



# C-CIARN Northwest Territories

## State-of-Play Report

2006-2007



# C-CIARN North NWT – State-of-Play Report

*The Status of Climate Change Impacts and Adaptation  
from the Perspective of C-CIARN – North - NWT*

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## Preface

In the last year of C-CIARN's mandate (July 2006-June 2007), each C-CIARN office was asked to write a report summarizing their perspectives on the state of climate change impacts and adaptation within their region or sector.

The resulting State-of-Play reports identify, from the point-of-view of C-CIARN, the key climate change impacts, as well as the key stakeholders and adaptation decision-makers (including how these stakeholders/decision-makers were most successfully engaged) of each representative region and sector of Canada. The reports also include a description of the important research questions which, from the perspective of C-CIARN, need to be answered, as well as the steps that need to be taken to both increase the level of engagement on the issue and to facilitate the decision-making that is needed to reduce vulnerability, across Canada, to the impacts of climate change.

It is anticipated that the State-of-Play reports will serve as a valuable point of reference for climate change impacts and adaptation initiatives carried out across Canada, post-C-CIARN.



# 1. Introduction

In November 2004, Ecology North became the host of C-CIARN Northwest Territories (C-CIARN NWT). Founded in 1971, Ecology North is a non-governmental organization with over 200 members in the NWT. Hosting C-CIARN NWT was a natural fit for Ecology North as climate change has been one of its top priorities since 1997.

One of the main priorities of Ecology North when it took over hosting C-CIARN NWT was raising public awareness of climate change. One of the main tools in this regard was the 22 minute video on the highlights of the Arctic Climate Impacts Assessment. C-CIARN NWT was able to show this video extensively in schools and workshops. Other priorities included re-establishing an advisory committee and monitoring climate change impacts and research taking place in the NWT.

C-CIARN NWT was originally hosted by the Aurora Research Institute (ARI) in Inuvik. One of its priorities was to complete a research needs survey similar to the one started by the Northern Climate Exchange, C-CIARN Yukon/C-CIARN North. The ARI had distributed survey questionnaires to stakeholders and had started to collect data. After reviewing the questionnaire and consulting with its Advisory Committee, C-CIARN NWT decided to take a more qualitative approach to gathering data for the research needs survey. C-CIARN NWT organized four community workshops to confirm climate change impacts, research needs and to introduce the concept of climate change adaptation to communities. The four community workshops were held in four different regions throughout the NWT: West

Point in the Deh Cho Region, Deline in the Sahtu, Aklavik in Mackenzie Delta, and Yellowknife in the North Slave.

The workshops were successful in documenting impacts and raising awareness about climate change issues. The workshops also revealed concerns in many other areas, such as costs of living, water pollution, and impacts of industrial pollution. While climate change is having an impact on the communities we visited, it is not usually their main concern. Many NWT communities and their politicians are occupied by other pressing issues, such as settling land claims, economic development, creating jobs, and making sure their communities are healthy. Environmental issues such as changes in water quality and population declines in the Caribou herds, are of more immediate concern than climate change. The public may not yet fully recognize the potential relationship between climate change impacts and environmental changes, including water quality and caribou numbers.

In southern, non-coastal NWT communities, many residents and political leaders view climate change as something that is relatively benign. Sustained periods of -30 to -40 °C weather makes living in the North much more challenging and less comfortable. To date, most communities in the southern parts of the NWT have been able to adapt to changes thus far. However, as warming trends continue, attitudes towards climate change may change drastically if it starts to impact community re-supply (ie. a shorter winter road season), the cost of transportation (loss of permafrost and resulting damage to highways and aircraft landing strips), and recreational activities such as snowmobiling (shorter season, more overflow and dangerous conditions).

In contrast to the First Nations in the southern NWT, Inuvialuit communities on the Arctic coast have been much more affected by climate change. Adapting to climate change in these communities is more immediately challenging, and has profound social and cultural implications. After consulting with one of the Inuvialuit agencies, C-CIARN NWT did not hold any workshops in Inuvialuit communities. It was felt that doing one workshop in the region would not really help the situation.

## 2. Key Climate Change Impacts on NWT

### 2.1 Winter Roads

Winter roads form vital lifelines for many NWT communities and businesses. None of the transportation alternatives such as aircraft, barge, and permanent roads can match winter roads' flexibility and relatively low costs.

With the mild winter in 2005-06, many winter roads across the NWT had significantly shorter operating seasons. The diamond mines north of Yellowknife were particularly hard hit and were forced to either delay construction plans, bring in essential supplies via costly aircraft transport, or do a combination of the two.

The trend towards a shorter winter road season has stretched over the past twenty years. When it first opened in 1983, the Mackenzie Valley Winter Road was operational for 75 days of the year. Today however, it is only operational for around 47 days of the year. Despite this, some roads such as the Tibbitt to Contwoyto winter road to the diamond mines, and the crossing of the Mackenzie River, have so far managed to retain close to their original

annual longevity through new technology and costly, intensive management practices.

As warming trends continue, the building and maintenance of winter roads will likely become more expensive. With the decreased reliability of winter roads, there have been more calls for permanent all-season roads, at least in vulnerable sections of existing winter routes.

The trend towards shorter winter road seasons could act as a barrier to mining and mineral exploration activities in the NWT as mines are increasingly being forced to rely on aircraft freighting for resupply. On the other hand, a shorter winter road season has encouraged existing mines to try reducing their energy consumption. The escalating costs of transport have also prompted resource development corporations to begin to examine new, efficient, and potentially more environmentally sound means of transportation.

They are researching the potential and demonstration costs for on site development of renewable energy sources such as wind turbines. However, this progress with renewable energy may be outweighed by the need to ship in more material on cargo aircraft. The mines are likely to spend more money and emit more greenhouse gases by using additional air cargo capacity. Increasing fossil fuel use in order to adapt to the impacts of climate change could be considered an example of "mal-adaptation"

Shorter winter roads seasons, the less favourable cost/benefit ratios they provide, and the possible end of winter roads will mean higher food costs for many small communities, unless alternatives to air transport are found. Communities are already lobbying the Government of the Northwest Territories (GNWT) to build all-season roads. The push

towards all-season roads could potentially divert needed capital dollars from other important projects such as schools and hospitals. However, at this point many NWT communities are still served by both barge and air resupply. As long as those forms of transport are not affected (e.g. through low water levels, bad sea ice conditions, or damage to landing strips from loss of permafrost), the loss of winter roads in these communities will be less severe.

The communities most vulnerable to winter road closures are those without access to barge re-supply. These communities depend on the winter roads for bringing in annual supplies of basic food goods, construction materials and fuel for heating, transportation and electricity. In light of this vulnerability, some communities (e.g. Whati, Lutselk'e, Gameti) are actively investigating alternatives such as mini-hydro for electricity and heating.

## **2.2 Permafrost**

Building in a permafrost rich environment such as the NWT has always presented challenges. Warming to date has already affected permafrost, and future warming will have an even greater impact. Damage to, or loss of permafrost is affecting road building and maintenance, airport construction, residential and commercial construction, and oil and gas developments such as the Mackenzie Gas Project. Existing knowledge about building in a permafrost environment will have to be revised and more effort and resources will be required to understand the implications of changing permafrost on structure design and mitigation techniques. All of this will most likely translate to higher building costs in a region that already has a high cost of living. Because the impacts of climate change are proceeding faster than predicted, up to date research is necessary to

assist with the scale of adaptation likely to be needed in both the short- and long-term.

## **2.3 Shoreline Erosion**

One of the impacts of melting permafrost and less sea ice is increased shoreline erosion. While shoreline erosion is being experienced elsewhere in the NWT (Banks Island and the Arctic Coast), Tuktoyaktuk is experiencing it within the community. A significant portion of Tuktoyaktuk was built on a peninsula. This peninsula is experiencing a great deal of erosion. Since 1975, the community and the GNWT has spent over \$1,000,000 on erosion control efforts. Currently, the plan is to gradually relocate the community to higher ground.

## **2.4 Wildlife**

Caribou, moose, fish and waterfowl remain the most important sources of protein for most Aboriginal communities in the NWT. It is difficult to underestimate their cultural importance to Aboriginal people in the NWT.

All of the major barrenland caribou herds in the NWT have experienced 30 - 90% declines in the past 10 to 15 years. The Bathurst Caribou herd, the NWT's largest and most important herd, is in a serious state of decline. In 1986, this herd was estimated to have 472,000 animals and in 2003, its population was estimated to have declined to 186,000 animals. In the most recent survey completed in 2006, the herd was estimated at 128,000 animals. While human harvesting is undoubtedly a factor, biologists do not know for certain what specific factors are causing the downturn. Many caribou herds across northern Canada are showing similar trends. The reason for this trend is probably complex and climate change may be one of the factors.

Climate change impacts may also be affecting other important food animals such as moose and fish. Over the last few years, the Mackenzie Delta has experienced more snow, reducing the mobility of moose and increasing their vulnerability to wolves. Hunters in the Mackenzie-Delta have also observed increasing numbers of moose falling through the ice. Large swings in fish numbers and seasonal migration dates are occurring, and people report that the flesh of fish is mushy - a characteristic often associated with warm water temperatures outside of the normal range of tolerance for arctic species of fish. People report that they can not leave the fish in their nets as long as they used to, because they rot more quickly than in the past.

### 3. Key Stakeholders

#### 3.1 Federal Government

Indian and Northern Affairs Canada (INAC), through its land ownership and management of much of the Northwest Territories, plays a critical role in managing the adaptation to the above climate impacts. INAC also manages mineral development in the NWT.

Non-governmental organizations worry that INAC's conflicting mandate (and unequal weighting) of mineral development and environmental protection contributes to the loss of long-term environmental health in the North. It has been suggested that resolving this conflict would provide an opportunity to give environmental concerns the proper weighting and would assist in effective climate change adaptation and mitigation.

By and large, INAC and other federal departments, including Environment Canada, Natural Resources Canada, are engaged and doing good work on climate change issues. C-CIARN NWT has enjoyed a good working relationship with all of these departments. However, given C-CIARN NWT's size (one half-time position), it is difficult to track all of the federal government's activities in the NWT.

#### 3.2 Government of NWT (GNWT)

The GNWT does not currently have authority to manage land or minerals (which is part of the federal jurisdiction), but it would like to pursue these responsibilities through an arrangement similar to the one negotiated by the Yukon government. It currently plays the lead role in operating winter roads and managing shoreline erosion insofar as it impacts municipalities. The GNWT, through an agreement with the federal government, also manages forests and wildlife resources. The GNWT is also largely responsible for health care, welfare, and schools. Thus, the GNWT has the responsibility for most of the infrastructure affected by permafrost degradation. As climate change continues, there will likely be increasing impacts in these areas. The GNWT's continued engagement on climate change issues will be critical.

Within the GNWT, the Department of Environment and Natural Resources (ENR) has the lead role for climate change mitigation and adaptation. C-CIARN NWT has a good working relationship with this department. ENR has recently hired a climate change specialist and now has at least two positions, in addition to their scientists, dedicated to climate change issues. ENR expects to initiate stakeholder discussions and develop a climate change adaptation plan starting in early 2007.

### **3.3 Aboriginal Governments**

Land claims agreements have been settled in four out of six claim areas in the NWT. The Inuvialuit, the Gwich'in, the Sahtu, and the Tlicho have settled their claims. The Dehcho and the Akaitcho are still negotiating. In settled claim areas, Aboriginal governments have become land owners of significant tracts of land and hold some sub-surface mineral rights. The Aboriginal governments have also entered into co-management agreements with both the GNWT and the federal government for key wildlife species such as caribou, and have increased their involvement in the environmental assessment processes.

The authority of Aboriginal government stems from their land claim settlements, superseding legislation that provides self-government powers and land-ownership. Aboriginal governments play a huge role in natural resource management and economic developments, such as the Mackenzie Gas Project, and thus are essential partners to engage on climate change issues. C-CIARN NWT has had limited contact with these governments. To further the adaptation agenda in the NWT, it will be critical to strengthen their engagement on climate change issues.

### **3.4 Environmental Assessment Boards**

Environmental assessment boards and agencies play an important role in determining the pace and shape of development in the NWT. These bodies, such as the Mackenzie Valley Land and Water Board, are products of land claim agreements and have their authority set out in federal legislation. These bodies review the environmental impacts of projects, including impacts of climate change on the project and vice-versa. They generally make their recommendations to the responsible

federal minister or agency, such as the National Energy Board. Their recommendations are usually accepted.

Currently, the Mackenzie Gas Project is being reviewed by a joint review panel consisting of representatives of the federal Minister of the Environment, the Mackenzie Valley Environmental Impact Review Board and the Inuvialuit Game Council. The federal and territorial governments, Aboriginal governments, and all other organizations and individuals have to intervene in these processes in order to provide evidence, although community members are able to present their views without intervenor status. While industry proposes how developments take place, intervenors and the Joint Review Panel question the developers. Based on the evidence, the Joint Review Panel makes recommendations for review and approval by the federal Ministers of Environment and Indian and Northern Affairs and for consideration by the National Energy Board.

### **3.5 Community Governments**

There are 33 communities in the NWT. Very few of these communities have just one government. Most have a First Nation government, or an Inuvialuit community corporation, and a municipal government under territorial legislation. In some of the latest land claim and self-government agreements, such as the Tlicho, these governments have been combined.

C-CIARN NWT has had limited success in getting community governments involved in its community climate change workshops. The one bright spot was hunter and trappers associations. Hunter and trappers associations

are usually among the most interested in climate change issues as their members depend most directly on the land.

### 3.6 Industry

The main industries in the NWT currently include diamond mining and oil and gas development. Industry, through their spending power and the promise of jobs, have a tremendous influence in the North. Through the environmental assessment process and the regulatory process, they propose how development should occur. C-CIARN NWT has had virtually no contact with industry representatives.

Another industry in the NWT is power generation. The NWT Power Corporation (NTPC) is an arms length corporation of the territorial government and generates power for most NWT communities. Like roads, electrical power generation and distribution is a critical infrastructure, and like roads, it is being impacted by climate change. For instance, NTPC is finding increasing damage from frost build-up on power lines, and thus they spend more time removing frost from power lines. As climate change continues, new impacts may also emerge.

C-CIARN NWT has a good working relationship with this sector. NTPC has attended C-CIARN NWT workshops and it also attended the climate change and hydropower workshop in Winnipeg earlier this year. NTPC is working with INAC to study water levels affecting its reservoirs for its hydro-dams. Although NTPC has relatively little experience with renewable energy development other than conventional hydro, they have considerably improved their efficiency of diesel generators, and they are showing interest in small,

community-based, run of the river hydroelectric developments and even wind power.

### 3.7 Non-Governmental Organizations

A number of environmental non-government organizations such as Ecology North, the Canadian Arctic Resources Committee, World Wildlife Fund Canada, Canadian Parks and Wilderness Society, and the Arctic Energy Alliance operate in the NWT. While very few have full-time resources dedicated directly to climate change issues, they are very aware of it and its implications for the NWT. While they may not have abundant resources to dedicate to climate change, work on issues such as the Protected Areas Strategy and energy conservation all have a role to play in climate change adaptation.

## 4. Strategies for Stakeholder Engagement

In our experience, the best way to engage stakeholders in the NWT has been through face-to-face meetings and workshops. Climate change and its impacts are complex subjects that require time for questions and clarifications.

In our view, the goal should be to get all levels of government in the NWT to incorporate climate change into their policies and regular decision-making process. Despite the impacts of climate change, the consideration of climate change and its impacts is very much a back-burner issue. This has to change. In his budget speech to the Legislative Assembly in February 2006, the GNWT Minister of Finance did not mention climate change. It should be noted that this speech was given before a shortened winter road season affected the operations of the diamond mines.

Currently, NWT leaders are preoccupied by issues such as the Mackenzie Gas Project, land claims, community capacity, and resource revenue sharing. This makes it difficult for them to dedicate time to an issue as complicated as climate change. To address this situation, we came up with the idea of the NWT Climate Change Summit. The Summit will be bringing Band, community, government, and business leaders to Yellowknife on January 15-17, 2007. The Summit is designed to give leaders at all levels a better understanding of the impacts of climate change impacts and the need for adaptation. The emphasis in workshops will be on plain language and practical approaches to managing impacts and adapting to climate change. In preparation for the Summit, we plan on releasing a plain language discussion paper on climate change issues in the NWT.

Another avenue for engaging local leaders will be the development of community sustainability plans. Under the federal government's New Deal and Infrastructure Canada's Gas Tax agreement, and in concert with the NWT's New Deal of devolving capital funds for establishing, operating and maintaining infrastructure in communities, each community is required to develop Integrated Community Sustainability Plans (ICSP) by 2010. The GNWT's Department of Municipal and Community Affairs is charged with assisting NWT communities in developing the plans. MACA is currently in the process of defining what should be included in those plans. The working group for the Climate Change Summit is lobbying to ensure that local adaptation planning is included in the ICSPs.

The NWT, with its many levels of government, probably has significant capacity to adapt to the challenges of climate change, but this capacity needs to be engaged. This may be difficult to do without new resources, at least in the short-term, as governments will have to decide to re-arrange priorities. The key in this process is to raise awareness of climate change among politicians and leaders, so that they can start to redirect some of their resources towards this critical task. In terms of dealing with new infrastructure requirements, it is clear that the GNWT and municipalities will likely require increased financial assistance from the federal government.

## 5. Engaged Stakeholders

The federal government, territorial government, private consultants, and environmental assessment bodies employ a relatively large number of scientists. Most of these scientists are very aware of the impacts of climate change. Annual conferences such as *Science in the Changing North*, provide a venue for exchanging research findings and networking among NWT-based scientists and those who are based outside of the NWT. These scientists represent a large reservoir of adaptive capacity the NWT.

Outside of these scientists, the GNWT Department of Transportation and the diamond mines are among the most engaged stakeholders. Due to their huge costs, roads are still a relative novelty in the NWT. For instance, the final stretch of road between the Alberta-NWT border was just paved. Roads are a key to promoting economic development and reducing the cost of living in small isolated communities. Ferry crossings are key points in the transportation infrastructure, and among the most affected by climate change. Those who are tasked with the operation and maintenance of such facilities are becoming experienced in the need for adaptation.

Over the past 20 years, it is very clear that NWT winter roads have been impacted by climate warming. Given the importance of these roads, government and industry have aggressively pursued techniques and technology to build better winter roads and extend their season despite climate change. This innovation and adaptation, while increasing costs, has helped to reduce some of the impacts of climate change. With the winter road shortening, the GNWT is gradually transforming winter roads into more permanent

roads by installing bridges at river crossings, where possible. Although already motivated, the GNWT has been greatly assisted by funding for research from Natural Resources Canada.

In general, departments within the GNWT are open to considering climate change impacts and adaptation issues, and many have worked actively on specific issues ranging from designing buildings for possible increases in snow loads, mitigating shoreline erosion, and designing new intakes for water systems. The territorial government's department of ENR, which is C-CIARN's principal contact within the GNWT, has recently hired a climate change specialist and is committed to developing a climate change adaptation strategy.

### 5.1 Outstanding Needs of Engaged Stakeholders

Many components of our society, including government regulators and service providers, are still not well informed about climate change impacts, and the degree of change that should be expected. The need for comprehensive informational workshops still exists, and the degree to which they can be provided at the community and departmental levels, gains will be made.

While much good scientific research is happening in the NWT, there may be a need for new resources to fully address all of the emerging research questions. (Please see the questions in the further research section).

Managing climate change impacts on infrastructure is a relatively new phenomenon outside of government control. To date, few impacts have resulted in less government spending. Thus, climate change represents for the GNWT a new economic burden which will

likely increase as warming continues. Spending money on reducing the impacts of climate change on infrastructure will take away money from regular spending. Depending on the severity of the impacts to come, the GNWT will likely be looking for additional funding for infrastructure. In particular, the GNWT will likely be looking for funding for permanent roads and road repair. Increased work on climate change models / scenarios that can predict climate change at a finer resolution may allow more precise estimates as to when these permanent roads might be needed.

While the diamond mines are currently coping with the reduced winter road season, they may also look to government for assistance to build permanent roads to the diamond mines, or developing other alternatives.

## 6. Unengaged Stakeholders

### 6.1 NWT Leaders

There is a great deal of engagement on climate change issues at the bureaucratic level within government. However, as outlined above, NWT leaders with some notable exceptions do not appear to be engaged. Without awareness and engagement at the political and leadership level, it will be difficult to put the existing interest and commitment at the bureaucratic level into high gear. Public servants in the NWT need the resources and the mandate to carry on with the task of adapting to climate change.

The shortened winter road season in 2006 certainly got the attention of many NWT leaders. We feel that increased communication of the issues through the Climate Change Summit is the best way to build on that increased attention.

## 6.2 Oil and Gas Industry

As discussed above, while recognizing climate change is a factor, the oil and gas industry and the proponents of the Mackenzie Gas Project seem bent on ignoring the advice of some federal departments. The oil and gas industry probably views consideration of climate change impacts as a cost, and they want to take the low cost approach. Being forced to adopt higher standards of care will simply add delays, costs and reduce their profits.

In contrast, the diamond mines and transportation industries are much more engaged in the issue of climate change. The diamond industry was built on the premise of winter road re-supply and they are effectively responsible for the winter roads to their mines. As winter roads become less and less reliable, they have little choice but to adapt as their bottom line depends on it. It appears that the only way that the oil and gas industry will become engaged is through the environmental assessment process and the conditions that will be attached to any permits issued.

## 7. Unanswered Research Questions

The research questions from this section come primarily from the community workshops held by C-CIARN NWT. Many of these questions are probably in the process of being answered. We hope to provide some of these answers in the upcoming discussion paper for the Climate Change Summit.

- What will be the impact of permafrost loss on municipal infrastructure like roads, runways, buildings, sewage treatment facilities, and bulk fuel storage tanks?

- What are the latest and best predictions on climate change by region?
- What will be the impact of warming on fish stocks?
- What will be the impact of melting permafrost on water quality?
- Will climate change affect the way the NWT should be fighting forest fires?
- What pests threaten NWT forests, and what can be done?
- What is the impact of climate change on caribou and other wildlife?
- What will be the impact of higher ocean levels on the Mackenzie Delta including communities such as Aklavik?
- What is the vulnerability of communities to unprecedented flooding?

Other key research questions include:

- The impact of melting permafrost on greenhouse gas emissions through positive feedback loops.
- The impact of a warming ocean on gas hydrates in the Beaufort Sea.
- In the community workshops, C-CIARN NWT focused on changes that people were observing. Many of these observed changes could be driven by factors other than climate change. However, as the Arctic Climate Impact Assessment points out, the Arctic is under many stresses that will in turn affect the health of the ecosystem and the ability of communities to sustain themselves.

The NWT is experiencing a major increase in industrial development. This new stress will interact with the increased impacts of climate change. In this dynamic environment, one of the best ways of managing research and helping communities to adapt may be to focus research on the basic needs of communities, such as food, water, energy, transportation and building.

## 8. Advancing the Impacts and Adaptation Issue

A synthesis between mitigation and adaptation program delivery is needed. Clearly, we can adapt to some change, but as climate change becomes increasingly severe in the absence of mitigation, the potential for effective northern adaptation declines. Currently, there is a need to emphasize that to be effective, successful adaptation is not an action that further increases our use of fossil fuels. There is a serious need for a comprehensive message on climate change to be delivered to and understood by decision makers.

The mild winter of 2005-06 and the shorter winter road season reminded all NWT residents, including politicians that climate change is happening. When the winter road to the diamond mines closed earlier than planned, there were hundreds of loaded trucks waiting around Yellowknife with nowhere to go. The Yellowknife Airport, which previously had been fairly quiet after 10:00pm, soon became a beehive of activity 24 hours a day as the diamond mines struggled to get their essential loads delivered with large aircraft such as Hercules and Antonovs. Increased air traffic, from spring onward, continues to remind Yellowknife residents of the shorter, warmer winters.

In the next nine months, C-CIARN NWT hopes to build on this increased awareness with the *Summit* itself, and with the preparations and the follow-up. After the *Summit* we hope that there will be follow-up meetings on territorial, regional and community climate change processes.

A great deal of planning for climate change is already taking place. Roads are a prime example. The challenge is to recognize the existing planning, to learn from it, and apply the lessons to other areas. In many cases, adaptation planning in the NWT will not require new tool development. Existing planning tools for communities and common sense will go a long way towards developing sound adaptation plans.