membership is determined by the agreement signatories (each federal government). No provisions of the agreements guarantee local user communities representation on the board.

The international agreement and its Board are unusual by international standards, requiring written notification of disagreement and an explanation by sovereign powers indicating why recommendations were rejected (Osherenko 1989). Also noteworthy is the language which makes explicit the focus on conservation of habitat and provisions which place the burden of proof for imposed hunting restrictions on government agencies. Objectives "c." and "d" (stated above) serve as terms of reference in directing the involvement of caribou users, given the focus of this research. The agreement also states unambiguously that there shall be no commercial sales of Porcupine Caribou, but does provide language that allows for traditional uses by caribou hunters (rural residents in Alaska and natives in Canada as defined by the Canadian Porcupine Caribou Management Agreement).

The terms of the agreement are clear that the IPCB's advice and recommendations are "not binding on parties," although it is to be "accepted" that parties will "participate in the operation of the board." Also of significance is the absence of the word "management" in the language of the agreement. This omission was a conscious choice on the part of the negotiators, and a reflection of the intent that US and Canadian federal governments maintain full sovereignty of management functions within their respective countries. This omission, in effect, relegates the international board's function to that of coordination and communication. It does, however, allow the board to produce documents, and as recommended in the agreement, create a conservation management plan. Structural features of the international arrangement are presented in Figure 3.12.

Figure 3.12 Structural Features of the PCH International Arrangement



3.8.2 The Canadian Porcupine Caribou Co-Management Arrangement

PCH management in Canada is governed, in part, by the Porcupine Caribou Management Agreement (PCMA), signed in 1985 by the Ministry of Environment, the Ministry of Indian Affairs and Northern Development, the Yukon Government, the Northwest Territories, the Council of Yukon Indians, the Inuvialuit Game Council, and the Dene Nation & Metis Association of NWT.[23] Like many co-management agreements, the PCMA grew out of a conflict dealing with the interrelated issues of sovereignty and resource development. This agreement differs from the Beverly - Qamanirjuaq Caribou Management Agreement of central Canada in that native organizations of that arrangement signed as witnesses and the agreement is between territorial- and federal-level governments.[24] In the case of the PCMA, the agreement was between native organizations and territorial- and federal-level governments.

The Canadian PCH change in wildlife management is the result of the Mackenzie Valley Pipeline environmental assessment process of the mid seventies, the land claims settlement in the Inuvialuit Settlement Region, and early efforts to negotiate an international caribou agreement. These conditions are described by Therrien (1988) and historical aspects of the agreement are addressed in Chapter Five.

In some respects, the PCMA, negotiated before the IACPC, is similar in overarching objectives to that agreement. The PCMA objects are:

> 1. To co-operatively manage, as a herd, the Porcupine Caribou and its habitat within Canada so as to ensure the conservation of the Herd with a view to providing for the ongoing subsistence needs of native users;

---

[23] Because of a change in land claims status, the rights conveyed to the Dene Nation & Metis Association of NWT are now assumed by the Gwich'in Tribal Council.

[24] The Porcupine Caribou Arrangement in Canada also differs with respect to the number of user communities which are part of the co-management regime; the Beverly - Qamanirjuaq has sixteen native user communities and the Canadian PCH arrangement has seven.

2. To provide for participation of native users in Porcupine Caribou Herd management;

3. To protect certain priority harvesting rights in the Porcupine Caribou Herd for native users, while acknowledging that other users may also share the harvest;

4. To acknowledge the rights of native users as set out in this Agreement; and

5. To improve communications between Governments, native users and others with regard to the management of the Porcupine Caribou Herd within Canada. (Canada 1985)

The co-management agreement directs that parties establish the Porcupine Caribou Management Board, an eight-group organization whose membership is mandated to include an equal number of native and other representatives, and whose activities are under the leadership of a chairperson supported by a secretariat.

The PCMA states clearly that the PCMB is an advisory body to the Canadian Federal and Territorial government, and is to facilitate communication between parties involved with management including caribou user communities. The board is also directed to assume responsibility for harvest allocations in the event that it determines that they are needed, maintain a list of eligible hunters, take a role in environmental assessment review processes and land-use planning processes, and assist in data collection and review of studies. Meetings are to occur at least three times a year. The agreement also makes explicit that "user communities" have priority rights in involvement in management through the PCMB and in allocation of caribou in times of scarcity, with somewhat ambiguous language regarding non-native rights to a 250-animal apportionment of PCH in such conditions. The agreement also specifies community rights to barter and trade caribou in customary and traditional manner and for the PCMB to specify the terms of such exchanges. As well, it states that communities may continue to use traditional and current harvesting methods.

The agreement is also unique in its specific reference to user communities. Through the terms of the agreement, those native members of agreement-recognized user communities (Old Crow, Dawson, Mayo, Fort McPherson, Tsiigehtchic, Aklavik, Inuvik, and Tutktoyaktuk) have the right to hunt caribou without a license or special fees, and in the event that a permitting program is necessary for conservation, permits will be issued locally. The agreement also references community hunting areas for user communities, which are included in an appendix of the agreement, and notes that when access to these has been permitted by governments, user communities shall be duly notified. This final reference is in response to the pending land claims legislation which was, at the time of the PCMA's signing, unresolved, and thus allows such processes to be determined through those negotiations.

The PCMA is a single population co-management agreement with its jurisdictional authority limited, by the terms of the agreement, to activities in Canada. Although it has no jurisdictional authority to activities in the United States, by virtue of the IACPC, it is linked to the International Board for such activities. As a stand-alone agreement, the PCMA represents a legal contract between parties, and is subject to contract law. No method of arbitration is stated explicitly in the agreement for resolving an intractable conflict among parties (except in the event of a conflict with the selection of a board chairperson) although the agreement does give the Board Chairman the role of breaking a tie in the event of a deadlocked decision.

The agreement, while being a "stand-alone agreement," (i.e. settled independent of land claims processes) is embedded in land claim agreements; the PCMA is explicitly referenced in the Inuvialuit Final Agreements, the Yukon First Nation Umbrella Final Agreement, and the Gwich'in Land Claims Agreement; and is thus recognized as holding the constitutionally entrenched status of land claims. At the time this research was conducted, two native land claim agreements of three native groups had been

signed. Those are the Inuvialuit Final Agreement (signed in 1984) and the Gwich'in Land Claim Settlement of Northwest Territories (signed in 1992). The Yukon Council of Indians (CYI) Agreement only signed in principle. Each of the two agreements (as well as the CYI agreement in principle) makes specific mention of the PCMA in their respective texts.[25] As stated in the Gwich'in of NWT Agreement:

> The provisions of the Porcupine Caribou Management Agreement and any management agreement with respect to Bluenose caribou shall apply to the herds named, notwithstanding any provisions of this agreement which may be inconsistent with such agreements.

The organizational chart below (Figure 3.13) provides a basic schematic of the agreements signatories, lead agencies, implementing organizations, dedicated number or representatives as allowed by the agreement, and designated native user communities. Table 3.5 lists functions of management, associated management problem areas for communities, and how the terms of the PCMA specify community rights.

Although the agreement states that government parties hold responsibility for financing the operations of the board, including user representatives participation at meetings, no specific terms were negotiated before its signing and the existing terms were informally negotiated in the early stages of the board's development (see Therrien (1988) for discussion). At present few to no board activities are financed by non-government organizations (although some research dollars are acquired from other claims-based co-management bodies). Finally, the PCMB, has established itself as a non-profit charitable organization, a designation which makes it eligible for grants and donations as well as intervener funding in impact review processes of government. By achieving charitable status, the PCMB has been able to supplement its income substantially from foundations such as the Walter and Duncan Gordon Foundation (which donated $100,000 Canadian), the Muttart Foundation and others.

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[25] The Vuntut Gwitchin First National Final Agreement signed May 29, 1993.

Figure 3.1 Organizational Chart of the Canadian Co-management Arrangement

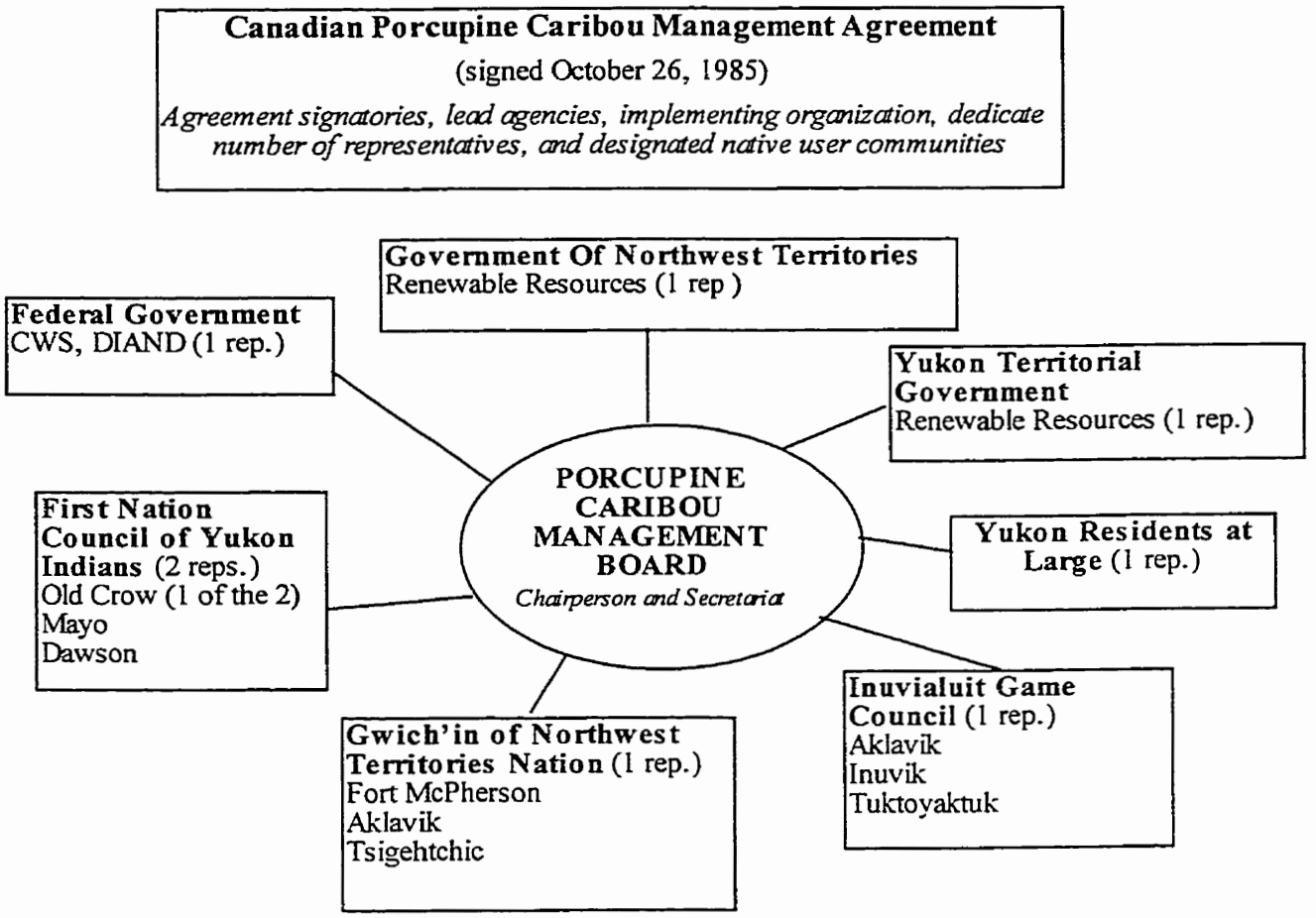

Table 3.5 Overview of key PCMA terms for community		
function	***problem area***	***Provisions guiding community involvement in various activity areas***
Communication	linking community with management	Agreement explicitly states that communities will participate and sit on board with government members. Authority for community membership is held by signatory organizations and the Co-management board chair is selected by the Board's membership.
Research and Data collection	adequate knowledge of conserve resource and its habitat	Agreement gives co-management board role in reviewing research and methods and encourages community members to participate in the collection of data.
Impact assessment and habitat protection	providing a role for community to participate in the assessment of impacts and protection of habitat	Agreement includes directive to conserve resource and habitat. Also directs co-management board to participate in land management planning and impact reviews.
Policy on Caribou as an exchangeable good	exploitation of caribou resource by unchecked market forces and maintenance of traditional systems of exchange	Agreement allows for traditional systems of exchange and barter and trade guidelines to be established to regulate those transactions. Agreement also prohibits the commercial sale of PCH meat, but allows for the commercial sale of non-edible parts.
Enforcement	regulations of general laws of application (e.g., safety) and hunting using traditional methods	Agreements says little about enforcement directly, but charges the board to recommend the establishment of quotas if necessary and make other recommendations to the Minister. Agreement also states that native hunters can continue to harvest caribou using traditional and new methods of hunting.

3.9 Asymmetrical Regimes and Implications

As indicated earlier, PCH co-management is asymmetrical in the types of arrangements found on both sides of the border and the role of users in the management process. Porcupine Caribou management in the United States differs from that of Canada. In the US, responsibilities for PCH management are fragmented

by on-going legal conflicts between the State of Alaska and the US Federal Government regarding Alaska's State constitution and the Alaska National Interest Lands Conservation Act (ANILCA). As a result of such conflicts with the State of Alaska, the United States Fish and Wildlife Service manages wildlife resources on all federal lands; and the Alaska Department of Game and Fish on all other lands, with the exception of subsistence activities which are managed by the US Fish and Wildlife Service. Each agency operates regional and state-wide advisory boards as venues for citizen participation in management decision-making, although these boards are focused primarily on enforcement and allocation issues (and generally do not delve into issues of habitat protection). As well, in the United States, there is a greater separation in decision making arenas between land management and enforcement affecting PCH than there is in Canada; the United States provides no single management body comparable to the PCMB in which local user communities of Alaska can be involved in Porcupine Caribou management issues. In addition, Alaskan communities have fewer specified rights, more meager resources, and thus a more limited sphere of influence in affecting management outcomes.

These conditions are best exemplified by comparing provisions for community involvement in the impact assessment process for proposed development of lands in the calving grounds of the PCH. On Alaska's North Slope, the Department of Interior assumes primary responsibility for assessments under provisions of the National Environmental Policy Act (1969) and has historically treated those PCH users who are not North Slope land owners (e.g., Gwich'in of Alaska) as citizens with equal rights to people living in Anchorage or Boston (Kofinas 1992). On Yukon's North Slope, environmental impact review procedures include federal-level regulations with the guidelines of the 1973 Canadian Environmental Assessment and Review Process (EARP) with advisory input from committees which were established through constitutionally entrenched native land claims. These claims, along with the Inuvialuit

Final Agreement of this region, formally provide native Canadian PCH users with a role in the review process, establishing environmental review bodies to which Aklavik members have representation. (Land-claims based review committees are discussed later in the dissertation in relationship to their implications to scientific research.) Coupled with the differences in Alaska and Yukon demographics, and the coincidence of prospective oil deposits, these conditions create community vulnerabilities for PCH users both of Alaska and Canada.

Responding to these conditions, two organizations have been established by Alaska PCH users to advance community caribou management interests. The first is the Alaskan Porcupine Caribou Commission, a body which was originally founded as an international body of community users in the negotiation phases of the IACPC, and which has become Alaska-based since the signing of the Canadian and International agreements. This organization functions with minimal funding and little to no infrastructure.[26] In addition, Gwich'in on both sides of the border established the International Gwich'in Steering Committee in 1988. This non-profit organization is formally reorganized as a 501 (c) (3), with the mission to help sustain the culture of the Gwich'in through education. It has served to inform non-locals about a range of caribou management issues. More importantly, neither the Alaskan Caribou Commission nor the Gwich'in Steering Committee are recognized by government as having any formal duties in management of the herd.

3.10 Overview Of PCH Management Issues

Below is a brief description of issues which illustrate the range of activity areas of the PCH co-management process. Given that this dissertation focuses so closely on the 1993 Caribou Crisis, this listing provides an important overview of problems the

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[26] Alaska Porcupine Caribou Commission did receive one federal grant in its early stages of development, but receives no on-going funding.

PCMB and IPCB have addressed. These issue areas are categorized into four activity areas: habitat protection/impact assessment, caribou as an exchangeable good, enforcement and hunting practices, and herd health and conservation. Some activity areas will be referenced later in the dissertation.

3.10.1 Habitat protection/Impact assessment

Arctic National Wildlife Refuge 1002 Gas and Oil Development: As previously described, the ANWR 1002 conflict has involved variety of players (Alaskan interests, oil industry , and Iñupiat) interested in developing hydrocarbon prospects on the Coastal Plain of Alaska within the calving grounds of the herd. The political debate engaged the PCMB and user communities with environmental advocacy alliances in political lobbying in Washington and Canada, and at the grassroots level in the United States This issue, more than any other, dominated the attention of PCMB members and consumed the major portion of its energies.

The Hondo Oil Pipeline Proposal: A submission to the Yukon Government in January 1993 proposed the construction of a gas pipeline from the Mackenzie Delta, south through Alaska, to Kenai, AK. Hondo Oil, a Louisiana-based company, espoused a strong environment ethic and parleyed Yukon Government leaders to explore the possibilities of going forward with the mega-project plan. The proposal was forward to the PCMB by an agency board representative. community leaders called on the co-management board and biologists for input and support. The PCMB continued to track the proposal.

Dempster Microwave Towers: The construction of telephone signal repeating towers which parallel the Dempster Highway were planned and constructed within the herd's winter range. The review and impact assessment required the PCMB's attention to insure that location of facilities were consistent with conservation goals and access

issues will not become problematic in the future. The board was included in the review process and its recommendations were incorporated into the final design. Construction of towers was completed in 1993.

Canadian Gas And Oil Lease Sales: On-going sale of gas and oil development leases was tracked by the PCMB to gauge potential impacts on the herd and to consider political fallout of development in Canada affecting lobbying for habitat protection in Alaska's Arctic Wildlife Refuge.

Assessment of Sensitive Habitats: An assessment of the sensitivity of various seasonal habitats of the PCH was called for by the International Agreement and undertaken by the IPCB. The project involved an assessment of available research data on annual distribution and movements of animals for a twenty year period.

International coordination of PCH Management Efforts: Managing jurisdictional complexity has challenged PCH agency managers since the 1950's . In 1994 to 1995 federal agencies of the US and Canada, prompted by the PCMB, began exploring the idea of coordinated land management regimes which would include "Twinning" Ivvavik National Park and Arctic National Wildlife Refuge. For the PCMB the effort was part of the strategy in achieving better protection of sensitive habitat in the absence of wilderness protection of the 1002 area. The proposal met with resistance from some locals who asserted that First Nations had not been properly consulted in the initiative. The idea was later abandoned when the US State department perceived that bilateral negotiations were occurring on the agency-to-agency level.

3.10.2 Caribou as an exchangeable good

Antlers Sales: In 1990 the PCMB was informed by the Yukon's Minister of Renewable Resources that a Canadian Porcupine Caribou user community had signed

a contract with an Alaskan-based firm to buy caribou antlers, with their value being an aphrodisiac in the Asian market. The message to the Minster of Renewable Resources originated from a non-native health care worker living in the community who expressed concern about wastage and possible extinction of the resource. The PCMB, in consultation with community members, resolved to prohibit futures antler sales and support for the prohibition on antler sales was supported by enforcement even though it is legal, by the terms of the PCMA for natives to sell them.

Native Trade and Barter Policy: The PCMB spent several years facilitating a discussion among user communities to establish a set of barter and trade guidelines which would set conditions under which individuals and communities as a whole can exchange meat for services or goods. Recommendation were achieved in 1990.

Free Passage: The transportation of fresh meat and other caribou by-products was occasionally problematic for natives users travelling across US/Canada borders. The issue was raised at IPCB and PCMB meetings. No formal action was taken, although the Yukon Director of Wildlife contacted Alaskan customs officials and established an informal arrangement which resolved problems for most natives traveling to the US with caribou meat.

3.10.3 Enforcement and Hunting Practices

Native and non-native Dempster Highway hunting and wastage issues: Establishing coherent Dempster Highway regulations was one of the initial problems faced by the PCMB, with the "problem" stemming from agency and non-local concerns of displacement of animals from winter habitat, wastage, highway littering (leaving gut piles near the highway were they are visible), and safety (shooting caribou and leaving gut piles on the highway which later become frozen and a hazard to highway driving). The conflict also stemmed from non-native and native hunters, for whom there are

different rules regarding caribou access (i.e. non-native hunting regulations require that all hunts occur at least one kilometer from the highway while natives can exercise aboriginal rights and hunt directly off the road.) After considerable community consultation, a set of recommendations was formulated by the PCMB and forwarded to the Ministers of Renewable Resources in Northwest Territories and Yukon. The recommendations included a call for native hunters to comply voluntarily with a no-hunting corridor. Yukon Government supported the recommendations. Northwest Territories' Minister of Renewable Resources never responded to the PCMB recommendations. Native people of Fort McPherson continued to hunt from the highway and for the most part did not comply with the one-kilometer corridor recommendation.

Hunting bulls in the rut: Community members expressed concern to the PCMB regarding guide outfitter and non-native hunters shooting bulls during the rut. They suggested a closure on October bull hunting to limit perceived wastage since the taste of caribou in that season is considered "stinky" to the locals unpalatable. Outfitters typically operate much of their guided hunting at that time. The concern for hunting bulls in the rut was reframed by government members who undertook a full review of regulations on hunting seasons. No resolution to the community concern was achieved.

Hunter education: Hunting education of adults and youth are on-going topics. The PCMB addressed these broad problems areas with information programs, support of local efforts, as well as a scholarship program which is intended to teach the skills of science to a youth intern who works directly with agency biologists.

Offensive enforcement methods by agency officers: Community board members complain that Yukon government Conservation Officers are unduly harassing native

hunters while on the Dempster and not being respectful of aboriginal rights. The issue has a long history of conflict.

3.10.4 Herd Health and Conservation

Cesium in caribou: The Chernobyl incident prompted researchers to explore the levels of cesium in caribou and reporting of results sparked local concern and misunderstandings. This is not a new problem area, as post-W.W.II testing resulted in some studies and findings of elevated levels of radio nuclides in caribou. In this case, at the PCMB's insistence, medical test were conducted on a sample of local users to evaluate problems and demonstrate that local level concerns were being address with PCMB-level action.

Cadmium in caribou: Reports from the analysis of caribou tissue found that levels of cadmium in caribou livers and kidneys exceeded world health standards. Results were documented in a prospective journal article which was leaked to the press. Local leaders responded by charging government and alarming locals. Local-level testing of humans resulted in several problems; specimens freezing while in transport and a local unwillingness to participate in testing reduced the initial sample size. Government health officials initially posted an advisory stating that locals limit their consumption of livers and kidneys from older animal levels. The PCMB immediately became more centrally involved to reassess risk and develop better methods of risk communication. Confusing locals further and confirming some hunters' suspicions of the incident being a government conspiracy, the PCMB later released a bulletin stating that "All health authorities agree that there is no danger in eating Porcupine caribou livers and kidneys."

Muskoxen-caribou competition: Based on their Banks Island experience, Inuvialuit of Aklavik asserted that increasing muskoxen populations within the range of the PCH

and dispersal of animal to new range are detrimental to caribou, changing caribou's migration patterns and potentially affecting herd numbers. Calls are made to the PCMB for action.

Too many caribou: Total number of animals are calculated every two to three years. Findings indicated an increase in numbers which concerned some biologists and locals. Biologist explored the possibilities of opening the season to more southern-based Yukon hunters. Natives rejected the idea and no action was taken.

3.11 The Three Study Communities; Old Crow, Fort McPherson, Aklavik

Three Canadian Porcupine Caribou user communities serve as the basis of analysis for this study. These communities are Old Crow of Yukon Territory, and Aklavik and Fort McPherson of Northwest Territories. All of these three communities share common characteristics. As well, each is unique, with its own history, ecological orientation to caribou's annual cycle, political relationship with government, and sense of community identity. These differences and how they affect participation in the co-management arrangement and power sharing in generally are not explored in this study. Instead, I look more generally at the similarities all three communities of Canadian Porcupine Caribou user communities and their involvement in co-management of the herd, and point up differences when they seem to be of particular relevance to the analysis.

When considering the characteristics of the three study communities as an aspect of the context for co-management, it is critical to keep in mind that these communities of people are traditionally *not* "villagers," per se. That is, as social collectives, locals have limited experience as year-round dwellers of specific locales (Acheson 1977), and their sense of common identity is tied to a region larger than a village site. Prior to the

turn of the century and the establishment of trading posts, communities traveled seasonally through territories that were defined by soft borders and at times defended from neighbor populations. Gathering places, like *Klo Khut* on the Porcupine River, were sites where family groups would aggregate, trade goods, discuss the success of hunting and the condition of animals, and share in social life. Moreover, it is important to remember the radical change in social structure and subsistence patterns that occurred as a result of changing populations. Krech (1978) estimates a decrease of 80% of the Gwich'in by the turn of the century because of various epidemics.

After the closing of the Rampart House trading post in 1912 and problems surrounding smallpox (Beairsto and College 1993) at that post, Vuntut Gwich'in, dispersed to trapping areas to the east and later, after the establishment of another trading post and store near the fishing camp of John Crow (current site of Old Crow village), the Vuntut Gwich'in began using the site as a village location. The Tetl'it Gwich'in developed a similar movement pattern much earlier around the Fort McPherson, which was one of the original trading posts of the HBC and part of a string of posts that extended from Fort Yukon across the Richardson Mountains to the Mackenzie, and south. With the establishment of permanent trading posts in the Mackenzie Delta region and at Herschel Island, Gwich'in groups of the Peel River area forfeited their former role as middle merchants in the region's trading regime. During the gold rush much of the community relocated to Moosehide (just down river from Dawson and the traditional village of the Han Gwich'in) to profit as hunters supplying the Dawson City boomers with wild meats. In the 1920's Tetl'it Gwich'in families returned to Fort McPherson. Concurrently, Gwich'in of several groups along with Inuvialuit (which by the 1920's included a majority of IÒupiat from Alaska who had migrated in to the region as a result of dramatic increases in caribou of the Western Arctic Herd) came to reside seasonally at Aklavik. Aklavik, first a traditional hunting area for local hunters and later established as a trading post in 1912. Later it went on

to become the Canadian Government's center of the Western Canadian Arctic. In the mid 1950's, an Ottawa-based decision was made to "relocate" the government center and much of its population to what is now known as Inuvik, in part, because of potential flooding at the town site and also in anticipation of the coming oil boom (Wonders and Brown 1984). Tied to the region and its access to Porcupine Caribou, many of Aklavik's original families elected to remain in Aklavik, and today as a symbol of this relationship with the region and the town site, have adopted the town motto, "Never say die."

Until government education policies required formal education for native Canadian youth and constructed schools in these communities, families continued their seasonal subsistence patterns of fishing (summer), caribou hunting (fall, winter, and some spring hunting), and trapping (early winter, winter, and spring). While seasonal movements are radically different from what they were before 1950, there are still seasonal patterns of on the land occupation. Aklavik Inuvialuit make use of a traditional whaling camp located at Shingle Point where more than a hundred people commonly gathering in the summer months to share in the harvest of bowhead and beluga. As well, members of other communities maintain (and some reside in) bush camps for extended periods. Finally, members of all three communities describe their future aspirations to returning to the land, a prospect of future change that is yet unknown.

Today, all three villages are geographically located on river systems, with Old Crow situated at the confluence of the Porcupine and Crow Rivers, Fort McPherson or "Tetl'it Zheh" (high grassy place) on the Peel River and up stream from the confluence of the Peel and Mackenzie Rivers, and Aklavik located on the West Channel of the Mackenzie Delta approximately 50 miles from the Beaufort Sea. Of these three, only Fort McPherson has year-round road access. It is located on the Dempster Highway which links the Klondike Highway to Inuvik. The highway's construction was initiated in

1959 as part of Canada's "Roads to Resources" or northern development program. It was not completed until 1979. Old Crow and Aklavik have no year-round access, although during the winter months an ice road is plowed from Inuvik west through the delta to Aklavik. Aklavik and Old Crow are regularly served by airlines and in all communities, river travel and over-land winter travel is made via snowmobile.

The village of Old Crow, like Fort McPherson, is populated with Gwich'in and Metis (mixed blood people). Aklavik is the most heterogeneous of the three with Inuvilauit, Gwich'in, and Metis residing. While these social and cultural groups continue to be important, the rights of hunters to access caribou and participate in the co-management process are based on individuals' land claims affiliations. Today Old Crow's population is the center for and mostly populated with beneficiaries of the Vuntut First Nation. Most of Fort McPherson's population are beneficiaries of the Gwich'in First Nation of NWT. Aklavik as a village is by far most heterogeneous culturally and complex politically of the three (see Table 3.6). 54% of its population are Inuvialuit, 30% are Gwich'in, and 10% Metis and 6% non-native. Of all three communities non-native people represent less that 7% of their total populations. Aklavik's population includes two claims groups, Inuvialuit beneficiaries and beneficiaries of the Gwich'in of NWT (part of the same claimant group as McPherson), with most Metis people of Aklavik being beneficiaries of the Gwich'in claim. These overlapping frames for understanding sociological features of community and formal institutional structures for the governance of natural resources create a challenge in analyzing community involvement in co-management.

Differences in community associations with land claims settlements are reflected in differing local organizations for involvement (Table 3.6). While Old Crow had a smaller and more centralized system and a loose affiliation with the Whitehorse-based Council of Yukon Indians (later renamed Yukon First Nation), the other two communities

functioned with designated local organizations as well as regional parent organizations which are charged with addressing matters of resource management. In Old Crow, matters relating to PCH management are handled largely by the Chief and Council, (although its land claims office offers some support in their work). McPherson and Aklavik each have separate, locally elected bodies, and in some cases a full or part time staff person to address the range of renewable resource issues. However, none can be considered to be endowed with an extensive infrastructure nor well supplied with individuals (local and non local) who are formally trained or educated to undertake the administrative task demanded of these organizations (e.g., computer skills, writing, finance). As well, in all cases, high turnover of resource workers is common. Consequently there is an internal tension in all three communities; a desire to assume responsibility for management tasks and a need to hire outsiders to do the work. This tension as manifested in the co-management process is explored in the dissertation. Finally, all three communities have similar age structures as well as a burgeoning population of youth. (See Appendix 11.4 for profile of the three communities' demographics and education levels). In all three communities, English is the spoken language among the majority of the population and the language in which most meetings are held and conducted.

Table 3.6 Comparisons of the Study Communities

	Old Crow	*Fort McPherson*	*Aklavik*
population	281	759	801
Ethnic heterogeneity	Low - mostly Vuntut Gwitchin ("people of the lakes")	Moderate- Tetl'it Gwich'in ("people along the Peel River")	High - Inuvialuit and Ehdiitat Gwich'in ("timber people")
Political status; Land Claims status	No settled land claim agreement; Vuntut Gwitchin and Yukon Metis people negotiated land claim formerly through Council of Yukon Indians. Vuntut Gwitchin claim in final stages during negotiation during research period.	Land claim formerly negotiated with Dene Association and Metis of Northwest Territory. Subsequently settled as Gwich'in of Northwest Territories April 22, 1992.	Two land claims: Inuvilauit Final Agreement settled in 1984 and Gwich'in of NWT in 1993; Gwich'in formerly negotiated with Dene Association and Metis of Northwest Territory. Subsequently settled as Gwich'in of Northwest Territories.
Local organization linking community with co-management system	Vuntut Gwitchin First Nation Chief and Council	Formerly through Hunters and Trappers Association; in post-land claim setting through local Renewable Resource Council..	Local Inuvialuit through Hunters and Trappers Committee (HTC) and local Gwich'in through Renewable Resource Council (RRC) .
Regional organization linking user community to caribou co-management arrangement and land claims	Council of Yukon Indians	Gwich'in Renewable Resource Board (before land claim linked through the Dene Conservation Association – prior to 1990).	Inuvialuit Game Council (IGC) and Gwich'in Renewable Resource Board (RRB) (regional organization contact of Gwich'in was the Dene Conservation Association prior to 1990)
Access to community	Air, boat, or skidoo and dog sled access only	Situated on Dempster Highway	River access in ice-free months and ice-road access after freeze-up.
Contemporary community hunting of caribou in ice free months	Boat access at caribou river crossings with some ATV on-land hunting near community	Primarily road access hunting with occasional river hunting in Peel River tributaries	West Channel of Mackenzie River and coastal area hunting, with occasional use of small skidoo tundra access.
Contemporary community hunting of caribou after freeze up	Skidoo access, boat, foot, dog sled travel.	Highway hunting and skidoo access.	Skidoo access, river access, dog sled travel, with occasional access of caribou via Dempster Highway.

3.11.1 Communities' Use of and Consumption and Need for Caribou

Old Crow, Fort McPherson, and Aklavik are the primary Canadian user communities of Porcupine Caribou, with their annual take of PCH animals totaling, on average, more than the total harvest of all other 13 PCH user communities combined (see Figure 3.9). While historically caribou served communities as a food source, tools for all aspects of life, materials for clothing, and even implements used in medical surgery (Slobodin 1962), locals' current use of the resource is primarily as a wild food stuff, and as material for artistically-sold native wear (e.g., hand sewn and beaded slippers), and as a "blanket" or sleeping pad when camping. If assuming these three communities had a combined harvest of 2000 animals, annual production would be approximately 150,000 lb. of meat.![27]

The dietary research of Wein (1994a; 1994b) and Wein and Freeman (1992) allows a comparison of caribou consumption in two of the Porcupine caribou study communities. Interview data show that caribou is the most frequently consumed wild food in Old Crow and Aklavik, with Old Crow households (n=31) serving caribou on average 241 times per year and Inuvialuit households in Aklavik (n=36) serving caribou 145 times annually (see Figure 3.14). It is also interesting to note that while Inuvialuit people of Aklavik have a long history as sea mammal hunting people (Usher ; McGhee 1988; Freeman, Wein et al. 1992), various forms of caribou are most preferred as a source of wild food (see Table 3.7). Interview data collected in my research show that those interviewed reported that 59.16% (std. ±23.56%) of the annual meat consumed by individuals is caribou, with annual household caribou *needs* reported to be 8.71 (std. ±7.25) caribou (see Table 3.8). Using these figures as a basis, and only considering the adult population (those over 16), per capita *needs* are 3.8 caribou annually.

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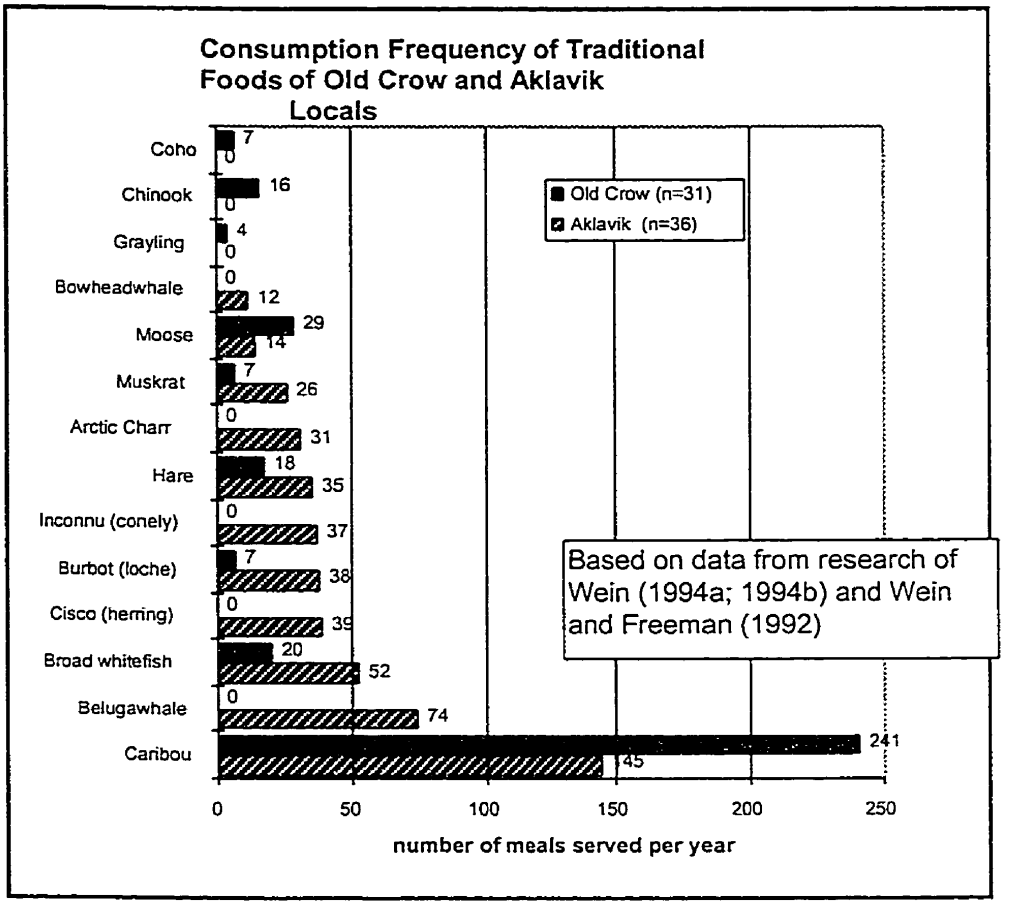
[27] Estimate is based on 75 lb. per caribou. For an evaluation of the economic value of caribou to Old Crow and a discussion of problems associated with the economic notion of replacement cost, see Murphy (1986).

Figures 3.17, 3.18 and 3.19 are based on reported harvest data (and are not extrapolated to the total population of the community hunters). Figure 3-15 compares harvest data as reported by various community harvest programs to estimate per-capita take.[28] Moreover, these data signatures reflect each community's orientation to the herd's ecological rhythms as related to the animals' seasonal movements and distributions.

Aside for the nutritional implications of communities' relationship with caribou, there are other cultural differences which are explored later in the dissertation.

Figure 3.14 Consumption Frequency of traditional foods in Old Crow and Fort McPherson, adapted from Wein and Freeman Traditional Food Use Studies



[28] These figures are based on actual totals per community reported and are not extrapolated to account for non-reporting. While it is acknowledged as less than accurate, it does provide a rough measure of comparison between communities.

Figure 3.15 Per Capita take by Community based on Reported Harvest Totals

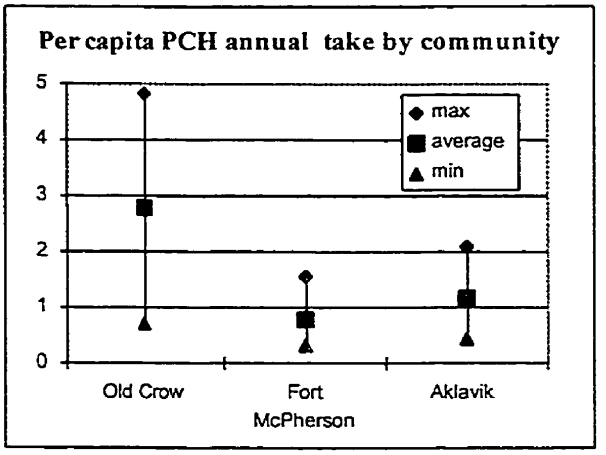


Table 3.7 Aklavik Wild food preferences

Aklavik Inuvialuit food preference rating in descending order by adults (n=36); 5 is highest preference (Wein and Freeman 1992)

caribou	5
bannock	4.9
caribou tongue	4.9
arctic char	4.9
beluga muktuk	4.9
caribou dry meat	4.8
smoked muskrat	4.8
muskrat dry meat	4.6
beluga dry meat	4.6
hare	4.5
fish eggs	4.3
cranberries	4.3
blueberries	4.3
whitefish	4.3
burbot (loche) liver	4.2
bowhead muktuk	4.2
lake trout	4.2

Table 3.8 Household (HH) needs of caribou, Household composition, and percentage of meat consumption that is caribou as reported by interviewed locals.

Field data	HH caribou needs for one-year period: number of caribou	Number of adults in HH	Number of children in HH	Percentage of meat eaten by individual respondents that is caribou
average	8.71	2.30	2.19	59.16%
std	±7.25	±1.37	±2.42	±23.56
n= sample	90	136	114	90

Figure 3.16 Old Crow Seasonal and Annual Rhythms Of Caribou Hunting

(Based on data from Stager 1974; Murphy 1986; Urquhart 1989a; Quock March, 1987; Ward October 1989; Ward October, 1989).

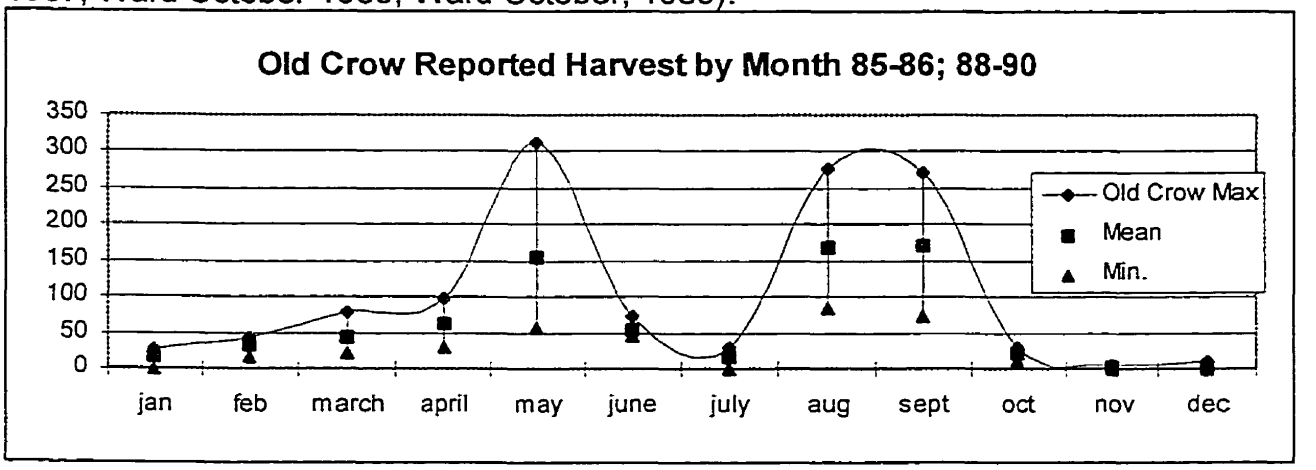


Figure 3.17 Aklavik Seasonal and Annual Rhythms Of Caribou Hunting

(Based on data from Fabijan 1991; 1988)

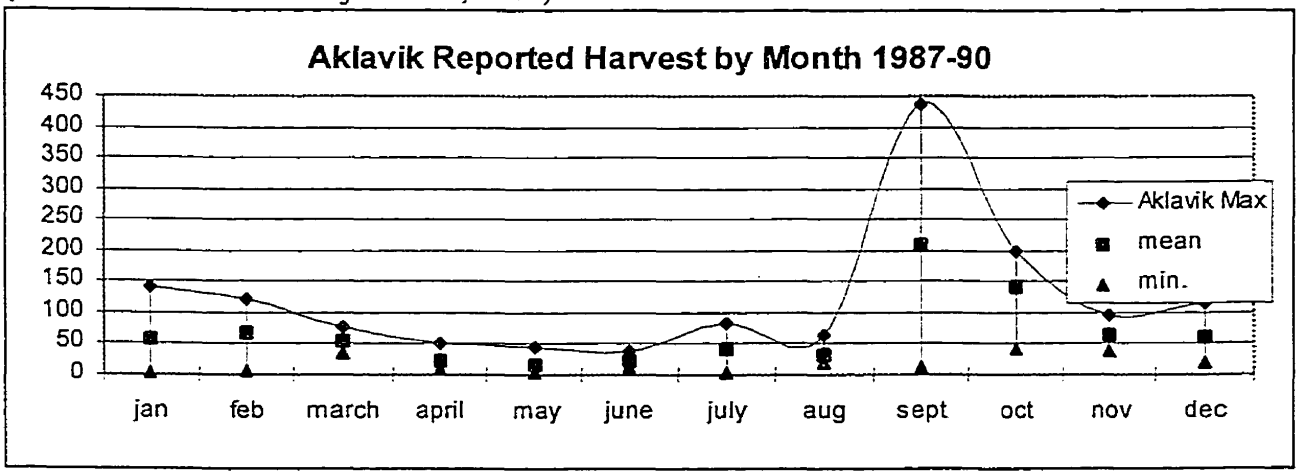
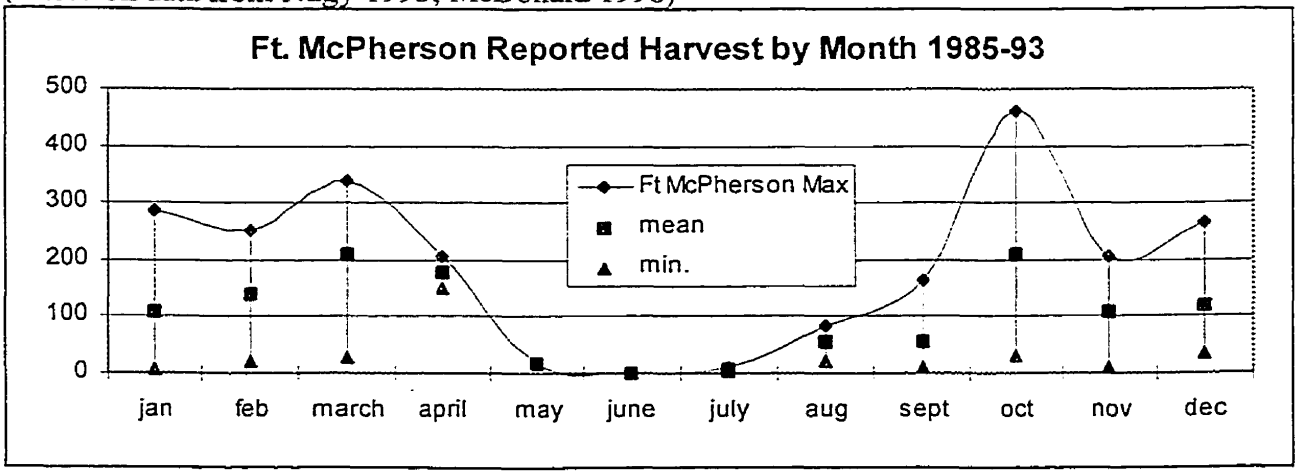


Figure 3.18 Fort McPherson Seasonal And Annual Rhythms Of Caribou Hunting

(Based on data from Nagy 1993; McDonald 1998)



3.12 Conclusion

In this chapter I have presented an overview of the context of Porcupine Caribou co-management by describing the Porcupine Caribou resource, discussing some of the issues which have been central in the management of that herd and resource ecology debates of caribou management. I have also situated Canadian co-management of Porcupine caribou in the international context by presenting a review of Porcupine Caribou management agreements at the Canadian and international levels. I have also highlighted some of the differences in Canadian and US approaches to involving native caribou users. Finally, I presented a general description of the three caribou user communities which serve as the basis of this study, with a special focus on their consumption of caribou. In the chapter that follows I focus on local systems of management and examine local-level institutions that government the relationship between caribou and hunters and community and its people.

4. MANAGEMENT RELATIONS: COMMUNITY AND CARIBOU [1]

Back then we were like animals... Still are today.

We only take what we need.

The more you share, the more you get.

Caribou is our symbol, it runs in my blood.

Caribou are like people.

You can't manage caribou.

Quotes from six different hunters

4.1 Introduction

The relationship of caribou and community is one of great significance to those communities which hunt, use, and share *Tsyo Denjik Vutzui* (Porcupine Caribou). It is the relationship with this wildlife resource, perhaps more than any other, that is responsible for the enduring success of human survival of communities of the region. It is the relationship of community and caribou that bridges the experience of the community elder with that of the modern-day village dweller, and it is caribou that transcends virtually all aspects of today's community life. As I show in this chapter, it is also the hunting, using, and sharing of caribou, and relations with all animals and the land in general, that has and continues to define the ethos of local culture and community caribou management.

The purpose of this chapter is to provide an account of Canadian PCH user communities' relationship with caribou and situate the concept of "local culture" and "caribou management," in a manner which informs the study of community costs of involvement in co-management. I undertake this objective by presenting elements of

[1] The use of Gwich'in the dialect of Tugugh in this chapter is undertaken with the appreciated support of Mr. Roy Moses, a Vuntut Gwitchin lingual scholar of Old Crow. While native languages are today spoken less commonly than English in Canadian PCH user communities, the use of Tugugh illustrates indigenous constructs which underpin local management.

community-caribou relationships, focusing on the longevity of community's systems of caribou management, the intimacy of that relationship, and the related institutions which govern human action at the community level. As well, I pay special attention to the explicit and implicit assumptions of community caribou management; and address the related topic of ecological rationality and how it is constructed in the caribou management systems of Old Crow, Fort McPherson, and Aklavik. In short, this chapter presents what I understand to be the internal logic of these communities' institutions for the management of community-caribou relations.

The study of local caribou management systems is presented here by reflecting on stories community elders shared with me in this research, drawing on my own field experiences, the ethnographic record of anthropology, oral historical records, and various theoretical conceptions of how such systems function. Quantitative findings from semi-structured interviews are used to describe current-day conditions. I begin by referring to elders' stories (see Appendix 11.5 for transcripts of those stories) and the underlying ideology of caribou -community relations that are reflected in them. These are used both to look at the assumptions of local systems, but also to frame the analysis of current-day practices. Finally, I examine community's local knowledge of caribou and the frames used by hunters of Porcupine caribou to learn about the animal.

One of the central points of this chapter is that the debate regarding northern native people's conservation of natural resources is confused and culturally biased, and differs little from the false dichotomies and the red herrings of the common property debate in which the native hunter is portrayed as either the ruthless devil or the conserving angel (Wiener 1991). More appropriate is an institutional perspective which incorporates an historical context of local institutions and accounts for the enduring resilience of rule systems derived in different settings.

While all three of the user communities of this study share much in common with respect to wildlife management systems, and material about all three communities

is used in the discussion, much of the information presented here is based on the cultural orientation of the Gwich'in. To facilitate this analysis, some points of comparison between communities are provided, as well as comparisons with non-aboriginal cultural perspectives of management.

Finally, there is little doubt that learning how community knows caribou is exceedingly difficult. Exacerbating the difficulties are recent changes of local cultural systems. More writing on this topic is needed to help wildlife managers and the policy community understand better the historical roots and present-day circumstances of caribou co-management.

4.2 Perspectives on "Local Management Systems"

What is meant by the term "management system?"

In 1970 Usher explored the concept of "resource systems" by acknowledging the multidimensional characteristics and the sometimes inconsistent paradigms of economics, ecology, and sociology/anthropology used to assess them. Attempting to apply a framework which encompasses all three of these paradigms, he went on to complete a study of Banks Island, the historical conditions of resource exploitation in the region, and the community of Sachs Harbor. Some years later, Usher (1986; 1987) further advanced a framework for studying resource systems by defining systems of wildlife management (applicable both to state and local systems) as consisting of at least the following set of elements:

- an information base and paradigm or set of mental constructs that organizes and interprets information into useful knowledge;
- a set of practitioners with a distinctive worldview or culture that includes both this paradigm and certain normative values;
- a system of rules, norms, and customs concerning rights and responsibilities that are intended to govern the behavior of all who partake of wildlife and its benefits;
- an overall set of objectives which are embedded in the situations and

ideology of the society as a whole.

Following from this definition, he articulated the distinction of "indigenous" and "state systems of management." Describing northern wildlife management problems, he pointed to the interface of the two systems described as idealized typologies: 1) a "state system" which is hierarchically organized, has a distinct separation between harvesters and managers, and functions with policies designed for sport hunters; and 2) an "indigenous system" which is kinship-based, dependent on sharing of information and wild resources, which does not view wildlife as a commodity for trade. Government agency bureaucracies that emphasize formal procedures, he noted, contrast with the more substantive or collective forms of decision-making and the personal facets of indigenous communities, the disparity between the two leading to a problem Osherenko (1988a; 1988b; 1988c) calls "dualism." In this study I follow Usher's definition of resource systems to explore community management systems as subsumed within a co-management arrangement, and to ground those at the local level with empirical evidence.

What then are the characteristics of local resources systems of management and how do these elements of management systems occur at the local level in the small communities of the North?

It may be appropriate to first respond to this question by noting that northern indigenous approaches to wildlife management are centered on issues of membership, and thus as well on the roles of individuals and the collective identity of each community. (Here I use the terms "local culture" and "local systems" of caribou management interchangeably.) "Practitioners," as they occur at the community level, include community members of all ages, and, as is demonstrated in this chapter, caribou as well. The "objectives" of local systems of management are not simply articulated, although their historical roots, as well as their contemporary aims, are clearly centered on survival – both in meeting nutritional needs of people and maintaining individual and collective

needs (Nuttall 1992).

In local resource management systems, rules, norms, conventions take at least three forms. One includes those rules which are formally stated as written or *de jure* rules. Until recently, this form has had little to no presence in northern local systems, but with the settlement of land claims and the evolution of self government, *de jure* rules are becoming more prominent. The second are those that are *de facto* in standing, also called customary law (Caulfield 1983; Usher and Banks 1986). This class of rules was illustrated in Chapter Two (Table 2.2) in the discussion about organization and institutions. A third class of rules is the unspoken assumptions which underpin, and to a significant extent, govern much of a local system's thinking (Douglas 1986; Evernden 1993). This last set of rules corresponds with the concept of paradigm of a resource system, as is reflected in language, ideology or mental models. Writing about unspoken assumptions in the context of environmental "issues," Evernden (1993) forces his readers to consider specifically the last set of rules,

> [W]e are so overwhelmed by [issues]...that we seldom look deeper. But issues. . . are analogous to the tips of icebergs: They are simply the visible portions of a much larger entity, most of which lies beneath the surface, beyond our daily inspection. The submerged mass constitutes the fundamental "Problem," that domain of unspoken assumptions which legitimates, indeed even demands, the behavior which precipitates the state of affairs we designate as "the environmental crisis. (page xi.)...

What are the theoretical approaches to understanding hunting systems of resource management?

Cultural ecologists, economic anthropologists, and students of the anthropology of property have long explored the many dimensions of local systems by focusing on modes of subsistence as their central component (Lee and DeVore 1968; Netting 1977; Moran 1979). As is commonly stated, for the greatest proportion of human history,

people have made their living as hunters, fishers, and gatherers.[2] Those following Marxian and related frameworks note the commonalties of egalitarian social organization, consequently oriented political structure, sacred views of natural phenomena, and ecological adaptability of hunting societies which are patterned somewhat consistently in case studies of a range of environmental conditions (Lee and DeVore 1968; Cashdan 1989). Given the uniqueness of hunting as a mode of production, an economic perspective for understanding the relationship of hunting communities and caribou users has special relevance in the study of local cultural systems of wildlife management.

Following from an economic perspective, and addressing the term "subsistence economies" in the context of Alaska's socio-political issues, Lonner (Lonner 1986) describes the non-monetary functions of the socio-cultural systems of subsistence as being for *use* as well as *exchange,* and thus providing material and psychological security and self-sufficiency in the face of on-going uncertainty. In this sense, survival is not focused exclusively on the acquisition of goods, but in the transactions which bind participants through social networks of relations (Mauss 1967; Sahlins 1972).

A focus on economic transactions, while a central feature of the socio-cultural core of any system (Steward 1955), should not overshadow an examination of ideology, and more specifically, cultural perspectives on the workings of and humans' role in the environment. Polanyi, a devoted economic anthropologist who focused on institutions, argued the need to look at the full range of institutions of a society and to include those of the religion as well other broader ideological aspects in the study of culture systems (Polanyi 1944, Polanyi, Arensberg, *et. al.* 1957, Godelier 1986). Widening the frame, Langdon (1986) shows how subsistence activities of the northern native community are intimately tied to social, psychological, and religious aspects of life at the individual and

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[2] I use the term "hunters" here to refer to all community members where community is engaged in hunting as part of the economy.

the community level. As explored in this chapter, it is this intimacy and indivisibility of elements in local culture that are critical in understanding local caribou management systems.

4.2.1 The question of northern hunters' ecological rationality

Do hunters of community consciously manage living resources? The question of the conservation practices of northern hunters has been a topic of debate (Martin 1978; Krech III 1981), and as I contend, much confusion. Clearly, evidence shows that communities of hunters have held a relationship with Porcupine Caribou for time immemorial. A question frequently posed, however, is to what extent are these communities' cultural systems responsible for the on-going viability of living resources? This question is related to community costs of co-management involvement in that it challenges the overt and underlying assumptions that traditional systems of resource management have consciously sustained wildlife resources. Thus, a sub question of this chapter with direct relevance to presenting an account of local systems concerns the "ecological rationality" of northern wildlife management systems.

As already pointed out, cultural systems of native hunters, as perceived by some wildlife managers, have been described as "inadequate" and attributed to past resource degradation of caribou (Kelsall 1968). Others challenge this assertion, pointing to problems of scientific uncertainty (Freeman 1989) and how the "ecological knowledge" of northern peoples has and can contribute to the conservation success of sustaining living resources (Freeman and Carbyn 1988; Corsiglia and Snively 1997).

This chapter addresses one aspect of this debate by looking at the patterns of logic of local systems of resource management, raising a fundamental question. Are northern hunting communities with their traditional institutions to be viewed as consciously rational in their long-range strategies for conserving wildlife resources, or are they, as Burch (1995) argues, "arational" in that both ends and the means are at least, in part, non empirical ? Said another way, to what extent can the empirical

dimensions of sustaining living resources (e.g., awareness of population and resources as finite) be tied to the unconscious and, as commonly regarded, mystical or religious beliefs of northern wildlife resource systems?

One of the arguments used to assert the conservation-oriented institutions of long-standing local systems of management is Slobodkin's (1968) concept of "the prudent predator" in which strategies of predatory behavior, common among predator species, insure the successful regeneration of prey. As is illustrated in examples from animal ecology, survival of a predator species is dependent upon relations with prey that avoid irrevocably deleterious exploitation. Applying this concept to the field of human ecology and game theory, Berkes (1989) contends that patterns of reciprocity motivated by long-term human-nature relations can evolve into systems of cooperative actions and enduring benefits (Axelrod 1984). In this respect, aspects of local culture commonly attributed to hunting societies (e.g., collective resource production, reciprocity in economic exchange, adaptability to varying conditions, and consensus process), are framed as highly-evolved strategies of success in sustaining the exploitation of living resources.[3]

Challenging Slobodkin's notions of the "prudent predator," Burch (1995) follows Ingold (1980; 1996) in his view of the northern hunter as holding a short-term perspective on resource needs, thus being immediately responsive to opportunities rather than being mindfully aware of and planning for ecological outcomes. Exploring religion and the rationality of the northern hunter, Burch (1995: 166) asks, "... is a 'conservation effect' the result of a rational harvest strategy or simply the fortuitous outcome of some other strategy?"

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[3] From an earlier era, cultural anthropologist Rappaport's (1968; 1971) work makes a greater leap, freely applying the concept of homeostasis from ecological theory to demonstrate the self-regulating functions of religious ritual in small-scale societies of primitive technologies. Moran (1979: 57) points out that Rappaport's use of the term homeostasis is equivalent to equilibrium – "A shared view by some biological ecologists and reminiscent of the Greco-Roman search for order in nature."

For Burch, northern community wildlife management systems with their mystical views of the natural order, egalitarian forms of social organization, acephalous leadership, and economic systems of sharing are a happenstance; consequences of cultural and environmental conditions which coincidentally functioned with restricted technological potential, thus resulting in sub-maximum levels of exploitation. Johnson (1989), writing about other hunters, calls the condition an "historic accident." Berkes, Feit, and others, on the other hand, point to cases in which aspects of northern peoples contribute directly and consciously to and maintain an ecologically rational system of conservation.

From my estimation, this question of northerners' conservation is confused and culturally biased by setting up a problem of false dichotomies, or as Weiner (1995).puts it, the tendency to frame hunting people either as native angels or ruthless predators. Two assumptions are important to expose in order to address this problem. The first is to appreciate that the human actor is both economically driven while at the same time culturally embedded and negotiating relationships, making discoveries, and managing issues of group membership within an institutional environment. Secondly, it should be assumed that the conditions that lead to an on-going availability of living resources are situational; there is no single formula for success. Said another way, the argument proposed by the empiricists (i.e. Burch, Ingold, etc.) is problematic in its suggestion of a universal theory of rationality; it imposes its own construction of rationality and its underlying paradigm on the cultural systems of those whose world view differs from that of the analysts. It may be said that Berkes, applying the framework of game theory, repeats the same mistake to some extent. The science of ecology, centered wholly on the empirical and based on the rules of western science (i.e. generally deductive in its approach, centered on quantitative measures, and based on falsification of null hypotheses), while noted as being consistent in its findings with native way of knowing natural resources, differs in its approach (Feit 1988; Evernden 1993).

4.2.2 How, then is it best to conceptualize local systems of management?

How then does the student of co-management best conceptualize local systems of resource management in a manner that captures the cultural perspective of local community as well as its understandings of power and power sharing? Ridington (1990:100) writes that anthropological theory may, and in some cases should, reflect the "thought world" of the people we study as well as those of academic traditions. Studying the Wassanabi Cree of Quebec and extending the analysis of a northern aboriginal peoples from the economic analysis of subsistence to issues of ideology and identity, Feit (1986) follows a similar approach by framing indigenous management systems of the Cree by drawing on hunting as metaphor for life, thus using it as a model which helps in understanding not only the culturally defined institutions for hunting, but also the cultural systems of the hunters themselves.

Hunting, Feit states, is a process by which the hunter looks for animals, and when the hunt is a success, the hunter's anticipation is fulfilled. That anticipation, he asserts, plays a role in Cree thinking, its perspectives on resources, resource control, and views on uncertainty in general. The quest for power as it is achieved in the hunt is both a collective and individual endeavor of northern life and can therefore be expressed as an analog to the life of a hunter and community (Feit 1986). In this way, understanding the relations of the hunter and animal helps both to explain the resource management systems of the hunter and community relations. Understanding notions on power as related to the hunt also allows one to contrast its construction with different perspectives.

Using analogy as a method of inquiry which centers on patterns of social and ecological relations following from the anticipation of the hunt, I examine the relations of community and caribou as a means of explaining local systems of caribou management. As is discovered below, the "pervasive animism" (Ridington 1990) of the northern hunters' caribou management system offers a framework which is both grounded with empirical evidence and, to some extent, self-referential and thus consistent with the

perspectives of Porcupine Caribou user communities themselves.

In the discussion above, I examined theoretical issues related to how best to conceptualize the logic of community-caribou relations and the notion of resource management at the local level. In the material below, I present aspects of community "management" of Porcupine Caribou user communities. This section provides a basis for understanding the dimensions and significance of community costs to involvement in co-management. The image presented here, as well as community transaction costs, is further elaborated when examining the interface of community and state systems.

4.3 An Account of Local Systems of Porcupine Caribou Management

When native people talk about hunting animals, it is not uncommon to hear the adage, "Take what you need, use all that you take." Indeed, indigenous systems of resource management can and in some respects should be considered a type of "needs based management." But the emphasis on needs and the norms of behavior associated with its approach are only tips of the cultural iceberg that Evernden has discussed. With deeper inspection one discovers the subtle, but important differences between the European view of the harvesting and knowing of "game" and the northern traditional hunters' perspective on the taking of a gift.

4.3.1 Oral traditions: Foundation of PCH community management systems

Knowledge held in a wildlife management system is time and space dependent; it is the product of experience as perceived in a culturally defined process. Legitimacy and truth are also linked to knowledge (Rushforth 1992), and in some respects are reflected in the institutions or "rules of the game" that they prescribe through their own internal selection processes (Douglas 1986).

In Porcupine Caribou user communities, the institution of the narrative traditionally, and still today, is a foundation in processing, storing, transmitting, and

discovering the knowledge of northern Native cultures (Cruikshank 1990).[4] Through stories, the mystical is presented in the sacred narrative and is shared both in the ceremonial sweat lodge and from the pulpit. Travel through one's homelands is described in the tale of one's journey. Local geography is retained as mental maps of events taking place across a familiar landscape. The epics of a community's history are sketched with key events of outstanding heroes, their epochs, and elders' life histories. From stories of a family's elder, a youth traditionally learns the lessons of a past life.[5]

Writing specifically about the oral tradition of northern people, Cruikshank (1990) investigates the role of narrative in the culture of northern peoples and the extent to which interpretation of stories is reliant upon the listener's experience, as well as potential contributions and limitations of these human artifacts to other disciplines.

> Oral tradition does not provide us with a series of data which stand by themselves. It is more like a prism which becomes richer as our ability improves to view it from a variety of angles. The question is not whether a particular tradition reflects the way a particular individual views the world, but whether it broadens the worldview of the listener. (Cruikshank 1981: 86).

Narratives are descriptive rather than quantitatively oriented, dynamic in their construction as told and retold in time. Stories are open to interpretation by individuals and the community as a whole. Truth, as established in stories, cannot be objectively measured, but rather reflects an impression of things as they are seen and shared by the teller. As well, rules govern their transmission. As locals of Old Crow, Fort McPherson and Aklavik told me, it is inappropriate or "against the rules" to interrupt those who are sharing their story.

In this way, oral traditions pattern a process by which knowledge of a northern wildlife management system is tested with direct experience, revised with new

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[4] The use of oral traditions in the social sciences has been used with various methods of analysis. For discussion see Finnegan (Finnegan 1992).

[5] For examples of Gwich'in oral history used in this manner see Slobodin (1975), Frank (1995), Ritter (1970).

discoveries, roughly systematized, and conveyed in words. This process is not linear. The telling of stories shapes and is shaped by local norms, values, and customary law.

It is, therefore, most fitting to begin the discussion of local systems of management with reflections on narratives of Porcupine caribou users themselves, and consider how the material of these narratives inform an understanding of the cultural and historical transformation of the Porcupine Caribou hunter. Below, I draw on the stories of elders of Porcupine Caribou user communities to ground and broaden the explanation of local systems of caribou management. In an effort to honor those who shared their stories for this project and to avoid the fragmentation of stories, I include a collection of these stories in Appendix 11.4, making reference to them in the discussion below.

4.3.2 Negotiated relations in the time before there was time

The traditional stories and life histories of Porcupine caribou community elders speak volumes on hunting, as an occupation with the objective of meeting the sustenance needs of communities. While in the three study communities, I asked elders to share stories about caribou, both from their own lives and from "long long ago." Hearing them, I began a personal process of tying the threads of story themes that tell a larger story of the history of caribou-community relations, the passing and changing of time, and the negotiation of rules by which animals and people would coexist. In this process, much of what has been articulated in the literature of cultural ecology on hunting peoples was reconfirmed (Feit 1973; Slobodin 1973; Tanner 1979), but framed specifically in the context of Porcupine Caribou.

In the stories, I learned that success in bringing home caribou, as reflecting in the ideological assumptions of local culture, is determined not by playing the game of outwitting *vutzui* (caribou), but by the ability to think like the animal, to become a part of the animals' decisions, and to please the animal enough to receive it as a gift. Success in the hunt is related, in part, to the hunter's and his or her community's sensitivities to

the animal and their obligations to act appropriately.

Sharing their knowledge of caribou, Mary Kendi, Mary Vittrikwa, Albert Oliver, John Vaneltsi and others offered stories that I will reference here as sacred narratives. I hesitate calling the narratives myth. When describing my documentation of "myths" (my use of words) to a learned and religious (Anglican) community member, I was corrected. "Myth for you maybe," were his words. I realized from the exchange that "an objective view" of these stories and their cultural perspective is impossible if one hopes to understand the logic of local systems. Appreciating the ethos of another's cultural system requires a willing suspension of disbelief in one's own cultural bias in the way one may immerse oneself in art to be one with the thinking of the artist. Developing the basic tools for understanding the transaction costs of community in a co-management situation, to a great extent, demands this of the analyst. To understand, I was asked to believe.

For several elders, stories of caribou are introduced in "ancient times," or *nunh ttrotsit ultsui gwuno* (when the earth was first made), a time before humans and animals had differentiated.[6] Koykukon of Alaska describe a similar period which for them literally translates as "Distant Time" (Nelson 1983). Nelson compares this time to Genesis and Darwin. Differing, however, from the Darwinian notions of competition and natural selection, the stories I heard were tales of the interaction of animal and human personalities, a process of co-evolution, and the means by which relations of humans and animals were established. As is told in these stories, *nunh ttrotsit ultsui gwuno* (when the earth was first made) humans and caribou each experienced hardship. Recognizing their common needs of survival, the stories tell that caribou and people shared something of themselves and struck an agreement, or as Mary Kendi says, "a deal" that would serve to define future interactions.

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[6] This story narrative was pervious summarized by Slobodin(1981: 527).

Adding the image of a public meeting and community consensus to the story, Jane and Johnny Charlie, Sr., tell me they too have heard the same story, but understood it to have taken place at a meeting of all animals. At the meeting, the terms of how caribou would be used were negotiated among animals. Johnny Charlie, Sr. commented that Chickadee was present at the gathering and posed the question, who would eat *ighee* (fetal caribou). From the ensuing discussion, it was decided that this entitlement would be conferred to human elders. To this, Jane Charlie added, Grizzly Bear became angry, abruptly left the meeting, and defecated as he departed. It is said that even today, he remains disgruntled with the final decision.

Community members of Old Crow, Aklavik, and Fort McPherson are quick to point out that they know caribou to be wise animals, and John Vaneltsi speaks to the wisdom of caribou and how in the negotiated exchange between caribou and people, people were given some of that wisdom, and caribou the ability to run fast. Slobodin (1981), who documented a version of the story from the Tetl'it Gwich'in of Fort McPherson during the 1940's, states that the sharing of wisdom to humans would not diminish the capacity of caribou to know; caribou would retain its knowledge, and thus caribou would, at times, be difficult to hunt. "Hence," he wrote, "humans will always have partial knowledge of what caribou are thinking and feeling, but equally, caribou will have the same knowledge of humans." The assumption of animals holding wisdom means that caribou are not objects, but partners in a process of survival. As Mary Kendi told me,

> They are wise...they don't have to just keep on going and running into people. They know they are going to get killed.

Hearing and reading these stories create a disorienting effect when attempting to decipher them as a set of events. In reviewing the stories and talking with other community members, it is my interpretation not to understand the differentiation of caribou and people as a single incident, but as cyclical transformation. From the stories is projected a set of changing images; caribou and human differentiate and merge, merge and differentiate, but never fully. In reading the stories in the sequence of

Mary Kendi and John Venelsi, then Mary Vittrekwa and Effie Linklater, next Sara Able, and finally the last story of Mary Vittrekwa, the relations of caribou and people unfolded through time, with each story indicating a greater separation and the entire set of stories reflecting changing notions of time.[7]

Time is an important resource in the management of wildlife, both as measured in quantity and as perceived by a culture group, by its passage. Describing the contrasting notions of time, Herskovits (1961: 128) writes,

> The difference between industrial and non-industrial societies has been phrased as a difference between groups who use 'clock' time and those that live by 'natural'... time. It has also been expressed as the difference between [time] conceived as falling into carefully measured units, often of very small dimensions - seconds, minutes, and hours, as well as days, weeks and years - and of seasonal time where the limits of the units are blurred and imprecise... The tendency to exactitude in measuring time may thus be regarded as an integral part of the technological complex... requiring specific schedules maintained in all phases of life - a meeting with a friend, a church service, as well as a production line - if the daily round is to move smoothly (cited in Slobodin 1966)

Ross (1992) , who draws on his experience with the Ojibwa and Cree, points out the ethical implications of notions of time in the *ethic that time must be right* (often misunderstood to mean all things in their time). This convention, according to Ross, is related to the age-old survival tactic of appropriate and inappropriate notions of timelines and the conservation of energies.

> The notion of "the time being right" is ... not some mystical or metaphysical construction but a practical, down-to-earth survival tactic. Nor is it a "minor" custom, for it is inextricable bound up with the expectation of excellence and the folly of unconsidered response. It involves not only taking the time to walk through possible courses of action in advance but also preparing oneself emotionally, and spiritually, for the course chosen. It requires *not* acting until there is conviction that the task can be performed successfully. (Ross 1992: 38-39).

As a means of enduring time and its changing expressions, Mary Kendi tells of the symbolic reminder of *tinji tthui* (human flesh) left from the caribou-human exchange. When bringing a caribou leg to John Vaneltsi, Alfred Francis, and Mary Vittrikwa each

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[7] Studying traditional Gwich'in stories, Slobodin writes that in earlier narratives of the Gwich'in there no sense of time, later cyclical time is found along side linear time, and finally, in the modern context it becomes fully linear (Slobodin 1975; Slobodin 1981).

located the *tinji tthui ti* (human flesh) near the patella, with Mary Kendi noting that the symbolic reminder is in the rear leg of the caribou.[8] As Roy Moses and Charlie Peter Charlie described it (in separate but consistent accounts), on the hind leg of the caribou and in front of that leg there is found piece of flesh extending from the top of the shank downward. Here is found the *tinji tthui (*human flesh), a part that is never eaten.

Today the reminders and symbolic role of caribou to people transcend all aspects of community life and, to some extent, can be regarded as totemic. Walking from where I reside in Old Crow to the center of the settlement, I observe on the exterior of local public school, the local band council office building, and the local co-op large, hand-painted murals in which caribou is portrayed prominently. Above the doorway of the school and displayed at several of the homes are various arrangements of caribou skulls with antlers. In Fort McPherson and Aklavik, I find the Gwich'in Nation's flag flying above several buildings. Silhouetted on it is a bull caribou with head held high, a northern sun, and the phrase "Proud to be Gwich'in." On a spring morning walk in Aklavik, I identify twelve individuals wearing clothing that displays a caribou image – hats, embroidered jackets, and a belt buckle.[9] Across the street from the Caribou Cafe in Aklavik, I find a meeting notice announcing that the Inuvialuit Hunters and Trappers committee's meeting will begin this month with a caribou and bannock feast. Soon after first arriving in Old Crow, I am invited to an elder's home. Upon entering, I am overwhelmed with what I experience as the stench of caribou. In his cabin, which is like many of the community in autumn, strips of drying caribou meat hang from poles suspended across the ceiling. On the countertop is a caribou hindquarter. On the kitchen table is a roasted caribou head. In several months I realize that my own perceptions have been transformed and by the

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[8] Slobodin's documentation of the story indicates that it was part of the human heart that was left in the exchange. Stories take many forms and change in time.

[9] One community member made the point that the notion of creating an image of caribou was, in a former time, taboo among the Gwich'in. It was only with the suggestion of a non-local (resident priest) that caribou images were first made to create symbol for the communities newly formed cross-country ski team (crest of caribou animals) and with the understanding that the image was one of deference.

end of my stay in the community, I recognize caribou meat smell as sweet. In short, there is an omnipresence of caribou in these communities.

The indivisibility of caribou and people is articulated in general and profound ways by locals. In the local grocery store a local grumbles about the high cost of hamburger and then tells me of the quality of this year's caribou. On the softball field, a pitcher teases and distracts the batter by telling him that there are caribou on a distant mountain and then throws a pitch. At dinner with a community family, the eldest woman of the house who is also a former community chief, tells how the consumption of caribou gives her people strength, and how long periods of time without consuming caribou results in weakness. The view of caribou as a strength-giving resource is repeated by others in all communities.[10] Later, when talking about caribou and community, she says emphatically, "Caribou is our symbol, it runs in my blood."

4.3.3 Ethnographic Sketch #2 – Context: hunting caribou with a local on the mountain near Old Crow

It is December, 1993. I accompany an Old Crow local in search of caribou. I assume my stance on the rear of sled which is being pulled by the snowmobile across the mountain. In the distance, I observe a lone caribou. After I signal the hunter, he cuts the snowmobile engine, and we watch in silence. A lone caribou stands for a moment about 100 yards away, examines the two of us , and then comes directly towards us, passing within 60 feet. Having previously traveled in caribou country, I have observed caribou to behave in this manner before, and heard it explained by non-natives as being the result of the animal's curiosity, dullness of senses, (Kelsall 1968) and lack of intelligence. For community hunters, however, the interpretation differs.

[10] Locals reported that caribou meat differs from moose. While a person will lose strength if eating moose for a prolonged period of time, eating caribou will keep one strong and healthy. As expressed by another person, one never tires of eating caribou.

The hunter is a skilled marksman and drops the caribou. Once the animal has fallen, we complete the process of butchering, and load the meat. When finished, we exchange our first words since the firing of the gun. The hunter turns to me and says, "It was a gift. You see how it gave itself." Back in the village, I am given the gift of the animal's thick autumn *cha* (hide). Years later, when talking with the hunter by phone, he mentions the day's hunt, referencing both his gift of the quality *cha*, the shared experience of the hunt, and our friendship.

4.3.4 The Reciprocal Relations of the Hunter, Community and Caribou

Long-standing relations of caribou and community, as based on the exchange and agreement of caribou and people, come with expectations and obligations. The exchange and agreement in the ethnography below is one of many illustrated in this chapter. Systems of reciprocity serve as a fundamental component of human-nature and human-human relations, and underpin locals' knowledge. According to local hunters, *chutthui kwuntletutatchi* (the animal gives itself) in the hunt as a gift, with the gift being the consequence of a quality of relations both between caribou and community and people in community. Local hunters, like the one I joined in this hunt, would commonly be described by fellow community members as being *ttsinanyoo* (lucky) or more literally, *vitive gwinzi* (his ways are well). In this respect, luck is not a simple play of the game in a purely probabilistic sense or deriving solely from chance or risk, but the outcome of appropriate actions in reciprocal relations of the animal and the hunter and the hunter and community. Nelson (1983:27) puts it eloquently.

> Luck is a finite entity, specific to each natural thing or even to certain activities. It can be lost, transferred, and recovered. Luck binds people to the code of proper behavior toward the natural world. And so success in living on the land involves far more than a mastery of technical skills. It requires that a sensitive balance be maintained between each person and the conscious forces of the environment.

Luck, then, is a form of power. This is not to suggest that in the quest for the power of luck, the hunter and community are not mindful of the conditions of risk. Elements of chance are acknowledged by most to be found in all things. Luck in hunting,

however, is manifested not as a means of controlling animals, but as a way of coping with uncertainty and insuring survival. As Feit (1986) puts it,

> Power is a coincidence between an intentional state of being (thought) and the configuration of the world (event), a congruence anticipated by the inner state, and that this anticipation helps to actualize. Both the thought and the event are a social process. Power is not an individual possession, it is a gift, and a person cannot in this view bring thought to actuality by individually manipulating the world to conform to his desires...
>
> Power is the relationship in thought and action among many beings, whereby potential becomes actuality... We might say that power is truth unfolding, rather than the power is control.

The complexity and multiple meanings of the power of luck as they are expressed in community is evidenced in the range of what people say makes a caribou hunter lucky. Among the most common principles expressed is the obligatory act of *chyirzi* (sharing of the hunter's bounty). As well, the power of luck is achieved and maintained by the showing of proper *yinjigwihile* (respect) for animals and people. Finally, respectful behavior is demonstrated with methods of communication which exhibit deference.

It is respectful for the hunter, therefore, to take a gift when it is given rather than waiting for a better offering. Sitting with a group of middle-aged hunters while hunting caribou, I listen as each shares his prior experience forgoing caribou in hopes of finding a better take later (e.g., animal of differing gender, fatter), and how in doing so, each had been unlucky in future efforts. The hunters went on to tell of how each of their fathers had taught them humility and to take the first animal that is available. While the behavior may be framed as spontaneous opportunism (Johnson 1989), it was not articulated here in that sense.

It is commonly held that it is disrespectful to make jokes about, make fun of, or "play" with animals, whether animals are living or deceased. Many hunters talk about the inappropriateness of touching a live animal. One hunter talked about how he had been scolded by elders when he had shot a caribou in deep snows when it could not escape, posing the question of whether he would want to die like that. When butchering caribou, most hunters first cut the head of the animal off and some hunters feel that it is

respectful to close the animal's eyes and face it away from the kill site. Not hunting on Sundays (unless there is critical need for food) is another way of respecting caribou and insuring luck. With less conviction (and in some cases with laughter), elders mentioned how the consumption of *ighee* (fetal caribou) is reserved only to elders, and how those that eat it will become weak and have bad luck hunting.

Disrespect of caribou occurs when an individual is intentionally wasteful. Several hunters spoke of times that they had killed an animal and left it because it was too skinny, adding that it had not been wasted because it was left as a gift to Grizzly and Wolf. As one said, "They have to eat, too." Waste management requires taking no more than one can properly handle and store, while seeing that those in community are not hungry.

In Old Crow, where many homes have outdoor meat caches (log structures with no insulation), managing for waste requires assessing temperature and the rate at which seasons and weather events may change. As a result, warm temperatures force the respectful hunter to limit take since caribou meat spoils without proper cold storage. An early spring bringing warm temperatures may result in thawing and spoilage of cached meats; those who are greedy by overstocking or waiting until late in the season to share meat face the problem of redistributing caribou to other households when other households are also emptying their caches. Those taking meat to the trash dump are subject to direct and indirect forms of community criticism.

Mr. Neil Colin, a local historian of Fort McPherson, shared the story of two young boys who hunted for caribou near what is today the Yukon-NWT Border. One is said to have made jokes about caribou after it had been shot. Soon later, the story is told, a sudden early winter storm arose, killing one of the boys and leaving the other close to dead. An Vuntut Gwitchin man shared a more contemporary tale from his childhood of a local man of the community who would commonly jingle change in his pockets when in the presence of kids. As a way of controlling his boastful behavior, a local shot a

moose and gave it to him. The gift of a moose from a fellow community local comes with the obligation that the man hold a feast for the entire community. The man of means was then forced, by customary law, to share. In a third story, I was told of a man who had shot at a flying loon in hopes of making a stew of the bird. In his aim, he partially hit the bird with the shotgun blast to its rear, but did not kill it. Soon after, when out of town, the hunter learned that local vandals had damaged the rear of his boat, untied it, and set it adrift. In another discussion about hunting luck, a man told how he had shot a wolf with his 30-30 rifle and since that shooting, the rifle does not function properly.

These examples help to sharpen the image of local systems by illustrating the ways reciprocity and perspectives on power are found in concert. In the example of the young boys hunting at the Yukon Border, the power of luck and systems of reciprocity as manifested in the storm are associated with forces external to community. In the example of greedy local, systems of reciprocity are played out consciously by members of community. In the example of the man who shot the loon, we see how external forces link with those internal to community. And in the final story of the rifle gone unlucky, we see how the power of luck can be held and lost in objects.

Moreover, these stories demonstrate how animals and all things living hold standing as legal persons with rights; community has duties and obligations to the holder of those rights; and sanctions follow from the violation of those duties (Piddocke 1985).11 Property as a power relationship is, therefore, associated not solely with the "stock and flow" of resources as articulated in the more mechanistic portrayal of some

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11 Piddocke's work in the anthropology of property represents an effort to establish a definition which is, to the best extent possible, not culturally biased. The triadic relationship expressed here occurs in simple conditions. As social complexity increases, he states that additional conditions of property are likely to be present These additional conditions include: a) a set of practices and/or rules arising from community's recognition of claims, which defines property rights. b) A set of sanctions and procedures for enforcing property rights, which come into play when recognized claims are breached or met. c) Persons who infringe upon property, or who make counter-claims, and so provoke the emergence of sanctions and procedures and the definition of rights in rules and practices.

common property theorists (Bromley and Cernea 1989; Ostrom 1990), but in the more culturally oriented perceptive on resource relations (Livingston 1981).

Although scholars projected that processes of acculturation and modernization would undermine community subsistence economies (Murphy and Steward 1956), today there is good understanding that local systems' process of change is non-linear (Slobodin 1973; Acheson 1977; Fogel-Chance 1993). Some locals in today's communities speak of the power of luck in caribou management as an antiquated belief, saying, "That is what we used to do." Community members also state that the ways of Jesus and the Church have negated these powers. Yet, for many in community who are either followers or non-followers of Christianity, traditional perspectives on the power of luck are well integrated and openly expressed into a neo-indigenous image of local caribou management. More important, few in community would openly deny the legitimacy of local customary law on practices of respectfully hunting animals, sharing of one's take, proper care of caribou meat, and waste avoidance. As well, it appears that the definition and application of principles guiding local management systems are dynamic and in an on-going state of negotiation.

Field data from interviews, like those from many other northern subsistence systems, show that while the power of luck and systems of sharing caribou in community have changed, norms in this area continue to be observed (Wolfe and al. 1984; Langdon 1991). Elders in community indicated that patterns of reciprocity are today less communal and free flowing than in earlier periods. Similar statements are documented by Balicki (1963) and Stager (1974). "Less" sharing is, however, best described as changing forms and patterns of exchange. For example, several elders in Old Crow described how in early adulthood (about 40 years ago) a small group of hunters would commonly take 50 to 75 caribou in a single hunt, raft those caribou down river to the community (undertaken by tying animals together and using a boat and motor to

negotiated the river) and beach them on the beach.[12] Under the direction the local chief, most of the community would work collectively to butcher and distribute the meat, based on family needs.

Today the communal hunt is, for the most part, replaced with small group, pair, and individual caribou hunting. More than fifty percent of the individuals questioned reported that they share their caribou take regularly, with 16% saying that they never share (See Figure 4.1). Of those in this latter category, some are recipients of caribou. It was also reported that households, on average, share a little less than a third of their caribou (29.91; std ± 25.09) with that meat going to about four households (3.53; std ± 3.76) annually, and receiving more than a third of their caribou needs (36.60; std ± 39.68) from other hunters (See Table 4.1.)[13]

[12] Caribou float after they have been shot.

[13] Household is defined as those living full-time in the dwelling. It is acknowledged that extended family relations in small communities make the application of this definition of "household" problematic. These data on community sharing are the first measures of reciprocity known to have been made in theses communities.

Figure 4.1 Frequency of sharing caribou with other households

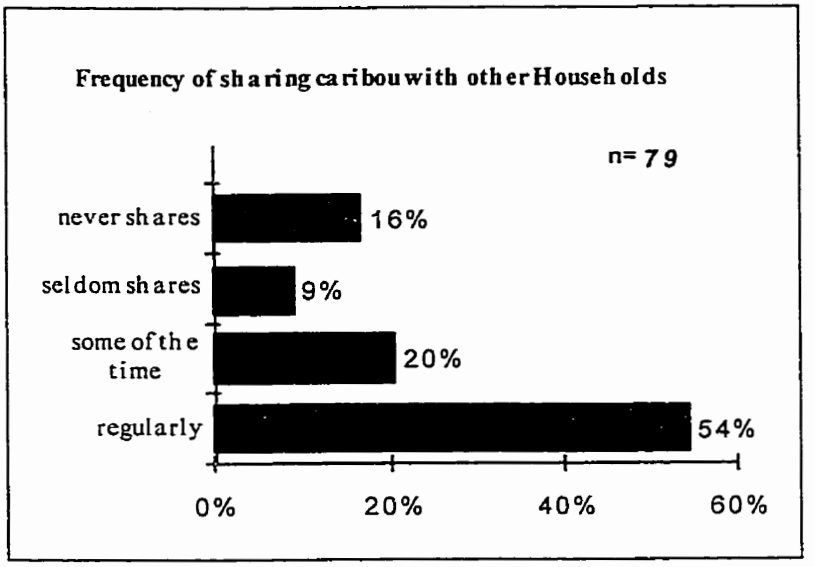


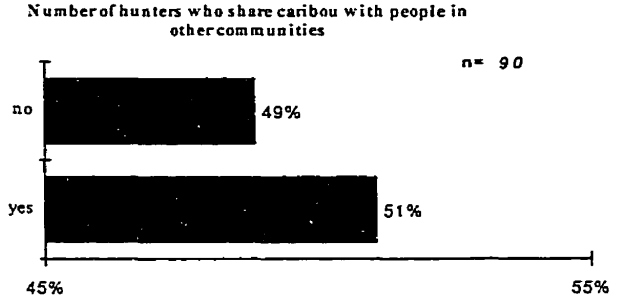
Figure 4.2 Lucky Hunters of Fort McPherson

Tetl'it Gwich'in hunters from Fort McPherson relax after a successful caribou hunt and before distributing meat to family and friends in the community.

Table 4.1 Household data on needs and sharing		
Percentage of caribou take HH shared during past 12 months	Number of HH with which each HH shares	Percentage of caribou HH received from other hunters
29.91%	3.53	36.60%
std ±25.08	std ±3.76	std ±39.68
n=65	n=63	n=73

Today, shared caribou as well as all animals hunted, are commonly distributed through kinship and other social networks, allowing community to work as a collective in meeting needs for caribou. Those who are not lucky or have limited time or equipment to acquire caribou are supplied by others who hunt for the greater community. The type of hunters assuming a primary role of provider to those in need varies. Observations and interview findings indicate a pattern in all communities in which single males who work part time or seasonally, are skilled at hunting, and equipped with the basic equipment needs, regularly provide for a community's single mothers, elders, and families in need. While the collective or "group hunt" is not longer practiced as it was in former times under the direction of the hunting leader (Slobodin 1969) , in Aklavik and Fort McPherson, the formal collective hunt is periodically organized to supply local families in need, elders, and non-hunters. At times these group hunts are subsidized by local resource management organizations (e.g., local RRC, HTC) or subsidized by territorial government funding.[14]

Figure 4.3 Number of hunters who share caribou with people in other communities



Systems of exchange have historically, and today continue to extend beyond the immediate village. More than half of those sampled reported that they share caribou with people from other communities (see Table 4.2) with

[14] An historical point of interest is that while most attribute the transformation of the collective hunt solely to the introduction of the rifle, I found in all communities that collective hunts in various forms were practiced with some frequency until the arrival of the snowmobile. New forms of collective hunting represent another form of resilience of local systems of management.

eleven destination communities listed (see Table 4.2). A sister living in Yellowknife, a family friend in Ft. Yukon, and a daughter attending boarding school are examples of the kinds of individuals who may receive a gift of meat from a local family.

Table 4.2 Inter-community sharing **Communities with which Old Crow, Aklavik, and Fort McPherson Hunters share caribou (number of respondents)**
Inuvik, NT (17)
Aklavik (6)
Whitehorse, YT (6)
Edmonton, AB (5)
Fort Yukon, Alaska (4)
Yellowknife, NT (3)
Tsiigehtchic, NT (3)
Vancouver, BC (2)
Fort Smith, NT (2)
Arctic Village, Alaska (2)
Mayo (1)

In some cases, community-to-community exchanges are organized on a larger scale. In 1991, the Chief of Old Crow made a request for all available caribou from local households and air freighted the meat to Arctic Village, Alaska where caribou had not migrated that winter. Similar community-to-community exchanges are frequently organized within Canada both on a formal (by local organization) and informal (individual initiative) basis.

Systems of reciprocity and the giving of gifts are practiced both with non-monetary and monetary-based transactions. As a way of measuring norms from appropriate and inappropriate forms of barter and trade of caribou, one of my interview questions asked about various perceptions of appropriateness in exchanges. Locals' perceptions of appropriate and inappropriate forms of exchanging caribou fall into three broad categories. One group stated that non-monetary exchange was the *only* means by which sharing is acceptable. No cash should exchange hands. An elder told me of baby-sitting for her neighbor, mentioning to the girl's family that she was short of meat. When picking up the child, the girl's father delivered a fresh hindquarter. As well, elders commonly give a hunter a gas coupon or a box of rifle shells when meat is delivered. A hunter described how informal exchanges of gas and use of another man's boat came with the expectation that if the hunt was successful, the hunter would share. A sister in Yellowknife might exchange a free place to sleep when a family member travels to the city. Similar to most forms of exchange among those with intimate relations,

exceptions of a daughter away at residential school are not easily articulated and are bound to identity. Another group felt that it was appropriate to reimburse hunters with cash, but only for direct expenses. The exchange rates from $50 to $150 dollars were stated as being an acceptable cost for a caribou, and considered a directly equivalent value when calculating for the hunter's food, the use of a boat, and gas, and the ability of people to pay.

The threshold for acceptable to non-acceptable methods of exchange was most frequently located when the transactions of caribou were perceived as "profiteering," or as described in the language of the economists, "rent seeking." While expectations concerning norms for acceptable ways of sharing caribou vary with intimacy of social relations (Sahlins 1972), also considered is an individual's and family's level of need. For example, while going from door to door with a truck load of caribou and offering to sell them for $100 each was generally considered to be unacceptable by most people reporting, some felt that it may be acceptable *if* the hunter were in dire straits (i.e. very poor with lots of family obligations). In another example, a local woman providing service of making and selling dried caribou meat by the bag is to be considered among some as an acceptable practice and valued service to the community, with the proviso that she "not get rich" from the effort.

As evidenced above, systems of reciprocity and the power of luck that is conveyed with it are dynamic, yet resilient components of local systems, with local systems of caribou management finding their origins in the obligations between caribou and people, and people and their community.

4.3.5 Individuals and the Uses of Knowledge and Power

Ridington (1990) states that the complex of knowledge, power, and individualism is a distinctive feature of sub-Arctic people's adaptation. While knowledge is on one level held by the community as a whole, it is the individuals who interact with local systems and shape local knowledge.

With respect to knowledge of animals, there are those individuals in community who hold special relations with certain animals, described as *nyin vutsun nili* (animal is his) or *nyin tso dhitshi*, (sleeping to the animal). Aspects of these special relations tell something about knowledge of local systems of management. Grandmother Sarah Abel, the oldest living Gwich'in woman, shares her story and knowledge of *Ch'eeghwalti*. A Gwich'in hunter of renowned reputation, *Cheggwulhtyi* is known for his understanding of animals, his service to community in dealing with animals, and his special relationship with *vutzui*. Using English terminology, it might be said that *Cheggwulhtyi* is a Shaman. In the language of Gwich'in, *Cheggwulhtyi* would be considered to *chuttui gwiyendo hadundui,* literally meaning one who "knows animals very well."

The middle-aged wife of a former community chief told how her husband "slept to the caribou." She described him as having uncanny success in predicting the arrival of the herd each year and coming upon these animals when hunting. Somewhat like that of *Ch'eeghwalti*, at the time of the man's death and on the day of his funeral, there were appearances of caribou near the community. At his burial, she described the "big wind" that came up in an otherwise still day, "taking his spirit to run with the caribou."

I was led to understand from other community members that having a special relationship between an animal and human is not necessarily a given. Individuals can go through life without ever finding their guardian and those who do not spend time on the land will not come to know them. One local hunter described how a set of events led him

to believe that he had discovered his animal, but he was awaiting a clearer signal. Another told me that the discovery of this relationship, when it does occur, rarely happens in one's youth and is most common in mid-life or after the individual has had considerable experience.

It is also said that some members of community are born with special abilities to know better than others. In this way, knowledge and the power of luck are achieved both through God or Creator given talent, and an achieved level of intimacy with the animal. Sleeping to the caribou, *Ch'eeghwalti,* draws on his skills and the events of dream world in a process that is essentially inductive. And drawing on his power, he is said to have shared his vision for the welfare of the community. Asking if there was anyone with meat in community, he used his power as a leader to encourage sharing and minimal wastage before performing the antler ritual. And in doing so, *Ch'eeghwalti* is considered a great and powerful man.

The story of *Ch'eeghwalti* also helps to explain how knowledge and culture are, as Geertz (1973) states, bound to patterns of communication. The legitimacy of dream world as a way of knowing highlights the manner in which culture defines the boundaries of communication and, more specifically, the means by which truth is established. Sara Abel's story also ties the power of knowing, as held by the knowledgeable individual, to expectations of reciprocity and obligations to share knowledge with community.

While on a hunting trip, I was taken to the grave of Jimus Esno, described to me as a man of great power. It was only later that I read the story of Jimus Esno, as told to Leechman (1950) by Effie Linklater, and began to understand what a male elder had meant when he said, "When your animal says you something, you have to do what it says ," echoing the words of Sara Able's story of the shaman, "If we don't talk about it, then we would suffer, if we talk about it, then we will live a good life." I began to realize the costs one can incur when ignoring these forces of power. Later we will see that

these costs are perceived to be borne by the individual as well as the community as a whole.

4.3.6 The Ethics of Communication and linkages to Community Survival

Threats to group survival, be they starvation, the misuse of power, or fear of a group of foreigners, bind the group and create solidarity.[15] As described by several students of northern hunting culture (Briggs 1970; Ross 1992), norms against openly confrontational behavior are common. Methods of indirect communication are regularly employed as a means of delivering messages of disapproval; and what is sometimes perceived by the outsider as uncooperative behavior can be interpreted as following from the belief that it is better to not participate and to withhold judgment.

Describing what he calls the *ethic of respecting praise and gratitude*, Ross corroborates my own understandings of community process with his description of the expectation that people do their best in survival situations. This norm has implications to styles of communication in teaching. Traditional systems of education teach experientially by modeling appropriate behavior since there are limited resources for trial and error instruction. Talking with caribou hunters about their early hunting experience, this ethic became clear to me. Several said that as youths they had served as a young observers, and then, when the time was determined by the elder to be right, they were give their guns and told to participate in the hunt. When asking these hunters how they had been taught, one echoed the words of several others. "I had to figure it out for myself, no one taught me."

This style of learning to hunt caribou was described by those who discussed the topic. To be sure, some students of caribou hunting were given lessons of the hard work

[15] See a discussion of external threats as a binding force for group solidarity in small democratic collectives in Rothschild's writings (Rothschild and Russell 1986; Rothschild and Whitt 1989).

required of hunting and the need for sharing and waste avoidance, with some receiving those lessons in indirect ways.

Learning about management of caribou was institutionalized informally (i.e. *de facto rules*) in traditional systems and to a lesser extent than years past, continues to be practiced. One adult hunter remembered how at age 13 he had come home from his first successful caribou hunt, left the animal with his father, and had run off to play with his friends. Upon returning that evening, he cried when learning that his parents, as a lesson in sharing, had followed the local ethic of giving the boy's first caribou away and had done so without first telling the boy.[16]

The traditional norms affecting non-confrontational forms of communication and the avoidance of interference in others' affairs speak to hunter's perspectives of control. Issues of control have significance with respect to controlling resources, controlling other people, and controlling oneself. Living in community, social control is achieved through monitoring. The level of familiar relations in small community is at times intrusive, and strategies are developed for managing communication about various issues while maintaining mutual respect. Two examples illustrate this communicative strategy. In the first, I attempted to befriend a local who was burning brush in his front yard by making a joke about the formal laws against smoking grass. The local did not seem to get my joke and responded with the statement that it was against "Indian law" to tell a neighbor what to do. In another case, during a community meeting, I observed locals grapple with the problem of how to deal with a local incident of caribou wastage involving a local hunter. Several days before, a wildlife officer had been in the community investigating the case and while most locals had an opinion of who had been responsible for leaving the caribou, no one would discuss the matter with the conservation officer. When discussing the incident with me, few locals mentioned the individual by name, referencing the

[16] The institution is more formally observed by some families by holding a community feast when the young man shoots his first moose.

suspected person as, "that guy." At a community meeting where the incident was discussed at some length, there was open-ended discussion among locals that lasted for several hours. No proper names were mentioned, but the problem was described, both specifically and hypothetically. At one point, a middle-aged member of the community spoke about the need for more enforcement presence in the community. He was followed by a community elder who talked about "Indian Law," the inappropriateness of telling people what to do, and the old method of teaching children by example. The two men, although expressing differing view points on the solution to the problem, never confronted each other directly, and together they and the community as a whole explored alternative solutions to the problem.

Departing from that local meeting, I was not clear on whether a decision had been made. The ethic of non interference, according to Ross, is predicated on the presumption that it is perilous to judge the motives, goals, and desires of others since others in the community may have more power. The implications of the ethic of non-interference to community decision making illustrates an important differences between "win-win" orientation of consensus outcomes as described by the conflict resolution literature (Fisher and Ury 1981) and those that I observed in community and illustrated in the story of the defecating Grizzly. Consensus in community is therefore not focused exclusively toward the achievement of resolution, but is a means by which the group can think collectively in a manner that respects and does not embarrass others. From a functional perspective, the ethic of non-interference can also be interpreted as a means of negotiating the multi-faceted relations of life as they are frequently found in small northern communities. It does not mean that community is unresponsive to problems. In the year after the wastage incident, when returning to the community, I learned that students at the local school had made a poster display about not wasting meat and hung it at the post office. I also was told by a local leader that he had visited with the individual in question, discussed the situation face to face, and encouraged the hunter to act

respectfully in the future.

Finally, Ross describes *the conservation-withdraw tactic,* which he views as following from the need to conserve energy in conditions of resource scarcity. As a result, few decisions or commitments are made until all aspects of the problem are carefully examined. This ethic completes the cycle by returning to the ethic that time must be right.

4.3.7 Legitimacy and Truth

Institutions establish the means by which legitimacy and authority are recognized, and in turn, notions of truth are conveyed(Douglas 1986). Rushforth (1992) describes ideological perspectives on truth, legitimacy, and knowledge of the Dene by identifying two means by which authority is established – primary and secondary knowledge. Primary knowledge, he defines as being that in which there is the highest degree of intimacy. A hunter's own observations of caribou while on the river, an encounter with wolf, or an experience in dream world classify are this type of knowledge. Secondary knowledge is that which is communicated from one person to another. In this way *thlihtegwitli* (truth) is tied to *gahshundui* (knowing) from experience. Below is the quote of a local hunter who talks about truth when referencing his knowledge of changing caribou populations.

> Like [other local hunter] said, the caribou herd is getting too large, and that is the truth. It is a true fact. Because 40- 50 years ago you don't see no caribou. Very few times, and them days we live on caribou, like this spring I took three caribou up river. I gut the whole thing. I have three little bags out of three caribou. So you can imagine that we lived on caribou long ago, we said, we have 10 , 12 some people have 14 dogs. and you can imagine how much caribou those people kill. But now they don't do that and caribou is getting lots, and I know it is getting lots, because I seen it all these years, not only caribou but everything is getting lots.
>
> If you are a hunter, you know that meaning is truth. You were brought up on that.

Assertions of truth, as presented in the two quotes above, illustrate Rushforth's theory of legitimacy and authority in Athabascan systems as linked with experience and

knowledge. The first hunter's quote illustrates how he expressed his understanding of caribou population as related to his personal experience observing caribou and community. (This quote will be discussed again later as it relates to ecological rationality.) In the second quote, the hunter describes knowledge and truth as finding legitimacy in a cultural process as experienced through a particular kind of life.

Making the connection to issues of legitimacy and truth, each of which will later be addressed in the context of the co-management interface, Rushforth states three points that are relevant to issues of authority in these systems. First is that the persons possessing the most experience (e.g., people who spend time on the land, elders who have long-life experience), or, to use his terms, primary knowledge (i.e. power or authority) generally assume leadership roles. *Cheggwulhtyi* was among these people when it came to matters of caribou.

Talking about leadership and hunt among the Gwich'in, Slobodin (1969) also points out that conveyed authority, as given to hunting leaders, was broader than simply knowing animals or being a fine hunter, but also encompassed knowledge of "soft skills" as relating to group process. Facilitating consensus, coordinating the movement of camps and working to resolve internal issues, and knowing how to distribute the meat of a community hunt equitably were among these other knowledge areas.

Second, Rushforth states that authority as conveyed by community to the individual is limited by primary experience. That is, there exists a tension between the self reliance and autonomy of the individual as needed for traveling and living on the land, and the need for community to act as a social unit. Finally, Rushforth arrives at the conclusion that authority in the hunting systems is, therefore, not concentrated in an organizational structure that encourages permanent class distinctions or other forms of social hierarchy.

Rushforth provides a theoretical basis for considering legitimacy of authority and

ways of knowing that is consistent with the power of luck. His theory does not negate the economic forces that bind hunting peoples to maintain their collective action with the objective of survival. His theory does help to explain how deep assumptions of legitimacy and truth structure the thinking of local caribou management, the distribution of power and authority, and egalitarian aspects of community life.

Today there is a great deal of discussion among community members about the quality and quantity of time people spend on the land. Changing lifestyles have brought jobs and material goods. At the community level in Old Crow, Aklavik, and Fort McPherson, there is an expressed concern among locals about time on the land, not in the time necessary to acquire an adequate number of caribou, but in the eroding quality and decreasing quantity of time spent on the land. Differing from former times of the first half of the 1900's when hunting was a part of the trapping life (Slobodin 1962; Krech 1976), today caribou hunting is typically undertaken as day trips or weekend outings with one's time on the land limited by in-community obligations. (see Figures 4.4 and 4.5) There remain those in community who are committed to having a "life in the bush." Some others express the feeling of being stuck in town.

Forty five percent of those questioned reported that they spend less than three weeks on the land each year, a quantity of time which is dramatically less than the seasonal trapping and on-the-land patterns of the community.[17] Referencing Netting's (1971) assertion that some aspects of local culture (i.e. personality traits) do not adapt as readily to ecological readjustment as do features of social organization, Acheson (1977) points out the various elements of the Vuntut Gwitchin people's transition to village settlement, drawing on the notion of adaptational "lag" to explain the tension between changing lifestyles and culturally encoded traditions. In short, culturally embedded and underlying aspects of community life -- its paradigm -- are not easily transformed in spite

[17] Time on the land was defined broadly as days spent at bush camps, camping trips on rivers, and time spent at one's whaling camp.

of organizational change, but are commonly long-enduring and well integrated into the social system.

According to some community members, the loss of time on the land is a key dimension of that tension, putting at peril the legitimacy of the traditional systems of management, the knowledge on which those systems are based, and quality of community's relations with caribou. This problem is exacerbated with the passing of elders whose knowledge of a former way of life is irretrievable. Later in the dissertation, community costs of co-management are linked to the interface of differing perceptions of legitimacy and truth, notions of time, and approaches to authority.

Figure 4.4 Number of weeks locals spend on he land

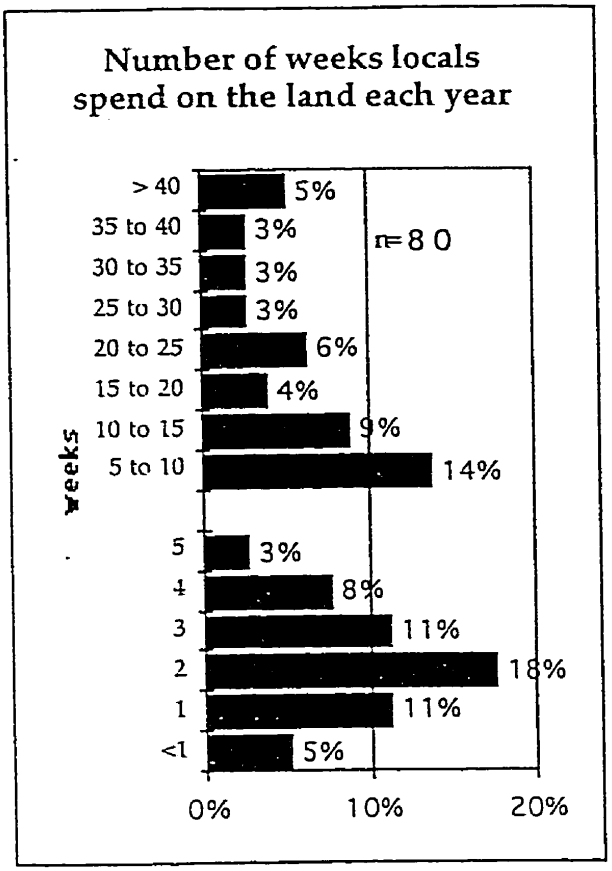
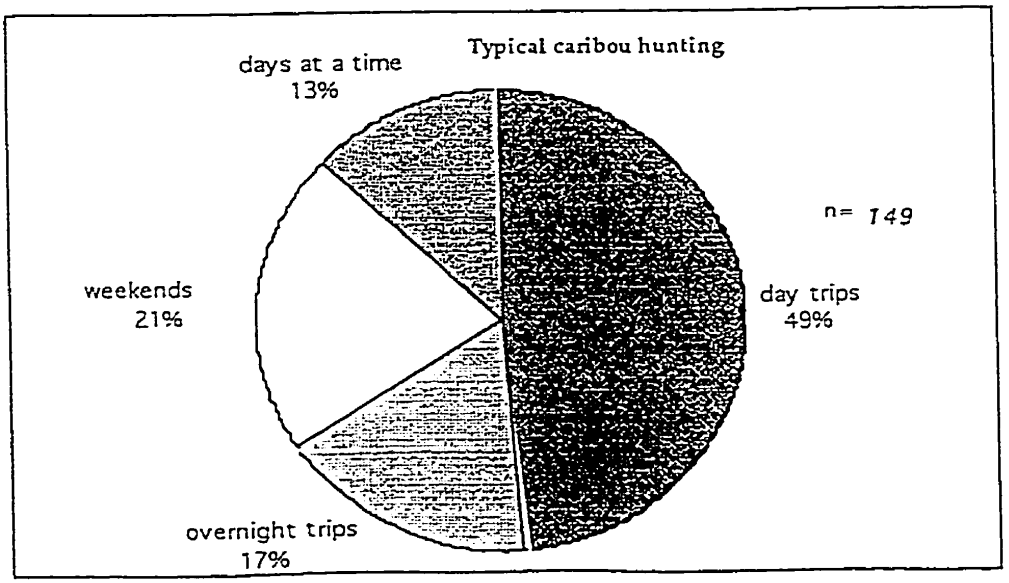


Figure 4.5 Hunters' typical caribou hunting trips



4.3.8 Inductive process and knowledge of caribou ecology

What does community know about caribou and how does that knowledge reflected in institutions and experience of their knowledge? Porcupine caribou hunting communities that seek survival in meeting subsistence needs and in maintaining their sense of identity have a vested interest in learning about caribou. In the discussion above I demonstrated how the patterns of local caribou management are modeled with the anticipation of the hunt. Below, the focus of this model is reversed from looking at community to examining the caribou resource. This reversal provides insight both into the kind of things people know about caribou and, more importantly, how they know them.

To be lucky, hunters must be patient when waiting for the arrival of caribou, observant of their surroundings, and skilled in reading the signals communicated from caribou and the land. From experience, hunters learn to identify annual, seasonal, and other changes that insure that animals are brought back to community and that other caribou will be available for future hunting. Riding up and down the Porcupine River, a hunter and I sit together in the bow of his boat while the man's brother steers. The caribou hunt lasts for several days and I am repeatedly surprised as the hunter spots caribou and moose long before I can discern the image of the animals. There is no doubt that the hunter's eyesight is better than mine, but as another hunter later points out, "The hunter knows his country." He has spent a lifetime traveling the river, he is sensitive to the locations of specific rocks and logs, and is aware of the conditions in which caribou emerge from the forest's edge.

As noted at the outset of this chapter, information about caribou is one component of the resource management system, and is based on a set of constructs or paradigm. For some time, anthropologists have written about what hunting people know about the environment, framing their discussion on the "ethnoscience" of folk

peoples (Moran 1979) . As well, students of the Gwich'in have noted these hunters' knowledge of caribou (Osgood 1936; Slobodin 1962; Haleigh-West 1963; Slobodin 1981). Irving (1958), writing about the intellectual competence of the Gwich'in in their understanding of their environment, cites Leechman's identification of 22 genera of plants used by the Gwich'in for medicinal purposes. He describes how ornithological studies involving locals generated a list of 99 Gwich'in names for local birds species. He also makes mention of the people's extensive lore on stars and weather. In my own work with Roy Moses and Johnny Charlie, Sr., Gwich'in names of caribou in the dialect of Tughuh were identified. (See Table 4.3)

Table 4.3 Gwich'in names for Caribou

vutzui	caribou
Nin	game animals
vutzui choh	mature bull caribou
dazho	smaller bull
dazho k'eilik	small antlered bull, two years old; considered a trouble maker
khui ntso	bull in fall (prior to rut/ September)
chutsunt	bull in fall (during and after rut)
dazoo	second largest bull
dazohtso vu	young caribou
vutzui tsul	cow caribou
chiattok	nursing cow with calf
tsigwildi	pregnant cow
vutzui ttriji	barren cow without antlers; runs between caribou and hides among them
vutzuih njo	cow without calf in winter
viggi kwa	barren cow without calf
khutu ahtsun	yearling calf (too young to bare calves)
chikkyi	newborn calf
gwaak'aa	Many white caribou on a mountain typically in the fall; scattered all over (not in a group)
tutchun tut kwuvutzui	caribou of the woods or woodland caribou

These names illustrate not only an indication of a typology of caribou, but also an understanding of the knowledge about caribou and its relationship with the land. The Gwich'in's ability to classify things of the environment, states Irving, is the result of an ancient perfected system of an intellectual culture whose oral traditions provide evidence

of people's knowledge of the land. He writes,

> To make fanciful stories significant for observant people, the characters and objects must possess the reality of accurate distinction by name. The dramatic representation and resemblance of reality is an essential basis for illusion and moralizing and the characters executing fanciful performance are only impressive when they have correct natural attributes (p 119).

More recently, this ethnoscientific knowledge of hunting peoples has been reframed and refocused to examine ecological relations, and termed under the banners "local knowledge," "traditional knowledge," and "traditional ecological knowledge" (Gunn, Arolookktoo *et al.* 1988; Johnson 1992; Inglis 1993; Ruddle 1993).[18] Providing a definition, Berkes writes that,

> [Traditional ecological knowledge] is a cumulative body of knowledge and belief, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment. Further, [traditional ecological knowledge] is an attribute of societies with historical continuity in resources use practices; by and large, these are non-industrial or less technologically advanced societies, many of them indigenous or tribal.

Table 4.4 Areas of Local Knowledge - Topics of Discussion -

Aklavik & Ft. McPherson Hunters' Focus Groups (n=10-12 hunters; two 3 hr. focus group; 70 pages of text/group)

- Migratory patterns
- Annual distribution
- Disturbance
- Range conditions
- Herd Range fidelity
- Body condition
- Causes of mortality
- Diet
- Population dynamics
- Competition
- Predation
- Taxonomic distinctions of Porcupine caribou
- Response to severe events
- Taste
- Changing conditions

Clarifications and validations of "traditional ecological knowledge" have highlighted the potential contribution of indigenous communities to wildlife management by presenting it as a legitimate way of seeing and thinking about living resources. Before embarking on a discussion of local knowledge of caribou, it is also important to make an initial distinction between ecology and northern local systems of wildlife management (one which will be explored more thoroughly later); the former being a science of interrelationships as

[18] For a discussion about the differences in these terms see Nahanni (1992).

established with deductive methods and the latter governed with underlying assumptions of caribou as a partner and with experience establishing legitimacy and truth (Cruikshank 1981; Feit 1988; Evernden 1993).

Without a doubt, hunters in Porcupine Caribou user communities know many "things" about caribou and their environment that provide complementary and unique information for explaining "natural" systems. Focus group discussions (Table 4.4) of this research illustrate the breadth of topics about which PCH community caribou hunters hold knowledge. Categories as observations, theories and preferences, together comprise a process of resource management. (See Table 4.5)

Yet as the stories of Mary Kendi and Mary Vittrekwa remind us, the framing of these topic areas is, in fact, a restating of the locals' words into the vocabulary of ecology. While on the one hand, the hunters' "animistic" image of caribou, as invoked in stories and everyday language, can be described as an anthropomorphic projection of self, this personification is also a model for viewing and explaining animal behavior.

This was illustrated with my field experiences. Sitting by the Dempster Highway with a hunter from Fort McPherson, we observed a small band of caribou in the distance while sipping tea and waiting for the man's son to retrieve killed caribou. As the hunter looked at the herd, he began describing the social status and interaction of the various animals. The presence of caribou prompted a narrative of how young bull caribou *(dazho k'eilik)* are sometimes found with a group of cows and how young bulls can "play" with cows by suddenly running, and initiating a herd-level fleeting response. Teaching these animals a lesson, he says, cows will sometimes punish young bulls by shunning them from the band. (Shunning or banishment from the community is, similarly, a serious social sanction that was and still can be imposed on human deviants of community who breach local rules and are deemed by community to be outcasts.[19]) As

[19] In traditional times these individuals were called "brushmen," and lived in the bush independent of community. As well they were feared by community members traveling alone (McKennan 1965).

we looked at the small band of caribou, the hunter pointed to a bull at the group's edge and described the caribou as being "the leader" and having "the job" of watching out for wolves and grizzlies while the caribou graze. Others were viewed as having roles as well.

Table 4.5 Observations, Theories, and Values and Preferences
Examples of "observations," "theories," and "values" documented from interviews with Old Crow, Aklavik, and Fort McPherson hunters.

	Old Crow	*Aklavik*	*Fort McPherson*
Value/choice/ preferences	Traditional on-the-land pursuits can help to maintain a healthy ecosystem and should remain a part of the communities' life style. People need to keep trapping.	People should avoid disturbance and pollution of ecologically important areas.	Temporary hunting closures are needed seasonally to maintain local winter supply of fresh meat.
Rule or theory:	Green vegetation of "muskrat push ups" provides important nutrition source for poor northbound caribou; muskrats i lakes add to health of herd; Muskrat trapping can increase number of rats in lakes.	Caribou select local routes in coastal areas based, in part, on quality of fresh water available in streams.	Caribou selection of migratory routes and winter habitat is based on movements (collective knowledge) of southbound vanguard. If approximately 500 caribou are allowed to pass through border area first, then caribou are more likely to winter in Caribou Mountain area.
Local Observation:	In years of deep spring snowpack and spring icing, northbound caribou move to select lakes and feed on "muskrat push ups."	Hunters repeatedly observe migrating caribou pausing at the freshwater creek draining into Ptarmigan Bay.	In one year caribou came into area, people did not bother them, and caribou over wintered near community. In another year caribou leaders were hunted upon first arrival, herd was redirected in new direction, and caribou wintered in Alaska.

As discussed in Chapter 3, anticipating caribou migrations and herding animals to the *tthulh vutzui* (caribou corral) was, in an earlier time, key to survival. Knowing something of caribou movements was important to success. This knowledge of caribou migration is reflected in social institutions on hunting. People from all three communities discussed how upon the arrival of caribou in the fall migration, community hunting leaders in former days imposed a ban on all local hunting until vanguard caribou of

the autumn migration had first passed and animals had "settled down" for the winter. Stated as a proposition, it could be said that allowing caribou vanguard to pass or not disturbing caribou before settling increases the probability that herd movements will overwinter in the area and not use routes or be deflected to other wintering areas. This proposition is corroborated with early natural history review of northern Canada by Bethune (1937).[20] Elders also told of management of caribou river crossings or *nehttui* (or *vutzui nanttui;* where caribou crosses) with the rule that caribou should not be disturbed (i.e. turned away or hunted) until after the animal has initiated its swimming. The rule, I was told, insures other migrating caribou continue using the *nehttui.*[21]

Mary Vittreka's story of boy-caribou, and the boy's preference to sleep alone speaks to hunters' awareness of caribou's acute sense of smell and its implications to migration. As with most hunters, tracking the wind is a good strategy in the hunt. Using this knowledge as his tool, one community hunter described how he herds caribou with a cigarette by hiking upwind of a group with his smoke in hand. Hunters also mentioned how local wind direction influences herd movements, with caribou generally following their noses. Alfred Francis, an elder of Fort McPherson, explained how time on the land allowed the hunter to know these things about caribou. This, he illustrated, with a story of how a group camping far away from the Peel River in the early 1900's knew of the arrival of the yearly barge with their noses by smelling the oranges it delivered before seeing the boat. As he put it, "We were like animals back then...Still are today."

While migration and movement of caribou are perceived as being influenced by a set of variables, community members also recognized that the process affecting animals'

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[20] Bethune writes, "The routes followed are influenced by such factors as large bodies of water, and whether these are covered with ice or open; hunting by natives or whites, particularly when leaders of the herds are shot down and the original course of the migration thereby deflected; wolves; areas which have been burned over or otherwise denuded of fodder; ice encrusted snow through which the animals cannot break to get food; storms, and other severe weather conditions." (83)

[21] Also see the recently published Gwich'in Traditional Ecological Knowledge Project which was in press at the time of this writing.

movements is highly complex. Indeed, causes of migration and caribou movements are great mysteries to hunters (i.e. areas of uncertainty). Yet some community members "sense" the arrival of caribou. In early August, an Old Crow hunter told me that his grandmother was having trouble sleeping at night because she knew the caribou were to arrive any day. Another told me that he had dreamt their coming. Soon after, the caribou arrived. How did they know? Slobodin (per com.) made the useful analogy of developing an intuitive ability to forecast the arrival of a building storm with no access to weather maps or broadcast reports.

With available knowledge, hunters make their best guesses while seeking more knowledge with an institutionalized set of methods. When there is consistency in findings about the "mysterious" or unknown, theories are espoused by individuals. If they prove consistent over time, preferred actions may be stated and institutions may be established. This process is undertaken in community with a discursive process of exchanging narratives. Differing from Popper's "problem of induction" and solution of "disproving" as a means of establishing fact, northern hunters practice a tradition of sorting through varying interpretations with their own research guidelines.

The sensitivity to caribou's sense of smell has implications for institutions regarding disturbance of caribou habitat protection. As expressed by older hunters, there is a code that land be kept "clean." In caribou hunting the sense of smell and the code for keeping the land is applied with traditional taboos on the presence and management of blood in caribou habitat. Traditional hunters consider it disrespectful to leave a kill site blood stained or to soil one's clothing with blood when working with meat. One woman put it this way. "My father was such a good hunter, he didn't even get blood on his canvas boots."[22] There is a strong norm to cover thoroughly all kill sites with

[22] Alternatively, one hunter suggested cynically that this behavior was actually a way of concealing one's harvest success and thus eliminating the obligation to share.

snow. Sarah Able describes how a bad incident or blood on a caribou route can shift the migratory routes of caribou for years.

Possibly related are the gender role distinctions, and long-followed rules restricting women's activities during menstruation, some of which restrict the participation of women in the hunt (Osgood 1936; McKennan 1965; Nelson, Mautner *et. al.* 1982). Acheson (1977) notes that in 1969, caribou's departure from near-by hunting grounds to more distant areas was explained by community members as being the result of menstruating women picking blueberries.[23] Like the power of luck, this belief is today still observed by traditionalists and neo-traditionalists. This is not to suggest that this and other associated institutions, like women's sequestration during the passage of puberty (McKennan 1965), are to be viewed solely from a functionalist explanation of attracting caribou. As Johannes (1993: 37) puts it,

> Under the circumstances, it is exasperating to read the assertion that superstitions and myths can be taken for granted to conceal functional ecological concerns. Some almost certainty do. But the assertion that all do implies that the *only* preoccupation of indigenous peoples is their natural environment.

Rules about blood do, however, provide insight into locals' awareness of ecological conditions and demonstrate the linkages between knowledge, survival, and institutions, as well as the blurring of "mystical" and the "ecological" distinctions.

Another topic area in which community members hold much experience is in the indicators of caribou body condition. Working with limited resources and opportunities to interact with caribou, a lucky hunters must select quality animals, and thus he economizes the effort of hunting. Well conditioned or "fat" animals are preferred over

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[23] Acheson (1977) writes that during her 1968-1969 field season caribou did frequent the region, but later moved on, with locals attributing the departure of caribou to women blueberry picking on the mountain. During my work in one of the communities, a non-native woman visited a local hunting camp and was later criticized by several hunters for violating the taboo. As well, during a visit of Olvi Mercerdi, the Grand Chief of the Assembly of First Nations, he was invited on a moose hunt by a local. Much to dismay of a non-native female journalist, she was told that only male photographers would be allowed to accompany the man on the hunt. Several women, however do hunt, and it appears that the taboo is more pronounced among the Indians than the Inuit.

those that are described as "poor" (i.e. poor body condition). Asking hunters of Old Crow and Aklavik what they look for when selecting quality animals before the kill, a list of indicators of body condition was developed. (See Table 4.6.)

Table 4.6 **Hunters' indicators of quality caribou - body condition and overall health.**	
Things hunters look when selecting their caribou	• size of rump • gait or waddle of walk • whiteness of mane • size of rack • symmetry and overall shape of rack • number configuration of points on rack • Size and shape of antler shovel • grayness of rack • social role of individual in group • posture of animals when moving
Post-mortum indicators of healthy caribou	• quantity of "backfat" (i.e., rump) • quantity of stomach fat • color of marrow • tone and color of lungs (i.e. lungs stuck to chest indicates poor health) • The color of kidneys and liver • Puss bags on kidney • Absence of "water" in muscles (with water being produced when animals is worked) • contents of stomach (grass filled indicates sick animal) • Presence of parasitic larva in kidneys

The caribou's body condition and overall health are most apparent in the later stages of the caribou production process; skinning, butchering, and handling caribou and caribou meat. In these activities, community members (both men and woman) have much knowledge. Hunters observe year-to-year and seasonal variation in fat content and describe caribou stomach contents as indicators of animal gastro intestinal illnesses. As well, variations in body condition and quality of caribou are reported by some knowledgeable hunters as differing in geographic distribution and the level of disturbance (e.g., in some years, wintering animals in the Richardson Mountains are perceived to be in poorer shape than those wintering in the Ogilvie Valley, an area near the Dempster.) Caribou hunters are also at times aware when weather conditions (icing or deep snow conditions) result in "poor" animals.

As I will discuss later this area of the hunter's knowledge is a potential contributing area of knowledge to the co-management process. And as I will explore in the PCH co-management case study, its integration into the formal process presents a challenge.

Having extensive experience consuming caribou, hunters of Old Crow, Fort McPherson, and Aklavik also reported a sensitivity to differing tastes of caribou, with taste varying seasonally, geographically (by herd), and annually (See Table 4.7). Being sensitive to the taste of caribou meat and observant of caribou's annual cycle, communities have a customary rule that the hunting of bulls be suspended during the rut period (for the first week to ten days of October) because animals activities at this time (i.e. constant movement, wallowing in urine) make for "stinky meat" and the possibility of waste. The prohibition on caribou hunting during the rut is rationalized by some hunters in community as a way of being respectful of the male animals' activities at an important time of the year. It also conflicts with the sport hunter who regularly selects large bulls during the rutting season.

Table 4.7 Local Knowledge of Caribou Taste

Seasonal Variation in taste:

They taste leafy when they come back this way in August. (Inuvialuit hunter of Aklavik)

Year-to-year variation in taste:

They're finally tasting right. I think they are in good shape after many poor years. (Vuntut Gwitchin Elder of Old Crow)

Herd to herd variation in taste:

I don't like Bluenose caribou. They taste like willow" (Tetl'it Gwich'in Ft. Hunter of Ft McPherson)

While these examples illustrate a breadth and depth of community knowledge of caribou, the information and knowledge of caribou are bounded, and to some extent enhanced, by a focus on qualitative measures. Illustrating the point that Gwich'in have had limited experience with quantitative assessment, Bertha Frances told the story of how a young man, pursued by an enemy band of Indians, had paddled his boat upriver and then hid in the bush. As the enemy passed in their canoes, he stacked twigs as a means of accounting for each boat as it passed. As the boats passed again in the

other direction, he removed each stick. While most of the enemy had passed, the man noticed that one twig remained, helping him realized that one boat had been delayed in hopes of tricking him. He waited for some time until the final boat passed before moving on safely.

Qualitative assessment does not fully restrict hunters' discussion of caribou populations. Alex Gordon, an Inuvialuit elder of Aklavik, stated how he had been told by his elders that caribou have seven to ten year cycles in abundance and that those cycles are attributable to the rate of lichen growth and foraging of animals. Other elders living to the south suggested that caribou rotate winter habitat use every seven to ten years. Sara Abel also shared a story of a winter that was followed by winter which provides a sophisticated appreciation of variability in weather conditions and its implications to calf survival and overall herd fecundity. Other hunters asserted that the more caribou taken by hunters, the more caribou will be made available the follow year. While seemingly ecologically irrational and empirically off-base, the several local hunters went on to describe the theory as an extrapolation from community members' controlled experiments in muskrat trapping.[24] Their conclusion -- high harvest yields healthy and productive stocks of animals, a notion that one hunter admitted as striking him as counterintuitive.

Recall the quote from the community hunter who spoke of caribou and truth.

> ...the caribou herd is getting too large, and that is the truth. It is a true fact. Because 40- 50 years ago you don't see no caribou. Very few times, and them days we live on caribou, like this spring I took three caribou up river. I gut the whole thing. I have three little bags out of three caribou. So you can imagine that we lived on caribou long ago, we said, we have 10 , 12 some people have 14 dogs. and you can imagine how much caribou those people kill. But now they don't do that and caribou is getting lots, and I know it is getting lots, because I seen it all these years, not only caribou but everything is getting lots.

This hunter, speaking from his own observations, with historical understanding both of caribou and community, and with the information gathered from news reports,

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[24] Trappers in Crow Flat have found that the more muskrat they take from a lake, the more muskrat of good quality are found the following year.

asserts that the increase in caribou is due to changing lifestyles (increased consumption of store foods, near elimination of community sled dogs which were fed considerable quantities of caribou and the recent decrease in community hunting). When considered in the context of the early fur trade and the a time when high harvests were facilitated with the use of the corral, we are faced with the plausibility that hunters may have affected population, and indeed created a "feedback" effect on the ecosystem.

Still other hunters talked about wolves and other predators affecting the number of caribou available. And several local caribou hunters talked about caribou decreases in population as being the result of animals "going away," a comment which has been suggested as evidence that northern hunters had no appreciation of the concept of herd. While some locals spoke of stories they had heard or witnessed events of caribou out migration from the range, some also talked of past changes in caribou populations as being the result of large groups of summering caribou wandering onto the Beaufort sea pack, resulting in a fatal separation from the coast.

Such accounts of local knowledge on caribou should be understood much as one would hear a community of caribou biologist; there is also an on-going discussion about the observations and the testing of ideas in order to construct explanations of newly observed phenomena. The point here is not to argue that hunters of the past or present behaved with full certainty in understanding their ecosystems. Clearly, stories of unsuccessful hunts and subsequent starvation are well etched into Gwich'in and Inuvialuit people's cultural perspectives on the living world. Rather, I make the point that indeed there was and continues to be a legitimate form of rationality that is governed with a systems of rules and whose presence continues to be employed by local hunters in their effort to answer questions about the workings of their world.

Fienup-Riordan (1990) writes that subsistence ideology is not based on assumptions of finite populations of animals, but rather focused on the uncertainly of animal accessibility. Berkes (1981), writing about caribou and community self-

regulation, makes a complementary point that local systems of wildlife management are bounded by the limits of experience and caribou is widely migratory species. If there were no interactions with caribou during the animals' calving period, there may be a less developed understanding of that portion of the herd's life cycle. It would follow that communities living within an expansive range, like the George River Herd of Canada or the Western Arctic Herd of Alaska, and residing in its southern reaches, would be unlikely to have extensive primary knowledge of caribou during the reproductive phase of calving and a limited sense of caribou stocks as herds.

The issue, however, is much more complex. The range of the Porcupine herd is considerably smaller than the George River and Western Arctic herd and there is good evidence that the Gwich'in and Inuvialuit hunters traveled widely across the PCH's current range (Slobodin 1962; Acheson 1977). Yet Asheson (1977) writes that such travel (e.g., from the Porcupine River Yukon to Barter Island in Alaska) would occur no more than once or twice in one's life. Lines of communication and systems of trading between communities of hunters were, however, far reaching (Wolf 1982; Langdon 1991). As well, the extensive network of caribou corrals across the entire range of the PCH speaks to the capacity of local caribou production systems.

Charlie Peter Charlie, an elder of Old Crow, when asked about the Vuntut Gwich'in's prior knowledge of the calving grounds, was definite in his assertion that people of long long ago had knowledge of the calving ground's location. The claim is also corroborated with a 1950's report of Lang (1952) . Lang, who hunted the Richardson Mountains from 1928 to 1942 and produced an unpublished report which is one of the few documents describing local s' early ecological knowledge of Porcupine Caribou, notes that

> I believe, and many old natives do too, that [caribou] cows prefer the return to localities where they raised their fawns the previous year, and young animals like to return to parts in which they were born, if no serious hazards prevent it. (Lang 1952:6)

The quotation is noteworthy in light of the fact that caribou biologists did not explore the notion of caribou herds as having an affinity to calving grounds until later in that decade. Lang also cited Aklavik native hunters' estimates of caribou to be in excess of 60,000 to 70,000, twice the number calculated by government's aerial census effort of the early 1950's. (Given present-day understandings of the herd's population, these locals' estimates are likely to have been a more accurate estimate.)

Charlie Peter Charlie also indicated that in some years caribou were observed to have calved at Crow Flat, and move on to the coastal plain. Mary Simon, a Tetl'it Gwich'in elder, spoke of how people of the Peel River area have always been aware of the location and importance of the calving grounds, noting that hunters' travel to the calving groups was important for the acquisition of light-weight *cha* (hides) used in making summer clothing and later sold to the Hudson Bay Post, an assertion corroborated by historic records. Would not knowledge of caribou calving grounds provide a basis for understanding caribou as a finite resources?

The point to be made here is that evidence of *what* caribou user communities knew of caribou as a finite resource and how that knowledge may have reinforced conservation ethics is not easily reconstructed. That locals know a great deal about aspects of what westerners term "resource ecology" is clear, however, and that they have their own institutional processes for understanding and their use of the caribou resource more apparent.

4.4 Conclusion

In this chapter I have presented an account of local systems of caribou management, modeled after the anticipation of the hunt and local hunters' traditional rules for management. Guided by the stories of elders, my own observations, and theories and findings documented by other researchers, I have described institutional features of northern community management systems with the objective of

situating local management in a study of community costs of co-management. Several points of the chapter are summarized below.

- The transmission of northern local knowledge is traditionally undertaken through the telling of stories; oral traditions serve as a means of linking community history, individuals' experiences, and lessons learned when confronting challenges.
- Understanding the institutional environment of these communities requires engaging actively to the extent that it is possible in the logical processes of local culture.
- People are a metaphor for understanding caribou; caribou give insight into the ways of people.
- Caribou and people maintain a power sharing relationship as established in a negotiated and long-standing agreement for mutual self preservation.
- The PCH native hunter's management systems include feedback in which uncertainty, obligations to animals and community, and power of knowledge are linked to one's luck in survival.
- Caribou transcends most aspects of community life and today stands as a totemic symbol.
- Communication boundaries of the more segmented western societies are commonly blurred in an unfragmented holism of PCH community management systems. Receipt of messages through dream world is part of an analytical process employed by those that are knowledgeable.
- Legitimacy of knowledge in these local management systems is commonly achieved with primary experience , intimacy of relations, and the status of being among those who know well. The predominance of this experiential approaches to learning reveals itself in the current-day settings and helps to establish the basis of a local authority system.

- Systems of reciprocal exchange, which are components of subsistence hunting economies, remain part of in the three communities economic systems, in spite of dramatic community change.
- The mystical and the rational in these small communities are integrated; local systems are "rational" to the extent that they are guided by rules which are legitimized by a collective through time in an effort to deal with uncertainty.

5. LINKING COMMUNITIES WITH THEIR CO-MANAGEMENT BOARDS

Communications, if taken seriously, will undoubtedly become the black hole of effort and innovation for any co-management organization. It seems that no matter how much you do and how clever your projects are, it is never enough. Some organizations do not experience these frustrations because they never seriously try to facilitate communication but instead rely on the standard procedures which are barely adequate for any audience. (Peter and Urquhart 1991)

PCMB Chairperson's paper, presented at conference of wildlife managers

5.1 Voices from the "Black Hole"

Context: Local hunters discussing co-management, meetings, and community involvement issues at a focus group conducted for this study.

Community member #286: They [the PCMB] were here one time. Here one spring. A really crazy meeting too. If you are going to get up and talk, they had one of these little caps, this thing with caribou horns on it. Just make believe one, uh? And if you are going to talk, you have to put that cap on. Shit, that's not right.

Community member #147: I'd put it in the garbage and tell them that I feel like talking. .. [background laughter from some hunters].. They have to get serious about what they are doing before people want to become involved. One way to get serious is going to the people and saying listen, we want to know what you want. Say how do you want things done?

Community leader #46: But a couple years ago, 1991, wasn't it, 1992? There was another Porcupine Caribou Board meeting and only a small amount of people came too. And *it* was publicized.

Community member #147: But that is not necessarily the way to go about it. I didn't know this meeting [this discussion group for hunters] was coming until Gary come over and say I should go to this meeting. That is what people should start doing around here.

Community leader #46: And there is radio too.

Community member #147: Not everybody listens to radio.

Community leader #46: What do you expect them to do, go right to your door step?

Community member #147: Sure, why not?

Community member #85: Another reason people don't go to meetings is that they don't get enough information.

Community leader #46: There are signs and posters, saying meetings so and so place.

Community member #85: Look at this [conference room], look at this, you can't have a small place to have a meeting.

Community member #147: You keep saying that nobody is going to go to meeting. If you want the people to attend, you have to make them feel that they are a part of the

decision, part of the process, the whole thing, from start to finish. You do up a proposal or a report.

Community leader #46: But you have to get out to the meetings first.

Community member #147: Yeah.

Community leader #46: Like you, like we said, why don't you go to the meetings?

Community elder #270: Look here! [trying to intervene in escalating conflict]

Community member #147: They don't let us go to the meetings.

Community leader #46: Don't tell us about that horse shit. .. [other locals trying to interrupt and stop conflict] .. There are lots of meetings you could go to, it is on, it is on the bulletin boards, on the radio stations. I am sure you listen to the radio station.. . .

[others talk]...

Community member #85: The reason we are not getting people, part of the reason, they are not getting information or they are not interested because, okay, you say you have Porcupine Caribou Board meeting, [and locals say] "What the hell is that?" They don't know. So they wouldn't come.

Community leader #46: Well there *has* to be honorarium. [said provocatively]

Community member #147: Well there doesn't have to be.

Community member #86: Not necessarily. If they are interested, give them information and then trust them.

Community member #85: Maybe next meeting they'll come.

5.2 Chapter Overview

The juxtaposition of the "black hole" image of communication effort, as described by the PCMB chairperson and the voices from community, as represented in the interchange of local hunters of this focus group, provides an introduction to some of the perceptions of community costs related to co-management linkages. Together they raise several co-management questions addressed in this chapter.

- How, if at all, are Mr. and Ms. Local Caribou User linked to their co-management system?
- How do locals hear about caribou management issues?
- Do community members have any knowledge of co-management board?
- How does the user representative function to link community with the co-management system?
- What are the existing communication accountability systems?
- What is the apparent problem?

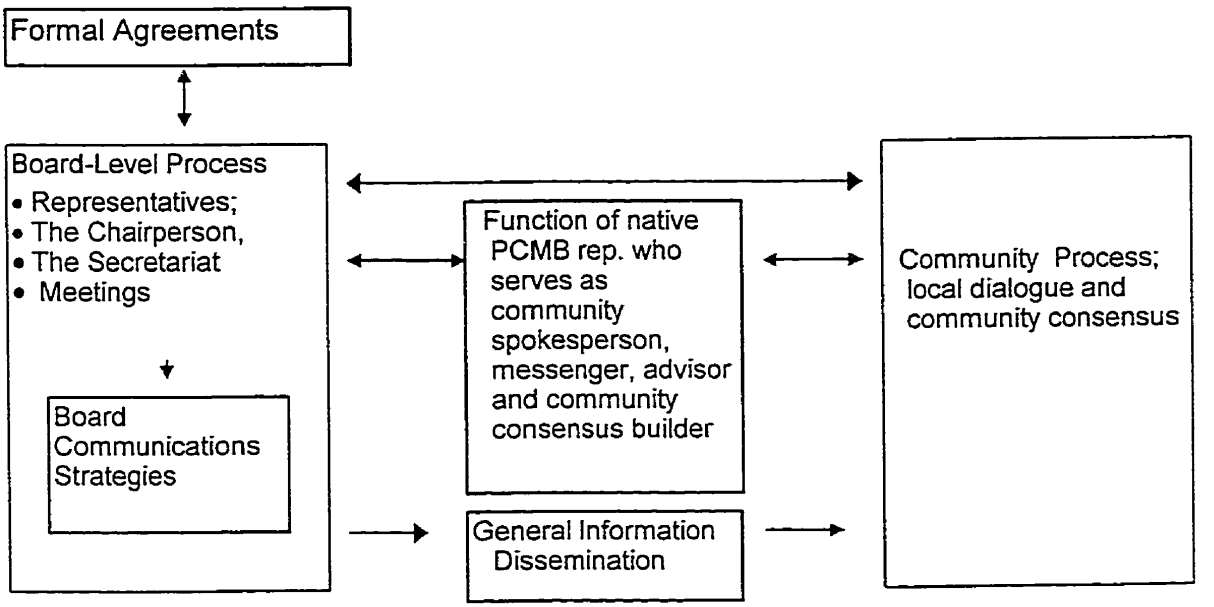
Linking community to its co-management system means providing for information exchange and facilitating a dialogue about collective problem solving that lead to shared commitment to policy decisions and the development of social capital. Linking also means getting the viewpoint of community members to its management board in a manner such that community's voice is a force in shaping policy decisions. For this linking to occur, community members must have a sufficient level of knowledge of the co-management system, or "process literacy" (Grey 1989; Kofinas and Griggs 1996) of where to send its messages; its members must have an adequate level of comfort in communicating their messages; and they must perceive that it is worth the expenditure of energies to share them. The systems must also have messengers who know community, are accountable to it, and serve as agents of change on community's behalf. As well, parties outside community must be willing to share the perceptions with communities, deliver messages in a manner that make them accessible to those at the local level, and be willing to enter into a dialogue about management issues. (Refer back to Figure 2.3.)

The purpose of this chapter is to study community linkages of the PCH Canadian co-management system, looking specifically at the communication strategies of key organizations and actors, non-locals and community members' perceptions of those strategies, forums for communication , and the information network which emerges.

This task is undertaken by drawing on three different perspectives, non-native board members, native board members, and community members, which together triangulate my account of PCH co-management linkages. This task is completed by first documenting communication-relevant elements of the formal co-management arrangement and then co-management board-level communication strategies at the international and Canadian domestic levels. Next I examine the perceptions of board

members and non-native board staff on its implementation and their changes in expectations. The study of co-management linkage next turns its focus on user communities of the system, looking first at the co-management user representative and his/her strategies for linking community with the management process; and the challenges this person faces. Attention is then given to community members, their perceptions of co-management communication process, and what they perceive to be the impediments to their involvement. Figure 51 illustrates the system as assumed to work in theory.

Figure 5.1 Components of Co-management Linkages, as assumed in theory



This chapter supports the finding that domestic board-level communication strategy was initiated with a set of performance assumptions, reflecting expectations about roles and responsibilities for achieving co-management consensus. Among these was the expectation that the community representative serves as an information messenger and plays a direct role in the process of bringing community to consensus. Realizing that expectations were, in part, inconsistent with the local process, agency managers and staff co-management practitioners innovated methods for supporting community representatives' reporting, and later modified those expectations, with

some accepting a "black hole" image of community and placing the "onus" on locals to self regulate community-board communications accountability systems. At the local level, I found representatives using numerous strategies for linking community with the co-management board and in the process negotiating a set of costs which come with that responsibility. Perceptions of community members help to identify another set of costs, with some related to mismatched expectations in changing styles of local level decision making. Emerging is a co-management communication network which functions with several incongruities, community-co-management board information pathways and bottlenecks.

5.3 Theoretical Consideration for Communication, Power, and Power-sharing; The Challenges of Democracy

Community-board communication is among the most important in the achievement of power sharing (Osherenko 1988a; Osherenko 1988b) , yet realizing success in this area may be one of the most difficult (Peter and Urquhart 1991). Co-management arrangements that involve several communities and multiple governments, and which are implemented with co-management boards are, by design, representative systems of governance and contrast with the local-level, collectivist forms of consensus decision typically associated with a small northern community.

While formal agreements, in part, define representative membership in board-level activities (e.g., rules for defining voting membership, rules for selecting representatives, rules limiting terms of office, etc.), informal systems govern cultural aspects of the co-management communication process. Where a community is situated in the management system's communication network influences local-level involvement by determining community access to information, as well as the form in which that information is presented. This situation, in turn, defines community's ability to assess management conditions and respond to crises, and its capacity to project its

own voice and cultivate its powers of persuasion both in board-level consensus processes and in greater political debates.

Daft and Huber (1887) describe information as a resource that can be used as a weapon in inter-organizational debate, as a justification for ideologically based decisions, as a symbol of adherence to norms, as well as an aspect capable of stimulating processes of organizational learning. If power is viewed as deriving from the ability to resolve uncertainty or through the capability of having an impact on decision making, then a group's position in the communication network is clearly an important predictor of power (Pfeffer 1981:130). The exchange of information is also arguably central to the development of cooperation, whether it be through direct transactions in sharing perspectives towards the resolution of collective action problems; or through the communication of one's intent as displayed in repeated actions (Axelrod 1984). Yet rational choice theorists, with their concern focused on individual rationality, are quick to point out that more talk may be only "cheap talk;" more communication does not necessarily change the play of the game.

> Individuals may expose the social dilemma before them, denounce selfish behavior, and exhort others to cooperate, but unless the communication involves side-payments (threats or promised benefits) or brings about other changes in the payoffs matrix confronting each actor (as would occur if altruism were engendered by conversation), the rational actor still confronts an overwhelming incentive to defect. Merely coming to grips with the problem of a social dilemma through group discussion is not enough. Indeed, absent binding commitments, communication may be regarded with suspicion, since promises are presumably intended to deceive others into cooperating while one defects. (Green and Shapiro 1994)

Exploring this assertion in the laboratory setting, the research of Ostrom and others (Ostrom 1987; Ostrom, Gardner *et al.* 1994) shows that communication provides opportunities for individuals to offer and extract promises of cooperation for non-enforceable contracts. Communication can also facilitate the boosting of prior normative orientations. Like the rational choice theorists, these researchers add the proviso that communication alone is insufficient to overcome repeated dilemma problems (in the game theoretical sense). Systems of accountability, whether they include apparent incentives, costs, or some combination of the two, remain important.

Considering the relations between the representative and his or her public, Reich (1988) points out that communication is neither a one-way process of public to administrator nor a simple two-way exchange of ideas. Rather, it is an on-going exchange which is vertical (between government and public) as well as horizontal (amongst administrators and publics), in which preferences interact and influence each other. It is important to recognize that a group's representative is hardly neutral in the exchange process. Reich argues that the role of the administrator/manager is not necessary to express positions or espouse the findings of costs/benefit analysis, but to generate discussion and even debate its future, and to create a process by which there is an exploration and generation of public ideas.

Realizing the benefits of such a process is far from easy. Dilemmas of public accountability and issues of communication are classic problems of organizational democracy, and have been well discussed in the literature (Michels 1960; Etzioni-Halevy 1983; Rothschild and Russell 1986; Rothschild and Whitt 1989). Noting the tendencies of formal organizations to displace goals (Weber 1960), Pinkerton (1989b:31) poses the question of whether co-management systems can break the trends towards bureaucratization, or if these systems will sacrifice more communication and accountability with local communities to achieve management efficiency. Conducting research into Washington State's Point-no-Point case study, Pinkerton and Keithlah (1990) find how those working in these systems face classic dilemmas of democracy, and how the problems of under-representation can be resolved when the individual user representative communicates well within the community, is highly respected among locals, and has the capacity to offer direct input on technical and political matters in the work of the management board. They find that conditions in which effective accountability is achieved vary, and are tied both to systems of accountability as well as personality.

Writing about co-management leadership issues, Berkes *et. al.* (1991) describes the challenge of co-management leadership as a "bi-cultural" skill, and asserts that experience,

> ... strengthens community leadership, and strengthens the confidence of the community as a whole, partly through peoples' recognition that these activities are competently, successfully done, and partly in response to the recognition by Cree experts and administrative authorities, of Cree competence and traditicnal knowledge (Berkes, George *et al.* 1991:19).

What then is the effect of culture in the co-management communications process, and the resultant costs to the native representative who is directed to bridge the gulf between the cultures of local community and the culture of the agency?

Unfortunately, many institutionalists writing of information exchange and communication process of common property management do not take institutions as reflections of cultural perspectives seriously enough (Martin 1993). There is little appreciation of post-modernists views of culture and language as influencing *what* a collective negotiates to be established as shared meaning, and *how* it arrives at such "truths"(see Geertz 1973; and Cruikshank 1998) . While in more southern latitudes these issues may be less pronounced, in the Circumpolar North, where cultural perspectives on uncertainty and collective strategies for coping with ambiguity are uniquely evolved, these issues are significant.

These cultural differences emerge in co-management when procedural formality of meetings confronts the local cultural process adapted to internally-paced consensus decision making. In a discussion of land management planing, Gallagher (1988) points to several problems associated with the formal meeting as a venue for involving community in the discursive process of resource management. Among the problems discussed, Gallagher notes differing notions of time and sense of schedule, a topic which was addressed in Chapter Four's discussion of local systems. As it was put by Alaska Gwich'in Sarah James (1992) when addressing academics at a policy conference,

> You might want Indians to make a decision. Ask them for a question and they just sit there - - - take them a long time to answer. Sometimes they don't even answer until a week later. Because they are looking at all angles to make decision. Because they don't make decision just on sea animal or just on land animal or just on birds or anything like that. They have to focus down to everything in order to answer the question.

Second, Gallagher points out that public meetings tend to encourage direct and confrontational styles of debate, a form of public discourse that he says is also uncommonly observed among aboriginal peoples. Gallagher adds that institutions dissuading boastful expression, discussion of topics on which the individual feels s/he has little knowledge, combined with the expectation amongst agency planners that all will participate at community meetings, make for inconsistencies. According to Gallagher, at times it is only key individuals who talk on behalf of community as a whole. Gallagher does point out that the research for his argument is meager. As well, it should be noted that such generalizations are not equally applicable to all northern culture groups; Inuit and Athabascan differences in these areas have been described to be considerable (Honingmann 1981). It is also well recognized by those who study northern aboriginal language that cadence and linguistic structures and, thus the underlying institutions are distinct from the English speaker (Scollon and Scollon 1979; Scollon and Scollon 1981). Moreover, such distinctions are perceived to exist in the range of expressive aspects of northern peoples (e.g., presentation of self, distribution of information, and the contents of discussions) These differences are contrasted in Table 5.1.

Of Athabascan languages, the prominence of the verb over the noun stands in contrast to the English speaker, for whom the emphasis rests on "things" - an orientation which has implications not only in linguistics but also in the philosophical approaches of human-nature relations (Bateson 1991; Evernden 1993).

Table 5.1 Comparing styles of communication

Perceptions in Athabaskan-English cross-cultural communication adapted from Scollon and Scollon (1980: 21-22)

What's Confusing To English Speakers about Athabaskans	What's Confusing To Athabaskans about English Speakers
THE PRESENTATION OF SELF	
They do not speak. They keep silent. They avoid situations of talking. They play down their abilities. They act as if they expect things to be given to them. They deny planning.	They talk too much. They always talk first. They talk to strangers or people they don't know. They brag about themselves. They don't help people even when they can. They always talk about what's going to happen later.
THE DISTRIBUTION OF TALK	
They avoid direct questions. They never start a conversation. They talk off the topic. They never say anything about themselves. They are slow to take a turn in talking.	They ask too many questions. They always interrupt. They only talk about what they are interested in. They don't give others a chance to talk. They just go on and on when they talk.
THE CONTENTS OF TALK	
They are too indirect, too inexplicit They don't make sense. They just leave without saying anything.	They aren't careful how they talk about people or things. They have to say "good-bye" even when they can see you are leaving.

Co-management processes of information exchange are further confounded by issues of communication boundaries. That is, not only are there issues of stylistic differences, but these matters extend to questions about with what entities we communicate. How is the agency manager to respond to an assertion that the hunter "knows" of coming events through his or her dreams? The implications of the culturally defined permeability of communication boundaries in living resource management are yet another problem area in collective efforts to resolve problems.

It has been suggested that in order to achieve effective co-management, linguistic and cultural barriers have to be removed (Osherenko 1988; Huntington 1991). Although it is important to remove barriers where possible, complete barrier removal may suggest the possible achievement of an impossible goal. At best,

communities will most likely have to negotiate the kinds and extent of the costs associated with their involvement in systems which are foreign to their own.

At the outset of this chapter, co-management communication of a board and communities was described as a "black hole." An alternative explanation is that the non-local actors of the co-management system function with limited understanding of community and a set of assumptions that are maladapted for community's institutionally defined social process. In this explanation, co-management arrangements are implemented with a set of communication assumptions which manifest a set of operational expectations. I summarize them as:

1. Community co-management board members will know with whom and how to share their perceptions.
2. Community co-management board members will share their perceptions on management.
3. A community member's messages will be delivered to the board-level arena for inclusion in decision making.
4. A co-management board will reflect on community messages to the board when exploring alternative actions.
5. The co-management community board member will share sufficient levels of information with community to allow them to participate in the management process.
6. A co-management board will disseminate that information in a manner that allows for process of demystification.

Figure 5.2 Media Richness

Modified from Daft and Huber (1987).

medium	*richness*	*degree of intimacy*	*and rate of feedback*
	HIGH		
messages from dreamworld		intimate	continually reflective
making talk when sharing time on the land		intimate	immediate
face-to-face home visits		intimate	immediate
unstructured public meetings		immediate	public
structured public meetings		formalized and public	moderately immediate
telephone		verbal, without visual	rapid, immediate
fax		formal to informal	moderate to slow
written communication, addressed and personal		formal	slow
electronic media (radio and TV)		informal	limited feedback
written communication, not addressed		very formal	limited
	LOW		

To assess aspects of the PCH co-management communications strategy, Figure 5.2 provides a simple measure of intimacy and rates of feedback of various forms of communication efforts, which Daft and Huber (1887) describe as especially critical in conditions of high equivocality. "Richness" is defined here as a condition which facilities a process of learning (*ibid.*). Implementing A Co-Management Communications Strategy

The section below outlines the development and adaptations of the formal PCH co-management regime's communication strategy.

5.3.1 Creating a Domestic Co-management Strategy

"Improving communication" is one of five stated objectives of the Canadian Porcupine Caribou Management Agreement. A related objective is to "provide for participation" of native users in management. Membership rules insure community's place at the table and community control in selection of membership. The agreement is explicit in its language that native board members sit as representatives of communities. PCMB "Operating Procedures" elaborate on the overall board responsibilities in this area to include disseminating of information and making of reports available. A "job description" for board representatives is not articulated.

Following the agreement's directives, PCMB's members began the work of formulating a communication strategy as one of the first items of business.[1] In that process, a representative from Northwest Territories inquired about the PCMB's proposed methods of communication with its user communities. Having sat as a member of the Beverly Qamanirjuaq Caribou Management Board (BQCMB) in NT, he drew from experience to describe the use of *Caribou News*, a printed publication of that co-management body used to establish linkages with the public. The NWT Government representative talked about the importance of community meetings, and tabled an offer from the BQCMB for *Caribou News* to serve as a means of communicating with the two groups of caribou users. The PCMB explored the options, and elected to go it alone and develop its own communication strategy.[2]

While discussing the various ways the board could meet its communications duties, a PCMB native representative and community chief advised other board members that, at the local level, there are plenty of meetings to send the message of the board across to the people, such as band meetings, settlement council meetings

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[1] The account of the formulation of the PCMB's communications strategy is based, primarily, on board minutes with some details provided by various board members who were serving at that time.

[2] In Canada the term "table" means that the proposal was presented, whereas in the United States to table is to postpone. Here I use the Canadian meaning.

and monthly joint meetings. To explore the alternatives further, it was decided that a consultant be hired to review and recommend methods for meeting these duties.

At the subsequent meeting, follow-up discussion on the development of communication strategies brought natives and non-natives to concur that the principal media focus should be on user communities. The GNWT representative again drew on his caribou co- management experience to offer suggestions, stating that the radio broadcast medium is the most effective means of communication, with posters being good for particular messages. It was also noted that having the management board hold meetings in user communities had significantly aided in the BQCMB's communication effort. The GNWT member recommended that these meetings include a public session of about one half day where the board can respond directly to questions from community residents. A native representative concurred that people would rather listen to radios than read a newspaper. It was noted that the communication effort must include a wider audience than user communities, but should first concentrate on the villages. It was agreed by the board that radio, posters, and community meetings are the best formats. To address the details of the issue, a subcommittee was formed to address the communication strategy.

At a subsequent meeting, the consultant presented her communication report (McPherson 1986). The presentation focused primarily on communication as a public relations effort with no discussion of the cultural issues, no mention of the special problems of linking with community, and no discussion of the role of the representative. The consultant advised against using printed media in community interactions (e.g., reports). The consultant did, however, inform the board of the legitimacy and purposes of various communication tools -- persuasion, education, information feedback, and consultation. No community contacts were listed in the report as having been interviewed in the development of the proposed strategy.

5.3.1.1 The Board's Strategy

By April 1987, a multi-method communication strategy was launched, with additional methods added in later phases of the board's implementation. Methods focused on community as the target of the effort (and in some cases overlapping with other groups) and included:

Electronic media

- Bi-weekly radio program in English, Gwich'in, and Inuvialuit on 4 radio stations
- Television Announcement produced annually and distributed to Canadian Broadcast Corporation North
- Production of an educational video documentary about PCH and co-management process
- Production of "Nature of Things," to show PCH and local peoples
- Radio reports by native board member after each PCMB meeting on local station
- Interactive video as a discussion tool for single issue produced and distributed

Printed media

- Monthly newspaper column called "Caribou Almanac" appearing in five northern papers
- An information packet containing five pamphlets about caribou and board printed and distributed
- Annual report, published each year and distributed to 75 agencies and organizations
- "Technical Report" on caribou biologist and management topics printed
- Board meeting summaries distributed by mail to 45 organizations
- Fax messages reporting on caribou locations (satellite collar reports) and other details distributed to First Nations offices (initiated in 1992)
- Occasional special radio interviews with key people (e.g., board chairperson or caribou biologists) to discuss topical issues

Public meetings

- PCMB meetings are held in communities about three times a year and are open to the public if they wish to sit as observers. Meeting locations occur on a rotational basis from community to community
- Public meetings held in conjunction with PCMB meetings. These meeting generally include an informational session with time allotted for the awareness of locals questions.

Symbolic images and meeting attendance incentives

- Ball caps, posters, and mugs with PCMB logo are freely distributed at PCMB meetings to those attending and to others.

Field observations and interview findings about key methods of communication, especially those aimed at engaging community in the co-management process, are explored later in this chapter.

5.3.1.2 The "Management Plan"

The management plan is a another communications method developed by the PCMB which runs on a three-year cycle, and is representative of the innovation that is possible in a co-management process. Perhaps more importantly, it provides an accountability system for tracking the status and completion of action items recommended by the co-management planning process.

The PCH co-management plan concept was developed primarily by non-community board members, and in its design phase, met resistance from a government representative board member who preferred that the board follow a more conventional wildlife management plan method.[3] As an alternative to the conventional wildlife planning model, which commonly includes a full literature review about the resource, a set of broadly-stated conservation and research objectives, and which typically ends up collecting dust on the agency manager's shelf, the PCMB Management plan is a living document which blueprints a structured process of

[3] The decision to go forward with this plan design is one of the few times the board made a decision by voting. The conflict about the proposed management plan was reported to have been between non-native board members, and did not directly involve natives.

accessing needs and decision making of what to do about those conditions. The PCMB management plan model is organized primarily around a process in which board members gather every three years and for several days articulate the status of management conditions in a number of management areas, express immediate and long-tern concerns about that area, and agree to a method for addressing those concerns. Finally, board members identify what party will assume responsibility for completing the action item . Table 5.2 presents the basic planning matrix of the PCMB co-management plan and the general questions posed in process. Appendix 11.6 includes a detailed example.

Table 5.2 Basic Matrix with Questions Guiding PCMB Management Plan Process

Issue areas	*Physical Condition*	*Herd Pop.*	*Habitat*	*Co-Mgt. Communications*	*Culture & Education*	*Tourism Activities*	*Industry Activities*
Status (current)	*What is the current status of the caribou resource vis a vis the issues area; what are the current programs to address past initiatives?*						
Concerns about mgt. area	*Are there problems associated with the status of each area?*						
Solutions to concerns	*What should be done about those concerns?*						
Actions for coming year and parties responsible	*What are the action items listed for coming year and who will take responsibility for completing each one?*						
Actions for year two and parties responsible	*What are the action items listed for year two and who will take responsibility for completing each one?*						
Actions for year three and parties responsible	*What are the action items listed for coming year and who will take responsibility for completing each one?*						

Printed as a matrix, "The Plan" designates not only who is responsible for each task, but also includes a method for updating parties on the status of each action item each year. To facilitate the process of tracking the status of action items, agency board members meet periodically to review the plan and assess the status of various action items. With respect to community involvement it is noteworthy that only

governments are listed in printed plan as organizations assuming management responsibility for actions.

My observations indicate that while community members were active in the three-day planning process that is used to formulate the plan every three years, there was little to no direct involvement of natives in the on-going planning process of the plan. That is, community representatives do not participate when agency members and the board's secretary gather (generally after hours of the board's meetings) to review the status of various action items. When a suggestion was made by a government representative to the PCMB that Native organizations be listed alongside governments as those assuming management responsibility, local board members stated their preference *not* to be included, giving the rationale that communities are already overburdened and overworked with land claims process. In short, communities' members assume a role in guiding the management planning process, but few of the assigned responsibilities associated with completing action times and few to no tasks assigned are assumed by Native organizations.

Functionally, the plan is administered almost single-handedly by the board's secretary, who serves as a coordinator and accountant of completed and uncompleted tasks, holding government agencies accountable for board-level decisions that might otherwise slip through the cracks and be forgotten. As noted in the examples above, "telling the public" is integrated into many of the action items. At least theoretically, the plan offers community board members, local leaders, and other agencies, all of whom receive it via mail, the opportunity to track the status of various co-management activities. Practically, this is rarely if ever done; and after mailing over 100 copies of the plan to these organizations in 1993, the board's secretary received feedback from only one (federal agency staff person in Ottawa), with no comments received from communities. One might assume from the lack of response from communities that the co-management board is on the right track. An alternative explanation is that there is

a disconnect between the board activities and the activities at the local level, and that the reports are filed without being read or reviewed.

5.3.2 The (absence of an) International Board Communications Strategy

The Agreement for the Conservation of Porcupine Caribou (i.e. international caribou agreement) has language similar to PCMA, calling on signatories (US and Canada) "to encourage co-operation and communication among governments, users of Porcupine Caribou, and others" and to achieve the objectives of conservation, users' participation, and customary and traditional uses of the caribou resource.

The International Porcupine Caribou Board (IPCB) has never developed a structured communications strategy beyond the publication of its annual report. Agency members of IPCB have defined the function of this board as being a coordinating body (regularly noted by board members that there is no "management" in its title.) This limited definition is motivated, in part, by concerns that the agreement and the International Board could infringe on government agency jurisdictions. While the PCMB assumes the primary role in caribou management communication in Canada, it also finds itself facilitating delivery of information to Alaskan PCH user communities.

As noted earlier, the United States (US) has no parallel co-management body focusing on caribou. US agencies provide little communication support to their respective local users. The International Porcupine Caribou Technical Committee (previously formed as an *ad hoc* group of biologists) was formalized by the IPCB in 1990, but offers no direct communication link to communities either.

General functions of this board in voicing community concerns and representing communities' interests in caribou have been confounded by political vagaries of the US Federal Government 's Administrative Branch. Holding a pro-1002 development policy, this branch (first under Ronald Reagan and then under George

Bush) used its authority to select its Alaskan board membership in the first six years of implementation and imposed its political bias on development by not selecting an Alaskan Gwich'in (anti-development) to the International Caribou Board. Later, the US Government ignored the agreement requirement calling for regular meetings, and in effect, stalled all board-level activity (and formal face-to-face communications) for about a year. The situation did not change until January, 1993, when the Clinton administration assumed responsibility for the oversight process. Table 5.3 provides a schedule of past meetings and locations of the IPCB.

Table 5.3 International Porcupine Caribou Board Meetings

Dates of meetings	location/place	conditions
4/10-11/89	Marsh Lake Marina, YT	
8/22-23/89	Fairbanks, AK	No quorum established when Alaskan user reps do not show up at meeting
1/16-17/90	Aklavik, NT	
8/1-2/90	Fairbanks, AK	
extended lapse in meetings due to government inaction		
3/11/1992	Old Crow, YT	
8/11-13/92	Kaktovik, AK	No quorum due to missed planes
1/27/93	Whitehorse , YT	No quorum due to extremely cold weather
11/9-10/93	Arctic Village, AK	Gwich'in Representative from Alaska selected
5/94	Dawson, YT	

The US community system of representation to the IPCB contrasts with that of Canada. Canadian communities, through the PCMB and with governments, have a Memorandum of Understanding (MOU) signed by PCMA signatories parties (governments and organizations), designating that the PCMB Chairperson is to serve as Canada's user representative to the International Board. The MOU is informal and its legal standing as a contract is questionable. However, the MOU does set a

precedent and has been observed by the Canadian parties since the establishment of the International Agreement.

Also of note has been the role of the PCMB to advance the interest of community representation through the implementation of the International Agreement. PCMB minutes indicate an early effort by the Canadian caribou management board to support the negotiation of these terms, with much of the work coordinated through the Canadian Office of External Affairs (during the periods after the PCMB was established but prior to the signing of the International Caribou Agreement in 1987) and later directly through the IPCB and governments after its establishment. Among these efforts was a proposal by some Canadian government representatives to create a "Users' Committee" which would parallel the International Porcupine Caribou Technical Committee. The minutes of the PCMB indicate that when this plan was proposed (along with the effort to formalize the Technical committee), it was met with resistance from the US delegation, although the reports I gathered from various individuals conflicted.[4] Regardless, no user committee has, to date, been created, and only after the election of the Clinton administration (which holds a no-development policy) was there representation from a wider spectrum of Alaskan users.

The International Board, impaired by the political volatility of the Arctic National Wildlife Refuge oil development issue, muddled through its nascent stage of development with limited activity. After the changes in board membership and at the agency level implemented by the Clinton administration, the board did finalize its "Plan for International Porcupine Caribou Conservation," which, among other tasks, calls for a set of action items to achieve the bilateral agreement's communication objectives. The board has also compiled and produced a report identifying sensitive PCH habitats

[4] It was reported to me by a Canadian government IPCB member that at a later meeting the US delegation shifted its position and was amenable to the idea of a user committee; and when the proposal was actually tabled, the Canadian user representative stated that there was no such need for this body. The user representative had no recall of the event.

(IPCB 1993). During the time of research, however, limited substantive activity of the IPCB has been undertaken.

The problems associated with community representation and local-state information exchange through an international body illustrate an important example of government manipulated transaction cost. In the contrasting conditions in the US, community transaction costs associated with unspecified community membership rules have the potential to derail fully a co-management process. With federal governments holding rights to membership selection, communities are left vulnerable to government choices. As political winds change, so can communities' access to the seat at the international table. And while Canadian user communities have enjoyed a quasi-guaranteed representative at the international table, the effectiveness of that body to work on behalf of community caribou management objectives has been limited.

5.4 Non-native Perspectives on Representation; Their Assumptions, Experience and Adjusted Expectations

In the previous section, elements of the Porcupine caribou regime's co-management communication strategy were presented. This section describes non-native board members' perspectives on the PCMB communications strategy, these members' effort to make the strategy innovative, and their changes in expectations. The strategy of the system and the perspectives of non-native users set the stage for identifying the sources of community communication costs related to co-management. Overall, it is important to point out that representatives to the Canadian co-management system assert the sophistication and effectiveness of PCMB communications strategy, and by comparison, other co-management bodies of the Western Canadian Arctic pale in their relative efforts at developing a community-oriented comprehensive communication program. It is in this respect the PCMB's strategy is regarded as "the model" among co-management practitioners. This

projection of the PCMB systems as a model raises the question of how it actually functions, and how it has evolved since the implementation of its communication strategy.

5.4.1 Readjusted Expectations

Drolet *et. al.* (1987) describe the changes made by the Coordinating Committee of the Quebec Cree, one of the oldest co-management bodies in Canada, as a progressive adjustment of perspective and attitudes to its own experience, successes, and failures. Soon after establishment of the PCMB and dealings with several "decisions," non-local board members (government members) came to question and readjust their understanding of the role assumed by representatives in the communication process. To summarize their new perception:

- The user representatives do not consistently serve as information messengers to the public of their communities.
- User representatives do not consistently utilize written correspondence in their management role and at times do not respond to it when it is received.
- User representatives do consistently express personal viewpoints and regularly do not "speak for community."
- User representatives regularly do not function to coordinate communication between the board and various local formal organizations.
- User representatives regularly do not serve to bring community to consensus.

Relevant quotes from government representatives

The quotes below capture some of what non-native board members perceived (as documented in unstructured interview) to be the causes for the shift in expectations and their feelings about it.

5.4.1.1 The ubiquitous "representation problem"

> [Native representation] is not a problem that's issue specific. It's a problem that's related to the fact that the native members on the board do not keep communities informed about what the board is doing on any issue and if these people are specifically requested to poll their community, find out what the community feels about a particular issue, and it doesn't matter what the issue is. That's rarely done. ...

I would like to have seen more rigorous participation by the native reps of the board... I don't think there is this sense that you sit on the board and you represent all these people and you have an obligation to go back to these people and back to your community and let them know about what issues the board is dealing with and what information the board is using and what information the board needs and maybe the board needs answers to some questions from that community and this member goes back to the community and he works the community, you know, like a representative should. That doesn't happen. And I wish it did...

I think it happens a little bit in some communities. In some communities it may happen for two or three times and then it won't happen for a year or two and then it might pick up again. But I would like to see more commitment on the native users.

5.4.1.2 Perceptions of changing performance

The involvement of community members has always been a problem, because they tend to... after a couple years...come to a meeting, but don't go to their [community organization] and say "I was at this board meeting and this is what they said. How do you feel about it?" He just goes home? He goes back to his job, ya know, and that is it.

5.4.1.3 Paper and the oral tradition

[A]t the end of the meeting when I am cleaning off the table there are no notes. So you say to yourself, "Well, maybe that is OK, they'll keep it all in their heads."... If you want [a user rep name] to do anything, don't send him a letter. Which is a real problem when you get to the point we have decided at the meetings we would have the community members more involved... [One local representative] never comes with his notes even though I send them to him.... Paper doesn't mean anything to him. I was in his house and I saw stuff that I'd sent him that he hadn't even opened. Because he know what was inside it. It is paper! (Laughter)..

5.4.1.4 The high cost to the board's staff of maintaining links with communities

Securing the money and then physically doing the work, I mean it all takes time to do that which is time taken away from doing something else. So on the administrative side, that appears to be, anyway, fairly time consuming. Things like getting back and forth to people on paper, phone calls, audits, reporting, and accounting for the money, and all that stuff.... But what would be the function of someone who wanted this thing [i.e. effective community-board communications] to work? So I'd phone everyone, and then I get into the bureaucratic. "Well the band meeting was last week and they are not meeting again for another month." What do I do now? I could conceivably spend my entire life on the phone, so I'd have to mark that down. I have to call [local rep.] two days before the meeting and make sure that he has his stuff. So that is the way boards go... Our board has a fairly hefty [communications] budget, but most boards don't, you couldn't afford to pay someone to do that level of office stuff.

5.4.1.5 "Dumping some of the onus" on community members

For one thing they [PCMB people] do a great job at communicating with the communities and meeting in different places and having the public show up, etc. That's always been a strong suit for that group. It goes a long way for awareness etc. and then you can sort of dump some of the onus of following up on what this group's doing on the actual people in the community. I think in the case of the individual representatives that at times it is a lot to expect them to go back to the community and get the word in. I think that the Board, in my experience, at times thought that there was a lot more communication going on in the community than there actually was. That the reports back were a lot more extensive and far reaching than they actually were.

5.4.2 Government Representatives' Readjustment of Expectations

As described by former and current board members interviewed, experience in the co-management system shifted non-native members' expectations. Those changes can be summarized as:

- Non-native representatives assume primary responsibility for oversight and logistics of co-management activities.
- The board's collective membership is viewed in the letter of the PCMA as representative of community but functionally as symbolically representative of a generic native community with a cross section of locals (e.g., elder, young up-coming leader, chief, claims negotiator, etc.).
- Responsibility for establishing accountability of user representative to community is assumed to rest with community.

Reflecting on the emergent system and the profile of board members, one non-native board member put it this way.

> This is the best way for the board to function . . . the way boards are designed to function are as a slice of community.. and if you have 25 boards in the community and if you have 2 or 3 board members on the rest of them, it might be best, in the theoretical sense..

Highlighting his awareness of the problem as fundamentally ones of cultural incongruities, admitting to the respective roles assumed by various groups, and reflecting on the condition, this non-native board member offered a telling quote and an important question.

> Well then, the whole system is two white guys sitting in [name non-native board member]'s living room talking to each other...But maybe that is not so bad. It doesn't sound it when you say it – two guys, southern educated guys, sitting in the room. . . if you were to write it that way everyone would react to what you said, they'd say, "This is crazy." [But] this is *our* system, this is not a native system. We are imposing, I mean the whole thing, starting at the government system... The board answers to the government, the board system is not part of the native system.

To summarize, non-native members of the PCMB describe their understanding that the co-management process did not meet their initial expectations, that they recognized that the problems were ones of incongruity in styles of representation, and they, in turn, modified what role the board members would be expected to play in the process.

5.4.3 The Mayo Amendment

Improving community-co-management board communications can, from an efficiency perspective, be understood as a method for reducing transaction costs when seeking to streamline a co-management consensus process. Improving accountability is one method of achieving this goal. There are, however, hidden costs related to who implements an accountability system, and how accountability actually functions. Implemented by those external to community, there is a possibility that such initiatives will be viewed by those at the local level as imposed and be met with resistance and resentment by locals. Conversely, if implemented by community and self imposed, they come with the expectation of outsiders that community leaders will follow through to make commitments credible. This relocating of authority and with it, the internalization of enforcement costs from an external agent to the local level, has significance to compliance problems. I discuss this type of costs again when deconstructing the 1993 Caribou Crisis.

Several events have precipitated board-level and community-level efforts to bring improved accountability to the area of representative-community communications to the system. Among those initiated from outside the community is a PCMB resolution I call "The Mayo Amendment."

On December 4, 1989, more than two years after the establishment of the PCMB, the board grappled with problems related to achieving consensus on developing barter and trade guidelines for native Porcupine Caribou users, a board-level decision which demanded community-level discussion and local approval. Several non-native board members, as well as the board's native chairperson, although allowing locals to undertake the process on their own, noted to me that they viewed the Barter and Trade consensus process to be inefficient due, in part, to the

apparent lack of board-community members' communications as facilitated by local board members.

At the same meeting that these Barter and Trade issues were being discussed, the board also received a memo from the Minister of Yukon's Renewable Resources regarding community sales of caribou antlers to an Asian buyer. The Minister's memo was prompted by a letter from a community nurse, in which she reported her perceptions on local hunting activities associated with the sale of caribou antlers and her general concerns about the future of the herd. What is relevant about antler sales in the analysis of co-management communications is how information is shared and with whom it is shared between parties in various organizations at different levels of the co-management system. As reported to me by native board members, at least two local representatives from other user communities were aware of the community's antler sale contract *before* the arrival of the Minister's letter, and had consciously chosen to not inform non-native board members. As one native board member reported,

> I heard it through the grapevine about that issue and I knew sooner or later that issue was going to be coming to the board. And our Chief in Council had said that if that issue had ever come up, this is the position that you are going to have to take...

Also associated with the same meeting was an incident of a native representative's intoxication, a topic that was discussed more directly by native members of the board and will be addressed later.

In an effort to improve the flow of information between the co-management board and communities, several non-native board members drafted and tabled the Mayo Amendment (PCMB 1989) . The amendment, along with several others, was moved and seconded by a government representatives and passed unanimously. It reads:

> Following each regular meeting each user member will report to the Band council, HTA or HTC in their community and at the following regular meeting of the board, user members will report the response from their communities to the Board.(PCMB 1989: Appendix III 2.1.8)

No discussion of the amendment appears in the board minutes nor is there any evidence of discussions amongst board members in the board-meeting tape recordings. An agency member recalls the events of late 1989 and reflects on the board's response:

> The trade and barter issue was an issue that native members of the board dealt with themselves. The government reps on the board were not part of that sub-committee... everybody on the board felt that this was a native issue, a user issue and the user reps on the board should tackle this one through fairly substantial dialogue and liaison with their individual communities, and come up with some strategy of dealing with this. And I think it was in that context some of the board members and the executive board member [i.e. chairperson] too felt that there wasn't enough exchange of information between the community member, the user representative and the community, and that's how we started thinking about how we could facilitate this.
>
> Maybe there were things that we could do to make it easier for them. I mean it's not kind of a slap on the wrist. Come on, do your job. It's maybe all of our stuff was written material. Maybe there was something wrong with the way we were dealing with this and we needed to somehow facilitate that communication between the representative and the community and that's where we came up with this sheet at the end of the meeting, which was kind of a fact sheet and questionnaire. To kind of jog their memory when they left the board meeting.

The effort to supply a pre- and post-meeting user rep questionnaire to be used by each user representative in his or her home community was also undertaken by the board secretary for three meetings subsequent to passing the Mayo Resolution, but was abandoned when it became apparent that the innovation was neither being utilized by locals nor facilitating the desired process. Reflecting on the trial and error efforts of board members to innovate methods for improved communication, one government manager and board member commented,

> There's lots of different ways to tackle it and you simply have to understand the realities out there and don't continue to use a mechanism strategy that you know has a high chance of not working. You always make sure that you use things that will work. You know the situation. There's no excuse for not doing it right just because of a principle that you think this god damned community rep should behave this way, we'll just keep dumping on them. It's not going to work. If it doesn't work, use another technique. And you're not going to change a sixty year old man in an old community. So you have to understand how communication works and work with it. Don't change it, just work with it.

Key non-native co-management members, although disgruntled, were resolved to settle with a community-board communications system that was primarily based on the dissemination of information through electronic media and at public meetings where public attendance at meetings was variable from community to

community. Additional communication methods were developed to meet specific needs (e.g., video tape discussing Dempster Highway hunting issue was distributed to communities as means of informing them on the decision facing the board, an educational video for use in the schools). As well, meeting attendance "inducements," in the form of free PCMB hats and posters were offered to "get the crowd out" at the board's public meetings.

As the co-management system moved from infancy to early adolescence, various management crises siphoned energies (in particular was the 1002 development scheme proposed for the caribou calving grounds in Alaska and the PCMB's increased activities in that political debate). This controversy limited the dedication of human and financial resources of communication to internal community process, and energies were reserved for more immediate tasks. Adding to the system's resource strain, the board's newly selected chairperson adopted a communications policy stating that all but the most formal community-to-board interactions were the responsibility of the board's one-person secretariat. Non-community board members came to the realization that the issues of local representative accountability were best resolved through the internal process of community, rather than external pressure for user representatives to adapt to an imposed system, and that co-management would function as a quasi-representative/quasi-independent body, or, as a board member put it, a "symbolic slice" of community.

The style of "working with it," described by the government board member above, meant that while the board had to function within its own finite resources (e.g., limited staff, time, and money), it would create a communications strategy that would, in effect, also be perceived by some at the agency and local levels as sub-optimal. Consequently, the board established a pattern of interacting which, on the one hand,

expected a great deal from the user representative as a communicator and consensus builder, and on the other hand, was limited in the support it could offer.

This situation would continue for the first nine years of the board's existence. If community-board communications were to change, it would be up to the user communities to design their own accountability system and put it into place. Reflecting on the emergent system and his philosophy of leadership, a PCMB chairperson commented,

> GK to Chairperson: I was wondering if you ever had to nudge a rep or make a suggestion, have you ever had to take that kind of leadership?
>
> Chairperson: Not really, because I don't really see that as part of my role. If a concern was lodged directly with me by a member of their community, then I would relay that message. That's just my style of doing things. I'm not a person who likes to be the bad guy, kind of thing. In my mind the concept of representation brings with it the responsibility of accountability. So if you, for example, are a representative on a particular organization or board, that brings with it the bonus of having to account or report to your constituents what you're doing or not doing. And, my view, it's up to the representative and their respective communities to resolve those kinds of things.
>
> GK: For you, accountability should be at the community level?
>
> Chairperson: Exactly. It's definitely a bottom up process as I see it. Like I say, if a particular community wanted me to raise in a formal sense something with the Board, that's within their right. There's nothing wrong with having a small group that's actively involved, but all the people have to understand what's happening. I mean accountability doesn't stop from a territorial to community level; there has to be accountability within the community. Accountability, I'm using that as a generic term to imply that there is understanding and agreement and support for various decisions or activities or undertakings. I mean, that's part of the process as I see it. More responsibility, more accountability.

There are several power-sharing implications of the emergent communication systems. First, a self-regulatory approach to community supervision of local representative in community-board communications would allow each community to design an accountability system in its own time and in a manner that it prefers. Such systems, if implemented, would, in turn, be dependent upon the availability of the time, financial, and human resources allowing for its development to occur, as well as the commitment of local-level leaders and the public at large to maintain them. Second, this situation would in the interim create a situation in which external agents serve as

gateways for the flow of information and interpreters in deciphering the process of their meaning, both of which would leave community vulnerable in the interim period.

5.5 The Challenges Facing Community Representatives

In the previous section, the co-management communications strategy and non-local perspectives on that strategy were discussed. In this section the focus is on the role and perceptions of the local representative, specifically who these individuals are, how they are selected, and their strategies for engaging community in the co-management process. More specific to the research, the question of costs of community as anticipated and incurred by the board member is addressed. A number of costs specific to this important linkage in the co-management system are identified.

5.5.1 Profile of User Representatives

Since the establishment of the PCMB to 1995, twelve individuals have served as community board representatives, with two of these individuals serving as members for a full nine year-period. When reviewing the profiles of these people, some common characteristics are found. Most representatives have first-hand experience in local and non-native cultural worlds, and have previously moved back and forth between village life and living on the land, and a more urban existence. Many of those who have served also assume multiple-roles, or, as referred to by one local, are "professional meeting goers," sitting on several boards and committees and regularly attending out-of-community meetings. For example, Table 5.4 provides a list of the roles and board memberships of one PCMB member.

Table 5.4 Listing Of Aklavik User Representative's Roles In Addition To PCMB Membership

- Wildlife Management Advisory Council (North Slope)
- Herschel Island Technical Committee
- Aklavik Aboriginal Committee
- Inuvialuit Game Council
- Aklavik Hunters and Trappers Committee Officer
- Aklavik Elders Committee

These multiple roles, along with those assumed by government members of the board, provide the PCMB with linkages with local-level activities as well as other co-management processes recognized to coordinate PCMB's involvement in various planning processes. Conversely, this arrangement sets up the potential situation in which only small number of decision makers may be aware of and influence management activities. In July, 1988, the PCMB's native membership was represented on Wildlife Management Advisory Council (North Slope), Wildlife Management Advisory Council (Northwest Territories), and the Yukon Fish and Wildlife Management Board.

Native PCMB board members that I interviewed all had good to excellent native language skills, and thus were able to converse both with elders and young members of their communities. More than half have completed grade 12. None holds a college degree.

Of those who serve their community on the PCMB, there are several for whom alcoholism has been a problem, and most of those serving are among the community members to have achieved a prolonged period of abstinence. This is not to suggest that there have not been problems related to alcohol at PCMB meetings, a topic to be addressed later.

And as already noted, these community board members face a daunting task with a wide range of responsibilities, often coming with conflicting expectations. As board members, these individuals are cultural interpreters of local traditions to non-native board members and other agency personnel; reporters of information to community members; reviewers of technical research proposals; evaluators of herd

health; policy advisors to local leadership and through the recommendations of the PCMB as a whole, advisor to Ministers of the Federal and Territorial Governments. Working as a part of the PCMB's lobbying campaign to gain wilderness designation for area 1002 , board members have also made presentations to Congressional Committees in Washington DC and in Alaska. By the letter of the agreement, they are spokespeople for community and commonly these people are, or emerge to become, among those in community who "know" or "speak for" caribou.

5.5.2 The Selection Process

By the terms of the PCMA, native representatives are selected by regional organizations (i.e. CYI, IGC, GRRB), but historically have been selected by local organizations (e.g., HTC, Chief and Council, Regional RRC's of the Gwich'in) with those selections requiring approval of their respective Minster of Renewable Resources. From interviews with board members and community's formal leaders, it is clear that community's limited talent pool factors into a local group's appointments. One native PCMB member commented that people of the communities who sit on these boards don't volunteer to be selected, but are often drafted. As he put it,

> This is not California. One does not get to choose whether or not they're going to serve.

I asked 55 community members if they would be willing to serve as a PCMB member if asked. 65% responded "yes," 13% responded "yes," yet expressed some hesitation, and 20% responded "no." Of those responding "no" and "yes" but hesitant, more than half mentioned the *cost of being entangled in political conflicts* as the reason for their answer. (This issue will be discussed below.) One community leader summed up the issues of board membership and availability of potential representatives by pointing out that the problem is not a question of peoples willingness to serve, but the limited supply of people the community as a whole feels are ready for the job, given its importance to each community.

5.5.3 Reasons Community Representatives say they serve as a PCMB Member

Current and former PCMB members gave several reasons why they serve as board members. Among the reasons cited are a sense of responsibility to serve community, a need to put their skills to good use, as well as gaining the opportunity to become well informed. As two representatives, quoted below, stated,

> It's not, it's not just for the money that they go to the meeting. It's a meaningful thing and you have to, that's what the money is there for. And I would like to use it good ways, I mean, the best possible ways we can to make use of that money that's coming to us.

> [M]y reason is I like to be kept informed. If I had not been on the board, I would have had to go to representatives on the board. It gives me some satisfaction in that I am doing something. Not only am I just a user of this caribou, but also trying to help. Trying to be helpful anyway. Because, today, our life doesn't depend on the caribou, but it's a major part of our life. If there was no caribou, boy I'll tell you, that meat [price] is going to go up.

5.5.4 Methods Local Reps Use To Communicate With Fellow Locals And Get Them Involved In The Process

What methods do native representatives use to facilitate the communication between the board and communities and engage locals in the co-management process? Native board members described a variety of techniques they draw on to link the board activities with community. Commonly, the selection of their methods is considered with respect to their understanding of their constituency's needs and the social conditions of communities. The following methods are among those mentioned, and are followed by illustrative quotes.

5.5.4.1 One-On-One Visits With Locals And Follow Up Research.

> [S]ometimes some people don't really care to stand up in a community meeting, but would really like to know something about what is going on... I've had that happen quite a few times where someone would visit with me. And then, I would have to do some research myself. Or call people and find out more information. Some old people put me in a tight spot [looking for answers to questions] sometimes.

5.5.4.2 Engaging Locals to Encourage Involvement

> Sometimes I try and get people involved by taking them to meetings, by sitting down and talking to them about the issue that is very critical to them and I see something that is going to be affecting their children. That's my way of getting them involved and sooner or later, down the road, they're interested. Or else, I even take them out hunting and

talk to them out there in the bush or in the wilderness about different, various issues. Once you're out there, they feel their contacts to the land, they feel their contacts to the fish and wildlife, and they also feel their contact to Mother Earth and nature. That's where a lot of our people usually get hooked into issues that are here today and you can get some people and talk to them and they don't want to get involved because they think it's so political they don't want caught up in the political life.

5.5.4.3 Informal Community Research before a Meeting

Usually, before the meeting, I know what's going to happen .... We get an agenda. From there I take whatever I think is important and I go to visit a few people. I talk with them about these things, and that's how I usually get some information on it. I visit people who are quite busy on the land....the old man next door....and some other boys...people like [middle aged hunters], and the older people mostly. I tell them, I need to know because I'm going to the board meeting and if I'm asked any questions, I need to have information. And this is why I'm poking at you. And that's how I usually get information. People are usually pretty willing to talk, and not just a casual conversation.

5.5.4.4 Reporting to Organizations

The hunters and trappers (Committee), I basically either meet with them one to one or I gather them all up together and I tell them that these are the issues that I want to talk about. I wouldn't mind to sit down and have a meeting with them.... And I also meet with [another local organization] who basically coordinate themselves around the hunters and trappers meetings, Chief and Council meetings... they coordinate themselves around other board meetings.

In additional to these methods, one board member makes periodic announcements on the radio after each PCMB meeting or after key events to report to his community members about current affairs. These radio reports are typically given in Gwich'in.

5.5.5 Member as individual or community representative; Methods for coping with a community of many voices

Earlier in this chapter, I reported on non-native perspectives of whether the PCMB functions as a representative body (i.e. speaking on behalf of their community) or as an independent advisory body and slice of community (i.e. where representatives speak as individuals). The question of representation raises the question of how community board members negotiate local conditions and work with the board to formulate policy. Are native board members simply speaking for themselves, or do conditions at the local level make it difficult to speak for community as a whole? In some respects, these questions force one to address the internal

political process of communities and the manner in which native consensus processes actually function today. The methods described below demonstrate how local representatives create their own strategies for working as agents at the co-management interface and endeavor to meet their responsibilities.

One example of how native board members deal with issues of heterogeneity at the community level is drawn from the report of a young representative who in the early stages is reported by a non-native board member as unwilling to make board-level decisions for his First Nation, insisting that he go back to community and get an okay on all issues, no matter how insignificant. Later, after becoming more acquainted with the policy perspectives of his people and somewhat frustrated with the pace at which local level decisions were achieved, he was more willing to commit to board-level consensus without a local-level check-in. As a strategy of establishing his own position when community spoke in many voices about a particular issue, this board member also drew on his skills interpreting the stories of elders as a method of identifying the best direction for his community.

> I'm a little more confident in making my decisions and knowing the whole process of the board, knowing the process of the First Nation positions that they're taking through their constitutions, through their resolutions and knowing that those are mandates that are given to me and given to the people that are representing that First Nation or representing that community. [When] taking things back to the community like that I'm not very familiar with or not sure of, [I] first take it back to our Chief in Council, I take it back to the elders and I also take it back to the people who are affected, such as the hunters and the trappers... After communicating with them and hearing what their positions on these positions are, I try and gather all those positions up and make it as one collective position, and going back and looking at the resolutions that come out of the General Assembly and putting those together.
>
> I also sit down with the elders and try and communicate with them a lot more and listen to their stories. There's only some people that can really pick it up in terms of the elders and their stories and I, myself, was really one of the lucky ones that was brought up in that process and listened to the elders' stories and listened to my dad and friends and brothers and so on, and basically giving me the knowledge, listening to the stories. And in the stories they're laying out the position and in that story, if you're not listening to those stories that they tell you. In those stories there are messages there for you and you have to figure out those stories and what they're saying to you, because they are giving you messages. And it's so unique and only so many people can pick that up.

5.5.6 Costs borne by community representatives when involved in the co-management process

Thus far I have discussed co-management linkages from non-native and native members' perspectives to describe how native members of the PCMB link community in the co-management process. Below I draw on interview data and field observations to delineate costs borne by local representatives when working to link communities with their PCH co-management board. These are illustrated with native board members' quotes.

5.5.6.1 Feeling obliged because of the *limited talent pool and the needs of community*

A sense of duty also comes with the weight of obligation. Being among those in community capable of doing such jobs, these people are regularly "caught wearing four or five hats."

> You have key people in the community, like myself, and like a few other people in the community. Because of the lack of knowledge and the education other people in the community don't have, and they aren't very familiar with the process of land claims and the process of these boards, these councils, these committees and the terms of reference that these boards go by. Not very many people are familiar with this and there's a lot of lack of education, so they don't want to take on these responsibilities. So people like myself are caught up in wearing four or five hats. And what would happen if somebody like myself had so much responsibility in representing the community in so many various different ways, all of a sudden had to go somewhere or disappeared. Who would take on all these responsibilities?

5.5.6.2 Competing demands from other responsibilities

Competing demands of various task create occasional hardship for board members. Not described here but also mentioned was *the cost of traveling out of town for meetings.* In several cases, local board members described how these responsibilities interfered with their subsistence hunting opportunities, took away from family obligations, and changed the pace of life.

> Well, you know, there are times when this board meeting does get in the way. There are times when I have to go out and talk to people. This is infringing on my time. For instance, you know, when beginning of September the court circuit was in [community], I had to attend the court because I'm probation worker. And I decided I'd better do that, but I also had to do some things for some other people. You know, it was kind of a squeeze. Sometimes, it's sort of awkward. But, not trying to neglect this probation

> services, but there are times when I do put the board ahead of everything else. As long as I know what's going on, I try to keep myself prepared for it. Keep myself open so nothing else interferes. I just do that!

5.5.6.3 Difficulty interpreting technical information

Interpreting technical data was commonly described as the most challenging aspect of a board member's work. This issue is not restricted to interpreting science (which will be discussed later in the context of the 1993 Caribou Crisis), but cuts across a range of management activity areas (e.g., public policy making process, impact assessment processes, evaluating existing regulation, etc.) The PCMB member below speaks to issues of dependence which emerge in these situations.

> Reading science, technical reports, that's a tough part [of working with the PCMB]. I try to understand [technical reports], but gee, mostly I just depend on [board secretary] to make sense of it and tell me what they're about.

5.5.6.4 Overcoming one's own inhibitions

As noted, northern peoples have culturally defined norms for dealing with conflict and achieving community consensus . The quote below captures the struggle of one board member who strives to overcome his own inhibitions while meeting the challenge of providing local organizations with information.

> Yeah, some people are kind of shy. Not shy, but they just, yeah, shy too, and they just don't speak up. They have lots to say. but they just keep it inside them. Me, I'm starting to speak up a little bit and now you just kind of keep quiet, go to meetings and then just put your head down and you come back, but you have to report too, report at least to the Board Members.

5.5.6.5 Knowing what to say, being lobbied, and managing the politics.

While some community members noted that they are not interested in serving as board members because of the costs associated with being embroiled in political conflicts, this board member referred to the costs he incurs when having to be accountable to community by reporting on issues and board-level positions.

> You have to watch what you say sometimes in the meetings... And then you get bullied up to the people that doesn't like what you say and what I've learned is that you got to watch what you say and then, if a guy says something, something wrong two, three times, [locals] just get him out of the Board.

5.5.6.6 Getting caught in community's crossfire and being the subject of criticism

Of the board members I interviewed, there were several casualty cases, people who were formerly involved in the PCMB or other aspects of community life, but who left because of the high cost of being subject to public scrutiny.

> When you get involved with the political and speak out, you're always on stage. They're [fellow community members] always talking about you.
>
> I really had a hard time taking information back to the community, because communities had different ideas and different thoughts on it and different people in the community took a different positions because there was a lack of understanding.

5.5.6.7 Keeping various activities straight, taking notes and reporting back to community

Two long-standing and elder board members (i.e. late fifties to mid-sixties) talked about the problems associated with sorting out the differences in various issues addressed by the board (e.g. various research projects) and keeping track of those issues while participating in several co-management processes of which he is a part. One of them expressed his concern that the may be providing misinformation.

> But some guys know it, they know a lot... and know everything what's going on and then know what to say and what not to say. Sometimes the [issues] get mixed up. I go to about two, three different meetings and I forget to put that down on a piece of paper and then I forget and then say the wrong thing about it.
>
> GK: Did you mix up which board meeting you're attending?
>
> Yeah, which board and what I'm talking about and sometimes they [fellow community members] ask me questions, and I give the wrong answer.

5.5.6.8 Negotiating around community pathologies

Several board members referenced their work with the caribou management as leading them to confront more directly community pathologies like drinking and violence. These were referenced in relationship to the board members' efforts to motivate locals' participation in local level decision making and in the process become exposed to the internal conflicts of community, especially as related to alcohol.

5.5.6.9 The costs of train locals who are beginning to plug into community affairs and attend meetings; and working with community apathy

> Well [fellow local] just started going to meeting. [Unintelligible] first time he started going to meeting. All these years they didn't give a shit. Last time we called meeting, where's [fellow local]? There's one time I told him when you start coming to meeting you're going to say, "Well I don't understand. I don't know what this meeting is about." But the time will come, I said, when you have to attend meetings and then it's going to be hard. Like [other fellow local]. All these other people stay clear. It's okay. See. All them people. Where are they when there's meeting? And we're just about all burnt out from meeting. Look at what happen to [another fellow local].

While some community PCMB representatives mentioned the need to train new community members and provide some form of succession planning, several also spoke of the "hassles" of having these people who generally have little experience traveling, tagging along, and being responsible for them.

5.5.6.10 Bearing the responsibility of being a decision maker

For this quoted native board member, one of the most difficult aspects of the job was being on the front lines of decision making, and by the terms of the job, making decisions on behalf of fellow locals.

> The hardest part of the [PCMB] job, for me, is coming back from a meeting. Coming back from a meeting and then coordinating the things that have been given to me and I have to take back to the community and wondering whether I took the right position, whether we made the right decisions, and taking it back and reporting it to our people and wondering what thoughts and decisions and answers they are going to give.

The PCMB's one-community representative per each of the three native organizations provision raises communications costs both for community and the native board member. The board's structure results in each local representative having limited opportunities to share his or her impressions of board-level transactions with the fellow community members (commonly three-day events). The local representative, and that representative alone, bears the burden of sorting out issues speaking on behalf of community, and then communicating the essence of board-level activities back to community. One community-based initiative to resolve this problem was sending one or more community members to accompany each representative.

This solution is financially problematic because of the high cost of travel and the expectation by community members participating in meetings that they will receive honoraria. To address this problem area and broaden the involvement, the PCMB has also used its own funding to bring alternative members to meetings periodically.

In summary, community PCMB representatives utilize a range of methods to link community members in the co-management process and incur costs ranging from opportunity costs that come with the expenditure of time, social costs related to exposure to political conflict, as well as psychological costs which are associated with bearing the burden of community decision making. The list provided above is not intended to be fully inclusive. It does, however, provide a basis for assessing the challenges facing these individuals and assessing the performance of the system.

5.6 Towards an improved communication system; community-generated efforts at representative accountability

This section turns the focus of the chapter from the perceptions of the native board member to address the emergence of a community-based accountability system, with the understanding that communications are, in many respect, a form of accountability in all governance systems. In the section above I noted how government board members for the most part have assumed a non-intrusive approach to forcing community PCMB members to function consistently with their original expectations. Below I present three case studies which together illustrate community initiated efforts to make local PCMB members more accountable to community management objectives. As well, they touch on three dimensions of accountability related to communication -- sobriety and native participation, native land claims and organizational capacity, and accounting for change by balancing tradition with the modern skills needed for caribou management.

5.6.1 Case # 1-Maintaining Sobriety

This case illustrates how native board members (independent of government members) dealt with the issue of board-member sobriety, and removed a fellow First Nations representative (and key negotiator of the PCMA) as a result of this individual's recurring intoxication when in the service of the board and community. Differing from some northern co-management boards, the PCMB has never established formal rules on sobriety for members, but maintains an unwritten code of ethics for appropriate and inappropriate behavior.

5.6.2 Case # 2-Changing organizational networks and capacity

On March 12, 1993, about one year after signing its land claims agreements with government, Officers of the Gwich'in Renewable Resources Council (GRRC) gathered for a regional meeting. Meeting at the Finto Hotel, these organizations passed several resolutions, with three relating to Porcupine Caribou Co-management communications. They read:

- Motion 93-12 - Calls for moving the PCMB office from Whitehorse to Fort McPherson since that is the largest community of caribou users
- Motion 93-14 - Call to send RRC delegates to the coming PCMB meetings to be held in Inuvik
- Motion 93-15 - resolved, that the delegates request more information be sent to the GRRC's on Porcupine Caribou and that the current representative of the Gwich'in consult with the RR Council and the Gwich'in Tribal Council on the activities of the PCMB

Motion #12 was passed with the assumption that the PCMB in fact has a government-based office in Whitehorse, and that the co-management board would better serve caribou users if its offices were based out of a user community. Motion #93 was passed in an attempt to monitor better board-level activities and provide a stronger community voice at board meetings. Motion #15 was passed as a recommendation to the PCMB that more and regular communications be disseminated to communities. A Chief of these communities later commented that he regularly

receives fax messages with summaries of meetings, but feels out of the loop, wanting more complete records to maintain Porcupine Caribou Management office files. As well, he sought opportunities to draw on his own political contacts to support the board's political efforts with the ANWR issue. Later, PCMB, agency board members met with the chief, to his surprise, and informed him that that the PCMB maintains only rustic office facilities (a room in the back of the secretary's garage) and that its total operating budget is approximately $150,000 per year.

The three 1993 Finto Resolutions illustrate how supplementary community resources and additional organizational capacity can allowed communities to modify and improve on user representative accountability and in the process learning more about the co-management process. In this case, the settlement and implementation prompted more community-to-community discussions about the performance of the co-management system and the perceived absence of user rep-community. It is not clear from the evidence if and how this effort has been maintained over time.

5.6.3 Case # 3: Local Calls for a more traditional community representation

A third dimension of co-management accountability is identified in community-level calls that traditionalism be adequately represented through the appropriate selection of membership, an issue that is not easily resolved given the nature of the task of serving as a member. As I observed, this issue was raised publicly at a local community meeting where two women voiced dissatisfaction that their PCMB member was not a "traditional" user. In the statement, the two locals made an appeal for local leadership to re-appoint a hunter who really "knows" caribou. Later I found no evidence that there was any direct response to this call, and the incident may have been as much a public statement about the need to follow traditions as it was specifically focused on the individual user. As well, there are local-level factions in all

small communities, and rivalry regarding which group is perceived to hold the balance of power.

While some interviewed caribou users also expressed sentiments similar to the two women, others stated that co-management board members should be young adults, educated in the western ways, and capable of addressing the technical issues of caribou management. Clearly there are apparent contradictions in some of these statements, yet in most cases locals noted that a PCMB co-management board member be a community member who understands and asserts community management objectives, regularly interprets events to community, and is motivated by non-pecuniary incentives. (See Table 5.5) The reference to drinking

Table 5.5 Characteristics of prospective leaders mentioned by locals:

Interview Question: *If you were on a committee to chose a community representative to the caribou board, what kind of person would you recommend?* (Statements below are quotes from users interviewed.):

A person knowledgeable about old and new ways.
Someone who speaks for people, and someone who will keep them (government) on track.
A strong person.
Someone who doesn't do it for the money.
A young person who will learn from the experience.
Someone with lots of time on the land, not someone just out of school.
Good hunters.
Someone who has good words and is a good hunter.
Someone who drinks lots of brew.
Someone who'll go around and visit, not like the current person who never comes.
Young people that'll go around and tell folks what's going on.
Someone on the land; someone who knows our livelihood, some one college educated, maybe more than one person. Two together, because of the language.
Members of [First Nation] educated in college.
Lots of different people.
Someone who likes to argue, who goes after what they know, but then again, you have to keep an eye on those people.
Should be a young person with old there as observer.
Someone who comes back and reports and someone who talks our language.
Elder who knows caribou and speaks real good.

brew (i.e. home brew) reflect a political situation in some communities in which pro-prohibition factions are in opposition to pro-drink citizens, each with their own prospective candidates for positions of leadership. The issue of remuneration (e.g., payment of honoraria) was expressed by locals as a concern, and was framed with respect to community leadership changes from the time when local leaders earned little to no dollars for their service to those who today earn a profession salary. Issues of changing aspects of community leadership, communication, and community decision making will be discussed later in this chapter.

5.7 Local Perceptions of Co-management Linkages

At the introductory section of this chapter, I presented a portion of a community discussion group in which community hunters stated that there was little awareness of the caribou co-management system among locals; and that meetings, as currently used by the board and as functioning in community, did not allow for adequate levels of community involvement in the management process. Clearly, a community that has little knowledge of its potential co-management linkages and which faces inappropriate methods for community involvement incurs considerable costs when seeking to voice community management needs and objectives in decision making.

This section now turns from the perspectives and actions of board members to community members' perceptions of co-management linkages and delineates costs of involvement as they are anticipated and incurred by those at the ground level of the co-management system. In the section below, I present some findings from my interview questionnaire which serve as indicators of community members' knowledge of the management system. I also draw on interview findings to explore how locals hear about caribou management issues, and then address some of the apparent problems of meetings as a venue for community dialogue.

5.7.1 Locals' Knowledge of the PCH Co-management system

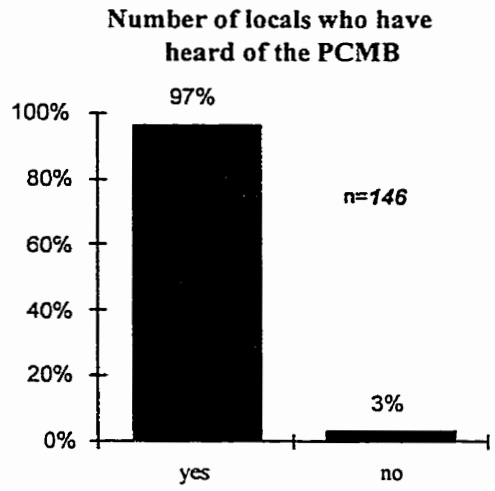

Figure 5.3 Number of locals who have heard of the PCMB

I asked 148 people if they had heard of the Porcupine Caribou Management Board and found that the overwhelming number of them had. (See Figure 5.3) It is no surprise, given that the name "Porcupine Caribou Management Board" is displayed throughout these communities on material distributed by the co-management body. PCMB hats (i.e. ball caps with the PCMB insignia) are favorite fashion items among the men. PCMB drinking mugs are also well distributed among the homes as are posters and other PCMB paraphernalia. This high degree of name recognition can, with qualifications, be compared to research findings conducted by Kruse, *et. al.* (MAB 1995) of the Beverly Qamanirjuaq Herds (Canada) and Western Arctic Herd (Alaska) caribou co-management systems. In these systems, 46% and 29% users responded that they heard of their management boards, respectively. The difference in awareness here may be related to the greater geographic scale of those systems,[5] or be attributable to differences in sample selection methods of our two studies.[6]

A review of cross-tabulated data indicates no significant relationships between various classes (i.e. age, employment, socioeconomic status) of users and their respective knowledge of PCMB. I did discover in more open-ending questioning of

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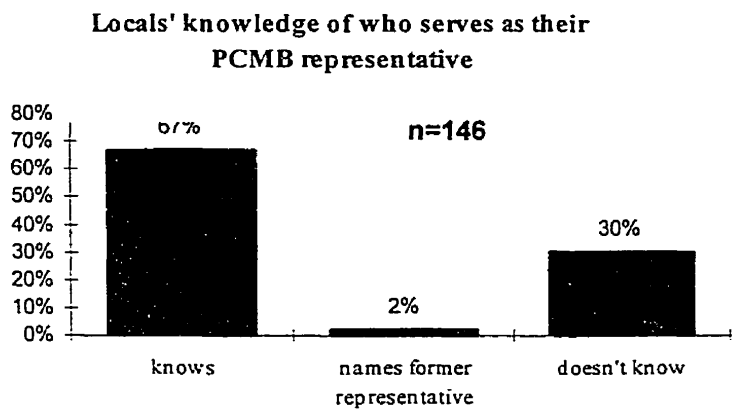
[5] The Alaskan Western Arctic Caribou and Beverly Qamanirjuaq Caribou systems address management with 31 and 16 user communities, respectively spread across a larger geographic area.

[6] The study of the Western Arctic and Beverly Qamanirjuaq system used a method of random sampling to collect data. As previously discussed in the methods section, local participants in the structured interview of this research were selected to represent a cross-section of community hunters.

hunters that there is some confusion regarding what is meant by "Porcupine Caribou Management Board." For example, one hunter responded that he had heard of the PCMB and went on to reference it as "The outfit that sends me the harvest questionnaire each year." (That questionnaire actually comes from Yukon Territorial Government.) Another hunter referenced the PCMB as "Those government people who fly around and do all that caribou research." Discussions with other users revealed that many locals have difficulty (and express some frustration) sorting out the array of co-management structures and new land claims organizations created in the region, much like the board member quoted earlier.

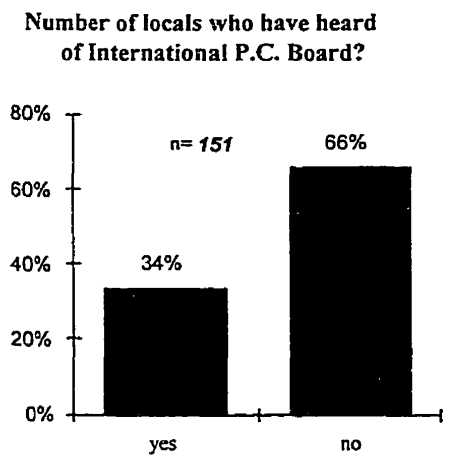
Figure 5.4 Locals' knowledge of who serves as their PCMB representative



I also found that while the vast majority of locals had heard of the PCMB, fewer knew the name of their local representatives; 30% of those interviewed did not know the name of their PCMB member. (See Figure 5.4) There was some confusion of Old Crow locals who indicated that they perceive Yukon's Public at Large representative (also from Old Crow) to be their community representative.[7] This perception is likely to be the result of this particular individual functioning as a local board member, advising local leadership on matters of caribou management, and being seen by community members as having a good knowledge of the political facets of caribou management.

[7] The decision by YTG to select a native member to the PCMB for the one spot available for a non-native and non-government representative was intentionally given to a Vuntut Gwitchin member as a way of building trust between parties in the early stages of co-management development.

Figure 5.5 Locals' knowledge of International Porcupine Caribou Board



Given the lack of activity and low visibility of the International Porcupine Caribou Board, it is no surprise that locals have less awareness of the International Board than the PCMB. (See Figure 5.5) While there was little difference identified in awareness of various groups of locals (age, employment, socioeconomic status) the data do indicate that older community members are more likely to know about the International Board than younger community members. A plausible explanation may be the richer historical perspective of these older community members and the participation of key elders in the early negotiations of the International PC agreement (*circa* 1970's). I also found that several community leaders (council chairs and officers of local organizations) reported that while they were aware there was an International board, they knew little to nothing about the body's work.

5.7.2 Patterns of "Don't know" responses and locals' overall knowledge of the management system

Interviews with locals about the PCMB and the IPCB reveal a pattern in their "don't know" responses. As might be expected, the more in-depth the question posed about the board's activities, the greater the "don't know" responses given by locals. An interpretation of "Don't know" responses, however, requires qualification. As well, it begs the question of how much they want to know.

Preston (cited in Honingmann 1981) believes that when a Cree subject answers numerous questions with "I don't know," he means, "I don't know how to reply

to your question in a way that will be satisfactory to us both." Preston adds that when resorting to narrative responses, the complexity of the situation is readily discussed. When interviewing locals about the range of PCH management issues and the performance of PCMB, I found that while some locals may have used the "don't know" response both as a way of referencing the complexity of conditions and their unwillingness to respond, others echoed the comments of the focus group participants which opened the chapter by talking directly about their limited awareness of the formal caribou management system and the activities of the board. In some cases this limited knowledge is described in spite of a local's direct involvement at meetings As one put it,

> I am not too familiar with that group, I really can't understand them. I went to a meeting three years ago and couldn't understand. My wife might know, but I was lost.

5.7.2.1 *Illustrative quotes indicating locals' understanding of the co-management system.*

Open-ended questions posed to locals regarding their awareness of the international aspects of management, and particularly management of Porcupine Caribou as assumed by government in the United States, generated somewhat emphatic statements about the lack of understanding of topics on issues perceived to be far beyond the realm of their community. Given the controversy around the Arctic National Wildlife Refuge conflict, and locals' general mistrust of US caribou management, these statements can be interpreted literally, as well as an expressed unwillingness to engage in topics of political controversy. Others, noting the need to stay focused on their own homelands, stated that such matters were the responsibilities of natives living in those areas, and not the concern of their community.

Table 5.6 Patterns of "Don't Know" Responses	
Question topic	*Percentage of "don't know" responses*
1. Individual hunter's trust in the PCMB	15% don't know
2. Expectation that leadership will hear about board decisions	22% don't know
3. Perception of who controls the PCMB	51% don't know
4. Trust of US in PCH management	34% don't know

Table 5.6 lists a set of topic areas and the percentage of "don't know" responses in each. Topic area #1 addresses the relationship between the individual and the PCMB, and yielded the lowest of the set in "don't know" responses. Topic area #2 addressed an operational issue at the community level and yielded 22 % "don't knows." The question regarding the PCMB's internal operations, #3, provided the highest number of "don't know" responses , with many locals commenting that they were not familiar enough with the board's operations to make such a judgment. The 34% of the "don't knows" from question #4 were described later to indicate that some of these locals' have both a lack of understanding, and some discomfort in telling a US citizen researcher their feeling about the American system. Unfortunately, no questions were posted asking locals what level of detail they optimally would like to know about their co-management system. Clearly, those comfort levels relate in some way to issues of trust, perceived legitimacy, and current and changing concerns.

5.7.3 Sources of Information on Caribou Management

As a method of identifying the ways hunters of these communities receive information about caribou management issues, 81 locals were asked, "What are the 'main ways' you hear about caribou management?"[8] The most frequently mentioned information sources by these hunters include radio (16%) and meetings (9%), with a native PCMB representative (referenced by name), their local organization (e.g., HTC,

[8] This question regularly raised the need for clarification from me regarding what was meant by "caribou management," to which I responded that caribou management is decision making by governments and communities that may affect caribou and user communities. This explanation was generally illustrated with several examples of management issues (e.g.. ANWR, Dempster Highway Hunting, Antler Sales, Caribou Research).

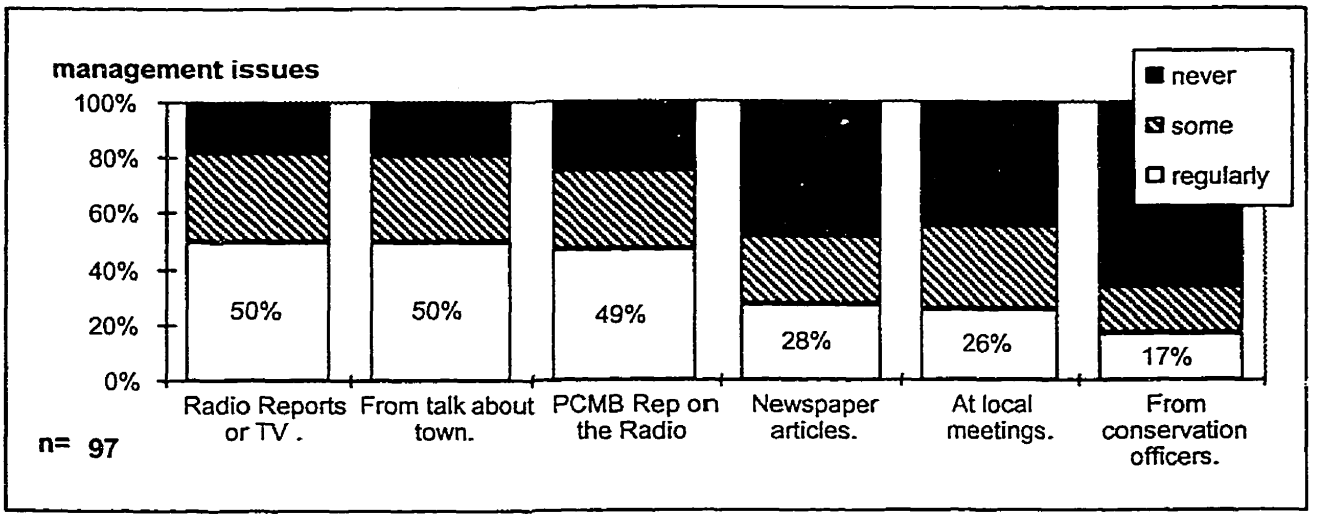
RRC), talk in town (among others of the community), and a specific PCMB who uses the radio for reporting also mentioned. See Table 5.7. Also noteworthy is the 16% who responded that they don't hear.

More revealing of the co-management system's communication linkages is the reported frequency of hearing from specific sources of caribou management, with radio and television report, talk about town, and the reports of a PCMB representative made on the radio being the most frequent information sources. Newspaper articles, local meetings, and the local Conservation officer were reported to be the lowest (See Figure 5.6).

Table 5.7 "Main" ways people say they hear about caribou management	n=81
Radio	16%
Meetings	9%
PCMB Rep by name	7%
Talk in town/hunters	7%
PCMB Rep on radio	7%
Local organization	7%
PCMB Memos/bulletins	4%
Elder	4%
Newspaper	2%
Local leader	2%
Renewable Resources/Game Officer	2%
TV	2%
Non-local caribou advocate	1%
Newspaper	1%
School	1%
From people that go to meetings	1%
I don't hear	16%
Don't know	7%

In the section below I discuss some of information sources that were found to be part of the co-management communication process. These are assessed relative to their information richness. I then go on to discuss in more detail community meetings, perceptions of responsibility, and related costs of accessing and deciphering information. In Chapter 8, I present additional interview data to discuss specifically the dissemination of herd status and health information to communities and address the issue of the biologist's role in the communication process.

Figure 5.6 Sources and Frequency; ways locals hear about caribou management issues



5.7.3.1.1 Radio Reports to community

Radio broadcasting services of these communities, particularly in the Mackenzie Delta region, have a rich tradition and are associated by many locals with the first radios introduced to the Aklavik region in the fifties, and locals' (natives' and non-natives') lives in the bush. Today "bush radios" continue to provide a vital link for those few who continue to spent long portions of the year on the land, and to others who have emergencies and need community support while on the land. As well, community-run radio stations are found in Aklavik and Fort McPherson with links to the Canadian Broadcasting Corporation, broadcasting from Inuvik. In Fort McPherson, the community airs several regular programs, including regular afternoon reports by community leaders about community affairs and coming events. Old Crow was said to have a local radio station at one time, but not in the past ten years. At present, its residents receive their radio signals primarily from Whitehorse, including the native broadcasting station. Televisions are found in most homes in the community, with some having satellite dish reception. Given the presence of these media services and the energies put into this method of communication by the PCMB,

it is little surprise that the so many locals responded that radio and TV provide regular information on Porcupine Caribou management topics.

For the most part, locals are unaware that many of the public service announcements and general news reports received have been crafted or indirectly prompted by the PCMB efforts. Such efforts from the Caribou Management Board are made easier and supplemented with national and regional media's focus on the Arctic Wildlife controversy and their fascination with Old Crow as an "archetypal Indian subsistence community," both of which help to keep Porcupine Caribou in the public eye and locals well informed. The post-PCMB meeting reports and special event reports delivered regularly by the Fort McPherson PCMB community representative were mentioned frequently by locals of his community as being their primary and most useful information supply line on caribou related topics. Reception of this user representative's reports from his home community are, however, generally available in only two of the three communities.

While community members of Fort McPherson noted the benefits of receiving regular reports from their PCMB member via the radio, several mentioned that because these reports are regularly delivered only in Gwich'in and many are not native speakers, the use of native language stands as a barrier to understanding the radio reports. As was pointed out in several of the households where I did interviews, this use of native language puts those with little to no fluency (which includes most of the younger and many of the middle-aged members of these communities) in the odd situation of depending on older people for and interpretation of the reports. The issue of language barriers is one that transcends all forms of media in the communication process, and as well be discussed later, is problematic for those with English literacy as well.

5.7.3.1.2 Community PCMB Representative as messenger

By design, the community representative is an important agent of any co-management communications system and in the PCH system of Canada, the function of this person seems to vary widely. Locals' comments about the lack of reporting by PCMB user representatives to communities were among the most common statements of dissatisfaction made by community members about the communications process. Illustrated in the quotes of the four community members is the costs of community members to access information from their community board representatives which follow from the lack of reporting back to community or from not having direct contact with the local PCMB member.

> Those who go to management board meetings do not report back to the community. The information stays with those people and goes not further. Didn't use to be like that. Public meetings were to disseminate. Now elders and others go for five day meeting and nothing is known. PCMB is no different.

> We never hear nothing from the members, so I guess it hurts rather than helps.

> I never heard directly from our member about PCMB work. Members from the [local organization] should have a report from member for the [local] committee to see. Now it's available only if people want to see yearly reports. Need to have better lines of communication between the two.

> Don't really know. I live in the bush most of the time. [Community rep who uses radio] is the only one we hear from. [That rep by name] mostly. [Local representative] needs to speak out.

While similar statements were made in all the communities, they were more commonly expressed in two communities not receiving regular PCMB radio reports delivered by the local representative. In the community which did receive the radio reports, community members commented that while they learned a great deal form the radio reports, these reports were generally made after meetings and offered no opportunity for community pre-meeting input. One local reported having regularly attended ten years of local meetings, and having never heard the local PCMB member make a report on a PCMB meeting, a claim that was confirmed by other members of the same community. For some community members, the perceived lack of reporting

was described with the descriptor "sneaky." Non-reporting by local board representatives to their constituency was also mentioned by local hunters and First Nation administrators, as well as elected leaders. It should be pointed out, however, that while lack of reporting was mentioned, local leaders did perceive community board members as being readily available to meet with them upon their request. As well, some hunters noted that they received their information from their local representative through informal visits to the individual's homes. On the other hand, several community members pointed out that kinship factions, found in all communities, commonly manifest divisiveness around key issues (e.g., the local alcohol prohibition or the need for a local road to the community) and as a result strain locals' interactions.

These statements may have been provided without the knowledge that some board members discretely share their reports with key community leaders in informal settings. At one community meeting, I observed a local chief to be taken aside by a PCMB member, and later heard the chief introduce and facilitate discussion on caribou management matters. The comments of locals do, however, reflect their expectation of receiving regularly delivered reports.

A review of local organizations' meeting minutes (completed in two of the three communities) did indicate evidence of occasional to highly regular reporting by community PCMB representatives. In one case, a PCMB representative (middle aged and educated in the school systems) was found to be systematic in his reporting and delivery of information between the various bodies. This consistent pattern of good reporting was revealed when reviewing transactions at his community's local organization as documented in its minutes and comparing them with those of the regional organization and the PCMB.

Reflecting on findings of Pinkerton and Keitlah (1990) regarding the function of technical expertise, communication skills, and personality in community representation, it is difficult to make any broad conclusions from the evidence of the PCH case study except to note that systematic reporting appears to be an exception rather than a common practice.

5.7.3.1.3 Talk about town

Communities have their own internal systems of disseminating information and it is no surprise that the internal dialogue of community members is reported as among the most frequent information sources by which caribou news gets distributed. "Talk about town" means communication in a wide range of arenas -- at the poker table, while on the hunt, when waiting for mail, and while having tea with a neighbor. Although this "rich" method of disseminating information may be considered by outsiders with time constraints to be inefficient, as well as leading to a distortion of "the facts," the process must be considered not only in relation to the dissemination of information, but also with respect to the social structure of community and as an important dimension of the local management system's consensus decision making.

Writing about processes of communication in Old Crow and potential expectations of agencies in public policy decision making in the 1970's, Stager (1974) observed,

> There are those who are "in" and "out" of every subgroup. In fact, the village seems shot through with several webs of interpersonal connections, and it was not possible to invade. Without needing to understand these alliances or lines of influence, it is clear that community opinions are formed in the network. Thus no one observes people engaged in serious conversation in the open; views are exchanged behind closed doors. It takes time, therefore, for information and reaction to pass through the village. Consequently, agencies from outside who seek a community view or wish to place a proposition before the people cannot expect an adequate response without allowing time for people to speak privately with one another and react to leading opinions. To force the pace of decision making in Old Crow is to run the serious risk of hostile and adamant treatment. (Stager 1974: 137)

The statement that "no one observes people engaging in serious conversations in the open" may be a condition which has changed in the past twenty years or, more likely, it can be assumed that outsiders are restricted from various arenas where discussions occur. Indeed, today there are occasions where issues are openly explored in the public setting, although conventions regarding privacy and intimacy continue to be observed and play a role in the local level consensus process.

5.7.3.1.4 Printed text (Regional Newspapers and magazines)

It was initially assumed by the PCMB, when formulating their communications strategy, that "printed material" would be an ineffective means of disseminating information to community members. This method of communicating to the people is report as the least frequent means of receiving information, with some locals interviewed talking about problems associated with their own abilities to access information which is delivered in the printed format.

It is, however, surprising that an analysis of cross-tabulated data describing the frequency of delivery of various information sources and respondents' age and class indicates no statistically significant relationships. While it might be assumed (as was stated by some agency managers and locals in interviews) that elders of communities are for the most part not of a literate society, my field observations indicate the presence of a group of elders in each community who are avid and regular readers of newspapers (i.e. regionally-based publications) and magazines, eager to consume general and technical data on caribou management, and well-informed on current social and political affairs, contrasting to some younger members of their communities

-- a finding that bears a vague resemblance to Slobodin's (1963) observation of the "Dawson Boys."[9]

The PCMB's regular newspaper column, written in a highly journalistic and editorial style, was mentioned by locals as a valued source that they sought out each month, both for the information provided, and for entertainment. In several cases these locals referred to the column's author, the board's secretary/treasurer and a former caribou biologist as making the information of the columns especially accessible. PCMB annual reports are also distributed widely, but only to regional and local organizations (by mail) and at PCMB meetings, and not directly to households, with a direct household mailer recommended by some community members. These publications are designed to present the business of the board and current data about the herd in the simplest of terms, include lots of photos, small quantities of text, and simple explanatory graphs. In communities, PCMB annual reports are commonly found on a desk in an RRC office, in the Chief and Council's meeting room, and other local resource rooms. Thus locals' access to them is dependent upon locals' use of these facilities.

5.7.3.1.5 Conservation Officer as messenger

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[9] Slobodin's (1962) discussion of the "Dawson Boys" refers to Tetl'it Gwich'in elders who were present in Dawson as meat hunters during the gold rush days. Slobodin's point addresses issues of acculturation and cultural resilience, and the contrast between sophisticated elders and local youth.. He writes:

> Many of the 'Dawson Boys' claim to have attained proficiency in pool, billiard, and bowling; at least one of then asserts that he once made a ten-strike in bowling. In 1947 there existed the paradoxical or at least unusual situation' that many or most of the band elders had 'experience of frontier culture unknown to the younger men.' The "Dawson Boys" became familiar with bars, pool halls, brothels, motion pictures, drug stores, banks, pawn shops, and other specialized emporia, while younger people who have attended mission schools speak English, it is noticeable that most of the "Dawson Boys" speak it more fluently and more colloquially that do many of the younger members of the band....As of 1947 it could be said that most of these men 'retain a taste for good whiskey, rather than the homebrew which is all that their juniors know, but this has not prevented them from working hard and striving, each in his own way, to approach the [Gwich'in] ideals of manhood, which is, put briefly, to be tough, competent, generous, and high hearted" (Slobodin 1962:33).

Of the three study communities, two have locally-based, full-time wildlife officers (called "Conservation Officers" by the Yukon Territorial Government) with one of the communities having two Wildlife Officer staff (one local native and one non-local Metis) and the other having one non-native staff person. In the third community (i.e. the one without a current full-time wildlife officer), a member of the enforcement division of the agency regularly comes to the community once a month for general field work and other agency business. Most community members know these individuals by name, and there is a history of the territorial government agencies hiring locals to assume such positions in all three communities. In one community, the local wildlife resources officer, retiring at the beginning of this research, had served in the community for more than twenty years. Knowing people on a first-hand basis, working with them on the land, and helping them sort through the bureaucratic aspects of buying and selling furs means that these agency personnel represent a potential supplementary source of information on caribou management and opportunity to strengthen local level co-management performance. Yet according to the responses it appears that these players are not integrated into board's communication system. Why is this the case? Locals of several communities whom I interviewed talked at length about communication problems (and more general problems) related to their local conservation officers, with the nature of these problems varying from community to community. While some of these issues were not directly related to caribou management, the issues of communication linkages and the utilization of this potential human resource as a part of the co-management process is of some relevance to this study.

Communication barriers related to the wildlife officer in disseminating information about caribou information can be summarized as follows. First, territorial agencies of resource management are organizationally segmented into divisions, with the enforcement branch and wildlife branches being separate. As I document later in

the events of the 1993 Caribou Crisis (Chapter 7), this organizational feature of government resource management systems can create co-management problems. While I found that there is some internal agency interaction among personnel in different divisions (wildlife branch to the enforcement arm), lines of authority between agency divisions are separate. This bureaucratic segmentation is true both of NWT and Yukon Territories, but seems more problematic in Yukon where, on a territorial-wide basis, recreational hunters have a greater presence and thus wildlife officers more regularly assume the role of rule enforcer. In the Northwest Territories, there is a long tradition of the community-based wildlife officers working in a wide range of resource-related areas and providing a "community support" function to the local hunter and trapper, a point that most GNWT wildlife officers noted when comparing themselves with their Yukon counter-parts. Perhaps more importantly, it is clear that while the wildlife officers may serve locals in a variety of ways, and indeed most do, their primary function is enforcement. In this respect the wildlife officer is accountable to his or her territory's Wildlife Act, and serves as independent agent working on behalf of justice.

Second, because of limited restrictions on PCH native hunting (i.e. a native hunter takes all she or he needs, but must be safe and not waste), most of the work of the PCMB has been on habitat and biological issues. Consequently, government members appointed to the PCMB have been mostly biologists.[10] As a result, there is limited interaction between personnel working in the enforcement arm of agencies at the community level and the PCMB. This is not to suggest that wildlife officers are unaware of the PCMB, and do not support the PCMB's initiatives. Indeed I found that wildlife officers attend local PCMB meetings and have PCMB annual report materials readily available in their public offices. But two of the three wildlife officers noted that

[10] For several years Northwest Territories had its regional supervisor of operations in the Inuvik Region attending PCMB meetings as the government's alternative member and later appointed him as the official member. With his title, this individual managed the region's Wildlife Officers and, at least theoretically, provided the link between the caribou co-management body and enforcement.

they had had little to no direct communications with the PCMB and did not appear to be integrated into the caribou management communications network.

Third is the issue of community-government conflicts that can arise from the relationship between the officer and the community, and has implications to issues of self governance and enforcement costs in resource management and the costs that may come with it. In one of the communities, a locally-born native resident who had pursed formal training as a conservation officer had later been hired by the territorial agency as a wildlife enforcement officer, and placed for service in the individual's hometown community. Communications with locals became especially strained after the locally-born officer cited several locals on incidents of meat wastage. Subsequently, interactions became so dysfunctional that the officer was transferred and based in another community. This individual did maintain ties and work in the community and regularly worked with caribou field biologist when doing work in the area, yet mentioned that social relations and communication among some in the community remained strained.

And in Fort McPherson there was much discussion about the overall lack of presence of wildlife officers in the community, even though that community has two full-time officers. According to locals, these government workers were spending too much time in their offices and no attending community meetings (i.e. RRC meetings). Wildlife officers, on the other hand, spoke about how the responsibilities of their jobs had changed through the years, requiring them to spend more and more of their time on paperwork, thus limiting their direct contact time with community hunters and changing the service-oriented traditions of a NWT wildlife officer. Locals' comments about the lack of visibility of game officers also stem from on-going community-agency conflicts of their respective jurisdictional domain and locals' assertions that wildlife officers should be more accountable to local leadership, an issue that was independent of the PCMB's efforts. Nonetheless, there is little doubt that in Fort McPherson these

issues limit the opportunities for these agency personnel to become more integrated into the caribou co-management system. More to the point of caribou co-management communication pathways, it can be said that the wildlife officer is an underutilized resource by the caribou co-management systems as a support person for the local representative, or as a board messenger to the people at large.

5.7.3.1.6 Meetings

"Meetings" are of important symbolic and functional significance to community as well as to the caribou co-management system, serving as a means of making the link between the reception of information and those discursive processes that occur in a formal setting. Although the settings and structures have changed dramatically in the past fifty years, the local community meeting or gatherings have been part of the social, political, as well as economic traditions of all these communities. Regional meetings at places like *Klo Kut*, Barter Island, Whitefish Lake, Herschel Island and other historic sites are very much a part of the oral history of Porcupine Caribou users and were likely places where community members talked about caribou.

Today community meetings, although changed, continue to serve both as venues for sharing information, and in some conditions, provide for open discussions, cross-examination of officials' actions, and public debate. Meetings also provide a platform for the generation of public ideas, much as described by Reich (Reich 1988). They also serve as an opportunity for conducting ritualistic events, where pre-determined decisions are formally resolved. Meetings are also the primary method non-locals (e.g., bureaucrats) engage community members in their public discussion, and as Gallagher (1988) points out, with the expectation that the outsiders' business can be completed in these settings. From the local's perspective, public meetings are among few places the community can gain access to the non-local resource people and voice concerns to decision maker.

Meetings, although potentially functional, are also costly, not only because of the allocation of time they can require, but also in how public pronouncements can potentially set false expectations for action that may or may not follow. Unfulfilled expectations have the potential of leading to apathy in involvement, which in turn leads to the cost associated with motivating the disillusioned community member.

As has already been pointed out in the analysis of native PCMB representative's costs incurred when fulfilling his responsibilities, meetings can also be events which put people and controversial issues (and at times conflicts) on public display.

Two kinds of meetings have been mentioned thus far that are associated with the caribou co-management system. The first is caribou co-management board meetings (i.e. PCMB and IPCB meetings), generally held in a fish bowl-like environment where locals sit as observers, and special accommodations are made for local leaders or special guests to sit at the table and join deliberations. A second is PCMB public meetings, generally an evening event offered in conjunction with in-community, scheduled PCMB meetings. In the section below I discusses PCMB public meetings and then community meetings. Given the use of meetings and the issues that emerged concerning the use of them in this study, this section is longer than the treatment of other information sources.

5.7.3.1.6.1 PCMB Public Meetings

As noted previously, PCMB meetings are held three times each year and in on a rotational basis in the various PCH user communities. At public meeting, people attending are provided with an update of caribou management and invited to ask questions. Meetings are generally announced ahead to time on the radio with a notice that those attending can receive free hats and posters.

Attendance at PCMB public meetings varies widely from meeting to meeting, and appears to be influenced by the sense of urgency locals perceive at the time about caribou issues, the manner by which the meeting is announced to the public, and the opportunity costs associated with locals' participation. Attendance also varies from community to community, with the smallest community, Old Crow, reported by PCMB members as having the greatest percentage of its local population generally attending. A board chairman noted that attendance of 25 locals at a PCMB public meeting would be considered a good turnout.

PCMB members consciously strategized ways of getting out a crowd, with the board's schedule coordinated around local bingo games (which have been know to foil attendance efforts when conflicting with meetings) and by providing PCMB hats, mugs, and as inducements (one reason some locals mentioned for attending). The problems regarding public involvement in co-management process at the local level and locals' passionate interest in gaming cannot be understated.[11]

The public meetings I observed took several different forms. In one case, PCMB members held an open house in Inuvik where approximately 18 individuals came. More than half arrived, took PCMB hats and mugs, and left with minimal interactions. Others lingered, asked questions of board members and agency personnel staffing various stations (e.g., a biologists demonstrating caribou radio collars and their function, the PCMB chair talking about political lobbying in Washington, and local representatives having conversations with acquaintances). At an unusual Public Meeting held in Dawson, a community of mixed natives and non-natives, where less than 15 were present, several individuals associated with the mining industry attended and challenged the practice of native peoples' espoused

[11] The interest in gaming is considered by some in community to be both pathological and dysfunction to the community process as a whole, and to family life in particular.

caribou traditions. A third, and equally atypical public meeting is described later in the dissertation as part of the 1993 Caribou Crisis.

While PCMB's government members told how these three meetings per year in PCH user communities offered government representatives an opportunity to interact with locals on a regular basis and give the board good exposure at the community, community members commented that the PCMB meet in their communities every several years and disappear. With expectation of greater access, some locals stated that this level of contact with the board through meetings was not adequate and suggested the need for more meetings, others expressed they satisfaction with the existing system. (See Table 5.8)

Table 5.8 Number of months *between* regular PCMB meetings held in each community.

Months between meetings noted below in bold face.

Communications Strategy states that PCMB meets in villages three times a year. From local perspective, the PCMB will appear in the community once every 29.7 months (average time between meetings in each community.) Below is a table providing the dates of meetings and their locations.

Whitehorse	*Dawson*	*Aklavik*	*Old Crow*	*Inuvik*	*Mayo*	*McPherson*
Jun-86	Aug-86	Nov-86	Apr-87	Jun-87	Oct-87	Nov-88
26	**44**	**59**	**24**	**24**	**25**	**33**
Apr-90	Apr-89	Aug-90	Apr-91	Jun-89	Nov-89	Jul-91
17	**13**	**43**	**20**	**34**	**12**	**45**
Oct-91	May-90	Feb-94	Nov-93	Mar-93	Nov-90	Apr-95
18	**49**				**19**	
Jan-92	Jun-94				May-92	
Average months between meetings:						
20.3	**35.3**	**51.0**	**22.0**	**29.0**	**18.7**	**39.0**

5.7.3.1.6.2 And More Community meetings

Also associated directly and at times indirectly to caribou management, are community-wide meetings and community-based organization meetings (e.g., Chief and Council businesses meetings, HTC and RRC officers' meetings) some of which are not open to the public.

In Fort McPherson and Aklavik, organizational meetings include the monthly convening of Renewable Resource Councils and the Hunter and Trapper Committee, all of which are generally open to the local public, which follow formal agendas and, in some cases, are guided with formalized protocol. These organizations also interact with regional organizations, each which has its own scheduled meetings. And in all caribou user communities, annual general assembly meetings are held, providing an environment for the public discussion about the year's business.

Old Crow differs from Aklavik and Fort McPherson, not only in its size, lack of Hamlet status, and internal ethnic homogeneity, but also in its on-going tradition to hold periodic (generally monthly) public meetings which focus on the specific and a range of community topics. These meetings are regularly facilitated by the chief and/or councilors, can be structured with formal agendas or open ended, and commonly include "reports" from various community sectors (RCMP, Nursing Station, Education committee, Social Service, etc.), with "visitors" making presentations.

There are also several other co-management boards which regularly meet either in communities or in the region (e.g., Wildlife Management Advisory, North Slope, Yukon Fish and Wildlife Management Board, Inuvialuit Environmental Screening Committee, etc.). The settlement of land claims as well as the development of local governments in Aklavik and Fort McPherson have created occasions for additional organizational meetings held at the village level (e.g., Hamlet Council, Local Corporation, Chief and Council, Aboriginal Committee, Elders Council, etc.) most of which are attended by visiting non-local "experts." To illustrate, during my four month stay in Old Crow, I counted a parade of 27 consultants who passed through the community on business, many holding public meetings to discuss their particular areas of business.

5.7.4 Local perceptions of meetings and associated costs

When addressing the topic of today's meetings, those interviewed offered considerable discussion, not only about PCMB meetings, but about the institution of community meetings as a whole, and how involvement has changed and conditions current conditions impeded and or detracted from locals' participation. In most cases, the costs to community members associated with meetings are similar to those articulated by community PCMB members, although for non-board members anticipated costs may be more easily avoided. And as mentioned below, the sum total of costs are cumulative, and may affect overall participation.

Of the costs mentioned by community members, *the costs of deciphering foreign language* by visiting non-locals as a barrier to locals' access to information (and understanding) at meetings was commonly mentioned by interviewed locals. This particular problem resurfaces through the full gamut of co-management transactions and should be understood not only with respect to the delivery of information, but the entire process of community decision making. As said by a community member who is both an elder (yet still active in community affairs) and one who helped to negotiate the PCMA,

> They [non-native managers at PCMB meetings] use 18 cylinder words and that is a problem... They talk hypothetical and all that bullshit. I don't have dictionary. This is not only the caribou board, it is all the organizations.

Earlier I touched on problems associated with *translation costs between fluent and non-fluent native language speakers* of community. This problem is also described in the larger context of community life as an impediment in elder-youth communications. Yet this problem of language was also described as a *costs of intra-community communications* not only among those for whom English is their first language, but also those of differing ethnic background (i.e. Inuvialuit and Gwich'in), described below with an accompanying behavior of pretending to know and the embarrassment of appearing to not understand.

> Those people [i.e. other local native group of community] use big words, and people nod and act like they understand. That's why people don't talk out, they are embarrassed about speaking out.

Community members of the two larger communities mentioned the communication *costs of having inadequate meeting facilities,* a problem associated with not using a facility which provides good acoustics. Aklavik and McPherson community-wide meetings were regularly held in the gym, spaces in which there are serious echoes. While this obstacle may seem trivial, I attended several meetings in one of these communities and had great difficulty myself following the proceedings. This condition coupled with the nodding behavior described above make for a worrisome situation. Additionally, community members commented on problems associated with a lack of awareness that meetings were scheduled, particularly where meetings were not set as taking place on a specific date each month, and, the overall complexity of structures and land claims issues leaving members disinterested in attending.

> There seems to be a problem with communication sometimes – I don't even know what the meetings are about; all I hear is there's a meeting tonight. Too many meetings. They talk about all these different things and I can't keep up.

Time and opportunity costs are not to be understated, especially when considered in the light of changing lifestyles of communities. For those with full-time jobs, a passion for TV, gaming (bingo, "oko" games) or family obligations, attending meetings and being a part of the process is not of interest unless there is sufficient need (i.e. crisis situation). As explained by this Fort McPherson hunter, the outcome creates a new kind of dependence, not on government, but on local leadership.

> People get involved in Bingo, and on teacher's night no one shows. It's still a white mans' world, and they don't realize that things are changing. People do care, but they're preoccupied with their new life–employment, family and all. The land claim stuff is too big. We need a master plan. But Aboriginal peoples don't feel ready for the white man's world, and they fought against it so long, too. Now with land claims, they have to depend on others.

Tied to these problems and issues of community capacity are the *costs of healing* from a range of social pathologies that inhibit individuals' contribution to community growth

and development, the most insidious of them being alcohol. As reflected by this recovered community member,

> When I was drinking I was always thinking someone else would do it. I had low self-esteem. There was times when I was scared to leave the house. Meetings and being involved were out of the question.

Napoleon (1992) points out that substance abuse is manifested from a larger set of social problems related to rapid social change, imposed cultural systems, and individuals' self esteem. As well, it appears to create negative feedback and a downwardly spiraling cycle which is reversed only by considerable effort among communities as a whole. Whether community costs of co-management contribute to this healing process or detract from it is most likely highly situational.

Finally, and perhaps most fundamentally, I heard locals, many of whom maintain older traditions and deferential postures towards the natural world, expressing their discomfort at addressing controversial issues, or what I term anticipating the *costs of engaging in confrontational discourse*. This perception was framed both as a criticism of others, as in being critical of a fellow community members who was perceived to be too argumentative and self assured at public meetings; and referenced with the tradition of it not being appropriate to be arguing about animals. The statement below illustrates the latter and was made by an Aklavik elder when asked if the PCMB needs to lobby against oil development in Alaska. As he said,

> I don't like to argue about animals. I follow the old rules. The old rule is, never matters how much you get, you'll always split it up. I won't discuss [controversial] issues, because it's disrespectful to animals, that's why I don't go to meetings. Never talk about animals behind its back, they'll know--especially bear, and they'll get you when you're alone.

This elder went on to tell me that "arguing" about animals in the traditional context typically meant squabbling about how much of an animal would be shared to hunting. The application of the rule to talking about contemporary issues indicates the force of culturally regulated institutions and their underlying systems of belief.

5.7.5 Change institutions of meetings, attendance, and working with apathy

The formalization of community organizations and community meetings (i.e. formalized agenda setting, procedural formalization, minutes taking, voting of officers) was the consequence of federal legislation which created the Indian band organization in the 1920's. This also brought a role and a presence of government officials to those meetings (RCMP.) Writing about meetings of Old Crow in 1968-69, Acheson (1977) notes,

> Much communication and feedback is achieved by calling band meetings at which the chief presides. Questions requiring community opinion are raised, and any member of the assembly may speak before decisions are taken. These meetings allow announcements to be made, but frequently are occasions for admonition on behavior (e.g., children out after curfew) or helped with jobs. ... Meeting are open to Meti's and non-status Indian members of the community. (Acheson 1977:246)

She goes on to point out that,

> To outward appearances, band gathering are ideally like New England town meetings. However...the content of most meetings consists of messengers, suggestions, or orders originating in Canadian Government agencies and transmitted through the mouthpiece of the RCMP constable or the band chief. The Indians go through the process of "discussing" and voting because they have learned that this is expected of them in this context, not because they expect theses processes to affect the outcome. ...Open debate or disagreement with one another in such a public setting is not yet part of their behavioral repertoire. Although members of the audience do speak, the speeches are highly stylized, and disagreement with the words coming from the head table is rare. (Acheson 1977:246)

A tradition of public or community meetings of the Tetl'it Gwich'in and the Gwich'in and Inuvialuit of Aklavik are similar, with the latter said to have generally met separately and on occasion together. Recalling how meetings and leaders functioned in the local process of decision making, a Tetl'it Gwich'in elder said,

> Chief Julius [a chief of thirty years in Fort McPherson] would bring the people together, put the question to them, and let them talk it through, and they talked for a long time until the problems were solved.

The Old Crow Community Pipeline Study (Stager 1974) offers another measure of local perceptions of meetings as occurring in the mid seventies. As the Old Crow survey (n=80) indicates, 30% people always go to community meetings, 60% sometimes go, 10% never attend, and 75% of the locals reported that the same people

usually attend. He noted that at those meetings, 25% report that that they speak, with the remaining stating they never do. It was also reported that 95% agree with the proceedings of the meetings and that if conflict were to occur, 19% would speak out openly with others talking one-on-one with councilors or influential people. In addressing highly controversial issues, 12% stated that they would meet with councilmen in advance. Based on these findings and my observation, it is difficult to comment on how attendance in community meetings has changed since the interviews conducted for the Stager Report. Meetings held in the fifties and mid-sixties (i.e. before alcohol was widely used), however, are reported to have been well attended. Community members of Old Crow recalled with nostalgia how notice was taken at those meetings of those community members who were *not* in attendance, how youth were seated in the front rows to learn from the events, and the manner in which traditions dictated the sequence of speakers. This sequence was described as beginning with the introduction by the chief, followed by the talk of elders, with the general public to follow.

Today, the problem of achieving a quorum at public community meetings is ubiquitous in all three communities, with the effort to achieve it sometimes requiring a delay in the start of meetings, phoning of individuals to encourage participation, and in some cases the drafting or "grab" community members off the street to meet the necessary number. These observed conditions and perceived changes are interesting in the light of locals' response to the question of what they perceive to be the "best way" for them to receive information on caribou management. As displayed in Table 5.9, a third of the locals who were asked this question referenced meetings as the preferred method. And as noted in the segment of the focus group referenced at the beginning of the chapter, there are differing interpretations about the nature of the problem associated with attendance and community involvement in general. Why then the apparent contradiction?

Table 5.9 The best way to get locals information on caribou management issues, as identified by locals, is:	n= 75
Meetings	33%
Home visits	8%
Media	3%
Radio	3%
Written reports	3%
PCMB member by name	3%
See it yourself	3%
Hunters	1%
Newspaper	1%
TV	1%
Newsletter	1%
Local leader by name	1%
Local organization	1%

There are at least two explanations for this apparent contradiction. The first is that meetings, although presently not well attended, are perceived as an instrument with which community can come together in the event of a crisis situation, express concerns, and collectively gain access to information or key people, and, if need be, resolve common problems. As was observed several times through the course of the research, community crises (e.g., a fire resulting in the death of two locals, a public meeting to voice accusations of financial misdealing of local leaders, an incident involving wastage of caribou meat by local hunters) motivated locals to fill their community hall and allowed for sharing of ideas and an opportunity to air various perspectives.

A second explanation, which is not mutually exclusive from the first, is that when locals reference "meetings" as their preferred method of receiving caribou management information, they are actually referencing meetings as they occurred in a former time. Such meetings were described to me by locals as focused primarily on internal process, not regimented with procedural formality, cluttered with agenda items, nor addressing technical matters. These expressions of nostalgia about local meetings, the role of local leaders, and community process, in general, can be understood as an articulation of the institutional memory of a set of social relations and an internal authority system which is today functioning in different conditions, but whose recollection remains.

Broadening the discussion from meetings to these issues of "self governance," diminished systems of community authority, and internal heterogeneity, a former chief of Fort McPherson recalled,

> But back then was just one peoples here. Yeah. What you call the native self-government in them days. Everything was done by the peoples themselves. Chief and councilor were the main body. No game warden, no police. Don't need them, this town is too good. You can go up and down this town day and night, you never see a drunkard. I don't know how that drinking started. And this goes on boy, you complain to the chief, right then he collect his councilors. This is the complaint we got from that guy, that he's not getting along with his wife. We got to go over there and straighten that out. That today is the social worker's job, see. If they go over there and they straighten it out, you can't even talk to them. She's your wife. You want to divorce? Go ahead. But we going to bring charge against you. There was jail in them days. Not to remind them. Remind them and then in the end, they get out with nothing. Not like that them days. And stealing. You stole something, tomorrow you go to court. Not wait a year later.

Changes in the functioning of local authority systems also has implications to community members' roles and responsibilities in the co-management process. Below I delve into this final topic as related to problems of co-management linkages.

5.8 Issues of Responsibility.

In the introductory focus group discussions, it will be recalled that a local hunter, when addressing the problems of meetings and community involvement, suggested that a local leader visit him at his doorstep and invite him to the public meeting.

> Community leader #46: What do you expect them to do, go right to your door step?
>
> Community member #147: Sure, why not?

The challenge has significance to co-management linkages because it represents an internal dilemma facing community, and is illustrative of the *costs community faces with changing structures of governance* when being forced to focus on external conditions rather than internal process. The call for "door-to-door" contact with community members also reflects local culture's institutions of intimacy when discussing public matters (as noted by Stager 1974), as well as styles of leadership practiced before the implementation of land claims and various power sharing

arrangements. Regarded by many locals as "one of the last of the traditional chiefs," Mr. Peter Moses served Old Crow from 1936 to 1954. A grandson of the esteemed local leader, he described his grandfather's method of engaging the public and working to achieve consensus,

> I remember my grandfather would leave in the morning and not come home until late at night. He'd be out all day, visiting people, having tea. They talk about community, ya know? That 's how those leaders worked back then. Door to door.

Open-ended interviews I conducted with former and current chiefs of three communities provide a striking pattern of the shifting focus of their leadership responsibilities. Those who had served as leaders before 1970 described that much of their work was focused on a range of internal and external issues, including social issues of community (e.g., domestic affairs) as well as interactions with government through the Indian Agent and the RCMP. Those working as community leaders in the late sixties until after the Berger Report described their work demands as differing from those of the prior period, with the more contemporary leaders talking about the heavy demands of land claims negotiations, what one former chief called "a distraction. Several contemporary leaders described how their administration's management policies had been organized such that local problems were allocated to band councils while the community leader traveled to meetings. As noted by a former chief in Old Crow,

> I was chief all those years and never unpacked my suitcase. It was always ready to go.

As communities and their leaders are increasingly encumbered with externally driven agendas, job demands require an increased commitment of time spent either in the office or out of community. This is not to suggest that the local leaders are not attentive to internal conditions, but only to make the point that their attentions are divided between the focus on external affairs and those focused on the internal processes of community development, and that expectations at among locals are often framed with the memory of "traditional leaders." It is little wonder that the demands of

the job associated with assuming local leadership positions were commonly described as highly stressful.

Acheson (1977) observed that ecological readjustments in social organizations occur more readily that those of personality and culture (citing Netting 1971: 17). In the context of caribou governance systems, we can infer that aspects of the social system of governance remain in spite of changes in formal institutional features of the systems and organization. This assertion is supported with interview findings, indicating that in spite of changes in communities political structures and focus, and the resultant demands on local leadership, there continues to be a segment of caribou user communities who hold expectations (both about issues and general and about caribou issues in particular) that community leaders will continue the tradition of door-to-door information sharing, polling, and consensus building.

Two more specific interview questions addressed these issues with respect to responsibility to be part of the management process. First, locals were asked what is the best way to hear *from* the people (differing form the previous interview question in which I asked what is the best way to deliver information to the people.) Of those responding, less that half responded that "meetings" were the best method, with almost as many responding that one-on-one visits were the preferred method, and another 13% saying that both were best. (See Figure 5.7) Asking locals whether its the community members' responsibility to speak out or the leaders' responsibility to visit community members, more than half noted that it is the responsibility of the locals to speak out at meetings, with less than a quarter of those stating the need for both, an indication that as perceived by about half of community members, the burden of providing input rest with the community members. (See Figure 5.8)

Figure 5.7 Best Method for hear from the people

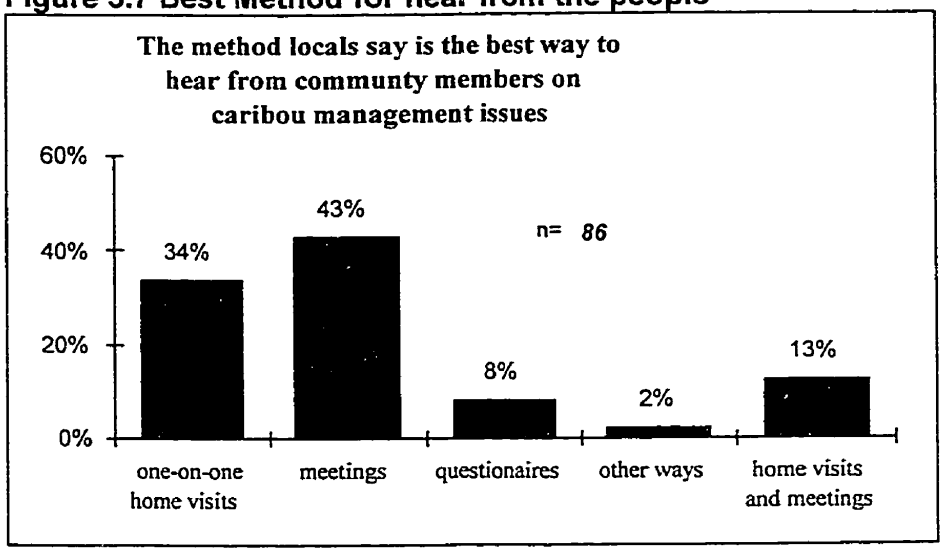


Figure 5.8 Locals' view on whose responsiblity it is to solicit commuity concners on caribou-related issues

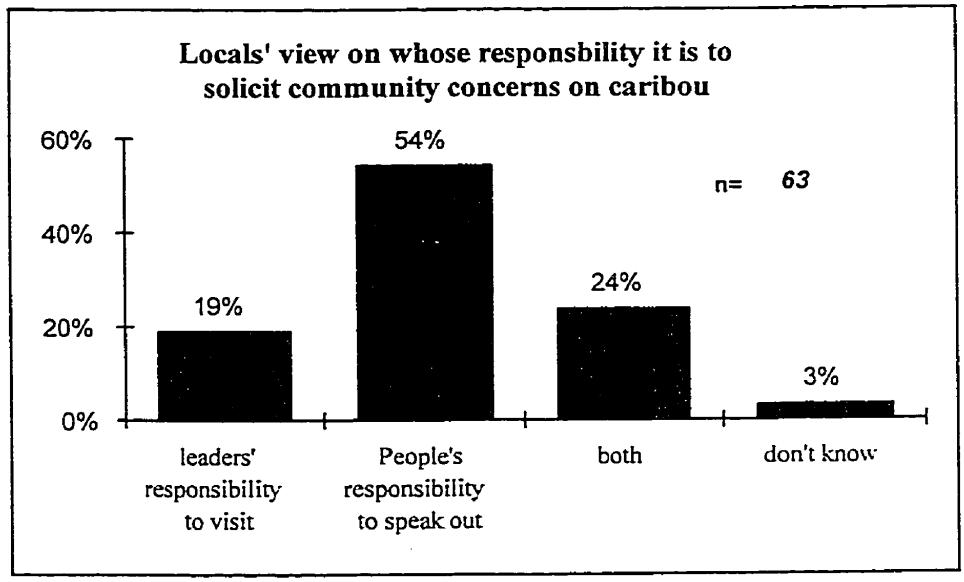
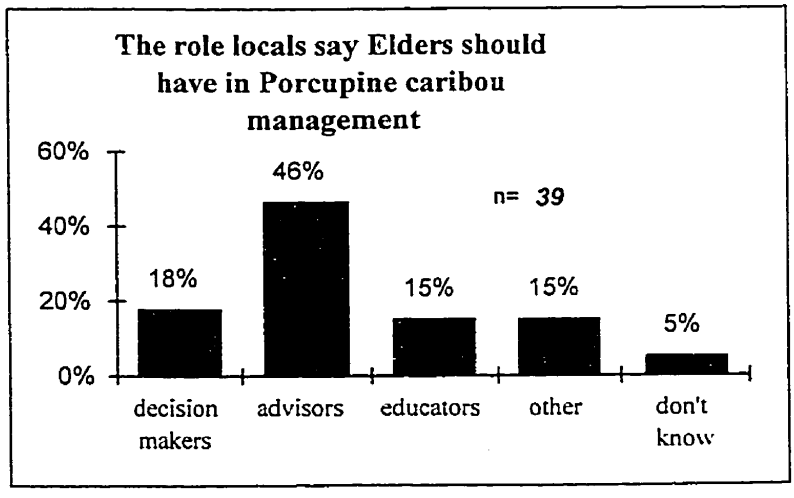


Figure 5.9 What locals see as the preferred Role of Elders in caribou management.



In addition to community-level issues of responsibility and the role of leaders the caribou management process, community members also talked about the appropriate role of leaders in caribou management. Some of this local-level tension is created by the perception that young leaders, some of whom have an array of technical skills for operating computers and understanding science, were described by some as usurping the traditional role of the elder. The more dominant view as perceived from outside community is how science and researchers neglect the knowledge of these elders. What then do locals see as the best role for elders in the management process? From the interview data, I identified several schools of thought, including some stating that elders should be in direct positions of power, others seeing elders as most appropriately assuming an advisory role, and yet others recognizing the benefits of a blend or (See Figure 5.9). It should be added that there was also discussion among locals about what constitutes being an elder, with some stating that the status is not age dependent. And in some cases there is animosity expressed by local leaders about the lack of leadership of some elderly community members whose drinking habits have been or are now a negative force in the community development process.

The following quotes for interviewed locals provides an example of the range of perspectives about what role elders should play in the caribou management process.

> We should have elders telling young people how to run it. It's different now from the way I was brought up.
>
> They should share their experience, they lived on the land for decades, we still have caribou, so they must have done something right.
>
> They should be looked upon for their opinion, what they think, how they used to hunt, mainly advice. From their advice we know what is happening today.
>
> They know more than the younger generations, they need to voice their knowledge more so they can learn. I learned from my father and my uncle, and my brother.
>
> They used to handle that stuff, but newer young don't listen to elders. Lots of time older people know, but young don't ask. People need to spend more time with elders.

5.9 The Emerging Communications Network

What then is the emerging communication network of communities *to* their co-management system?

To answer this question, I conduct two kinds of analysis. In the section below, I draw on interview findings to present a simple network analysis (Nohria and Eccles 1992) and outline some of the pathways of the co-management system as defined by findings. In subsequent chapters, and particularly in Chapter 7 (describing the 1993 Caribou Crisis), I present ethnographic interpretations of Porcupine Caribou co-management in action, and thus document the roles assumed by various players and actions taken in a co-management drama.

Community members were asked whom they perceived to be speaking on behalf of the community on the topic of caribou. They were also asked to whom they would go to express a management concern about caribou. The results of the first question (see Table 5.10) indicate that local leaders, the PCMB representative mentioned by name, and the local organization (i.e. RRC, Chief and Council, or HTC) being perceived by 70% of those interviewed as the spokespeople for the community. Community members stated that if they had a concern, their local organization, the PCMB local representative, or local leaders are viewed as the primary agents to whom community would express concerns, seemingly a good fit in linking community with those interacting with the co-management system. Almost a fifth responded "don't know" with some of them commenting that no individual can or should speak on community's behalf and that there was a need for outsiders to hear "from the peoples" directly.

Table 5.10 Local Perceptions of who speaks for community	*n=95*
Local leader	28%
PCMB member by name	24%
Local organization	18%
Local hunters	2%
Elder(s)	2%
Wildlife officer	2%
PCMB	1%
Local ANWR advocate	1%
I wouldn't; no one	1%
"The people"	1%
Don't know	19%

A closer examination of social relations based on field observations and more open-ended questions indicates that in all communities, internal conflicts (i.e., between local leaders and board members) create communication barriers, and thus communities may not benefit from the direct experience of those who serve the board and engage in a discursive process of problem solving. For example, one group of local leaders stated that if faced with a set of caribou management concerns, they would be inclined to call their MLA or a government leader and would be less included to work directly with the PCMB. In another case, I observed a local organization council grapple with a caribou management board issue which the PCMB had addressed for several years (the Dempster Highway case), with the local organization discussing a set of action plans, and only making a passing mentioned of the PCMB at the end of the conversation. While there are strains, field observations of conditions in times of stress or perceived external threat indicate that community divisions have a way of strengthening cohesiveness of community.

A review of interview findings with those to whom community members deferred (See Table 5.11, "group 2") show how the PCH communications network forms an hourglass-like configuration, with the bulk of the communication funneling through the board's secretary/treasurer. From a community transaction costs standpoint, these implications reinforce the issues of dependency and trust articulated earlier, as well as point up the importance of this role in the exchange and dissemination of information.

Table 5.11 Where people go with a PCH caribou management concern

#1 Where locals say they would go to express a management concern about Porcupine caribou?

#2 Where Group B would go with a caribou management concern?

Community Members' responses n=99	Whom locals identified and the number that was asked question #2 Locals' Responses † *Manager asked as second phase question* †† *Office staffed asked question*	How those identified responded.
30%	Local organization †† (n4)	• to Local PCMB representative (75%) • to PCMB Secretary (25%)
14%	PCMB member, referred to by name	• to PCMB Secretary (100%)
12%	Local leaders (n=7)	• to PCMB Secretary/Treasurer (85%) • to Territorial Minister (15%)
6%	The PCMB	• PCMB Secretary/Treasurer (100%)
6%	Renewable Resources (n=4)†	• PCMB Secretary/Treasurer (100%)
6%	Wildlife officer (n=7)	• Agency Supervisor (75%) • PCMB Secretary/Treasurer (15%)
5%	Local hunters	
3%	Meetings	
3%	People outside	
2%	Elder(s) (n=9)	
2%	wouldn't tell anyone	
1%	Biologists	
1%	Family member	
1%	PCMB secretary/treasurer (n=1)	• PCMB Secretary/Treasurer and PCMB members
1%	PCMB chairperson (n=1)	• PCMB Secretary and PCMB Members
5%	Don't know	

Perhaps the final comment of the hunter of the focus group segment quoted at the introduction of this chapter helps to put these findings in perspective. As he stated, "Maybe next meeting they'll come." In other words, the current linkages should be framed with the understanding that the PCH co-management system is dynamic, communities and government are learning, and the work of developing strong co-management linkages is not yet perceived by locals to be completed.

5.10 Summary of Findings

This chapter has investigated community linkages in co-management. The findings presented can be summarized as follows.

- Formal co-management arrangements are implemented with structural and theoretical assumptions about how power-sharing is to perform. It was initially anticipated by non-locals that the role of the native board representative would be central to the exchange of information between communities and the board and achievement of community consensus.

- PCH co-management strategies in Canada were formulated both by lessons learned from a previous co-management system, the assurances of community members about the adequacy of meetings to meet community communication needs, and the need to develop an effective communication systems for projecting an image of the co-management board to the greater environment. Multiple methods were development and implemented with varying success.

- The absence of user communities specified rights for membership selection in Alaska leave all communities vulnerable to the manipulation of transition costs by governments whose political agendas differ from local hunters.

- Within the first three years of the PCMB's implementation, non-native members adjusted their expectation that native board members would serve as messengers in

the co-management process. Non-native members innovated methods for improving the accountability to the co-management process, especially in the area of government commitments to caribou management, and assumed a non-intrusive approach in issues of native accountability to the systems.

- While government board members travel from community to community over the course of the year to hold meetings and refer to their regular contact with locals, locals noted that for those at the community level, the co-management body makes an appearance every two years.

- Native board members employ a range of methods for engaging community members in the co-management process. Concurrently, they incur costs associated with the demands of the job, the lack of professional support, and nature of community social dynamics. Negotiating internal heterogeneity raises the question of the extent to which community members serve as representative or as individuals serving the board.

- PCMB has high name recognition amount community members and evidence suggests that their level of awareness of the systems provides enough process literacy for community concerns to be delivered to those centrally involved at the co-management board level There also appears to be widely expressed confusion and frustration among local users about the role of the board in the PCH management process and the emergence of the multitude of structures which have grown from the land claims process.

- Community members receive information about caribou management through electronic media and local social networks. Meetings are stated as preferred venue of supplying community input to the caribou management and for discussion these issues, although additional evidence indicates that meetings are not always well attended.

- Locally-driven system of accountability local level accountability systems for communications and in maintain traditional approaches to management has emerged, but is new.
- Community members incur a range of communication-related costs which are both anticipated and incurred. Anticipated costs have the affect of limiting participation.
- The emerging network of communication from porcupine caribou user communities to the board takes on an hourglass configuration, with the board's secretary serving as a central ear piece in the co-management process. There is high satisfaction expressed about the function of this component of the system, and it appears to be personality dependent.

6. COMMUNITY PERSPECTIVES ON CARIBOU MANAGEMENT ACTIVITIES, INFORMATION, AND CO-MANAGEMENT BODIES

> I'm not too happy. I watch caribou with collars on TV and that net with the caribou tumbling. That is fear. Not good for us to have fear. Is there a better way to see how they are? Don't like it. They may use it to help people, still not good.
>
> We are not our grandfathers. Some [people] in this community say they don't like collars, but they sit on their front step and expect the caribou to come to them. It's not like that any more. We live on the land, but live the modern way too.
>
> *Quotations from two hunters*

6.1 Chapter Overview

While communication linkages which facilitate an exchange of information are noted as critical to the involvement of locals in a power sharing process (Peter and Urquhart 1991), community perceptions of the reliability of caribou management information and locals' views on whether managers are acting appropriately are central to people's commitment to co-management outcomes (Jentoft and Kristoffersen 1989).

In the previous chapter, I investigated Canadian community linkages with Porcupine Caribou co-management boards, provided findings which illustrate aspects of the emerging co-management communities network, and identified community costs which are part of the co-management process. In that analysis, I explored the communications strategies of the two PCH management boards and those utilized by community representatives, public meetings as forums for co-management dialogue, and the emergence of a co-management communications network. This chapter extends that line of inquiry to document my findings on hunters' perceptions on wildlife management activities, the legitimacy of caribou management information sources, and the appropriateness of caribou research methods and other PCH co-management activities. As well, I report on findings of locals' trust in the PCMB and the US system of management. Moreover, this chapter serves as primer for the next, in which I review theoretical considerations of interfacing knowledge systems under

co-management and present an ethnographic account of the 1993 Caribou Crisis. Of special concern in this chapter are local perceptions of "caribou research" and "caribou studies," defined as the process of producing and reviewing information used in shared decision making (state-community) about human actions affecting caribou.

These topics have direct relevance to the study of community costs in co-management, especially as they are related to heterogeneity. As discussed in Chapter Two, rational choice theorists and sociologists have long focused on homogeneity and the transaction cost as have implications to community and the achievement of consensus (Ostrom 1990; Koehane and Ostrom 1995). Differing from that approach, Brown's (1992) framework of analysis works from the assumption that a healthy tension caused by differing perspectives is important in the development of innovation, a finding which should not be overlooked. Kruse *et. al.* (MAB 1995) use the congruence of perceptions of caribou managers and caribou users as a measure co-management effectiveness. Deviating somewhat from their approach, but drawing on some of the same indicators, I present results of semi-structured interview questions about a range of caribou management issues. Together these findings provide both a measure of intra-community heterogeneity and community views of wildlife management, and touch on power-sharing issues related to appropriateness of management activities, perceived legitimacy, and trust. Finally, these findings serve to ground the reader's understanding of community perspectives in transactions of the 1993 Caribou Crisis presented in the next chapter. Posed as a set of research questions, this chapter focuses on research questions and co-management performance indicators listed in Table 6.1

Table 6.1 Topic questions and indicators which are presented in this chapter.

Topic questions:	*Indicators:*
• What kind of information needs to be known in order to achieve successful management of caribou?	Population census, contaminants, harvest counts, body condition studies, migration studies, habitat impacts
• What are viewed as the most reliable information sources for knowing about caribou?	Migration, population, body condition
• What are appropriate methods for gathering data?	Use of collars
• How accurate is the information that is gathered?	Population census, harvest studies
• How should communities share power in studies of caribou?	The role communities assume in the approval process
• What are necessary management responses to changing conditions in caribou populations?	Need for quotas
• What are locals' expectations about their responses?	Expectations of local compliance to quota if decision is endorsed by PCMB and local leaders.
• What is the need of the co-management body and willingness of locals to get involved in habitat protection?	Involvement in lobbying on the ANWR conflict
• What is community members' trust of the co-management process to insure caribou health?	Comparisons of locals' trust of PCMB with federal and territorial governments, and perceptions of the US system

6.2 The Need to Conduct Studies of Caribou

Northern hunting people commonly state that they have lived in their region for millennia without causing radical change to their lands, nor to the overall health of animals. Asserting their own valued knowledge base, some members of communities question the need to conduct wildlife research. Wildlife management agencies, on the other hand, commonly purse management responsibilities with an arsenal of research and monitoring methods, all of which are intended to inform decisions in the achievement of resource conservation. In the case of the Porcupine herd, agency and academic interests in

advancing knowledge about caribou have in the past been both comprehensive and intensive. Table 6.2 provides an overview of topics addressed in PCH research and the role locals have assumed in various projects. The latter topic is discussed in more detail in Chapter 8 in relation to the 1993 Caribou Crisis.

Table 6.2 Types of agency and university PCH caribou management activities

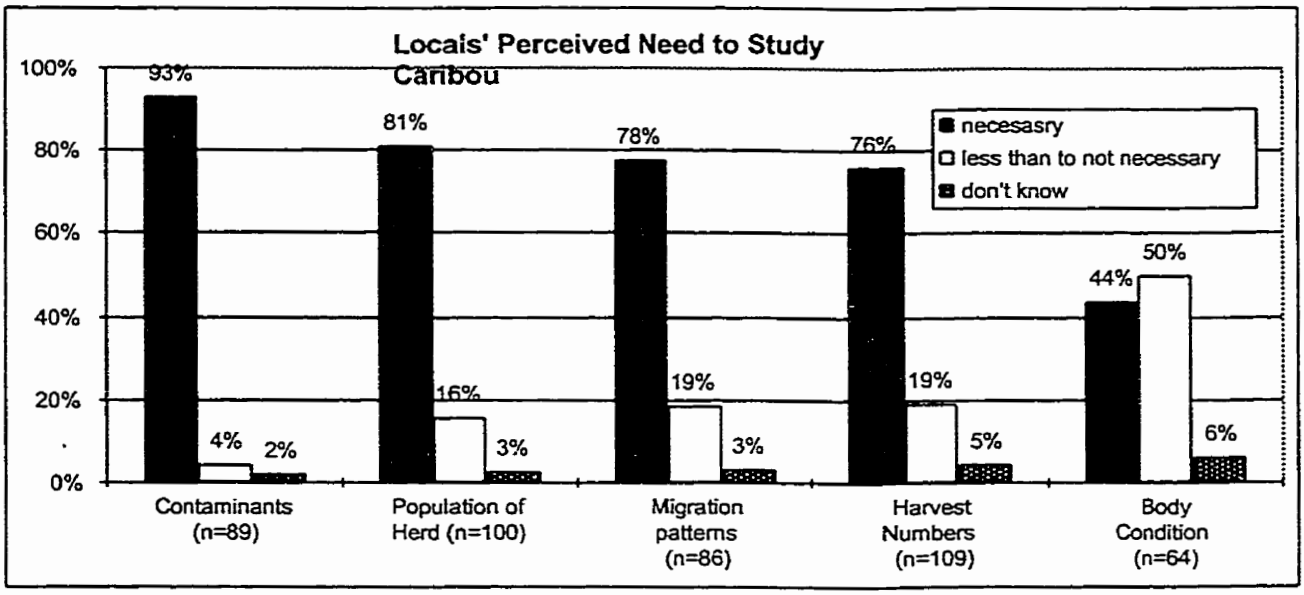
Type Of Study And Objective	*Objective and details*	*Canadian local involvement in field work or analysis from 1988 to 199-*
Population Census	Count of total herd populations, conducted every two to three years on coastal plain during post-calving period. Caribou collared to locate major groups and take aerial photographs which are later counted by biologists.	none
Seasonal Movement Studies	Focus on distribution of animals, total movements, use and affinity for seasonal use areas. Has previously addressed question of sub- herds having winter-habitat affinity.	Some local field workers involved in the 1970's. Data for analysis now based primarily on data gathered with radio collars.
Behavioral Studies	Looked at causes of various behavior and related energy needs of caribou (e.g., mosquito harassment, winter cratering behaviors, cow-calf imprinting, caribou-road interactions).	Some native hiring in the late seventies and early eighties related to Dempster Highway impacts. Little involvement since.
Predation Studies	Focused on ecology of major predators (wolves, bears, eagles) and annual motility of caribou.	Field workers; on a project-by project basis.
Contaminants Studies	Aimed at monitoring levels of contaminates and assessing human health risks associated with eating caribou. Focused primarily on Cesium and Cadmium levels in caribou.	Field workers hired to assist in collecting samples. Human subjects used to assess impacts of contaminant on people
Harvest Studies	Provided measure of hunter mortality of various user groups. Also undertaken to determine use levels for issues of liability and compensation in the event of an accident.	Varies by region; there are approximately thirteen different systems instituted across the range of the PCH. Locals participate as field data collectors and as respondents and in some cases manage full programs.
Composition Counts.	On-the-ground counts that provided estimates of herd demographics and assessment of calf survival.	Field worker participation in the 1970's. Occasional participation of local field workers since implementation of co-management.

Table 6.2 continued

Type Of Study And Objective	*Objective and details*	*Canadian local involvement in field work or analysis from 1988 to 199-*
Body Condition Studies (Described In More Detail Below)	Two types initiated, a monitoring project for assessing current status with findings predicative of cow reproductive success. Another was a research project in which seasonal and annual variation of cow physiology were used to determine relationships with pregnancy and reproductive success.	Field worker assistants hired in the case of body condition monitoring study; no local involvement in the later phases of the body condition research project.
Gas And Oil Developm ent Impact Studies	Assessment of potential impacts of proposed oil development on herd health. These took two forms; experimental studies in which conditions were altered to study caribou response (e.g., noise generators used to examine changes in movements) and field studies which developed theoretical understanding of ecology. The former are not a part of the studies completed in Alaska's area 1002.	Locals hired to participate as field assistants in 1970's in conjunction with experimental Arctic Gas Studies. No participation of locals in 1002 studies.
Computer Modeling	Exercise of ecologists seeking to synthesize findings and understand relationships with predictive models.	None to date beyond demonstration of model to users.

What type of studies do locals see as necessary? In an effort to understand better community perceptions of research, a series of semi-structured interview questions was posed to locals. These questions addressed caribou research with respect to the need to conduct Porcupine caribou population censuses periodically, collect harvest data from hunters, conduct organized body condition studies on caribou to assess if animals are "poor" or "fat," document the migratory patterns of the herd, and study caribou to test for contaminants which may be harmful to humans. On the surface, these questions address what type of information is of value in the management process. As well, locals' perceived need for caribou studies touches on several co-management issues, among them the conflict of paradigms in wildlife management, deeper ideological perspectives, as well as access to resources.

Figure 6.1 Locals' perceived need to conduct caribou studies.



From the response, (Figure 6.1) it is clear that there was general agreement in principle among community members to conduct most types of caribou studies, with the exceptions being the need to conduct body condition studies. Cumulative responses, calculated as a percentage across all areas of locals interviewed, indicate a 74% rate for the need for caribou studies in general. Albeit homogeneous in this respect, this set of responses does *not* provide insight into locals' rationale for such studies, which not surprisingly, vary between individuals. Open-ended discussions with hunters about the need to conduct specific caribou studies, however, provide a more in depth insight into why counting caribou is necessary.

6.2.1 The need to count caribou

Focusing on locals' perceived need to count caribou, many hunters described the need as a fundamental method of monitoring change. As one hunter put it,

> "It's a good thing to know, to see if anything changes."

Some hunters expressed the need to count caribou as relating to a concern for overhunting.

> Need to count so we'll know if we shoot too much.

Some hunters expressed the need with respect to monitoring for herd fecundity as well as describing human harvesting as subtracting from the total number.

> You can see the increase these days. Most cows are calving. Population counts are good 'cause its only way we'll find out what the people are taking.

Other hunters described the need to conduct a caribou census as a way of monitoring for herd health and sickness.

> They might get sick on the trail some year, so we have to count.

He added,

> But I have never heard how many there are. One time, when biologists first said caribou [may be] radioactive, they figured caribou [numbers were] dropping, but old timers said mother nature will take care of its own, but it is getting more, I notice on my own.

While this hunter as well as many others made mention of their own abilities to observe the signs of population changes (a topic we will explore in more detail later), this hunter still considered it necessary to organize and undertake more systematic studies.

Of the 16% who stated that there was little to no need to count Porcupine Caribou periodically, several commented that methods of conducting the census have caused a significant enough impact on caribou behavior to merit not undertaking this activity. The hunter quoted below, like many others of the 16%, rationalized his statement with the belief that disturbance from caribou counts was leading to changes in overall migratory patterns of caribou, and similar to other local hunters, perceived the herd to be more dispersed or "spread out," leading to an overall increase in locals' hunting effort.

> Leave them alone, poor caribou try to live. They are all over the place, now. Too hard to tell where they are.

Finally, other locals who said there was no need to count caribou talked about the adequacy of locals' observations of caribou and a steady stream of available animals for monitoring herd population.

> Cause we can see it ourselves and we shoot out of it what we need and it is the same every time; don't have to count to know how much there is.

While historically the hunter's system of caribou management may have been based in an ideological tradition that is more focused on access to caribou than to caribou herds as finite numbers, this evidence appears to indicate that most community members interviewed have a firm understanding of the finite nature of their caribou resource. A cross tabulation of these data indicate that this perception is held among those interviewed regardless of the community, age class, and employment type sampled. The sample of explanations of why locals hold these perceptions is not intended to be exhaustive, but serves to dimensionalize the spectrum of perceptions.

It is helpful comparing locals' views on the need to count caribou to the comments of a PCMB agency manager about counting caribou.

> [A caribou herd is] like a bank account. As long as you know that there's $2,000 going in every month and you're spending less than $2,000 you're going to be able to spend - you need less than $2,000, you're okay. But if you don't know what's going in, you got to know how much is in there. And with the Porcupine Caribou herd, I think it's one of those rare examples where all you need to know is how big it is because it's easy to get, it's accurate. Most other populations it's hard to know how many animals are in population. I don't think we really need to track the harvest. I don't think we need to track birth rates and improvement rates. I think we just need to do a census every three years. That's just my gut feeling.

The managers' input-output bank analogy of herd population management shares many attributes of the hunters' perspective. In some respects, this manager states that he is satisfied with less information than many hunters want (e.g., harvest studies), and in this quote is questioning composition counts which are, interestingly enough, commonly performed by biologists working under his direction. But more importantly, his statement indicates an apparent difference in causality; some hunters view the monitoring of caribou harvest as sufficient, while his perception, somewhat unconventional by wildlife management standards, is that one must monitor either input (recruitment) or total population.

6.2.2 The Need for a body conditions study

Of the five types of caribou research discussed, the body condition study was viewed by the total sample of community members to be the least necessary. Several explanations account for this distinction. First, few hunters I talked with were aware of the biologists' rationale for conducting the research, which was to study the relationship between the reproductive success of females and their seasonal changes in body condition. Second, of the study projects involving field work with caribou, community members have had the most direct involvement in this study, and thus have the most direct exposure to its activities. As will be illustrated in the 1993 Caribou Crisis, locals at the time of this research had issue with the methods employed by this study, including the orphaning and consequential hardship of calves. Another problem associated with the body condition study was described by local leaders of one community as involving an incident of government-caused wastage in which caribou carcasses, collected through the study, were delivered by helicopter for villagers' pick-up and use by locals, but were scavenged by ravens and wasted. I should add that an agency manager described the incident as a communication failure resulting from an intoxicated local leader not relaying the message of the arrival of the meat to fellow community members. Locals viewed the incident as a case of government neglect in making one-on-one contact when delivering the meat. Regardless of the events, the point here is that the events left a blemish on the field collections of the body condition monitoring project, as perceived by locals. Third, and relevant to issues of community involvement in research, is the common view among caribou hunters that this area of knowledge is one in which hunters perceive themselves to have considerable knowledge, with one hunter stating,

> Why do they have to do studies, why don't they ask us? We have our own Ph.D.'s here.

A follow up question regarding the need for caribou body condition studies makes this point, as do responses from a set of questions about locals' perceived reliable information sources (presented in a later section).

As a follow-up, a question regarding the need for agency-based caribou body condition studies vs. documentation of locals' knowledge and observations was posed to hunters, asking them if "biologists' study of caribou body condition was necessary or if it was good enough only to gather the information directly from local hunters." The question also provides a basis for evaluating the hunters' perceived adequacy of local knowledge as compared to the work of agencies' projects. Hunters interviewed (n=64) were nearly equally divided in their responses, half (44%) stating that biologists' study of body condition was not a full replacement for local knowledge; the other 44% stating that this information should be gathered directly from the hunters, with 6% of the locals stating that both were needed.[1]

I identified two common sentiments among hunters regarding the need to conduct body condition studies. The first had to do with the difficulties that hunters have in recognizing year-to-year variability in the seasonal changes of body condition. The second, captured in the quote below, has to do with issues of mistrusting the biologists.

> We don't know what they'll be doing with that information. Why not take hunters out for meat to get information.

The topic of trust in biologists is addressed in a later chapter.

To summarize, a homogeneity of perceptions among local hunters was found in the perceived need to conduct studies of caribou. A diversity of views in why those studies needed were also expressed with a minority of hunters stating that the continued availability of caribou (i.e. local observations) are sufficient to monitor the herds' numbers.

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[1] This is not to suggest that these two are mutually exclusive, although at the time of conducting this research, observations of local hunters were provided only as anecdotal evidence at PCMB meetings and systematic collection of local knowledge of caribou body condition was not being undertaken. This topic is explored in detail in Chapter 9 when deconstructing the 1993 Caribou Crisis.

Moreover, the evidence relating to the local perceptions of body conditions studies indicates an internal division among locals interviewed; there are mixed feelings about the adequacy of local knowledge to meet the needs of modern-day management. I expand on this point when writing about locals' perceptions of the appropriateness of using caribou radio collars.

6.3 Reliable Information Sources

Locals were asked open questions to identify what information source they consider the most reliable for knowing the total population of the herd, for knowing the body condition of the herd, and for receiving the best explanation about PCH's seasonal migration. The responses (see Table 6.3) to these three aspects of caribou ecology provide an indication of varying perspectives and that issues of use of local knowledge is qualified..

With respect to the most reliable information source for knowing the population of the PCH, most locals I interviewed identified individuals and other information sources with direct linkages to the formal management system other than those of the local system. In descending order (See Table 6.3) these include biologists (15%), a Native PCMB member referred to by name (14%), the agency wildlife officer (12%), the community organization (12%), and the PCMB (11%). When asking them to identify the best information source for explaining the migration of the Porcupine Herd, more than a third identified elders as their own experts (37%). Another group (12%) viewed migration as mysterious, saying it was "hard to know," with others saying that they did not know of a good information source (12%). Others referenced a native PCMB member by name (10%) and biologists (10%) as good sources for getting an explanation of caribou migration. Three information sources for knowing the body condition of caribou totaled more than 60% of the responses. These are local hunters (38%), the respondent him or herself (13%) and elders (10%).

Table 6.3 Locals' Perceptions of Best Information Sources and Ways of Knowing Caribou
highlighted border indicates 60% of total responses

Body Condition	*n=105*	*Migration*	*n=106*	*Population*	*n=114*
local hunters	38%	elders	37%	biologists	15%
self	13%	don't know, its a mystery	12%	PCMB member by name	14%
elders	10%	PCMB member by name	10%	wildlife officer	12%
local organization	7%	biologist	10%	local organization	12%
family member	5%	self	7%	PCMB	11%
wildlife mgt. agency	5%	local hunters	7%	don't know	8%
biologists	5%	PCMB	5%	wildlife management agency	7%
PCMB	4%	local organization	5%	local hunters	6%
PCMB member by name	4%	wildlife management agency	3%	elders	5%
wildlife Officer	4%	wildlife officer	3%	local leader	5%
reports from other communities	2%	reports from other communities	1%	TV	2%
local leader	1%	David Suzuki	1%	no body	2%
TV	1%			family member	1%
local health center	1%				
women	1%				

How can the pattern of these three sets of responses be explained and what can be learned from them? First, a comparison of the three areas of responses illustrates an integrated pattern of reliable information sources. Talking about caribou body condition, community members were found to perceive local sources of knowledge (local hunters, elders, Native PCMB member) as offering the greatest reliability; no non-local sources were mentioned in this category which totaled greater than 5% of the responses. Recognizing communities' own traditional strategies of predicting the movements of caribou as well as the limitations of existing knowledge in this area, community members pointed to elders as being the best information sources as well as stating that movement of caribou was an area of "mystery" or uncertainty. And when identifying a quantitative information source, they defer to sources with more direct experience in these management matters (biologists and PCMB member).

Table 6.4 Locals' Perceived Reliability of Local, Non-local, and Interface Information Sources	n=92
Local sources (hunters, elders, local orgs, etc.)	58%
Government (biologists, agencies, wildlife officers)	24%
Interface (Local PCMB Representative and PCMB)	18%

The pattern of community perceptions of local sources of information also indicates local sources to be perceived as more reliable. (See Table 6.4)

Table 6.5 Perceived Reliability of Local and Non-local orgs. as Information Sources	n=63
Local Organizations	41%
Non-local organizations	25%
Interface organization (PCMB)	33%

Examining the three sets together it is clear that community members are most likely to identify local sources as providing reliable information than they are non-local sources, although biologists are not dismissed. There is also an interesting pattern with respect to community members' perceptions of the PCMB (see Table

6.5). These data indicate that local organizations are more likely to be identified than the PCMB, although it is clear that the PCMB's members do feature prominently.

6.4 Locals' Perspectives on the Use of Caribou Collars for Caribou Studies

Table 6.6 Locals' perspectives on the use of caribou collars

	collars are acceptable	*collars are not accept-able*	*equivocal or conditiona l approval*	*don't know*		
Responses from total sample	40%	36%	22%	3%		
COMMUNITY						73
Old Crow	50%	50%	0%	0%	12	
McPherson	40%	37%	17%	6%	35	
Aklavik	35%	27%	38%	0%	26	
AGE						73
elder	33%	53%	13%	0%	15	
middle aged	40%	35%	21%	5%	43	
young adult	47%	20%	33%	0%	15	
CASH EMPLOYMENT						72
full time	62%	23%	15%	0%	13	
part time	39%	44%	11%	6%	18	
seasonal	20%	50%	30%	0%	10	
unemployed	37%	30%	30%	4%	27	
student	50%	25%	25%	0%	4	
TRADITIONAL. HUNTING EXPERIENCE						71
exp. hunting w/ dogs	31%	39%	25%	4%	51	
no exp. hunting w/ dogs	65%	25%	10%	0%	20	

In Ethnographic account #1, I tell of the concern expressed by PCMB board members about the use of collars on caribou. In the next chapter I describe in detail how local-level observations about collars and research in general evolved into the 1993

Caribou Crisis. In the data presented in Table 6.6 I confirm that locals indeed perceived research of various types to be a necessity. While most community hunters were in some agreement about the need to conduct a range of caribou studies, they were in less agreement about the appropriateness of using radio collars for caribou research. Of those asked about the acceptability of collars (n=73), there was a near-even split among those viewing collars as acceptable (40%) and those stating that caribou are not acceptable (36%), a condition of internal community disagreement that PCMB government members were not aware of, based on their reports to me..

6.4.1 Illustrative Quotes: Caribou Collars are Acceptable

The following set of quotes are illustrative of community members' statements of approval for the use of caribou collars.

> Helicopters and collars are the only way it can be done.
>
> We are not our grandfathers. Some [people] in this community say they don't like collars, but they sit on their front step and expect the caribou to come to them. It's not like that any more. We live on the land, but live the modern way too.
>
> Good idea to know where the caribou are, especially if the migration is different. Can always call biologists. Got to stay with the times. Can't go backwards.
>
> I saw it on TV, collars and capture and release. No bother.
>
> It's acceptable, but it is harassment. It's giving us an in. But why are scientists doing these studies?

All these users express an understanding for the need for collars, with some stating their use to be "the only way" to meet today's management challenges. The second quote is of a local hunter who describes the use of remote sensing caribou research technologies as part of the new native reality with which he identifies. He expresses some contempt for fellow community members who espouse a traditional view against caribou collars but, in his opinion also do not live an on-the-land lifestyle. The characteristics of this particular hunter are interesting, illustrating in more detail his personal experience and perspective. At the time of this research, the hunter was unemployed He had previously been employed

full time but had left his well-paid job with the territorial government to pursue a back-to-the-land life style. In addition, he had worked previously with biologists doing field work in support of the body condition study (though never by collaring) but had also talked with me about his experience with his own search for his "animal protector," or guardian. As illustrated by the final two respondents, this hunter was positive about his communication with biologists. The final hunter is among those who view the use of collars as acceptable, but is not clear why they are used.

6.4.2 Illustrative Quotes: Caribou Collars are Not Acceptable

From those 36% of the hunters interviewed who were clear in telling me that the use of collars was unacceptable, I discovered a ubiquitous perception that collaring, and sometimes collaring along with the net gunning of animals, was harmful to caribou.

> Research is disturbance. Don't collar caribou.
>
> They should study them, but don't hurt them. Collars might be too tight and choke them, or they might get sick from them and pass it on to other caribou. But tell me, why do they need to study anyway? To keep track? Everyone knows where caribou go.
>
> I'm not too happy. I watch caribou with collars on TV and that net with the caribou tumbling. That is fear. Not good for us to have fear. Is there a better way to see how they are? Don't like it. They may use it to help people, still not good.
>
> We can put people on the moon, why can't we find a better way of studying caribou? Common sense tells me if you collar caribou, it is going to kill him, and something is going wrong.
>
> Collaring is not good for animals. I shot one with a collar several years ago and it was not healthy. Didn't seem to be eating enough, I think. Poor shape, almost died. So collars are OK on some animals, but I keep hearing these kind of stories. Not acceptable for caribou.
>
> [Collars are] harmful to caribou, causes radiation. Helicopters not necessary, pretty sickening. Lots of money spent. I never hear about how community deals with these things. Research is valuable, at least we know population and movements.

Like some of the hunters speaking out at the public meeting, these hunters share the perception that the collaring of caribou is a form of disturbance, and as one hunter puts it, causing fear both to caribou and humans. As has been documented, this statement is

another expression in which there is transcendence between the constructs of human and animal. One hunter went as far as to describe the use of collars (framed with respect to calf *and* adult collars) as causing sure death. The perceptions of caribou hardship from research and the resultant hardship to humans cannot be understated. In a rather dramatic interview, one elder extended the human-caribou identity and the traditional perceptions of ecological causality to point out that recent hardships experienced by First Nations people in general and her community in particular (several recent suicide attempts and two alcohol-related fatalities) as being the direct consequences of human disrespect of animals in the caribou calf collar incident. When asking a young native PCMB member about this perception, he noted that he shared the old woman's view.

The hunter referring to the potential hazards of collars as causing "radiation," expresses a cluster of perception associations that illustrate issues of "understanding," and embody many of the themes of concern described by those who viewed caribou collars as unacceptable. For others who mentioned this, the association of radiation as a potential hazard to caribou also was associated with microwave radio towers, a set of which was constructed on the Dempster highway and was the subject of an assessment of caribou impacts. Others referenced the problem of radio collars as related to radio cesium, an issue which has been the subject of repeated study with respect to lichen absorption, caribou foraging, and human health concerns.

The statements about radiation of caribou collars (as well as radio microwave towers on the Dempster Highway) would, for most scientists, be dismissed as an unfounded assertion. Yet these statements also speak directly to community's cost of deciphering foreign constructs. The statements "Maybe its better now," "Why are scientists doing these studies?," and " "I was surprised" are illustrative of community members' process of grappling with the use of collars and efforts to comprehend their use. As already noted, while conducting interviews I commonly interrupted and returned to the my line of questioning, "why to they need to study anyway?" The repeated interrogatives of

this sample of illustrative quotes points to the hypothesis that those community members that find caribou collars unacceptable have a basic lack of understanding of their purpose and formal caribou management in general. Indeed, as I will discuss later when deconstructing the 1993 Caribou Crisis, this is an assumption held by several government representatives of the PCMB. It is also important not to lose track here of the social constructionist perspective; that what we know (or think we understand and don't understand) is underpinned by the iceberg of assumptions of how we know (Evernden 1993). The framing of caribou research as "waste," provides an example of a problem definition which corresponds with the constructs of local rules for the use of caribou described in Chapter Five. Differing from some of hunters who viewed collars as acceptable, this user tells of how he is disconnected from the decision making process.

6.4.3 Illustrative Quotes: Conditional or Equivocal Approval

A final set of illustrative quotes about collars are from the hunters who expressed equivocality or elaborated on the conditional appropriateness of their use on caribou.

> First time collar was put on, hunter from here shot one and caribou was choking. Snow was drifting in its neck. That was 70's. Arctic Red Elder tells me they tagged caribou with metal on their ear and it gets infected with puss on the head. So he shot one. Maybe its better now. I don't hear.
>
> Do studies, but do it another way, like walrus where they use small collars. You don't need to use a big dog collar. Caribou might be hurt. Okay to put it on a certain number of them, but not straight cows. Do bulls and cows, calves are out of the question.
>
> Collars are okay for information, as long as it don't affect them. I hope it doesn't. Collars have radiation, so its dangerous for caribou. People shouldn't eat caribou with collar.
>
> I heard on the radio that caribou [with collars] are getting hung up on trees. This is kind'a like what Greenpeace is after. We don't want to hurt the animals, and we are stuck in the middle.
>
> Net guns are good. If you're going to shoot them for studies, use it all. This fall there were radio collars on calves. They grew out of it and died. My brother got one with a collar, and it was in OK shape. I was surprised. I didn't think caribou get along with them.

The first of these quotes relates a hunter's and elder's personal experience in the 1970's shooting caribou with collars. In the course of my field work, I heard several "collar stories" from hunters that I also observed told and retold to community members. In several cases, local community members, having heard stories from other members, suggested that I visit with the holder of those stories to learn from their experience with collars. It appears that these epics, some as old as twenty years, are captured in the oral traditions of community, much like favorite songs, are repeated and thus incorporated into the community's living memories about collar experiences. As reflected in the quotes listed in the previous section, hunters expresses some frustration with their access to knowledge and understanding of the researcher's rationale for completing the work.

Also illustrated with these quotes are a few of the conflicts and dilemmas which emerge for some locals from the use of collars. Among these is the sense of being "stuck in the middle" between the animal rights activists, commonly framed by Native Canadian community members as "Greenpeacers," and the appearances of animal hardships caused by researchers who are part of the co-management process. Also illustrated here is the dilemma experienced by the hunter who views that caribou collaring is OK for information but at the same time taints caribou with radiation, thus resulting in what is perceived to be a violation of meat wastage norms. There is also the related dissonance of the hunter who has previously heard from locals that caribou collars are harmful and is surprised to learn from his brother's hunt that caribou can have a collar and be found to be in good condition.

A final dilemma associated with the topic of collars speaks to locals' direct experience with research. When asking a local hunter the question about collars, he initially offered the answer, "I don't know." Later in the interview, however, he asked me to go back to the question. He then talked about his current employment working with a renewable resource management agency through a local hire program and direct involvement in a research project that places collars on wildlife. He went on to tell me that from his personal experience with their use, he has come to the conclusion that collaring of

wildlife for scientific purposes is "inappropriate and unacceptable," but also knows that if he expresses his views openly, he will lose his job working part-time with the agency.

6.5 Locals' Perceptions of Accuracy of Caribou Census and Harvest Data

Radio Collars offer caribou managers a method of locating a sample of animals (generally about 100 animals) for the caribou census that is completed biennially. The use of collars and the aggregation of cows and bulls on the coastal plain in the post-calving periods are said to make the counting of this herd among the most accurate. At the least, the photo census provides an accounting of the minimum number of animals in the herd.

To assess locals' perceptions of the caribou census, local hunters (n=69) were asked if they perceive the biologists' findings to be accurate (see Table 6.7). The question was posed by asking,

> Every couple years biologists count the number of caribou in the Porcupine Herd. Do you think that the numbers that are produced from those counts are accurate?

While more than a third stated that caribou censuses were very accurate to accurate, more than half of those hunters either expressed doubts about the accuracy of the caribou census or stated that they did not know. A cross tabulation of these data indicate consistent perspectives across community, and age, and employment status groups; and a greater likelihood that hunters with old style hunting experience (traditional hunters) would question the accuracy of the information from these studies.

Table 6.7 Locals' Perception of the Accuracy of Porcupine Caribou Herd Census					
	viewed as very accurate to somewhat accurate	*expresses serious doubt about accuracy*	*don't know*		
all responses:	39%	29%	32%	n	n
COMMUNITY					69
Old Crow	50%	30%	20%	10	
McPherson	42%	18%	39%	33	
Aklavik	31%	42%	27%	26	
AGE					69
Elder	43%	36%	21%	14	
Middle aged	37%	29%	34%	41	
young adult	43%	21%	36%	14	
CASH EMPLOYMENT					68
full time	46%	31%	23%	13	
part time	31%	19%	50%	16	
seasonal	55%	18%	27%	11	
unemployed	32%	36%	32%	25	
student	33%	67%	0%	3	
TRADITIONAL HUNTING EXPERIENCE					67
exp. hunting w/ dogs	43%	24%	33%	49	
no exp. w/ dogs	28%	44%	28%	18	

How then do I explain these responses, given that local hunters are generally in agreement about the need for these studies and also see biologists as among those who hold the most reliable information about caribou counts? First, caribou censuses have been conducted since the early seventies with the findings of these studies being reported with regularity to community members since the mid-eighties. Many local hunters are aware that the work of counting caribou is new to the North and in the past (and still in some regions) produces questionable results. In short, the act of counting caribou comes with a history of doubt, not to mention it being a task which is inherently challenging. Second, Caribou counts of the PCH are regularly undertaken in Alaska and to date,

Canadian locals have not participated in the census process since the seventies.[2] From a local perspective, census numbers are manufactured into management information behind the doors of agencies and distant from the activities of community. This puts locals in the position of evaluating the accuracy of the caribou census based on their own experiences and trust of those producing the findings. Since at least the 1950's, community hunters have used aircraft to locate caribou for hunting. In my interviews, several made reference to these "caribou searches" when commenting on the accuracy of caribou censuses. Third is an issue of association of caribou counts and imposed quotas. While Canadian PCH native hunters have not been subject to quotas, they have had to work within them with other species (grizzly bear, bowhead, and some fish). The generation of numbers, without contact with real control of that process, instills a fear, expressed by some hunters, that those numbers will be turned against the local hunter. Finally there is the matter of local mistrust of the biologist and biology.

6.5.1 Illustrative Quotes: Range of Locals' Perceptions Of Caribou Census Accuracy

> [Final numbers are] pretty close because I have seen them [used on] TV, but they miss some [when doing counts]. They go by collars but what if there is a herd without collars?
>
> It's not that accurate, maybe 15 to 20% off, but biologists say only 5% off. They miss some groups, but they are getting better. They said 50 years ago no caribou, but maybe they just went to the mountains
>
> I've been in planes looking for caribou. It's pretty hard to count'm. You fly around and look down with clouds everywhere. All they're [biologists] doing is guessing. All caribou look the same, unless maybe there's a way to count them.
>
> Counting caribou is a waste of money, you count and they are moving at the same time.
>
> Hard to count, but I don't know how they do that , and haven't heard much about population changing.
>
> Over the years caribou don't vary that much. Can never get accurate count because it's counted from a plane.

---

[2] It was reported by Alaskan resource managers and biologists interviewed that on occasion residents of Kaktovik are welcomed to participate as passengers when caribou census is conducted from that village, yet this is on an ad hoc basis.

> Can't be accurate. Maybe they count the same ones over and over.
>
> I don't know about accuracy, but the numbers are going down for sure. 10,000 vanished at once? (Referring to the 1993 reported decrease in PCH population.) What happen? And then, I never heard anything after that. But they (the biologists') population isn't accurate. Most of the time they just guess.
>
> [Biologists] say the herd is declining, but I don't believe them, I don't believe that there are less.

Hunter focus group discussions provide some insight into the internal process by which information about and understanding of caribou census takes place at the local level. In both groups the topic of census accuracy was raised when discussing the need for caribou management information. In both groups, participants asked me to explain how the caribou census is conducted, and in both I turned their question back on the group, asking if a local among them would please explain. And in both cases a younger hunter with formal training in resource management (two-year technical degrees) responded. Here is one of them.

> Local Hunter #85: They take aerial photographs and then they take the pictures and then they go on the ground and they count, like sometimes when you take pictures in the air. When you are taking pictures from the air, the young ones might be under the caribou so you got to go down and try to get an idea of how many young cows are in. Kind of guessing at it. (Statement followed by laughter from the group)

Hunters of one of the groups also recounted an experience they had in 1990 when biologists announced that census counts indicated that the herd had continually increased at a rate of 5% for a decade. In anticipation of the herd exceeding its carrying capacity, there was discussion among some PCH biologists about the need to take more caribou to avoid an impending crash. The focus group interactions below illuminate two aspects of community perceptions of the accuracy of caribou census. The first is how locals perceived the biologists' concern for the herd to exceed its carrying capacity; and the second is the difference between the comments of local hunters of this groups and the assertion of the Local PCMB member who was in attendance.

> Local hunter (#142): Well, about five years ago one biologist came here. That's when they were saying that the population was about 200,000. I

> think they came to the [local organization] then and one biologist panicked. I think the letter [the biologist] wrote to the local organization] must be around someplace. He said the population is way over the limit. The letter stated that the we, the natives from [local community], should kill off a whole bunch. And that was from one of the biologists!
>
> Local hunter (#282): I think it was [name of agency biologist] that came in and said that they are going to increase to the number where they are going to crash and then that's when [local hunter #142], he asked how come if there's so many, how come there wasn't any here in that year?
>
> Local hunter #142]: Another year, after they took a count and they said there was about 160,000. So that's why I say their count is wrong. I mean it's not accurate.
>
> Local PCMB Member: I think to me it's pretty close. It's not that far off because they go all over the place, in the plane, looking for the herd, they find one bunch, or one or two bunches, and they count them. You can't miss a whole bunch of caribou in aircraft looking out over the whole Richardson Mountains and the US.

This discussion contrasts with the perception (below) of the caribou biologist who made the visit to that community.

> It's pretty well known, you know, even although you probably wouldn't get a crash in a big herd like that you might, you might see a fluctuation you know, say now if you're talking numbers say, you could maybe see a fluctuation two hundred and twenty, you know, I figure over a number of years. In theory, you would dampen these fluctuations if before you would see a reduction, you would increase the harvest. You would tend to dampen those fluctuations. It's pretty well an accepted theory, I guess. So it kind of then speaks for that it would probably be acceptable to have a slight increase in the harvest. Yeah.

What is aiso noteworthy is that his theory of dampening the rate of change in caribou population is actually similar to many locals I interviewed who held the belief that the recent increase in caribou numbers is due to modernization and lowered human dependence on caribou, and the result of a total historical decrease in human harvest.

6.6 Perceived Accuracy of Harvest Data

Harvest data are considered, in conventional wildlife management systems, as fundamental information collected in order to successfully manage a living resource. Caribou users' perception that the numbers collected are accurate is important in that allocation of quotas, if imposed, could be based in part on these numbers. Also, harvest

data serve as the basis for financial compensation in the case of an environmental accident as provided by some land claim agreements. Hunters were asked if they perceived the information collected in harvest questionnaires to be accurate. Those stating that they felt that numbers were accurate and those stating that numbers were inaccurate were equally split. The largest group of respondents indicated that they did not know if numbers were accurate. In discussions with hunters about this topic, they discussed problems relating to recall of numbers, issues relating to the politics of sharing harvest data with government agencies, and the fear of imposed quotas, as well as their own perceptions that many of their fellow community members were not being truthful in their reports. Among the reasons stated was the fear that hunters that report low harvest numbers would be perceived by the interviewer as being lazy hunters. As well, hunters talked about the fear that outsiders would perceive their take to be high and thus the community would be viewed as wasteful and overly consumptive.

6.7 Perceived need to control the caribou research agenda

So what role do community members see their community taking in the research approval process? An additional interview finding (See Table 6.8) helps to answer this question and clarifies the perspectives of community, explaining the differing perceptions between the co-management process and local communities. One aspect has to do with the locus of control and the other with locals' perceived need for studies. While 80% (n=77) of those responding indicated that it was very necessary to somewhat necessary for locals to approve caribou studies, 44% of the community members questioned stated that their community should have a direct authority in approving research. The other half deferred to the Canadian co-management body by responding that it was good enough for

Table 6.8 Locals' perceptions of the accuracy of numbers collected in harvest questionnaires					
all responses	*very accurate to somewhat accurate*	*less than accurate to not accurate*	*don't know*		
total	32%	33%	35%	*n/group.*	*n*
COMMUNITY					
Old Crow	23%	34%	44%	18	94
McPherson	18%	43%	39%	44	
Aklavik	56%	19%	25%	32	
age					
Elder	43%	24%	33%	21	95
Middle aged	37%	38%	26%	58	
young adult	6%	26%	69%	16	
CASH EMPLOYMENT					
full time	39%	43%	17%	23	93
part time	43%	17%	39%	23	
seasonal	36%	35%	29%	14	
unemployed	21%	34%	45%	29	
student	0%	50%	50%	4	
TRADITIONAL HUNTING EXPERIENCE					
exp. hunting w/ dogs	39%	33%	28%	64	91
no exp. w/ dogs	15%	34%	52%	27	

the PCMB to make these decisions on behalf of community. One key aspect of these responses is related to the question of what research is conducted on a community's homelands (use of aircraft). In some cases, community members interviewed expressed no desire for their community to have authority in decision making regarding research taking place on others' lands, even though the research was focused on the migratory species of caribou. Others talked about community control in the context of more native people assuming roles as management biologists.

6.8 Perceived need for Quota

As a test to clarify community members' perspectives on the appropriateness of using quotas as a management tool, I asked locals if they felt that a quota would be

necessary in the event that the herd dropped below 70,000 animals. (See Table 6.9) (100,000 caribou was the figure given to me by three government representatives to the PCMB board when I asked them at what point they felt a quota should be imposed on hunters.)

Table 6.9 Locals' perceived need for hunting quota if numbers dropped below 70,000 Porcupine Caribou

all responses	very necessary to necessary	less than necessary to not necessary	don't know		
total	69%	28%	3%	*n/group*	*n*
COMMUNITY					
Old Crow	88%	0%	11%	9	68
McPherson	76%	24%	0%	34	
Aklavik	60%	36%	4%	25	
AGE					
Elder	57%	35%	7%	14	68
Middle aged	67%	33%	0%	39	
young adult	87%	7%	7%	15	
CASH EMPLOYMENT					
full time	92%	8%	0%	13	67
part time	54%	40%	7%	15	
seasonal	70%	30%	0%	10	
unemployed	72%	28%	0%	25	
student	50%	25%	25%	4	
TRADITIONAL HUNTING EXPERIENCE					
exp. hunting w/ dogs	61%	37%	2%	47	66
no exp. w/ dogs	84%	10%	5%	19	

69% of the respondents share the perception of managers that a quota of some kind would be necessary in the event of a dramatic decrease of Porcupine Caribou and only 28% indicated that a quota would not be necessary. I found no difference in responses (significant) between communities. As well, I found the greatest variance in response to this question from the elders who were interviewed. Almost all young adults (n=15), 87% saw a quota as necessary. 28% indicated that a quota was NOT necessary, with some referencing their belief that the more caribou that are harvested, the more will be

found the following year. As noted in Chapter 4, this hypothesis is extrapolated from locals' experience harvesting muskrats. In focus group discussion this topic was discussed in more detail, with some locals leaders (i.e. elected to local organization as officers) describing the strategy of first imposing a bull-only restriction in the event of a decrease, and pointing out that with census data collected every two years, dramatic decreases are not likely to be discovered spontaneously.

6.9 Locals' expectations that community hunters will comply with a hunting quota

Following from the previous question, community members (n=65) were asked if community hunters would comply with a quota if the PCMB and local community leaders decided there should be one imposed, in an effort to measure locals' expectations of local compliance. 32% of the respondents indicated that it was likely, whereas 47% indicated it was less than likely to not likely. 22% responded that they did not know.

It is important to understand that community members' expectations that local hunters will comply with a quota if imposed by the PCMB and local leaders is *not* an indication of actual behavior, but helps to explain two aspects of the co-management regime. First, it reflects that community members have never had a Porcupine caribou quota imposed by an external authority, and thus have limited experience with the institution. While hunters of the past have forgone the talking of caribou for a variety of reasons (e.g., to insure that caribou continue to return, to insure that caribou over winter in an area, to allow bulls to rut with dignity and not to offend animals with the act of wasting meat), the decision to implement a range-wide quota in collaboration with governments is foreign. Given this history and the traditional institutions for managing caribou (i.e. needs-based management), these findings help to illustrate the cost a co-management board may incur when recommending new institutions, even if local leaders are in support.

Second, this set of responses is an indication of the limited social capital accrued by the co-management board in the work of allocating harvest by the co-management regime. While individual PCMB members are viewed as knowledgeable and in some cases viewed as spokespeople for communities, there is another leap of trust required in order for locals to achieve the consensus to comply. The experience of local members with the failure of locals voluntarily to comply with PCMB recommendation for native Dempster Highway hunting surely colored their comments. Finally, and perhaps more importantly, the responses underscore the extent to which quotas are a politically charged issue related to local control and individual autonomy, a condition that surely colored the respondents' answers.

6.10 Perceived Need to Lobby against development

As described earlier, proposed gas and oil exploration and development for the coastal plain of the Arctic National Wildlife Refuge (Area 1002) have been the focus of much of the research conducted within the range of the herd. Consequently, the PCMB has been involved in an international lobbying effort in a number of capacities, one of which is lobbying the US Congress against development and proposing that Congress grant he 1002 area wilderness designation. Also mentioned has been the tremendous energy expenditure dedicated to this effort by the PCMB, part of which has included coordinating a grassroots lobbying campaign against development, in which locals travel across the United States and describe the implications of negative impacts on Porcupine Caribou to native people.

As a way of measuring the congruity of this board level activity with locally perceived needs, and understanding better one dimension of the interface of science and policy, three questions were asked about the issue of oil development and caribou lobbying. These focused on locals' perceived need to lobby against oil development in

calving grounds, locals' willingness to lobby against development if asked, and locals' view of the best way to make the decision on such development proposals.

Responding to the question regarding the need to lobby against oil development on the calving grounds of the Porcupine Herd (n=102), (See Table 6.10) 85% stated that lobbying was very necessary to necessary. The majority of those (65%) fell into the former category. Those holding full-time employment represent the largest single group stating that lobbying was not necessary. Of the three communities, the greatest variance in perspective on the need for lobbying was found in the community of Aklavik. Aklavik, it should be noted, is populated with Inuvialuit (60%) many of whom have kinship ties with community members of Kaktovik, a community that is formally in favor of development, and with citizens who have in the past worked in the oil industry. It is noteworthy that until the early 1990's, off-shore oil production was in operation in the Beaufort Sea and members of their community recently worked in varying capacities. With the full disengagement of the oil industry in the Beaufort and the loss of employment opportunities by locals, some of these people who were interviewed told me that they had recently changed their perspective. Whereas before they favored development in Alaska's caribou calving grounds, the loss of employment helped them to realize the mobility of multi-national corporations and industry's lack of long-term attachment to the communities. In one case one man who had worked in the oil field for more than a decade required that I accompany him to his freezer where he opened it and showed me his bounty of ducks, caribou , and muktuk. At that point he proceeded to talked about his anger for industry and appreciation that in the end the Porcupine Herd was still there for him and his family in their time of need.

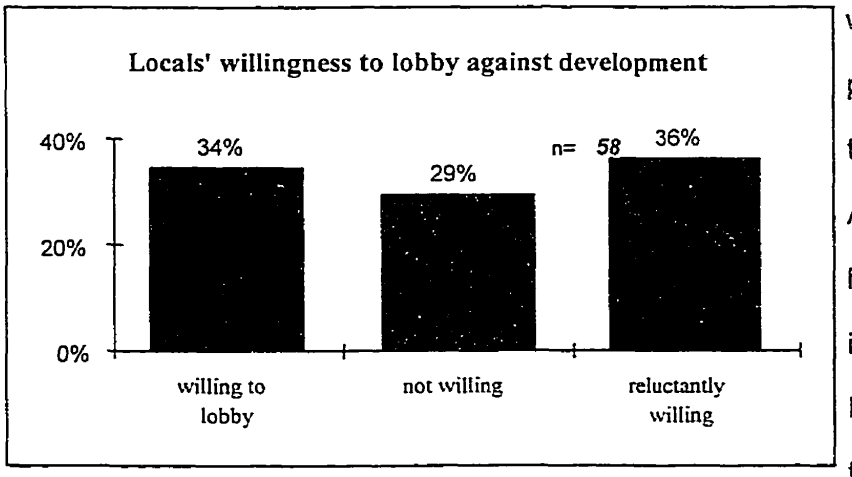
Table 6.10 Locals' perceived need to lobby against oil development in the calving grounds of the Porcupine Herd					
all responses	*very necessary to necessary*	*not necessary*	*don't know*		
total	85%	4%	9%	n/grp.	n
COMMUNITY					
Old Crow	100%	0%	0%	21	103
McPherson	88%	2%	10%	42	
Aklavik	81%	8%	13%	40	
AGE					
Elder	86%	7%	7%	15	103
Middle aged	84%	3%	12%	58	
young adult	94%	3%	3%	30	
CASH EMPLOYMENT					
full time	85%	10%	5%	20	103
part time	90%	0%	10%	20	
seasonal	75%	8%	17%	12	
unemployed	86%	4%	11%	27	
student	96%	0%	4%	24	
TRADITIONAL HUNTING EXPERIENCE					
exp. hunting w/ dogs	61%	20%	19%	56	101
no exp. w/ dogs	71%	24%	4%	45	

While there was an overall perceived need to lobby against oil development in the Arctic National Wildlife Refuge, only 34% (n=58) of the community members stated a willingness to lobby, with 36% expressing a reluctant willingness, and 29% stating that they were not willing. Of those in the final category (n=17), 64% said that lobbying against ANWR development was necessary. Of those individuals who saw a need for lobbying against development, but were unwilling, individuals fell into several categories -- those for whom competing demands (e.g. family, work) set up opportunity costs which limit the opportunities and incentives for travel. Another group talked of the more psychological *costs related to their fear of travel to foreign places*, concern about change of diet from wild foods to "*oonjet* (white man) food when on the road," and their hesitation about the idea of speaking in a public setting, particularly to a group of southern white Americans.

Several individuals who had actually participated in lobbying efforts in grassroots and Washington-based tours organized by the PCMB spoke of *the costs of bearing one's*

soul to strangers, the emotional hardship of imagining a world without caribou and describing it to others, and the sheer physical exhaustion of traveling and living in the city. Former community lobbyists also talked about their difficulties of projecting a realistic, yet convincing image of their people as caribou users while interacting with southerners who have expectations of native's dressing and behaving in "traditional" ways. At a workshop for training locals to participate in lobbying, veteran travelers told stories of discovering the need to have cash to use toilets at Kennedy International Airport and being petrified when approaching and passing through a mountain tunnel in Pennsylvania while riding in a car. This class of transaction costs in the political struggle of locals to share power in the ANWR development issues can not be understated and puts in perspective the role of a co-management body as facilitating a lobbying effort for communities that seeking to influence international affairs.

Figure 6.2 Locals' willingness to lobby against development



Community members were also asked what they perceived to be the best way to know if oil development in Alaska's 1002 lands would have a significant negative impact on the herd. (See Figure 6.2) Responses to this question varied. Some indicated a need for additional studies, yet others talked about the best way of making such assessments as including a decision-making process in which people from all communities would gather, discuss the issue, and make the decision independent of government agencies and legislatures. Several community members suggested that all "the people" get into one room and talk together until consensus was achieved. Another talked about a gathering of elders for various user communities.

Reflecting on their own decision making concerning the decision of whether or not to support the Mackenzie Valley Pipeline Inquiry, Fort McPherson leaders described how at that time they had challenged the project proponent (Foothills Ltd.)to send a delegation of community members to Alaska to talk directly with people in regions where the pipeline had been constructed in close proximity to communities. While the leaders had toured the oil facilities and observed the Trans-Alaskan Pipeline, today these men, many of whom are formal leaders of the community, talked at length about attending a community meeting in a small Alaskan community in which local trappers gave testimonials that the oil boom had radically changed their life and negatively altered environmental conditions which allowed for trapping. They also talked about how development had created greater access to community by outsiders and increased the presence of alcohol. Today the story appears to serve both as a reference point for assessing future oil development and stands as an example of how to incorporate a community-level assessments when making such decisions.

6.11 Local Perceptions of Community Influence as provided by the PCMB and Trust in the system

Now, I turn to perceptions of efficacy (i.e. fate control) in decision making in the area of natural resources, an outcome of power sharing which some (Berger 1985; Lonner 1986) argue as an important rational for the establishment of wildlife co-management. Pateman (1970; 1975; Rothschild and Whitt 1989) notes that efficacy is important in the development and maintenance of any democratic process. Investigating local hunters' perceptions of their community's relationship with the PCMB helps to identify levels of efficacy, as well as issues of trust, both elements of a power sharing situation. Looking at perceptions of change in the power relationship with government, which have been the result of the implementation of co-management, I asked hunters (n=89) if the PCMB has given their community more power and influence in (See Table 6.11) 10 years ago. 59% stated that it had with 12% saying that community's power was about the same as before.

28% answered the question by saying they did not know, an indication either of community members' limited understanding of the operations of the board and its role in the management process or their ambivalence about answering the question. Responding to another question on the topic of efficacy and power relations, 51% indicated that they did not know who controls the PCMB. 32% stated that they perceived it to be well balanced between native organizations and government. Of those responding that natives controlled the PCMB, some were Inuvialuit commenting that the Gwich'in dominated board-level affairs. Others were Gwich'in, who saw themselves as being in that position. Many expressed satisfaction in the work of the PCMB and the overall arrangement, with several stating, "If it ain't broke don't fix it."

Table 6.11 **Who locals say controls the PCMB activities.**

all responses	*natives*	*govern-ment*	*others*	*well balanced*	*don't know*		
Responses	6%	9%	2%	32%	51%	*n/group.*	*n*
COMMUNITY							
Old Crow	0%	14%	0%	41%	45%	29	109
McPherson	12%	8%	4%	25%	51%	51	
Aklavik	10%	7%	0%	24%	59%	29	
age							
elder	0%	13%	0%	35%	52%	23	109
middle aged	6%	7%	3%	31%	53%	70	
young adult	13%	13%	0%	31%	44%	16	
CASH EMPLOYMENT							
full time	3%	3%	3%	41%	48%	29	109
part time	8%	12%	4%	23%	54%	26	
seasonal	0%	7%	0%	47%	47%	15	
unemployed	6%	14%	0%	26%	54%	35	
student	25%	0%	0%	25%	50%	4	
TRADITIONAL HUNTING EXPERIENCE							
exp. Using dogs	5%	8%	3%	34%	50%	74	103
no exp. w/ dogs	7%	14%	0%	31%	48%	29	

As a final indicator of users' trust , I asked locals to compare their trust of the PCMB with the Canadian federal and territorial governments. No distinction was asked between these two levels, and 65% (n=134) stated that they trust the PCMB more than government. (See Table 6.12.)

Table 6.12 How does locals' trust of the PCMB compare with the Canadian federal and territorial governments

All responses	*more*	*the same*	*less*	*don't know*	*n/grp.*	*n*
n=134	65%	11%	1%	22%		
COMMUNITY						
Old Crow	50%	18%	0%	32%	34	134
McPherson	77%	9%	4%	11%	57	
Aklavik	60%	9%	0%	30%	43	
AGE						
elder	46%	17%	0%	38%	24	134
middle aged	65%	12%	2%	20%	84	
young adult	81%	4%	0%	15%	26	
CASH EMPLOYMENT						
full time	74%	6%	0%	19%	31	134
part time	61%	9%	0%	30%	33	
seasonal	63%	19%	0%	19%	16	
unemployed	51%	20%	6%	23%	35	
student	84%	0%	0%	16%	19	
TRADITIONAL HUNTING EXPERIENCE						
exp. using dogs	58%	17%	3%	23%	78	126
no exp. w/ dogs	77%	4%	0%	19%	48	

Finally, when asking about locals' trust of the United States to protect the caribou herd, 54% (n=77) stated that they had low to no trust with 34% stating that they did not know. "Did not know" or no response answers to this question were frequently elaborated on, with comments that they're not aware of what happens on the international level, and that it is difficult enough to follow political affairs in community and within the territory. It is possible that those responding that they don't know said so out of discomfort with being critical of the American government to a US citizen/researcher.

Table 6.13 Locals' trust of United States caribou management to protect the Porcupine Herd					
all responses	*trust*	*little to no trust*	*don't know*		
total	12%	55%	34%	n/grp.	n
COMMUNITY					
Old Crow	7%	93%	0%	14	77
Fort McPherson	8%	53%	39%	38	
Aklavik	20%	36%	44%	25	
AGE					
Elder	13%	40%	47%	15	77
Middle aged	13%	54%	33%	46	
young adult	6%	69%	25%	16	
CASH EMPLOYMENT					
full time	31%	56%	13%	16	77
part time	0%	53%	47%	17	
seasonal	18%	55%	27%	11	
unemployed	7%	52%	41%	29	
student	0%	75%	25%	4	
TRADITIONAL HUNTING EXPERIENCE					
exp. using dogs	37%	52%	37%	51	75
no exp. w/ dogs	25%	75%	25%	24	

6.12 Summary of Findings

- Communities are not monolithic in their members' perspectives on the use of science in caribou management. Findings indicate that there are few distinctions in responses to questions on this topic among the way various age, community, employment, and traditional groups.

- Locals generally perceive a need for studies which provide an count of total caribou herd numbers, an assessment of the health hazards of eating caribou, tracking of migration patters, and documentation of human harvest. While there is homogeneity among locals in this area and apparent congruence with PCMB efforts to acquire this knowledge, there is great heterogeneity of perspective among community members about methods for

acquiring knowledge and particularly the use of intrusive methods requiring human handling and harassment of animals. Associated with many perceptions of inappropriate use of methods are perceptions of accuracy of data gathered in census work and a expressed lack of understanding of how and why such studies are conducted.

- Locals' perceived reliability of types of caribou information varies with the area and is integrated; where there is primary local experience available in an area of caribou knowledge, it is viewed by locals interviewed as the most reliable information source for knowing. Best source for explanation of migration is viewed as the knowledge domain of elders, and for quantitatively assessment (i.e. population of herd) , locals look to their community PCMB representatives and biologists.

- Community members interviewed are divided in what role they see the PCMB and their community taking in the caribou research approval process. Some defer authority to the regional co-management board while others perceive a need for greater local control.

- Locals perceive a need to engage in political activities to counter proposed oil development in Alaska, but fewer are willing to engage in political lobbying because of their associated costs. A preferred decision making process for making such decisions has locals as a central part of this process.

- Locals indicate that they have low expectations that fellow community members would comply with a Porcupine Caribou hunting quota if that quota were endorsed by local leaders and the PCMB. Locals also indicate that they have greater trust in the domestic-level co-management body than government. Trust in the US systems for Porcupine Caribou management is limited to absent.

In this chapter I document community perspective of caribou management and explore issues of the need for knowledge, reliability, and accuracy, as well as issues of trust. In the next chapter I review relevant literature about the interface of local and

western knowledge in co-management, and present an ethnographic account of the 1993 Caribou Crisis.

7. HUNTERS AND RESEARCHERS AT THE CO-MANAGEMENT INTERFACE

> Alaskan Caribou biologist talking about his calf-habitat research project: So the question is how important is [the calving grounds] to the annual cycle of the caribou and to long-term population dynamics? The fact that it is a calving ground tells us this is an important area. But we are interested in what are the effects of what happens there on subsequent performance. When I use the term performance I mean weight gain or survival... So the thing we settled on, as sort of a output variable, or something we can measure the indexes, the value of these habitats, is the weight gain of the calf... We wanted to determine the weight gain of these calves from birth to 3 weeks of age. Birth to 6 weeks of age, and birth to 20 weeks of age. And we [measure] the weight gain to 3 weeks and weight gain to 6 weeks while they're on the calving grounds...
>
> Alaskan Gwich'in Member of the International PCH board responding to a presentation by a PCH biologist: I'm not a biologist, I'm not a scientist, but I know my oral history... The way we count caribou, and the way we use caribou. Now it's good and well to have charts and all that kind of stuff. We know why the caribou is multiplying in our Indian way... if you look at this guy's [i.e. biologist's] chart for the caribou increasing, and if you look around every village of Gwich'in country you'll see small kids all over the place. Caribou is multiplying because the people are multiplying. If something happens to destroy or to decline the Porcupine caribou herd, our people are going to decline... I'm not a scientist, but I'm a believer here of my country... , that we take care of it, we believe in it. It tells us that. I don't care what [a long-time caribou biologist]... says, that oil is not going to hurt this caribou herd. Maybe it won't, but it's going to hurt our people. That's what we're fighting for. That's what we always believe in.
>
> *Statements of two participants of the "People, Caribou Science Workshop" held in Arctic Village, Alaska*

These two quotes graphically illustrate two perspectives of knowing caribou. While the biologist focuses on the ecological performance of caribou as a consumer of energy and discusses his research interest in understanding the weight gain necessary for calf survival and the causal relationship between that gain and caribou habitat, the native leader looks to humans as a method for understanding caribou population changes, and frames the topic with assertions of belief and concerns for cultural survival. Together the two statements of these Alaskans raise the question of how interactions at the researcher-hunter interface occur in the Canadian PCH co-management arrangement.

In the previous chapter, I presented findings which document community perceptions of the work of caribou management, and examined perceived legitimacy of

various components of the systems. This chapter presents a discussion of theoretical issues of interfacing knowledge systems in joint management regimes and provides an ethnographic account of a critical incident, "The 1993 Caribou Crisis."[1] In the chapter that follows I draw on the 1993 Caribou Crisis ethnography and other evidence to identify communication patterns, assess general conditions of Canadian PCH co-management decision making and the manifestation of community costs of co-management involvement.

The ethnographic account of this chapter, the 1993 Caribou Crisis, is a documentation of a set of transactions and perceptions which is intended to illustrate the drama of the researcher-hunter co-management interface. Like many conflicts which emerge in complex organizational settings, causality is multi- dimensional; the Caribou Crisis is a tapestry of interrelated events, only some of which are presented in the ethnography. No single thread or row of stitching explains the phenomenon as a whole. Told as a story, the Crisis offers insight into the nature of that complexity. Viewed analytically, the Crisis highlights problems associated with community-state power sharing in the management of caribou research and particularly the dilemmas of co-management arrangements for communities..

In the pages that follow I provide an account of the crisis by beginning with its immediate antecedents and then focusing on board-level decision making. In the tradition of the North, the account of the 1993 Caribou Crisis that follows from the narrative and reflexive style of ethnographic sketch of Chapter One which opens the dissertation. My analysis of the events represents many hours of construction and deconstruction of transactions and perceptions, shifting focus to look at multiple meanings, causalities ,and complexities.

[1] Reference to the situation as one of "crisis" is taken from a territorial agency board member's memo, written to the manager's Director of Wildlife. In the internal memo, the PCMB member describes the events of the crisis of the board meeting and defends his actions.

7.1 Potentials and Challenges of Co-managing Caribou Research; Theoretical Considerations

The contrast of northern hunting people's traditions of learning about and knowing of living resources and the scientific traditions, as commonly reflected in natural sciences and their wildlife management applications, is described in the literature (Cruikshank 1981; Feit 1988; Berkes 1994) . As I explored in Chapter Four, the institutions of local management systems of Canadian Porcupine Caribou hunters are steeped in the traditions of experiential learning, ascribing high legitimacy to primary data, transmitting knowledge through oral traditions, and employing a concept of common property that transcends the western dichotomy separating humans and "nature" and viewing animals as well as humans as party of the power dynamic. The traditions of scientific study, to draw the distinction briefly, are conventionally documented and transmitted with the written word, espoused to be objective, and quantitatively measured with methods that stand the tests of comparability and repeatability. Whereas the oral traditions of natives accommodate varying perspectives, the practitioners of science search for a singular truth, with that truth achieved through the confrontational efforts to falsify (Northrop 1959; Latour 1987). In Chapter Four, I discussed at some length the manner by which community institutions reflect historical conditions of coping with a specific form of resource uncertainty. Science in itself, and the western tradition from which it has emerged, is a differing strategy for dealing with uncertainty, in some ways creating a means to overcome, control, and manage those conditions rather than negotiating within them.

Why then is there a need to meld such disparate cultural approaches to make a synthetic whole in a co-management process? The objectives and espoused benefits of melding northern aboriginal knowledge and scientific management in management of northern living resources have been a topic of discussion for almost a decade and a half

(Berkes 1981). In his early assessment of northern wildlife management systems, Usher (1987) speaks to the need for an integration of systems as an essential component of meeting the challenges of sustaining northern resources, and Feit (1988) who writes about indigenous and state ways of knowing describes in slightly different language the need to develop "dual forms of knowledge" through co-management arrangements.

Osherenko (1988a; 1988b; 1988c), in her review of nascent northern co-management arrangements, notes the problems of user compliance and ecological crisis that grew from previous wildlife management crises, and attributes them, in part, to the inadequate research data of former state management systems. Describing the potential benefits of integrating the two systems of knowledge, she writes,

> Where co-operation rather than confrontation occurs, by contrast, the frontiers of knowledge about wildlife can expand rapidly. University-trained researchers create excellent synchronic data sets covering wide geographic areas (well beyond the limits of knowledge likely to be available in remote native communities). For their part, natives provide remarkably accurate diachronic data for particular localities and specific stocks of animals about which knowledge has been transmitted orally for a hundreds years or more. But the two sets must be integrated to produce a full picture of the wildlife population dynamics and to generate assessments credible to both communities. (Osherenko 1988b:8)

Asking the question of whether or not indigenous knowledge systems are qualitatively different from western science, Scott (1996: 85) captures both the problem of ecological rationality, notions that one group may hold an exclusive methods for arriving at truth, and the need to understand differing management paradigms. He writes,

> Western Science is distinctive not through any greater logical coherence or empirical fidelity, not any lesser involvement with metaphysical premises, but through its engagement of particular root metaphors in specific social institutional- and socio-environmental settings. Any number of root metaphors, situationally elaborated in the course of practical engagement with the world, may inform rational explanation and the effective organization of empirical experience. Equally, any number of the same metaphors may obstruct effective knowledge through a dogmatic and misplaced literalism.

Today the assertion that "traditional" or "local knowledge" can complement the objectives of sustaining northern wildlife resources is commonly found in the literature, yet as Gunn, Arolookktoo et al. (1988) point out, there are few specific guidelines offered detailing how to integrate the two. There are, however, an increasing number of examples of "co-management success" in this area (Drolet, Reed et al 1987.; Freeman 1989; Albrecht 1990), and entire volumes dedicated to articulating the ecological validity of traditional understandings of and practices for using living resources (Freeman and Carbyn 1988; Johnson 1992; Inglis 1993). Much more common in the literature are critiques which identify the problems associated with the interface of science and the local resources users.

With respect to the problems associated with use of local knowledge in the management process, Johannes (1993) mentions its subjective nature as creating the "temptation" to embellish the facts with the political objective of influencing outcomes (e.g., exaggerating the environmental significance of an area that is under consideration for development so as to extract greater concessions from the developer.)

Much has been written about the hegemony of science as a dominant and undermining cultural force in northern resource management (Gamble 1986). As well, literature has addressed the appropriate role of science in the public policy process (Brunner and Ascher 1992; Brunner 1994), the tension of science as an instrumental form of reasoning, and the role of science in a democratic process for resolving issues of values (Dryzek 1990). Moreover, the overall emergence and implications of science on the social organization of society (Weber 1930) and the disenchantment of nature (Greisman 1977) have been common themes in sociological considerations

Writing specifically about the integration of science and the northerner's knowledge, Nakashima (1993) speaks of the difficulties of achieving equal partnership in a resource management process, given the tendency of the exclusive culture of wildlife scientists to marginalize the legitimacy of traditional forms of knowing. As has

commonly been the case in government agency management where there is uncertainty, science's promises of prediction prevails; and locals' views, not buffered with the analytical precision and quantitative measures of science, remain, at most, confined to a side-line role, providing anecdotal evidence and being regarded by managers as inconclusive. These power dynamics are certainly not unique to co-management and have been well explored in the power literature (Pfeffer 1981).

Writing of public policy, science, and the democratic process, Brunner (1992) points out that in spite of a world-wide exponential growth of science's domain in the past thirty years, there is little evidence that the goals of democratic process (i.e. equity in the distribution of resources) are any better achieved. Brunner does not advocate rejection of science, but a reorientation of its purpose. He goes on to argue that the continued support of science as assuming a meaningful role in public policy process will be jeopardized to the extent that science serves scientists and their political allies at the expense of the general public (Brunner and Ascher 1992). He goes on to identify three barriers to broadening the use of science.

1. The overriding emphasis on science of prediction and precision;
2. The belief that science-based predictions are prerequisites to major decisions intended to ameliorate the solve the ills of society;
3. The belief that there is a distinction between the science in that the scientists' input is objective and value free. (Brunner and Ascher 1992)

In the Circumpolar North, the barriers are exacerbated in a co-management setting to the extent that modern-day hunting societies continue to perceive their own approaches of knowing and traditions for transmitting that knowledge as tied to their self-identity and self determination. In the language of Mary Douglas (1986), the processes by which information is selected and incorporated as legitimate within the institutions of cultural systems are, in part, a functional process whereby groups define their "self" as different from others. As I explored in Chapter Four of this dissertation,

self identity and the legitimacy of knowledge among traditional caribou hunters are interrelated to and steeped in the assumptions of local culture. With the need to assert the value of local or traditional knowledge as a cultural marker of the local hunter, there may be advancements in legitimating the role of the hunter in the management process, but also potential problems in the widening gap between the two groups. Yet co-management is, on some levels, intended to find common ground in what is perceived to be legitimate; and to develop social capital or trust relations. Indeed, as Pomery and Berkes (1997) write, co-management is intended, in part, to develop a mutually legitimate method of achieving consensus which will insure users as well as managers that decisions are worthy of commitment, a process that is tied not only to the outcome of specific decisions but also to how it is reached (Jentoft and Kristoffersen 1989).

Why marginalization of community in the use of local system's knowledge occurs is a matter of some debate. Johannes (1993), like many writing about science in society, attributes the dominance of science to the elitism and ethnocentricity that is part of its own culture. Gunn (Gunn, Arolookktoo et al. 1988), a caribou biologist herself, explains the difficulties as being related to issues of time and communication failures, rather than an "inherent limitation in the system." Clearly, there is an underling objective and dilemma in these discussions related to the contribution of the legitimacy of communities on the one hand, and the need to maintain standards of objectivity on the other.

Fisher's (1990) assessment of power and knowledge in academia is of relevance here. His writing focuses on "boundary work" of science to define the problematic, two-fold demarcation between the scientists as elite and the common citizen (i.e. common resources user). First, he attributes the problem to rapid change which, he argues, is concomitant with rapid increase in the forms and quality of knowledge types. Our transformation as a society, he points out, has been tied to an increase in the generation

of more information. He also describes as related to structural differentiation in the social organization that is encouraged by technological change, and with it, a higher division of labor. Long ago Weber (1960) spoke of the trajectories of change and tendencies of society and its organizational systems to become more complex, and its actors more specialized. Therefore, Fisher writes, power penetrates knowledge systems, in part, through the boundaries it creates to the extent that cultural markers between groups incorporate processes whereby legitimacy and cognitive authority are attached to knowledge as supplied in units. Differing, however, from the classic sociological assumption of ever-increasing bureaucratization, Fisher describes a condition in which there are responses to these conditions that re-focus the efforts towards the "integration" of knowledge systems, and with this melding coming new forms of interdependence and cooperation.

Co-management boards, agencies, and communities separately and collectively do not make decisions independent of the greater decision making environment. Thus, the power dynamics of caribou scientists and northern hunters at the co-management interface is embedded in a development paradigm with the researcher assigned the role of contributing "expert" knowledge, and making recommendations in various formal processes (e.g., environmental impact assessment and land use management planning.)

How then is local knowledge of caribou treated in the PCH co-management process? How well does the board and the system as a whole serve communities in their efforts to influence management activities? In the section above, I outlined some of the theoretical issues associated with co-management of caribou research as described in literature. Below, I present an ethnographic account of the 1993 Caribou Crisis, based on my observations of events, and begin the process of answering these questions.

7.2 Ethnographic Sketch #3: The 1993 Caribou Crisis

7.2.1 Antecedents to the Crisis

For three and a half months, I am a participant observer in community life. I share with locals in the anticipated arrival of caribou, join men on their hunts, and work with villagers in preparation for the coming of winter. During that same time, I learn from the stories of elders, attend local meetings, and acquire a taste for caribou. With much anticipation, I also await the arrival of the PCMB which is scheduled to conduct its next board meeting in the community. As a Ph.D. student researcher, my objective is to conduct interviews with locals about co-management, track events of caribou management activities at the local level, and document if and how local-level concerns are addressed in board-level transactions. In the months that follow, the 1993 Caribou Crisis unfolds.

The crisis that emerges differs from the "Caribou Crisis" of the 1950's and 1960's (Banfield 1956). Whereas the former Caribou Crisis was widely publicized by biologists (Banfield 1950; Banfield 1956; Banfield 1964; Symington 1965) and followed from the findings of scientific studies assuming that uncontrolled Native hunting was partially responsible for apparent declines in barren ground caribou populations (Kelsall 1968), the 1993 Caribou Crisis is prompted by local community members' public statements that research science activities are having a negative effect on caribou. The contrasting conditions of the two crises are instructive. The 1993 incident's reversed direction of causality (i.e. researchers are seen as causing an impact on caribou as opposed to Native hunters causing an impact on caribou) and its emergence in a co-management context, provide the opportunity to investigate the interactions of various types of co-management actors in conditions of stress, identify co-management communication

patterns, and investigate community costs of co-management while accounting for their cultural construction.

During the season, I observe the comings and goings of two teams of agency caribou biologists, and in doing so, identify patterns of miscommunication, and communication avoidance. (See Appendix 11.7 for detailed account of antecedent transactions.) The first team, referred to here as "Team A," is composed of a biologist and an assistant, employs local hunters as field workers, and collects samples of cow caribou for a caribou body condition monitoring study. The second team, referred to here as "Team B," arrives later in the season and undertakes an associated body condition research study. This group is composed of two pilots, a biologist, and two technicians. It utilizes a helicopter, a fixed wing aircraft, radio telemetry equipment, and a net gun to capture radio collared calves; and provides for no direct involvement of community members.[2]

I join members of the first research team in its field collection and observe as locals and researchers share time on the land, visit locals at their bush camps, and conduct the study's sampling protocol. To the disappointment of the study team, we are unlucky hunters. The 15 to 12 cow caribou needed for the study do not avail themselves to the hunters and the researchers leave with only four sets of specimens. The day biologists depart for their offices, a local hunter visits me, comments on the high expense of flying biologists to conduct the study's field work, and asks why it is that those who live in the community are not hired to conduct the body condition sampling on their own. Another local also talks about the body conditions study, and references "his religion" as an explanation for caribou's availability. He illustrates his point by noting that there is a coincidence of events in the year's observed autumn caribou migration; animals first appear in large numbers early in the season, then disappear during the

[2] Net gunning caribou from helicopters is a method of casting a large net on wildlife, and is employed to capture and release select animals. It has been developed, in part, to avoid the use tranquilizer drugs.

period of biologists' body condition study field work, and then reappear in large numbers immediately after the biologists' departure. Soon after Team A's departure, I also hear reports that a lone calf orphaned by the hunt of Team A has been spotted up river from the village by several local hunters. The hunters tell me that the animals appears to be lost and its death by a wolf is imminent.

Late in September, I begin tracking another set of hunter-researcher transactions. Community members hear reports of "dead calf caribou with collars," as described by their locally elected leader located just north of the community, or as described to me by a biologist, "The radio collars of calf caribou that are transmitting mortality signals."[3] (See Figure 7.1.)

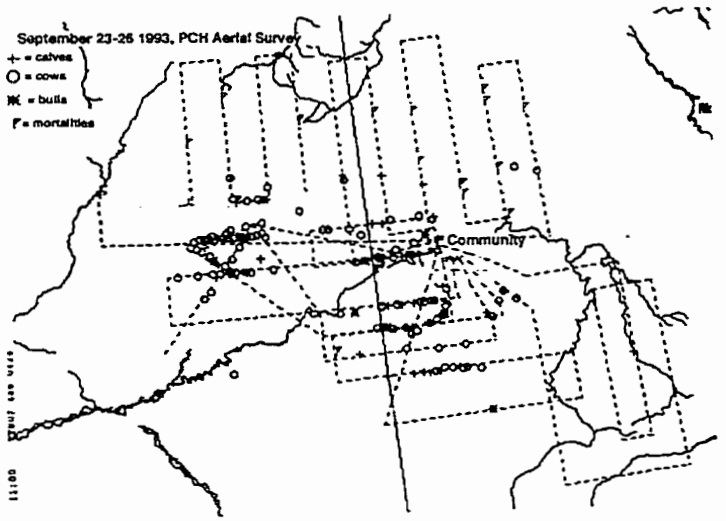


Figure 7.1 Caribou crisis aerial transect map

This aerial transect map (modified here) was faxed to the communities formally elected leader by the Alaskan PCH caribou researcher on September 28, 1993 in an effort to assist community hunters in locating caribou. The map's dotted lines trace the biologist's aerial flight path when completing the survey. Symbols show where caribou were located. "P" symbols indicate that caribou collars where caribou collars were found to be transmitting "mortality signals" (i.e. which indicates that the collar has not moved for an extended period of time). The map was sent to the community via fax and posted for a five-day period on the community's office building, with no written explanation.

[3] Reception of a mortality signal from a radio collar may also suggest a collar has fallen off the animal, and does not necessarily imply a dead animal.

As the news is shared locally, I learn that residents of Fort McPherson, Aklavik, and Old Crow hear of the "dead calf" report and respond by contacting a native PCMB representative for an explanation of the incident. The native PCMB representative contacts several key players in an effort to access details about the report, but fails in contacting the researchers who are most familiar with the study in question.

Concurrently, researchers of Agency B, whose work is closely associated with a calf collar study, arrive in community, base their operations from that village, and complete their research. After several days in the community they depart, without responding to a request from the local leader for a meeting. The biologist of Team B explains his actions in not meeting with locals as conflict avoidance. In an interview he explains.

> [T]he old adage is, if you don't want 'no' for an answer, don't ask. So to go [to community] to say that this is what I'm doing, what do you think? Somebody's gonna say that they don't like it. And then what do you do? Spend time trying to educate the community, I mean, it probably all stems from "I know what I'm doing and I probably know I'm right." Whether that's true or not. You know, if I felt uneasy at all about what I was doing in terms of having some conservation problem with the herd, maybe, I would be more apt to go and consult and sort of get concurrence and get their blessing to go on and do it.

In the aftermath of the autumn research activities there is discussion among locals about the studies. Two PCMB members and one local leader, in separate interviews, tell me of their communities' interest in a two- to three-year moratorium on caribou studies. In one interview a native PCMB member acknowledges the advisory nature of the board and tells how he sees the ultimate authority for a moratorium decision being within the jurisdictional domain of the state.

> GK: I've heard you express a concern about caribou research... What is the best way of making decisions about research? That is, on what basis should it be made and who should make it?
>
> PCMB Community Representative: Well, on the basis that these studies have been going on yearly for the last I don't know how many years. By now they should have enough information from all the studies that have been taking place in order to lay off studies for 2 -3 years. And that decision should be up to wildlife and conservation officers. And I'm sure if they did something like that the Porcupine Caribou Board would really like to support a decision like that. And I'm sure the people of the communities who use this herd would be in favor of that.

Calls for a two to three-year moratorium on caribou studies are also circulated beyond the homes and offices of communities. A high-profile and non-resident informal community leader (i.e. not elected) receives word of the recent caribou research events. The informal leader responds by conferring with several other local leaders, both of informal and formal status. Assuming that the leaders have achieved consensus on how to deal with the issue, the informal leader draws on her high profile status and ready access to media to embark on a systematic campaign to advocate a moratorium. In the process, the informal leader attends several public events, and while sharing the stage at one of these with the PCMB's chairperson, she asserts the need to "Give caribou a rest." (Buckley 1993a; 1993b). Media capitalize on the debate by positioning the informal leader's pre-taped statements against the PCMB Chairman to manufacture a public debate.

> Broadcast taped interview of informal leader aired as a news story just prior to live interview with PCMB Chairman: We're being faced with a lot of caribou and animals being killed for scientific information, scientific data. Every year, ... biologists themselves take 15 to 20 caribou cows from [the local] area. We want those animals left alone for a while.[4]
>
> Live interview with Chairperson that follows the informal leader's taped statement: ..Guess I have heard the concern from the communities...this information is critical for our defense of the calving grounds... There have been studies, not necessarily by biologists, but there are academic studies that are conducted from what I understand, for the purpose of obtaining their degrees or certificates. Those research that are not necessary from a management point of view, we've been trying to discourage.
>
> Newscaster: How do you discourage?
>
> Chairperson: We've tried to work out a protocol with researchers that any study... should get the support either of the board or the community before they proceed.... I'm not aware of any evidence that there is serious damage to the herd.
>
> Newscaster: How is the board dealing with the concerns that have been raised by [informal local leader]?
>
> Chairperson: Well, this is the first I have heard of it.

The board chairperson and the informal leader find themselves in an awkward position. Both are allied in the fight to stop oil development. Both are perceived by

4 The news feature and follow-up interview were broadcast on November 8, 1993 by CBC Radio Whitehorse. Printed articles about the informal leader were authored by Buckely (Buckley 1993; Buckley 1993).

locals to be community leaders. And both are at odds about the use of science in caribou management. In the midst of the controversy, I talk with the Chairman and a PCMB community member who together agonize over the conflict and the hardships they personally face when explaining these situations to local hunters who are more peripheral to the process. An additional dimension of the conflict concerns the intra-group relations of the board itself; community members' relationship with government representatives are multi-dimensional. As well, the body condition monitoring study, with its local hiring of hunters as field assistants, is the PCMB's best examples of co-management researcher-hunter cooperation.

At a more political level, the public controversy has the effect of challenging the legitimacy of PCMB in caribou management. Since it is an advisory co-management body, much of its political as well as social capital is accrued by maintaining a position in which the board resolves public policy issues in a manner that is perceived by government ministers to be "reasonable." Maintaining their legitimacy, co-management boards offer elected officials the opportunity to hand off difficult decisions issues which might otherwise erode political capital. For those at the co-management interface, cultivating a co-management board's legitimacy is an on-going balancing act that occasionally requires compromise by all, and, at times, makes special demands of communities who are the least powerful of the arrangement.

Adding to the complexity and the solidarity of the PCMB is the externally driven threat to calving grounds of the herd. As it happens, in November, 1993 and just prior to the PCMB's scheduled meeting, the International Porcupine Caribou Board meets and passes a resolution to publish a report based on twenty years of caribou research findings. The publication of the *Sensitive Habitats Report of the PCH* marks the first time that the international body has stated a value for caribou habitat and identifies the PCH's calving and post-calving grounds (including Area 1002) as its most sensitive (IPCB 1993). As native PCMB members are aware, much of the data compilation and

framework conceptualization of the report are the products of a fellow PCMB member/biologist's effort. As well, it is understood that distribution of the document will serve in the political efforts of the board to protect the herd.

As Native board members become aware of their PCMB's chair' face off, the conflict is re-framed. The "issue," previously articulated as a problem of disrespectful researchers and unnecessarily research, becomes an intra-community conflict. The matter is re-framed as a native PCMB representative (who is quoted above when talking about community support for the moratorium idea) makes public statements identifying the informal leader as the "problem." Speaking out at a workshop on science, people and caribou held in Alaska, the community representative vocalizes his perspective.

> PCMB Community member speaking at workshop: Somebody just put a burr in my pants this morning, saying something about some report going on around in the [the region] where we take game. We help the biologists take some caribou for sampling. I took part in that two or three years ago. Maybe a couple of times. I did that to see what happens. I also helped collar caribou. Someone is making some very negative statements, and too bad it happened behind my back. Now there are some things I don't agree with that go on, but there's also a lot of things, a lot of good that comes from it. Research is necessary.

7.2.2 The Crisis Unfolds (Board-Level Transactions and facing the dilemma)

It is November 12th, 1993 and several days after the closing of the People, Caribou, Science Workshop. The Porcupine Caribou Management Board convenes a public meeting in a log structure that serves as the community hall of the northern village. Outside, the *aurora borealis* drapes the northern sky as a moving curtain of colors. Inside, Native and government representatives negotiate conditions that are quickly moving into a colorful caribou co-management crisis. For board members of the community, the crisis is centered around a dilemma, a trade-off between honoring traditional rules for respecting caribou and using research science in managing modern-day threats to the caribou resource.

The public meeting begins at 7:40 PM with eight locals in attendance. The gathering commences with a native's prayer, followed by the PCMB chairperson's welcome. PCMB members introduce themselves to locals by stating their names and organizational affiliations. Locals are encouraged to take free Porcupine Caribou posters, hats, annual reports, and mugs, and are informed that the PCMB holds its public meetings in communities to listen to locals' concerns, answer locals' questions, and provide information on the status of the herd.

The discussions of this public meeting are structured by the board to focus on lobbying the United States Government to prohibit gas and oil development in Alaska's Arctic National Wildlife Refuge and the efforts of the PCMB to involve locals in that lobbying effort. The transactions of the public meeting are a two-way exchange. The discussion on lobbying begins with the presentation of a new video that is produced by the board and which opens with footage of pro-development Senator Bennett Johnson (Rep. LA) conceding his loss to the US Senate immediately after the 1992 defeat of the energy bill which would have opened the "1002 lands" to hydrocarbon exploration and development. Although the senior senator mentions "environmental groups" as the winners, those in the community hall recognize themselves as among the victors.

> I must say that while I lose and, I hope, lose graciously, I certainly have great admiration for those who fought the fight. The environmental groups, I must say, wrote the textbook on how to defeat a bill [such as] this...(as documented in video PCMB 1993)

The video documentary goes on to tell the story of a local Gwich'in woman's work in that political battle and illustrates her expressions of emotion (sometimes tearful) which sway the opinions of Washington politicians. The documentary includes scenes of the woman's city-to-city slide-show campaign and repeated meetings with politicians and their staffs. There she describes her traditional uses of caribou, the value of caribou to her cultural survival, and the implications of a possible loss of caribou to her way of life. For community members, the tale of the woman's travels and the resulting political victory are a new, but familiar story. For more than 25 years, the threat of

southern-initiated development proposals has repeatedly captivated community's interests, contributed to its solidarity, and motivated local action.

Following the video, locals receive a twenty-minute lecture by the board's secretary/treasurer about current status of pro-development and pro-wilderness legislation. By 8:40 PM, an additional nine locals join the meeting and the secretary/ treasurer distributes a printed handout of the board's newest lobbying strategy. For "security purposes," each handout is individually numbered so as to account for all when retrieving them at the end of the meeting, and thus eliminate the possibility of "the opposition" hearing of the PCMB's new plan.

More discussion follows. Several community members in attendance supply the board with grassroots suggestions for moving key Congresspeople away from their pro-development positions. One suggests producing another video that illustrates the lasting ecological impacts of previous gas and oil exploration in the region. There is also discussion about the possibility of elder community members joining the lobbying campaign, to which a community member points out the hardships incurred by locals who are involved in the kind of on-the-road lobbying work depicted in the video.

> It's fine for [name of local lobbyist] and [another local lobbyist]. We give'm all the credit in the world, those people that go down and lobby for us, down to the States, but at the same time, they do the best they can, but a lot of things, they really don't come out. It is hard for people from small places going to a city like that and really expressing everything. Some of it , maybe it's a little bit embarrassing inside. Sometimes you don't want to tell people how you feel.

With the time nearing 9:30 PM, the PCMB Chair begins bringing closure to the meeting by expressing thanks for locals' attendance. I note that up to this point, all discussions of the public meeting have centered on political lobbying and there has been no time allotted for a general discussion about other caribou management matters. Across the room I observe the community's locally elected leader and a young local hunter turn to each other and make eye contact, after which the leader calls for the attention of the PCMB chairman and redirects the course of the meeting.

> One issue that is of concern, that really comes up in the community is that studies have been going on long enough... The issue behind that is the

> collaring thing. Porcupine Caribou Herd research. Gotta stop messing with the young calves because they are growing and they get tired as they grow. That is one of the concerns this community has this winter... I think the Porcupine Caribou Board should put that into a resolution tomorrow. The community is concerned about that and I'm here to speak on that issue.

There follows an open-ended, lively, and, according to several non-native board members, unanticipated discussion. Local hunters, one after another, take the floor and describe their confusion and express concern about what they perceive to be the disrespect of animals by caribou researchers, the impact of repeated biological studies on the herd's behavior, and researchers' maltreatment of caribou calves. Acrimonious statements are voiced by local hunters, with the community's formally elected leader being among the most outspoken. Several locals at the public forum, including the locally elected leader, call for a two- to three-year moratorium on all PCH studies. One local hunter shares an eye-witness account of caribou harassment by researchers who use helicopters and net guns for caribou capture and release activities. Another local asks why a method for capturing and collaring caribou swimming at caribou cross rivers, previously-used in the 1970's and employing local hunters with their boats, is no longer practiced. Several hunters at the meeting state their frustration with the PCH being the subject of twenty years of continuous research. And an elder and active caribou hunter talks of the dissonance in what he understands to be a need for studies and what appears to be a wasteful allocation of research dollars for activities offering limited value to management. Still others frame the discussion around the hardship experienced by animals. The local leader comments to agency representatives that he is not being kept informed on the work and findings of caribou researchers and needs access to more information. A question posed by one hunter captures the sentiments of many. "Don't you know enough yet?"

I note that the expressions of discontent from locals about the work of caribou researchers have a longer history than those I observe at the public meeting. As recorded in the public submissions of local hunters from Aklavik, Old Crow, and

McPherson to Justice Thomas Berger's 1974 Mackenzie Pipeline Inquiry, the comments of locals at the November 1993 public meeting echo the statements of now deceased hunters in a hauntingly similar tone. As well, the statements of both call into question how, if at all, the PCH co-management arrangement has changed the relationship of researchers and hunters.

> Question from Berger Inquiry: You hunt caribou and you've seen the caribou researchers that have been around [this community]. Would you tell the judge about what you feel about what they have done?
>
> Response from Local hunter: They work up here from March until the last part of October, and they go around the country over the caribou with airplanes and with chopper... We [have] never heard or seen the caribou run across his land in different direction so many times in one season as when the airplane was after them, taking photograph from the air... [Biologists in small plane] landed by me and I asked them where the caribou were, and they told me caribou was about 25 mile up river. So we [hunters] all took off... We wait two days.. When [caribou] do start crossing, they cross late at night... Just then the airplane got there and chased then all back into the bush.... they kept going, they keep following with airplane. (Hearings 1975)

At the PCMB public meeting the responses from board members and agency personnel are delivered after most locals in attendance have expressed their views. Speaking to locals' concerns about an agency-funded and PCMB-endorsed caribou body condition monitoring study whose method includes the collection (i.e. killing) of lactating caribou and abandonment of their calves, a research biologist who is also a long-time PCMB member presents statistical evidence from a previous study indicating that orphaned calves are more likely to survive the loss of a mother than perish.[5] Addressing locals' concerns about the study method of putting collars on caribou calves, the biologist demonstrates the design and function of easily expanding caribou collars, and rationalizes the capturing of calves (at birth and at 3, 6, and 20 weeks of age) as part of a calving habitat value and population dynamics study.[6] Also rationalized are methods of aircraft and net gunning techniques, used for periodically recapturing

5 See Russell, et al. (1991) for description of the study described.
6 The project was entitled "Effects of Use of Coastal Plain and Adjacent Habitats on the Performance of the Porcupine Herd Caribou Calves" and administered by the US Fish and Wildlife Service.

caribou to monitor individual cow caribou's weight gain and statistically relating physiological conditions to reproductive success. Also mentioned is the biologistís observations of lynx sign in the vicinity of collared calves which had perished and later been relocated, and his hypothesis that the cats were responsible for the young animals' death. There is a comment by the board chairman of the guidelines for the duration of a chase when pursuing an animal with helicopters and net guns, and the intent of the PCMB to reevaluate the existing protocol. An agency biologist and wildlife enforcement officer, both native and one born in this community, challenge the claim of the local leader regarding his limited access to information on caribou research by reminding him of the updates that outline their agency's caribou research program and are sent to his office via fax periodically.

As managers respond to the statements of community members, I begin to identify a pattern of user-researcher interactions. The pattern includes a voicing of discontent or questioning by locals that is followed with a board-level response to explain studies and educate hunters. The interaction is first observed at the December 12th meeting (Ethnographic Sketch #1 of Chapter One) in which discussion about caribou collars shifted from locals' statements to an explanation by a caribou biologist about the uses of collar techniques. A similar transaction occurred several months earlier when I attended a PCMB-sponsored workshop for local PCH users teaching the skills of grassroots lobbying for use in the calving grounds protection campaign waged in the United States. While attending that workshop, I was asked by organizers to document the workshop's events, and take notes as a group of local hunters redirected the topic of discussions, this time from political lobbying to questioning of the need for caribou collars. In response, the board's non-native secretary/treasurer explained the management rationale for collaring caribou. With the use of a flip chart and skillfully-drawn diagrams, he illustrates how radio collars on caribou function to improve the accuracy of the biennial Porcupine Herd census, and went on to tell how periodically

counting a herd is important to management. After that exchange, I meet with the secretary/treasurer who comments on the apparent off-topic diversion and the board's endless efforts to explain the use of caribou collars to communities.

At the November 1993 meeting, there is an exchange of point, counter-point debate. The board's chairman pauses and then openly talks of the difficulty of integrating traditional knowledge with western science. "You know, bringing traditional knowledge together with science has always been a hard one." I note that this comment of the PCMB Chair is the only instance the term "traditional knowledge" is invoked at the public meeting. In response to the Chairman, a local hunter takes issue with the chair's assertion that there should be a problem. Stating that he has no difficulty with caribou research, *per se*, he suggests to PCMB members that practical needs and respectful methods for assuring caribou health should guide all study practices.

At 10:40 PM and after several rounds of statements by locals, the meeting comes to an end. Locals' concerns are vented, but remain unresolved. Board members and locals disperse into the cold evening. Immediately after the meeting, I encounter the local leader who knows of my work in the community. Referencing the meeting's events, the leader shares his sentiment with the comment, "All for nothing."

On the following day, the co-management board resumes its regular meeting. During a discussion on contaminants in wild food resources and community-government communications on the topic, the board expresses its collective outrage at a contrived and highly bureaucratic process proposed by government for channeling information on contaminants and explores several alternative solutions to dealing with the issue. Grappling with technical aspects of the discussion on contaminants, a native elder and long-time member of the board poses an informational question. "What is the difference between Cadmium and a dyadic cyst?" A moment of silence follows. Younger board members, knowing that the elder has recent and direct experience communicating with locals about cadmium issues and personally has had a partial lung removed after

contracting a dyadic cyst, are struck by the elder's question. Given the elder/board member's direct experience with both topics, a non-native board member expresses his own befuddlement by the man's lack of understanding. Reflecting on the apparent disconnect between the work of researchers and local hunters, the question illustrates the interface of *what* locals understand, with *how* they understand . Months after the event, I ask a Native board member for an explanation.

> GK: Do you remember at one meeting... an elder asked the question, "What's the difference between cadmium and a dyadic cyst?" How do you interpret that question?
>
> Native PCMB member: That's always been a problem. I think, where the situations that we're dealing with today, the language that is out there, the words that are out there, in our language and other aboriginal languages, there are no equivalents...I mean the best we can say it is, "That meat's no good!"

While the elder incurs the cost of deciphering technical language, the challenges he faces are amplified by the absence of constructs which are common to the native hunter and the manager with whom he communicates. Or as Irving (Irving 1958), an academic researcher and student of the Vuntut Gwitchin put it 35 years ago,

> Science and technology rely so much on the printed word that it is difficult for us to communicate accurately with people whose only records of knowledge consist of the remembered meaning of spoken words. Our attempt to communicate with Indians is hindered by the necessity of using language, established for quite other circumstances than theirs, with concepts and vocabulary limited by our rudimentary familiarity with the objects and conditions surrounding the people who live in the arctic villages.

If put in the more insidious terms of the hegemonic forces of predictive science (Pfeffer 1981), Kuhn (1962; 1977) argues that when learning the language of a scientific community, members also acquire cognitive commitments and values that are not fully analyzable within that language (Clark and Minto 1994: 68). Such commitments are a consequence of the ways in which the terms, phrases, and sentences of the language are applied to nature, and its relevance to the language-link that makes the original, narrow sense of the paradigm so important (*ibid.*).

That evening, board members turn their attention to the topic of caribou-muskoxen intraspecific competition. The meeting agenda item follows from a local concern about increasing muskoxen populations within the range of the PCH and what some Inuvialuit elders articulate as a belief that muskoxen are detrimental to healthy caribou populations and affect the animal's migratory patterns. The belief, articulated by an elder at a public meeting in the 1970's, has since been reinforced by an eruption of muskoxen populations on near-by Banks Island and a coincident crash of Peary caribou populations (Urquhart 1993; Larter and Nagy 1997). In preparation for the discussion, a caribou biologist has prepared and distributes a set of data bar charts, illustrating how muskoxen within the range of other North American caribou herds live in significant numbers and in close proximity. The implicit conclusion of the handout is that there is insufficient evidence from available data to support the locals' theory that muskoxen have a negative impact on caribou, and that more scientific studies are needed. Later I inquire about these transactions and document two different reactions to the biologist's presentation from two native board members. For one native, the evidence of the biologist indicates that the problem of caribou-muskoxen competition is now a non-issue. For the other, the data are inconclusive, and the biologist's style of information presentation stands as evidence of the professional's inability to communicate effectively with local caribou users.

Throughout the transactions of the meetings, locals' statements of discontent about caribou research and research methods resurface. For some board members, the recurring topic is a distraction from the pressing tasks of co-management, and throughout the meeting there remains an atmosphere of tension among board members and community members as the local leader repeatedly speaks of the "wasteful" activities of researchers and suggests the idea of a two- to three-year moratorium on all caribou studies. The conflict of the meeting is not simply described as community vs. government. At one point the community's own PCMB representative challenges the

local leader to validate his claims of research meat wastage, to which the local leader states that he does not have first-hand evidence, and makes statements on the behalf of "the people."

During the lunch break, two agency biologists seek the council of a local friend and together discuss the situation. The local tells the biologists of his support for their work, apologizes for the brash behavior of his local leader, yet adds that he, personally, will say nothing to the local leader about his views on the need for caribou research, to avoid making "bad friends." He also comments, in passing, that he has a recurring fear of caribou going away and never again returning.

By evening, the 1993 caribou crisis comes to a boil. A delegation, composed of Canadian government personnel of different agencies whose function is to promote oil industry-government relations, flies to the community via chartered aircraft and seeks an audience with the PCMB. The delegation's objective is to discuss government plans to open gas and oil leasing rights for bid within the Canadian range of the Porcupine Herd. As board members and community leaders already know, a portion of the prospective lease sales fall within the traditional territory claimed by the community. And as board members and community leaders anticipate, oil development activity in Canada may have a negative effect on community's future claims to those resources; and public image implications to the Canadian lobbying effort to stop oil development on Alaska's PCH calving grounds.

When the group arrives, a coffee break is called and a verbal conflict erupts. The elected community leader indicates that he does not wish to meet with the pro-industry delegation, and had previously written to the delegation spokesperson to that effect. The delegation's spokesperson claims that his group has come to the community through a pre-scheduled invitation of the Porcupine Caribou co-management board secretary. A PCMB member counters that claim by pointing out that the

delegation was, indeed, invited, but with the proviso that it could address the board only if it was in a town meeting with local leaders.

Pressures on the PCMB about local concerns for caribou research are coupled with those of the oil-industry delegation which is perceived to advance a pro-development agenda by pitting the board against the community. Concurrently, PCMB government members maintain a physical distance from the heated discussions, aware of their responsibility to represent their respective government members who are in the delegation, as well as their need to sustain a trusting relationship with caribou user communities. The heated discussion continues. The PCMB Chairman, exhausted from his own First Nation's land claims negotiations with government and distraught from the conflicts over caribou research, abruptly leaves the site of the meeting in frustration. Proposed oil development and the work of caribou research, southern-driven activities that are commonly found in tandem in the North, trigger a board-level response.

Leaving the public community hall, co-management board members retreat to a private home and convene an in-camera (i.e. members-only) session. Invited to join them is the formal local leader who leads the charge for a moratorium on caribou studies.[7] Not invited is the spokesperson from the oil-government delegation.

The members and local leader first address the issue of caribou research. Reviewing the situation, a middle-aged native board member tells of his grandfather's knowledge of caribou as offering a valuable, but limited understanding of the animals and their seasonal movements. The board's most experienced caribou biologist expresses his frustration at being the target of repeated local attacks on caribou studies while communities selectively glean the benefits of his work. Having invested a career in studying the Porcupine herd, he presents the board with an ultimatum; he will conduct

7 The in-camera session is the only time in my work with the PCMB that I am excluded from observing its members' work. The events of the in-camera are reconstructed here based on interviews with seven of the individuals who participated in the meeting and an internal memo filed by a PCMB government member present who was asked by his supervisor to account for his lack of support for the oil delegation's efforts to receive an audience with the co-management body.

no future PCH research unless his research receives full-board support. The board's secretary/treasurer makes mention of the option of formalizing the board's role in the research approval process, though the idea is not pursued by the board's official members.

Local members discuss the value of scientific research in managing a caribou herd in the face of unknown contaminants, future impact assessment processes, and fluctuating herd populations. It is noted by a manager that given the existing system for funding biological studies, it is difficult to cease and then re-initiate a well-supported wildlife research program. The group ponders its dilemma and considers its choices. On the one hand there is a desire by some to be respectful of and maintain the cultural traditions of local hunting. On the other hand there is a need by all to be strategic when confronting new environmental threats and interfacing with systems of authority in which legitimacy differs from that of the local community. The locally elected leader who previously called for a moratorium on caribou studies listens, talks, and listens, and in the process, is "convinced" that science can provide his community with a "bigger hammer" in its efforts to lobby against proposed oil development in Alaska's Arctic Refuge.[8] The instrumental value of western science is endorsed. Board-level consensus is achieved. And the board's secretary drafts a resolution explicitly supporting select research programs. (See Appendix 10.8.)

The board chairperson then asks if members of the PCMB would like to meet with the uninvited oil industry-government relations delegation. A second consensus is achieved as the members concur that the board will not grant the delegation an audience. In doing so, the Board sends a message that its trust relationship with community and political interest in the caribou herd take precedence over its alliances with governments.

8 Quotes are the local leader's words used in a post-crisis interview to describe his change of position. A local leader of another community spoke of the crisis as "a dilemma" which offered "limited choices."

An hour after beginning its in-camera, the group emerges from the private home where this meeting took place. The oil industry -government delegation is informed by the board chairman of its decision. Consequently, the delegation's spokesperson is left with the task of explaining to agency supervisors why it incurred the cost of an aircraft charter to the community and did not parlay with the board as intended. In the weeks that follow the event, memos are exchanged between government agencies, as PCMB government members are asked by their supervisors to account for their apparent lack of support for fellow agency personnel of the delegation effort to meet with the co-management body.

Reconvening its regular PCMB meeting in the community hall, a resolution supporting caribou studies is read and then passed. (See Appendix 11.8). For the remainder of the November, 1993 PCMB meeting, there are no critical comments voiced about caribou research nor an explanation from the board about its resolution of the dilemma.

The following morning, the meeting goers disperse and non-local PCMB members await their airplane departure from the community. A government member of the PCMB seeks me out to discuss the events and tells me that the board's resolution marks an important policy shift in the business of Canadian Porcupine Caribou co-management. His view of the situation is that prior to this meeting, government and local board members alike had found it easy to sit back and watch as caribou biologists bore the burden of defending caribou studies to local community members, who openly and sometimes aggressively express disdain for these projects. In the future, the manager proclaims, the co-management board will change its strategy by being supportive of caribou researchers and more assertive when endorsing the work of caribou science. In theory, the decision relocates decision making regarding future Canadian research projects from agencies to the Porcupine Caribou Board, and does so without a formal obligation. It does not, however, change the board's role in directing

the research agenda. How the policy change will be operationalized and the extent to which parties will comply are unknown.

In the year that follows, I continue my research and document how the 1993 Caribou Crisis reverberates throughout the system.

7.3 Conclusion

In this chapter I presented an ethnographic sketch of the transactions of the 1993 Caribou Crisis and described events which culminated in a PCMB resolution to support the use of caribou collars. I also provided an overview of some of the antecedents occurring at the community level. In the next chapter I deconstruct these events by examining the roles assumed by key actors, the interactions between parties, and their implications to the greater power sharing .

8. DECONSTRUCTING THE CRISIS

8.1 Introduction

What can be learned from the 1993 Caribou Crisis about community involvement in the Co-management of the Porcupine Herd, specifically in terms of understanding the costs of community and the dilemmas they face in a power-sharing process?

The 1993 Caribou Crisis was a critical incident of the PCH co-management arrangement, manifested by a coincidence of events which had the cumulative effect of motivating community members to speak out about their concerns. In the end it triggered a board-level response, leading to an intent to institute a new policy in PCH co-management. It also included community level interactions with researchers and their work. These interactions outlived the set of events at the board level which may, for board members, been resolved after the November meeting.

On the basis of my study of the Canadian PCH co-management arrangement, I found that the level of conflict of this incident is atypical of this co-management process; rarely are the issues so heated, or the dilemmas so pronounced. Yet, the crisis is instructive in that it illuminates clusters of conditions which when teased apart, help to explain the dynamics of power sharing. The objective of this chapter is to deconstruct the 1993 Caribou Crisis to investigate more closely and with differing frames the costs to communities associated with co-management as found in the PCH case study.

In this chapter, I draw on the critical incident and other related background evidence from the PCH co-management case study to identify patterns of behavior, perceptions of actors, and community costs of co-management. To meet this objective, I look not only at the transactions of the immediate 1993 Crisis and season preceding it, but examine background events, the interaction in several activities areas, and topic areas related to the co-management of caribou science. In short, my analysis is in the tradition of anthropology's "holistic" approach (Wolf 1982; Plattner 1989; Chance 1990).

8.1.1 Frames of analysis and organization of the chapter

The deconstruction of the 1993 Caribou Crisis is undertaken at three levels of co-management activity: institutional, organizational, and individual. Of course, the complete segregation of levels is not possible; there is considerable overlap and changing frames throughout the analysis that follows. I begin by focusing on the formal arrangements that are established to govern the study of caribou, and examine how the Porcupine Caribou Management and the International Agreements direct agencies and provide communities in this management function. The terms of these agreements are found to establish a limited set of choices for communities wishing to co-manage caribou with agencies. Next, I build on perceptions of users presented earlier in the dissertation to show how locals' descriptions of biologists are related to issues of trust. Next I explore the culture of wildlife management, and then track the events surrounding three caribou research projects which, in part, were the subject of locals' concerns at the public meeting of the 1993 Caribou Crisis. An analysis of these three case studies leads to an investigation of problems associated with the interactions of community members and biologists, and then an analysis of board-level transactions. In that frame, I examine various roles of actors of the PCMB and patterns of communication between board members and community members in the co-management of caribou research. Finally I examine board-level considerations on the research approval process and community-level which may be the consequence of the 1993 Caribou Crisis outcome.

The chapter can be summarized with the following frames of analysis:

- Working within formalized co-management agreements
- Overcoming a history of mistrust of science and researchers
- Transforming the culture of wildlife management agencies
- Accessing agency biologists and their information
- Influencing work of the co-management board

- Broadening the scope of the arrangement
- Internalizing the duties of regional authority

8.2 Working within Formally Stated Agreements

As noted, the Porcupine Caribou Management Agreement in Canada provides communities with a legal framework by which locals can participate in the various functions of caribou management. Among the topic areas that the PCMB addresses are activities related to caribou studies, the adequacy of information needed in management, the methods of data collection, and the role of the PCMB in encouraging community participation. The terms of the agreement direct the board with two types of language which determine the force of the agreement's terms -- *"shall"* statements and *"may"* statements. *Shall* statements of the in-Canada PCMA that direct the activities of the co-management board and its role in involving communities in research specify that:

> D.4 The board shall review technical and scientific information relevant to the management of the Porcupine Caribou Herd and its habitats and may advise the Minister of its adequacy.
>
> D.5 The Board shall encourage native users and other harvesters of Porcupine Caribou to participate in the collection of statistics and biological information.

With less directive language the PCMA also states that the board *may:*

> E.2.a Review and recommend development of Porcupine Caribou research proposals:
>
> E.2.b Review available information and recommend further research where there appears to be a need;
>
> E.2.c review and recommend methods of data collection and presentation;
>
> E.3 b With respect to habitat protection, the board is directed that it may identify sensitive habitat areas requiring special protection and recommend measures to protect such areas.

Elsewhere the PCMA directs the PCMB to recommend the allocation of quotas if necessary, and thus implicitly directs the co-management body to assume a role in monitoring and anticipating changes in the herd's total population. Direction in the processes of habitat management is provided in the PCMA as well as the International

Agreement, although these and other provisions appear as recommendations that are advisory in nature, to be directed by the minister of governments.

This language has several implications with respect to the co-management body's authority in directing the work of agencies and its mandate to involve communities in the work of those agencies. First, with its limited access to financial and human resources, the board essentially depends upon agencies to implement research directives that it may recommend, in its role of coordination (Therrien 1988). In this respect, the PCMB functions in its management responsibilities differently from government agencies (Urquhart 1995), as well as from communities. As coordinating and advising bodies for communities and government, co-management boards are charged with the task of monitoring the status of a living resource's health, while at the same time making recommendations on the full array of other management functions (e.g., education, land-use planning, enforcement, human health, etc.). As Urquhart points out, the broadness of this mandate poses a challenge to a co-management board, given a board's divided attentions.

Therrien's (1988) early-stage analysis of the PCMB indicates that in 1986 (i.e. year-one of board operations) there was dissatisfaction among community members with the limited provisions of the agreement and power of the board to design and implement caribou research programs. There was, however, optimism on the part of managers who believed that PCMB recommendations to ministers regarding research (and other topics) would elicit a positive response. This optimism, she found, stemmed from government board members recognizing that the board's mixed membership is government's best advisor on the topic, because of their experience, and their intimate knowledge of the resource..

Operationally, the link between the PCMB and ministers has functionally been limited to sending a copy of the three-year management plan to the three agencies

heads and assuming that there are adequate linkages between them and those charged with implementing caribou research at the ground level. In the early stages, these linkages between operational-level managers and senior bureaucrats are reported not to be strong, as a result of limited continuity in attendance of high-ranking managers (federal regional director and territorial level directors of wildlife management agencies) at board meetings. In a pattern similar to the Beverly-Quamanirjuaq Caribou Management Board memberships evolution (Monaghan 1983), after the first four years of PCMB's establishment, there occurred a shift of government membership to middle managers who are charged with overseeing or conducting Canadian PCH research activities on behalf of various agencies. In other words, when making recommendations on caribou research which is to be initiated by agencies, the board is now indirectly making those recommendations to those charged with overseeing management activities. As I discussed in the 1993 Caribou Crisis and will explore later in this chapter, while this lowers *community costs of accessing key managers* involved in caribou studies, if having to challenge the research activities of a Canadian agency, community members must also directly confront those with whom they share the table.

With respect to communities' participation, agreement provisions direct the board to "encourage" involvement. The language of the PCMA frames that involvement as including the collection of "statistics" and "biological information." Differing from some subsequently legislated agreements (e.g., the Vuntut First Nation Final Agreement), there is no reference to "traditional ecological knowledge" or more generally, the contribution of locals' understanding of caribou to management decision making.

The language in the agreement drives home the point that the terms of formal co-management arrangements are a reflection of former negotiations and the conditions considered by negotiators. In this case they are a reflection of the constructs used in 1986 for negotiating the agreement a time before the terminology of "local" or "traditional

knowledge" had gained currency among native people and made an appearance in the political and management arenas. As one PCMB government member put it,

> [The term traditional ecological knowledge] certainly wasn't used in the early days and it wasn't the native people who were actually the proponents of it. It was really [says the name of the other non-native board member] and me that pushed it.

Locals certainly were aware of their unique understanding of and relationship with the herd, but the discourse concerning native involvement, and consequently the caribou agreement, was not articulated with terminology that specifically reference their unique knowledge of caribou. The absence of this terminology also shows that formal agreements put a burden on players to advance the relationships of parties within the language constraints of formal institutions. Even minor changes to formal agreements, while discussed by the PCMB ,[1] have been avoided by governments and communities alike, in fear that opening the process would allow for a suite of new issues to be raised and complications to arise, described by Ostrom (1990) with the term "transformation costs" or referring to the costs of changing the status existing institutions (which she differentiates from transaction costs.)

As noted earlier, the PCMA is embedded in native land claim agreements, each of which has its own provisions for the planning, approval, and implementation of research conducted on lands and shared resources which are under the jurisdiction of these land claims. By the terms of the Inuvialuit Final Agreement (IFA), research is defined as a form of development, meaning that research proposals are subject to review by the Inuvialuit Screening Committee and the Environmental Impact Review Board, the

[1] Making a change in legal language of PCMA was considered by the board because one of the original signatories, the Dene Nation and Metis Organization, was after the signing of land claims represented as the Gwich'in of NWT. The Gwich'in, once a part of the Dene organization, withdrew the Dene/Metis negotiations and negotiated their own agreement, in part because of the high costs associated with coordinating their needs with a larger set of First Nations.

two co-management advisory bodies of the IFA.[2]

Another Inuvialuit land claims board which has some function in research is the Wildlife Management Advisory Council (North Slope), given that it is charged with overseeing management of the Yukon portion of the calving grounds. As well, it assumes a role in the funding process by allocating claims-based dollars for specific projects of its choosing. It is ironic that the caribou body condition research study of "Team B" which was of such concern was partially funded with native dollars of the Inuvialuit, but escaped review because the actual field work was not conducted on Inuvialuit lands.

At the time of completing this research, the Gwich'in Comprehensive Land Claim Agreement, the land claim of Gwich'in beneficiaries of Fort McPherson and Aklavik, was in its initial stages of formation, with its primary regional resource management body, the Gwich'in Renewable Resources Board, having its first meeting in winter, 1994. Nonetheless, Gwich'in Claim states that governments,

> shall seek timely advice of the [Renewable Resources] Board," in "policies respecting wildlife research and the evaluation of wildlife research in the settlement areas" and the planning of "cooperative management and research relating to species and populations not wholly within the settlement area, such as the Porcupine Caribou herd..(1992: 12.8.32 (f-g)).

8.2.1 Other Canadian arrangements for governing caribou research.

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[2] "Development" is defined in S.2 of the Inuvialuit Final Agreement as:

> (a) any commercial or industrial undertaking or venture, including support and transportation facilities relating to the extraction of non-renewable resources from the Beaufort Sea, other than commercial wildlife harvesting; or (b) any government project, undertaking or construction whether federal, territorial, provincial, municipal, local or by any Crown agency or corporation, except government projects within the limits of communities not directly affecting wildlife resources outside those limits and except government wildlife enhancement projects.

Keeping (1989) notes that this definition of "development" has been interpreted to include even the most trivial commercial, industrial, or government undertaking, "there is no threshold below which the definition does not apply. The IFA also provides for the establishment of a Research Advisory Council. To date the creation of this board has not been identified as a priority by the Inuvialuit (DIAND 1993).

In additional to co-management arrangement requirements, non-government researchers have an obligation to comply with the Explorer's Act of Northwest Territories and the Explorer's Act of Yukon; government agencies conducting research are, however, exempt from this requirement, which means that research activities are regulated by the internal systems of agencies and the voluntary cooperation with the PCMB. Parks Canada, which administers Ivvavik Park, also has its own research permitting program, but it is applicable to caribou research only if the researcher has to conduct field work in the area. Land management agencies' directives for involving communities are found in the broader language of the IFA. And all research activities generally are considered well beyond the realm of Canada's Environmental Assessment and Review Process.

Thus I find that while the PCMA outlines in broad terms the role of the PCMB in the management of caribou research, there are also varying arrangements that are linked to land claims agreements which govern land-based assessment processes. From the perspective of the government caribou researcher, the PCMA allows for a great deal of latitude in the conduct and work of caribou research. At the same time, emerging land claim arrangements have the potential of being enormously costly to researchers by creating a labyrinth of labor-intensive community consultations to gain approval for a each individual caribou research project.

8.2.2 International aspects of caribou research

As noted earlier, the interest in proposed hydrocarbon development on or near the PCH calving grounds has led to over twenty years of baseline and impact assessment research in the Arctic National Wildlife Refuge (formerly called the Alaska Wildlife Range). This work has been administered by Alaska's Department of Fish and Game, the US Fish and Wildlife Service (as well as its associated research agencies like

the National Biological Survey), with other agencies participating in various aspects of the work (e.g., Alaska Department of Fish and Game generally conducts the biennial caribou census, academic research originating from the University of Alaska). Each of these organizations has its own internal project review process to evaluate and approve proposed activities. As well, PCH user communities of Alaska hold limited if any *de jure* authority[3] in directing the research work of state and university managers, thus leaving agencies unaccountable to specific communities in their own internal reviews and implementation of research programs.

8.2.2.1 Research and the International Agreements

The International PC Agreement, while calling for co-ordination, planning, and sharing of information, makes no specific mention of caribou studies or research, and as noted in Chapter 3, is designed to function as a bi-lateral coordinating device. The IPCB's "Plan for the International Conservation of Porcupine Caribou" was finalized and approved during this research period, and beyond its language that there be communication and encouragement of communities to participate in PCH management, it makes no direct statement about involvement of communities in the research process. The Plan is not a formal agreement, but a policy statement of the IPCB for meeting the terms of the IACPC, and focuses the efforts of the board on monitoring herd status, collecting harvest data, conserving habitat, and identifying sensitive habitat.

8.2.3 Reflecting on the significance of agreements to communities.

The bottom line is that the terms of the PCH management agreement provide limited terms for communities to influence the activities of agencies, or to assert their own

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[3] Alaskan First Nations, as established with the Alaska Native Claims Settlement Act (1971), the National Interest Lands Conservation Act, and the Indian Reorganization Act (creating the Venetie Indian Reservation) offered land, corporate structures, and cash to Alaskans (vs. land, money and wildlife and land management rights in Canada) . Apart from advisory councils set up to address fish and wildlife enforcement issues in Alaska, this legislation has no provisions for community involvement in the research.

knowledge in the decision making process. The PCMA does, by the letter of the agreement, direct parties to cooperate in meeting the agreement objectives, which include conserving and "encouraging" local involvement. It provides an opportunity for communities to *review* research and its methods. The PCMA is, however, simply advisory and has no *de jure* authority beyond making recommendations to government ministers. The absence of formal provisions does not, however, preclude the evolution of informal power sharing (Acheson 1987), although it does represent an area of community vulnerability and thus potential for community cost.

Therefore, the PCH institutional arrangement (and organizational configuration that follows from it) is articulated with an assumption that local communities have or will cultivate the capacity to influence the recommendations to co-management boards and agencies will, in turn respond to board-level recommendations. Underlying this arrangement is the assumption that communities will have the financial resources, time, infrastructure, and technical expertise necessary to participate in this process.

How then does the formal arrangement direct the interactions of communities with boards in the research process? Table 8.1 below shows options for community involvement in studies that follow from the PCMA and International PC Agreements. As I will elaborate in the sections below, option number one serves as the primary means for community involvement in co-management of caribou research with other options occurring sporadically.

Table 8.1 Options for Community involvement in Caribou Research Process.	
option	*implications*
1. Directing resource management agencies' activities through the board-level recommendations	• Requires that the co-management board have sufficient social and political capital to initiate direction • Requires that co-management board is responsive to community directions
2. Being cooperators or partners with agencies in projects; dependent upon agencies' willingness to involve locals	• Requires willingness on the part of agencies to engage communities in management process • Requires that agencies have sufficient funding • Requires locals are willing to or interested in cooperating
3. Working through board-initiated projects undertaken independent of agencies, which depend upon board's access to resources and willingness to involve locals	• Requires that board has sufficient funding • Requires infrastructure or expertise at board and community levels to coordinate activities • Requires that agencies view findings to be taken seriously.
4. Serving primarily as producers of information and, as needed, making presentations to boards, agencies, and the public	• Requires human and financial resource base to coordinate project • Requires that agencies and board are willing to receive material

In the section above I analyzed formal arrangements and their implications to what options communities have in being involved in caribou research. In the next section I look at locals' perceptions of those who conduct caribou studies, and issues of trust as reflected in their expressions. In spite of the options available for community involvement in the caribou research process, there are outstanding issues relating to trust, and the difficulty of overcoming the history of less than perfect interactions between biologists and community members.

8.3 Overcoming mistrust of science and researchers, expressions of mistrust

In order for resource user communities and research professionals to share power in decision making, there has to be some basic trust relationship between the two groups, a conditions which is predicated on common understanding and mutual respect. PCH user community members' twenty years of experience with researchers, as well as

disparate ideological perspectives relating to caribou and uncertainty, have shaped community's view of caribou researchers and their work. There is a cost to *overcoming long-standing mistrust and establishing more cooperative relations.*

For many communities, the events of the summer to winter 1993 season leading to the crisis only reaffirmed what locals viewed as a long-standing image of caribou biologists and their work, the comments of locals, like those of hunters documented at the Berger Inquiry, have become integrated into a perception of biologists and their motivations. During my own field work, the "Berger days" and the research activity of those time were commonly mentioned.

What is not apparent from the events as described in the 1993 Caribou Crisis ethnography, however, nor from the statements made to Judge Berger in 1975, but which are clear from the individual and group interviews I conducted, is how community members describe researchers. Of 109 locals questioned, 11% stated that they had previously worked with caribou researchers. Among these, more than half had worked with PCH researchers as a part of the Arctic Gas studies in the 1970's. About half of those who had worked with caribou studies described their experiences in positive terms. Of these, one local woman described at length how she had worked as a cook in a research camp that was based up river from her community and how the researcher and local field assistants had share many good times conducting caribou studies. Others talked about the early adventures of intensively tracking caribou to document the animals' migratory patterns from Yukon to Alaska using fixed-winged aircraft, and several spoke with admiration of those with whom they worked, regarding them to be "friends." In particular, locals of one community recalled the work of two territorial biologists, one of whom spend considerable time meeting with several elders and the communities and learning from their stories.

Yet others described their previous experiences by referencing their frustration with the biologists. One elder mentioned how he had worked as a part of a survey crew of the Canadian Wildlife Service (documenting the migratory patterns of the herd), and how he had attempted to share stories of his elders about caribou with the biologist, and how the elder (at that time a middle-aged man) had been told that "Indian Stories are nonsense," and of little value in the modern-day studies (as recalled by the elder). Another local working with a different caribou research team in Northern Yukon spoke of his anger when witnessing harassment of animals with aircraft, how he had expressed his concern to biologists that the over flights would cause harm to animals, and how his perspective had been discounted. The recalling of this specific memory of working with the Arctic Gas studies was followed with a more general discussion about the arrogance of biologists and the community's minimal and unpleasant with them.

While these impressions of the past present a mixed image, the negative experiences of individuals and community members who were more distant from the actual work (i.e. observers and indirect recipients of PCMB reports about studies) have had their effect on locals' impressions of biologists. To be sure, there are those in each of the three communities who have great respect for caribou biologists. Yet today, as it was commonly and at times stated emphatically by some, caribou biologists are not to be trusted. The most common expression of this mistrust is described in a view of the biologists as monolithic in character and closely associated with government, and with the perception that these agents of "government" are controlled in what they report to the public. The description of the government caribou biologist as "objective" and "independent" was never mentioned by locals with whom I talked.

The 1993 caribou crisis and field work that followed began with the discovery of mortality signals north of the community, and revolved around the distrust and disrespect local hunters had for biologists. Hearing the biologists' explanation about what caused these radio collared caribou calves to die, community members I interviewed during and

after this period reacted with apparent skepticism, and in some cases outright stated disbelief. Not only was the biologist's explanation met with suspicion among locals, it was described by many as a government cover-up. The following is an excerpt from one of the hunter focus groups(convened by me five months after the November meeting) in which discussion addressed the collaring of calves. Note the local PCMB representative's explanation of the incident, his lack of defense of biologists' explanation to his fellow community members, and his sharing with the group of his own experience with collars.

> Local hunter # 128: They figured some lynx were killing the young ones too.
>
> Local hunter # 142: See, that answer comes from the biologist so you are not getting an answer, the truthful answer, because he is working for government. After all, he's going to be saying what he wants to say...
>
> Community PCMB representative: Yea, and then they're choking too. The second stitch [of the expanding collar is] supposed to come off, but sometimes it doesn't. It just chokes the calf, you know. I shot one years ago, quite a few years ago, it was just laying there. Although it was in good shape when I shot it, but it had choked and I didn't notice it had a collar until I shot it...

Biologists were also commonly framed by locals as economic maximizers, motivated not by professional interest nor altruistic concern for conservation, but by financial gain. Of these community members, some referenced biologists' professional mobility (i.e. the options available to them for moving from job to job or moving on to seek employment with a higher status). Their lack of binding attachment to the herd, not like the attachment of locals to caribou, marked a perceived difference in commitment of the two groups of people. Other locals framed their mistrust and critiques of the biologists (and their work) using the word "wasteful;" citing the misallocation of funding which could be better directed to more immediate local needs (e.g. general education and training of the public). Finally, and in some respects in contradiction to those locals who talked about the biologists as being agents of government, some focused their statements about the biologists as being unaccountable to community. The statement below, made

by a elected local leader who participated in one of my focus group discussions, captures several of these points.

> Where do [government biologist] get the okay from when [biologists] want to do this collaring and lately been doing , eh, catching them with nets, eh? Who gives them permission to do that? I mean sometimes you see them at Eagle Plains. They are doing studies there, and we don't even know what kind of studies they are doing. They are always around, you see that [a government biologist] there all the time. And you see [same government biologist] in the meetings, and [same government biologist] talks to you, but when you see him [said person] some other place, [said person] won't even look at you. Eh? People like that we don't need working for us. They can go to Africa, as far as I am concerned. Because we are more concerned about our caribou. They are not that concerned, it is just a job for them. That is the way they make their money. They are not really concerned. As long as they are getting bread and butter on their table. I bet they don't even eat caribou, because they know how much contaminants are in it. They are the only ones that know the information. We don't. After a good days work on caribou, they come home to steaks, you know? That is what I think.

Locals' stereotype of the caribou researcher as untrustworthy and as agents of government can be explained in several ways, none of which is mutually exclusive. One explanation follows from the perceived government control of researchers and their activities. As I have already pointed out, agency biologists have historically held a power relationship over community hunters in their role of evaluating environmental conditions and recommending conditions in which harvest restrictions can be imposed on hunters. Within the range of the PCH, this is perhaps best illustrated with the caribou management events around the construction and opening of the Dempster Highway in Yukon and NWT.

A second explanation of the expressed mistrust follows simply from the cultural differences of the community hunters and caribou researchers. Whereas the locals' system of management is based on intimate relations, experiential learning, and a view of the resources that includes both people and caribou, the professional researcher's world is focused on production of objective knowledge. An important component of this mistrust is found in the locals' perception of and frustration with the caribou biologists' unwillingness to assert statements of fact without sufficient evidence. A third explanation

can be related to the limited time biologists spend in communities interacting with locals. I explore this topic later in the chapter.

While there is evidence to suggest that many community members mistrust biologists (and commonly express mistrust to each other), there was also talk among locals about possible solutions for overcoming locals' mistrust. Of 72 people questioned, 85% stated that it was "necessary" for biologist to become better educated about native people's uses of caribou, with the most common method for that education described as being through direct contact, or biologists spending "more time in community."

From the events of the Caribou Crisis and the evidence presented above, as well as the historical experience of the PCH caribou user, it is clear that as a group, hunters have limited trust in caribou biologists. To change these conditions and develop conditions of better mutual understanding, improve the cooperative spirit of co-management, and accrue social capital requires an expenditure of effort on the part of all parties, including those at the community level who, if choosing to train agency biologists, will have to incur the costs of enduring non-locals' questions and assume the responsibility of sensitizing them to locals' cultural perspectives.

8.4 Transforming the Culture of Wildlife Management Agencies

8.4.1 Agency Culture

The signing of a wildlife co-management agreement and the establishment of a co-management board does not guarantee a change in the *modus operandi* of agencies. With extensive financial and human resources and well-developed organizational networks, wildlife management agencies are in a strong position to maintain the status quo and, if they choose, ignore the requests of communities and advisory-based co-management boards. In this respect, a decision by government agencies to be unresponsive to a particular group is a common form of transaction costs manipulation

(Twight 1994). While the establishment of co-management agreements and co-management boards do provide opportunities for community-agency co-evolution (Pinkerton 1992), the evidence of the Crisis suggests a great rigidity in bureaucratic systems and power dominance of those at the agency level. Thus, if seeking to change conventional systems of wildlife management, communities face a significant challenge.

The study of these bureaucratic organizations, their cultural systems, and more specifically, the projects on which they focus, offer some insight into the nature of the problem. As pointed out earlier, to effect agency change, community members must work directly with agencies or through change agents who work with agencies, to modify their existing incentives structures and sensitize agency personnel to the needs of community. Such efforts must be undertaken at the organizational and the individual levels, as well as at the societal level.

Change at the organizational level of agencies may result from any combination of conditions. It will most likely require a shift in the flow of resources that maintain the economic viability of agencies' (and biologists') work. It may also occur if seeding agencies with the notion that being accountable to communities meets the agencies' fiduciary responsibility of resource conservation.

To understand better the prospects that a co-management arrangement might transform the business of wildlife management agencies and the implications of biologists initiating such changes, it is important to take into account that biologists are members of a long-standing cultural system geared to producing knowledge using a well-defined method, searching for funding, and advancing their profession success. As reflected in the historical record, this system is especially well entrenched.

8.4.2 Oil Development and the development of science

By 1986, the year of PCMB's first meeting, agency biologists working with Porcupine Caribou, and the state of science about Porcupine Herd, had been transformation. Two events precipitated this change. One was the Arctic Gas/Mackenzie Valley impact studies of the mid seventies. The other was United States' federally-funded studies, mandated by Section Article 1002 of the Alaska National Interest Lands Conservation Act, to complete five years of baseline research on the Alaskan coastal plain of Arctic Refuge and culminating in the release of a legislative mandated environmental impact assessment on Coastal Plain gas and oil development (USFW 1986; USFW 1986). Driven by several iterations of oil development proposals and their companion impact assessment processes, knowledge about the Porcupine Herd underwent a change in status from being one of the most unstudied herds to becoming the most studied arctic caribou herd of North America. These studies have been generating rich data sets which are allowing biologists to pursue their interest in the development of predictive computer models.

Both the Arctic Gas Studies and the research of the 1002 development also led to a change in the way biologists interact. Facing threats to the caribou resource (mega-project developments), and facing problems associated with duplicated studies (particularly in the period of the Arctic Gas and Mackenzie Valley pipeline studies), agencies, universities, and some industry consultants organized in the early 1970's to establish the Porcupine Caribou Technical Committee (PCTC) which would meet periodically, assess various research endeavors, coordinate efforts, and serve as a peer review process for setting the research agenda.

After the signing of the International Agreement for the Conservation of Porcupine Caribou and the establishment of the International Board, the IPCB passed a resolution

which formalized the PCTC's status, making it accountable to the five key agencies responsible for management and research of the PCH, indicating that the participation of other groups (e.g., universities) would be by invitation of the PCTC members, and charging the PCTC to promote cooperative approaches to management and research among agencies (IPCB 1990). The PCTC's initial task in the post-IACPC signing date, as requested by the IPCB, was to assess sensitive habitats for the board, a task which culminated in the publication of the Sensitive Habitats Report. During the years that followed, the PCTC remained primarily an *ad hoc* organization, and informally served as a forum where caribou science research agendas get established.

Consequently, accountability of the PCTC to the user communities of Old Crow, Aklavik, and Fort McPherson is through the PCMB and/or through whatever influence communities have on agencies and individual members. As native representatives of the newly-formed PCMB engaged in their first co-management discussions with government agency members, they faced a research infrastructure which was extremely well-funded, moderately well coordinated , and whose data based on caribou represented multiple years of research.

8.4.3 Coping with researchers' seemingly insatiable need to know more

In the ethnographic account of the Caribou Crisis, I tell of a community hunter at the PCMB public meeting who posed the question, "Don't you [biologists] know enough yet?" In essence, the hunter was expressing a common community concern for what at the local level appeared to be the insatiable need of the biologists to cultivate and produce more and more knowledge, an approach to inquiry that is in violation of traditional norms that dissuaded the asking of frequent or repeated "why" questions (as discussed in my chapter on local systems of management). As well, this hunter's words

can be said to reflect a culturally defined response for coping with conditions of ambiguity and uncertainty.

Conscious of the management dynamics of this process, an active and formally educated community member (quoted below) talked about this problem, how it is associated with those who promote these activities, and the dominant role those individuals assume in caribou management.

> Well, science is important. It takes an important role. It clarifies a lot of things, except the part that I'm not clear with is that with science, it's known that people that study can get carried away, because, I mean, they get the piece of information and the next thing they want more and more and more. And pretty soon you have a whole lot of science that is being done.

Clearly, the work of science is focused on the effort to advance the horizons of knowledge, generate new information, and cope with uncertainty with the promise of prediction (Brunner and Ascher 1992). As I noted in the theoretical discussions of the previous chapter, this perspective comes from a modernistic view of development that is closely tied to the role of science and its practitioners by supplying the democratic processes with established fact. As well, the work of science is organized in wildlife management primarily through the work of agencies and universities, both of which are bureaucratic in structure, the former of which is legally mandated to assume responsibility for insuring the conservation of living resources, and both of which are also focused on their organizational survival. For local hunters, activities which seek to advance knowledge for knowledge's sake present a challenge related to directing researchers' energies away from idle curiosity and towards efforts whose findings are applicable to community concerns.

8.4.4 Three Research projects of the Caribou Crisis

To this point, while I have talked generally about the conditions which contributed to the events of the 1993 Caribou Crisis and suggested that the cumulative effects of on-going and intensive research on caribou contributed to the Crisis, I have not addressed

the specific projects which were of concern to locals and how they were formulated and later endorsed in the PCMB's management plan.

A review of the interactions of the board and agencies in the evolution of three caribou studies is undertaken below. These are the *body condition monitoring study* (undertaken by Team A of the 1993 Crisis), 2) *a body condition research project* (undertaken by Team B of the Crisis) and *a habitat/calf performance study* (involving the use of calf caribou collars and undertaken by an Alaskan-based agency). While I address them separately, it should be noted that all three, overlapping in their objectives, are part of an array of studies undertaken by cooperating agencies.

My content analysis of board-level discussions about the evolution of caribou studies and a review of agency and board documents are used to provide rich examples of how the on-going interest in hydrocarbon development, the drive of science to supply information to assess those projects, and the issues of community involvement surface which are addressed in the PCH co-management arrangement. (See Appendix 11.9.) A review of the three projects gives an indication of how Canadian PCH co-management has functioned in providing communities a role in caribou research, and what some of the on-going issues surrounding the approval processes for caribou studies have been.

8.4.4.1 The "inexpensive" body conditioning monitoring study

Plans to initiate this PCH caribou body condition monitoring study were announced to the new PCMB at its second meeting in August, 1986. The objective of the project was to create a "detailed study of body condition throughout the annual cycle" of the herd, and to do so in a way that involved locals in the process. The idea of the project was identified by "several members" of the Porcupine caribou Technical Committee (PCTC) at its April 25, 1986 meeting (CWS, 1986). At the time of the project's announcement, funding for its first phase had already been secured through

several sources, including the Canadian Wildlife Service, Indian and Northern Affairs Canada, and the Institute of Arctic Biology at the University of Alaska Fairbanks; and would be carried out in cooperation with YTG-RR, ADFG, USFWS. According to the memo announcing the study to the PCMB, the success of the project depended upon the cooperative efforts of agencies as well as hunters of the herd.

The objectives of the body condition monitoring study were initially described as providing an "inexpensive" and "accurate" method for early detection of changes in the health and productivity of Porcupine Caribou herd, with the underlying scientific question seeking to relate body condition to reproductive success (White and Russell 1986). This line of analysis followed from an on-going theoretical interest among biologists in the study of energetics and nutrition as key factors in caribou population dynamics (Thomas 1982) and the two substantive and immediate concerns of the time -- 1) whether the increasing population of Porcupine Caribou was approaching range-carrying capacity, and 2) how future disturbance of the herd from proposed gas and oil development might affect overall herd fecundity. The body condition monitoring study was (and is) implemented with the intent to provide baseline data for changes in herd health which are complementary to and may not be detectable in population data and herd movements. As well, the project was intended to provide data for use in the development of predictive population models.

One of the selling points of the project was involving community members in the research. In the initial proposal for the body condition monitoring study funding, and as announced to the newly formed PCMB, the proposed methods of data collection indicated that the project would begin with an exploratory phase focusing on the establishment of quantitatively-based body condition indices through the sampling of whole carcasses of reproductive females four times each year, and the collection of 100 samples of indicator muscles and bones from animals killed by Old Crow hunters during the fall migration. The exploration was to be followed with laboratory and then statistical

analysis to "validate the technique for application to hunter-killed animals" (White and Russell 1986). As well, the proposal describes the use of satellite caribou collars to identify the use range of specific animals to be located and sampled.

Launched on the cusp of co-management's implementation, members of PCTC innovated a method for involving locals with the idea that locals' total caribou take would supply a sample large enough to serve the needs of caribou science and provide an additional measure of herd health. Given hunters' known experience with and awareness of caribou body condition, the fit was considered to be a good one. As stated in a memo distributed to the PCMB in 1986,

> Collection of samples from hunter kills
>
> The body condition of caribou can be assessed from a few measurements and muscle/bone samples from hunter-killed caribou once the relationship between these samples and entire body composition is established from a few whole carcasses. The co-operation of hunters is essential to this aspect of the study, as the extraction takes some time, and means the loss of a small amount of meat (less than 2 pounds). In addition, standard information such as approximate age, sex, and measures of back fat and kidney fat will be recorded. For samples taken in spring, the number of warble fly larvae under the hide and the number of bot fly larvae in the throat will also be recorded.
>
> Proposed schedule
>
> At present, the systematic collection for complete body composition analysis is scheduled to start in March [1986]. However, given the endorsement of the management board and councils, and once the infrastructure of personnel and permits is in place, collections from hunter kills could commence at any time (CWS 1986: 2).

My content analysis of board-level transactions on the body condition studies from 1986 to 1990 (Appendix 11.9) illustrate that caribou research biologists made five announcements about this project, and repeatedly spoke of the development of "superior" methods for analyzing body fat. According to an agency biologist who was among the research designers and project announcers, the body condition monitoring study was presented as part of a larger "package" of studies, all integrated toward a

common science plan which was informally directed by key members of PTCT. In the case of the body condition monitoring study, active members of the PCTC, through the research of a Ph.D. student of the University of Alaska Fairbanks, sought to identify those body parts which were the most indicative of body condition and which body conditions allowed for greatest reproductive success (Allaye-Chan 1991).

Field work in the experimental stages of the monitoring project included the collection of whole animals as well as select body parts, with the remaining caribou meat given to community hunters assisting with the collections. And as the caribou biologists reported to the community at the November 13 meeting, a side project involved the collaring and tracking of caribou calves to determine a statistical calculation of their rates of survival.

The refinement process of body condition monitoring measures had several implications involving communities in the study to monitor the herd. The newly developed measures of body condition monitoring became based on a algorithmic quantitative analysis. Well-trained technicians with access to equipment and knowledge of sampling procedures were therefore needed to complete field work and gather needed data. Because of the cost of training and biologists' perceived need for a high standard of expertise, inadequate community infrastructure, and limited human resources, the field component of the monitoring project would remain under the direction of an agency biologist. Consequently, biologists who had launched the project and originally talked about a broad community involvement in the project would abandon the idea of amassing a large sample directly from hunters' harvest. The emergent technical approach of monitoring body condition would limit the extent of the involvement of hunters to those working directly with field biologists, and thus redefine the notion of an "inexpensive method" to mean "research without the support of aircraft." As I describe below, while the project did not involve locals as originally intended, it did provide for some involvement of users in the research.

In June, 1989, after the calibration of statistical indices for calculating body condition of lactating cows,[4] agency managers of the PCMB announced at a meeting that the agency would be expanding into two additional study areas (the Porcupine River and off the Dempster Highway) and would thus involve more local hunters in the work. In these field collections, locals were hired as hunters, field assistants, and boat drivers or truck drivers. Two locals were generally hired in each collection and paid $160 per day, plus $160 per day for the use of boats or mileage for use of trucks and daily fee for use of snowmobiles. From the program's beginning in 1990, ten local hunters were hired (Cooley 1994). Several PCMB native representatives repeatedly were hired as field workers.

Samples for the project were collected in September, November, and March, with approximately 15 lactating cow and non-lactating caribou taken. In the field, hunters took responsibility for locating, selecting, shooting, and butchering animals, and assisting the caribou biologist who was responsible for sample measurements (weight and size), labeling, and collection of select body parts, and of course all analysis and reporting of findings. Since sampling takes less than two pounds of caribou,[5] hired hunters retained possession of all caribou meat (except those body sampled parts) and were free to distribute meat to community members (e.g., local elders' home) or use the meat for family consumption.

According to government PCMB members and agency biologists involved in the project, this field component of the body condition monitoring project models successful co-management in action, functioning both to facilitate a process in which hunters and

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[4] The first phase of the refinement of the body condition study culminated in the dissertation of Alley-Chang (1991) entitled, "Adipose dynamics and the prediction of body weight and composition in female barren-ground caribou."

[5] Whole body weights, total length, length of foreleg and hind leg, and chest girth were measured from each animal and females were checked for lactation. Indicator muscles (gastrocnemius, peroneus tertius) were weighed and the peroneus kept for body protein assessment. Kidney fat weights and back fat depths were also measured. The reproductive tracts were collected for pregnancy determination. The lower jaw and indicator bones (femur, tibia-fibula, metatarsus) were collected for age analysis and marrow fat content, respectively.

researchers mutually learn from one another other. The study is undertaken in a manner in which is "least subject to criticism." As the wildlife agency manager and PCMB member describe their shared experience,

> By taking the First Nations [i.e. native] hunters, it's giving the hunters the chance to live out their life's ideals, I mean this is how they live. It gives them a chance to hunt which is important to them, gives them a chance to gather meat, which is really important to them, and it gives them a chance to work with the scientific people so that they have a better understanding of the scientific people, and gives the scientific people the chance to have a better understanding of the First Nations people, and the chance to gather the information they need in a way that is least subject to criticism.

Smits *et. al 's.*(1991) annual report on the project acknowledges the contribution of locals in sampling, noting the skill of community hunters in the difficult task of "differentiating between small bulls and cows." In my own observations when accompanying hunters and biologists of this study in the fall of 1993, I observed researchers and local hunters interacting in a bush environment with unstructured discussions about caribou, and with opportunities for face-to-face communications. I also observed incidents in which biologists learned from hunters. For example, on one occasion a biologist who was examining a carcass found what initially was identified to be an abnormality, a marbled discoloring of the animals' lungs. Making note of the observations, the biologist consulted with the local hunter and was told that this coloration is frequently observed. The transaction, albeit a minor incident, illustrates the subtle shifts in awareness of the hunters and the biologists, due to shared experiences. Later the biologist commented, "They [hunters] see a lot more caribou than I do, and know more about these things." Another biologist who was formerly involved in the project told how at the early stages of the project a local hunter with whom he was working began the field work by watching the biologists butcher an animal for sampling, and after the second taking of a caribou, politely insisted that all future butchering of animals be undertaken so as not to ruin the meat. While this hunter (also a PCMB member) expressed his concern and directed the biologist's work, it is noteworthy that

the two hunters I accompanied each told me of their discomfort with shooting cows and intentionally leaving their calves "to suffer," yet never told the biologist directly. It was only at the public meeting of November, 1993 that the field biologists acknowledged that the community viewed the practice as inappropriate.

From the perspective of community's experience, the plan of adapting caribou scientific research so that community involvement could be ongoing is beneficial in facilitating communication and providing for local employment. It should be pointed out, however, that locals have served caribou biologists as hunters, boat drivers, and field assistants for over 13 years working in numerous projects. When comparing the single body monitoring condition study to the days of the Arctic Gas studies when biologists were stationed in community for as long as a month at a time hiring groups of locals to assist in aerial surveys and to collar caribou, today's biologists in contrast appear to have limited time for field work (as was the case of the biologists of Team A). Biologists' uses of radio collars and other remote sensing techniques represents an even greater distancing of biologists from contact with locals, and a decrease in locals' participation in studies.

Several locals familiar with the body condition study commented that the repeated hiring of PCMB board members as paid field assistants both limited the greater community members' chances to work with researchers, and represented unfair hiring practices. Because agency members sought continuity in field workers and sought to make the links with activities of the PCMB members while supplementing their part-time board member earnings, PCMB members were the locals most commonly contracted to conduct caribou studies. In my interviews with hunters, I heard other locals comment that the hiring of PCMB members for the body condition study was inequitable in another respect. They talked about the need for greater participation of locals in study projects, not always the same preferred board members. This is a contrasting dilemma from the

one expressed by others (Therrien 1988; see Llody in Roberts 1996) to improve co-management effectiveness with greater continuity in board membership.

In June of 1994, six months after the November, PCMB meeting and at the close of the period considered in this co-management study, a memo was distributed to members of the PCTC. In it, the biologist responsible for the project re-considered the project design, and wrote,

> In short summary, the project is fairly time consuming and expensive considering the sample size I am getting. The original intent of the project was to get samples from hunter killed animals. I would like to modify the project so that we can do that. The change would be beneficial to the hunters as it would promote awareness of the herd, increase general knowledge of some of the studies, and increase user involvement. It would also benefit the study with better hunter awareness and support for the project, and there is a potential for a much greater sample size (Cooley 1994).

The memo illustrated both the desire of those working in agencies to involve locals in the research process. The biologist' perceived the benefits of involvement, and the need to modify methods. The extent to which such modifications can occur while at the same time meeting the perceived information needs from the agency biologist points to another underlying dilemma similar to the one facing the PCMB in the crisis – the need to gather good information for management while engaging locals in appropriate and participatory methods. At the time of this writing, the status of this project remains the same.

8.4.4.2 Body Condition Research Study

Early in their studies, caribou researchers realized that while the body condition monitoring study involved local hunters and provided a measure of the herd's body condition, it did not answer adequately the question of how weight change in cows affects the likelihood that a caribou would become pregnant, a question which for some researchers had implications for assessing the impacts (potential and real, if occurring) of 1002 oil development. With this question in mind, in May 1992 a biologist/board member announced a second phase of the body condition studies with the

announcement of body condition *research*, a project intended to provide a "finer resolution" (as described to the PCMB at the May, 1995 meeting) for measuring herd health. In the 1993 Caribou Crisis ethnographic sketch, this project is the work of Team B which arrived at the community with a team of five, one helicopter and a fixed winged aircraft, used net guns for caribou recaptures, and departed the village without making contact with the community leader.

The new project's study methods included recapturing of collared females (lactating and non-lactating) to track each individual animal's body condition and rates of pregnancy, a longitudinal analysis which was not possible using the harvest-based method of the Phase One body condition study. Differing from the local condition monitoring study, this study provided community members no role in the project. For researchers, the goal of the study was to advance the state of caribou knowledge by determining thresholds of weight gain (fats and proteins specifically) necessary for caribou reproductive success (i.e. what are the energy needs for a cow to get pregnant?) through a seasonal and annual comparison of lactating and non-lactating females. As with the other body condition study, the overarching objectives and design for the research was formulated by members of the PCTC. In this case, the project's field component was short-term (two-years) in duration.

The decision to pursue the Body Condition Research project was motivated not only because of an interest in advancing caribou science and producing information which would contribute to answering the 1002 oil development question, but also because of the availability of funding. Hedging bets, the lead caribou researcher submitted the proposal to two organizations for funding. One proposal went to the Northern Oil and Gas Assessment Project (NOGAP), a multi-year project focusing on impacts of hydrocarbon development and administered through DIAND. The second was sought from to Inuvialuit land claims funding (dispensed through Wildlife Management Advisory Council: North Slope) which the biologists learned had a "one-

time only" funding, or as one respondent called it, "mad money." After proposal review, the project was permitted to receive funding from both sources. Because it was a government project, it did not require approval or a special permit to be conducted. The announcement of the agency member to the PCMB of the agency's decision to pursue the funding and not first seek board-level approval first was met with some frustration by some board members. I discuss this issue at the end of the chapter.

8.4.4.3 The Calf Habitat Study

In collaboration with the body condition research study described above and was a third project – a US Fish and Wildlife study focusing on habitat use and "performance of PCH calves." Designed as a five-year project to determine the value of Arctic National Wildlife Refuge coastal plain habitats to the herd and funded by Federal sources allocated for 1002 oil development impact studies, the project's objective was to relate habitat value to population dynamics and assess implications of oil development on herd welfare. The method of study included capturing and collaring approximately 75 to 80 caribou calves each year at or near birth, and relocating and recapturing collared calves at three weeks of age, six weeks of age, and 20 weeks of age (during the rut) to measure weight gain. Design was completed by the agency and in collaboration with PCTC members. In the process it was determined that the calf habitat study would be coupled with the body condition research project by having the researchers of that team relocate the mothers of collared calves. A content analysis of board minutes indicates that the PCMB was informed of the project in March, 1993, a year after its first field season.

In the Caribou Crisis ethnography I noted that locals were surprised to learn of the loss of calves and many attributed their death to the fact that they were wearing collars. Biologists, however, having previously completed studies of calf survival rates, were aware of annual "natural" mortality of the "calf crop" and estimated a 45% loss of calves in the first 20 weeks of life. The project was budgeted at $161,000/year (average

for the five years originally proposed). The project, based from 1002 area of the Arctic Wildlife Refuge, extensive use of aircraft for relocation and capturing activities. Non-technical field workers were hired in the project, yet no native PCH users, Alaskan or Canadian, participated in any aspect of the work. According to one project leader, locals (Alaskan Iñupiat of Kaktovik) were not interested in the project because rates of pay offered were based on Fairbanks wages; those living in small communities of the Alaskan North Slope have expectations of higher wages.

8.4.5 Reflections on the three projects; bureaucratic tendencies

The three caribou research projects described above, 1) the body condition monitoring study, 2) the body condition research study, and 3) the habitat/calf study, were all initiated by government agencies and controlled and indirectly directed by the specialists of the PCTC. Only one project involved communities and that project, a hallmark of co-management efforts for hunter and biologists cooperation, provided a role for locals to work as field assistants.

Long ago Weber (1960) recognized organizational tendencies of bureaucracies and their role as a force of societal change (Etzioni-Halevy 1983). Weber's theory of bureaucracy is based on a historical perspective on the rise of civilization, the various forms of authority, their means of gaining legitimacy, and the need of rulers to maintain their power (Morgan 1986). From this historical perspective, Weber attributed the development of bureaucracy to several causes: the emergence of a capitalist economy, a more encompassing trend towards big government and large organizations, the disenchantment or demystification of the natural world, the rise of democracy, the growth of populations, the complexities of administrative problems, and modern forms of communication.

Weber had great concerns for the influence of bureaucracy in society. His study of this organizational form was consistent with his views of Judeo-Christian ethic in post-industrial societies (Weber 1930), and the view of science in understanding the natural world. In a bureaucratically organized world, humans become nothing but parts of the machine, and a bureaucrat is one who clings to his or her position, hoping to become a bigger cog (Etzioni-Halevy 1983). Commonly associated with bureaucratic organizations is the problem of goal displacement as well as overall organizational rigidity. In Weberian terms, once entrenched in society, bureaucracy would become revolution-proof. (Rothschild and Russell 1986; Rothschild and Whitt 1989).

The theory of bureaucracy offers a powerful frame with which to explain the on-going need to study caribou, and the drive of agencies to seek funding which perpetuate research agendas, advance individual's careers, as well maintain dominance of science. Clearly, the initiation of the body condition studies and the collar-habitat project were part of a larger societal response in which "development," in its many forms, is regularly accompanied with the perceived need to acquire more information for use in the assessment of possible changes.

From a more individual and, perhaps, compassionate perspective, the choices of the "decision making elite" (i.e. wildlife biologists) who dictate the direction of caribou research are also explained as the actions of socialized actors, negotiating their own professional and financial survival through a labyrinth of well-established norms and rigid conventions. One of the institutions governing the work of the caribou biologists is a set of rules for acquiring funding for studies (generally occurring through an externally-dictated funding cycle), the publishing or filing of reports (in language composed for peers and which result in barriers of communication between that group and others), and the supplying of objective information to those responsible for wildlife management. While it is true that aspiring researchers commonly have personal agendas and direct organizational and financial resources to accomplish their objectives, these scientists

also act in a cultural milieu of "professionalism" where individual achievement is linked with rates of promotion, a process which some have pointed out commonly transforms the scientists and field biologists to headquarters mangers (Usher 1986).

How, if at all do agency biologists, working through co-management regimes relate to and interact with communities, and what are the implications of their co-management experience to their in-agency work?

8.4.6 The Incentive Systems of agency and the biologist

I talked with mangers and PCH biologists in interviews and discussed the internal reward systems of their organizations and their personal comfort level and interest in working with communities. Evidence suggests that these conditions described above persist in agencies in spite of the establishment of co-management. While some biologists I interviewed stated that they had no discomfort when working in communities or with locals, others talked about their unease in these situations. Of those who expressed their comfort, one was a biologist of First Nations descent . Another referred to his own work with caribou studies during the Arctic Gas studies and the "training" obtained from the extended periods of time that field researchers spent working from community in those days. As well, many of the managers I talked with expressed similar comfort, having participated in community meetings as part of their regular routine. However, there were agency PCH biologists, who expressed discomfort or displeasure in the work of meeting with communities, preferring that others assume that responsibility.[6] One of these, formerly the territorial PCH biologists, talked about himself as having been attracted to the profession of biology by the idea of working with animals, not people. As he put it, had he had an interest in working with people, he would have become a social

[6] Ushers (1986) thoughtful discussion regarding sociological aspects of wildlife management and their practitioners helps to identify some of the problem areas.

worker. Talking about current demands of wildlife work that expects some interaction with communities, he commented,

> I somehow don't seem to fit into that scene [of working in communities] very much. I guess I'm too much of a new world technocrat. I feel more comfortable working with my computer and things like that. To tell the truth, I always felt a little bit uncomfortable in doing [community presentations]... Although I see the need for it but I much, much rather that somebody else do it. ... Because you only do so many things and do them well.

I also asked biologists and wildlife managers to talk about their perceptions of the internal incentive systems of their respective resource management agencies by inquiring if biologists are rewarded for involving communities in the research process. Based on the statements of these respondents it appears that efforts on the part of biologists to be attentive to communities and efforts to include locals in the research process were viewed in positive terms by most colleagues and supervisors, but that the business of completing quality science was the priority in the tenure and promotion process. What was also revealed in this line of questioning is that among agency personnel, the role communities should assume in management is a matter of internal debate. While none dismissed the idea of local involvement, some expressed frustration with fellow agency members as retaining the "old view" and retaining the elitist approach of former biologists. I return to this point later and how co-management has facilitated agents of change working within agencies.

Also revealed from this line of questioning was the presence of an internal conflict among the ranks of agency biologists (and managers) regarding the appropriateness of some caribou studies and the need to generate new knowledge. These charges were focused both on individual biologists and select agencies. This tension seemed to be located with biologists who are critical of those agencies whose research agendas were perceived to be overly focused on new knowledge production and not attentive to making knowledge available to communities. Those holding these criticism saw themselves as "management oriented" and others as "research" oriented.

I found it interesting that these charges were not restricted to biologists talking about other agencies, but were also expressed as intra-agency critiques. Two biologists stated that fellow colleagues were not sufficiently quantitative or ambitious in their analyses. On the other side of the debate, I identified a PCMB government member and manager who perceived himself as a community advocate in the agency and fighting internally for community change.

> And I'm fighting a bit of a battle inside our department. There are a lot of people there that have gone up through the university system and [fellow associate and member of PCMB] and I have talked about this off and on over the years. There are two kinds of people. There are those people who can put themselves in other people's positions and think about it and intellectualize about it and really come close to understanding what it must be like to be an Indian in Old Crow.

Of those who viewed themselves as community advocates in agencies, several spoke of their own personal transformations which have followed from their experiences with native people in the co-management process and in spending time in community. Some spoke of their role in agencies as tempering the conventional perspective of some managers and negotiating plans which were more sensitive to community needs. As indicated above, several of these managers, who were also more regionally aligned with their responsibilities, were engaged in "battles" with those at "headquarters" or with agency directors of their own offices, with the nature of the conflict described as resulting from the greater agencies' (or particular individuals) in attentiveness of the needs of community.

Some agency personnel who work with co-management bodies either directly as members or indirectly through a support role (i.e. biologist) or alternative membership role went on to talk about their learning from co-management as readjusting their view of wildlife more generally, others talked about how the experience had fine-tuned their own definitions of Traditional ecological knowledge, while several commented on how the experience had developed their abilities to communicate.

> I got to meet some real... First Nations people that live close to the land... I got to meet some people who appeared to be totally honest, warm, friendly, compassionate, polite, concerned. Some real honest people, their amazing politeness in letting other people finish.
>
> I probably got my best lessons in that native people often have a different speaking style, communications style, than non-native people, and I learned very quickly... to keep my mouth shut until that person was obviously finished. Because they think, they take thinking breaks... during what they're saying...they don't just ramble on. They take pauses in their conversation when it appears that they're either letting the point sink in to their audience, or pondering a little bit more about what they just said, or wording what they're about to say so that it will come out as they want to say it, not just blurt it out. It's really quite amazing to listen to them, and to watch the other people around the table who have had experience talking with First Nations people, the people around the table who knew to wait, to be patient and let the person finish. ... And how amazingly ignorant some people were, who were new to the Board, brought in from somewhere else as a resource person perhaps, who every time there was a pause in the conversation they jumped in with their words, not realizing that the First Nations person that was speaking was not yet finished, so, I'm not arrogant about it, but I'd learned and was pleased... [b]ecause sometimes their conversation ends similarly to a break in their conversation. They're actually finished but you don't know unless you wait a minute or so, you can't be sure that they are finished yet. Because the way they speak, the way their words flow sometimes, they'll actually be finished, but they'll finish on a high note which would normally indicate they're about to say some more... that's my perception.

Those managers who have the dual role of being a board member of a co-management body or a biologist working closely with community and being a full-time employee of an agency have the potential of playing an important cost-reducing function in the power sharing process. By teaching these individual the ways of community, a process that is attained through the common bonds of co-management, communities of a co-management process make investments in agency personnel developing the sensitivities and skills of those working within the halls of government. *The cost of training resource managers* is amplified in conditions when there is high turnover rate among agency staff, a situation that is perceived at the local level as a constant flow of government workers. As noticed in the 1993 crisis, agency members also are forced at times in the position to make different choices and at times bear the consequences of making relation with communities.

Again, it is important to consider the actions and perceptions of agency biologists in the context of their cultural settings, a system teaching that proper distancing from the conflicts of democratic process (i.e. politics) through the contribution of new knowledge (e.g., analyses, reports, publish papers) in support of resource management decision making is a culturally acceptable expression of one's altruistic interest in conservation.

I acknowledge that this discussion of the culture of caribou science and wildlife management agencies is brief. What I have sought to demonstrate is the manner in which three studies of Porcupine caribou have been created and evolved under PCH Canadian co-management, and what are some of the societal, organizational, and individual incentives that directed their evolution. I have also provided some introductory evidence that touches on the structures of wildlife management agencies and their supply of resources, all of which speak to the degree of resistance communities face when trying to transform agencies' operations and their underlying paradigms. In the section above, I described the evolution of three research projects which were, in part, the subject of local concerns of the Caribou Crisis. I also provided details about three study projects and how they accommodated or did not accommodate local hunters in the research process. In the section that follows, I delve deeper into the study of community involvement, and look at patterns of interaction between users and agency biologists..

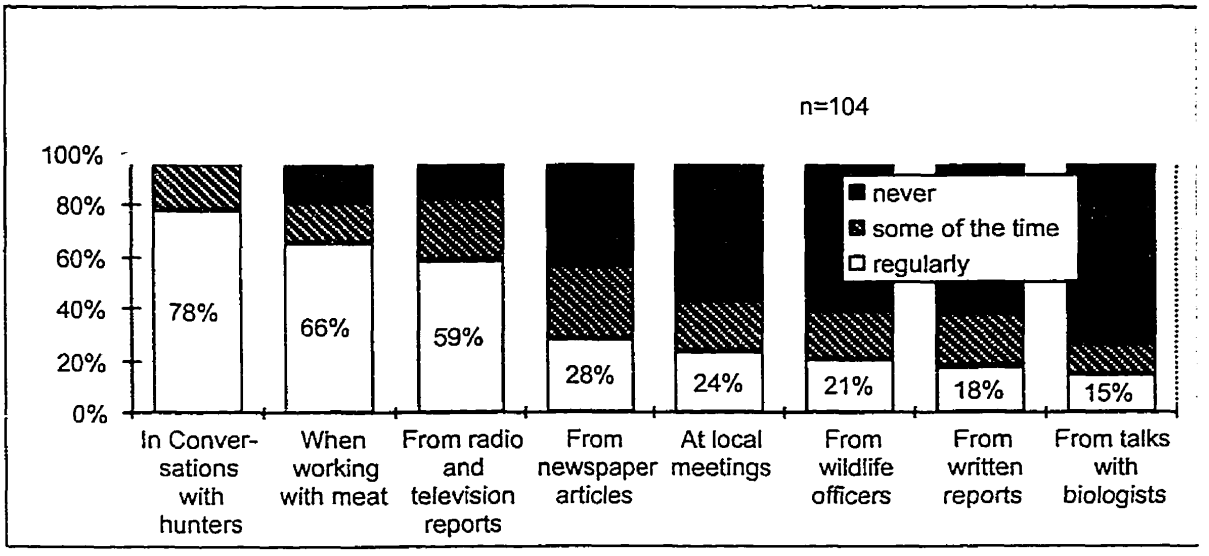
8.5 Accessing Agency Biologists and their Information

What are the costs to community in accessing information about caribou studies and linking with the PCH biologists? In the chapter on communication linkages, I investigated the role of the representatives in linking community with the board, the problems PCMB members face when interpreting technical information, and the costs of reporting back to communities with board information. In that analysis, I described the network communications from the community to the PCMB and IPCB. In that analysis I did not talk specifically about the interface of biologists and community members, how

locals receive information about the health of the herd form these agency workers, and the dynamics of their transactions.

In semi-structured interviews with locals, I also asked how community members hear and learn about the health and status of the Porcupine caribou herd (Figure 8.1).

Figure 8.1 Frequency locals hear and learn about the condition, health and general status of the Porcupine Caribou Herd



Given the direct experiences of working with caribou hunters, and the communication efforts to the PCMB, it is of little surprise that hunters reported that their own experience assessing caribou and their interactions with local hunters, along with reports from radio and TV reports, account for the highest frequency of ways people hear and learn. Notable is the lowest of them, which indicates a lack of contact and communication with biologists and problems when there is contact. Responses to this prompt were frequently reported with an emphatic "never" or "none of the time."

In my presentation of the events of the 1993 Caribou Crisis, I also document the exchanges of information, noting how community members learned of the report of calf moralities with an interpreted map sent to the community via fax and through the reports of the locally elected leader. The Crisis events described how community members, concerned about reports of dead calves, contacted a native PCMB member (also an

Elder), who in turn went on to contact the PCMB secretary, a native-born agency biologist, and a locally-born conservation officer who is also a First Nations beneficiary. In my investigation of the critical incident, I discovered that the board secretary was not aware of the biologist's presence in the community, could not make contact with the researchers, and could not obtain answers to the questions posed to him by the native board member.

While this set of events confirms the communication network reported in Chapter 5, when teased apart it also demonstrates some of the complexity surrounding the assessment of community costs of accessing information. As well, it supports my broader investigations into several of the conditions which are barriers to the transfer and exchange of information in the co-management of caribou research. These barriers are characterized as occurring where there is found:

- Agency unwillingness to share information with communities
- Unwillingness of agencies to share information with the PCMB
- Jurisdictional Complexity
- Impersonal communication
- Limited community infrastructure
- Competing Demands
- Community Disinterest

In the account of the crisis, I noted that agency members (countering the claims of the formal community leader) do send periodic fax messages to some communities about their work. Copies of fax messages outlining agency activities were located in agency and native organizations files. As well, the PCMB regularly uses fax communication as a methods of delivering information about biological finds. Like the faxed map sent by the Alaskan biologists visiting the community during the crisis, these messages are commonly posted in community with only limited interpretation to users, thus leaving it to them to make sense of the material presented (i.e. little one-on-one interaction). I have also discovered that fax messages and written correspondence in general are frequently lost when received at the community level, in part because of a

lack of infrastructure, absence of orderly filing systems, high office staff turn over, and urgency of competing demands.

Biologists' reports on research activities and findings, a ritual of almost all PCMB meetings, are not as frequently made to community members at local forums. In an effort to investigate the patterns of repeatedly expressed concerns to the PCMB, I tracked an October, 1991 report of a native PCMB members report about locals' concern regarding the orphaning of calves. (See Appendix 11.9 for table of coded body conditions transactions). An agency manager and PCMB member, hearing about the concern, responded by directing the biologist of his project to make a presentation at a community meeting. As described in the minutes, the manager would direct the biologist to inform the community about the body condition monitoring project and learn more about local concerns. The locals I interviewed had no specific memory of the biologistís presentation. The biologist, who was interviewed, stated that when he did make the presentation there was, at the time, an internal conflict which appeared to consume much of the attention of the community that evening and no questions or extended discussion with community members occurred at the meeting. Thus the effort was made, but the timing was wrong.

> Agency biologist: It was at public meeting while I was doing one of our collection periods there. There may have been a meeting that was called for another purpose and since we were there I think we may have said a few things. Yeah that's why I did the CO from [that community].
>
> GK: How was that?
>
> Agency biologist: There were a couple of other issues that were considered much more important than the caribou study at that time. And they got all the attention. Yeah, Yeah. It was actually at one point even a bit of hostility between some people.
>
> GK: Internal conflict?
>
> Agency biologist: Yeah internal conflict that had nothing to do with the presentation. Yeah, we get that sometime. Because it is a small town. And there are hard feelings between people.

So in this case, a board-level concern led to an agency response, with an effort made to respond to the local concern about the orphaning of calf caribou by sending the biologist to the community. As noted above, the consultation was delivered within the scheduling constraints of the biologist's field work and travels, and as it turned out, was poorly timed with the events at the community level.

My investigation into similar agency efforts found that an apparent community inattentiveness to agency efforts, as perceived by agency biologists, had tainted some biologists' willingness to allocate resources for community meetings, thus shaping their perspective of community as a "Black Hole." Of those who shared that perception, several agency personnel cited an incident in which federal and territorial level agencies had responded to a local appeal for more information on research (forwarded from communities through an Inuvialuit Co-management body) by scheduling a pubic meeting of researchers of the region. Chartering a plane, the researchers arrived, learned that their event conflicted with a large-pot bingo game. To their frustration, the meeting was, by their estimation, poorly attended (i.e. described as having more researchers than locals). These visits, however, should be understood in the context of biologists spending limited time in communities. Describing a "typical trip," and illustrating the limited time biologists spend in communities, this biologists said,

> Yeah. Say you would arrive in Inuvik you would switch over to Aklavik. You would get there in there in the afternoon. You could have that evening to presentation. Yeah. And you might even leave as early as the next afternoon, and in the morning you might meet with a couple of HTC (Hunter and Trapper Committee) people or with a conservation officer. If there was a regular [PCMB] board meeting, it would usually be stretched over a couple of three days or so.

Problems of interacting with biologists may also be related to issues of jurisdiction. In Fort McPherson I found no record of PCH caribou biologists making reports to the community during the period from 1990 to 1994, apart from presentations made in conjunction with PCMB public meetings, perhaps the result of that village being

within Northwest Territories, whose Renewable Resources Department biologists have conducted few PCH studies since 1989. As well, differing from other communities, Fort McPherson is not a regular staging area for those conducting studies, and thus it is additionally costly for agency members to drop in at a community meeting.

The final problem identified was described by some non-native board members to be a problem of some agencies not supplying the PCMB with details about the research, and thus not facilitating the board's role in the community-government communication process. The problem of "not coming clean with the board," as expressed by one manager, is tied both to the board's dependence on agencies' voluntary supply of information about studies and the limited provisions in the co-management agreements requiring reporting. One example of this situation is illustrated in day-to-day operational terms in the Caribou Crisis when as board's secretaryís expressed surprise and frustration that biologists of Team B were conducting their field work based from the community without notifying the PCMB office. Talking about his own agency's efforts to follow the letter of the PCMB's three-year Management Plan, an agency member described the actions of another agency in the context of the Crisis.

> As I mentioned to you earlier, the only work that [our agency] does on the herd is work that is called for in the Management Plan so they know what we do and we brief the board at every meeting on the status of the projects. But what happens with [agency and biologist] is they got their own research interests and will make sure that [biologists name] reasonably cover up for all the things he's suppose to do in the Plan, but does these other things as well, and sometimes doesn't notify the board or will show up in [name of community] and I don't know, It's as if [the biologist] hasn't learned from the mistakes he's made in the past or whether he understands all this and I sometimes feel that (Biologist) doesn't understand the value of involving local people and it's going to have to hit him right between the eyes one of these days before it finally sinks in.

Thus we find that the problem associated with locals accessing information is *external* to community to the extent that agencies choose to "not come clean to the board" (quoting an agency manager and PCMB member) and *internal* to the extent that communities are not focused on the problems, and have limited resources to investigate

the issues and interpret the work of researchers. These problems are, of course, underpinned with the deeper ideological issues described earlier.

8.6 Influencing the Work of the Co-management Board

Given communities' lack of direct involvement with agencies in the design and implementation of research studies, users are constrained in their choices of how to access caribou biologists. Communities therefore utilize the board as a primary means of interacting with agencies about the status and well-being of caribou. The PCMB is important to communities as a venue for sharing local caribou observations, influencing the work of agencies, and learning of the findings of biologists. As well, the board affords a place for local knowledge and the work of science to be compared, contrasted, and at times melded into policy recommendations.

At the level of co-management board transactions, communities anticipate and incur several types of communication costs which are similar and in some cases in addition to those costs listed earlier. Several of these are well illustrated in the ethnographic account of the 1993 Crisis and include the *cost of asserting local knowledge, the cost of accessing information from specialists, and the cost of deciphering new and foreign information* (see Table 8.2). What is not clear from the 1993 Crisis is how such costs occur as patterns in co-management decision making, a question which is central to understanding both power sharing and how costs can be cumulative (e.g., how repeated efforts by locals to express their knowledge can change their willingness to share such knowledge, which is a cost incurred by leaders who wish to engage apathetic community members in decision making.) Drawing on my content analysis of board meetings conducted in several topic areas (i.e. collars by the board, contaminants body condition studies, policy discussion regarding the approval of research), I discover transaction types which reflect activities of power sharing and power holding.

Table 8.2 Examples of Community Costs in the 1993 Crisis	
types of costs	***illustration from the Caribou Crisis***
The cost of asserting local knowledge	Local hunters express local belief that muskoxen have a negative effect on the migration and total population of caribou (at the November, 1993 PCMB meeting).
The cost of accessing information from specialist	A PCMB member and locals attempt to get details from agency biologists regarding the "dead calves with collars."
The cost of deciphering foreign information	Elder PCMB member sorts out the difference between Cadmium and a dyadic cyst.

At the PCMB meetings described in ethnographic accounts of Chapters 1 and 7, I document examples of local hunters attempting to communicate their knowledge and understanding of caribou for use in the on-going monitoring of the herd and for board-level decision making.

In "The Decision to Affirm" in Chapter 1 of this dissertation, I describe how native board members reported that local hunters observed caribou wearing collars being shunned by other animals of the herd. The locals believed that these collars were not in the best interest of the animals' well being. In the account of the 1993 Caribou Crisis, I describe that PCMB members mention to the board that muskoxen have a deleterious effect on caribou. In another PCMB meeting (not described in either of these ethnographic sketches and occurring in April, 1993), I observed a locally elected leader of Fort McPherson who reported to the board about his people's hunting rule allowing vanguard members of the herd to pass and settle before the commencement of community hunting (previously discussed when describing local systems of management; generally referring to fall migration). At that same meeting, the local leader went on to communicate his First Nation's request that the PCMB recommend that a

seasonal closure on fall hunting be imposed in the area of the Dempster highway to insure better availability of caribou to the community. And in the 1993 Caribou Crisis, I also describe how locals expressed concerns about the orphaning and potential mortality of young caribou related to the caribou body condition monitoring study.

In some cases, I observed that expressions of local knowledge were framed as questions for the apparent purpose of inquiry. In others these expressions were to direct the activities of the co-management bodies, agencies, and hunters. And while the basis of assertions differ from case to case (see Table 8.3), all illustrate community efforts to communicate local knowledge with the hope that local perspectives would be viewed as sufficiently legitimate to merit their consideration and be incorporated in the management decision making process. [7]

Table 8.3 Assertions of local knowledge in co-management board-level transactions

Assertion	***Basis of Assertion***
Muskoxen-caribou competition	Based, in part, on knowledge of elders of Banks Island and reaffirmed with recent eruption of muskoxen populations which are correlated with dramatic caribou decrease (Larter and Nagy 1997))
Caribou with collars are shunned by other caribou	Based on direct observations by several hunters of Old Crow and Fort McPherson and coupled with understanding of caribou social behavior and institutions against handling animals
No hunting of vanguard caribou	Traditional hunting rule, commonly followed across the circumpolar north.
Captured and collared and orphaned calves are subject to high rates of mortality	Based on rules regarding humane treatment of animals, population conservation, energy needs of caribou.

[7] While some of these locals' statements are expressed as preferences, all are described here as "knowledge," since all are based on an understanding of the workings of the world -- integrated through community's inductive process of making collective observations, interpreting those findings, comparing with theories, and translating them into choice.

How then are these aspects of local knowledge expressed to the PCMB? How do non-local board members respond to local hunters' expressions of local knowledge? How, if at all, is local and scientific knowledge about caribou synthesized at the board level? What are the communication patterns of these transactions? And how are these transactions together incorporated in decision making?

I have noted that transactions of a power-sharing process are concurrently unfolding on multiple dimensions. These occur at the individual-to-individual level (e.g., between two actors or among board members as a group), through symbolic exchanges of organizations, (e.g., selection of membership to the IPCB by federal governments) and at a societal level (shifts paradigms or transformation of overarching institutions).

To understand the patterns of these kinds of discussion in more detail, I examined the transactions of actors at co-management board meetings. I identified the roles managers and caribou users regularly assume when interacting at board meetings, and reviewed types of decision made by the board in this topic area. A summary of these are presented in Table 8.4.

Table 8.4 Roles assumed by actors in co-management of caribou research

Community representatives	*Government representative and agency personnel*	*Secretary and Chairperson*	*Types of board (collective)action*
• inquire about studies • dispute findings • inquire about status of caribou • express concerns about methods of study • share observation of herd	• announce study • share observation • explain study • report on research findings • inquire about study	• recount history of events • state policy • maintain agenda • closes decision • pose fundamental and technical questions • Restate report of biologist in less technical language	• educate locals • state policy • pass resolution • make recommendation to Minister • consult community • endorse project • initiate new study • request information • disseminates findings of study

Focusing on individuals' roles in board meetings and drawing on content analysis of board minutes and my observations, I find that government members and agency biologists function in several capacities. As noted in the review of the three case studies

of caribou research projects, managers and biologists at the board level (members as well as agency staff) repeatedly assume the role of announcing the initiation of new research projects. They also respond to questions from board members about caribou research and explain the purpose of research activities, present findings about caribou studies and expound on the theory of caribou ecology. As well, these people occasionally share their own field observations of caribou. The secretary/treasurer and the chairperson (i.e. either the board chairman or the alternative chair who is a regular PCMB member) recounted the actions of the board, posed questions about caribou research to caribou researchers, asked community members for clarification, and stated or restated board policy on caribou research. The PCMB Secretary in particular was observed recounting the history of caribou research to board members and posing questions to government board members about their management practices, which on some occasions forced the full membership of the board to question why specific research activities were being undertaken and what their overall contributions to management are. The board chairperson assumed leadership, directed the agenda and discussions, served as the time keeper, guided the board's consensus process, and marked closure to board-level decisions. Community representatives, on the other hand, requested explanations of research activities, expressed concerns about research methods, shared personal and fellow community members' observations of caribou, and stated community needs to address key questions in research.

Decisions of the board in the area of caribou studies fall into several categories – decisions to educate or inform locals about the work of caribou research, initiate or recommend more research, consult with locals about their concerns, consult with agencies for information, and request by key caribou researchers who are not board members to attend board meetings. This list is not intended to be all-inclusive, but reflects general decision types and recurring roles that were commonly assumed by key players.

8.6.1 Synergistic transactions and lost opportunities

There were several transaction types which help to illustrate the dynamics of the co-management decision making process about caribou studies and the community costs associated with the 1993 Caribou Crisis. These fall into two broad classes: those which are "synergistic" in facilitating a process of power sharing, and others that are "lost opportunities" in that they did not appear to build trust relations, and are best characterized as power holding.[8]

Synergistic transactions and the process of the melding of knowledge systems in caribou management are defined as those communicative transactions in which there are mutual exchanges in dual forms of knowledge about caribou and animal-human relations. Typically, but not always, these transactions were found to include a process of discovery for locals or mangers, and allowed for some kind of collective learning or the reframing of problems. Topics in this type of interaction were generally focused on the caribou resource and initiated both by hunters or managers. I label these events as synergistic transactions in that they were, on the one hand, complementary, and at the same time, expressed as differing perspectives of the same phenomenon. In some cases this process generated new questions which had not yet been considered by participants of the discussion.

As noted in Chapter 7, synergistic transactions are similar to what Berkes (1981) described when considering the potential of power sharing arrangements, and are characterized as synchronic-diachronic data set exchanges by Osherenko (1988a; 1988b; 1988c). Through my content analysis of board minutes, I identify several such events occurring at board meetings. Listed below are two of them.

> November, 1986 PCMB Meeting: Biologist reports that 50 or 55 caribou collars appear to be in Alaska this year, and much of the herd seems to be wintering in that area. Local tells that that meat from animals is poor

[8] Lee (1993) uses the term "synergistic" in a different, but parallel manner in his discussion about science and politics.

> because there has been a lot of rain and ice, causing herd to shift habitat and re-select over-wintering area.
>
> June, 1987 PCMB Meeting: Local reports that caribou are fatter this spring than last fall. Biologist confirms observation with body condition study. Conditions puzzle biologist – who ponders rate at which protein and fat are metabolized.

For government board members these events were described as some of the more laudable moments of their PCH co-management experience. Describing these exchanges as a process of interactive learning, one manager commented:

> [A Biologist/board member] gets up there with a flip chart and the slides or whatever and does it, and a native member will stand up in the room and he will say some things that are related to this but [the biologist] didn't cover that. And it tweaks something in [the biologist/board member] and he says you know, and then he brings a whole bunch of other scientific information which supports what this native person is saying. So [the biologist/board member] may have given some information on population fluctuations and habitat and things like that. This native person stands up and says, you know, I saw a wolf do this. And all of a sudden it brings another whole bunch of scientific information from [the biologist/board member] that he didn't cover before that has to do with wolf predation at certain times of the year or something. They both fit together. And some of the things which [the biologist/board member] says triggers native people to say some things and vice versa. And all the information starts coming out around that topic. And it helps the board decide what it's going to do.

Clearly, agency managers were developing skills from their co-management board experience which allowed them to interpret and learn from the community hunters with whom they interacted. These skills seemed to vary from individual to individual. As discussed earlier, these skills in turn enabled those who learned them to function as change agents within government bureaucracy.

One native board member spoke of his own efforts successfully to combine knowledge systems as an empathic process, and described his hopes for the creation of a dual system of resource management. In the quote below he touches on the need for this effort to incorporate a bi-cultural perspective.

> Not being a biologist, I usually try and put myself in their position and to feel for myself where they're coming from and try to accommodate my own as well. I think it would really be unique to use two different methods, two different wisdom and knowledge, two different traditional ways of doing things and putting them in one and find out what the results are. I think the

> opportunities are there and I think it's to take advantage of those opportunities and finding out what that biologist has done, his educational background in terms of my own educational background.

These types of exchanges most commonly focused on the topic of caribou body condition monitoring. Such transactions were generally launched with an agenda-scheduled report from biologists about their recent field work findings (regularly presented in generalized and qualitative terms). Familiar with local environmental conditions, native board members who are also active hunters regularly augmented these reports with their own observations of caribou body condition, talking about the geographic location of animals with differing body condition, and providing a degree of resolution in the monitoring that biologists were not able to assess based on their small sample collected in a single area and within a relatively short period of time.

I also observed cases in which local board members indirectly questioned the findings of researchers, which I will consider in positive terms here. One example twice observed was when a native member reported that his own cow:calf ratio studies (conducted while in the field, hunting) differed dramatically from those reported by a biologist after conducting an agency sponsored count. This comparison of experiences, while on one level challenged agency findings, is also an important cross-check and balance, and an informal system of internal accountability.

8.6.2 Lost Opportunities and communicative disconnect.

While positively synergistic interactions, particularly about the topic of caribou ecological knowledge were regularly observed events at board meetings, I also documented conditions which appeared to be a kind of disconnect; unsuccessful communication efforts between biologists, mangers, and caribou hunters. There were also times when the conclusions of hunters and biologists differed radically. To generalize, these efforts (based on the statements of participants) occurred in a number situations and in several patterns of exchange. One of the situations occurred when a native member presented knowledge with an elaborate (i.e. long and non-linear) story

line which managers described as "hard to follow" or off topic. Conversely, I also observed other communicative exchanges in which the biologist initiated a lengthy presentation (generally about a more theoretical aspect of caribou ecology) which lost locals' attention. In one such case, PCMB members were discussing the implications and possible causes of the recent census findings showing a decrease in the total number of animals of the herd. Using a flip chart and drawing an x-y axis, one board member/research biologist went on to explain the significance of cow body condition to a decrease in caribou population. As I (and two non- native members interviewed later) noticed, shortly into this technical presentation, three native board members left the meeting table, gathered at the side of the room by the coffee machine, and in their native language, had their own discussion.

A more in-depth review of community members' observations of shunned collared caribou and those of a biologist also highlight how differing perspectives can lead to differing conclusions. It also highlights how on-the-ground observations made by hunters can contrast with observations made by caribou biologists whose modern-day work generally provides a view of the animals from aircraft. It is also interesting to note that after locals shared this observation, a biologist mentioned his own observation that caribou wearing collars appear to behave differently from other caribou, evidenced by his experience that collared caribou, being approached by aircraft for capture and release, run from the aircraft in a different direction from other caribou (i.e. these animals separate themselves from others animals.) While the hunters believed that caribou were shunning their collared comrades, the biologist went on to speculate that caribou had a learned behavioral response to the sound of engines, and commented that the hunters were likely observing collared caribou responding to the sound of their snowmobile motors, thus giving the appearance of being shunned.

What is suggested from these limited observations? Findings from other studies show that achieving innovation at multi-cultural and inter-organizational environments is

facilitated in conditions where there is a balanced level of structure, conflict, and informality (Brown 1983). In PCMB meetings, it appears that a commonality of language, shared constructs for learning about the resource, commonly accepted methods for achieving understanding, (monitoring the herd vs. researching and making predictions about the herd) could facilitate the type of synergistic power sharing described above; yet some tension in the systems maintains good accountability between parties. In other cases, it appears that community efforts to express local knowledge to researchers appears from locals' perspective falls on deaf ears.

According to several board members I interviewed, maintaining an open and cross-cultural atmosphere for discussion about caribou research was at times consciously managed by the board's chairman. On one occasion, the board chair requested that government members not sit together so as to avoid their technical discussion with exclusive terminology dominating meetings. On another occasion I heard the board chair ask non-natives to stop "talking technical." Recalling the quote of the community member discussing participation in public meetings in communities, this problem is related to those who talk in "high language." At board meetings and among board members, the *cost of managing the technical talk of specialists* represents an on-going area of community effort. Underlying all these problems are differing ideological perspectives which lie at the center of culturally defined notions of legitimacy and definitions of truth.

Reflecting on the elder who in the November, 1993 meeting asked the difference between cadmium and the dyadic cyst, it is evident that *the cost of crafting common constructs* continues to be problematic at the board level in spite of efforts on the part of the co-management body to make information accessible and the long-term continuity of native membership. This condition also raises the question regarding who incurs the cost of change. That is, is it incumbent on the biologist to modify (i.e. make more

accessible) his or her language to accommodate the hunter? And to what extent should the hunter be expected to become conversant in the terminology of biology?

Viewed from a more micro-analytic frame of transactional analysis,[9] the 1993 Crisis account illustrates several transactions in which locals' understanding of caribou (commonly expressed as concerns and questions) are shared at the board level, receiving a response from scientists. One is the biologist's choice to reply to assertions of local knowledge with statistical evidence. Another is responding with the need to educate community members or supply them with additional information. (See Table 8.5)

Table 8.5 Observed and Documented Hunter-Researcher Transaction Types as illustrated in the Caribou Crisis

hunters' statements	*observed manager responses*	*examples of this transaction from Ethnography #1 and #3*
Local expresses concern, shares observation, or poses a question.	Manager responds with statistically based explanation.	Biologist at public meeting shares results of research conducted as supplement to Body Condition Monitoring Project and current population status of other herds which have Muskoxen.
	Manager responses with need to conduct more studies or investigate in more detail.	PCMB formulates research proposal to study traditional and scientific knowledge of caribou related to highway disturbance.

Examples of these transaction types can be identified as occurring at the November, 1993 meeting when locals expressed concerns about the orphaning of calves, and the biologists responded by presenting the statistical evidence of calf survival. Board minutes indicate that a similar exchange on the same topic occurred at a PCMB meeting in October, 1991. While locals focused on the hardships experienced by the young

[9] Transaction Analysis is a field of psychotherapy in which exchanges are assessed with respect to the dominant- subordinate roles assumed by actors. Here I use this term liberally, to describe the power dynamics of communicate exchanges where paradigms differ.

animal, the biologist, who trusted the results of the research on calf survival, focused on the probability of the animal's survival.

The repeated concerns about caribou collars are among the most frequent and interesting of those I have described. Based on my content analysis of board meeting minutes and my observations, the November, 1993 meeting marked the sixth meeting in the period of eight years that locals commented or questioned about the use of caribou collars in studies. It is likely that there have been more.

This pattern leads non-native board members to speculate why locals repeatedly ask about collars and have not reconciled the issues concerning their use. Clearly, non-native board members were aware of the repeatedly expressed concerns of locals. As two government board member put it,

> It's a perennial question about radio collars you're asked to answer every time you go to a community meeting. "They're too big," or "Why do you use the radio collars anyway?" And the frustration, of course, is after you explain it to them everything makes sense. Then you turn around the next day and the same question comes back.
>
> No matter how many times you explain, well, if we didn't put radio collars on the herd, we couldn't tell you the population size even, or we couldn't have any confidence in telling you what it is.

Through my unstructured interviewed, I documented some of the ways non-native board members describe why these recurring patterns persist.

8.6.2.1 Community ignorance and the need to educate hunters.

> A lot of the problem is based on ignorance. And that if the hunters in these communities got a receiver and understood how it works and understood what kind of information we can get from this. [pause] They don't understand that in many cases. They just see this collar on this animal and then you hear stories about how this animal was off by itself and it's not in the group and they think it's being ostracized. Maybe it is, I don't know. But it was just designed to get them more familiar with the technology and reasons behind using it.

8.6.2.2 One or two outspoken individuals; and the notion of a "community opinion" and locals' perception that there is little need for research.

> [The collar issue] comes out at the public meeting. But one-on-one they never tell me. I don't know if they are just too polite to do it. And I don't

> know if there's such an entity as a community concern. One person will get some bug that he doesn't like and we never hear about collaring, but I had talked to [local hunter] and he said he was collaring every animal, then he knows where the hell they are. So, you start to wonder if it's a community concern or two local individuals. The users' perception of there being no reason for research I don't think many people in the community think there's any reason whatsoever to do any research on the herd. And maybe if it doesn't affect them directly, they shouldn't be blamed for that.

8.6.2.3 Caribou collar as the tangible object of locals' frustration and the capturing of the animal's spirit.

> It could be just their lack of knowledge as to what's going on, and radio collars are the only manifestation of that they can actually see and feel. I mean, we can talk about body condition studies and that doesn't mean anything and they can't see it. And there's the collar attached to the animal. So maybe, it's just an outlet saying, "we're kind of frustrated. We don't know what the research is all about?" I don't know, maybe it's as simple as that. It's the personification of research that they can see if front of them. They can watch caribou and they can see a collar. And maybe, it's deeper than that in the sense, you know, that somehow, we've changed the caribou because we've captured its spirit by putting a handmade collar on it. They just, basically, don't like it.

8.6.2.4 Historic parade of researchers.

> Part of it is the frustration of a long line of researchers going through [community]...And part of it was the rhetoric that was used to negotiate the Porcupine Caribou Management Agreement and the Land Claim Agreements and you see this in all native communities. The rhetoric that is used is often a bit different than reality.

8.6.2.5 Youth embracing idea of traditional knowledge, but not knowing traditional ways.

> The breakdown in Aboriginal society, as a result of mission schools and all the things that happened to them over the past fifty years,... only a few people are left who know the traditional ways and you've got all these young people who are trying to embrace the traditional ways and away they go - they don't know anything about it but boy it sure sounds good and away they go.

8.6.2.6 The political struggle between natives and non-natives.

> It was more than just methods. Part of it was the struggle between traditional knowledge vs. scientific knowledge. Which one is going to carry the weight.

These quotes, although an incomplete account of how non-native board members understand the problem, do shed light on the range of perspectives of some agency representative board members about the collar problem. They also allow for some comparisons with the locals' perceptions of caribou management activities and their perceived research needs as documented in a previous chapter.

With respect to locals feeling that there is no need to do research, I reported in Chapter 6 that among those members of the communities I interviewed, most do see the need for caribou studies (population counts, contaminant studies, migration studies, etc.), yet at the same time many would like local members to have a role in the research program, and be acknowledged and respected for their ability to contribute to a body of knowledge. As well, there is a strong sentiment among locals against research which they perceive has no apparent management application. With respect to the managers' perceptions that "a few outspoken individuals" voice the views of only a few, my findings indicate a near even split among those I interviewed on whether collars are acceptable or unacceptable. The quote of this manager makes the important point demonstrated in Chapter Seven; that local community members, like members of the biological community, are not monolithic in their perspectives about various management topics. This diversity of perspective is not acknowledge by some locals and adds a suite of difficulties to the process of co-management.

Finally there is the strategy that "educating locals" will resolve the problem of hunters "not understanding" the need for collars. This perceptions is, perhaps, a simplification of a problem that is clearly ideological, political, and organizational, and at the same time spiritual. This multi-dimensional issue raises the question of whether and how a co-management process can ever "demystify" information, given the cultural differences. While not appearing in older dictionaries, demystification is described by Rothschild and Russell (Rothschild and Russell 1986) and Rothschild and Whitt (1989) as distinguishing collectivist organizations from those that are bureaucratic in structure and whose activities are centered on specialization and professionalization. Rothschild and Whitt define demystification as "the process whereby formally exclusive, obscure, or esoteric bodies of knowledge are simplified, explicated, and made available to the membership at large. In short it is a central tenet of any idealized democratic process.

Striving to demystify the work of science, the PCMB has made numerous efforts. Among these is the publishing of a "Technical Report" (PCMB 1989), which distilled the language of biologists to basics with the hope that the report would help relay the essence of biologists' perspectives. Yet after reviewing the published work, board member responded that the final product was "too technical" for community members to understand. In this case, the effort to demystify science failed.

The board has also made some efforts to initiate its own research projects as a means of facilitating a process of shared learning, albeit only few initiatives, and with only minimal success. One of these was followed from concerns regarding Dempster Highway hunting and the need to allow migrating vanguard caribou to pass in the fall. This effort led to the writing of a research proposal (by an agency biologist) which allowed for the inclusion of traditional knowledge that was later distributed to communities and agencies. Only one community organization ever responded in writing to the proposal (positively) and two biologists from the adjacent jurisdiction critically reviewed the proposal and stated that it was not worth funding. In an early case there was interest among biologists in assessing historical changes in PCH populations. Community board members were sent back to their communities with a questionnaire be used in interviewing elders. That effort, which provided no support beyond two to three days of honoraria payments and the list of questions, resulted in a short discussion at the following board meeting. Finally, the board was approached by a university research who asked to collaborate with the PCMB in a project on the impacts of fires, an issue of interest among some community members after an especially harsh fire season. Unaligned with agency dollars, the university researcher and the PCMB never obtained funding.

In short, beyond board level discussions as a forum for the sharing of knowledge among community members and agency biologists, and the work of the body conditions monitoring study which includes the hiring of locals, there are few opportunities for a

discursive process of knowledge and power sharing among community members. As well, there remain on-going and continual issues which seem to repeat themselves in the system.

8.7 Managing the Board as A Social Unit

From a broader and more political perspective, the literature of democracy has for some time addressed the potential emergence of a decision making elite (Michels 1960), and included on-going debates regarding the potential of democratic organizations to avoid political leaders usurping the ideals of collective decision making for personal gain (Pateman 1972). Brown's (1992) work, focusing on conflict at the organizational interface, provides insight into those conditions in which an interface organization (i.e. board, council, committee) may become homogenized in its members' view, and distanced from constituency groups. Brown writes that homogenization occurs when the perspectives of the interface organization representatives, functioning as independent social units, depart from the groups they are intended to represent. These conditions are characterized as being the result of an impermeability of communication boundaries between the interface organization and constituency groups and a resultant shift in the perceived identity and allegiance of original members to the interface group.

This issue points to the dual roles representatives assume as members of their original organizations (agencies and communities) and as members of the co-management (interface) body. Assuming two roles means these members are both change agents (i.e. representing their respective groups and advancing their group's interest) and change targets (i.e. being the object of group discussion and individual objectives). Brown also notes that assuming these trans-boundary roles can lead to suspicion on the part of single-role, home group members who may question the loyalty of those sent off to represent them at the interface organization.

On the other hand, cross-cultural communication is best facilitated when those serving as interpreters have cross-cultural experience and, thus dual perceptive. Those who join an interface group bring a rich perspective with them both to the new group, and back again to their home group.

In my analysis of the 1993 Caribou Crisis, I have presented an account of decision making in which board members called an in-camera (members only) session after encountering a crisis situation (i.e. after hearing local concerns regarding caribou studies as espoused by non-board community leaders and facing the unanticipated visit by pro-development government personnel.) In the account of the Crisis, I also documented the internal dynamics of the board decision making, and the dilemmas community members faced when making their final decision to endorse future studies which used collars. As well, in a previous chapter I described problems related to communication linkages between community board member and communities, and the emerging, but not-altogether functional process of local representative- board reporting.

This evidence from the PCH case study grounds the discussion of problems associated with a co-management board maintaining its closeness to resource user communities, and avoiding the potential of homogenization of board members' views. Framed from a community perspective, the problem is associated with issues of accountability, and points up the potential for local board members to become socialized through the on-going experience of working with agency members to a set of values that are out of step from those found at the community level. A situation in which agency managers, who spend limited time and must rely on local board members as key their contact, adds to the problem. Had homogenization of perspectives occurred among PCMB's membership? The answer is not simple.

As described by several non-native board members, one of the informal but intentional objectives of the PCMB has been to develop a strong sense of trust and

camaraderie among its membership. Several methods have been used to facilitate this process, one being that board members travel as a group at least once a year by means other than air, to provide more contact time and shared experience with board members. Travels to community have been organized as boat or road trips. One which I joined was a highway journey up the Dempster to a meeting in Inuvik with an overnight at Eagle Plains.

Another way the PCMB has developed a sense of group is via the "horn hat" referenced in Chapter One and again in the introduction to Chapter 6. The use of this hat is illustrative of one aspect of the organizational culture of the PCMB, which was engineered, in part, to create a distinct sense of identity. Through these commonly shared experiences, members tell how more intimate relations are said to have developed, and a more in-depth understanding of board members' individual lives were appreciated. Talking about the board as a social unit, one board member (non-native) spoke of the boardís collective membership metaphorically as being like a "clan." After the in-camera session at the November 1993 meeting, another board member referred to the board's need to meet in private as the occasional need to "tend to family business."[10]

The emergence of the co-management board as an independent social unit is both unavoidable and potentially costly to communities which seek to influence board level recommendations. The inevitability lies in the fact that the board is directed to function as an independent organization, with members being accountable to the agreement and not the signatories (except where authority is directed specifically to native organizations, communities, ministers, or government). Indeed, government members stated that they regularly look to the terms of the agreement for clarification when in situations of role conflict. Non-native members also referred to another regional co-management board which has no government representatives as a "renegade" and a

[10] In a study of the British Columbia Round Table on the Environment and the Economy, problems associated with that organizationís internal focus are explored, suggesting that the emphasis on internal activities contributed to its eventual decommissioning (Kofinas and Griggs, 1996).

"run-away board" (meaning that it had deviated widely from the interests of its government, with its recommendations not taken seriously by government.) I suggest that the opposite is possible with respect to communities; a board can be captured by government and lose sight of its responsibilities to communities.

Can it be argued that the PCMB's native membership departed from the interest of community members by supporting a resolution which approved the on-going collaring of caribou? (Resolutions found in Appendix 11.10.)

One government representative noted how native board members' perspectives on the use of science in resource management and their perceived need for "good information," is transformed when serving as members of joint management bodies. To quote him,

> ....you take a group of native people and you put them on a board and you give them the mandate to make decisions based on information. They want damn good information. They want this information. I've seen this with the Porcupine Caribou board, the Mayo Council, the Fish and Wildlife Management Board,... Once they're part of the management process, and decision making process, they realize the importance of this information. But when they're outside of this process, they have some fundamental problems with it. And it's largely an attitude.

In the account of the Crisis, I document how board members had gathered information about the use of caribou studies and explored the decision regarding collars in some detail, albeit in a private setting, and in the end concluded that, given the limited choices, caribou studies involving the use of collars were necessary to meet the conservation objectives of the agreement. Yet the method used to communication this decision to community members is more suspect when considering that at the next meeting, the PCMB began addressing the problem of collar concerns by initiating an "adopt a collared caribou program" which sought co-sponsorship (i.e. community funding support) for a satellite collar program that would tell locals where the caribou are located, thus reducing hunting effort. In some respects, the board can be said to be engineering community support by demonstrating the usefulness of collars to locals. What was not

discussed publicly at the November public meeting or regular PCMB meetings was the dilemma associated with the use of radio collars and the implications of the various choices. If anything, those at the board level had a broader appreciation of the trade-offs regarding the collar issue, and the proposed moratorium; and consequently made a decision to frame the need for collars in a manner that resonates with the interests of local hunters.

8.8 Broadening the Scope of the Arrangement

Finally, I turn to the question of what function the PCMB assumes in directing the research approval process and what, if any efforts have been undertaken to widen its role in this area. I also examine briefly what happens when community representatives and leaders make collective decisions in a co-management process, a topic which has implications to enforcement and compliance.

According to board minutes, the board's role in the research approval process has been an on-going issue and source of frustration for some. In 1992 these events came to a minor boil in a pre-crisis, (i.e. an antecedent to the November Crisis) when Agency B announced that it had received funding for the body condition research project. Discussions among board members about the role of the board in the research approval process surfaced, not as a result of the direct calls at a board meeting for power-sharing by local board representatives to government members, but as indirectly mediated through a statement appearing in the PCMB's minutes that referenced the board's role in the research process as "an enigma."(PCMB 1992). In the process of reviewing the board's draft minutes, a decision and an agreement among parties followed in which agency members noted the value to this sort of funding in maintaining an on-going research program; and the realities they face when working within existing funding cycles and the costs of not pursuing funding opportunities as they became available

(e.g., "mad money"). According to the minutes of the following meeting, an agreement among board members was struck whereby it was acceptable that agencies would seek such funding with an understanding that agencies would *report* on their research activities to the board.

As the 1993 Crisis indicates, the 1992 agreement did not resolve the problem, since lines of communication between the board (especially its secretariat and its community representatives), agencies, and community leaders and community members resulted in frustration and anger on the part of several parties. As was observed, the fall 1993 events and the November PCMB public meeting were also a catalyst, changing the informal policy of how those involved would related to the board and their expectations of the function of the board in the management process. This change is summarized by a caribou researcher/PCMB member's quote below, and illustrates explicitly that while the outcome of the Crisis had achieved a commitment of the biologists to conduct only those studies of which the board approved, their willingness also came with a "price" to the board as a whole, and to its native members.

> So, how do I get my research approved? I don't ask anyone. If I've got funding, I do it. I don't ask [my supervisor] whether I can do this or not. My approval comes from whomever I'm asking for funding. So, I'm pretty independent that way... Okay, but the change last year [i.e. the PCMB's decision at the Crisis meeting] that I've resolved myself is that...I won't do [caribou research projects] now, unless the Board formally approves it. But then they have to support it also. If you want to approve it, it comes with a price. Cause I've got a little tired of every time there's a research question, or slamming this piece, or all the eyes were turned to me and I'd have to get up to support it... [I]f the question comes again, I'm just going to go look over at [the board chairman]. And he can answer it. If it gets technical, I'll answer it. So, I guess I held the title of approving research. But I still say [the PCMB] can't [approve it] anyway... I mean if the US decides to do something it will.

Thus the relationship between community and the Canadian government as facilitated by the co-management body had been transformed. Community expressions of discontent had, indeed, not been ignored, but prompted a re-evaluation of the terms with which PCH management agencies and the board would work together in endorsing

caribou research, and with the informal understanding came an expectation the board's membership would assume a *cost of supporting the board-level decision.*

8.9 Internalizing the Duties of Regional Authority

This leads to the final area of costs considered in the dissertation; costs incurred by community when self regulating activities under co-management. This type of cost has direct relevance to the problem of enforcement, monitoring, and community voluntary compliance under co-management.

Elsewhere I have addressed this type of costs as related to Dempster Highway hunting (Kofinas 1997) ; a brief discussion of that case study is helpful in illustrating the costs of self-regulation. In the Dempster case study, the PCMB's recommendation that native hunters voluntary comply with a no hunting corridor was never widely practiced by local hunters and subsequently, community highway hunting has been described both by community members and outsiders as a free-for-all.[11] In the Dempster Highway case, the failure of community to self regulate is similar in nature to the problem articulated by the local hunter of the 1993 Caribou Crisis who expressed his unwillingness to tell his local leader of his differing view on the need for research in fear of making "bad friends." Said another way, the intra-familial relations of community life in small communities and the institutions of conflict avoidance add to the challenge of community self regulation under co-management. Conditions of eroded community authority systems, coupled with local leaders encountering limited support from governments to be responsive and recognize non-legally binding co-management recommendations (like GNWT in the Dempster case), amplify community enforcement costs. The two quotations of hunters of focus group discussions about the Dempster situation highlight the coincidence of the

[11] The assertion of local knowledge by Fort McPherson hunters that vanguard caribou be allowed to pass and that the PCMB move to institute a hunting closure was a response to the failure of the no-hunting corridor recommendation and an effort to avoid herd displacement in the winter season.

anticipated *cost of "squealing"* with the *cost of leaders enforcing fellow locals when having limited recognized authority.*

> Not very many people want to go to court and squeal on one another
>
> If we, just the seven of us from the [local organization] say we are going to go out there, people are going to laugh at us and say, I have a right to shoot caribou.

Costs associated with internalizing enforcement responsibilities have implications when relocating authority from agencies to both the co-management board and the local level, and support Perrow's (1986) argument that changes in transaction costs from the integration of management are not always reduced (i.e. made more efficient), but simply relocated. Of course, if and how authority is assumed at the local level is dependent upon the extent to which community representatives and other community leaders elect to endorse publicly board-level decisions (and incur the associated costs). Alternatively, local representatives may simply choose to not align themselves with board-level recommendations when interacting with fellow villagers.

In the case of the 1993 Caribou Crisis, evidence indicates that community leaders and board members alike, assumed the responsibility of supporting caribou research and in doing so, were forced to negotiate the internal conflicts associated with the pro-moratorium informal leader.

Finally and importantly, community costs of co-management must be put in the overall context of small communities facing the dilemmas which come with on-going efforts to extract the region's resources and put caribou at risk, a condition which bonds the group and, at times, amplifies the costs and limits the choices.

8.10 Summary of Findings

In this chapter I have drawn on seven categories related to community involvement in co-management to deconstruct the account of the 1993 caribou crisis, and augmented that analysis with additional evidence about the PCH case study. They are

- •Working within formalized co-management agreements
- •Overcoming a history of mistrust of science and researchers
- •Transforming the culture of wildlife management agencies
- •Accessing agency biologists and their information
- •Influencing work of the co-management board
- •Broadening the scope of the arrangement
- •Internalizing the duties of regional authority

The deconstruction has focused closely on the transactions of players of the co-management systems, and not focused on the overarching political issues facing community (e.g. Arctic National Wildlife Refuge oil development, negotiation of land claims). Findings of this Chapter can be summarized as follows.

•Formal agreements, negotiated before the lexicon of local and traditional knowledge were part of the power-sharing milieu, offer communities a role in the research process as side-line reviewers and recipients of information gathered from research. Opportunities to participation in research is restricted to working as cooperators with agencies or sharing local knowledge at the board level.

•Community members vary in their perspective on caribou biologists with some expressing mistrust and viewing the scientists as controlled by government. Biologists are commonly framed as agents of government with limited ties to caribou that differ from those in community. Community members suggest opportunities for improving trust

relations which include biologists spending more contact time in community, and more reporting, more accountability to users.

•Board members of government agencies who have been affected by the PCH co-management process assume a role in changing their parent organizations. As a consequence of agency members' co-management experiences, they develop improved sensitivities to local interest. While communities assume the costs of training government mangers, mangers assume costs when seeking to affect change within their home organizations.

•There is limited contact between field biologists and community members, a condition resulting from scheduling problems and the perceptions of biologists that efforts to interact with locals are generally not worth the expenditure.

•The co-management board meetings serve as a forum in which local knowledge delivered by board representatives and scientists is shared. At times these knowledge forms complement each other to make for a dual knowledge/synergistic learning transaction. In other instances there is a disconnection between the two.

•There is a pattern in board-level transactions in which local knowledge is repeatedly expressed by hunters in the form of questions and concerns about methods of conducting caribou studies, to which locals perceive limited response. The 1993 Caribou crisis was the manifestation of repeated local expressions. Some government managers and community representatives see community concerns as reflecting a lack of understanding or as part of the dysfunctional element of community. Efforts are commonly undertaken by the co-management body to resolve the "problem" by educating locals about research practices and the need for science.

•Co-management boards are social units, independent organizations with their own membership and internal social processes. By serving on boards, native

participants hear about caribou studies first-hand from managers and biologists, share experiences of addressing management issues, and with non-native board members, develop a sense of group. As specialists in caribou management affairs locals make contributions to the board-level decisions. As a consequence of their experience and association with the board, local representatives may assume positions on issues that differ from some of their fellow community members.

•The internalization of authority under co-management comes with the costs of relocating decision making to the regional level and within a complex, politically charged inter-organizational environment. The costs of assuming responsibility for supporting regional decisions at the local level, when borne by local leaders and board representatives, are amplified by the intra-familial relations of community life and the absence of recognized authority of local leaders.

9. CONCLUSION

9.1 Overview

Living with caribou has never been a simple affair. Communities of hunters of former times negotiated relationships with *vutzui* and learned to share power with animals to insure survival and sustain livelihoods. Today, communities are partners with governments in a formal co-management relationship, seeking to maintain elements of cultural traditions while securing their future in the face of new uncertainties. Power sharing, as provided through the Porcupine Caribou Management Agreement and the bilateral agreement for the conservation of Porcupine Caribou, represents a redistribution of rights and reorganization of governance structures which hunters use to negotiate new relations. Co-management also comes with compromises and may be a burden where there is limited choice.

9.2 Thesis Argued

The central thesis of this dissertation is that involvement in formal co-management is a costly endeavor for northern hunting communities which seek to share power in decisions affecting caribou. While co-management potentially offers a number of benefits to local communities, power-sharing also generates an array of community dilemmas. The Porcupine Caribou case study demonstrates that the significance of community co-management dilemmas extends beyond the rationalization of costs and benefits or the dissonance of conflicting values. These dilemmas represent community choice sets that are defined, in part, by the institutional environment, and are indicative of the power relations between community and the greater environment in which community is nested.

More specific to the Porcupine Caribou case study, institutional arrangements directed towards local involvement provide partner communities with pathways for the

sharing of information and the articulation of community management preferences. Co-management is found in some instances to advance community objectives, and to support the legitimacy of a community's voice when interacting with the state. As a direct result of board-level interactions, agency personnel directly involved in Porcupine Caribou co-management are better sensitized to locals' perspectives and their culturally defined approaches to resource management. Through enhanced sensitivity, the co-management experience can serve as a source of feedback, advancing community efforts to make agencies more responsive to community perspectives. In some instances, governments defer to co-management boards when facing difficult policy conflicts; caribou boards assume a lead role in maintaining community-agency caribou management relations. In the case of the Arctic Refuge conflict involving the possible loss of sensitive caribou habitat, PCH co-management contributions to the policy process have, at great odds, helped to influence a highly controversial international debate while at the same time teaching locals the skills of political advocacy and the nuances of state resource management. Co-management arrangements can link local relations with land and animals, activities of wildlife management, and habitat protection.

Though the benefits of co-management are clearly evident, communities make sacrifices when seeking to exercise authority in shared decision-making. The transaction costs of co-management associated with community involvement come at the price of time commitments and imposed schedules, restructuring of traditional leadership, and engaging with government agencies in bureaucratic processes. Internalizing authority in caribou management means that community members and leaders must decipher new information, interact with a host of players, engage in lobbying, and become involved in conflicts which are at times turbulent and controversial, as well as divisive to community. And in some cases, the costs of power sharing are perceived to violate customary and traditional

institutions regarding human-human, and human- caribou relations and in turn, are perceived to undermine the well-being of the caribou resource and the relationships of those who depend on it.

9.3 Amplified Costs

While it is assumed that transaction costs are inherent in any decision making process, it is demonstrated here that community dilemmas and their associated costs are situationally amplified.

- Incomplete co-management and asymmetrical regimes occur because jurisdictionally fragmented ecosystems and inadequately specified community rights leave community vulnerable to external threats, thus deflecting community energies. *Conversely*: Co-management arrangements which are designed with ecologically oriented boundaries and with explicit systems of accountability increase the possibility of lowering community transaction costs.

- Structural design features and bureaucratic processes of regional co-management (i.e. board-oriented activities with limited direct community involvement) are incongruent with traditional institutions of collective decision making. *Conversely*: Co-management activities undertaken with face-to-face involvement of community (i.e. in a way that reflects community institutions of learning) may ameliorate community co-management costs by establishing new relationships and a common understanding of knowledge.
- Insufficient community capacity (i.e. human capital and financial resource deficiencies), limits community's potential to engage as a partner in the co-management process. *Conversely*: The supply of adequate community-based

human and financial resources allows for a lowering of community transaction costs and increases the likelihood of effective community involvement.

Consensus style decision making governed by the informal institutions of local caribou management differs from decision making of a board-oriented process. Co-management arrangements that become overly dependent upon board-level activities may come with the greater social costs of ignoring community styles of communication and decision making, eroding traditional authority systems, and limiting opportunities for collective learning and the development of trust. Co-management arrangement practitioners seeking to advance development of community government partnerships need to be aware that communication linkages and accountability between management boards, communities, and agencies are important elements of power sharing, and generally require change in the status quo.

9.4 Delineated Costs

As delineated in the study of Fort McPherson's, Aklavik's, and Old Crow's experience with the Porcupine Caribou co-management arrangement, the transaction costs of power sharing are both diffuse (as shared by the collective as a whole) and concentrated (as borne by key individuals). The listing below summarizes the costs delineated in the dissertation, in categories.

Communication

- *accessing the expert with the information*
- *deciphering "high language"*
- *reading technical reports*
- *interpreting science and policy to community*
- *crafting common constructs*

Process Literacy

- *knowing the system*
- *being overwhelmed by new structures*

Meetings

- *interacting at meetings*
- *confronting procedural formality*
- *engaging in confrontational discussions*
- *having inadequate facilities for public meetings*

Community-level Process

- *working with leaders who have limited time*
- *negotiating internal conflicts*
- *making "bad friends"*
- *squealing*
- *conforming with regional decisions*
- *working with limited support staff*
- *draining a limited talent pool*
- *being bounded by "clock time"*

Representation costs

- *finding a seat at the table when government controls the membership rules*
- *traveling and attending meetings*
- *bringing community to consensus*
- *bearing the responsibility of being a decision maker*
- *being militant to make one's point*
- *asserting local knowledge*
- *interpreting community affairs to non-locals*
- *reporting back to communities with updates*
- *polling community for input*
- *misinterpreting information*
- *losing time on the land*
- *burning out*
- *working with a limited support staff*

Local Leadership

- *tracking and staying informed on issues*
- *deciphering new issues*
- *working with community apathy*
- *balancing the focus on internal and external affairs*
- *training locals who are new to involvement in co-management*
- *enforcing fellow locals when having limited recognized authority*

9.5 Community Dilemmas

Community dilemmas of a northern co-management process may include:

Dilemma of dependency vs. local empowerment: Community short-term management objectives require entrusting key tasks to external agents and foregoing immediate opportunities for involvement in order to develop the human capital necessary to participate more fully in the process at a later date.

Dilemma of legitimacy vs. truth: Community's social institutions for defining admissible "truth" and legitimate authority (i.e. experiential styles of learning/inductive systems of knowing) are in conflict with the system utilized by outside decision makers.

Dilemmas of clock time vs. local time: Externally dictated perspectives of efficiency and the need for working within imposed schedules conflict with local needs to approach decision making at a slower pace and internally dictated schedule.

Dilemma of privacy vs. self exposure: Preserving the privacy of internal community affairs is desirable, to limit the risk of exposure to judgment by outsiders. This institution of privacy, however, conflicts with the need to share openly with outsiders in order to achieve collective management objectives.

Dilemmas of deference vs. assertiveness: Community institutions dictating non-confrontational methods of negotiating conflict may themselves conflict with external decision making styles driven by competitive and at times aggressive negotiation tactics.

Dilemma of external threat vs. internal solidarity: Threats that are perceived to originate from beyond community (or the group) bond the group, while at the same time limiting the group's permeability to new ideas, criticism, and the exploration of innovations.

Dilemma of role conflict vs. local harmony : Community institutions govern the "multiplex of community relations" (e.g., I'm your neighbor, hunting partner, and brother-in-law) with ethic of non-interference and conflict avoidance. Co-management relocates authority with expectations that may put these rules out of step with internal traditions. Co-management conditions may intensify community conflicts.

9.6 The Utility of Delineating Community Costs; Implications to Theory Building

Investigating the costs to community of involvement in a co-management process offers a useful approach for explaining power-sharing relations. Transaction costs, when framed with an understating of local cultural perspectives, help to identify incongruities between local management systems and those with which locals interact. Assessing costs avoided by community members draws attention to the impediments of local involvement and overall problem areas of the system. Recognizing the extent to which transaction costs are diffuse or collectively incurred is also useful in identifying where and how community members expend and, at times, invest their energies in a co-management process; and who and by what method they bear the burden of collective action. When coupled with an accounting of consequences, community costs of power sharing with their respective conditions serve as indicators for understanding the overall dynamics and power relations of community-government decision making.

As I have demonstrated, the process of power-sharing in the management of northern living resources is complex and dynamic, escapes simplistic generalizations, and is well appreciated by those who are focusing on the drama of activities unfolding at the ground level. The analysis of transaction costs associated with a specific institutional arrangement using conventional rational choice frameworks (i.e. cost-benefit) limits the scope of decision analysis. Greater explanatory powers are available when including respective cultural processes influencing group identity, views on uncertainty, and styles of learning. Moreover there is a need to move beyond the mechanistic notions of costs in

transactions, to understand more comprehensively the greater social costs associated with engagement of small communities and large bureaucratic systems.

9.7 Implications to the Practice of Co-Management

Co-management arrangements are never static. On the contrary, they are dynamic in the entry and expectations of various players, the strategies employed to communicate, and types of problems faced. Governments, their agencies, native resource management organizations, and communities of users have several options which may help to resolve attendant co-management problems, reduce costs for communities, and direct the evolution of a caribou co-management power sharing arrangement. These options for change fall into several broad and interconnected areas, including

- Building community capacity
- Reallocating agency resources and spending time in community
- Developing and implementing accountability systems
- Innovating to accommodate dual ways of knowing
- Specifying rights and achieving a balance

Building community capacity: Investment of human and financial resources into capacity building at the community level is hardly a novel recommendation, but is worthy of mention since it remains problematic. This conditions persists in some communities spite of more than a decade of settled and implemented claims arrangements, which points to the intergenerational nature of this challenge. The development of organizational capacity at the local level can, at the least, better facilitate the exchange of information, help maintain communications between regional co-management and key community members, and support the work of the board representative to influence management. Improving community capacity need not preclude the opportunity for elders or the traditional hunters to

be actively involved in a co-management process. Indeed, their contribution is important. What is needed are adequate resources and well-understood systems supporting the efforts of individuals who are charged with representing communities.

Reallocating agency resources and spending time in community: Ultimately, government must make changes in the operational systems which pre-dated co-management, create monitoring and research programs which include local-level participation, and redirect the flow of resources used in the management process. In Yukon, the establishment of a regional biologists' program with agency personnel attentive to communities and co-management boards, is one step in this direction. In that case, however, too few personnel covering too large geographic areas limit the program's success. Joint management in personnel choices, and directives through management planning as implemented by the PCMB, offer much promise. Economies of scale in the reallocation of resources must be considered as well. Current devolution of responsibilities should be balanced with planning towards region coordination. While meetings of key players are an important component of management coordination and overall communication, they are no replacement for on-going personal relations developed with community as a whole and the engagement of work by managers who are spending time on the land and in community where they are working side-by-side with locals, meeting with them on their terms, and planning and evaluating a variety of projects.

Developing and implementing accountability systems: The Canadian PCH co-management system's management plan is one example of an informal system which holds government parties accountable to the directives of a co-management board's recommendations. Other elements of accountability are important too, such as a board's and its local representatives' accountability to user communities as well as a user community's accountability to boards. These internal dimensions of successful co-

management may be overlooked when the threats to the resource are perceived to be primarily external to those directly involved. Systems of accountability may be best addressed, not with formal procedures, but perhaps with clarity of job descriptions, on-going evaluations of decision making processes, and occasional forums where locals, and locals and managers reflect critically, yet openly, about the direction and effectiveness of their shared co-management relations.

Innovating to accommodate dual ways of knowing: The 1993 Caribou Crisis illustrates well how there is a need to move beyond board meetings as the sole venue for sharing knowledge on caribou, and actualize a process that accommodates what Feit (1988) refers to as "dual systems of knowledge." Broadening opportunities for synergistic learning is clearly important if governments and communities of hunters are to achieve authority systems that can grapple with emerging management challenges and result in coordinated actions. As I have already noted, such a synthesis of knowledge is best achieved when recognizing groups' commonalties and differences, and finding ways to work together with those differences, rather than engineering methods that attempt to force convergence. Facilitating a public discourse to innovate methods of producing and sharing knowledge on caribou, while defusing claims that particular groups have a wholesale access to truth, will undoubtedly advance this objective.

Specifying rights and achieving a balance: Finally, there are the issues of unspecified rights and asymmetrical regimes. Clearly, the specification of rights comes with costs for community, as is indicated in this study. While the Canadian arrangement has done much to establish new relations between community and government in the management of Porcupine Caribou in Canada, the herd is currently managed with strained relations between communities and agencies in the United States. While this strain is, in part, a reflection of the confrontational and litigious nature of the US system and a problem

of demographics, there remains the outstanding question of how conditions of caribou scarcity will be addressed and how communities will respond. As found in the Canadian example, expectations of community compliance with quotas are low even in conditions where co-management boards have established relations with community members and their leaders. Moreover, those conditions do not speak to the attendant problems of habitat management, industrialization, the mobility of corporate entities, and the expectation of some that all costs associated with these activities can be mitigated. Such issues are regularly viewed as beyond to scope of wildlife management, but, in fact, are central to the undertaking. Specification of rights and establishment of meaningful roles for locals in the system offer great promise, but is only part of a solution. Beyond the specification of rights is learning something about how to interact within the systems that new institutions create, and improving them over time.

9.8 A Final Word

The presence and persistence of significant community costs associated with Porcupine Caribou co-management should not lead to a rejection of the concept of community-state management of living resources. Arrangements that strive to develop good working relations among parties with vastly differing cultural perspectives should come with the expectation that the achievement of success is inherently difficult. The notion that the local management systems of traditional hunters can be easily coupled with systems of wildlife management whose origins are found in western industrial society is nothing short of idealistic. Yet, this is not to say that workable co-management relations are an impossibility.

This study of community involvement in co-management with its ethnographic sketches, interview findings, delineation of community costs, and identification of

community dilemmas is presented with the intent of learning from the Canadian Porcupine Caribou experience, not to dismiss the accomplishments of those who strive to make it effective. When reflecting on the historical context of *Tyso Denjik Vutzui* management, clearly it is evident that much has changed with respect to the power relations between communities of caribou hunters and the state under co-management, and in the process, caribou user communities and wildlife management agencies have been transformed as well. As is also evident, a decade of co-management transactions represents only the initial stage of institutional and organizational development. Further gains will only be achieved through the commitment of individuals, and of groups willing to listen, hear, and seek understanding of varying perspectives.

The Canadian Porcupine caribou co-management effort represents an alternative approach to the management of a common pool resources and an opportunity for learning. The goal here has been to examine carefully this laudable experiment, and from the findings, analysis, and reflections of a single researcher, impart something of the system's behavior and inspire those who seek to sustain shared resources through the sharing of power.

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License
Number 93-184E

YUKON - CANADA
SCIENTISTS AND EXPLORERS ACT
LICENSE

PURSUANT to the provisions of the Scientists and Explorers Act (1958) of the Yukon, permission is hereby granted to:

Gary Kofinas (University of British Columbia)

to enter the Yukon Territory to conduct scientific research with respect to:

Community Involvement in Natural Resource Co-management:
The Case of the Porcupine Caribou Herd.

GENERAL CONDITIONS

1. A complete, final report of the research conducted under this license shall be submitted, in duplicate, within one year of completion or termination of the project.
   a) A field or progress report, including descriptions or catalogues of collections made (where applicable) shall be submitted in duplicate on, or before, the expiry date written below.
   b) The Licensee shall provide two copies of any report or article published on the research conducted under this license.

2. All camps shall be established according to the provisions of the Territorial Land Use Regulations.

3. All steps shall be taken to avoid unnecessary disturbance of wildlife.
   a) No camp site shall be established within 2 km of an active raptor nest.
   b) When using aircraft, maintain a minimum of 1,000 feet over wildlife such as sheep, raptor nests and migrating caribou.
   c) Pay particular attention to bear habitat, and take all steps necessary to avoid contact with bears.

4. The Licensee shall inform any nearby Indian Band(s) of the field activities conducted under this license, and shall not proceed as long as there are irreconcilable objections from the Band(s).

5. The Licensee shall strictly observe all applicable Territorial and Federal legislation and regulations.

OTHER CONDITIONS

NIL.

THIS License is valid for the period January 1 to December 31, 1993.

DATED at the City of Whitehorse, in the Yukon Territory, this 15th day of June, A.D., 1992.

DIRECTOR
HERITAGE BRANCH
Department of Tourism

SCIENCE INSTITUTE OF THE NORTHWEST TERRITORIES

SCIENTIFIC RESEARCH LICENCE

LICENCE # 12603N
FILE # 12 410 458

ISSUED TO: Mr. Gary Kofinas
Room 436 E
2206 East Mall
University of British Columbia
Vancouver, BC V6T 123
(604) 822-9249

ON: April 12, 1994

TEAM MEMBERS: self

AFFILIATION: University of British Columbia

FUNDS AGENCY: US Man & the Biosphere Reserve, National Science Foundation

TITLE: Community development in Porcupine caribou co-management

OBJECTIVES OF RESEARCH:
To study community involvment in co-management decision making and its relationship to the sustainability of human-caribou interactions; to determine what factors influence community involvement in co-management, how these factors influence management outcomes, and how community members evaluate their involvment in co-management.

DATA COLLECTION IN THE NWT:
DATE(S): Apr. 13 - Nov. 30, 1994
LOCATION: Fort McPherson and Aklavik

Scientific Research Licence 12603N expires on December 31, 1994.
Issued at the City of Yellowknife on April 12, 1994.

for Chuck Parker
Science Advisor.

P.O. Box 1617, Yellowknife, Northwest Territories, Canada X1A 2P2 Fax 873-0227 Tel. (403) 873-7697

11.2 Porcupine Caribou Management Users' Interview

Interview Number: _____ Date of Interview: _____

Duration of interview: _____ Complete/ Incomplete (circle one) Tape #_____

Interviewer_____

Notes:

This interview is part of a project aimed at understanding how native communities are involved in Porcupine Caribou co-management and how locals evaluate their involvement. By co-management I mean the way the Native communities and governments share responsibility in making decisions that affect the caribou and caribou users.

There are no right or wrong answers in this interview. We want to hear your ideas and learn about your experiences because hearing from the people is very important in improving caribou management. It is okay not to answer a question or say you don't know the answer. All that you say in this interview is confidential. Your name will not go into any reports, so no one will be able to connect you to what you say. When this project is completed its findings will be presented to the people of Aklavik, Fort McPherson, and Old Crow in community workshops so communities can benefit from the research. The project is funded by the U.S. Man and Biosphere Reserve Program, which is organized by the United Nations, and is the basis of my [Gary Kofinas's] dissertation at the University of British Columbia.

[Optional] With your permission, I'd like to record the interview. Gary and I are the only ones who will hear the tapes. Taping helps me to listen closely to what you're saying, frees me from taking notes, and helps us to report responses more accurately.

The interview should take about an hour. Are you ready?

11.2.1 PROFILE QUESTIONS

The first part of the interview has questions that require only short answers. At the end of the interview the questions are more open ended.

How long have you lived in [community]? _____ yrs. *or* *whole life*

Have you lived in other communities for long periods of your life?
If yes, Which ones?

Have you ever held a local leadership position or sat on local or regional committees?
(Be sure to ask about the past)

Positions: *other:*

_____Years_____

_____Years_____

_____Years_____

_____Years_____

Do you work a job? *no* *yes*

Is it full time part time or seasonal? *Full time – part time --- seasonal – unemployed*

And have you ever done any work in the area of renewable resources or worked with biologists? *yes*

no
Ask what kind and when?

How much time did you spend on the land this year? *(ask for number of months or days)*

Have you yourself hunted Porcupine caribou?	*yes*	*no*	*dk*
Have you cut and stored caribou?	*yes*	*no*	*dk*
Have you ever hunted with a dog sled?	*yes*	*no*	*dk*

If Hunter- When you go out caribou hunting do you generally go on day trips, overnights, weekends or do you stay out for several days at a time?
Day trips --- overnights --- weekends --- out for several days at a time

-Do you use the Dempster Highway to access caribou more often than not?

How satisfied are you with the kind of time you now spend hunting caribou or working caribou meat?

not satisfied - satisfied would like to spend more time - - would like to spend less time

If unsatisfied or spending less time ask :

What is it that keeps you from spending more quality time hunting or being on the land?

11.2.2 NOW I HAVE A FEW QUESTIONS ABOUT CARIBOU AND YOUR USE OF CARIBOU.

How many caribou does your household need for its own consumption over a one-year period? *(not including what you share with others)* a) _____

And that 's for how many adults? _____ and how many young people? _____

Do you generally get enough caribou to meet your needs? *Yes No*

What percentage of the meat that you eat each year is caribou? _____

When the hunting is good, how many times a week do you eat caribou? _____

When you get caribou, how often do you share your caribou with other households?

never shares seldom shares sometimes share always shares

Over the past 12 months, what percentage of the caribou you killed was shared with people in other households? *(What is your best guess?)*

_____

And how many different households received caribou from you last year? *(What is your best guess?) (list if they offer)*

Did you send caribou to people in other communities during the past year? *no yes*

To which communities or cities did your household send meat last year?

How much of the caribou you used this past year was given to you? *(Percentage)* _____

Other than for family food, are there things that you have used caribou for in the past three years? *(like trapping bait, dog food, mattress, clothing?)*

	no	*yes*	
List each item and then ask:			Did you make it yourself?
mattress		*yes*	*no*
dog food		*yes*	*no*
trapping Bait		*yes*	*no*
other			

Do you know how to make things from a caribou hide? *yes* *no*

If yes, Have you made anything from one in the past three years *yes* *no*

11.2.3 NOW SOME QUESTIONS ABOUT CARIBOU INFORMATION AND COMMUNICATION—

If you wanted to know the condition the Porcupine Caribou Herd are in (if the animals are in poor or in good shape this year) , what person, people or organization would you go to for the most reliable and trusted information?

If you wanted someone to explain the migration of the herd, that is, why caribou were migrating a certain way, whom would you ask for the best explanation?

And if you wanted to know the population of the Porcupine caribou herd, whom would you ask to get the most reliable information?

Of these, what are the main ways you actually hear and learn about the condition and the status of the Porcupine Caribou Herd? *(Such as whether the caribou are poor or healthy, whether there are lots of caribou, and if they are healthy...)*

Do you ever learn the condition, health and general status of the Porcupine Caribou Herd from your personal time hunting or working with meat?

	regularly	*—— some ——— never*
-from conversations with hunters?	*regularly*	*—— some ——— never*
-from local meetings.	*regularly*	*—— some ——— never*
-from talks with biologists	*regularly*	*—— some ——— never*
-From written reports	*regularly*	*—— some——— never*
-From Conservation Officers	*regularly*	*—— some ——— never*
-From radio and television reports?	*regularly*	*—— some ——— never*
-From newspaper articles	*regularly*	*—— some ——— never*
-From anywhere else?		

And how do you learn about Porcupine Caribou management activities, like the review of development proposals, the decisions of managers, and changes in hunting rules? . .

I don't hear

-Do you hear about caribou management activities and issues from . . .

-talk about town?	*regularly*	*—— some ——— never*
-At local meetings	*regularly*	*—— some ——— never*
-From Conservation Officers	*regularly*	*—— some ——— never*
-Radio Reports	*regularly*	*—— some ——— never*
-Johnny on the Radio?	*regularly*	*—— some ——— never*
-From newspaper articles	*regularly*	*—— some ——— never*
-Other ways?		

And if you wanted to know the real story about a caribou issue, whom would you contact for the most reliable information?

Would you say that you feel that you are better informed on caribou issues than you were ten years ago?

Have there been times in the past when you have been confused about caribou management issues or found the information you got difficult to understand?

If yes -Can you give me an example of when that happen?

Is there information on caribou or caribou issues that you are not getting that you would like to receive?

Let's say that you, yourself, had a concern about a caribou management issue which involved government or people from outside this community, who would be the best person to share that concern with?

What do you see as the best way to hear from the people and get their concerns?

(meetings, home visits, questionnaires, other?)

Do you think it is it the responsibility of leaders and community representatives to go door to door and ask people about their concerns or is it the responsibility of the people to go to leaders and meetings and speak out?

People's responsibility to speak out *leader's responsibility to visit* *both*

Today, who speaks for _____ (name the community) when it deals with the federal and territorial governments on caribou issues?

Have you heard of the Canadian Porcupine Caribou Management Board?

yes *no*

Did you know there was also another board called the International Porcupine Caribou Board?

yes *no*

Who is your Porcupine Caribou Management Board representative?

How do you generally hear about the Porcupine Caribou Management Board's activities?

-Do you hear any other ways?

What is the Canadian Porcupine Caribou Management Board supposed to do? What is its job?

Do you think that having a Canadian Porcupine Caribou Management Board has changed the way this community is involved in caribou management?

Would you say that creating a Porcupine Caribou Management Board has given _____ (name the community) more power and influence in Canadian Caribou Management than it had 10 years ago?

a lot more power -- more power -- about the same -- less power -- a lot less power

If no power ask Why is that?

If people of your community had a concern about a caribou management issue, how likely is it that the Porcupine Caribou Management board would hear about that concern and spend the time dealing with it fairly ?

very likely *likely* *somewhat likely* *unlikely*

If Porcupine Caribou Management Board had an important decision to make, how likely is it that your community's leadership (like the RRC) would be asked for its input?

very likely *likely* *somewhat likely* *unlikely* *DK*

And if it were an important decision, how likely is it that the people would hear about the decision beforehand and be asked for their input?

very likely *somewhat likely* *likely* *unlikely*

How much do you trust that the PCMB is working to protect Porcupine Caribou and your community's continued uses of caribou ?

Would you say that you trust the Porcupine Caribou Management Board more or less than the Canadian federal and territorial governments?

Are there things that you think the Caribou Management Board or its members should be doing that they are not doing, or things they shouldn't be doing? *(PROBE)*

-Can you give me an examples

What ideas do you have for improving the way the people of this community are involved in caribou management and caribou issues?

How much do you trust that caribou management in the United States is protecting the Porcupine Herd?

Do you have any suggestions for improving or changing the way the US, Canada, and native user communities work together to make decisions which affect the herd?

If knows about the International Board– ask - What are your impressions of the International Caribou Board?

What things are most important to you when you consider the way the Porcupine Caribou Management Board, native user communities and governments work together to make decisions about the Porcupine Caribou Herd,?

How involved does the community have to be?

In what ways?

What do you think the role for Elders should be in caribou management? How should Elders be involved?

How directly involved do you need to be, and when do you need to be directly involved

Now let's talk about specific caribou issues.

11.2.4 RESEARCH--

How do you feel about caribou studies and research or how studies are being done?

-Do you feel that using collars is acceptable?

-How about the use of helicopters, and capture and release with net guns?
-if OK -- Are collars on calves OK?

-Are there any studies being done that you don't feel are necessary?

-Are there studies that you'd like to see undertaken?

-How satisfied are you with what you know about caribou research?

How necessary to successful caribou is counting the population of caribou in the herd every few years?
very necessary *necessary* *not necessary*

In 1992, biologists reported that the Porcupine Herd had about 160,000 animals. How accurate do you think that population estimate is?
very accurate *accurate* *not accurate*

Let's say that the biologists told us that the herd's population went down to 70,000. Do you think it might be necessary to put limits or a quota on the number of caribou people hunt each year?
yes *no*

If the Porcupine Caribou Management Board and local leaders decided that a quota for this community's hunters was necessary, how likely is it that most people from this community would comply with the quota?
likely *unlikely* *depends on:*

If unlikely - Why?

How necessary is doing studies to sees if there are things in caribou which may harm humans (like diseases or chemicals)?
Very *necessary* *necessary* *less necessary* *not necessary*

And how necessary is having biologists do yearly studies to determine if Porcupine caribou are in good shape or poor shape ? Or is it good enough to use the information from hunters?
Very *necessary* *necessary* *less necessary* *not necessary*

How useful do you think local users' knowledge of caribou is in caribou research and caribou management?

very useful *useful* *not useful* *dk – If yes,* How? *Ask for examples.*

How necessary is it to get community's approval for all caribou studies done within Porcupine Caribou's land, or is it good enough for scientists and government to decide on their own?

Very *necessary* *necessary* *less necessary* *not necessary*

Would you be satisfied if the Porcupine Caribou Management Board assumed lead responsibility for approving all caribou studies in Canada, or do communities need to be directly involved?

Satisfied with board leading *community directly involved*

What kind of community involvement is best?

How necessary to successful caribou management is it to know how many caribou are shot by hunters each year?

Very *necessary* *necessary* *less necessary* *not necessary*

How accurate do you think the numbers are that people give to harvest reports?

very accurate *accurate* *inaccurate* *very inaccurate* *don't know*

11.2.5 THE 1002 ISSUE

How important to successful Porcupine Caribou management is it to lobby against development in on the calving grounds in Alaska?

Very *necessary* *necessary* *not necessary* *don't know*

Have you heard about plans to develop for gas and oil on the caribou calving grounds in Alaska?

yes *no*

What do you see as is the best way for development projects to be reviewed? That is, what's the best way to decide if a proposed project will harm the caribou and if the project should go forward?

Follow-up question if respondent is concerned about development –
If asked, would you be willing to travel south and lobby against oil development in Alaska?

If yes- What would be the hardest part of this work?

If no - Why not

11.2.6 SHARING - COMMERCIAL USES

And how necessary to good caribou management is not allowing any commercial sales of Porcupine Caribou?

very necessary *necessary* *less necessary* *not necessary*

Why is that?

What do you see as acceptable and unacceptable ways for sharing caribou between you and another native person? -What of these is OK and not OK to trade a caribou for ?

-Is trading a caribou for gas and shells acceptable?

-Is exchanging money for a caribou acceptable?

-Is it acceptable for a hunter to go around with a truck or a skidoo and sell a load of meat to different households for a 100 dollars each?

-Is selling Porcupine caribou meat in the store OK?

A while back there was concern about the sale of caribou antlers for medicine to people in Asia. Was the decision to stop the sale of antlers necessary?

very necessary *necessary* *less necessary* *not necessary*

Why?

11.2.7 ENFORCEMENT AND EDUCATION

What do you think it is that makes a person hunt properly, not be wasteful, and respect caribou?

Probes:
-Can you think of a time when you were disrespectful? Why did that happen?

-What makes some people disrespect caribou and hunt improperly and others hunt properly??

How necessary to good caribou management is having stronger enforcement of wildlife regulations on non-native hunters. . .

very necessary *necessary* *less necessary* *not necessary*

Why is that?

How necessary is having stronger enforcement of wildlife regulations on your community hunters?
very necessary *necessary* *less necessary* *not necessary*

Why is that?

11.2.8 HUNTING PRACTICES

Have you ever had to shot a caribou and leave it behind?

1. Is acceptable to leave an animal which you shot and found to have abscesses (sores)?
2. To leave an animal that has been cached and later disturbed by ravens?
3. To leave a collared animal that has been shot as long as the collar is retrieved?
4. In times when there are many caribou, to leave an animal shot by mistake that turns out to be skinny?
5. To leave a bull that was shot when heavily in rut and killed when believing the meat is OK?
6. Not to go after a wounded caribou when it goes where it is difficult to get to like into willow thickets or in a rocky area where it is hard to travel by snow machine?
7. Are there any uses of a snowmobile which are not appropriate when hunting?
8. To follow caribou on a snow machine to get to a good place to shoot?
9. To herd caribou with a snow machine towards another hunter?
10. To pursue a wounded caribou on a snow machine?
11. To shoot a caribou from a stopped snow machine?
12. When a herd is bunched up and it is difficult to get a clear shot, to shoot into the herd?
13. To shoot a caribou swimming in a river from the boat?
14. To take a flight in an airplane and that afternoon go up river and shoot the bunch you saw?

15. To leave an animal on the tundra for a later pick-up when snow or ice will cover it quickly?

16. To feed spoiled caribou meat to working and recreational team dogs in town?

17. What about hunting caribou to feed working and recreational team dogs in town?

18. It there anything that is NOT OK to do when handling , transporting, and storing meat?

    To shoot drag, and then gut?

    To step over it?

    To let a woman gut?

Do you think that it is necessary to have a list of written community rules for hunting and respecting caribou?

v necessary - necessary-- less necessary — not necessary

What would you do if you noticed that a local person was wasting meat or hunting inappropriately? Would you bother saying anything to anyone?

Several years ago native hunters were asked to comply voluntarily with a 1 km. "no hunting corridor" on the Dempster and to keep gut piles away from the road. Who made that decision, the community or outsiders?

What did you think when you first hear about this decision?

What one thing would you recommend for improving the way people respect and use caribou?

People talk a lot about community involvement in decision making. What is it that makes some people become involved and others not so involved in community issues like caribou management?

Looking down the road into the future, what changes would you like to see in the role native communities assume in making decisions on Porcupine Caribou Management?

PROBES

-Would you like to see native communities have more overall control?

-What things would you like to see native communities do which they are not doing now?

-What needs to happen to make that become a reality?

-What will these changes do for the Porcupine Caribou?

If you were on a committee to chose a community representative to the caribou board, what kind of person would you recommend?

If asked, would you be willing to sit as a member of the Porcupine Caribou Management Board?

yes *no*

Do you have any other concerns or ideas about local or regional issues on caribou or use of caribou?

Do you have any other messages, recommendations, or questions on Porcupine caribou management. . . or ideas on how to make things run better? Again, all your comments are confidential.

11.3 Agencies involved in different functions of management

11.3.1 Public Policy Process

United States	*Canada*
• S. Congress • Alaska State Legislature • Alaska Board of Game • Regional Boards of Game • Native Village of Venetie Tribal Government • Venetie Village Council • Arctic Village Council	• Prime Minister's Cabinet • Parliament • Yukon Legislature • Northwest Territories Assembly

11.3.2 Agencies and organizations assuming *de jure* Enforcement Duties

United States	Canada
Alaska Department of Fish and Game United States Fish and Wildlife Alaska State Troopers Venetie Tribal Government	Yukon Territorial Government Renewable Resources- Operations Division Government of Northwest Territories- Renewable Resources Royal Canadian Mounted Police

11.3.3 Caribou Studies and Research

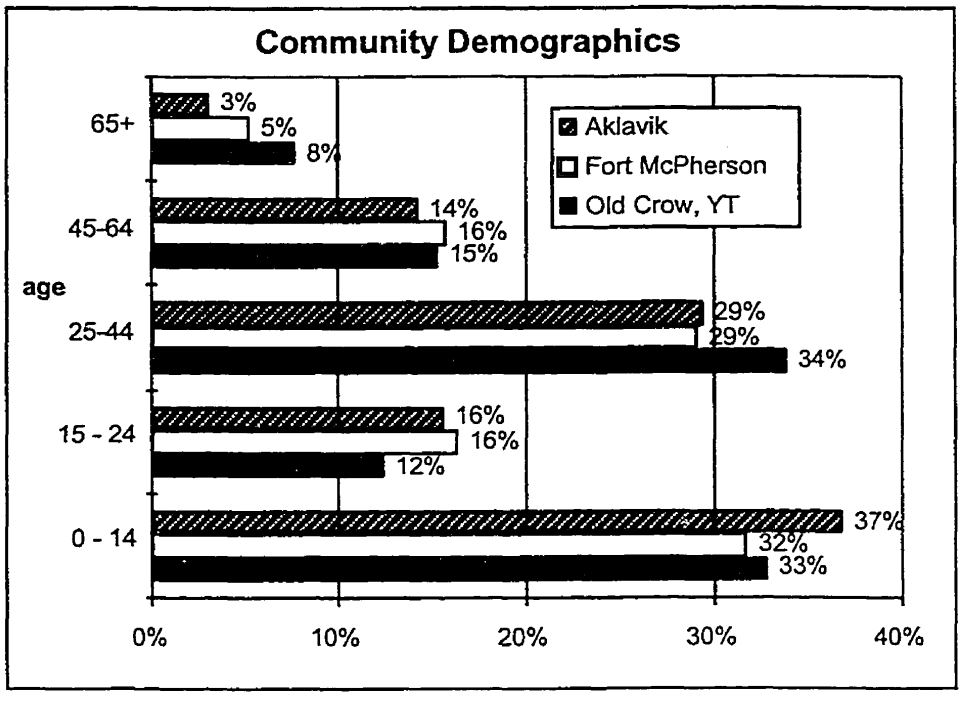
Key PCH Government and Native Agencies

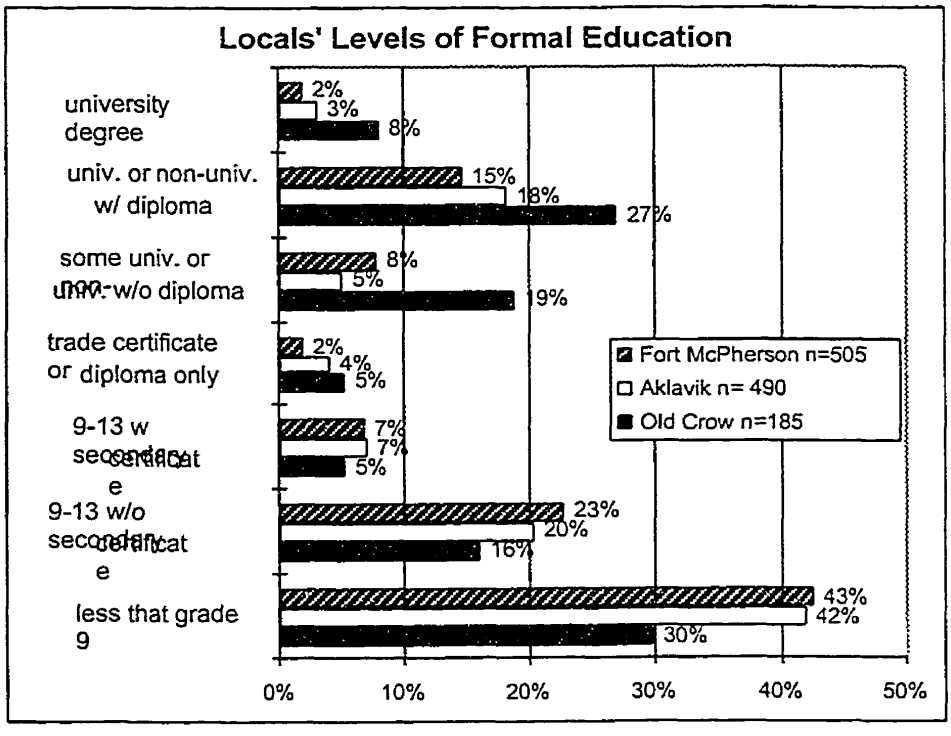
United States	Canada
• *Federal level:* • US Biological Survey (USBS) • US Fish and Wildlife Service (USF&W) • *State/Territorial:* • Alaska Department of Fish and Game (ADF&G) -Wildlife Department • -Division of Subsistence • *Regional Native Agencies* • Council of Athabascan Tribal Governments - Natural Resources Department	• *Federal level:* • Canadian Wildlife Service (CWS) • Department of Indian and Northern Affairs (DIAND) • Parks Canada • *State/Territorial:* • Yukon Territorial Government Renewable Resources • Northwest Territories • Renewable Resources • *Regional Native Agencies* • Inuvialuit Game Council - Harvest Study Council of Yukon Indians- Indian Harvest Study

11.3.4 Land Management Regimes of the range.

Land Management Regimes	
YUKON AND NWT TERRITORIES •Vuntut National Park •Ivvavik National Park (formerly called Northern Yukon National Park) •Special Conservation Area (IFA) •Special Management Area •Order-in-Council Withdrawal •Dempster Highway Area •Territorial Land-Use Regulations •Gwich'in Settlement Lands •Inuvialuit Settlement Lands	ALASKA •Arctic National Wildlife Refuge (formerly called Arctic Wildlife Range) •Alaska State Lands •Bureau of Land Management Lands •Alaska Native Lands •Yukon Charlie National Preserve

11.4 Community Profiles; Levels of Education and Demographics





Data for two figures are based on Yukon Bureau of Statistic data (January 1995) and Northwest Territories Bureau of Statistics (1991).

11.5 Transcribed Elders' Stories

11.5.1 Mary Kendi,(Ehdiitat Gwich'in) of Aklavik; Power sharing *Ch'oodenjik vutzuit*

(Interview with GK)

Mary Kendi: One old woman, she stay with us, I want to go to dance and mix with other people, but she holding me back. She didn't want me to go no place, so and, we got that old woman staying with us and after that I settled down. And when everybody go to dance and , me I stay home and clean up the house. Do a little cooking, I look after this old woman and she put her bed right close to our bed too. She lay down there and she used her pipe and smoked it. All that, Grandma tell us story about the olden days. This was the grandmother of Bella Ross. Mostly from there I get my story, but my mother never tell me story. They just train me. They help me out how to look after my life, how to look out for myself, and that is when that old woman was telling me story about the caribou.

Long ago, human was caribou and the caribou was human, and they change. And then they make agreement with one another so they change, because, ya know, the caribou run fast, uh? And the human don't run that fast. So, the caribou run away from them. And they can't keep up so much. They change again that way, you know? That *ungua*l [lower leg of caribou] not in front, but the back leg in the back leg someplace, it got a little piece of meat left from the human. And if you see that, it is light colored meat. It is just a little skinny strip, like that. [Mary shows me]. Left from that human flesh.

GK: Does it have a name?
Mary Kendi: No. *Dingi ti,* That means human flesh, and that is from the human. That's what she told me.

They made a deal. The caribou, they change, The human and the caribou, they were people first, hu? But animals get them, wolf get them easy too. You see how it goes around, even that. Wolves still get them. Before they were human and they couldn't run that fast. So they exchange. They know people, They read things, I think. Just by heart, maybe they read everything. By acting they know what they are telling one another. And they got a leader all the time, and it is big bull. It is big bull. That's their leader. All, everywhere they go. Then there is a cow and a calf. They all got different names in Gwich'in and *vuzhui choo*, and then cow is *vutshi, dezoo so*, and another one, the calf is *ighee*.

All these things are named and by that the children should know all that, but when we tried to talk, when we try to teach them, but they look at you, they couldn't say it, and they laugh. They don't try. They just laugh. And then they get away with it. If they could just settle down and listen to all the stories and then they will understand. It's good for their future. An then, the old people be gone. By then they going to be adults. They will start raising their children , It's good these stories they carry on. And today they don't listen. Today the little children are more boss then their parents. They boss their parents. If they listen to their parents and listen to story like this, in future they have good life, but they are not like that. All the old people mention that. And then the children don't listen so the parents don't have to tell them no story.

11.5.2 Mary Vittrekwa(Teetl'it Gwich'in) of Fort McPherson; Return of white caribou boy

(Interview with GK and interpreter Bertha Francis, tape translated by Roy Moses)

My uncle told us a story about ancient times. In ancient times, the role of the caribou and the humans were reversed. At that time the caribou was much smarter than men, and the caribou were going hungry. The role of the caribou and the role of the human beings were not working out, so we had to reverse back in order to survive. Some time later a young man told his father he was going to spend time with the caribou, so he entered among the caribou and turned into a young bull, and he was easily distinguished among the caribou because his fur was much whiter than the rest of them.

At this time the people were staying on one side of the river, and the young bull went away and started gathering caribou together. It would go away and bring more together, and soon it started swimming across the river, towards the people, along with the rest of the caribou it had gathered. When the old man saw this, he want forward and told the rest of the hunters, leave the white young bull to me. I'm going to use the skin for snare. The young bull was swimming ahead of the rest of the caribou but when the old man was coming, the young bull started swimming downstream and the old man was behind him. The caribou was swimming downstream and it went ashore just at the bend a little further down. The caribou spoke to the old man and said, "Hurry, come ashore, and rub me down with wet mud." The old man rushed ashore and immediately rubbed the young caribou down with wet mud, and the caribou turned back into a man.

After this, when the bull had turned back into a young man, he told his father,

"Quickly, build me a cache, and gather me some inner fat and please, father, get away from me, you smell very strong." After this the old man returned to camp but did not tell anyone about the incident. The following day, the young man came back into camp. All the hunters had killed a lot of caribou. The young man was walking among the kill. Walking among the dead caribou he identified certain ones, saying "This one was a leader and that was of another family," and identifying them.

This is how the humans and the caribou exchanged roles. In the first place, the caribou was too smart to be killed, and in order to survive the roles were reversed and that's how it was. This is the story my uncle told me. Later on, this young man had to leave camp and live alone for quite some time before he got accustomed to living among people again, because people had a strong odor, and people had to get accustomed to that.

11.5.3 John Vanelsi (Teetl'it Gwich'in) of Fort McPherson: Caribou are wise

(Interview with GK and interpreter Bertha Francis, translated by Ruth Carroll)

John V.: My father told me stories when I was young. Told me that our people were caribou at one time, then we changed places with the people. The people were having a hard time for food. The caribou were wise, Very smart animals, they exchanged places, since then, we were better off and were not without food much anymore. Plus we are much smarter.

11.5.4 Effie Linklater (Vuntut Gwitchin) of Old Crow: Two stories

(Stories of Effie Linklater appear in two documents, the first edited by Keim (1964:102-103) and the second by Leechman (1950: 158-160).

11.5.4.1 "The Boy in the Moon"[1]

Effie Linklater: One cold morning the people were hungry and even starving. There was no meat and fish. Men with strong medicine tried to make caribou come their way, but nothing worked. All the time one boy asked and asked, wanting to work with his medicine, but no one paid any attention to him. They thought that he was just a baby. Finally, however, the men decided to let the boy do as he wanted, just to see if anything would happen. The boy ordered that a fence be built. After this was done, the boy told the men to set all their caribou snares in the fence. Although there were no

[1] Mrs. Effie Linklater of Old Crow is reported to have been engaged by Dean Keim to collect stories. The project was materially assisted by Father Jean Marie Mouchet, Roman Catholic priest at Old Crow. Editing has been kept to a minimum."

tracks of any kind to be seen, five hundred or more snares were set in a single day.

Then, the boy split the men into two groups, one group to do one way and the other group another way. They were to go quite a distance then circle towards each other and come to where the fence had been built. This was done and other of nowhere a herd of caribou was driven into the fence. A caribou was caught in every snare.

After killing the herd, the boy asked his father to carry the fattest caribou and to give the fat from it to him. However, the boy's uncle who found the special caribou would not give the fat away. The boy begged and begged. Other men offered their caribou fat, but the boy wanted only the fat from the special caribou. He cried when he did not get it.

All the hunters went home. Finally the boy had his father pull him and a load of one caribou home too. There they cooked some meat. The child put aside one shoulder and the tripe half full of blood. He then went to bed.

The next morning the father called his son, but he did not answer. He had disappeared during the night. His martin skin pants which he always wore were hanging by the smoke at the top of the tent, but nowhere was the boy found.

That same morning the hunters went to haul meat. When they came to the caribou fence, no meat was left. It all had vanished. There was not even a sign of blood.

Everyone cried because of the loss of the child and the meat. They knew this had happen because the boy had not gotten the piece of fat form the fattest caribou.

One night not long after this all happened, the boy appeared to his surprised parents. He told them to keep that one caribou shoulder, cut off the meat to the bone for eating, but not to break the bone or tear the tripe. His parents did as they had been instructed. Every morning the bone would have lots of meat on it. Every day the parents cut off the meat and ate it. They did that for a long time.

Then the boy told the parent that he would vanish into the moon and live there until the end of the world. He said that at the eclipse of the moon, if the moon were on its back, there would be a good winter with lots of caribou. But if the moon should be face down, that would be a sign that there would be cold winter and starvation. He told his parents that in time of plenty all the people should sing, dance and feast. He said that he would be watching from the moon. Today if people look at the shadow on the moon, they will see the boy with his bag of blood in one had and a dog at his side.

11.5.4.2 The Story of Jimus Esno (A young medicine man)[2]

This young man believed in God and didn't want to have anything to do or work with his dreams. He sleeps to the wolf, females of any kind, also a crack in any kind of timber. So long as he lived he never killed any female caribou or moose.

One year we stayed with them[3] and he didn't want to show that he dreams of these animals. He knows that I believe in God and he knows I don't believe in evil dreams. Also Neil, his father, is Archdeacon MacDonald's son, and he was doing also this work he never did before.[4]

And that fall we killed a moose and he came with us to cut up the moose. As he can to the female moose, he was just standing there telling stories, and all at once he fell as though he fainted[5] and called for warm water.

He also sleeps to an owl and , before we started to the moose that night, the owl just landed on the big tree that was beside his house and the owl was hooting and it seemed to talk, and this young man just mumbled in answer. "Who doesn't know that someone is going to die soon?"[6] So that night his father dreamed about him, and the wolf[7] showed himself and said that nothing can kill him but chewing tobacco. This old man thought that there was someone trying to kill his son, so he tried to work with his dreams to kill the person that was doing this.[8] He didn't' know that the wolf was his own son.[9]

When the young man called for warm water I tried to give him a drink, but his jaw as clamped together too hard, but I poured water in his mouth and it seemed to run down and all at once he started to retch and all at once he threw up. We examined the vomit and it looked just like chewed up tobacco and it had wolf tooth marks on it.

His father cut down a big tree. The tree was cut his length and the tree split so easy. You see, he sleeps to a split in the tree or wood. That's why the tree split so

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[2] Footnotes as appearing in Leechman (1950).

[3] "We" and "them" are the narrator's family and the young man's family, respectively. The narratory insisted that the events described actually took place.

[4] The sense here is not quite clear, but the intention seems to be to show that the young man found himself in an unusual position.

[5] When he say the moose was a female, he avoided touching it and, to distract attention from his idleness, told stories while others were working. In spite of these precautions, his mere proximity to the tabooed object was enough to make him faint.

[6] Such actions by an owl are believed to predict death in the near future. The young man's mere proximity to be tabooed object was enough to make him faint.

[7] One of the animals the young man "slept to."

[8] That is, to use magical methods to prevent it.

[9] In the mythical sense in which a man identified with his guardian spirit.

easy. His grave was easy to dig and we buried him and prayed over him.

11.5.5 Sarah Abel (Vuntut Gwitchin) of Old Crow; Shaman and Ecological Knowledge

Interview with GK and interpreter Roy Moses, tape translated by Jane Montgomery

First of all, long time ago, we use caribou fence to kill caribou, then guns arrived. At that time it was difficult to hunt because we had no guns, we only use arrow to go hunting. I was born after guns arrived but I remember my dad telling this story. Pete Moses also told this same story. Before I was born the people used only arrows for hunting, when they would look for game or caribou far away the young strong men in the group would pull the elderly to the next camp where there is sufficient food or game to be kill. In those days there was no chief like they have today, they have someone to be the leader in the group. In order to survive we have to travel where there is game otherwise we would starved. Today elders are cared for but I think elders were cared for better in the past.

The old people use to gather and talk about hunting and other related stories, I heard the elders talk about some of the story I'm going to tell you. I was brought up at Rampart House and I think about that time there was no caribou. There was no caribou for 5 years. The people had to travel a great distance to get food. I remember very clearly that my dad took us with him across from Rampart House to hunt, we dried lots of caribou meat that time. I don't remember my family hunting in this area, meaning Old Crow. The people from *Neets'aii* (Arctic Village, Alaska) use to hunt on the mountains behind Rampart House because there was no caribou around their area. When I first came to Old Crow there wasn't much caribou around. There was caribou, but they were not crossing the river like they do today. Long time ago *Neetaii* (caribou crossing, a specific place where caribou cross) the caribou know exactly where the crossing is, they don't seem to forget their path or trail. At Tl'oo K'at (caribou crossing) up the porcupine River was once a place for caribou to cross. They would know specifically where the crossing is. Another place where caribou cross is called Chiitsiighe' (Salmon Cache) up the Porcupine River. At one time the caribou were not crossing so the people would have to travel across the porcupine River to hunt. Some of the people would stay North of Old Crow but they hunting for moose...

I remember people talking about when there was no caribou. The old people said it was hard times then, there was no food. In the summer time the people would hunt on the mountain near Bell River or they would travel to Herchel Island to hunt.

Only those who can travel that distance would go. Two years before that, spring passed and all the animals had there young, but winter came back so suddenly all the animal babies died that year. It was terrible. Tanana Gwich'in, who is Myra Moses's Dad told this story. Tanana area (in Alaska) was also affected. When all the animal babies were frozen, the people's only survival was to eat the calves. That was the first year, the second year a lot of people died from starvation...

Some say when the caribou do not return, maybe there is not enough food for them to survive. Not enough food like plants. I remember when the caribou returned, we were still living at Rampart House. They came by way of the mountain behind Rampart House. I remember all the animals returned that same year. *Gwahtl'ahti'* (Elias) and John Tizya told this story in front of me. (Meaning she was there when the story was told.) There are three caribou crossings I told you about, one at *Tl'oo K'at*, *Chiitsiighe'* (Salmon Cache), and one at Rampart House. In the beginning , (*nunh ttrotsit ultsui gwuno* - literally meaning when the world first began), the caribou crossing came to be. Down in Fort Yukon, Alaska there was no caribou, so the people would come up towards Rampart House to hunt. It's a long ways to hunt but they still come up to hunt. Again, we only hunted with arrows and meat was our only source of food. In those days people took care of the younger people in a special way, if this doesn't happen then the people would freeze. Up around Little Flats one entire family froze because of this. One other thing is that if a man or human is ill, bleeding inside and he is taken places or travels in any particular place, then the caribou will not travel in that place, where ever the ill human traveled. That's why in someplace there is no caribou for a long time. At *Tth'oh K'at* above *Tl'oo K'at* this happen, a man was sick and bleeding inside and was at that particular spot, he died there and since then there have been no caribou there for a long time...

In those days we only use arrows, arrow was like the shell use in a gun. The people put steel on the head of the arrow, and that is why it travels fast. Around Beaver, Alaska there is no caribou and the people would travel to a mountain near Arctic Village and they would hunt there. Long time ago we had to travel to survived. People from Arctic Village, Old Crow and Fort McPherson depended on fish too. The *Chuutl'it Gwich'in* hunted and fish around Salmon Cache. The Eskimo around Herchel Island had to come south to hunt on the mountains. Unlike the Indians, the Eskimo never dry meat, they depend mostly on fish. The caribou also travel beyond Arctic Village, near the ocean which they called calving grounds (literally meaning *choove vutzui tekit* (meaning ocean side caribou place). The people of Tanana, lived mainly on salmon. There was no fish net so they made fish net from willow bark which they braided.

Caribou travel where ever there is food. When I was growing up we had great difficulty but we lived well. There weren't many boats around in those days, the people had to make boats from wood. Everyone shared. Sometimes there would be three families in a boat. When we were traveling, the strong people would be lugging the boat from the shore. The only time they would get into the boat is when it was difficult for them to walk because of a high bluff or there was no way for them to walk. In the old days, people took care of each other. When people travel to a particular spot to hunt, they would stay for a while if food is plenty, otherwise they would move on. In those days food was always dried so it would keep for when caribou stay in one place and days are getting shorter. Then the caribou would stay there all winter. That was the best caribou in those days because the caribou stayed fat. People respected the caribou, they take only what is needed.

Annie Fredson's dad Robert who came from Han Gwich'in practice shamanism. No one really knows until the person would say so, and if we don't talk about it, then we would suffer, if we talk about it, then we will live a good life. Those who are against us or who do wrong would be punished. My dad's dad practiced shaman. He practice shamanism by dreaming about caribou. Our grandfather Ch'eeghwalti' also practice shamanism through caribou. He knew was going to die so he returned to Fort Yukon. He died in the fall time, just pass midnight, everyone was surprised when the whole area around the village and down towards Ch'ondeenjik, caribou was every where. When he died all the caribou disappeared, the people were surprised. Every one knew him because he saved a lot of lives. When the people were in need of food he would bring caribou...

How does shaman work? When there is no food, the people would ask whom ever practice shaman that the people were hungry, then he will ask if anyone has any meat with bone hidden, if no one does then and only then he will help. Those who are wise would approach him, there would be fire in the middle of the hut. He would sing and dance around the fire twice then he would stop at the door where there is a pile of wood, he would grab a hold of a caribou horn and pull it from under the snow. The people would be watching while this was going on. The next day he would direct the people where to hunt, they would returned to camp with lots of meat. He saved a lot of people from starvation. Other shaman practice the same way.

11.5.6 Mary Vittrekwa (Tetlit Gwich'in) of Fort McPherson; A life with caribou

(Interview with GK and interpreter Bertha Francis, translated by Roy Moses)

I'll tell you something. I never knew my mum and dad. I was born and not long after that my mum got sick and died. Not too long after that my dad died too. My grandmother raise me up since I was way small and I did not know my parents. My grandmother, Caroline, son Joseph, who is my uncle, lived around us . I stayed there with my grandmother and all my uncles lived there also. My Uncle use to say stay around where I stay, that way you will get meat. While they stay at that certain place waiting for caribou to start coming, they fish for mountain fish and hunt also for mountain squirrels. In September caribou stay and we all get enough caribou. I was really small and I never work. My older brother was raised by my grandmother, he was big enough to work so he got caribou for my grandmother. Tents are set up on real nice ground and in front a big stage was set up, on which we dried meat. Oh, it looks really good! Two tents are set towards each other and in-between there is a stage. Never would any one throw any part of caribou away. They dry everything and what they may not use, they feed to the dogs. Whatever they prepare from the caribou is what they use in the winter. When winter sets in, people start moving around, but they go so far and set up camp. Then after winter is over, the move back to their summer camp. They start getting ready to move down to Dawson to a place called "Moosehide." The woman's skin caribou legs and make sled with it. At the same time, the meat that they got during winter is hung back up on the stage and re-dried. They pound their dry meat and put it in caribou leg skin bag and there is lots of work to do. When we were very young and there was lots of work, but we never did work. The only thing the little children did was pack water for the parents and the grand parents. After that, they fixed everything up, all what they use in the winter, like sleds. They made a good stage, high up and put all the winter stuff away on there so bear doesn't get into their winter gear. That is how big a stage they make. After that, they get all the dog packs ready and put some willow in the bottom. These willows they dried and put in the bottom, and they put their meat up on top of that willow. The willows they dry a little bit before putting it in the pack. Then there is a piece of canvas they put over willows and dry meat. That is what the dogs pack -- a long ways to go, some of the trail is full of nigger heads (sedge tussocks). I remember when I had to walk I use to cry. After all this is done, then we all go to Twelve Mile (on the Peel River). Lots of caribou around there too, They stay there for a while. We make a little more dry meat. ...

All that. In the summer, the caribou hair is very short. They keep some of the

skins to make clothes out of. The young calve skins too. My older brother, when he get a good calf skin, he keeps it and my grandmother makes a line calf skin parka for me. She makes it long. That is only way we dress. When we started getting cold, she also made caribou skin pants and the feet part she put moose skin on it. I really like the outfit. That is how I would dress. We also have caribou skin mitts. And we never even get cold. My uncle really liked me, especially when I dress in caribou skin cloths. When a woman doesn't dress warm and looks cold, the men don't like that. When my uncle stayed around with us, we lived really good. All at once my Uncle got hurt. My brother told us we live good by our uncle. We may get stuck. We went back to Fort McPherson and we really didn't want to.

My uncle usually tell people where to expect caribou. "Go to top of the high hill and watch for caribou. When you see caribou, make noise like crow and say 'caw, caw, caw,' and do this," he tell them. "When you do this, while that you wave. And way the caribou is going to come to you." When they see caribou, they go home and have a meeting like and say this way go, this way, and the other ones that way. And they all follow the rules that was and they get almost all the caribou. And then they work with the meat, really good. They hardly throw anything away. They divide that meat amongst each other. Real good too. The next summer, same thing. When the caribou takes long to come, the people get fish. Also mountain squirrels. Lots of squirrels. They work for all this .

My brother, when we were alone once and killed some caribou. He got twenty five bulls. He cuts it open and behind him I skin caribou. He also cuts out the wound parts. When he finish, he come behind me and cut up the caribou I skinned. I skinned the whole thing, after that he made fire, and cooked good meat. While we were eating, he talk to me. The back part of caribou, he cuts out. The fat it is just like bacon. You never see any blood on his meat. He told me you pack this next fall when we go back to Fort McPherson, you never see this again. After we come back to here, people use to move over mountain. One old man, *Deheha*, Laura's father. The old man, he held out and he was talking. I never seen this happen before. I ask Laura, what is your father saying? "People going hunting , this is what we are going to do," he said. "Some of you go this way, the men and the young boys take the trail to the next camp ." They kill caribou, they cut it all up. The woman bring it home. Andrew Kunizzi wife, I wonder how many times she haul caribou. My sister-in-law, Annie too. Me and Laura we haul meat, Nena never went anywhere. Bring home the meat is very hard work. We were young and not very wise. Caribou leg is heavy. That is what we put in the dogpack. The woman that know, cut out around meat inside the leg bone, meat ball. We have a

hard time to put it in the dog pack, so we tell the dog to lay down. Then we put the meat in there, then we try to lift him up. After a while we were stronger and we did our work right.

After that, the hair of the caribou skin is cut off. In the fall the skins are very thick. They scrape the skins and then they tan them. They make caribou skin parkis for their husbands. August caribou they hair is short. That is what they make parkis with. They also make pants out of it too. They make the legs to be below their knees. From tan caribou skin put on to it. Caribou skin duffels over that is canvas shoes. They don't know how it is to get cold. Woman never skin caribou. Just the men. They bring it home, that is Black City Bridge– that hill and all the ridge is called "sikquiquin. " The big trees on the side of the mountain, those they clean the trees, Chapi Lake close to there, they put the poles in a line. That is where the caribou follow the poles. They put moss at the top of the poles. Long ago they use to made fence for caribou. I don't know about that. In the year 1927, we came down (river) before that in the 20's. That is when they use to put poles up for caribou. 1923-24-25, that is when everyone came to come back here [to Fort McPherson from Moosehide]. In 1927, we came back down here, first time I really cried for my country, where I was brought up.

11.6 Examples from the PCMB's "Management Plan"

Examples from PCMB Management Plan Design Matrix

Numbered "solutions" match numbered actions and I an other section of the plan are tasked to government agencies. No numbering system was used in the 1989-93 plan.

Management Foci	Physical condition of animals (adapted from 1989-93 plan)	Natural Mortality (adapted from 1993-96 plan)	Co-Management (adapted from 1993-1996 plan)
The status	Not much is known about what caribou need to stay healthy. Cesium levels are still safe for people, but nothing is known about other chemicals that may be harmful. A body condition study begun in 1987 should be finished in 1989.	Calf studies since 1984 show survival related to the health of the cow and location of calving. Adult mortality studies 1982-91 show PCH females have 15% mortality rates on average. Although no 'unusual' changes in cow mortality rates have been reported, even small differences can cause the herd size to change. Calf mortality studies are planned for summers 1993/94.	In Canada, PCH management has been guided by the PCMA since 1986. Membership on the board includes Gwich'in and Inuvialuit users plus representatives from the Yukon, NWT and Federal governments. Land Claims in the NWT and Yukon will greatly improve communication and management of PCH. An interim management plan for the PCH in Canada was introduced by the Board in 1988, with a revised edition for 1993/94 to 1995/96. PCH management is guided by the IPCB. In 1993, the IPCB adopted International Guidelines for the Conservation of the PCH. The IPCB includes members from federal, state and territorial governments in the U.S. and Canada plus the user communities.
Concerns	The caribou could become unhealthy, which would mean fewer calves and a smaller herd. Also, it could become dangerous to eat meat with chemicals in it.	If the herd begins to decline, we need to know if natural mortality is a cause. Disturbances could affect natural mortality but we would not know about it. If caribou are forced out of calving and post-calving grounds, more calves will die.	The present level of PCH co-management must not be reduced. New Land Claims organizations must be included, .and existing co-management groups kept involved. PCH co-management needs to be reviewed. Local and traditional knowledge is seldom used in PCH management. People must be told about and involved in PCH management. Enforcement practices need community input.

Solutions	Keep track of (monitor) how body condition is affected by range conditions, disturbance, disease and how all this affects calf production. If body condition becomes poor find out why and try to correct it..	1. continue monitoring calf and cow mortality rates 2. find out what affects calf deaths 3. protect calving and post-calving areas from development	1. maintain support of Canadian and International Caribou Agreements and management plans 2. work closely with new organizations plus other existing co-management groups 3. review effectiveness of PCH co-management 4. make sure scientific/ traditional information is understood and used in PCH management 5. ensure communities are told about research and land use plans in their area 6. include users in PCH projects 7. review enforcement of PCH regulations and develop policies with community input
	1. honor management agreements and maintain or increase funding to co-management boards 1. review, revise and report on Canadian PCH Management Plan 2. work closely with local Renewable Resources Councils and Hunters and Trappers Committees plus other co-management boards 3. support independent study of PCH co-management 4. begin traditional knowledge pilot project in user community 4. send users to gatherings concerning PCH and encourage presentations 5. maintain current PCMB communications program 5. improve government communications on PCH issues 5. notify communities about field work and land use in their regions 6. hire users for PCH field work 6. change enforcement methods based on community input	Finish body condition study and begin monitoring. Begin monitoring program. Tell public about the body condition study.	1. keep about 100 radio-collars on cows 1. monitor radio-collared cows in summer and winter 2. monitor calf birth rate and survival to July 2. do report on death rates in PCH for 1980-1990 2. relate calf death rates to health of cow, birth weight and calving location 2. report on previous and current studies of wolves in PCH range 3. work to protect calving grounds in the Arctic National Wildlife Refuge

Actions (year two)	Continue body condition monitoring program. Tell public about the body condition study.	1. keep about 100 radio-collars on cows 1. monitor radio-collared cows in summer and winter 2. monitor calf birth rate and survival rate to July 2. relate calf death rate to health of cow, birth rate and location of calving 2. tell users about report on mortality rates of PCH 1980-1990 3. work to protect calving grounds in the Arctic National Wildlife Refuge	1. management agreements and maintain or increase funding to co-management boards 1. review, revise and report on Canadian PCH Management Plan 1. produce information package on Canadian and International plans 2. work closely with local Renewable Resources Councils and Hunters and Trappers Committee plus other co-management boards 3. support independent study of PCH co-management 4. maintain traditional knowledge pilot project 4. send users to gatherings concerning PCH and encourage presentations 5. review PCMB communications program and adopt changes 5. improve government communication on PCH issues 5. notify communities about field work and land use in their regions 6. hire users for PCH field work 7. maintain revised enforcement methods

Actions (year three)	Continue body condition monitoring program. Use results in "energetic model." Tell public about the body condition study.	1. keep about 100 radio-collars on cows 1. monitor radio-collared cows in summer and winter 2. monitor calf birth rate and survival rate to July 2. do report on calf death related to health of cow, birth weight and calving location 2. tell users about report on calf death rates 3. work to protect calving grounds in the Arctic National Wildlife Refuge	1. honor management agreements and maintain or increase funding to co-management boards 1. review, revise and report on Canadian PCH Management Plan 2. work closely with local Renewable Resources Councils and Hunters and Trappers Committees plus other co-management boards 3. revise PCH co-management based on results from independent study 4. maintain and report on traditional knowledge pilot project . send users to gatherings concerning PCH and encourage presentations 4. encourage co-management conference 5. maintain revised PCMB communication program 5. maintain improved government communication methods 5. notify communities about field work and land use in their regions 6. hire users for PCH field work 7. maintain revised PCH enforcement practices
Targets	Target will have a better idea of what caribou need to stay healthy. If any problems have been found, they will be studied and corrected if possible.	Factors affecting natural mortality will be better understood. Calving and post-calving grounds will be fully protected.	PCH co-management will be more effective. Traditional/scientific knowledge will be used in management. Users will be better informed and more involved in PCH management and conservation. Enforcement of PCH regulations will reflect community concerns

11.7 Antecedents To the 1993 Crisis

Antecedents to the Caribou Crisis – Chronology of Pre-Season Events (best read left to right		
Community-level	***PCMB members and staff***	***Caribou Researchers***
1a) An elder of the community tells me that his son has recently shot a caribou wearing a collar, that it was in poor condition, and the meat was not fit to be eaten. The son tells me the collared animal was in good condition and is being eaten by family.	1b)	1c) Regional biologist of Team A and assistant travel to community to conduct Body Condition Study. Two locals and their boats are hired for week to assist in hunting for samples. Biologist collects lactating and dry cow caribou, leaving calves orphaned. Samples are taken for contaminants study and body condition analysis, with remaining meat given to hired local hunters. Regional biologist sends fax message to local leader reporting (only) Team A's caribou research activities.
2a) Local hunters observe orphaned calf "lost on river bank" without other caribou in sight. The observation is reported several days after the biologist take lactating females.	2b)	2c) Alaskan caribou researcher who is part of an 1002-based calf habitat study conducts aerial survey of caribou to identify location of collared animals in preparation for arrival of researchers from Team B who will capture and release animals for nutritional/productivity study. Alaskan pilot/researcher overnights in community and is visited by local leader who inquires about location of herd. Alaskan researcher tells local leader of his surprise to find that 20% (n=50) of collared calves are transmitting mortality signals north of community. Returning to Alaska the following day, Alaskan researcher shares findings by sending copy of his transect map to local leader via fax. Map indicates locations of collared caribou, calf mortality signals. (See map)

(section 11.7 continued)

Community-level	*PCMB members and staff*	*Caribou Researchers*
3a) Local leader posts fax message map on community notice board and informally reports his concern for "20 dead calves." No locals that I ask in community report that they know of calf collar research program. Locals from this and other user communities hear of "dead calves" and phone wildlife officer and local PCMB representative of distant community for clarification.	3b) Community PCMB representative who lives in distant community receives calls from locals asking for explanation on "dead calves" situation and expressing concern for research activities. Local PCMB representative calls regional biologist of Team A and PCMB secretariat for explanation. PCMB secretariat tries to call field researcher team leader of Team B but receives no answer.	3c) Regional biologist of Team A calls wildlife officer of Team A who is working in community where research team of Team B is headed. Wildlife officer also finds ten phone messages on office answering machine from community members who want clarification on "dead calves." Wildlife officer of Team A has meeting with local leaders to discuss moose population research and is "jumped on" by leaders about caribou research. Wildlife officer calls Team A supervisor. Supervisor of Team A advises officer to stay out of conflict because "it is not in our area." Wildlife officer answers some locals' questions about "dead calves," and tells me that he is staying clear of conflict. Team of three field researchers of Team B and two pilots arrive in community. Wildlife officer of Team A confers with member of Team B research team who reports on possible implications of mortality signals. Team of Team B conducts caribou capture and release activities (using helicopter and fixed winged aircraft) from community-based government facility. Group is self contained (all food pre-packed), sleeps in the local government facility (busy making use of rented aircraft during days), and makes little to no contact with locals. Team B team leader receives message that local leader requests a meeting.
4a) Local leader and another local hunt for caribou in mountains near community. As they approach band of caribou, plane is heard in the distance; caribou are perceived to respond to sound of plane and run "wild" and "split." Caribou harvest of hunters is limited to one animal.	4b) PCMB secretariat cannot make phone contact with field researchers. PCMB secretariat gets message to GK and asks for report. GK takes report from caribou researcher, delivers it to PCMB secretariat. PCMB secretariat prepares brief on caribou research, faxes it to PCMB member of distant community. PCMB member goes hunting for several days and receives fax after return.	4c) Team B team leader locates several mortality collars and from evidence, hypothesizes that lynx have taken collared calves in willow thickets. Team B research makes report on research activities to CBC radio news. Team B team leaves community after completing capture and release work without making contact with local leaders.

11.8 PCMB Resolutions of the Crisis

Porcupine Caribou Management Board Resolution No. 9 -93
Science, management and community involvement passed by consensus, November 12, 1993

Whereas, to protect the calving grounds of the Porcupine Caribou Herd it is necessary to do m scientific studies and,

Whereas, such studies must explain how important the calving grounds are to the herd and,

Whereas, some studies must explain why the caribou calves need the '1002' lands to be healthy and grow up strong and,

Whereas, it is therefore necessary to radio-collar some caribou calves and get good information on their health and growth and,

Whereas, to manage and protect the Porcupine Caribou Herd in the future, it is necessary to count the caribou and keep track of their movements and,

Whereas the only way to count Porcupine Caribou is to find them by radio-collers and then photograph the whole herd and,

Whereas, without radio collars on the adult caribou no one will know how many there are or where they go or how much they use the '1002' lands and,

Whereas, without such information it will not be possible to manage the herd or protect the calving grounds in Alaska,

Now therefore be it resolved that the radio-collars be maintained on adult caribou to help manage the herd properly and,

Further be it resolved, that the present calf survival study complete its final year of field research and,

Further be it resolved that methods for radio-collaring caribou be fully explained to the community and,

Further be it resolved, that results of the radio-collaring studies also be explained to the communities, including how such information will help to manage the herd and protect the '1002' lands and,

Further be it resolved, that, ;in the future, when caribou research is being planned, the communities be informed about the purpose of the research and how it will help manage and protect the herd and,

Further be it resolved, that the communities actively participate in designing the research methods and,

Further be it resolved, that community residents work on scientific studies and,

Further be it resolved, that the communities be kept informed about the progress of such studies and the management actions that result from them.

Porcupine Caribou Management Board Resolution No. 1-93
Contamination of country food Passed by consensus, Nov. 8, 1993

Whereas, because caribou eat lichens and other plants that make them vulnerable to pollution and,

Whereas, it is very hard to understand how the pollution gets into caribou and if this is a real health risk or not,

Now therefore be it resolved, that governments make sure that people in the communities are told the truth about pollution in ways they can understand and,

Further be it resolved, that governments and scientists make sure they do not alarm people about eating caribou and other country food by not explaining pollution and health risks properly and,

Further be it resolved, that governments go to communities and sit down with the people to figure out how to explain pollution and deal with it in ways that make sense to people on the land and,

Further be it resolved, that governments continue monitoring contamination of country foods but also encourage people to use country foods wherever possible unless a serious problem is found.

Porcupine Caribou Management Board Resolution No. 2-93
Consensus of the Porcupine Caribou Herd Passed by consensus November 8, 1993

Whereas, the Porcupine Caribou Herd has declined from 178,000 in 1989 to 160,000 in 1992 and,

Whereas, it is not known whether the herd is still declining or not and,

Whereas, the calving grounds of the herd in the Arctic National Wildlife Refuge are still threatened by oil development and,

Whereas, if the herd is in trouble, it is even more important to make sure its calving grounds are safe,

Now therefore be it resolved, that the United States and Canadian wildlife agencies undertake a census of the Porcupine Caribou Herd in the summer of 1994 and,

Further be it resolved, that if the 1994 census is a failure, that the agencies keep trying every year until a good count is made.

Porcupine Caribou Management Board Resolution No. 3-93
Aircraft harassment Passed by consensus November 8, 1993

Whereas, everyone knows that caribou can be harassed by aircraft and,

Whereas, extreme harassment can harm caribou by causing injuries and,

Whereas, it is very hard to change people that disturb caribou with aircraft,

Now therefore be it resolved, that governments find ways of making laws and penalties to s aircraft harassment, including prohibition of flights below 2000' over the calving grounds in June, and,

Further be it resolved, that governments work with people on the land to help catch pilots disturbing caribou and,

Further be it resolved, that government and industry scientists prepare guidelines for research that minimize disturbance of caribou.

Porcupine Caribou Management Board Resolution No. 4-93
Science and caribou management Passed by consensus November 8, 1993

Whereas, in order to manage and protect the Porcupine Caribou Herd, it is necessary to do scientific studies and,

Whereas, it is not clear to the communities which studies are needed for management purposes and,

Whereas, communities are seldom directly consulted about caribou research and,

Whereas, governments need better community support for their programs

Now there be it resolved, that scientists get together with communities and explain what studies they propose to do an,

Further be it resolved, that communities get a strong say in which studies need to be done and how they should be done and,

Further be it resolved, that governments keep communities informed about the studies and what they show and,

Further be it resolved, that governments employ users from the communities in caribou research.

Porcupine Caribou Management Board Resolution No. 5-93
Science and traditional knowledge Passed by consensus November 8, 1993

Whereas, governments make management decisions about caribou based on scientific studies, and

Whereas, traditional knowledge of the people on the land is not used for managing caribou, and

Whereas, governments give all their money to support scientific studies but little or nothing towards gathering traditional knowledge,

Now therefore be it resolved, that governments begin to work with communities to gather traditional knowledge about caribou, and

Further be it resolved, that both traditional and scientific knowledge are needed to manage caribou, and
Further be it resolved, that governments show how traditional and scientific knowledge are used in management decisions.

Porcupine Caribou Management Board Resolution No. 6-93
'1002 wilderness protection Passed by consensus November 8, 1993

Whereas, the International Porcupine Caribou Board has recognized that the calving grounds and post-calving areas are the most sensitive habitats of the Porcupine Caribou Herd, and

Whereas, studies by the U.S. Department of the Interior and Alaska Department of Fish and Game show that oil development in the calving and grounds and post-calving areas will have sever impacts on the Porcupine Caribou Herd, and

Whereas, a decline in the Porcupine Caribou Herd would ruin the communities and Alaska and Canada which depend on the caribou for cultural and economic survival, and

Whereas, the most important calving grounds and post-calving areas are located in the '1002' section of the Arctic National Wildlife Refuge,

Now therefore be it resolved, that the U.S. Congress protect the calving grounds and post-calving areas of the Porcupine Caribou Herd by granting full wilderness status to the '1002' section of the Arctic National Wildlife Refuge.

Porcupine Caribou Management Board Resolution No. 7 -93
Twinning the Arctic Refuge with Canadian parks Passed by consensus November 8, 1993

Whereas, the International Porcupine Caribou Conservation Agreement, the International Agreement on the Conservation of Polar Bears and the Migratory Bird Convention were created to facilitate international cooperation and coordination in the management of transboundary wildlife populations, and

Whereas, in both the United States and Canada, national parks and refuges have been created to further protect such wildlife,

Now therefore be it resolved, that the United States and Canada formally twin the Arctic National Wildlife Refuge in Alaska with Ivvavik and Vuntut National Parks in Canada.

11.9 Coded PCMB Transactions of the body condition studies from board minutes and observations

Date of mtg	*Coded Activity*	*Description*
8/86	Caribou manager announces study	Agency manager tells board that has implemented body condition study of the intent that study will later be organized to take data directly from hunters.
10/87	Government board member announces study	Biologist announces that body condition study requires collection of lactating cows. Associated study will ask if orphaned calves can survive loss of mother.
	User and Manager meld knowledge	User and biologists compare research findings and local observations
11/88	Government board member reports	Biologist/board member reports on body condition findings
	Gov. Board member announces	Government Biologists announces development of "superior" method for analyzing body fat content
6/89	Government Board member reports	Agency member reports that, as directed in the PCMB's interim management plan, agency will experiment with "inexpensive field sampling technique" in two areas, with expansion to other communities.
10/91	Local report of Concern	Concerns expressed by two local board members regarding collection of lactating cows. Locals' report that fellow community hunters are worried about what happens to calves.
	Government manager responds with statistics	Biologist responds with data regarding rate of survival as indicated in orphaned studies.
	Government manager responds to concern	Agency member suggest that biologist goes to community and makes presentation about research program to explain rationale and answer questions.
1/ 92	Government Board member reports	Biologist board member reports status and findings of body condition study (no report back).
5/92	Government Board member reports	Biologist PCMB member tells board about new research program which will improve body condition to finer resolution.
3/93	Agency biologist reports	Biologists reports that neither fall nor spring collections were completed because no caribou were close to highway for hunting.
	Agency biologist announces	Future funding will be sought to provide aircraft support for location of caribou in body condition study.
11/93 crisis mtg.	Agency biologist reports	Biologists reports that only 4 caribou were collected in the September collection, that caribou were late in coming, and finances ran out.
	Agency biologist announces	Biologists looking for additional funding . States when November and March collection will be started.
2/94	Agency biologist reports	Biologist tells about November collection and blood samples to test for pregnancy and diseases. Notes that the original intent of study is to collect data from hunters and expresses interest in meeting that objective.

11.10 Caribou Management Workshop/Focus Group

Informed Consent for Workshop Participants-The goal of this workshop is to understand better and improve how communities and governments work together to make decisions about caribou. All reports and papers generated from this workshop will include no people's names. Gary Kofinas agrees to follow the "Ethical Guidelines for Research of the North." This workshop is funded by the U.S. Man and the Biosphere Reserve Program and the National Science Foundation and is part of a Community Involvement in Porcupine Caribou Co-Management study. The final products from the project will include a feedback session to each participating user community, a report to the PCMB, and Gary Kofinas's U.B.C. dissertation. For more information, Gary can be contacted through 604 822-9249 (UBC is in Vancouver).

WORKSHOP RULES: Relax and enjoy! Talk WITH each other and not AT Gary. Don't dwell on problems; look for solutions. Talk about caribou! I am glad to clarify the questions; I prefer not to be the source of information. YOU are the local caribou experts!!!

AGENDA / QUESTIONS:
•What were your observations of the herd this year? (What were its movements, condition, noteworthy behavior this year?)

•Group map project, note sensitive habitats of caribou.

•What have been the important changes observed by the community over the past years?

•What do users see as influencing population, predation, and migration of the herd?

(Lunch)

•What are _(name the community)'s major concerns about the Porcupine Caribou Herd and caribou management? (local, regional, international)

•What kind of information needs to be collected about Porcupine Caribou to help make good decisions?

•What kind of things do community members expect from those people doing studies on the Porcupine caribou herd?

•What are caribou managers now doing right and wrong?

•What specific information, advice, or skills can users here (hunters, Elders, others) offer caribou management?

•What kind of changes would you like to see in future caribou management?

•Does the group have ideas, recommendations, or messages for the Porcupine Caribou Management Broad, the International Porcupine Caribou Board, its representatives, governments, or other users communities?

•Is there a need for you to discuss community hunting guidelines and ethics?

11.11 Elders' Interview Schedule

-I am a university student who has worked to protect caribou. I am now writing my university thesis (paper) on native communities' uses and management of caribou. I am interested in learning about aboriginal people's relationship with caribou and with government. Much has changed through the years in the way people live and hunt, and I have heard a few things about caribou fences and the introduction of guns, but would really appreciate learning more. I have several specific things I am interested in, but please feel free to tell me anything you think is important. With your permission, I would like to include your stories in my paper.

First, I would like to know about the traditional rules for hunting and using caribou

- What was considered appropriate and inappropriate to do with caribou. Examples:
- Were there hunting practices that people were suppose to follow?
- How did people organized themselves for hunts and using caribou during your childhood and your parent's time?
- What were the jobs of the men, the women, young people and old people.?
- Were there things having to do with caribou that women were not suppose to do, and things that men were not suppose to do.

In other words, what were the rules and how were the work and the responsibilities divided?

Can you remember a time when a person or people who did not follow those rules. What did the chief do? How did the rest of the community treat these people? What did the caribou do?

Can you remember years when the caribou didn't come through? How did people explain the movements of caribou and why they didn't become available for hunting. How did people know where to look for caribou, when they would come, and so forth?

I understand that some people have a special relationship with animals -- I hear they call it "sleeping to" a bear, or caribou, or raven, or whatever. Can you tell me more about that? How did people know which was their animal and what did it mean to have that special relationship?

I am interested in other beliefs people had about the natural world - and if there are things specific to caribou. Was caribou considered different or special than other animals? ARe there are important stories or legends about caribou?

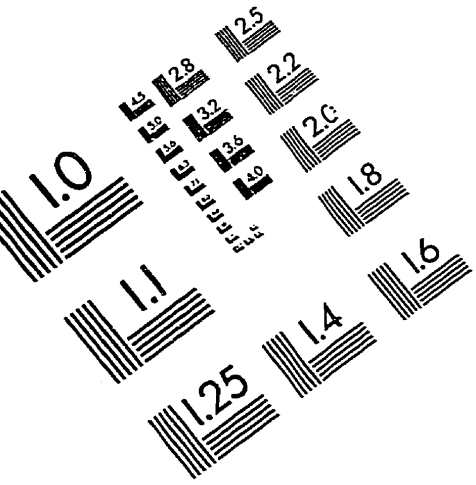
Next I am interested if the government people, like the RCMP or the Game officers, ever interfered with your hunting or uses of caribou? Did they ever tell you not to hunt for caribou in certain ways? Can you tell me about those times and when they happened.

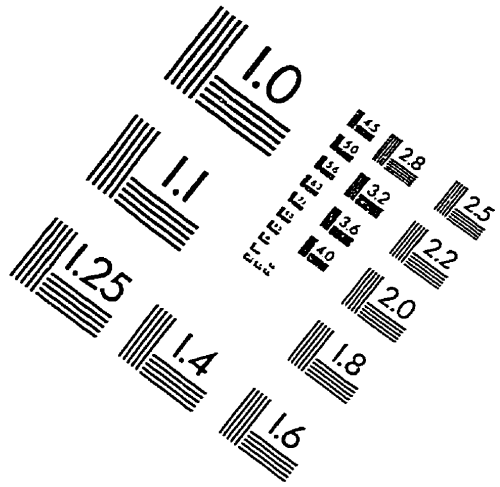
How were young people taught how to use and respect caribou?

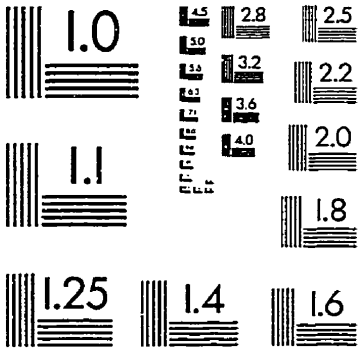
You have seen a lot of changes in your day. What do you think has had the greatest affect on your people's use of caribou -- and what advice do you give the generations who are coming.

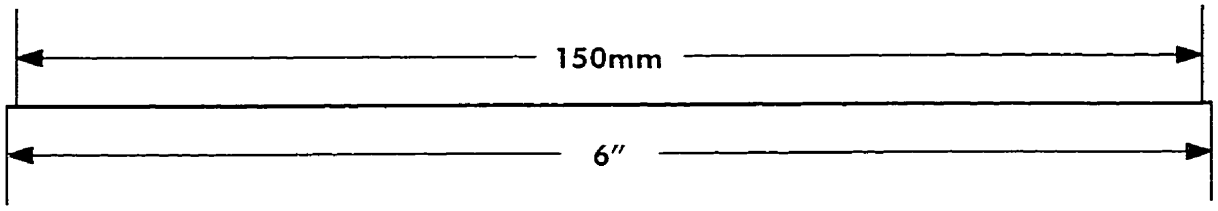
This was a helpful interview. Thanks you!

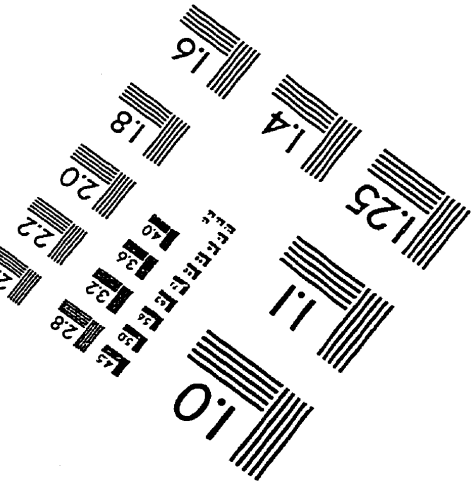
IMAGE EVALUATION
TEST TARGET (QA-3)

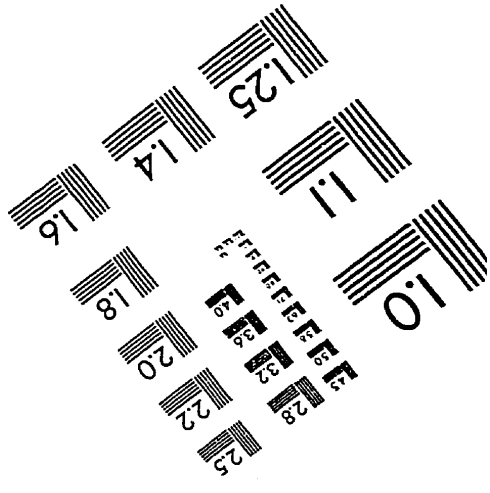












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