

Inuit Observations on Climate Change

Final Report

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This project was made possible through financial support from the following organizations:

- *Government of Canada's Climate Change Action Fund (Public Education and Outreach)*
- *Walter & Duncan Gordon Foundation*
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- *Indian and Northern Affairs Canada*
- *Government of the Northwest Territories*

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Executive Summary

Observations by the Inuvialuit of Sachs Harbour support what has long been predicted, that climate change would be felt first in the Polar Regions. This community's way of life is at risk, an urgent warning of the negative impacts of climate change predicted to occur elsewhere in the world.

On Banks Island in Canada's High Arctic, Inuvialuit hunters and trappers have a close relationship with nature. As they travel over the tundra or harvest fish from the sea, they notice even the smallest changes in their environment. Recently, the changes have been significant and troubling. The climate has become unpredictable; the landscape unfamiliar.

Autumn freeze-up occurs up to a month later than usual and the spring thaw seems earlier each year. The multi-year sea-ice is smaller and now drifts far from the community in the summer, taking with it the seals upon which the community relies for food. In the winter the sea ice is thin and broken, making travel dangerous for even the most experienced hunters. In the fall, storms have become frequent and severe, making boating difficult. Thunder and lightning have been seen for the first time.

Hot weather in the summer is melting the permafrost and causing large-scale slumping on the coastline and along the shores of inland lakes. The melting has already caused one inland lake to drain into the ocean, killing the freshwater fish. In the town of Sachs Harbour, building foundations are shifting from the melting.

New species of birds such as barn swallows and robins are arriving on the island. In the nearby waters, salmon have been caught for the first time. On the land, an influx of flies and mosquitoes are making life difficult for humans and animals.

These changes tell local people that the climate is warming. The residents of Sachs Harbour wonder if they can maintain their way of life if these changes continue.

Given the dramatic changes that local people have observed, IISD and the Hunters and Trappers Committee of Sachs Harbour initiated a two-year project to document the problem of Arctic climate change and communicate it to Canadian and international audiences. The project team worked in partnership with specialists from five organizations to develop an innovative method for recording and sharing local observations on climate change. The approach combined participatory workshops, semi-structured interviews, community meetings and fieldwork to better understand the extent of local knowledge of climate change. During the two-year initiative, the project team produced a broadcast-quality video and published seven scientific journal articles to communicate the consequences of climate change in the Arctic and to understand the adaptive strategies that local people are using in response. The science papers document the extent of Inuvialuit knowledge on climate change and explore how that knowledge can enrich scientific research in the Arctic. The video follows local people onto the land and sea as they partake in traditional activities. Their voices and the beauty of a fragile and bountiful land leave viewers with a clear understanding of what will be lost if climate change continues.

In November 2000, the video was launched concurrently in The Hague, Ottawa and Sachs Harbour with additional screenings in Yellowknife and Winnipeg. The launch attracted considerable media attention. A well-developed communications strategy resulted in the story being picked up by 12 newswire services, 24 U.S. papers (with a cumulative circulation of over four million), 20 Canadian papers (with a cumulative circulation of almost three million), *Maclean's*, *Panorama* and *Outside* magazines (cumulative circulation of two million), and at least 22 major online sources including National Geographic.com, @Discovery.ca, One World Net, ABC News.com and CNN.com. The project team participated in nine major radio interviews including ABC Radio, BBC, Radio Netherlands, *CBC As It Happens*, CBC Syndication (13 separate city interviews), CBC Radio International, KWAB, Great Lakes Radio Consortium (140 stations in 10 U.S. states) and CFX Radio. The project also received coverage on 14 major television networks including Associated Press Television Network (330 broadcasters worldwide), BBC, France 1, France 2, ARD Television Swiss Romande, National Geographic channel, CBC (the National), CTV, Global, *CBC Canada Now*, CBC Newsworld, Discovery Channel and the Aboriginal Peoples' TV Network. There were an additional 28 print, radio and Internet stories on the project prior to the launch.

The video was also screened or distributed at key decision-making forums including: the Joint Ministerial Meeting of Environment and Energy Ministers (October 16, 2000); Arctic Council Ministerial Meeting (October 12–13, 2000); Government of Nunavut Legislative Assembly (October 16, 2000); National Round Table on Environment and Economy (November 9, 2000); 6th Conference of the Parties to the UNFCCC (COP-6) in The Hague, Netherlands (November 16–24,

2000); House of Commons Standing Committee on Aboriginal Affairs, Northern Development and Natural Resources; World Environment Day Forum in Italy (June 4–6, 2001); and the Western Premiers' Conference (May 30–June 1, 2001).

Presentations at 17 conferences and workshops communicated the project's findings and approach to other researchers.

Final workshops were held in Ottawa and Sachs Harbour. The Ottawa event brought together project team members, funding partners and relevant individuals from other interested organizations. The objective of the Ottawa and Sachs Harbour workshops was to review the project, watch the video and discuss a strategy for communicating the project results as well as refining and replicating the approach elsewhere. To this end, IISD has followed up on the results of the workshop and has developed several proposals in partnership with relevant organizations. To date these proposals include:

- facilitating a series of workshops with the five other communities in the Inuvialuit settlement region to obtain a region-wide perspective on climate change. This project is being implemented in partnership with the Inuit Tapirisat of Canada, the Inuvialuit Game Council and the local Hunters and Trappers Committees (HTCs). Funding for this project has been provided by the Northern Ecosystem Initiative.
- producing a teachers' guide to accompany the full-length version of the video. The guide will be consistent with the Pan-Canadian Protocol on Science Curriculum Development, enabling its use by any school in Canada. This initiative will be led by Manitoba Education, Training and Youth and Learning for a Sustainable Future (an Ottawa-based NGO that develops sustainable development materials for teachers) with input from IISD and the Sachs Harbour HTC. A proposal has been submitted to the Sustainable Development Innovations Fund in Manitoba to produce and distribute copies of the video and the guide to all high schools in the province.
- producing a French version of the full-length video to provide a broader Canadian and international audience with access to the project's results. A proposal is in the final stages of development with funders yet to be identified.
- developing a concept paper to scale up the Sachs Harbour research. The strategy involves testing and refining the workshop methodology in the Inuvialuit Settlement Region, training other organizations in conducting the research to allow local observations to be collected throughout the Arctic region; piloting the use of video as a tool for communities to document and share local observations on climate change; and extending the successful elements to other circumpolar countries.
- sharing the project results with researchers, decision-makers and the public whenever possible and appropriate.

This project was made possible through the support and initiative of the community of Sachs Harbour and financial contributions from: the Government of Canada's Climate Change Action Fund (Public Education and Outreach); the Walter & Duncan Gordon Foundation; the Government of Canada's Climate Change Action Fund (Science, Impacts and Adaptation); Indian and Northern Affairs Canada; and the Government of the Northwest Territories. Generous in-kind support was given by the Hunters and Trappers Committee of Sachs Harbour; the Inuvialuit Game Council; the Inuvialuit Joint Secretariat; the Inuvialuit Communications Society; the Natural Resources Institute, University of Manitoba; the Department of Fisheries and Oceans; the Government of the Northwest Territories; the Geological Survey of Canada; and the International Institute for Sustainable Development.

Inuit Observations on Climate Change Final Report

1.0 Project Goals and Objectives

The Inuit Observations on Climate Change project set out to achieve two goals: public awareness on climate change; and the relationship between traditional knowledge and scientific research on climate change.

Goal one: to produce a video that will demonstrate to decision-makers, media and civil society that climate change is making an impact on the traditional lifestyle and livelihood of the Inuit on Banks Island in the Beaufort Sea.

Goal two: to understand the traditional knowledge of the Inuit regarding climate change and to explore the contribution that traditional knowledge, local observations and adaptive strategies can make to scientific research on climate change in the Arctic.

2.0 Team Members

Community Knowledge Experts

Joe Apiana	Andy Carpenter	Bradley Carpenter	Jock Carpenter
Larry Carpenter	Richard Carpenter	Robin Carpenter	Winnie Carpenter
Katherine Ciboci	Florence Elanik	Margaret Elanik	Joanne Eldridge
Ted Elias	Yvonne Elias	Aleta Esau	Beverley Esau
Joshua Esau	Peter Esau	Edith Haogak	Jean Harry
Donna Keogak	John Keogak	Martha Keogak	Frank Kudlak
Joe Kudlak	Lucy Kudlak	Manny Kudlak	Martha Kudlak
Jackie Kuptana	Sarah Kuptana	Roger Kuptana	Rosemarie Kuptana
Margaret Lennie	John Lucas Jr.	John Lucas Sr.	Kimberley Lucas
Peggy Lucas	Ryan Lucas	Samantha Lucas	Tony Lucas
Trevor Lucas	Fred Raddi	Adella Ruben	Cindy Smith
Evelyn Wolki	Geddes Wolki	Lena Wolki	

IISD Team Members

Graham Ashford, Project Manger/Producer
Neil Ford, Former Project Manger/Producer
Jennifer Castleden, Project Officer - Communications
Deborah Lehmann, Project Assistant
Dennis Cunningham, Fund Development and Outreach Officer
Rosemarie Kuptana, IISD Board Member

Science Team

Norm Snow, Lead Scientist/Executive Director, Inuvialuit Joint Secretariat
Fikret Berkes, Project Advisor/Professor, Natural Resources Institute, University of Manitoba
Theresa Nichols, Ocean Policy Analyst, Department of Fisheries and Oceans
John Nagy, Supervisor – Wildlife Management, RWED, Government of the NWT
Stephen Robinson, Permafrost Scientist, Geological Survey of Canada
Dyanna Riedlinger, Graduate Researcher, Natural Resources Institute, University of Manitoba

Video Production Team

Bonnie Dickie, Director, Writer, Researcher
Rosemarie Kuptana, Narrator
Terry Woolf, Director, Video Camera Operator
Gary Mulligan, Editor
Pat Braden, Composer
Lawrence Rogers, Sound, Inuvialuit Communications Society
Stan Ruben, Sound, Inuvialuit Communications Society

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- the Walter & Duncan Gordon Foundation;
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- Indian and Northern Affairs Canada; and
- the Government of the Northwest Territories.

Generous in-kind support was given by:

- the Hunters and Trappers Committee of Sachs Harbour;
- the Inuvialuit Game Council;
- the Inuvialuit Joint Secretariat;
- the Inuvialuit Communications Society;
- the Natural Resources Institute, University of Manitoba;
- the Department of Fisheries and Oceans;
- the Government of the Northwest Territories; and
- the Geological Survey of Canada.

3.0 Timeline of Primary Activities

Trip 1 (Banks Island, June 15–21, 1999)

Trip 2 (Banks Island, August 8–17, 1999)

Trip 3 (Banks Island, February 14–21, 2000)

Trip 4 (Banks Island, May 22–29, 2000)

Science team meeting (Victoria, August 15–17, 2000)

Project evaluation (Sachs Harbour, August 2000)

Video launch

The Hague (COP-6) (November 16, 2000)

Ottawa (November 16, 2000)

Sachs Harbour (November 16, 2000)

Yellowknife (November 30, 2000)

Winnipeg (December 7, 2000)

Final workshop (Ottawa, November 17, 2000)

Final trip/workshop (Sachs Harbour, January 27–February 3, 2001)

Documentation and follow-up (November 2000–June 2001)

4.0 Summary of Activities

Detailed trip reports are available at: <http://www.iisd.org/casl/projects/inuitobs.htm>

4.1 Trip 1 (June 15–21, 1999)

This was the project team's first trip to Sachs Harbour, the Inuvialuit community on Banks Island. Approximately 120 Inuit live in the community. Residents have a close relationship with the Arctic environment. They still harvest fish from the sea and animals from the tundra to support themselves.

The Winnipeg-based project team met prior to the first trip to discuss the objectives and details of the scheduled activities. The objectives of the first trip were to:

- describe the project to the Inuit in the community;
- hold planning workshops allowing local people to describe their livelihood system, discuss the climate change phenomena they are experiencing and help the project team plan further trips to the community;
- videotape for possible inclusion in the video production the planning workshops presenting climate change through Inuit eyes;
- videotape location shots of the community for inclusion in the video; and
- plan a journal article on the potential contribution of local observation and traditional knowledge to research on climate change in the Arctic.

The project team¹ accomplished all of these tasks during the trip. Rosemarie Kuptana played a key role in the success of the first trip. During the orientation day she took the project team for tea at the houses of Elders and key community members. As a result, the majority of adults in Sachs Harbour attended the workshops—more than 30 people in all.

Six separate activities took place during the two days of workshops:

1. Issue identification: Inuit participants wrote down all the phenomena that they have observed in their hunting and fishing activities that indicate the arctic climate is changing—one observation on each card.
2. Cause-effect analysis: Participants arranged the cards into “trees”, with the extent or scope of each phenomenon forming the “roots” of the tree, and the effects of each phenomenon forming the “branches” of the tree.
3. Timeline: Participants (especially Elders) charted changes in their environment, and in fish and wildlife behaviour, back through time to the earliest memories of local people—in this case to the 1930s.
4. Ranking: Participants “voted” by each placing five coloured dots next to the climate change phenomena that they considered most important.
5. Annual calendar: Participants created a circular chart of the seasons, and showed the time of year for each traditional activity and each climate change phenomenon (see Annex A).
6. Trip planning: Based on the information from the workshop, participants chose the best times for the project team to videotape and interview people about traditional activities and climate change phenomena.

The main climate change observations that were identified by the community during the workshops are listed below:

Changes in birds – The community described new species of birds they had observed—including robins and barn swallows—as well as changes in the number of birds that live in the area. The population of snow geese, for example, was observed to be higher. Local people also described changes in bird behaviour—snow geese stayed for a shorter time in the spring, while some small birds, which traditionally migrated, now stayed the entire winter. Changes in the local climate were also associated with a higher incidence of deformed geese eggs.

Changes in marine animals – In addition to observing seldom-seen aquatic species such as salmon and herring, local people also observed an increased occurrence of deformed fish. Rock cod populations were observed to decline. Char were larger in size. Less sea ice was thought to have led to more young bearded seals being separated from their mothers and starving. Although many people felt that the seal population in the area was higher, fewer seals were accessible to the community due to a lack of sea ice. Bowhead whales were also thought to be more abundant.

Changes in land animals – Local people observed that the population of caribou was smaller and contained fewer large males. The population of muskox had increased, but with a higher incidence of deformity. Climate change has also caused polar bears to leave their lairs earlier and move away from the community. The population of wolves was observed to be higher while the number of rabbits decreased. New types of foxes (black and red) had also been observed.

Changes in insects – Shorter winters, longer summers and more water were thought to have caused an increase in the number of insects in the area, and led to the arrival of new species. Local people noted an increase in the number of mosquitoes and a longer mosquito season. They also described the occurrence of new beetles and sand flies.

Changes in weather patterns – Milder winters, warmer summers, a shorter fall and a slower and later freeze-up were among the many weather-related changes that were observed locally. Increased rain, summer hail, intense summer sun, stronger winter winds and the occurrence of thunder and lightning were also identified. Fluctuations in the seasons were noted, particularly the earlier arrival of spring. The occurrence of bigger waves in the harbour was also felt to be a significant change.

Harvesting problems – Local people described a number of harvesting problems they had experienced. Most of these related to the difficulty of hunting seals and polar bears on the thinner and less abundant sea ice. On land, melting permafrost created difficult conditions for overland travel, making it hard to harvest and transport land animals.

Health Problems – Participants described a number of health problems that local people are encountering as a result of climate change. These include skin rashes and other skin problems due to sun and wind, and allergies to white pine pollen, which has moved northward.

Based on the results of the workshop, the project team and the community identified areas of scientific expertise needed during the subsequent seasonal visits. This was to be accomplished by maintaining Norm Snow as the lead scientist, and inviting a “guest” scientist with expertise relevant to the community’s priorities on each subsequent trip. Fikret Berkes would continue to provide advice on project activities from Winnipeg, and would be involved in the evaluation of the project. Dyanna Riedlinger would continue to travel to Sachs Harbour with the project team, and would stay for an extended period after the rest of the team had left in order to conduct follow-up research.

4.2 Trip 2 (August 8–17, 1999)

The Winnipeg-based project team met several times prior to the second trip to review the findings from the planning mission and to discuss the details of the scheduled activities. The team set the following objectives for the second trip:

- videotape the Inuit as they perform traditional activities such as sealing and fishing during the short Arctic summer, when the coastline is free of ice;
- videotape changes to the environment such as shoreline slumping caused by melting permafrost, appearance of new animal and insect species, and behavioural patterns that the Inuit observed during the summer period;
- videotape interviews with community members about changes in their environment due to climate change, the effect of these changes on their livelihood and their ability to adapt to these changes; and
- audiotape longer, more detailed interviews with selected community members to gather data for the project’s journal article on the potential contribution of local observation and traditional knowledge to research on climate change in the Arctic.

The project team worked in two groups to accomplish these tasks: a video group² to videotape traditional activities and record on-camera interviews, and a science group³ to audiotape more detailed interviews with Sachs Harbour residents.

Video Group Activities

The video group worked in perfect summer weather for the entire trip to Banks Island: highs in the 20s, clear skies and long evenings. The group obtained a series of video sequences, as listed below:

Seal hunting: This sequence starts with pictures of the way the Inuit used to hunt seals in the summer—by taking boats to the ice edge and harvesting them as they bask on the ice (The Inuvialuit Communications Society has high quality photos, taken about seven years ago, of people from Sachs Harbour hunting this way). For the last few years, however, the ice has been too far off shore, and the Inuit have been forced to harvest seals from the shore or from boats. The sequence includes images of these hunting methods. It concludes with a campfire interview with Elders, Lena and Geddes Wolki, a married couple, talking about the way the climate is warming in the summer, how climate change has affected traditional activities such as sealing and whether they will be able to adapt to new conditions.

Permafrost melting and mudslides: This sequence shows the rapid increase in the rate of permafrost melting along the coast of Banks Island, and the dramatic mudslides that result. It continues with images of inshore erosion caused by permafrost melting along inland lakes. John Keogak, a local hunter, comments on the extent of the slumping and the effect of the environmental damage on people from Sachs Harbour. The community is built on the shoreline and could slide into the Beaufort Sea if the phenomenon continues.

Net fishing: This sequence shows Roger Kuptana, a local resident, taking a small boat out to check his nets. That day he harvested Arctic char, but recent catches have included species never seen before in the area, such as salmon.

Interviews with elders: The video group interviewed three elders regarding the climate change phenomena that they have noticed over the decades, and whether these changes are more noticeable now than they were before.

Interviews with the science group: Norm Snow and Theresa Nichols were interviewed at a camp by an inshore lake. They commented on the contribution that traditional knowledge and local observation could make to their specific fields of research.

Wildlife and community shots: The team videotaped dramatic shots of the community and the Arctic environment in the summer.

Science Group Activities

Based on the outcome of the initial planning workshop, the guest scientist for the second trip was Theresa Nichols, an Oceans Policy Analyst with the Department of Fisheries and Oceans, and an expert in sea ice and seal habitat.

Over a six-day period, the science group conducted interviews with community elders and hunters. The interviews were loosely structured around observations on the effects of climate change on the summer season and related activities. Conversations with other community members and participation in traditional community activities also added to the science group's understanding of climate-related change as seen by the Inuvialuit of Banks Island.

The science group focused on three areas:

1. The extent of traditional knowledge in the community.
2. The relevance of that knowledge to scientific research on climate change.
3. The development of a process that could give scientists better access to Inuit traditional knowledge.

The purpose of the interviews was to allow the science group to flesh out and expand on observations of environmental change from the community workshops held during the first trip in June. The interviews were conducted in an informal, flexible manner over tea in the homes of the interviewees. The interviews built upon and enhanced the initial observations documented from the June community workshops in several ways.

Additionally, and of importance to the project's objectives, the interviews gave the science group insight into the process and techniques needed to interview elders, hunters and community members about traditional knowledge of climate-related change.

The science group conducted eight interviews during the second trip—five with elders and three with hunters in the community. Several other community members who had been identified as important informants were unavailable during the team's time in Sachs Harbour. Dyanna Riedlinger conducted interviews with these people in late August after the rest of the project team had departed.

Interviews were taped on audiocassettes as well as documented in note form. Translators were used as needed. Topographic maps and smaller photocopied base maps were used to illustrate such phenomena as the extent of pack ice over time. Each interviewee was paid \$100 for the interview.

The interviews were based on several groups of observations identified through the community workshops in June. They were structured around questions that began with observations collected in the workshop. For example, an open-ended question would begin with, "The last time we were here, you told us that there was less ice in the summer," or "The last time

we were here, people said the land was going down in some places.” The questions were based on earlier comments and observations and allowed the person being interviewed to begin from a familiar starting point and add more detail and context to the initial observation.

Questions about the following were included:

Ice

Multi-year and pack ice; ice conditions and hunting; ice conditions and sea mammals; freeze-up and break-up times; pressure ridges; lake ice; ice thickness.

Permafrost

Permafrost melting times and rates; landslides, erosion, and slumping; coastal and inland permafrost conditions.

Storms

Frequency and severity of storm events; hail, thunder, lightning and rain; wind patterns; seasonal timing.

Fish

Populations and conditions of char, lake trout and cod; occurrences of salmon and blue herring.

Insects

Types of insects; unusual insects; abundance; and changes in timing.

Birds

Bird species; unusual bird species; abundance and migration patterns; and timing change.

Wildlife

Caribou and muskox conditions and populations, as well as responses to weather conditions; populations of rabbits, wolves and fox; conditions and unusual observations of sea mammals such as seals, whales and walrus.

By following up on the observations from the first trip, the science group found that the interviews:

- gave the initial observations more detail;
- allowed for the separation of climate-related observations from non-climate-related observations;
- placed the observations in time and space;
- identified the context of the observations;
- allowed for the stratification of observations and identification of which phenomena were observed by which community members;
- identified which community members were most knowledgeable about climate-related change and traditional activities;
- gave insight on indicators of change, as used by the Inuvialuit; and
- helped to secure unclear bird and fish species identifications.

The results of the interviews were analyzed by the project scientists to determine the extent and relevance of traditional knowledge and local observations on their research and on scientific research of climate change. Observations from this analysis, combined with additional information from the subsequent two trips to Banks Island, are being used as the basis of a journal paper on traditional knowledge, climate change and sea ice. The paper, led by Theresa Nichols, is expected to be available in late 2001.

4.3 Trip 3 (February 14–21, 2000)

The Winnipeg-based project team met several times prior to the third trip to review the present project findings, to plan the third trip, to talk about interim conference presentations, and to discuss the development of journal papers. The team set the following objectives for the third trip:

- videotape the Inuit as they perform traditional activities during the Arctic winter, such as muskox harvesting;
- videotape the environment of Banks Island during the winter;

- videotape short interviews with community members about changes to their environment that may be caused by increased climate variability, about the effect of these changes on their livelihood system and about their ability to adapt to these changes; and
- audiotape longer, more detailed interviews with selected community members to gather data for the project's journal article on the potential contribution of local observation and traditional knowledge to research on climate change in the Arctic.

The project team worked in two groups to accomplish these tasks: a video group⁴ to videotape traditional activities and record on-camera interviews, and a science group⁵ to audiotape more detailed interviews with Sachs Harbour residents.

During the participatory planning workshop for the project (June 1999), community residents scheduled the project's winter trip for November 1999. The Hunters and Trappers Committee of Sachs Harbour subsequently decided to conduct a commercial muskox harvest in the autumn and early winter of 1999. The harvest required the full attention of the community and the winter trip for the project was rescheduled to February 2000. This new time suited the project well. Although it was still mid-winter, there were six hours of daylight, more than enough to videotape traditional activities at that time of year.

The project team decided to conduct one interim activity between the summer and winter trips—videotaping the annual migration of the Dolphin Union Caribou Herd from Victoria Island to the mainland. In recent years, the sea ice on the Dolphin Union Strait has frozen later than usual. As a consequence, caribou have been crashing through thin ice and drowning as they have migrated across the strait. The team thought this visual image of climate change in the Arctic would make a dramatic opening to the video production. Terry Woolf, the project's camera operator, chartered a helicopter from Cambridge Bay and attempted to videotape the herd as it crossed the sea ice in early November. Unfortunately, poor weather limited his ability to get pictures of the migration.

The project also produced a rough 10-minute video to show some of the best images from the first two trips. It was shown to the community during the winter trip so that local people could see how the video images were being put together and give comments to guide the project team on the production of the final version.

Video Group Activities

Given the importance of presenting the video footage in an engaging way, Bonnie Dickie, an award-winning scriptwriter and film director with extensive northern experience, was asked to join the video team on the winter trip. The video group worked in clear, cold winter weather with daytime temperatures hovering around -35 degrees and daylight lasting from 10:00 a.m. to 4:00 p.m. Terry Woolf, the camera operator, used chemical warmers inside a "polar blanket" to ensure that his video camera worked properly in such extreme conditions. The group was able to capture video footage of the following:

- wildlife north of Sachs Harbour, including caribou grazing on the snow;
- interviews with John and Samantha Lucas at a winter camp on the tundra;
- a traditional muskox harvest (including skinning the animal and butchering the carcass) near the Lennie river, 50 kms from Sachs Harbour;
- trapping and dogsled sequences with Trevor Lucas;
- a community meeting to discuss the project;
- interviews with Frank and Martha Kudlak, Edith Haogak, Lena Wolki and Sarah Kuptana;
- a sequence on ice-gathering with Frank Kudlak and his grandson Nathan;
- community shots;
- interviews with Norm Snow, Dyanna Riedlinger and John Nagy; and
- a sequence on polar bear fleshing with Sarah Kuptana and Lena Wolki.

The video group was very satisfied with the quality of the footage. Some sequences, particularly the muskox harvest, powerfully portrayed traditional winter activities. The interviews on climate change during the winter were not as striking, however, largely because the Inuvialuit had not noticed the same degree of change that they had in the summer. Generally, they had observed that winters are warmer on Banks Island than they were 15 or 20 years ago, with minimum temperatures hovering around -35 or -40 degrees rather than -50 degrees. The winters are also shorter in duration, with freeze-up coming about a month later than previously and the spring thaw a few weeks earlier. But these changes have yet to significantly affect wildlife behaviour and the ability of local people to harvest land animals. Most local people think that fluctuations in wildlife populations and changes in behaviour can be explained by variations in natural cycles rather than by climate change.

Science Group Activities

Based on the outcome of the initial planning workshop, the scientist for the third trip was John Nagy, a wildlife management supervisor with the government of the Northwest Territories and an expert in land mammals.

The objective of the science team during the third trip was to conduct interviews in the community relating to the potential impacts of climate change on land animals such as caribou and muskox, as well as impacts experienced by the community during fall and winter harvesting and other activities.

Over a six-day period, the science team conducted interviews with 13 community members. The interviews were conducted in an informal, flexible manner in the homes of the interviewees over tea. They built upon and enhanced observations and knowledge of climate-related change documented during the previous two trips and sets of interviews. Interviews were conducted primarily with active harvesters and elders, and were structured several ways:

- a) husband and wife group;
- b) two active hunters together;
- c) father and son group;
- d) two elders; and
- e) individual interviews.

The interviews began by establishing when the interviewee came to Banks Island and the extent of that person's knowledge of the area, including primary hunting and travelling areas. For example, a discussion about where a former trapline was located would begin the interview.

Dyanna expanded on this information in the following week using maps created by community members indicating their knowledge and use of land and ice during their lifetimes.

Interview questions were structured around community knowledge and understanding of:

1. caribou, muskox and wolf populations over time (with some questions on geese and fox);
2. animal condition and health;
3. severe weather events and impacts on caribou and muskox;
4. changes related to vegetation in the area;
5. snow depth on winter ranges;
6. changes related to insects and their relationship to caribou and muskox;
7. general weather patterns, i.e., winter temperatures, wind patterns, snowfall; and
8. general questions pertaining to how changes (i.e., warmer winters) will impact animal populations and the community.

The interviews were loosely structured around a series of questions to promote discussion of wildlife-related changes over time. Discussions began in the decade the interviewee first came to Banks Island, and proceeded to the present. They also included recollections of knowledge and stories passed on by parents and grandparents. Several key events were used as starting points for discussion, including a wolf-poisoning program in the late 1950s that had significant ecological impacts, as well as a severe icing event in 1952 that resulted in the movement of caribou off the island.

Based on initial observations of the interviews conducted during the third trip, several points can be made:

- there is an abundance of knowledge in the community relating to historical and current wildlife populations, behaviour and health, and of the relationship between weather and wildlife;
- understanding climate-related change and wildlife is complicated by factors such as harvesting patterns, species interaction, etc.;
- knowledge of active harvesters clearly contributes to current science-based knowledge of wildlife and climate change; it is spatially and temporally extensive and can help "piece together" the number and condition of animals over time. Active harvesters obtain this knowledge by continually monitoring animals in all seasons; and
- while the specific impacts of climate change on wildlife populations may be difficult to assess, it is clear that any wildlife-related changes will also impact the community and harvesting activities.

The project team also hosted a community meeting on Thursday, February 17, to show a 10-minute “rough cut” of videotape from the first two missions, brief local people on the progress of the project and answer questions regarding the project in general. Seventeen people attended—an excellent turnout in a hamlet with a winter population of just over 80 people, including children. They were impressed with the video and the way in which it portrayed community life and traditional activities. Discussion then centered on ways for the community to become involved in the final production of the video, including script writing, editing and post-production. The project’s plan called for one member of the community to travel to southern Canada to participate in post-production activities and approve the video on behalf of the community. However, the people who attended the meeting said they would rather discuss the general shape and tone of the video with the project team during the spring trip to Sachs Harbour. The community recommended that a member of the project team visit the community mid-way through the editing process, to show the entire community a “rough cut” of the final video, so that suggestions for improvements or alterations could come from the entire community. Local people who attended the community meeting were very supportive of the project.

4.4 Trip 4 (May 22–29, 2000)

The Winnipeg-based project team met several times prior to the fourth trip to review the findings to date, to plan the upcoming trip, to talk about ongoing conference presentations and to discuss the allocation of responsibility for writing the journal papers. The team set the following objectives for the fourth trip:

- videotape the Inuit as they perform traditional activities during the Arctic spring, such as ice-fishing and goose hunting;
- videotape the environment of Banks Island during the spring;
- videotape short interviews with community members about changes to their environment that may be caused by increased climate variability, in particular permafrost changes. Explore the effect of these changes on their livelihood system and their ability to adapt; and
- audiotape longer, more detailed interviews with selected community members to gather data for the project’s journal articles on the potential contribution of local observation and traditional knowledge to research on climate change in the Arctic.

Stephen Robinson, a permafrost expert with the Geological Survey of Canada, and Jennifer Castleden from IISD joined the project for the fourth trip. Jennifer’s role was to develop a communication strategy that would generate maximum public interest in the video and scientific reports.

Video Group Activities

The video group worked in unseasonably cold spring weather, with temperatures hovering around -14 degrees. The twenty-four hour daylight allowed for a flexible shooting schedule. The team had planned to document the spring goose hunt, which has been occurring earlier in recent years due to the warmer weather. However, this year was abnormally cold in late May, delaying the arrival of the geese and preventing the video team from capturing this activity on film. Instead, the video team concentrated on interviewing people around town and while they were ice-fishing. They also obtained footage of community life and the effects of permafrost melting.

During the trip, the group was able to capture video footage of the following:

- Tony and John Lucas Jr. in the evening hitching and running a dog sled team across the frozen ocean;
- an interview with Rosemarie Kuptana and her mother Sarah, in which Rosemarie talked about the unpredictable weather and recounted stories of her youth on the land. Sarah explained that Inuvialuit women have always had a deep understanding of the weather, as they were responsible for assessing conditions and preparing the hunters accordingly; a
- an interview with Roger Kuptana on observed climate changes, storms, rougher water, challenges to traveling, fishing and hunting. During the interview, Roger discussed changing ice conditions as a result of climate change and explained the dangers of travelling on ice and the potential impact on his business as a hunting guide;
- community members while they fished through small holes in the six-foot thick lake ice;
- an interview with Stephen Robinson, Geoscientist, regarding the increased melting of permafrost, impacts of permafrost changes and his perspective on the integration of local knowledge with western scientific knowledge;
- an interview with Larry Carpenter and John Keogak, in a tent on the shore of Middle Lake, speaking about changes in the permafrost and unpredictability of weather in recent years;

- an interview with Rosemarie Kuptana, at Middle Lake, concerning her memories growing up on the land and on Banks Island, as well as the impact climate changes have had and will have on her community;
- an interview with John and Samantha Lucas at their camp where they provided additional information on the changing climate and its impact on the Inuit way of life;
- scenic footage around the Middle Lake area; and
- an interview with Geddes and Lena Wolki for further details on the changes they had observed.

Science Group Activities

The objective of the science team during the fourth trip was to conduct interviews in the community relating to the potential impact of climate change on permafrost. The science team also looked at the changes experienced by the community during spring seasonal activities, such as ice fishing and goose hunting.

Over a seven-day period, the science team interviewed nine community members. As during previous trips, the interviews were conducted in an informal, flexible manner, usually in people's homes over tea. Two interviews took place at a Middle Lake camp. This was the first opportunity for the science group to conduct interviews out on the land. On Friday the team interviewed John Keogak and Larry Carpenter. The following day, Larry and John took the science group to see some of the permafrost-related changes they had described, including coastal erosion and inland retrogressive thaw slumping. Even though there was still an abundance of snow on the ground, several active thaw areas were visible, particularly along the coast. Having community members take the scientists to places where changes are occurring was considered to be an appropriate course of action for establishing permafrost- and landform-related changes.

All interviews emphasized permafrost and springtime changes, though they allowed the interviewee considerable latitude in explaining the changes by referring to other seasons or traditionally-acquired knowledge. Questions were loosely structured around topics such as active layer processes, thaw slumps, inland and coastal riparian zone erosion, water levels and ice wedges. They also explored the impact of permafrost melt on travel, accessibility, buildings and roads. Specifically, the science group sought to distinguish natural processes (i.e., erosion) from abnormal or unexpected processes. Precipitation, temperature and seasonal change were also discussed, particularly their link to changes in the permafrost environment. Finally, the science group were concerned with changes associated with spring seasonal activities such as goose hunting and ice fishing. These included observations on lake ice thickness, the timing of break-up and freeze-up, and the impacts of climate change on the migration of geese.

As with other trips, all interviews were taped on audiocassettes and transcribed. Dyanna Riedlinger remained in the community for a month following the project team's departure, photographing several of the key locations where the community had indicated permafrost melting was particularly noticeable.

The science team drew the following conclusions from the interviews conducted during the fourth trip:

- there is an abundance of knowledge in the community related to historical and current landforms, erosion activity and permafrost conditions;
- knowledge of permafrost-related changes is closely tied to community activities, including travel, hunting and fishing;
- community members interviewed can differentiate between natural and abnormal climate and erosion processes;
- discussions of permafrost-related changes do not occur in isolation from other variables such as wind, precipitation, temperature, human activity and seasonal change;
- changes associated with melting permafrost, while very visible, have had less of an impact on community activities than the rapid spring melt and the delayed winter freeze-up; and
- there is significant concern that this will change if the permafrost continues to melt, as the natural regeneration process takes thousands of years.

A 42-minute rough cut of the video was completed in mid-June. The videotape incorporated Bonnie's voice narrating the script that Rosemarie Kuptana would read in the final version. It also included dissolves and other visual effects, superb archival footage serendipitously obtained on the fourth trip, and a composed soundtrack blending contemporary and Inuvialuit music.

The video was sent to the HTC for community review in late June. It was played to small groups and individuals and their comments were collected and, where possible, incorporated into the video. Overall, the community appeared very pleased with the video, feeling that it accurately reflected their local situation and concerns.

During a subsequent screening with IISD staff, several people expressed the need for a shorter 10-minute version of the video that would be more appropriate for discussion with senior decision-makers, broadcast on shorter “Earth Report” style television programs and the Internet. The video team felt that producing a shorter version could be easily and cost-effectively accommodated in the production plans. As such, the decision was made to produce two versions of the video, a 42-minute (television-hour) version and a 10-minute summary version—both to include visual effects, narration and music. The title of the video is “Sila Alangtok,” which is Inuvialuit for “the weather is changing.”

The team also plan to produce a one-page foldout brochure for the project which IISD believes will be an effective pre- and post-launch tool. It provides readers with information on the community’s observations of climate change, individual quotes, photos and an outline of the project’s approach. The brochure also provides details on the videos and how to obtain them, and links to the project web site where the most up-to-date information is available and where project outputs are available and acknowledges the contributions of all project partners and funding agencies. The brochure will be used as an outreach and media tool and will complement the video cover in design and content.

4.5 Science team meeting (Victoria, August 15–17, 2000)

The goal of the meeting was to bring together the full science team to discuss the substance and style of their integrated report. This was the first time that Norm Snow, the project’s lead scientist, Stephen Robinson, the permafrost specialist, and Theresa Nichols, the sea ice expert, had met as a group. In the end, for cost and other reasons, John Nagy, the wildlife expert, Fikret Berkes, the project advisor, and Dyanna Riedlinger, the traditional knowledge researcher, were unable to attend. Nonetheless, Norm, Stephen and Theresa had a chance to assemble and discuss the aggregate data for the first time. With the input of experts from the Department of Fisheries and Oceans, the team drew conclusions that formed the outline of the final report led by Norm Snow. The report, a joint effort by all of the scientists, provides the most encompassing and rigorous look at the community’s observations of climate change and the extent to which their collective knowledge can enhance scientific research. It also contains recommendations for improving policy and research in the region. The document is expected to be available in late 2001 on the project’s web site <http://www.iisd.org/casl/projects/inuitobs.htm>.

4.6 Project evaluation (Sachs Harbour, June–August 2000)

In order to ensure an accurate understanding of the community’s perception of the project, an evaluation was conducted in Sachs Harbour in August 2000. Fikret Berkes and Dyanna Reidlinger led the evaluation with the assistance of Sachs Harbour residents Kimberley Lucas and Lucy Kudlak.

The three specific questions of interest to the evaluators were:

- 1) Did the project accurately reflect the local observations and traditional knowledge of the people of Sachs Harbour with respect to climate change?
- 2) Were the planning workshop, the video and the science interviews effective in meeting the project goals?
- 3) Was the project inclusive, participatory and responsive to Sachs Harbour concerns?

An advertisement for two community researchers was posted locally. The Hunters and Trappers Committee (HTC) of Sachs Harbour chose the two local researchers from a pool of four applicants. Dyanna Riedlinger (the evaluation coordinator), who had remained in the community for a month following the spring trip, trained them in evaluation techniques in June. A survey was designed and pre-tested; modifications were made and the revised survey was administered by the two community researchers in July when the community had seen the nearly-completed video. The results of the survey were synthesized by the evaluation coordinator and validated during a follow-up visit by the project evaluator in August.

The evaluation addressed only the community component of the project, as the video and journal papers had not been completed nor the communication strategy fully implemented. While the entire project had not been completed, the project

manager felt it was important to discuss the community visits with local people while they were still fresh in their minds. As well, many of the activities that followed the fieldwork took place elsewhere, making it difficult for the community to have an informed opinion even though every effort was made to update the community through faxes, telephone calls and newsletters.

The survey was primarily targeted to the 13 households (out of about 30 in the community) who had participated directly in the project through the planning workshop, the video or the science interviews, or by acting as guides for the project team. The survey ultimately covered 16 households, 12 from the target group and an additional four households that had not participated directly in the project activities.

The evaluator reached the following conclusions:

- 1) The Inuit Observations on Climate Change project accurately reflects the local observations and traditional knowledge of the people of Sachs Harbour with respect to climate change.
- 2) All three major components of the project were evaluated favourably by those respondents who participated. All respondents thought that the video portrayed their community, their lifestyle and their observations accurately. The video also met the approval of those who were not directly involved in its production. While those respondents who did not participate in the planning workshops could not comment on them, those people who did participate strongly agreed that this was the correct way to start the project.
- 3) The majority of respondents thought the project was inclusive. Some, including the non-participants, thought it could have been improved by having more women, more elders and more youth. The project was responsive to Sachs Harbour's concerns by involving the community from the start to shape the project and to determine the areas of emphasis. Almost everyone thought they had a say in how the project was organized. All seemed to appreciate the opportunity to give feedback and the chance to suggest corrections and changes.

The project evaluation was distributed to the project's funders prior to the Ottawa final workshop.

4.7 Video launch

In order to maximize media attention during the release of the video, *Sila Alangotok: Inuit Observations on Climate Change*, the communications team⁷ sought to time the launch with an existing news "peg"—an event that was expected to draw considerable media attention to the issue of climate change. Several events were considered, including the Joint Energy and Environment Ministers Meeting in Quebec City in October 2000, and the United Nations Climate Change (COP-6) climate negotiations in November. After discussing the choice with other organizations more experienced in media relations, IISD decided on COP-6 as it was a major international meeting during which strategies to address climate change would be negotiated. In order to mitigate concerns that the North American media would be pre-occupied covering the Canadian and U.S. elections, the IISD team decided to launch the video simultaneously in Sachs Harbour, Ottawa and at The Hague. Additional launches to continue the momentum were planned for Yellowknife in November and Winnipeg in December.

The team decided to release only the short version of the video. This was done in order to keep the full-length version fresh and appealing to broadcasters, and also to cut down on the costs of distributing complementary VHS and broadcast-quality tapes to the media.

The project's media strategy included the following components:

- providing advance media training and strategy workshops for IISD staff;
- designing a brochure that presented the project and its findings in a concise and visually engaging manner;
- distributing VHS, Beta (broadcast-quality) and CD (digital audio) copies of the 14-minute summary video to international media based in North America;
- posting high-resolution photos on the Internet for use by print media; and
- posting the 14-minute summary video at http://www.iisd.org/cas/projects/inuit_video.htm for advance media previews and for public viewing.

IISD staff, Graham Ashford (in Ottawa), Jennifer Castleden and Dennis Cunningham (in The Hague), Sachs Harbour residents Rosemarie Kuptana (in The Hague) and John Keogak (in Ottawa), and scientific team members John Nagy and

Stephen Robinson (in Ottawa), served as project spokespersons during interviews immediately before the launch. Together, the spokespersons conducted more than 35 interviews in person and by phone November 13–16, resulting in substantial domestic and international coverage. (See section 5.1, Outcomes: Public Awareness, Media Coverage.)

Local Launch

The Sachs Harbour launch was led by the Hunters and Trappers Committee and was primarily a local event. The video was screened at a community meeting and received very positive reviews.

National Launch

The video was released at a breakfast media conference at the National Press Club in Ottawa on November 16th, 2000. The 14-minute summary version of the video was screened and a panel of four speakers commented on the latest evidence of climate change. Panel members were:

John Keogak, Sachs Harbour resident and member of the Hunters and Trappers Committee;

David Suzuki, Chair, David Suzuki Foundation;

Elizabeth May, Executive Director, Sierra Club of Canada; and

Graham Ashford, Project Manager, IISD.

The audience included print, television and online reporters, as well as invited government and civil society decision-makers. While the launch benefited significantly from the involvement of the David Suzuki Foundation and the Sierra Club, much of the media coverage that the launch generated had occurred prior to the conference. In an effort to ensure a coordinated launch over several time zones, the project team gave several interviews prior to the Ottawa launch that were subject to an embargo. However, the embargo was not respected and the story broke on November 13, resulting in a flurry of media activity as different outlets attempted to get the information out quickly.

International Launch

The video was released at the Sixth Conference of the Parties (COP6) to the United Nations Framework Convention on Climate Change in The Hague, The Netherlands, on November 16. The key speaker for the November 16 press conference was Rosemarie Kuptana, IISD Board Member and resident of Sachs Harbour. IISD staff members Jennifer Castleden and Dennis Cunningham also participated in the international press conference. The summary version of the video ran continuously at IISD's COP6 display from November 16–24.

Yellowknife Screening

The northern premiere of the full-length version of the video occurred on November 30 at Ecology North's annual general meeting. The event was open to the public and was a follow-up to an earlier screening of the summary video during Ecology North's Climate Change Forum in October. The November premiere was introduced by Terry Woolf, the video's director and videographer. The northern screenings created considerable interest in the project and concern about the impacts that residents might expect as a result of climate change.

Winnipeg Screening

IISD and Resource Conservation Manitoba (RCM) organized a screening of the full-length video on December 7, 2000, in Winnipeg. The session was introduced by Toby Malone (RCM) and Graham Ashford. Theresa Nichols and Dyanna Riedlinger answered questions on the project's findings.

4.8 Final workshop (Ottawa)

The day after the Ottawa video launch, IISD convened a final workshop with project team members, funding partners and individuals from other interested organizations. The objectives of the workshop were to review the project, watch the video and discuss a strategy for communicating the project results, and refining and replicating the approach elsewhere.

The date was chosen to allow John Keogak of Sachs Harbour to attend without large additional travel costs. The workshop ran from 10:00 a.m. until 3:00 p.m. Project funders were invited an hour early so that the project's finances and evaluation could be discussed.

The original meeting agenda was developed to have participants identify and prioritize the target audiences for the video and science papers and to develop strategies to reach these people. The distribution strategy for the video was also discussed, as were strategies for refining and applying the project's approach in other areas. However, given a chance to review the agenda, participants expressed an interest in concentrating on the last item. As it was a group of people not fully assembled before, there was interest in discussing what individuals or organizations were doing on Arctic climate change, what their strategies were for COP-6, how better networks could be established (research and funding) and how to document ongoing changes in the North.

The following is a summary of some of the main points of discussion:

Final workshop in Sachs Harbour

Given the success of the initial workshop, several people commented on the importance of convening a final workshop in Sachs Harbour that brought together all of the team and community members to discuss the project's findings and plan the next step and follow-up projects. This activity was not anticipated in the original workplan. There was agreement that such a workshop was important, if only to give the community a sense of closure on the project. (Additional funding was subsequently provided by the Walter and Duncan Gordon Foundation, which allowed for a final workshop in Sachs Harbour in January 2001. For cost and logistical reasons, the workshop included only the project manager.)

Establishing Effective Networks

Collaborative research, advocacy and action were seen as necessary and important. The Canadian Climate Change Impacts and Adaptations Network (C-CIARN) was identified as an emerging relevant example. The C-CIARN is not intended to fund specific research, but rather to fund the coordination of overall research. It was suggested that the IISD project could provide ideas for the northern node of the network. A similar oceans policy network has proven to be an effective way of identifying key issues and thereafter generating funding for research. Another aboriginal/government network that had emerged to address contaminants in the North was mentioned several times as a model that might be applied to the issue of climate change.

The Sachs Harbour Project

Participants complimented the Inuit Observations on Climate Change project. Several people commented on the importance of having involved the community in setting the agenda, collecting the observations, defining the project activities and sharing the results. The project was considered important because it brought a large amount of existing knowledge to a focal point. The importance of spending time in the community and on the land was also mentioned, as was the value of driving the process from the bottom. This model has proven successful in other projects where the Inuit have shared their knowledge, such as the *Voices from the Bay: Traditional Ecological Knowledge of Inuit* and *Cree in the Hudson Bay Bioregion* document compiled by Miriam McDonald, Lucassie Arragutainaq and Zack Novalinga and published by the Canadian Arctic Resources Committee. There was agreement that the findings of such projects need to be gathered, assessed and used to inform policy decisions in resource management and other government departments.

Reaching Decision-makers

The meeting served as an excellent opportunity to connect knowledge and action on northern climate change while sharing the project's findings with key individuals. The Arctic Council was identified as an important venue for Canada and the Inuit Circumpolar Conference to share the project's findings and discuss policy actions. The findings could contribute to the Arctic Impact Assessment that is being implemented through the Arctic Council. The initiative is trying, with some difficulty, to integrate traditional knowledge into the Intergovernmental Panel on Climate Change process. Given that the October 2000 meeting of the Arctic Council had called for coordinated efforts on issues pertinent to northern communities, the need for further national and international funding was identified.

Several people mentioned the importance of sharing the Sachs Harbour research with the energy, minerals and transportation sectors. These industries face policy changes and technical problems (such as permafrost melting) as a result of climate change.

Public

Several participants commented that the project had successfully reached researchers through the journal papers and the conference and workshop presentations. They hoped the project would have the same impact with the public whose opinion drives much of the apathy on climate change mitigation. It was emphasized that the strategy should go far beyond television broadcasts.

Important Emerging Areas of Research

Climate change is an important but difficult area of research. Complex interactions are occurring that make it difficult to isolate causes and effects with any certainty. Nonetheless, through efforts to better understand local impacts of climate change, future research can be better prioritized and planned. Some interesting emerging areas of research were mentioned, including combining traditional ecological knowledge with GIS systems, and studying parasites and contaminants in order to determine and monitor climate change impacts.

4.9 Final workshop (Sachs Harbour)

The objective of the final workshop was to provide the community of Sachs Harbour with an opportunity to:

- review and comment on the project outputs including the full-length version of the video, the science papers and the brochure;
- discuss how they would like the project outputs to be used in the future;
- explore areas of future research and action related to climate change in the area, and to develop strategies for undertaking this work; and
- have a closing ceremony to give all people a sense of completion to the existing project.

A final workshop in Sachs Harbour was not included in the original project activities, but was identified as an important concluding step during discussion with the project team, the community and the final workshop participants. The trip was made possible through an additional grant from the Walter & Duncan Gordon Foundation and in-kind personnel contributions from IISD.

The trip was successful. The community was enthusiastic and engaged throughout the process. Local interest in the issue of climate change remains high, as was demonstrated by the large community turnout at the workshop and the myriad of ideas offered for future activities.

During the trip, the project manager met with Norm Snow, Executive Director of the Inuvialuit Joint Secretariat (IJS), and Larry Carpenter who is leading climate change work at the Inuvialuit Game Council (IGC). The purpose of the meeting was to update the IJS and the IGC on the progress of the Inuit Observations on Climate Change project, to discuss the final workshop in Sachs Harbour and to discuss a proposal from the Inuit Tapirisat of Canada (ITC) and IISD to conduct climate change workshops in the other five communities in the Inuvialuit Settlement Region.

As a result of the widespread media interest in the project, Alanna Mitchell, an earth science reporter for the *Globe and Mail*, asked to accompany Graham Ashford on the trip to undertake research for a follow-up piece to her November 14, 2000, front-page article on climate change in Sachs Harbour. While IISD considered this to be an excellent opportunity for further media coverage of the project, the request was ultimately passed on to the Hunters and Trappers Committee (HTC) where it was enthusiastically approved and Alanna was included in the community visits and the final workshop. She subsequently wrote a two-page focus piece in a series on how humans are affecting the environment.

The final workshop was well publicized locally by HTC secretary Florence Elanik. In addition to displaying posters around town, she had the information broadcast on the local radio station and followed up with telephone calls to every household. Consequently, when the airplane touched down in Sachs Harbour there was a large group of people to welcome it.

During the trip, the project manager was able to visit seven households to discuss the progress of the project and the purpose of the final workshop. Kimberley Lucas acted as a community liaison, scheduling the visits and taking Alanna and Graham around the community by snowmobile. It was an excellent opportunity to catch up with people who were actively involved in the project. The visits proved to be a good way to generate further interest in the workshop and to get ideas from people who do not regularly attend community events. The visits were also an opportunity for Alanna to hear first-hand about the changes

people had observed in the local climate and their anxieties about the future. During the visits, Graham gave copies of the full-length version of the project video.

The final workshop had excellent participation—over 55 people. The HTC organized a huge feast for the workshop participants.

The community was positive about all aspects of the project. The video was particularly well received, everyone feeling that it represented the local impacts of climate change in an accurate and engaging way. One person, however, did comment that it did not explore the effects of climate change on animals in enough depth. Most people felt that future projects should be developed using a similar approach—one that explicitly builds on local knowledge and actively involves community members at all stages.

In total, 50 copies of the video were distributed, including five to the HTC secretary in the event that someone who was not at the meeting wanted a copy. The three published science papers and posters prepared by Dyanna Riedlinger were also made available.

The community expressed its support for future activities to monitor and communicate the ongoing changes that global warming is bringing to the island. The ideas for follow-up activities included:

- giving copies of the video to public and school libraries;
- involving school children in monitoring ongoing climate change, particularly the timing of spring break-up and local temperature, wind and precipitation patterns;
- arranging screenings of the video with companies that emit large amounts of greenhouse gases;
- tracking other climate-related natural disasters;
- integrating climate change issues and the project's results into the school curriculum in science or social studies classes;
- monitoring the health of local wildlife, particularly polar bears, seals and marine life;
- monitoring the arrival of new species of animals;
- monitoring permafrost melting;
- monitoring riverbank erosion;
- conducting a five-year follow-up study to document changes;
- taking photos of the same area every year to monitor changes;
- undertaking and comparing research on climate change impacts on the opposite side of the world at the same latitude (Western Siberia); and
- undertaking and comparing research on climate change impacts in the Southern Polar Region.

The ITC/IISD proposal for additional workshops in the other five communities in the Inuvialuit Settlement Region was also discussed and supported, as was a proposal to air the video on CBC's *The Nature of Things* television program. The HTC indicated that they had passed a resolution supporting follow-up activities related to climate change and a continued close relationship with IISD.

In conclusion, the workshop achieved its objectives—giving direction to new activities and providing a sense of closure on existing ones.

5.0 Outcomes

5.1 Public awareness

Media Coverage

In November 2000, the video was launched concurrently in The Hague, Ottawa and Sachs Harbour with additional screenings in Yellowknife and Winnipeg. The launch attracted considerable media attention. A well-developed communications strategy meant that the story was picked up by 12 newswire services, 24 U.S. papers (with a cumulative circulation of over four million), 20 Canadian papers (with a cumulative circulation of almost three million), *Maclean's*, *Panorama* and *Outside* magazines (cumulative circulation of two million), and at least 22 major online sources including

National Geographic.com, @Discovery.ca, One World Net, ABC News.com and CNN.com. The project team took part in nine major radio interviews including ABC Radio, BBC, Radio Netherlands, CBC *As It Happens*, CBC Syndication (13 separate city interviews), CBC Radio International, KWAB, Great Lakes Radio Consortium (140 stations in 10 U.S. states) and CFX Radio. The project was also covered on 14 major television networks including Associated Press Television Network (330 broadcasters worldwide), BBC, France 1, France 2, ARD Television Swiss Romande, National Geographic channel, CBC (the National), CTV, Global, CBC *Canada Now*, CBC Newsworld, Discovery Channel and the Aboriginal Peoples' TV Network. There were an additional 28 print, radio and Internet stories on the project prior to the launch.

Upcoming television broadcasts

IISD and the producers of CBC's television program *The Nature of Things* (with the support of the Sachs Harbour Hunters and Trappers Committee) have reached an agreement in principle to broadcast sections of the video to introduce and conclude a four part series on climate change that will air early next season (October, 2001). IISD is also approaching other broadcasters to air the 42-minute version in its entirety.

Film festivals (14 at present)

The full-length version of the video has been submitted to 14 film festivals.

Special screenings

The project team continues to encourage the screening and discussion of the video at community, industry and civil society events.

5.2 Influencing decision-makers

The video was screened or distributed at a number of key decision-making forums including:

Joint Ministerial Meeting of Environment and Energy Ministers

Quebec City, October 16, 2000

The summary video was screened during a break.

Arctic Council Ministerial Meeting

Barrow, Alaska, October 12–13, 2000

Copies of the summary version of the video were distributed to each of the eight delegations to the Arctic Council. Country delegations included: Canada, Russia, United States of America, Finland, Norway, Sweden, Greenland/Denmark and Iceland.

Climate Change Forum

Yellowknife, October, 2000

Hosted by Ecology North, a preview screening of the summary version of the video was held for an audience of 60 as part of this important northern climate change forum.

Government of Nunavut Legislative Assembly

Iqaluit, Nunavut, October 16, 2000

The video was used as part of a climate change briefing for the members of the Nunavut legislative assembly.

National Round Table on Environment and Economy

Yellowknife, Northwest Territories, November 9, 2000

Elizabeth May, IISD Board Member and Executive Director of the Sierra Club of Canada, screened the video for members of NRTEE.

Video Launch and Media Conference

The video was released at a breakfast media conference at the National Press Club in Ottawa on November 16, 2000. The 14-minute summary version of the video was screened and a panel of four speakers commented on the latest evidence of climate change.

The video was released concurrently at a community meeting in Sachs Harbour and at the Sixth Conference of the Parties to the UNFCCC in The Hague, The Netherlands, on November 16. Key speaker was Rosemarie Kuptana, IISD Board Member and resident of Sachs Harbour.

Standing Committee on Aboriginal Relations, Northern Affairs and Natural Resources Development

Ottawa, April, 2000

A screening was held for committee members.

Western Premiers Conference

Moose Jaw, May 30–June 1, 2001

Copies of the summary version of the video were distributed to each Premier.

World Environment Day Forum

Italy, June 4–6, 2001

The Government of Nunavut showed the video at their display during the forum.

U.S. Congressional Field Hearing

May 29, 2001

Dr. Rita Colwell, Director of the National Science Foundation, used sections of the video during her testimony on the NSF's role in climate change research in Alaska during a congressional field hearing chaired by Senator Ted Stevens.

5.3 Reaching researchers

Journal papers

The project team achieved remarkable success in producing and publishing journal papers, largely due to the efforts of Dyanna Riedlinger and Fikret Berkes. In total, seven papers have been published in science or development journals and an additional document produced specifically on local adaptation to climate change for the Government of Canada's Climate Change Action Fund. A further three papers are in preparation and are expected to be available in late 2001.

The publishing of science papers has added rigor to the analysis of Inuit observations and shared the findings with other researchers. The papers have been very well received, with Dyanna and Fikret's paper "Contributions of traditional knowledge to understanding climate change in the Canadian Arctic," (due to appear in *Polar Record* this October) receiving the fifth annual ARCUS Award for Arctic Research Excellence.

The papers produced are listed below:

Publications

Ford, Neil. "Communicating climate change from the perspective of local people: A case study from Arctic Canada." *Journal of Development Communication* 1, no. 11 (2000), pp. 93–108.

Fox, Shari, Dyanna Riedlinger and Natasha Thorpe. "Inuit and Inuvialuit knowledge of climate change in the Canadian Arctic." J. Oakes *et al.* (eds.). *Native Voices in Research*. Winnipeg, MB: University of Manitoba Native Studies Press (2001).

Riedlinger, Dyanna. "Climate change and the Inuvialuit of Banks Island, NWT: Using traditional environmental knowledge to complement Western science." *InfoNorth (Arctic)* 52, no. 4 (1999), pp. 430–432.

_____. "Inuvialuit knowledge of climate change." In *Pushing the Margins: Northern and Native Research*. J. Oakes *et al.* (eds.). Winnipeg, MB: University of Manitoba Native Studies Press (2000), pp. 346–355.

_____. "Community-based assessments of change: Contributions of Inuvialuit knowledge to understanding climate change in the Canadian Arctic." Master's thesis, University of Manitoba (2001).

_____. "Responding to climate change in Northern communities: Impacts and adaptations." *InfoNorth (Arctic)* 54, no. 1 (2001), pp. 96-98

Riedlinger, Dyanna. and Fikret Berkes. "Contributions of traditional knowledge to understanding climate change in the Canadian Arctic." In *Community-based assessments of change: Contributions of Inuvialuit knowledge to understanding climate change in the Canadian Arctic* (2001).*

*To be published in *Polar Record* in October 2001. Awarded the 5th Annual ARCUS Award for Arctic Research Excellence.

Reports

Riedlinger, Dyanna. "Climate change and Arctic communities: Impacts and adaptations in Sachs Harbour, NWT." Report prepared for the International Institute for Sustainable Development. Winnipeg, MB: Natural Resources Institute, University of Manitoba (2000).

Berkes, Fikret and Dyanna Riedlinger. Project evaluation. "Inuit observations on climate change: The community component." Report to the International Institute for Sustainable Development (IISD). Winnipeg, MB: Natural Resources Institute, University of Manitoba (2000).

Forthcoming Papers

Nichols, Theresa *et al.* "Climate change and sea ice: Local observations from the Canadian Western Arctic." (2001). *In prep.*

Berkes, Fikret and Dyanna Riedlinger. "Adapting to climate change: Socio-ecological resilience in a Canadian Western Arctic community." (2001). *In prep.*

Fox, Shari, Dyanna Riedlinger and Natasha Thorpe. "Inuit and Inuvialuit knowledge of climate change in the Northwest Territories and Nunavut." *In prep* for *Inuktitut*, (spring 2001).

Snow, Norm *et al.* Summary science paper. *In prep.*

Riedlinger, Dyanna *et al.* "Frontiers in Social Science. Indigenous Peoples' Perspectives on Arctic Climate Change" Chapter in a book proposed in partnership with the Smithsonian Institute.

Conferences and Workshops

The project was able to reach a considerable number of researchers through presentations at conferences and workshops including:

Canadian Association of Geographers Annual Meeting. June, 1999. Lethbridge, Alberta. *Climate change and the Inuit of Banks Island, NWT: Using Inuit environmental knowledge to complement western science.* Paper presentation by D. Riedlinger and F. Berkes.

Cumulative Impacts Workshop. December, 1999. Yellowknife, NWT. Poster presentation by F. Berkes.

Beaufort Sea 2000 Conference – Renewable Resources for our Children. 1999. Inuvik, NWT. Inuit Observations of Climate Change poster presentation by D. Riedlinger on behalf of the International Institute for Sustainable Development and the community of Sachs Harbour.

Workshop on Climate Change Impacts and Adaptation Strategies for Canada's Northern Territories. February, 2000. Yellowknife, NWT. Evening presentation during a panel session was made by N. Snow. In addition, two posters were displayed.

International Climate Change Communication Conference. June, 2000. Kitchener-Waterloo, Ontario. Inuit Observations on Climate Change seminar presented by G. Ashford and D. Riedlinger.

12th Annual Inuit Studies Conference – “Inuit Communities, the Northern Environment and Global Processes,” August, 2000. Aberdeen, Scotland. Paper presented by D. Riedlinger: “Looking in new directions to understand Arctic climate change: Contributions of Inuvialuit knowledge to climate change research in the Canadian Arctic.”

Yukon North Slope Conference – “The Challenge of Change.” September, 2000. Whitehorse, Yukon. Presentation by J. Castleden, L. Carpenter and N. Snow.

51st AAAS Arctic Science Conference – Crossing Borders: Science and Community. September, 2000. Whitehorse, Yukon. Presentation by L. Carpenter, J. Castleden and N. Snow.

Climate Change Forum. October, 2000. Yellowknife, NWT. Screening of a draft version of the video to forum participants.

United Nations Conference on Climate Change – Sixth Conference of the Parties (COP6). November, 2000. The Hague, The Netherlands. Press Conference and public display by R. Kuptana, D. Cunningham and J. Castleden.

Northern Research Forum. November, 2000. Akureyri, Iceland. Video presentation by H. Castleden of the University of Alberta.

Circumpolar Climate Change Summit and Exposition – Uncertain Future, Deliberate Action. March, 2001. Whitehorse, Inuvik. Northern launch of the video and presentation by L. Carpenter and N. Snow.

Third Annual Arctic Science Summit Week. April, 2001. Iqaluit, Nunavut. Video presentation by D. Malcolm of DIAND on behalf of IISD.

Building Bridges with Traditional Knowledge Summit. June, 2001. Honolulu, Hawaii. Screening of the long version of the video during two sessions.

Canadian Libraries Association Conference. June, 2001. Winnipeg, Manitoba. Presentation and screening of summary video by G. Ashford.

Global Change Open Science Conference. July, 2001. Amsterdam, The Netherlands. Project presentation and video screening by J. Castleden during panel session.

5.4 Internet site

The project's Internet site (<http://www.iisd.org/casl/projects/inuitobs.htm>) has proven to be a potent method of reaching people. In the last year alone, over 5,000 visits have been registered on the main page. The summary version of the video has been screened from the Internet site over 2,500 times—well in excess of the 435 physical copies that have been distributed by IISD. The project's trip reports, which are also available online, have been downloaded over 2,400 times cumulatively. The second report alone was downloaded 1,048 times.

These totals confirm the importance of making research findings available over the Internet—a pillar of the project's communication and transparency strategies from the beginning. Countless web sites including National Geographic, the Globe and Mail, the Northern Climate Exchange and the Global Change Report have provided links directly to the project on IISD's web site.

IISD intends to maintain the project's Internet site, making the video and project papers available anywhere in the world for the foreseeable future.

5.5 Conclusions

1. **Full and active community participation throughout all stages of the project contributed greatly to its success.**
2. **The dual objectives of science and public awareness were mutually reinforcing.** The video added a compelling sense of realism and urgency to what had been a confusing and technical issue—it put a human face on climate change. The science papers added rigor and analysis that enhanced the credibility of the video.
3. **Traditional knowledge can add significant value to scientific research on climate change.** It provides a convincing narrative through detailed and historical observations, helping to establish links between multiple climate change related impacts. It is drawn from continual observation throughout the seasons, which enables a more complete understanding of the issue of climate change.
4. **The mix of project team members and their in-kind contributions greatly aided the project's success.** The team brought video and science expertise from various perspectives to bear on the issue of climate change with substantive results.
5. **Visual images and descriptions of actual climate change impacts are very helpful** in communicating the issue of climate change to non-technical and often skeptical audiences.
6. **The workshop methodology⁶ used during the initial planning meeting was very effective** in collecting and organizing local observations on climate change, and in planning a project based on them. It provided a useful structure within which people can participate.
7. **The project's approach and workshop methodology lend themselves well to applications in other areas.**
8. **Community visits are a key aspect of generating interest in project activities** and reviewing project outputs as they are being developed.
9. **Community review through newsletters, involvement of the Hunters and Trappers Committee** and extended visits to the community were also very important in maintaining the visibility and transparency of the project.
10. **Adopting a seasonal approach** contributed to the scientific research and to a more visually engaging video.
11. **Conference presentations and journal publications proved to be an effective method of communicating the project's findings to other researchers.**
12. **Senior decision-maker screenings significantly increased the project's profile and impacts.**
13. **The graduate student and her advisor greatly enhanced the documentation** of the project findings through journal articles.
14. **Well-organized and adequately-funded media and outreach strategies** combined with multi-city video launches (tied to important news pegs) allowed the project to receive significant public and media attention.
15. **The final workshops provided a good forum for reviewing the project's results** and linking them with other areas of research and action.
16. **The multi-funder approach allowed partners to share the risk and leverage resources.**
17. **The project should have involved Inuit Tapirisat of Canada, Inuit Circumpolar Conference earlier.**
18. **There is strong community support for their continued involvement in documenting climate change impacts.**
19. **It is important to ensure projects are designed around individual communities and their associated circumstances through full local participation.** This helps to identify modes of communication and sources of information present in the community.
20. **There is a need to continue collecting local observations on climate change throughout the Canadian Arctic and larger circumpolar region.**
21. **Further work is needed to strengthen and inform the knowledge (science and indigenous) and policy interface.**

6.0 Next Steps

6.1 Inuvialuit Settlement Region project

Through workshops, training and fieldwork the project will allow communities in the Inuvialuit Settlement Region to collect and share local observations and adaptive strategies on climate change. The nine-month project—a partnership between IISD and the Inuit Tapirisat of Canada—involves convening community workshops in Inuvik, Aklavik, Tuktoyaktuk, Holman and Paulatuk. The workshops will make use of a range of participatory exercises developed and tested during a similar IISD climate change study in Sachs Harbour in 1999–2000. The information collected in the community meetings will be compiled and shared at a regional workshop held in Inuvik if funding can be secured.

The project will help identify issues and concerns as well as fill an important knowledge gap on the impacts of climate change in Canada's Western Arctic. As Global Circulation Models consistently predict that the Polar Regions will be most affected by climate change, it is important to continue compiling information on the nature and extent of local impacts—particularly in sensitive Arctic ecosystems where people have a heavy reliance on the land. Locally relevant climate change indicators will be identified through the workshop process. The project outputs, a set of five reports summarizing the state of local knowledge, will be strategically communicated to key decision-making audiences to inform policy development and identify priority areas for monitoring.

6.2 Manitoba Education, Training and Youth and Learning for a Sustainable Future Teachers' Guide

This project will address the “Understanding of Our Environment” program of the newly developed Pan-Canadian curriculum on science education. Specifically, the video *Sila Alangotok: Inuit Observations on Climate Change* will be incorporated into the Grade 10 science programs across Manitoba, exposing students to a model wherein science and traditional knowledge are used to study a complex environmental issue. The Grade 10 science course is mandatory for all students in Manitoba and ensuring that the area of climate change is dealt with in an effective and meaningful manner is critical. This project will bring real people and local communities into the theoretical discussion of climate change and will help students develop critical thinking and decision-making skills. A comprehensive teachers' guide for the video will be developed that addresses the contents of the video (gathering scientific and traditional environmental knowledge related to climate change) and also provides examples and guidelines for a similar process which can be used in Manitoba communities. If funding is secured, the video and teachers' guide will be delivered to schools in the fall of 2001. As well, an electronic version of the teachers' guide will be available on the Internet (Manitoba Education, Training and Youth web site), allowing for free access and the ability to update the guides based on feedback from teachers or with new information as it becomes available.

6.3 French production of video

The goal of this project is to translate the Inuit Observations on Climate Change video, video jacket, brochure and web site into French, providing francophone audiences with access to the evidence of climate change impacts observed in Canada's Western Arctic region. The strong interest in the English version of the video for its stark portrayal of impacts has grounded the discussions of climate change with a tangible human element—perhaps a requisite beginning for institutional change. By making the results of the project available in French, the target audiences will dramatically increase and be provided with valuable information to inform their decisions concerning climate change.

6.4 Monitoring and reporting of global climate change in the Arctic

The anticipated project would build on the success of IISD's Inuit Observations on Climate Change project by developing the capacity of organizations in the Arctic region to collect and share local observations and adaptive strategies on climate change through an Internet-based local-observation network. IISD, therefore, is seeking support to plan and implement a three-year, five-phase project that would realize the following goals:

- build the capacity of organizations in Canada's Arctic region to document and share local observations and adaptive strategies on climate change through innovative workshop techniques and the use of digital video cameras, still photography, audio interviews and textual summaries;
- establish an electronic network of monitoring sites that would allow partner organizations to communicate the results of their research in an accurate and engaging way to the public and decision-makers throughout Canada and the circumpolar region; and
- provide scientists and other researchers with better methods of collecting, interpreting and integrating local observations and traditional knowledge on climate change into climate change research.

¹ Neil Ford, Graham Ashford, Rosemarie Kuptana, Norm Snow, Terry Woolf, Stan Reuben, Dyanna Riedlinger, Fikret Berkes (Winnipeg planning session only)

² Video team: Neil Ford, Graham Ashford, Terry Woolf, Lawrence Rogers

³ Science team: Theresa Nichols, Norm Snow, Dyanna Riedlinger, Fikret Berkes (Winnipeg)

⁴ Video team: Neil Ford, Graham Ashford, Bonnie Dickie, Terry Woolf, Lawrence Rogers

⁵ Science team: John Nagy, Norm Snow, Dyanna Riedlinger, Fikret Berkes (Winnipeg planning session only)

⁶ Best described in Ford, Neil. "Communicating climate change from the perspective of local people: A case study from Arctic Canada." *Journal of Development Communication* 1, no. 11 (2000), pp. 93–108.

⁷ Communications team: Jennifer Castleden, Terry Collins, Dennis Cunningham, Danielle Keebler, Deborah Lehmann, Stuart Slayen,