

**International Polar Year (Canada)
Application for Funding**

Project Title:

Arctic Peoples: Culture, Resilience and Caribou (ACRC)

Co-Applicants:

Arctic Athabaskan Council (AAC) <http://www.arcticathabaskancouncil.com/>

The Arctic Athabaskan Council (AAC) is an international treaty organization established to represent the interests of United States and Canadian Athabaskan member First Nation governments in Arctic Council fora, and to foster a greater understanding of the common heritage of all Athabaska peoples of Arctic North America.

Gwich'in Council International (GCI) <http://www.gwichin.org/>

The Gwich'in Council International (GCI) was established as a non-profit organization in 1999 by the Gwich'in Tribal Council in Inuvik, NWT, to ensure all regions of the Gwich'in Nation in the Northwest Territories, Yukon and Alaska are represented at the Arctic Council, as well as to play an active and significant role in the development of policies that relate to the Circumpolar Arctic.

Inuit Tapiriit Kanatami (ITK) <http://www.itk.ca/>

Inuit Tapiriit Kanatami (ITK) is the national Inuit organization in Canada, representing four Inuit regions – Nunatsiavut (Labrador), Nunavik (northern Quebec), Nunavut, and the Inuvialuit Settlement Region in the Northwest Territories. Founded in 1971, the organization represents Inuit interests and advocates on behalf of Inuit in Canada.

Inuit Circumpolar Council (ICC) <http://inuitcircumpolar.com/index.php?ID=1&Lang=En>

The Inuit Circumpolar Council (ICC) in Canada is a non-profit organization led by a board of directors comprising the elected leaders of the four Inuit land-claim settlement regions: Inuvialuit Settlement Region, Nunatsiavut, Nunavik, and Nunavut and the president of the national Inuit organization, Inuit Tapiriit Kanatami. They are the organization which represents international interests of Inuit in Canada and abroad.

Dene Nation (DN)

<http://www.denenation.com>

The Dene Nation is the political organization established in 1970 to represent the Dene, or northern Athapaskan-speaking peoples and their descendants, of the homeland Denendeh (the Mackenzie River valley and the Barren Grounds in the NWT).

Dr. Chris Furgal

Assistant Professor, Indigenous Environmental Studies Program, Trent University

Dr. Brenda Parlee

Assistant Professor and Canada Research Chair, Department of Native Studies,
University of Alberta

Administrative partner for grant management:

Cindy Dickson
ACRC Coordinating Office
Council of Yukon First Nations
Whitehorse, Yukon
Email: cindy.dickson@cyfn.net

Total amount of requested (3 years).....\$1,800,000

Arctic Peoples, Culture, Resilience and Caribou

Summary

Arctic Peoples, Culture, Resilience and Caribou (ACRC) is a research proposal for International Polar Year, led by a network of northern Canadian Aboriginal organizations representing Arctic communities. Northern leaders identified the concept of “community resilience” as a priority research focus to build capacity for Arctic community health and sustainability. Central to this study is the assumption that change is dynamic, uneven and unpredictable. Long term socio-ecological health and well-being for Arctic communities, means having the ability to adapt with change by accessing a range of strategies to respond to a variety of potential conditions. The **hypothesis** guiding the ACRC project is that resilience and adaptive capacity of Arctic communities are based on a variety of common key elements that can be illustrated through an investigation of a series of reciprocal community-natural resource relationships that exist across the North. The **research question** is: How will Arctic Aboriginal communities continue to be resilient and healthy in relation to the social and ecological changes which threaten important human-environment relationships now and in the future, such as that between Arctic peoples and an important country food resource such as caribou populations. Specifically, this series of community case studies will look at the role that culture and language, traditional knowledge and skills, and governance and institutional arrangements play in supporting community responses to fluctuations in access to and availability of a key local resource, caribou. In this sense, community socio-ecological resilience and health are the focus of the study, and the relationship between Arctic Peoples and caribou herds are the example through which these concepts are being investigated. It is expected that results will be important for understanding and addressing issues of resilience and community health in other regions of the North, and also in relation to other dynamic human-environment relationships (e.g. community resilience and health and declining numbers of other key country food species, or fluctuations in environmental development project opportunities).

The 3-year project includes three complementary case studies in the Eastern, Central and Western Canadian Arctic, each focused on one community harvesting caribou from a herd of importance to their people. Based on discussions with the Aboriginal organization leads and academic researchers involved in this study, one Inuit case study community (harvesting from the Beverly and Qamanirjuaq caribou herds), one Dene case study community (harvesting from the Bathurst caribou herd) and one Gwich'in case study community (harvesting from the Porcupine caribou herd) will form the basis of the field research with an International component focused on exchanging lessons learned among regions dealing with the question of community resilience, health and caribou as well. Funding is being sought from other sources to add case study communities (up to one per cultural group). The academic leads for this research project are Dr. Chris Furgal (Trent University) and Dr. Brenda Parlee (University of Alberta). They will be joined by one Community Investigator from each of the case study communities participating in the project. In collaboration with the Aboriginal organizations and their lead representatives, candidate communities for the case studies are soon to be identified. This proposal has been developed and reviewed by all Aboriginal partners involved in the project and is now being submitted for review to the IPY Federal office.

The nature of Arctic communities varies widely from place to place, and the goal of the ACRC research project is to gain a better understanding of various factors that support socio-ecological resilience and its role in community health and well-being in Arctic communities in general, with data from community and culture-

specific case studies. The research will employ a human ecology approach and each case study will investigate the importance, today and in the future, of three recognized critical elements of community resilience at various scales through an exploration of their importance in terms of human-caribou relationships. They are outlined in greater detail in Table 1 and include:

1. Social Networks
2. Traditional Knowledge, Skills and Language
3. Governance and Institutional Capacity

This multi-disciplinary approach, combined with a strong collaborative research design, and capacity-building at all levels (community involvement and training), will ensure that the research outcomes and related strategies are indeed sustainable. The ACRC Steering Committee includes one representative from each co-applicant organisation/partner: Arctic Athabaskan Council (Cindy Dickson), Gwich'in Council International (Bridget Larocque), Inuit Tapirit Kanatami (Eric Loring), Inuit Circumpolar Council (Stephanie Meakin) and Dene Nation (Bill Erasmus / Camilia Zoe-Chocolate); Chris Furgal (Trent U), Brenda Parlee (U Alberta), the three community PIs, and the CYFN Administrator (Cindy Dickson). Kathleen Fischer, Executive Director, IPY Federal Program Office will be an ex officio member.

At the end of this IPY research program, participating Arctic communities, researchers and all levels of government will have strong new evidence upon which to base various projections, and a range of strategic plans, actions and policies to guide community resilience and health in response to changing environmental and other conditions. The unique organizational structure, the emergent model, increased capacity and research outcomes will contribute to the Canadian IPY legacy.

Introduction

International Polar year is a science-based event that has occurred every 50 years. In the current 4th celebration, The Canadian International Polar Year program has provided leadership in the circumpolar research arena by emphasizing the ‘human dimension’ as a central theme, which has been endorsed internationally. In Canada several funded IPY projects will focus on the health and well-being in northern communities. It is the understanding of the northern Aboriginal organizations that the national IPY committee has reserved \$1.8 million to consider a proposal that contributes directly to the resilience and capacity of Arctic communities. In response, several northern organisations came together to develop this proposal, **Arctic Peoples, Culture, Resilience and Caribou (ACRC)**.

This three-year proposal (2008–2011) is the product of northern community organization leadership, and arose in response to thoughtful discourse in search of a common issue that would benefit the Arctic peoples of Canada. As is well known, the nature of Arctic resources and Arctic peoples change over time and as a result, communities are continuously being faced with new challenges and threats to the continuity of traditional livelihoods and lifestyles which have been central to their health and well-being for hundreds if not thousands of years. As this is common element to all northern communities, it was decided that a project focused on learning more about Aboriginal community-health and socio-ecological resilience would best benefit the organizations and regions engaged in this process. It is therefore being proposed to conduct a three year study on socio-ecological resilience and community health, as seen through the lens of an investigation on the relationship between different Arctic peoples and a common resource; caribou (*Rangifer tarandus*).

The founding partners of this proposal (Arctic Athabaskan Council-AAC, Gwich’in Council International-GCI, Dene Nation, Inuit Tapiriit Kanatami-ITK and the Inuit Circumpolar Council-Canada-ICC) believe that enhancing our understanding of the factors that influence community resilience will provide the foundation for future policy and program action for a variety of issues on a number of different fronts. As the focus of the study is not caribou per se, but rather understanding some key elements of communities and their response to changes in this common resource – so central to the lives, culture, health and livelihoods of many Canadian Arctic Aboriginal communities – it is hoped that the results of this work will be applicable to other community-environment relationships in which resilience is critically important to protect and sustain health and well-being.

The lead organizations in this project represent Aboriginal populations in the Canadian Arctic, with links around the entire circumpolar region. All have research experience and expertise and have frequently collaborated on research initiatives in the past. Through a relationship with two recognized academic PIs, the Aboriginal organizations propose to develop a strong and balanced multi-disciplinary research team from the Aboriginal and University research communities.

Setting: Social-Ecological Context

The health and resilience of the communities of Northern Canada are inextricably linked to the environments in which they live and the resources upon which they rely, such as the caribou herds that range across their territories. Caribou are central to the lives of Arctic peoples, touching every aspect of northern life: food and health (Wein, Freeman and Makus, 1996; Parlee et. al., 2005a, 2006; Van Oostdam et al., 2005), clothing, cultural and economic activities, spiritual and social meanings (Ohmagari and Berkes, 1997), education, mental health (McGrath-Hanna et al., 2003) and all other elements (Dinero, 2007). However, in recent years some caribou herds have experienced significant

declines (e.g. Bluenose East and West, Cape Bathurst and Porcupine herds) and these resources are believed to be under threat from a number of pressures. Recent declines have likely been related to a variety of factors including, but not limited to, climate change and variability. Additional factors involved include increased competition between caribou and muskox occupying the same habitat, increased incidence of parasitic infection, emigration to adjacent areas, wolf predation and hunting (Gunn et al., 2006) and resource development. Many of these factors are projected to continue, if not increase in the future with a warming and increasingly accessible Arctic region (e.g. Furgal and Prowse, 2008) further threatening the central role that caribou and other environmental resources play in community social, cultural and physical health and well-being. These trends are particularly important when considering the importance of the environment as a major determinant of Aboriginal health and well-being in the North.

The health status of northern Canadians is lower than the national average, as measured by a number of health indicators (Statistics Canada, 2001). All territories report lower life expectancy and higher infant mortality rates than the national averages. The health status of Aboriginal northerners is, for many indicators, significantly below that of non-Aboriginal northern residents and the national average. The health and well-being of many northern Aboriginal residents is inextricably tied to the land. Currently, the economies of many northern communities are a mix of traditional land-based renewable resource–subsistence activities and formal wage-earning activities. Estimates of Nunavut’s land-based economy, for example, are between 40 and 60 million dollars per year; with an estimated 30 million dollars attributed to all food-oriented economic activity (Conference Board of Canada, 2005). However, the true value of such activities is difficult to measure, as they are significant contributions to the social fabric of communities and provide more than monetary benefits. The traditional economy is similarly important in other northern regions (Duhaime et al., 2004). More than 70% of northern Aboriginal adults report harvesting natural resources via hunting and fishing and, of those, more than 96% did so for subsistence purposes (Statistics Canada, 2001).

However, food insecurity in Canada is highest in the three territories (Statistics Canada, 2001, 2005a) and the cost of a standard list of grocery items can be up to three times higher than in southern Canada (Statistics Canada, 2005a). In communities not accessible by road (e.g. Nunavut, Nunavik and Nunatisavut and some smaller regions and communities in the NWT and Yukon) access to market food items is reliant upon shipment via air or sea and this significantly increases the price. Data from 2001 show that 68% of households in Nunavut, 49% of those in NWT and 30% of those in the Yukon had at least one occasion in the previous year when they did not have the financial resources for sufficient food. Yet, Chapin et al. (2006) report that despite the physical, economic and administrative challenges to health for some residents in the North, the deterioration of cultural ties to land among Aboriginal people is the most serious cause of decline in well-being within circumpolar regions. The loss of connection to the land through changes in ways of life, loss of language and dominance of non-Aboriginal education systems are impacting health and well-being in various and long-lasting ways.

Historically, a variety of factors have supported communities’ abilities to respond to changes in local environments and resources, such as caribou, and maintain their central place in community health and well-being. Many of these are still important today. They likely include such things as access to economic resources to support hunting and traveling activities on the land, the strength of local traditional knowledge systems to understand changes in local environmental conditions and support adaptive hunting behaviours, flexible management regimes to protect local hunting access for

subsistence and other purposes, and the existence of strong social networks in communities to support distribution of resources for the hunt (e.g. equipment) and from the hunt (e.g. fresh traditional foods) as well. Therefore, regardless of the cause of the changes taking place in local environments, it is important to better understand these critical elements which support a community's ability to respond to change and maintain socio-ecological health and well-being as the one constant in most northern Aboriginal communities is change; change in local environmental, social and economic conditions. Therefore, a better understanding of the factors that support communities' ability to respond to change and minimize negative impacts is particularly valuable for the future.

Background Concepts and Theories:

The research is guided by the multi-disciplinary literature and theory on related to health and well-being and that of resilience. More specifically we focus on the interconnections between social and ecological systems or social-ecological health and social-ecological resilience.

Social-Ecological Health

Land-based cultures require healthy ecosystems because the integrity and health of the natural environment is important for the provision of goods and services that people need to survive (MEA, 2003). In the case of many Aboriginal groups, this connection between people and environment is more than a matter of survival; the health of the land and the health of the community are one and the same. This is in part because the local environment is considered to be a part of social and cultural identity (Adelson, 2000; Brightman, 1993; Nelson, 1986).

The concept of health is not an objective or static idea, and it varies across cultures. The usual Western construction of "health", as the absence of disease, dominates research on Aboriginal health in Canada; it tends to focus on chronic and infectious diseases and related social problems. However, the concept of health among many indigenous peoples is very different from this notion. Health for the Cree of northeastern Canada, for example, has to do with the ability to live off the land, the nature of social relations and cultural identity, as well as the body. The Whapmagoostui Cree idea of "being healthy" translates as "being alive well" (Adelson, 2000). In the Denesoline community of Lutsel K'e, health translates as the "Dene Way of Life" (Parlee et al., 2007). For the Gwich'in people of Fort McPherson, ecohealth includes a diversity of values that challenge disciplinary thinking: the ability to harvest food from the land, stewardship, self-governance and spiritual relations, as well as individual and family well-being (Parlee et al., 2005b). Inuit conceptualizations of health reflect both a strong connection to the land as well as a social determinants of health approach. Among the Anishinaabe (Ojibwa), the land is described as Mother. People, like the rocks, animals, and trees are born from her. As one elder commented, "without her we would not live" (Wilson and Rosenberg, 2002; Wilson, 2000).

In the circumpolar north, there are many emerging human health problems and broader issues of community well-being that are being linked to environmental conditions. They include such things as the threat of appearance of new vector borne and zoonotic diseases (Furgal and Prowse, 2008), neurodevelopmental impacts associated with contaminant exposure via traditional food pathways (e.g. VanOostdam et al., 2005), as well as the emergence of a variety of chronic illnesses associated with a combination of social, cultural, and environmental factors supporting a trend towards more western or southern based diets and lifestyles.

This awareness in the connection between human social and physical health and the environment has led

to interest in studying social and ecological systems as an integrated whole. Although western science has only begun to study these interconnections, much can be learned about the social, economic, cultural and ecological dimensions of health from Indigenous knowledge and practice. In northern Canada, human-caribou relationships provide a valuable context for understanding health in multiple regions and cultures in the circumpolar north.

Social-Ecological Resilience

Resilience has been important themes in the research literature of a variety of disciplines and in their application to a number of research issues for some time. These concepts, often regarded as the opposites of ‘vulnerability’, provide a more positive view of an individual’s or community’s ability to deal with pressures, stress or disaster (Walker and Salt, 2006). Additionally, this understanding sheds light on how individuals and communities can recover or heal from impact and enhance their ability to deal with stress or pressure in the future. These concepts have been important themes in the literature of individual trauma and healing (Landau, 2007), community health and nursing (Tobin and Whiteford, 2002; Kulig, 2000), community development and planning, hazards (e.g. Ford and Smit, 2004; Smit and Pilifsova, 2001) and disaster relief and response (Landau and Saul, 2004). Recent arguments in the community capacity literature associated with climate change (Tompkins and Adger, 2004) indicate a need for policies and programs that will enhance or support community adaptive capacity and socio-ecological resilience of communities facing climatic change and environmental variability in the future.

We use the terms ‘social-ecological resilience’ as defined by the most recent Intergovernmental Panel of Climate Change Fourth Assessment Report (IPCC, 2007) where:

Resilience is:

“The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change” (p. 880).

and, ‘Adaptive capacity’ is:

“The ability of a system to adjust to [climate change (including climate variability and extremes)] to moderate potential damages, to take advantage of opportunities, or to cope with the consequences” (p. 869).

In the context of the circumpolar north and Arctic Aboriginal peoples, it is argued that there is a need to consider resilience and adaptive capacity rather than solely the impacts of environmental and other forms of stress on communities to fully appreciate and respect the inherent adaptive abilities of northern cultures and people which have helped them survive and thrive in these environments for thousands of years. Additionally, in the face of increasing social, economic and environmental change, the ability to assess and understand community and individual resilience and adaptive capacity supports the process of identifying weaknesses to target with specific policies and programs to enhance the ability to deal with future pressure or threats.

For several years now research has turned from its focus on solely descriptive models to predictive and sustainable models for strategic planning (Berman et al., 2004; Kruse et al., 2004; Robards and Alessa, 2004). Throughout the recent literature there is a commitment to the inclusion of the individual and community as partners in the research and planning process, and/or as a source of important social and

ecological knowledge for planning (Duerden, 2004; Ferguson et al., 1996; Kofinas et al., 2003). Collaborative models of research and planning are evident across disciplines, ranging from the work of Richmond et al. (2007) on "thriving" in aboriginal communities, to ecological studies of adaptability and resilience (Angell and Parkins, 2007). This proposal takes a collaborative approach to an investigation of health and resilience in three case study communities. The degree of community leadership and innovative research design are unique and constitute an innovative contribution to research theory and practice.

Research Design and Methods

The project will consist of three community case studies, each located in one of the three Territories and associated with each of the three cultural groups directing the project (Inuit – Nunavut; Dene – NWT, Gwich'in – Yukon). The case studies will investigate central aspects of socio-ecological resilience at three different scales (individual/household, community and regional) in standardized ways so as to facilitate data comparability and integration while at the same time aiming to gain a comprehensive understanding of the critical elements of resilience.

Case Studies: Health and Resilience

Three case studies will be developed to study how northern Aboriginal communities deal with environmental change in ways that ensure their health and well-being and that of their environment. Some of the key issues and questions identified by northern partners at planning meetings for this project to date include:

- How can our communities work together to deal with changing environmental conditions, including change in the availability of caribou?
- How will our socio-economy, culture and health be affected by declining caribou numbers? And how do we minimize this impact?
- What kind of policies should be developed to help us address change in the environment and our communities?

A focus on socio-ecological resilience to attempt to address questions along these lines is not new in the North or in Canada; research over the last decade or more has revealed some key attributes of health and resilience that can help address these questions (Robards and Alessa, 2004; Berkes and Jolly, 2001; Chapin et al., 2006; Smit and Pilifsova, 2001) and the scales at which these concepts can be measured or understood (Landau and Saul, 2004; Landau, 2007). They include such things as:

- Perception of the issue;
- Diversity in access to economic resources;
- Diversity in access to human resources (skills and expertise);
- General health status;
- Cultural (Traditional) Knowledge;
- Social capital (support networks);
- Leadership;
- History and experience with pressure/stress;
- Political / governance structure and power;

among others. The matrix below (Table 1) reflects the selection of three central themes related to resilience drawn from team discussions and the literature that are of particular interest to the project team and therefore will be used to guide the study, and integration of data. The purpose of the matrix is to ensure comparability of data among the study communities, and to ensure detailed examination of resilience and adaptation in each case study at various scales or levels of organization.

Table 1. Organization of three central elements of socio-ecological resilience to be studied.

	Local			Regional	Circumpolar
	Individual / Household	Inter-household / extended family	Community		
Social Networks	Role of networks and sharing of caribou among individuals for community health and well-being	Role of networks and sharing of caribou among households for community health and well-being	Role of sharing of caribou within community (e.g. community freezers and distribution networks) for community health and well-being	Role of inter-community and inter-regional trade and sharing and other regional processes for community health and well-being	Role of inter-regional trade and sharing and other international processes for community health and well-being (circumpolar support networks)
Traditional Knowledge and Language	Individual and household role of TK generation, use, and value/respect related to caribou	Household and family role of TK generation, use, and value/respect related to caribou	Role of community programs (school and other) for TK generation, use and value/respect (e.g. school inclusion of TK, role of land camps etc)	Existence of regional or Territorial policies and legislation for TK; Role of TK in community based monitoring efforts; Scaling up of TK from local to regional level (collectives – Voices From the Bay)	Existence of Territorial or circumpolar policies and legislation for TK; Role of TK in circumpolar monitoring and assessment efforts; Scaling up of TK from local to circumpolar level (collectives – e.g. SAON, ACIA)
Governance and Institutional Capacity	Roles and responsibilities within and between households of individuals related to caribou hunting and preparation; Role of the “super hunter” (professional hunter) in communities; Gender roles and resources		Role of co-management structures, HTOs, RRCs, for resource resilience; Role of traditional laws and ‘taboo’ in protecting resilience in caribou-human relationships; Role of these things (formal decision making bodies and informal or traditional ones) in enforcing behaviour	Role of circumpolar international agreements, decision-making bodies for herd management and learning re: resilience	

The study will focus on each of the three following themes at each of the three levels in each of the three case community studies:

- *Social networks - In the face of variable and declining caribou numbers, what is the importance of social networks for distribution of resources to support caribou hunting and resources gained from the hunt within family groups, between families in the same community and between communities or regions now and in the future?*
- *Knowledge and Culture – In the face of variable and declining caribou numbers, what is the importance of traditional knowledge, cultural skills and language in the continuity of*

caribou hunting, distribution, preparation and consumption at the individual, household, community and regional scales now and in the future?

- *Governance and Institutions - In the face of variable and declining caribou numbers, what is the role of different wildlife governance and institutional structures and processes in managing access to and harvesting of caribou resources at the community and regional scales now and in the future?*

By the very nature of the diversity among Arctic communities and regions, case studies will reflect a diversity of socio-economic conditions, cultural groups and critical scales which factor into ensuring health and resilience for current and future generations of Arctic residents in terms of the importance of caribou. Elements of the research projects will consider how social networks, knowledge and culture and governance/institutions relate to and possibly foster health and resilience at different social scales (individual/household, inter-household, community, region, circumpolar). The synthesis of regional investigations will provide a national northern view on these topics.

Each case community is being selected based on the following criteria:

- Strong community-caribou relationship via –
 - Historical and contemporary cultural importance of caribou in community life;
 - Active harvesting of caribou by a variety of households / individuals in the community;
 - Caribou is central component to average community diet (as determined by past dietary surveys or qualitative observations);
- Geographic location in one of three Territories
- Member of one of the partner Aboriginal cultural groups directing project
- Interest in participation to the study and engagement of community residents in project
- Feasibility re: logistics of community accessibility and travel for community-based research
- Feasibility re: data access in community
- Likelihood of highlighting one or more elements of critical framework re: socio-ecological resilience

Case Study 1: Baker Lake, Nunavut

Baker Lake is home to 1,800 residents and is Nunavut's only inland community. It is situated at the mouth of the Thelon River, close to the geographic centre of Canada. The Inuit name for Baker Lake is Qamani'tuuq, meaning, "where the river widens". For the Inuit of Baker Lake, the Thelon and Kazan Rivers are a vital source of caribou, fish and spiritual renewal. Remains of Inuit campsites are found along the rivers, archaeological evidence of the homeland of the historically nomadic 'Caribou Inuit'. The Beverly caribou herd crosses the river in large groupings at a number of spots during the herd's annual migration; the location of the fall Caribou crossing is a current National Historic Site (<http://www.nunavuttourism.com/new/site/communities.asp?IDRegion=2&IDPage=108>, accessed June 25, 2008)

Historically, the lives of the Aboriginal people living in northern Manitoba, northern Saskatchewan and the adjacent portions of the Northwest Territories and Nunavut have been connected to the Beverly and Qamanirjuaq caribou for food, clothing and shelter. When caribou were plentiful, the health of family

groups and individuals thrived. When caribou were scarce in this region, hardship, and in some instances, starvation occurred. The caribou are still central to the culture and lifestyle of Inuit in this region although many aspects of daily lives have changed.

In the late 1970s, declining herd numbers and increasing development in the North, and changing political times gave rise to the creating of the co-management of this resource with the establishment of the Beverly and Qamanirjuaq Caribou Management Board. Current threats to the herd include climate change and resource development with the development of several base metal mines proposed in this region.

Case Study 2: - Gameti, Northwest Territories

The community of Gameti (formally Rae Lakes) is home to 301 Tlicho (Dogrib) residents and is located within the Canadian Shield habitat and Denendeh. Gameti is located midway between Great Slave and Great Bear Lakes, a traditional hunting area within the Bathurst Caribou winter migration route. It originated as a hunting camp for Tlicho people who wanted to pursue a traditional lifestyle, and its residents continue to rely heavily on subsistence hunting, especially on caribou of the Bathurst herd (<http://www.tlicho.ca/communities/gameti/index.htm>, accessed Sept. 17, 2008; http://www.stats.gov.nt.ca/Infrastructure/Comm%20Sheets/Rae_Lakes.html, accessed Sept. 17, 2008).

Caribou have great social, economic and cultural importance to the Tlicho, and the relationship between the Tlicho and caribou is based on mutual respect. The Tlicho harvest more caribou from the Bathurst herd than any other group of people, and community hunts continue to be an important event in Tlicho communities. Most communities still have some full-time hunters, and many women continue to tan hides, dry meat and make winter clothing from products of the hunt (Dogrib Treaty 11 Council, 2001).

“Georgina Chocolate (Personal Communication: 00/02/29) has heard several elders, including her grandfather Pierre Quitte, state that: the caribou are like the creator, when they know you need them they will come to you; when you are alone and you pray to them they will come and you will have food and clothing. Like the creator they take care of us. When they know you are in need they will help you.” (Dogrib Treaty 11 Council, 2001, pg. 20).

The population of the Bathurst herd has been declining at about 5% per year over the past decade, according to the GNWT Wildlife Division (<http://www.nwtwildlife.com/NWTwildlife/caribou/bathursttop.htm>, accessed Sept. 17, 2008) and threats to caribou and their migration are associated with climate change impacts and human impacts on caribou habitat from mining and roads. Currently, two diamond mines and a gold mine are operating within the herd’s range and two additional diamond mines are proposed. The newly formed Wek’eezhii Renewable Resources Board oversees management wildlife and habitat, including the Bathurst caribou herd.

Case Study 3: Gwich’in Case Study – Aklavik, Northwest Territories

Aklavik is located in the Mackenzie River Delta and is home to 594 primarily Gwich’in and Inuvialuit residents. Gwich’in have subsisted on caribou for thousands of years, and continue to rely on the Porcupine Caribou Herd for nutritional, cultural and spiritual needs. Gwich’in traditional lands in Alaska, the Yukon and the Northwest Territories are on or near the migratory route of the Porcupine River herd, which is reflective of the significance of the relationship between Gwich’in and Porcupine

caribou.

The lands on the coastal plain of the Arctic National Wildlife Refuge are the birthing and calving grounds for the Porcupine Caribou Herd, and are known to Gwich'in as *Vadzaih googii vi dehk'it gwanlii* – the sacred place where life begins. Traditional practices that demonstrate respect for caribou remain strong in communities, including participation in the annual caribou harvest, hunting protocols, sharing the meat, using all parts of the caribou and giving thanks (<http://www.gwichinsteeringcommittee.org/gwichinniintsyaa.html>, accessed Sept. 17, 2008).

The herd is managed by the Porcupine Caribou Management Board, a co-management board with representatives from the Government of Canada, Government of Yukon, Government of Northwest Territories, Inuvialuit Game Council, Gwich'in Tribal Council, and the Council of Yukon First Nations. The Porcupine Caribou Herd population has been declining since the late 1980s, and the PCMB recently passed a resolution calling for the herd's conservation (<http://www.taiga.net/pcmb>, accessed Sept. 17, 2008).

Many of the key issues related to health and resilience of Aboriginal people are not specific to a local, regional or circumpolar scale but are multi-scale in nature. The project will therefore work collaboratively with Aboriginal organizations and co-management boards to explore how knowledge is shared and how policy is constructed horizontally (across geographic space) and vertically (across levels of organization). The research aims to identify what forms and vehicles of knowledge transfer and policy development facilitate social learning. Of particular interest are studies on: (i) how does social learning happen within organizations at community, regional, circumpolar scales; (ii) how is traditional knowledge, which is conventionally considered local in scale, relevant at larger scales; (iii) what kinds of institutional arrangements are most effective at addressing cross-scale community-caribou issues.

Methods:

Each case study team will select methods appropriate to the community in which they are working. Methods will be proposed by the case study research team and regularly reviewed with relevant Elders and community (Aboriginal and University PIs) representatives to ensure they are culturally appropriate and scientifically rigorous. All case studies will rely on standard and accepted methods in the social and human sciences and will include: document review and research, key-informant interviews, focus group discussions, and participant observation (as in Denzin and Lincoln, 2005). All methods will be adapted to suit the specific cultural context (e.g. focus groups will take place on the land at a hunting camp rather than in a room in the Hamlet office when possible). Individual community case study projects will investigate each of the three central themes to socio-ecological resilience and at each of the specified scales. The project activities may be separated into sub-projects but each community case project will conduct work to investigate the different aspects of each element (social networks, TK and cultural skills, and governance and institutions) and their importance for resilience and health at the identified scale (individual family, community, region). Further, through workshops and youth exchange initiatives (see budget module) the program will incorporate an international component to exchange knowledge and learn across regions within the circumpolar north. All aspects of the research process will include elements of capacity building for community members and graduate students. Where possible, recruitment of graduate students will place special emphasis on Aboriginal and other northern students to maintain the northern specificity of the research team.

Capacity building, training of Aboriginal peoples and leaders

(a) The overall project is envisioned as a meeting and integration of the various kinds of knowledge, skills and ways of knowing related to caribou and their importance to Arctic peoples. The process of collaborating with the various fields of knowledge and skills across disciplines during proposal development will provide opportunities for scholars, Elders, hunters, healers and others with relevant skills, experience and knowledge to share these understandings. A central goal of ACRC is inclusion of traditional knowledge: practical, ecological, spiritual, and cultural, to promote community health and resilience and adaptive capacity, and from all sources—all members of the community from youth to Elders, both informal and formal knowledge.

The ACRC project will build capacity by:

- Increasing capacity of leaders to conduct and to monitor research
- Providing training to community members (particularly youth) regarding community resilience and adaptation
- Mentoring of youth by hunters to learn the range of knowledge related to caribou harvesting, management and sustainable use practices
- Mentoring of future leaders by Elders and local health experts regarding spiritual and healing properties related to caribou
- Transfer of knowledge from experienced women to younger women concerning the processing (including preservation and food preparation) of caribou products, and production of clothing and other products, thus increasing livelihood opportunities for young people.
- Enhancement of community resilience, health and well-being through traditional feast and food sharing ceremonies within and beyond communities and regions
- Provide administrative knowledge and organizational skills related to the research program that are transferable to various aspects of self-governance.

(b) Capacity building, training of scientists

ACRC presents an opportunity for both community and academic scientists to explore issues of paramount importance in a unique, collaborative relationship, with outcomes that will have international implications. The project will promote mutual capacity building. The case studies will improve the capacity of community and academic leaders alike to design and conduct research on emergent issues; the need for continuing research of this type is well-established, and the capacity is yet to be developed. Graduate students will be recruited, funded and trained in the community-based approach as well as participating in the creation of new knowledge in their respective disciplines. Interdisciplinary experience will also be an important aspect of graduate training experience. Preference in graduate recruitment will be given to students from the North; senior undergraduate students from northern communities will be encouraged to pursue graduate training within the program.

(c) Capacity building, training of governments

Another goal of the knowledge translation process in the larger project is to increase levels of knowledge, experience and understanding of Arctic Aboriginal communities among all levels of government in Canada. Each theme will develop training opportunities for local government officials and leaders (both formal and informal), by involving them in the project as partners, or at appropriate planning, implementation and communication workshops.

(d) Training of students

Each case project will develop training opportunities for students, including students in elementary and high school, undergraduate and graduate students, and post-doctoral scholars. Training will range from contributions to formal curriculum to participation in hunting camps and other land-based activities, involving Elders, and mentoring from project personnel.

(e) IPY conferences: All research team members will contribute substantially to conferences in all relevant disciplines. Similarly, results of the studies will be presented in appropriate academic journals. A workshop inclusive of the many partners in this extensive program will be held in the North at the end of the research period as one of the strategies for knowledge dissemination and translation. Funding for this event will be sought beyond the ACRC grant. It is likely that participation and presentation of preliminary findings will be planned for the International Union of Circumpolar Health Conference to be held in Yellowknife in September 2009 (Year 2 of the project).

Aboriginal team members will attend the December 2009 Copenhagen Conference of Parties to present the research process and outcomes to date. Graduate students will be encouraged and mentored to present and publish papers at academic conferences, and to address community groups with team members when possible.

Research Team

Academic Principle Investigators

Chris Furgal (PhD) is currently an Assistant Professor in the Indigenous Environmental Studies Program, cross-appointed between the Departments of Environmental Science and Indigenous Studies at Trent University. He is the co-Director of the Nasivvik Centre (Inuit NEAHR Centre) for Inuit health and changing environments co-administered between Laval and Trent Universities. His research focuses on community decision making related to environmental health issues, environmental health risk assessment, management and communication with northern Aboriginal communities. He has been working with Inuit communities and organizations on these topics for more than 15 years. Most recently he has lead the assessment of climate impacts in the North for the Natural Resources Canada and Health Canada climate change assessment processes (Furgal and Prowse, 2008; Furgal, 2008) as well as been a lead author on the Arctic Climate Impact Assessment (Berner and Furgal, 2005) and IPCC Fourth Assessment Report (Asinimov et al., 2007). He is a multidisciplinary researcher with significant experience working with northern Aboriginal communities on research and training initiatives related to the topics proposed here.

Brenda Parlee (PhD) is Assistant Professor and a Canada Research Chair (Tier II) in Social Responses to Ecological Change. She holds a split appointment between the Faculty of Native Studies and Faculty of Agriculture Life and Environmental Sciences in which she teaches both undergraduate and graduate courses in environmental sociology and on Aboriginal health.

Parlee has over ten years of experience working with communities in the Gwich'in, Sahtu and Treaty #8 regions of the Northwest Territories on a range of social and environmental research projects. The proposed research will build on recent traditional knowledge research on *Denesoline* and Gwich'in knowledge of caribou movements, ecosystem health indicators and community-based monitoring of community well-being. Parlee also was awarded a Tier II Canada Research Chair in Social Response to Ecological Change for 2007-2011 and a related Canadian Foundation for Innovation grant for a

Community-Based Research Lab. The resources mobilized through these awards (including direct and in kind contributions from northern partners) will enrich proposed research activities by attracting and funding of highly qualified personnel (graduate students) and infrastructure needed for northern fieldwork.

Community Principle Investigators

One Aboriginal lead researcher per case study is being recruited to work with the academic leads and be engaged on the project in the community. Individuals are being sought that have experience with social and environmental research but will also gain further experience and training in research through their participation in the project.

Governance

Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Council-Canada and all other national or regional Aboriginal groups (i.e., ITK, CYFN, Dene Nation) have partnered to lead this study. The planning group responsible for identifying the theme for ACRC envisioned an expansion of expertise involved in this project to include traditional knowledge holders and experts from across the North, enhanced by academic knowledge and expertise from relevant IPY and non-IPY engaged research. The research team will include community-based experts, academics, consultants, facilitators, and representatives of various activities and organizations across the north including various levels of government, and private sector / economic enterprise representatives, with complementary knowledge and skills related to the four overlapping levels of study.

The ACRC program will be guided by the Steering Committee (please see Terms of Reference in Appendix), including the seven Co-Principle Investigators, which will be responsible for the overall project and case study direction, review and coordination. The Steering Committee will meet at least every 6 months throughout the 3-year term of ACRC activities. Each case study will have its own academic and community PI, and will select its team of students and research assistants. The day-to-day administration and fund dispersal will be coordinated by the CYFN office in Whitehorse.

Relation to other IPY Research

This application presents a proposal that addresses an identified gap in the scope of current health research within the Canadian IPY program, with a specific focus on health and resilience in Arctic communities including adaptation, traditional knowledge and local resource practices. Among Canadian IPY projects that have been funded in previous rounds, several address northern health issues. The ACRC researchers will link with other Health and Well-Being teams as their research issues overlap. For example, Dawn Bazely (York University) leads *The Impacts of Oil and Gas on Peoples in the Arctic*; and Barry Smit (University of Guelph) leads *Communities in the Changing Arctic*. Both are multidisciplinary studies of adaptive capacity. Grace Egeland (McGill University) leads the *Inuit Health Survey: Inuit Health in Transition and Resiliency*. Shele Graupe's team with the Vuntut Gwich'in First Nation is addressing *Environmental Change and Traditional Use in the Old Crow Flats in Northern Canada*. And finally, Don Russell (Yukon College) and his team have funding for a project to *Monitor the Impacts of Global Change on Caribou and Wild Reindeer and Their Link to Human Communities (CARMA)*.

The CARMA project is particularly important to the ACRC proposal, in terms of complementary research strategies and community linkages. CARMA will be examining co-management and

community-based protocols for caribou monitoring. There will be shared opportunities for data collection and management, and particularly for education and outreach. Russell's work with the Porcupine and Beverly herds will be an important resource for the ACRC western case study team.

This cluster of IPY projects addressing Arctic community wellness creates a complementary arena for study, wherein the contribution of the ACRC research fits well. ACRC is unique in its community-led structure, and in examining the human community-caribou relationship as reciprocal, and as a lens for identifying outcomes that can lead to adaptive strategies for Arctic communities. ACRC will communicate regularly with the other IPY projects, sharing experience and knowledge throughout the IPY framework and beyond.

Other potential partners

The team is aware of the importance of building and maintaining partnerships with funders, and with policy makers throughout the research process. The ACRC research process and results will have relevance for other organizations and activities as well. For example, The Natural Resources Canada report, *From Impacts to Adaptation: Canada in a Changing Climate 2007*, in which PI Chris Furgal led the Northern Chapter, is part of the research foundation upon which ACRC will build. Furthermore, Canada will be chair of the Arctic Council in 2013, and ACRC outcomes will help Canada to establish its priorities for community health and resilience enhancement.

Through her current SSHRC-funded study, *Community Perspectives on Changing Caribou Populations*, PI Brenda Parlee brings an established research network to the ACRC study. Other elements of the ACRC program will be submitted for funding to SSHRC, and to CIHR. Health Canada, through FNIHB, has provided funding for ACRC proposal development, and will continue to be a partner as ACRC develops.

The NEAHR/ACADRE network, a series of funded programs for Aboriginal health research across Canada, is linked to ACRC directly through PI Chris Furgal, who is also a co-Director of the Nasivvik Centre at Laval and Trent University. As the ACRC initiative conducts its work partnerships will be developed with foundations and other organisations for education, communication and outreach activities. In many cases these relationships already exist or are already being made.

Program & Policy

A Program and Policy team will be struck by the ACRC Steering Committee at the end of the first year to monitor and guide results that have policy implications and to make connections on behalf of the project team with regional and Territorial policy makers. The Program and Policy leader will sit on the Steering Committee. The responsibility of this group will be to ensure that results are prepared in a format that is useful to the appropriate policy leaders and to ensure that those individuals are exposed to the results being generated by the project as they become available. This responsibility is closely related to communication and outreach, but the goals of the ACRC project merit special attention re: policy implications. This will require inter-theme communication to determine priority opportunities, and to ensure that each initiative builds on all available resources across themes.

It will be the responsibility of this team to ensure that relevant information is transferred to policy-makers and planners at all levels (local to international levels) throughout the life of the ACRC project. Key policy makers will be invited to the ACRC Steering Committee meetings (or appropriate

discussions within them) to be informed of progress and potential policy implications of knowledge being generated under the research program.

This team will work closely with other IPY outreach and communications programs to ensure that the various kinds of knowledge and experience collected and/or generated during the life of the project will be shared as widely as possible with various communities and organizations across the North, and that mechanisms will be developed for this knowledge to be shared with others in the south, and internationally.

Outcomes

The study population will include Arctic communities within the ranges of specific Arctic caribou herds. The range of some caribou herds reach into the northern parts of several Canadian provinces, and thus the outcomes may be relevant to communities in those areas as well. Although there are cultural differences across the North, the partners expect that through this project communities will share their knowledge and skills with each other, thus enhancing inter-community capacity and resilience, and establishing a long term sustainable network of Arctic communities with expertise to share and exchange knowledge.

In general, it is expected that the cross-cutting nature of this program will create new communication channels between various levels of leadership/power that reflect the multi-disciplinary nature of community resilience research. The outcomes of this project will address human resilience and adaptation to shifting patterns of caribou associated with, among other things, the effects of climate and other forms of change. This understanding will contribute to conservation and management of caribou herds and protection of access to them by Arctic Aboriginal peoples within a context of changing circumstances. The resilience of young people will be enhanced through the transfer of traditional skills and knowledge regarding the caribou: the skills related to harvesting, processing, sharing and consuming, and knowledge related to caribou condition, distribution and habitat, and the spiritual and cultural practices related to caribou utilization and stewardship that provide the security, resilience and survival of Arctic communities. Enhancement of the relationship between community youth and the local environment via engagement in the research program will help to address mental health and addiction issues as youth learn to adopt a meaningful role within their communities. Similarly, traditional and meaningful gender roles related to all stages from harvesting to consuming and celebrating caribou will reinforce healthy models for families, reducing the stresses associated with family violence and other social pathologies.

Specific outcomes of the project will include:

- An understanding of the nature of resilience and adaptive capacity in Arctic communities from a human ecological perspective, and the knowledge and ability to sustain / enhance / protect it
- Systematization of relevant knowledge of reciprocal human-caribou relationships to provide bases for further research, and for curricula and training at all levels of the education system
- A knowledge base for planning for improved, culturally-inclusive policy and programs
- A series of alternative strategies to support community resilience based on knowledge predictors of reciprocal human- caribou relationships
- Increased capacity for Aboriginal-led and directed research across Arctic communities and organizations
- A new model for sharing research results and experience among Arctic Aboriginal communities

At the end of this IPY research experience, communities will have the evidence upon which to base various projections for the future, permitting strategic planning and action to protect and promote community health and wellness. Governance of follow-on projects and continuing programs that were initiated within the research program will be transferred to appropriate northern organizations, resulting in greater autonomy and control over health.

Reports will be written in a variety of accessible formats including community plain language reports (translated into appropriate local languages and dialects) and papers illustrating the case studies and the community-led model will be collected into a publication for print and electronic circulation. Copyright will be jointly held by the publisher and the CYFN.

Timeline

By scheduling this project for the next 3 years, within the IPY framework, we will maximize the communications and capacity-building inherent in the IPY program, including leveraging the international network from local to international levels. We envision that the dissemination and educational outcomes of this project will influence southern and global communities, increasing their understanding and appreciation of the contemporary and traditional values of Arctic communities and people. The 3-year period of the project will begin when funding has been transferred and is available for the research partners. The first two years constitute the research phase, with the final years for communication, outreach, and transfer of outcomes to community/program/policy leaders.

Communication and outreach

This responsibility will be managed by each case study team, with coordination from the ACRC Steering Committee and administrative office (CYFN). The office will monitor each theme case study for potential outcomes, so that dissemination strategies are developed throughout the project. Knowledge Translation (KT) activities will overlap with training, and may also involve one or more theme projects at any one time.

The research process itself will be a major focus for media and community activities, and thus communication about the importance and process of the research will be continuous. As the project develops there will be opportunities for educational activities at various levels, and for community engagement, activities that are linked with the knowledge translation goals of the project.

Ethical considerations

Academic PIs will seek REB approval at their respective universities, according to standard procedures. The partner organizations represent Aboriginal communities across the North. The approval from their boards will ensure Arctic community engagement throughout the project. Additional organizations may be added as the project vision becomes more defined. Each of the lead partner organizations has an ethics process, and the IPY project design will be reviewed by these bodies, as well as by the territorial licensing bodies. As well, research in Inuit communities and regions will abide by the Inuit Tapiriit Kanatami Guidelines for Ethical Research as outlined in the document “Negotiating search Relationships with Inuit Communities: A Guide for Researchers” (www.itk.ca). All community contributions will be acknowledged and included at all stages of the research, both through the seed grant process and the subsequent major proposal.

Ownership and sharing of research data will be controlled by the partner organizations, and shared with their permission and leadership as appropriate with other organizations, regions and indeed nations. Formal agreements will be part of the ACRC research design.

Data Management

Data sharing agreements will be negotiated with the various partners on each research theme team. Ownership will be discussed, and data stored as per northern and university licensing and ethics agreements. When each project is completed, copies of the data, or appropriate summaries thereof, will be housed in the storage IPY facility, yet to be designated. Original data of case studies will remain the property of the study community or organization in relationship with the subproject. Co-PIs will facilitate communication and dissemination of results and lessons learned.

Evaluation Strategy

The Steering Committee will convene a meeting of the theme leaders every six months (for a total of five meetings, counting the initial gathering) to review progress and coordinate complementary activities. These sessions will also be structured as evaluation sessions. At each meeting team leaders will determine a set of goals for the ensuing 6 months. Each subsequent meeting will report on the progress within that framework, identifying challenges so that they can be addressed by the ACRC Steering Committee and/or the joint team.

The project leaders will meet all IPY requirements for budgetary and activity progress reporting.

Benefits to Canada and Canadian Arctic Communities

The ACRC project will establish a network that will be sustained beyond the IPY period, with new knowledge that leads on to further research, education and capacity building. The strength of the projects will be the tangible identification of factors that influence the resilience of Arctic communities, based on what we learn from the focused studies of aspects of the human community-caribou relationship. Strategies for sustainability, supported by policies and programs will be clearly identified.

Potential for further funding

The development of this proposal was funded, in part, by the First Nations and Inuit Health Branch of Health Canada to fill a gap in the funded scientific program of IPY. The ADM Committee has set aside \$1.8 million for a project such as the ACRC. Observers at the November meeting of the project partners from Health Canada and First Nations and Inuit Health Branch indicated that opportunities may exist for contributions to the IPY project in the future to complement core funding. It is expected that proposals will go forth to this organization for further support and potential expansion for the inclusion of other case study communities. The Walter and Duncan Gordon Foundation and other Foundations will also be approached to contribute funding for related proposals, such as the ACRC conference, other activities that arise within the research program.

Appendices

1. References
2. Terms of reference for ACRC Steering Committee
3. Steering Committee Membership
4. Budget (see attached budget module)
5. Case study timeline/activity pattern (see attached IPY forms and calendar of milestones etc)

Appendix 1

References

- Adelson, N. (2000). Re-imagining Aboriginality: An Indigenous Peoples' Response to Social Suffering, *Transcultural Psychiatry* 37: 11-34.
- Angell, A.C. and Parkins, J.R. (2007). Industrial development and aboriginal cultural practice: continuity and change in the NWT and beyond. Paper presented at the Annual Meeting of the Canadian Association of Geographers, May 29 – June 1, 2007, Saskatoon, SK.
- Anisimov, O.A., D.G. Vaughan, T.V. Callaghan, C. Furgal, H. Marchant, T.D. Prowse, H. Vilhjálmsson and J.E. Walsh. (2007): Polar regions (Arctic and Antarctic). *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, 653-685.
- Berkes, F. and Jolly, D. (2001). Adapting to climate change: social-ecological resilience in a Canadian western Arctic community. *Conservation Ecology* 5(2): 18. [online] URL: <http://www.consecol.org/vol5/iss2/art18/>
- Berman, M., Nicholson, C., Kofinas, G., Tetlich, J. and Martin, S. (2004). Adaptation and sustainability in a small Arctic community: results of an agent-based simulation model. *Arctic* 57(4): 401-414.
- Berner, J., Furgal, C. (2005). Human Health, Chapter 15. *In*, Arctic Climate Impact Assessment (ACIA). Cambridge University Press. Cambridge, UK. Pgs 863-906.
- Brightman R (1993) Grateful Prey: Rock Cree Human-Animal Relationships, Berkley, CA: University of California Press
- Chapin, F.S., III, Hoel, M., Carpenter, S.R., Lubchenco, J., Walker, B., Callaghan, T.V., Folke, C., Levin, S., Mäler, K-G., Nilsson, C., Barrett, S., Berkes, F., Crépin, A-S., Danell, K., Rosswall, T., Starrett, D., Xepapadeas, T. and Zimov, S.A. (2006). Building resilience and adaptation to manage arctic change. *Ambio* 35(4): 198–202.
- Conference Board of Canada (2005): Nunavut economic outlook; Conference Board of Canada, Economic Services Branch, Ottawa, Ontario, 100 p.
- Denzin, N.K., and Lincoln, Y.S. (Eds.).(2005). Handbook of Qualitative Research, Thousand Oaks: Sage.
- Dinero, S. (2007), Globalisation and development in a post-nomadic hunter/gatherer Alaskan village: a follow-up assessment. *Polar Record* 43(226): 255–269.
- Dogrib Treaty 11 Council. (2001). Caribou migration and the state of their habitat. Final report. Submitted to the West Kitikmeot Slave Study Society, Yellowknife, NT. <http://www.nwtwildlife.com/WKSS/caribou/caribou3.htm>, accessed Sept. 17, 2008.
- Dragon, Joseph I.D. (2004). Commercial use of caribou (*Rangifer tarandus*). Unpublished thesis, Dept. of Renewable Resources, University of Alberta.

Duerden, F. (2004). Translating climate change impacts at the community level. *Arctic* 57(2): 204–212.

Duhaime, G., Lemelin, A., Didyk, V., Goldsmith, O., Winther, G., Caron, A., Bernard, N. and Godmaire, A. (2004): Arctic economies; in Arctic Human Development Report, edited by N. Einarsson, J.N. Larsen, A. Nilsson, and O.R. Young; Ste_anson Arctic Institute, Akureyri, Iceland, p. 69–84.

Ferguson, M.A.D., Williamson, R.G. and Messier, F. (1996). Inuit knowledge of long-term changes in a population of Arctic tundra caribou. *Arctic* 51(3): 201–219.

Ford J., and Smit, B. (2004): A framework for assessing the vulnerability of communities in the Canadian Arctic to risks associated with climate change; *Arctic*, v. 57, p. 389–400.

Furgal C. (2008). Climate Change health vulnerabilities in the North, In, Seguin J. (Ed). Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity, Health Canada, Ottawa, ON. ISBN: 978-0-662-48365-6, pgs: 303-366

Furgal, C., and Prowse, T.D.(2008). Northern Canada; *in* From Impacts to Adaptation: Canada in a Changing Climate 2007, *edited by* D.S. Lemmen, F.J. Warren, J. Lacroix and E. Bush; Government of Canada, Ottawa, ON, p. 57-118.

Gunn, A., Miller, F., Barry, S.L. and Buchan, A. (2006). A near-total decline in caribou on Prince of Wales, Somerset, and Russell Islands, Canadian Arctic. *Arctic* 59(1): 1–13.

<http://www.statcan.ca/bsolc/english/bsolc?catno=82-221-X&CHROPG=1> accessed

Intergovernmental Panel on Climate Change. (2007). Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J. and Hanson, C.E. (Eds.). Cambridge University Press, Cambridge, UK, 976 pp.

July 2, 2008. Statistics Canada Catalogue No. 82-221-XWE.

Kulig, J.C. (2000). Community resiliency: The potential for community health nursing theory development, *Public Health Nursing*, Vol 17(5): 374-385

Landau, J. (2007). Enhancing resilience: Families and communities as agents for change. *Family Process*, Vol 46(3): 351-365

Landau, J. And Saul, J. (2004). Facilitating family and community resilience in response to major disaster, In (Ed) Walsh, F. And McGoldrick, M. *Living Beyond Loss: Death in the Family*, W. W. Norton & Company, ISBN 0393704386, 443 pgs.

McGrath-Hanna, N.K., Greene, D.M., Tavernier, R.J. and Bult-Ito, A. (2003). Diet and mental health in the Arctic: Is diet an important risk factor for mental health in circumpolar peoples? – A review. *International Journal of Circumpolar Health* 62(3): 228–241.

Nelson R (1986) *Hunters of the Northern Forest: Designs for Survival among the Alaskan Kutchin*, Chicago: University of Chicago Press

Kofinas, G., Lyver, P., Russell, D., White, R., Nelson, A., and Flanders, N. (2003). Towards a protocol for community monitoring of caribou body condition. *Rangifer*(Special Issue 14): 43–52.

Kruse, J., White, R., Epstein, H., Archie, B. and Berman, M., et. al. (2004). Modeling sustainability of Arctic communities: an interdisciplinary collaboration of researchers and local

knowledge holders. *Ecosystems* 7(8): 815–828.

Ohmagari, K. and Berkes, F. (1997). Transmission of Indigenous knowledge and bish skills among the Western James Bay Cree women of subarctic Canada. *Human Ecology* 25(2): 197–222.

Parlee, B., O’Neil, J.D., and Lutsel K’e Dene First Nation. (2007). The Dene Way of Life – Perspectives on Health from Northern Canada. *Journal of Canadian Studies* 41(3): 112–133.

Parlee, B., Berkes, F. and Teetl’it Gwich’in Renewable Resource Council. (2005a). Health of the land, health of the people: A case study on Gwich’in berry harvesting. *EcoHealth* 2(2): 127–137.

Parlee, B., Berkes, F. and Teetl’it Gwich’in Renewable Resource Council, (2006). Indigenous knowledge of ecological variability and commons management: A case study on berry harvesting from northern Canada. *Human Ecology* 34(4): 515–528.

Parlee, B., Manseau, M. and Lutsel K’e Dene First Nation. (2005b). Understanding and communicating about ecological change: Denesoline Indicators of ecosystem health. In *Breaking ice: integrated ocean management in the Canadian north*, Berkes, F., Huebert, R., Fast, H. and Manseau, M. (Eds.). Calgary: University of Calgary Press. pp. 165–182.

Parlee, B., Manseau, M. and Lutsel K’e Dene First Nation. (2005c). Using Traditional Knowledge to adapt to change: Denesoline monitoring of caribou movements. *Arctic* 58(1): 26–37.

Richmond, C.A.M., Ross, N.A. and Egeland, G. M. (2007). Social support and thriving health: a new approach to understanding the health of indigenous Canadians. *American Journal of Public Health* 97(9): 1827–1833.

Robards, M. and Alessa, I. (2004). Timescapes of community resilience and vulnerability in the circumpolar North, *Arctic*, 57(4): 415–427.

Smit, B. and Pilifosova, O. (2003): From adaptation to adaptive capacity and vulnerability reduction; in *Climate Change, Adaptive Capacity and Development*, (ed.) J.B. Smith, R.J.T. Klein and S. Huq; Imperial College Press, London, United Kingdom, p. 9–28

Statistics Canada (2005a): Food insecurity; Statistics Canada, catalogue no. 82-003 XIE, Health Reports, v. 16, no. 3, p. 47–51.

Statistics Canada. (2001). Health Indicators 2001, Chronological Index. Access at :

Tobin, G.A., and Whiteford, L.M. (2002). Community resilience and volcano hazard: The eruption of Tungurahua and evacuation of the Faldas in Ecuador, *Disasters*, Vol 26(1): 28-48

Tompkins, E.L. and Adger, W.N. (2004). Does adaptive management of natural resources enhance resilience to climate change? *Ecology and Society* 9(2): 10. [online] URL: <http://www.ecologyandsociety.org/vol9/iss2/art10/>

Van Oostdam, J., S.G. Donaldson, M. Feeley, D. Arnold, P. Ayotte, G. Bondy, L. Chan, E’ Dewaily, C.M. Furgal, H. Kuhnlein, E. Loring, G. Muckle, E. Myles, O. Receveur, B. Tracy, U. Gill, S. Kalhok. (2005). Human health implications of environmental contaminants in Arctic Canada: A review. *Science of the Total Environment* 351-352: 165-246.

Walker, B. and Salt, D. (2006). Resilience thinking: Sustaining ecosystems and people in a changing world. Washington, D.C: Island Press.

Wein, E., Freeman, M.M. R. and Makus, J. (1996). Use of and preference for traditional foods among the Belcher Island Inuit. *Arctic* (49)3: 256–264.

Wilson K (2000) *The Role of Mother Earth in Shaping the Health of Anishanabek: A Geographical Exploration of Culture, Health and Place*, Kingston: Queen's University (unpublished doctoral thesis)

Wilson, K., and M. Rosenberg. (2002). Exploring the Determinants of Health for First Nations Peoples in Canada: Can Existing Frameworks Accommodate Traditional Activities?, *Social Science and Medicine* 55: 2017-31.

Appendix 2

Steering Committee Terms of Reference

Overview

This three-year project concept is the product of Arctic community organization leadership, and arose in response to thoughtful discourse in search of a common issue that would benefit the Arctic peoples of Canada. The relationship between community resilience and caribou emerged as both a practical and a symbolic theme, and adaptive capacity for Arctic communities became the central objective for the research. The founding partners of this proposal (AAC, GCI, ICC) believe that collecting knowledge from all relevant sources regarding the factors that influence community capacity and resilience as seen through the lens of the community-caribou relationship, understanding the potential for change, and developing consequent strategies will provide the foundation for action. Strategies will be based on knowledge, policy and planning at all levels that will secure future health and resilience for Arctic communities.

Membership

The Steering Committee will include one representative from each of the founding organizations (AAC, ICC, ITK, DN, ITK, GCI), the administrative office of CYFN, the ACRC PIs, and the co-PIs of each of the three case studies.

Frequency/Location of Meetings

The Steering Committee will meet at least 5 times during the three-year life of the project: Once at the outset of the project. Every six months for three years, including a wrap-up meeting at the end of the project. Meetings will be held at appropriate sites in the North and be coordinated by the CYFN.

Honorarium/Travel Reimbursement

Elders will be paid a daily honorarium of two hundred and fifty dollars (\$250.00) for each day of the meeting and one hundred and twenty-five dollars (\$125.00) for each travel day. Travel expenses will be fully reimbursed upon completion of appropriate documentation and original receipts.

Mandate

This committee will provide guidance to the ACRC researchers for the duration of the project and will advise on local protocols and communication. To the extent they deem appropriate, members will be actively involved in the survey process in their communities.

Recognizing that there are many different roles Elders play, the Elders on this committee should be experienced in areas relevant to the complexities of the community-caribou relationship.

Appendix 3

Membership of ACRC Steering Committee

1 Representative from each of:

Council of Yukon First Nations

Gwich'in Council International

Dene Nation

Inuit Tapiriit Kanatami

Inuit Circumpolar Council – Canada

Academic PIs (2)

Aboriginal PIs (3)

IPY Caribou program PI (invited)

IPY Federal Program Office representative

See attached files for budget modules and justification