Health Canada

Climate Change Health Adaptation Program

Synthesis Report and Impact Analysis

Frances Abele and Joshua Gladstone

Table of Contents

Executive Summary 2

Introduction 6

Program History 8

Overview of Projects 12

Theme 1: Enabling Northern First Nations and Inuit communities to identify and assess key vulnerabilities and health impacts related to climate change 16

Theme 2: Developing scientific and community-relevant information to support Northern First Nation and Inuit communities in adaptation to climate change 27

Theme 3: Combining Traditional Knowledge with formal science through community based research to support sound adaptation policy development 33

Theme 4: Understanding the CCHAP in International Context 40

Conclusions 43

Bibliography 47

APPENDIX A: RESEARCH METHOD 51

APPENDIX B: CITATIONS OF CCHAP-FUNDED WORK AND INTERNATIONAL ATTENTION 53

Executive Summary

Climate change is affecting Northern Canada at a greater rate than most other parts of the world. For northerners, this means having to adapt. There will be more dangerous and uncertain travel, as well as damaged roads, buildings and water systems. Harvesting will be affected. The warming climate will also bring some new opportunities, particularly for growing food and sea transportation. Responding to all of the changes will require well-informed local analysis and planning.

Health Canada's Climate Change Health Adaptation Program (CCHAP) is one federal government response to the changing climate. During 2008-16 CCHAP supported ninety-five Northern community research and adaptation projects dealing with many of the potential health impacts of climate change. Unlike most research funding opportunities, CCHAP solicited proposals from Northern community organizations and dispersed funds to them directly.

This report explores what CCHAP funding enabled Northern communities to achieve. It explains the features of the program that were most helpful to communities' research and adaptation goals. It also demonstrates that several communities in Northern Canada have developed significant expertise in research management, research design and interpretation of results – as well as advanced capacity for communicating results using streaming, video, radio and documentary films.

A few of the 95 community research projects funded by CCHAP are described briefly in this report, to illustrate key aspects of important work that has been done. In a single report, it has not been possible to fully describe even these few, and the rich variety and depth of the individual 95 projects is not visible. They may be seen, though, at http:\\climatetelling.ca.

The impact of CCHAP is discussed in this report in terms of four themes:

Theme 1: Enabling Northern First Nations and Inuit communities to identify and assess key vulnerabilities and health impacts related to climate change

- Direct funding provided to community organizations ensured that control of the research agenda resided in community hands. This improved the prospects that each CCHAP project would fit into long-term community goals and needs.
- Community control of funding improved community awareness of the projects and results.
- Community control also facilitated the engagement of elders and youth in projects.
- A significant limitation to the effectiveness of CCHAP was the absence of multiyear funding opportunities for projects where this would be warranted.
- Despite some delays in funding and funding decisions, particularly in the early years of the program, direct funding to community organizations probably meant that funding reached community researchers more quickly than if it were paid to universities and then transferred to community organizations.
- Direct funding to community organizations led to cost savings, as university overhead was not paid.
- It seems likely that some communities did not take advantage of the program because of the complexity of the application form or the constraints of program guidelines. The program could become even more effective and useful with some refinements to engage communities

who have not yet responded to the funding opportunity. These could include hands-on support from communities where successful projects had been completed.

- Active working relationships between Health Canada staff and community research leaders improved the reach of the program and the quality of projects.
- Engagement of northern committees in funding decisions strengthened the program by making appropriate knowledge and expertise available to applicants.
- Opportunities for knowledge transfer were provided and highly valued by participants.There would have been a benefit to more opportunities for direct, community-to-community knowledge transfer.
- A significant limitation to the effectiveness of CCHAP is the absence of core funding for climate change planning and adaptation positions in community organizations, and the option of multiyear funding for projects where this would be warranted.
- Consideration should be given to diversification of funding options, to include pre-project planning and post-project implementation phases.
- Programs such as this one have the potential to advance democratic development in Northern communities. They can support the development of community knowledge institutions, and build a legacy of skills and expertise.

Theme 2: Developing scientific and community-relevant information to support Northern First Nation and Inuit communities in adaptation to climate change

- Where the CCHAP projects were successful, they also usually created demand. Communities that have made a good start now identify a need for funding for additional research or for community-driven adaptation projects.
- The CCHAP projects responded to needs identified by community members for appropriate training. It likely that there will continue to be an interest in providing "on-the-job" or co-op style education and training especially to young community members who are interested in working on community responses to the health impacts of climate change.
- Adaptation planning is well-established in some communities, but less familiar in others. It would be valuable for program managers to convene a discussion among program participants concerning a community-appropriate conception of adaptation planning.
- A number of projects revealed that some community members have advanced skills in communicating about projects and sharing the results, using the internet and video technology, as well as face-to-face activities.

Theme 3: Combining Indigenous Knowledge (Traditional Knowledge) with formal science through community based research to support sound adaptation policy development

- Direct funding to community researchers encouraged research that drew upon traditional as well as scientific knowledge.
- It did this by helping to ensure that the knowledge held by elders and others in the community was directly available to the projects, so that it could be used to guide and inform their work. This in turn made appropriate blending of scientific and traditional knowledge feasible.
- Community control of project design made it more likely that the research and adaptation planning would be more appropriate to Northern Indigenous communities. Northern communites have distinct advantages compared to many southern cities and towns, which

have a different demographic makeup and may lack the capacity for organic community development that is present in the North.
- Culturally appropriate and on-the-land research yields results that had multiple positive impacts, by responding to community priorities and strengthening social bonds, among young people and across generations.
- Projects that engage elders and youth support effective knowledge transfer.
- Reliance upon and transmission of traditional knowledge is a priority for the northern communities that participated in the CCHAP. Projects that incorporate this will have higher community engagement and longer lasting impacts.
- Implementing recommendations can be challenging because funding may not be available when it is time to act on the research. This can be addressed by development of better linkages across government programs.
- Effective community engagement arises from community-driven knowledge creation.

Theme 4: Understanding the CCHAP in International Context

- Adaptation to climate change (including the health impacts of climate change) in the circumpolar region has received substantial international attention.
- The CCHAP program has received international attention through major conference presentations and international attention to publications about the program itself, and publication of the results.
- The CCHAP program meets the highest international standards for successful climate change adaptation programs.

Recommendations

The basic structure of the CCHAP program is sound and effective, and appropriate to the needs of northern First Nation and Inuit communities. It has had a visible positive impact. With an eye to the future, we recommend the following:

1. The capacity afforded Health Canada staff for outreach should be expanded, and the most active and successful CCHAP project leaders should be invited and supported to assist interested parties in other communities to develop their own projects.

2. Consideration should be given to differentiation among options for funding. This would make the program more accessible, by directly addressing the differing situations of communities in need of climate change health adaptation research and planning. Specifically, it should be possible for applicants to seek:
   - seed funding, to support community members in taking the first steps necessary to complete a full application;
   - multiyear funding for projects that would benefit from this;
   - 'aftercare' funding for completed projects, to enable community members to explore and take measures to act upon research results;
   - core funding for community organizations focussed on climate change adaptation, or at least, project-related funding to support administrative stability.

3. Interdepartmental and intergovernmental coordination mechanisms should be developed to support community action to implement the results of completed projects whose results warrant this. While these actions may not be the statutory responsibility of Health Canada, the department could improve its capacity to play a brokerage role in ensuring that knowledge gained in successful projects is put to use.

4. In order for CCHAP to reach all communities who wish to participate, new measures for engagement should be introduced. We recommend extension of the already operative 'peer-to-peer' learning opportunities that have characterized the first eight years of the program. Funding should be provided for face-to-face or virtual meetings in which experienced community researchers could share their knowledge with communities just beginning research in this area, and for individual 'mentor' visits of experienced community researchers to communities in the early stages of planning their work.

Introduction

Climate change is creating significant challenges for Northern communities. More challenges are to be expected.[1] Already, in some places, harvesting is more dangerous and uncertain as weather, land, ice and water conditions change. Eventually these changes will affect all other forms of human and animal activity. Northern roads, bridges, housing, public buildings, or water and waste treatment are engineered for permafrost conditions: many will have to be adapted and replaced as melting continues. Rising sea levels and increasing storm surges will threaten coastal communities. These are just some of the potentially massive changes that climate change will bring to Northerners' way of life over the next several decades. It is crucial that Northerners, in partnership with others, find ways and means to respond that will preserve community well-being.

The Climate Change and Health Adaptation Program for Northern First Nations and Inuit Communities (CCHAP) was part of the Government of Canada's response to this need. The goal of the program was:

> ...to fund community-based participatory research, where the research is led and carried out by community members who develop culturally appropriate and locally-based adaptation strategies to reduce the effects of climate change on their health…The planned outcome is to develop relevant information and tools/materials to help in decision making at the community, regional, national and international levels with respect to human health and a changing environments.[2]

Ninety-five community-based CCHAP research projects were supported in Northern First Nation and Inuit communities during 2008 to 2016.

This report reviews the impact of the program and these projects. Since the program's goal was to support Northern Inuit and First Nation communities' efforts to better understand and respond to the effects of climate change on their health, the report also considers whether and how CCHAP enabled communities to meet their own research and implementation goals. The research reported here is thus not a summative program evaluation, but rather a multi-stage exploration of the impact of the program judged in terms of program goals based upon communities' needs and priorities. Our recommendations are made with an eye to future federal programs aimed at supporting communities as they conduct research and make plans to adapt to the health impacts of climate change.

Our findings are based upon multiple analyses of internal Health Canada records, 118 interviews with program administrators, decision-makers, and principal investigators as well as others involved in community projects, research visits to eleven Northern communities where projects had been implemented, and examination of the various products of community projects (such as videos, reports, and academic publications). Interviews and internet searches documented some of the community-to-community impacts of CCHAP projects. Information from all of these

[1] Larson et al 2014; Hassol 2004; Kunuk and Mauro 2010.

[2] Peace, D. and Myers, E. 2012. "Community-based Participatory Process – Climate Change and Health Adaptation Program for Northern First nations and Inuit in Canada." *International Journal of Circumpolar Health*.Vol 12. P. 2.

sources was repeatedly cross-checked. An initial bibliographic search for Canadian and international reference points was completed in 2015. Additional bibliographic searches were conducted at intervals to identify published research results and to monitor the Canadian and international context. [3] Finally, we examined CCHAP in the context of international efforts to support communities in adapting to climate change.

After a brief account of the program's history and a descriptive overview of funded projects, our findings are presented under four themes:

> **Theme 1:** Enabling Northern First Nations and Inuit communities to identify and assess key vulnerabilities and health impacts related to climate change
>
> **Theme 2:** Developing scientific and community-relevant information to support Northern First Nation and Inuit communities in adaptation to climate change
>
> **Theme 3**: Combining Traditional Knowledge with formal science through community based research to support sound adaptation policy development.
>
> **Theme 4**: Viewing the CCHAP in international context.

The report concludes with a summary of key findings and recommendations**.**

[3] See Appendix A for a detailed description of the research method.

Program History

The CCHAP was launched in 2008 as part of the Government of Canada's Clean Air Agenda,[4] a $3.7 billion multi-department initiative aimed at addressing air pollution, and "reducing vulnerabilities and risks to communities, infrastructure, and the health and safety of Canadians resulting from climate change."[5] The Clean Air Agenda thus presented an opportunity to address the health challenges posed by climate change in Northern communities.

Administered by Health Canada's First Nations and Inuit Health Branch, the CCHAP was allocated $7 million under the Adaptation theme of the Clean Air Agenda[6] for the 2007 to 2011 period, and additional $9.15 million[7] for 2011 to 2016. Overall, federal programs under the Adaptation theme were designed to "help provinces, territories, municipalities, First Nations and Inuit, and industry develop proactive actions to adapt to the impacts that climate change has and will have on Canada's economy, health and security, particularly in the North."[8]

The CCHAP was designed following a series of workshops held in Inuit communities across Inuit Nunangat, financed in part by Environment Canada's Northern Ecosystem Initiative and published in *Unikkaaqatigiit – Putting the Human Face on Climate Change*.[9] It also drew on work completed by the Assembly of First Nations, published in a series of reports on *How Climate Change Uniquely Impacts the Physical, Social, and Cultural Aspects of First Nations*.[10]

---

[4] The Clean Air Agenda was allocated $2.2 billion for the 2007-2011 period, and an additional $1.5 billion for 2011-16. Clean Air Agenda Horizontal Evaluation Roll-up: Synopsis of Evaluation Results Available to September 2010." http://www.ec.gc.ca/doc/ae-ve/2010-2011/1351/ec-caaher-s1.htm. Accessed June 12, 2015. Treasury Board of Canada Secretariat. "The Clean Air Agenda: Plans, Spending, and Results."http://www.tbs-sct.gc.ca/hidb-bdih/initiative-eng.aspx?Hi=12. Accessed June 10, 2015. Environment Canada. Clean Air Agenda Horizontal Evaluation Roll-up: Synopsis of Evaluation Results Available to September 2010." http://www.ec.gc.ca/doc/ae-ve/2010-2011/1351/ec-caaher-s1.htm. Accessed June 12, 2015. Treasury Board of Canada Secretariat. "The Clean Air Agenda: Plans, Spending, and Results."http://www.tbs-sct.gc.ca/hidb-bdih/initiative-eng.aspx?Hi=12. Accessed June 10, 2015. For information on some of these initiatives, see Office of the Auditor-General, Response to Petition 374: Federal actions on climate change adaptation in Canada's North. 2015. http://www.oag-bvg.gc.ca/internet/English/pet_374_e_40779.html.

[5]Treasury Board of Canada Secretariat."Horizontal Initiatives."http://www.tbs-sct.gc.ca/rpp/2008-2009/inst/doe/doe09-eng.asp. Accessed June 10, 2015.

[6] The other 5 programs under the Adaptation theme were "Assist Northerners in Assessing Key Vulnerabilities and Opportunities; National Air Quality Health Index and Forecast Program; Improved Climate Change Scenarios; Innovative Risk management Tools; Regional Adaptation Action Partnerships; and, Climate and Infectious Disease Alert and Response System to Protect the Health of Canadians." Source: PWGSC. 2009. "Evaluation Work Plan Program C – Climate Change and Health Adaptation in Northern and Inuit Communities." P. 2.

[7] The 2011-2016 figure is based on Health Canada records showing the original budgeted 5 year expenditure of $9.86 million (Vote 1 + Vote 10, excluding 13% Public Works and Government Services accommodation costs) was reduced by $707,200 as a result of Budget 2012 Cuts. The total value of Vote 10 Contributions for 2011-2016 was reduced from $800,109,250 to $7,789,250.

[8]Treasury Board Secretariat of Canada. "The Clean Air Agenda: Plans, Spending and Results." http://www.tbs-sct.gc.ca/hidb-bdih/initiative-eng.aspx?Hi=12. Accessed June 12, 2015. For information on the full range of Canadian government climate change programs, see Canada 2014; Canada 2016; Commissioner of the Environment and Sustainable Development, 2014.

[9]Nickels et al. *Unikkaaqatigiit Putting the Human Face on Climate Change* c.2005 n.d. and Centre for Indigenous Environmental Resources, *How Climate Change Uniquely Impacts the Physical, Social and Cultural Aspects of First Nations.* 2006.

[10]Centre for Indigenous Environmental Resources, How Climate Change Uniquely Impacts the Physical, Social and Cultural Aspects of First Nations."

In the first cycle of CCHAP funding, 80% of the allocation was awarded to Northern First Nations and Inuit communities.[11] The remainder was spent on project promotion, sometimes in cooperation (through contribution agreements) with the Assembly of First Nations (AFN), the Council of Yukon First Nations (CYFN), and Inuit Tapiriit Kanatami (ITK) who "help[ed] promote the Program, and… build awareness and capacity among potential participants and stakeholders… [by] delivering workshops, presentations, and briefings to potential participants."[12]

Eligible communities were those located North of 60°, or if south of 60°, in the discontinuous permafrost zone. Thus, in addition to the three territories, communities in northern Ontario, Nunavik (Northern Quebec) and Nunatsiavut (Northern Labrador) were eligible. Communities could apply for up to $200,000 of funding on an annual basis. Multi-year projects were required to re-apply for funding each year without guarantee of approval.

A funding application guide outlined proposal requirements. Successful applications met the following overarching criteria: [13]

- They relied upon community-based or community-centered research.
- The focus of the project was on the health risks of climate change.
- The project included the development of adaptation approaches to climate change impacts.
- The project included a plan for communication of results back to the affected community or communities;
- The project incorporated local and traditional knowledge.

The proposals were first screened by Health Canada officials for the necessary key elements identified in the funding application guide. Where this was not the case, and when draft proposals were submitted before the deadline, Health Canada officials provided guidance on how to meet the program requirements. Proposals were reviewed by one of two Northern committees: a First Nations selection committee and an Inuit selection committee, each comprised of community members, Health Canada staff (in the minority), and representatives from Northern organizations. These committees assessed proposals against twelve graded criteria, and provided practical advice to successful as well as unsuccessful applicants. For example, advice could include suggestions that the budget be revised to match available funds more closely to anticipated costs, or for more specific attention to the means of engaging youth in the proposed

---

http://www.afn.ca/uploads/files/env/report_2_cc_uniquely_impacts_physical_social_and_cultural_aspects_final_001.pdf. Accessed June 15, 2015. See also Health Canada. *Communities' Voices on Climate Change and Health Adaptation in Northern Canada: Summary Report of Health Canada's Climate Change and Health Adaptation Program for Northern First Nations and Inuit Communities, Research & Action and the Stories Behind Them* 2008-2011.

[11] PWGSC. 2009. "Evaluation Work Plan Program C – Climate Change and Health Adaptation in Northern and Inuit Communities". P. 3.

[12] PRA Inc. Research & Consulting. 2010. *Review of Health Canada's Adaptation Measures Related to the Clean Air Agenda*. Prepared for the First Nations and Inuit Health Branch, Health Canada. p. ii.

[13] Based upon Health Canada. "Climate Change and Health Adaptation in Northern First Nations and Inuit Communities Program: 2009-2010 Funding Application Guide". p. 6.

project. On occasion, selection committees advised project proponents of similar work being done elsewhere.[14]

Over time, the committees also developed consensus concerning the most important factors to look for in projects. Key themes included ensuring the project linked climate change to human health; ensuring the activities of the project (including results) were adequately communicated to the implicated communities; ensuring sufficient detail in project budgeting; ensuring participating Elders received reasonable honoraria or other compensation; ensuring a clear project methodology as well as clear and attainable timelines for project completion; ensuring the project benefitted from Traditional Knowledge; ensuring the project had the support of an appropriate Aboriginal organization; ensuring the project could provide benefits to target populations (over the long term) once the funding period had ended; and ensuring community involvement.

In order to develop interest in the Program and promote participation, during the first round of funding (2007-2011) Health Canada officials visited fifteen Northern communities and held capacity building workshops in Whitehorse, Yellowknife, and Ottawa.[15] Participants in the workshops were encouraged to discuss climate change impacts and their potential effects on health. The workshops addressed approaches to developing research proposals and budgets, and provided an opportunity for attendees to consider and outline a project of relevance for their communities. An estimated half of the proposals received by Health Canada between 2007 and 2011 grew directly out of community visits and the workshops.[16] Other forms of program advertisement included the distribution of posters and the posting of program application guides on websites.[17] In the second phase of the project (2012-16), reduced levels of funding and reduced staff meant that much less effort was devoted to such forms of community outreach.

To make it possible for project participants to share approaches and results, program officials organized the Pan-Arctic Results Workshop held in Ottawa in February 2011.[18] The Workshop attracted over 150 participants, including Northern project proponents, government and non-governmental organization representatives, scientists, policy-makers, Members of Parliament, Aboriginal leaders and a few international experts.[19] Also in 2011, Health Canada published *Communities Voices on Climate Change and Health Adaptation in Northern Canada*, a summary

[14] Peace, D. and Myers, E. 2012. "Community-based Participatory Process – Climate Change and Health Adaptation Program for Northern First nations and Inuit in Canada." International Journal of Circumpolar Health. Vol 12. P. 3. The examples mentioned here are drawn directly from selection committee correspondence with project proponents, available in internal HC files.

[15] Eventually a total of eight workshops were funded; the balance were related to increasing climate change awareness and project development.

[16] Peace and Myers, op. cit.

[17] Ibid.

[18] Peace, D. and Myers, E. 2012. "Community-based Participatory Process – Climate Change and Health Adaptation Program for Northern First nations and Inuit in Canada." International Journal of Circumpolar Health. Vol 12. P. 4.

[19] Peace, D. and Myers, E. 2012. "Community-based Participatory Process – Climate Change and Health Adaptation Program for Northern First nations and Inuit in Canada." International Journal of Circumpolar Health. Vol 12. P. 4-5; see also http://www.isuma.tv/fr/ikcc/voices/francois-paulettes-keynote-at-health-canadas-pan-arctic-results-workshop and http://www.isuma.tv/ikcc/voices/siila-watt-cloutier-keynote-at-health-canadas-pan-arctic-results-workshop.

report of projects funded between 2008 and 2011.[20] A website, climatetelling.ca, explains the program and profiles projects funded until 2010-2011.[21] Program designers intended also that the website would be a tool for creating awareness of the program and for sharing program and project information.

Communication about CCHAP projects was a commitment shared among program staff and project participants. Besides the measures put in place by program staff, communication about CCHAP projects included: media reports; advice from the selection committees and Health Canada staff; records made public by Northern licensing offices; collaborations with and among outside researchers; and information disseminated by community researchers through websites, workshops and other means. Many Northern participants saw effective communication of their goals and results as integral to their projects, and it is evident that word about certain projects, at least, spread from community to community.

[20]Health Canada. 2011. "Communities Voices on Climate Change and Health Adaptation in Northern Canada, Summary Report of Health Canada's Climate Change and Health Adaptation Program for Northern First Nations and Inuit Communities: Research & Action and the Stories Behind Them, 2008-2011".
[21] http://climatetelling.ca/health-canada-climate-change-program/ (BETA) accessed on June 15, 2016.

Overview of Projects

This section provides an overview of the ninety-five CCHAP projects funded over the life of the program. The overview shows that CCHAP projects were carried out across the North by both First Nation and Inuit communities or organizations who placed a high priority on maintaining access to country food, and in general on the well-being of the land – two themes that were foundational to the other health-related themes of specific projects. Project designs were sophisticated, involving a range of research, planning, and monitoring activities. Finally, the overview suggests that the communities who received funding were likely to carry their projects to completion, and many were successful in reapplying to the program over multiple years in order to support long-term community research goals.

Overview by region

Projects proceeded in each of the Northern territories, as well as Nunatsiavut, Nunavik, British Columbia, and Ontario. The number of projects carried out in each region are given in Figure 1.

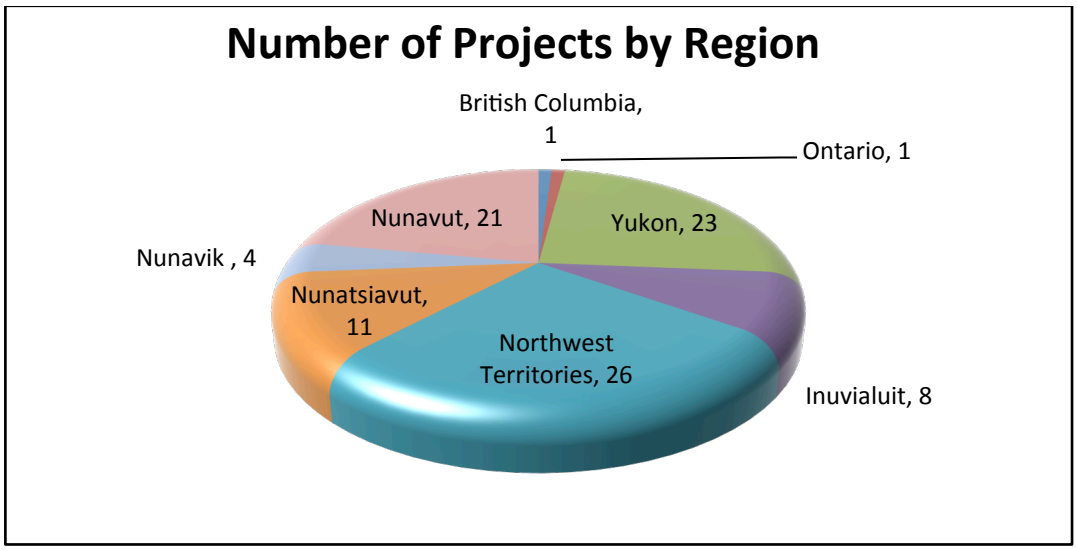

Figure 1. Number of projects carried out in each region, 2008-2016

Overview by theme

Figure 2 shows the distribution of themes among the CCHAP projects, with each project associated with a single primary theme.

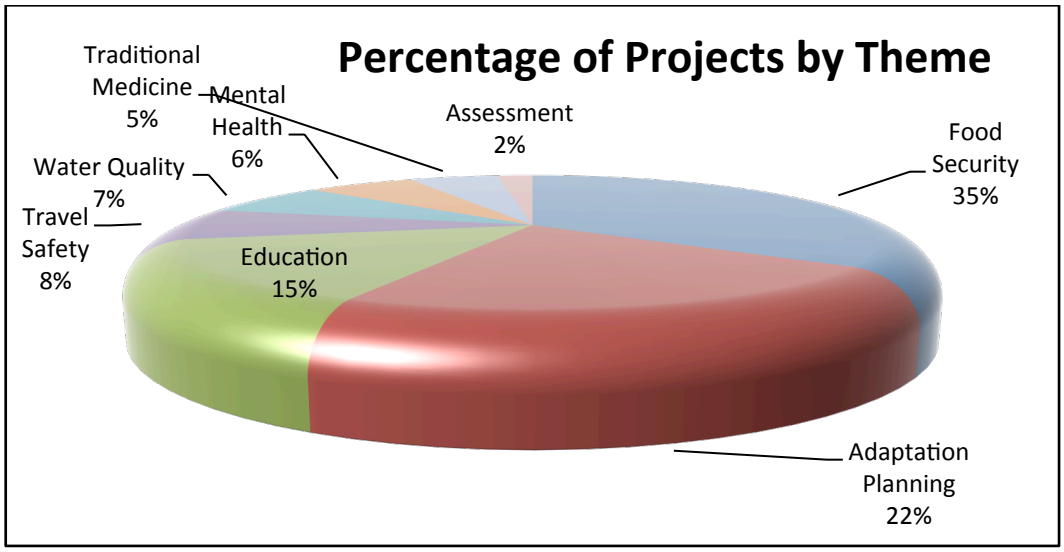

Figure 2. Number of projects by theme.

Overview of activities

Figure 3 shows the distribution of activities for all ninety-five CCHAP projects, where each project may have involved more than one activity.

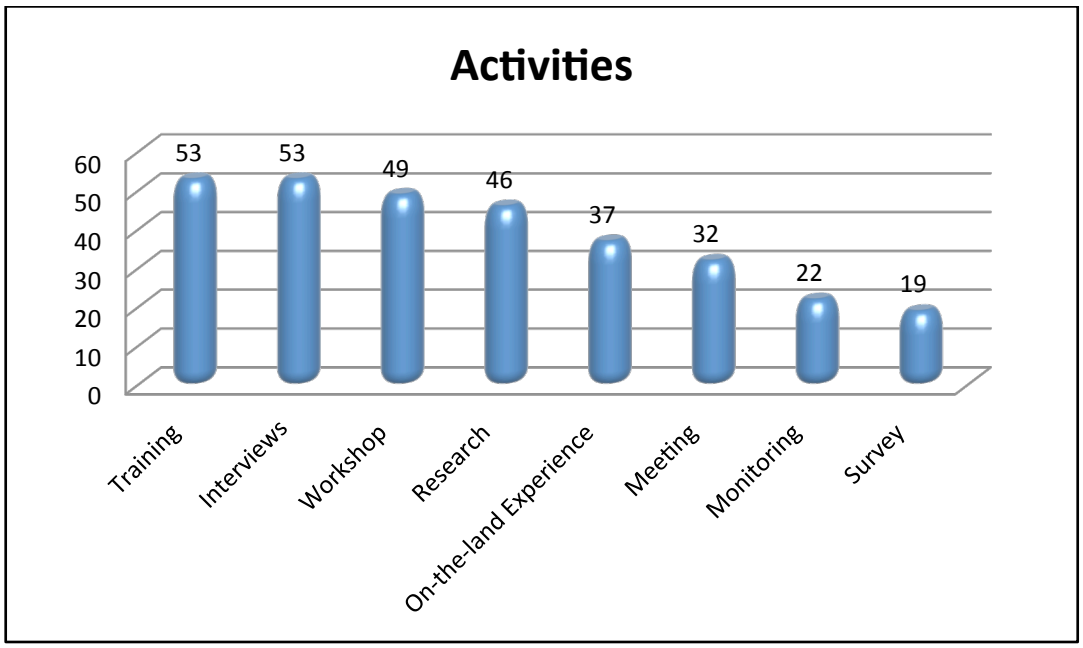

Figure 3. Distribution of project activities

Project continuity

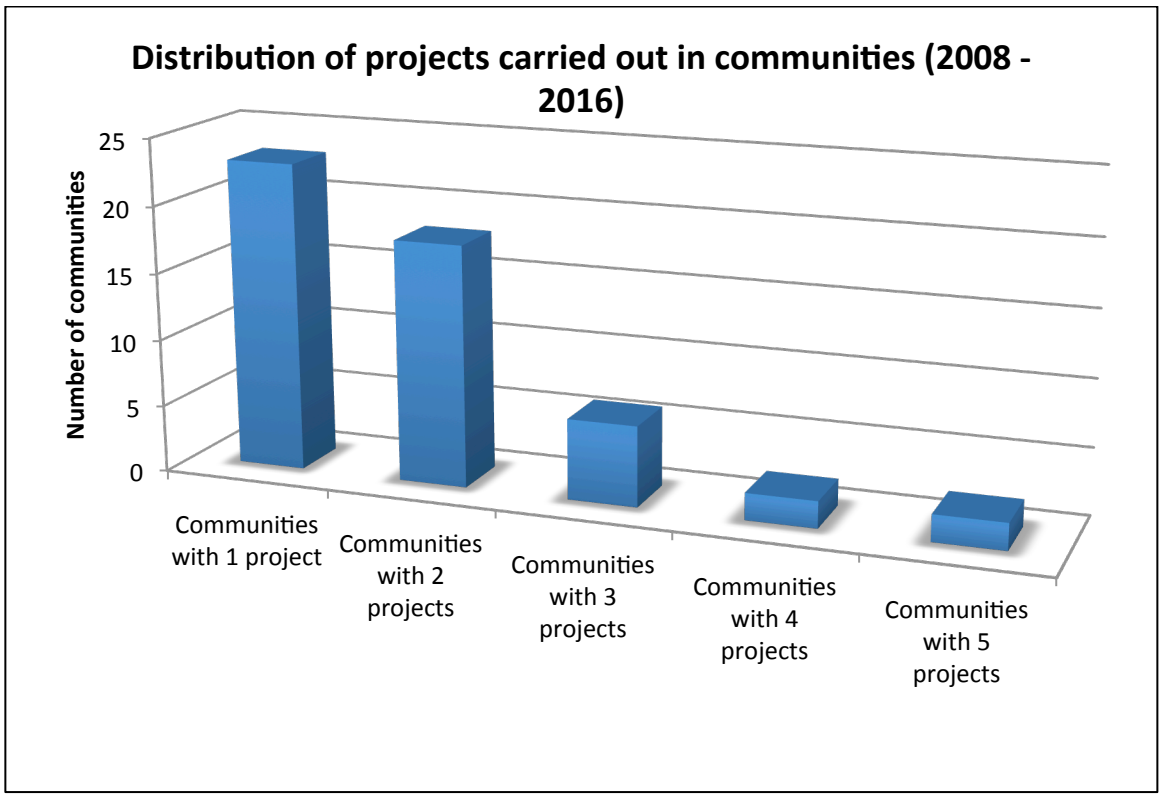

Figure 4. Distribution of projects carried out in communities between 2008 and 2016.

Although CCHAP funding was available on an annual basis only, over half of all projects continued beyond their first year, after proponents successfully reapplied to the program. Often the second and third projects were a continuation of past research and planning, building on accumulated skills, relationships, and knowledge. Many of the successive projects involved the same project leaders and community members who generated new research questions and project designs based on past research. Substantially, they built upon work completed year to year, sometimes also coordinating with projects funded by the Social Sciences and Humanities Research Council, and other sources.

The presence of successive CCHAP projects in one location is evidence of local capacity to develop *community research programs*, a research program being suite of projects taking place in series, linked by theme and often characterized by cumulative findings. The communities where successive CCHAP projects were funded frequently also developed projects funded from other sources, so that CCHAP funding was leveraged to shape a community research program that could provide a longer-term perspective on key topics and, just as importantly, more stable employment for members of the community who were developing research, communication and project planning skills. In this fashion, CCHAP funding was used by several communities to advance their own understanding of the health impacts of climate change and to develop their

capacities to plan for adaptation. As we shall explain later, the gap they then faced is that there was no obvious link between funding to arrive at this point, and funding to put in place adaptive measures – in short, funding for research-informed action.

Evidently, a substantial number of communities and most regional organizations had the capacity to direct and/or conduct their own research, building on previous success with community-engaged research and sophisticated means of intra-community communication and research dissemination. Others required some time to develop the necessary community capacities, to experiment, to provide training, and to find suitable partners. Perhaps not surprisingly, there were very few examples of communities or regional organizations that received funding but did not finish their projects. Communities that were unprepared for this work either did not apply, or were not successful in being funded. Thus, of the well over 100 communities in northern Canada, fewer than half were sites of CCHAP research.

This is an important finding. It suggests that continued support for knowledge transfer and community engagement would be desirable. Presumably all northern First Nation and Inuit communities face similar challenges in dealing with the health impacts of climate change. Experience with the CCHAP program to date demonstrates the value of cross-community communication and project development support. Consideration should be given to extending the capacity of Health Canada staff for outreach, and to inviting the most active and successful CCHAP project proponents to support other communities in developing projects.

Theme 1: Enabling Northern First Nations and Inuit communities to identify and assess key vulnerabilities and health impacts related to climate change

In this section of the report, we explain what were found to be the most important features of the design of the Climate Change and Health Adaptation Program. Although none of these features is unique,[22] the presence of all in one program is unusual. They have complemented each other in supporting communities' initiatives, and improving federal capacity to support community development. Some of the findings below also suggest improvements to program design based upon experience to date.

Providing direct funding to community organizations had important positive effects. It ensured that control of the research agenda remained in community hands, it enabled community researchers to develop successive projects in response to evolving knowledge and needs, and it improved community awareness of the project and its results.

Generally, public research funding goes to university-based researchers, who develop and complete projects. In the northern context, external researchers frequently seek community partnerships and endeavour to build trust and good working relationships. This can lead to work that is of mutual benefit. Still, there are certain characteristic limitations. Research priorities are very often set outside the community (by those who must seek funding from granting agencies). Also, much time can be taken up with educating researchers from outside the community to be effective. As one Elder commented: "*Science comes up to do research to tell us what we know.*"[23]

In the case of CCHAP, research funding was transferred directly to the members of Northern communities who submitted successful applications to grant-making committees made up of northerners. While the degree to which the following generalizations were true varied from project to project, in general direct access to funding enabled community researchers to develop projects that responded to community needs. Having control of the funds also generally ensured that community members had control of the management of projects and that they were able to direct the research and research communication processes in a culturally and locally appropriate way. It also contributed to community members' sense of ownership of the results and the likelihood that they would be applied in the community's adaptation to climate change. When community members are able to define the research questions, including scope and focus, research is more likely to reveal what it is the community wants and needs to know.

Very frequently, the leaders of CCHAP projects were long-term community residents who knew and were known by their communities. Project leaders often did invite outside researchers with subject matter expertise to work with them. In the words of a community member:

---

[22] For example, labour force development subsidies have been dispensed by regional decision-making councils for over twenty years, and the Urban Aboriginal Strategy dispensed funding directly to community organizations, for diverse community purposes.

[23] The researchers made a commitment to the people who were interviewed that their names would not be associated with direct quotations without their permission. For this reason, most direct quotations appear without attribution. All are in italics. Interviewees were asked for permission for their names to appear in a list of those interviewed, to acknowledge their contribution to the report.

> *CCHAP funding is perfect for us. There is very little access to funding* [for community-driven projects] *unless we find a research partner. But then we have to fit into the needs of someone else's project.* [CCHAP] *allows projects based on community needs. CCHAP was something that allowed a community to do their own piece: flexible, easy, could do it on your own. We didn't need to fit into someone else's project; we got some really amazing work out of it. We built on what we learned....We are quite concerned about building momentum. If the money is not there, what will we do? We are looking for funding opportunities but there is not a lot out there for smaller community projects. There is funding for multi-year scientific projects, but not for doing the community things, with small pots of money.*

Community members' engagement in the conduct of the research, and in the analysis of results, also meant that the knowledge generated would be more likely to find ready ears. In several projects, local schools were involved, so that the knowledge and enthusiasm of project leaders and participants was able to spread to the next generation – and the schools provided an institutional framework that supported the projects' enduring impact. Similarly, local radio stations and non-governmental institutions such as the Arviat Film Society provided important channels of communication within communities and beyond.

The combination of community control and community interest in the projects and their results meant that certain important features of the projects could be more fully realized – such as developing the connection between elders and youth and ensuring that individuals were able to spend time on the land. The learning curve for outside researchers seeking to build such features into their research projects can be great.

The Good Medicine project from Little Salmon/Carmacks First Nation is an example of a community taking advantage of the CCHAP opportunity to advance an on-going program of research and to gather needed information about the nutritional value of locally grown food, and to collect soil, water and air samples for monitoring the changing climate. Elders and youth were involved, as well as technicians.[24]

Control of the funding also meant that community members were able to build in provisions that made the research directly relevant and useful to community members. Perhaps the deepest expression of this capacity is the CCHAP-supported film, *Inuit Knowledge and Climate Change* (http://www.isuma.tv/inuit-knowledge-and-climate-change). Ian Mauro, co-director of the film, explained[25]:

> [The project] *took place entirely in Inuktitut…. Every interview was in Inuktitut, all editing; and we built the film in the Arctic. This project never really left the North. It was actually designed and delivered in the North.*

[24] See http://climatetelling.ca/community/little-salmoncarmacks/

[25] While other people who are quoted in this report remain anonymous, Dr. Mauro has requested that he be identified. He works closely with a very small group of people, and wished to avoid the possibility that his views would be attributed to one of them.

The linguistic – the link between knowledge and language – cannot be overstated. If it had been made in English, it wouldn't have the depth or the meaning. It was multi-dialectical -- four dialects. Bridging the knowledge of people in the territory. It brings together different language dialects in one space, making it the first Inuktitut language film on climate change in the world.

With subtitles it creates an opportunity for English speakers to enter into that Inuit mindset in a manner that allows for a simultaneous understanding of these issues. So you can have Inuit and southerners sit down and watch the film, and come out with a common framework for discussion and common understanding. There are very few data products that can do that.

There were also some practical benefits. Because the CCHAP program did not disperse funds to universities, it did not have to pay university overheads. This meant that more funding was available for actual research – a saving of (typically) 20% or more. One interviewee commented that, because salaries were paid locally rather than from remote university business offices, "*people got paid faster.*" Considering the time required to process payment requests in many southern institutions, and the difficulties that still remain for transferring funds to individuals in the North, this is a significant benefit.

Without wanting to overstate the degree to which control was shifted to Indigenous and Northern decision-makers, we note that the approach taken with this program is consistent with what appears to be emerging as the new federal approach to Indigenous – Canada relations, turning on the principle of free, prior and informed consent, and effective engagement in policy development rather than simple consultation.[26] In that sense, it is a step in the right direction and a helpful model upon which to build.

Importantly, direct access to funding meant that communities could build this program into their long-term work on issues of local importance – CCHAP projects could be fit into local developmental purposes. This occurred even though the program's funding was dispensed in one-year allotments with no guarantee of continuity. Our research found examples of community research programs, of which the CCHAP project(s) were an important but not solitary aspect. We were able to investigate four of these with site visits, located in Yukon, NWT and Nunavut. In all cases, continuity of personnel and community ownership of the programs yielded good research results and actively contributed to the development of community capacity.

For example, a traditional knowledge study conducted by Jean Marie River community members in 2004-5 (funded from non-CCHAP sources) revealed that Elders in the community were concerned about climate change. This led to two very productive CCHAP-funded projects focused on the health adaptation consequences of changes to permafrost. These projects were

[26] See for example Natan Obed, "Free Prior and Informed Consent and the Future of Inuit Self-Determination" in Northern Public Affairs 4(3): "Inuit and other Indigenous Peoples insist on playing a more participatory role in the design of policies, programs and projects that have the potential to impact our families, communities and homelands. We recognize the right of FPIC as a necessary facet of effective policymaking because it replaces the unilateral approach to decision making with a more inclusive process that begins and ends with consent. It also moves us away from a consultations-based approach to policymaking, which rests on an inherently asymmetrical and uneven power dynamic." http://www.Northernpublicaffairs.ca/index/magazine/volume-4-issue-2/free-prior-informed-consent-and-the-future-of-inuit-self-determination/.

partnerships between community members and scientists from Yukon College, Athabasca University and others; they yielded an understanding of changes to permafrost. The results were explained in academic publications, a permafrost vulnerability hazard map, community workshops, an active section on the First Nation's website, and other means of communication. These projects and their results also attracted the attention of the news media.[27] Climate change research continued in Jean Marie River after the completion of the CCHAP-funded project, supported by partnerships with other outside researchers.

To take another example, the hamlet of Arviat in Nunavut has a well-developed capacity for community research, collaborative projects, and video and digital communication. The five CCHAP projects in Arviat both benefitted from and contributed to these capacities of key community members. As was the case for Jean Marie River, a project funded by another agency permitted community members to study the nutritional health of children aged 6 to 12. The findings from this study led to the first CCHAP-funded research project, which sought to define food security and to understand why children were food insecure in spite of available country food. This study and a second one focussed on caribou provided knowledge about the dynamics of hunting and sharing in the community, and led community researchers to investigate other sources of community food. They were interested in whether one of the benefits of climate change might be wild plants that could be sustainably harvested, and whether it would be possible to develop a viable community garden. This sequence of projects demonstrates the capacity in this community for planning research projects that build one upon the other, to create a community-relevant program of research. Although there are a few non-resident northern researchers who have been able to sustain long-term research programs in one community, responding to community needs over many years, such a commitment and capacity is relatively rare.

A significant limitation to the effectiveness of CCHAP is the absence of the option of multiyear funding for projects where this would be warranted.

Many projects struggled with the constraints of the federal fiscal year, particularly since it was necessary for project staff to work with a "short" year; that is, they may not have received their project funding until well into the fiscal year. Even in situations where this was not the case, there are many projects that would have benefitted from either the capacity to roll funds over into the next fiscal year, or the possibility of applying for funding to be expended over several years.

Multiyear funding is a common feature of research funding dispensed by Canada's major public research funders, the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada and the Canadian Institutes for Health Research. There are two reasons for this: not all worthwhile research projects can be completed in one year; and not all research plans unfold as expected. This is particularly true in small close-knit communities where natural events (fire, flood, illness) or loss of personnel have a big impact on all residents and all public services. In addition, Northern research regulation introduces long

[27]For example: Roxanna Thompson, "Search for Permafrost Answers" *Northern News Services. September 12, 2013;* Kate Kyle, "Thawing Permafrost Threatens Food Security in Jean Marie River, N.W.T." CBC News On-line September 21, 2015; Kate Kyle, "Permafrost Study Could Help Forecast Mercury Levels in Dehcho Lakes." CBC News On-line August 7, 2015. See also Appendix C.

delays; it can require 3 months to receive a research license. Sometimes an extra few months makes the difference between failure and acceptable results, or acceptable and superb results.

Several respondents explained that both community development and project effectiveness would have been well-served by the ability to fund two or three year plans. This would have allowed more prudent management of funding, and also, afforded a better opportunity for the community to be engaged in the project. In the words of just six of the many respondents who addressed this:[28]

- *Actually, at one point we had discussed with …* [HC] *a 3-year concept for a project. The first year consisting of a baseline study, the second year an action plan and the third year focusing on implementation. The concept was received quite favourably, but there was no guarantee that we would get the second year of funding, never mind the third year.*

- *The year to year set up certainly isn't conducive to deep community-based research. In our methodology we say we draw on some of the concepts of Participatory Action Research, but we couldn't carry it out fully in our study because of both the time and funding constraints. So we weren't able to take as much direction from the community as we might have liked to have done, because of the deliverables and outputs we were obligated to produce for the funders.*

- *Adaptation is a complex issue. It takes a year to explain what is happening to each of the communities. Launching the survey in the first year was amazing. In the second year you can get down to doing some of the work and get that back to the communities again. A third year was needed to review and write down what you got out of the survey. And were able to do that on a scrappy basis….[but without funding for the latter years.]*

- *We would have liked more time. The funding came in a little late and ethics didn't come through until mid-summer. Really the project has been operating within a six-month window.*

- *Getting started earlier, or a multi-year option would have been nice. We couldn't get started on ethics until the financial side had been approved, which took time. And then ethics isn't a fast process. It's quite bureaucratic. It took 3-4 months for that. It also limits the flexibility of the project – we might have changed some of the questions asked or added some if it hadn't been so difficult to get ethics [meaning that the process of re-applying would have taken too long].*

- *There was definitely more we could have done on this topic, but we were limited by time. We didn't get the money until October but we planned do the workshop in May because it was a good time for being on the land, with weather and ice conditions. The slow release of money is not good for community organizations. I had to go into my own savings to pay for the workshop and then wait to be reimbursed. Multiyear funding is better. It is*

[28] What follows are the comments of five different respondents from various parts of the North.

good that in the last couple of years, CCHAP moved to direct deposit so we are now getting the money in July, instead of October. It's better but still a wait.

It seems likely that some communities did not take advantage of the program because of the complexity of the application form or the constraints of program guidelines.

Appreciation for the paying of funds directly to community organizations, and for the knowledgeability and responsiveness of Health Canada staff, was very widely shared. There were negative comments about just two aspects of the application process. One recipient with many years' experience in research administration commented that the application requirements were more stringent than was strictly necessary: *There were a lot of questions and sections,* [and it took] *lots of time and effort to fill it out. They asked for a lot of writing, and background research in the community….supporting letters, which are important but difficult to obtain. I think it was a little more stringent and onerous than say, the Northern Contaminants program. But it was better than say, ArcticNet, SSHRC, NSERC or CIHR. They never fund anything without an academic PI.*

Two community-based researchers commented that while the advertised purpose of CCHAP funding was to meet community needs with respect to research on climate change adaptation, some things were in fact ruled out. In the words of one: *what happens at the end of the day, they do have an agenda – they want you to fit into those….And it is a lot easier for small community organizations if it is presented like that up front….It is so much easier when you have limited proposal writing resources for funders to just be upfront about their priorities.*

While these were minority views, it is important that they be considered. Our findings were derived from interviews with CCHAP participants; we did not investigate why the Northern communities that did not apply for funding failed to do so. It seems likely, though, that more participants could be attracted by additional efforts to communicate about the opportunity, and/or a simplified application processes. While there will always be program guidelines and there will always be application forms, these can usually be improved and made easier to work with, based on experience.

Active working relationships between Health Canada staff and community research leaders improved the reach of the program and the quality of projects.

Particularly in the first phase of CCHAP funding, Health Canada staff expended substantial resources in holding workshops and other outreach activities in collaboration with Northern organizations. They provided advice about successful application strategies, as did the selection committees. The selection committees were themselves comprised of Health Canada staff (in the minority) and Northerners who had the expertise to advise on project execution.

The engagement of Health Canada staff was not merely formal, and it led to a helpful practice of collaboration. Applicants reported that they felt that the staff understood where they were coming from, and had "*the unique ability to work in a collaborative way with communities…well outside the normal of what we would get from other federal government programs. Normally it is*

sink or swim. With this program there was lots of feedback and appreciation of the challenges – with more success as a result."

Project leaders also found that interaction with the selection committees was helpful. In the words of one, [it was a] *positive learning experience; they* [made suggestions that changed the project] *last year so yes it was changed. I was OK with that change. The more training the better!*

Health Canada program staff were praised for their expertise and readiness to "make things work" for community research teams. As one participant commented:

> *This Health Canada program was one of the best I've ever experienced as an academic in my 15 years. It was community based, responsive; the program managers were human beings that treated everybody with a huge amount of respect. ….Where there were challenges; the program managers really tried to address them.*

The growing pains of the program were resolved as they came up. One example provided by a respondent concerned what was termed the originally "inappropriate" Health Canada ethics process:

> *Bio-medical researchers were thinking about traditional bio-medical projects so they were very circumspect of community-owned projects; they wanted to see more top-down controls through the Health Canada funded researchers over the researchers to make sure they were ethical. Ironically they were requesting outside ethical oversight, which didn't jive with community-based projects. We were seeing a lot of old school thinking in the early days of this program…but* [the program staff] *had a call with the ethics board … where the program lead had to justify the project to the "expert based" ethics board in Health Canada. I have a PhD; I'm used to defending ideas and articulating what I'm doing in a methodological framework but this call for a community member would have been tantamount to harassment. Community members were thrown to the wolves in this ethics process and feeling disrespected. While the program was respectful, some of the processes within Health Canada were not. But the program managers were really trying to make a better process for the communities; they wanted to be community friendly.*
>
> *They asked me to have a stand-alone call with the ethics board to help coach them to think about the second phase – how to do the ethics process better. That indicated a responsiveness of the program managers to facilitate bureaucratic-community communication and trying to honestly tweak the system so that it worked for communities. That's the strength of this program. They were always trying to make it work for communities, even those that didn't always jive with their own requirements as administrators.*

As this example indicates, although CCHAP program staff were well attuned to community needs, a process of learning took place within the federal bureaucracy to accommodate the unique features of the program. Ongoing and active relationships between CCHAP staff and community members helped to facilitate this learning.

Opportunities for knowledge transfer were provided by the program, and these were highly valued by participants. There would have been a benefit to more opportunities of different kinds.

Two kinds of knowledge transfer are important in connection with the CCHAP project. These are the sharing of practical and procedural knowledge about the research enterprise, and sharing of research findings.

The transfer of **practical and procedural** knowledge includes the sharing of project ideas, best practices, and the earliest findings among community researchers. Some projects build inter-community knowledge sharing into their projects, as was the case for two Nunavut-wide youth projects based in Iqaluit and several projects organized by the Yukon River Inter-Tribal Watershed Council. In other cases, projects were publicized while they were being completed, creating interest in other communities for similar work. This was the case for the potable water study in Iqaluit, which led to a transfer of skills and approach to and subsequently to Arviat. Word about these projects spread by the regular local communication channels.

The 2011 Health Canada Pan-Arctic Results Workshop, which brought project leaders together to compare notes on their work, was identified as a useful source of inspiration and support by many. Aside from a problem with acoustics in the conference room, evaluations of this event were all positive and enthusiastic. Also helpful was the effort by Inuit and First Nation Selection Committees and Health Canada staff on occasion to draw connections among projects in their feedback letters to applicants, making sure that project proposers were aware of pertinent experience elsewhere. This is a helpful feature of the administration of a program with a geographic reach across a vast area – the Northern half of Canada.

Several respondents stated that additional opportunities for sharing experiences would be extremely valuable for capacity building and for consolidating the lessons learned across the broad range of projects. The climatetelling.ca website provides information about projects and cross-cutting themes. While web-based information is probably not as effective as bringing project leaders together for a discussion, it is considerably less expensive and potentially could reach more people. Consideration could be given to using a webinar to draw people into conversation about projects displayed on an updated website. Additionally or alternatively, this could be a means of bringing somewhat smaller groups of people together, perhaps within regions or clustered with respect to theme or methodology. It might also be a means for more experienced community researchers to discuss their work with those who are new to the CCHAP opportunity. There is no substitute for events that bring project leaders together to meet face to face, but digital or telephone communication can be a helpful and affordable supplement. Since the program's inception, social media have created many and diverse opportunities for communication; various social media platforms are well-used in Northern Canada. Future programs should emphasize opportunities for knowledge transfer, so that communities that are

planning how to adapt to the health impacts of climate change can benefit from the experience of others.[29]

All of these measures can be seen as an advanced form of capacity development; discussions among experienced people lead to deeper understanding of Northern communities' situations and progress in adapting to the health impacts of climate change, and an understanding of where all this work fits into the Canadian political system. As one individual stated, the results workshop "*was a great opportunity to learn about what was happening in other regions, and to talk about important questions like, where the information goes once it leaves communities – does it make it "up the food chain?"* Another commented*:*

> *The results sharing meeting in Ottawa was really neat. You could really see the impacts of the projects across many different types and regions. [The format of the meeting] honoured communities; it created opportunities for short non-academic presentations. It was one of the first times I saw mostly Indigenous people presenting to each other....It was really communities talking to each other. There were academics around but the community was at the forefront. The program was a healing process. You saw young people talking about their projects for the first time. Creating skills. It was really exciting to see a program do all of these things. It connected people. They had control over their own messages. These things should be considered health outcomes. I don't know if these things were measured by the program, but the ability of communities to control their own message is one of the healthiest things I've seen. This should be measured.*

The second and equally important form of knowledge transfer concerns work by community researchers to share the **findings** of their projects with other Northerners but also with the broader community of people attentive to the need for adaptation to the health impacts of climate change. Sharing of findings took place at the results workshop, of course, but also in many other venues. In Appendix B the academic publications arising from CCHAP projects are listed, along with information about how often each was cited by other authors. Many projects also disseminated their results using websites, and/or videos posted on the internet. The Meaning of Ice project facilitated knowledge transfer across three jurisdictions – Canada, Greenland and Alaska – and produced a beautiful and popular "coffee table" book, among other publications.

One extremely successful example of knowledge transfer activity is the widely distributed documentary film, *Inuit Knowledge and Climate Change.* This film was partly funded by a CCHAP grant, which enabled the film-makers to complete over 60 interviews in Inuktitut, and to leverage Health Canada funding to find the capital necessary to complete the feature documentary. This documentary had remarkable range. Co-director Ian Mauro explained:

> *This film has been screened all over the world; I think it's safe to say that it's probably the most well-known film about Indigenous people and climate change in the world. It was shown at the Smithsonian, by National Geographic in Washington DC, at First Peoples' Film Festival in Montreal; at the National Maritime Museum in London England, and at the International Polar Year film festival. It was the focus of a major*

[29] As this report is finished, the climatetelling.ca website is being updated, with the expectation that all projects will be displayed by Summer 2017. It is also being modified to enhance its effectiveness as a site for information exchange and enhanced awareness.

exhibition at the Royal Ontario Museum which was attended by half a million people. APTN sought a five year broadcast license, and it was shown at the Berlin International Film Festival in 2016.

In addition to the Igloolik home base of Isuma Productions, the organization responsible for this documentary, a number of northern communities have developed substantial capacity for communication beyond the north using the IsumaTV facility and other venues.[30] Another example is in the Sahtu region of the Northwest Territories, where a lively Facebook page mobilizes knowledge among residents of the region and beyond, and the Sahtu Renewable Resources Board has established a digital library to collect resources contributed and needed by researchers working in the area.[31] These are two illustrations of the potential for Internet communication to contribute to research, knowledge sharing and discussion.

Programs such as this one have the potential to support democratic development in Northern communities. They can support the development of community knowledge institutions, and build a legacy of skills and expertise. This should be acknowledged and supported as are similar functions in other parts of Canadian society.

In the course of this project we encountered individuals in a number of Northern communities who have developed special expertise in conducting community research and in working collaboratively with visiting academic researchers. Those who were successful in successive grant applications used these funds to sustain experienced community researchers and to recruit and train young people in community research skills across a number of disciplines. Over time, they have been able to develop a core of trained personnel, and some are considering the establishment of non-governmental organizations to provide continuity for this specialized work.

While a single federal program of limited duration will have circumscribed impact, we found support in both community visits and telephone interviews to conclude that this single feature of the CCHAP was impressively empowering – an example of a federal program that really could make a contribution to decolonization.

In addition, it was clear that the design of the program, and the opportunity for multiple years of funding, contributed to the development of skills in the community that led to improved overall community services and greater self-sufficiency. These skills were put to use by community members, some of whom received employment income tied directly to their work. Though the dynamic processes of development in each community cannot be attributed solely to the CCHAP-funded projects, the CCHAP projects played an important role, including through the creation of employment opportunities in the Northern knowledge economy.

[30] There are fifteen Nunavut and Haida Gwaii communities in the IsumaTV network, broadcasting to a global audience. See http://www.isuma.tv/communities.

[31] For a longer description of IsumaTV and its role in advancing communication among northern communities, see The Facebook page mentioned here is Sahtú Gotı̨ch'ádıı - Wildlife of the Sahtú Region; the on-line library is made available on request by the Sahtu Renewable Resources Board.

Further work on the design of CCHAP, to address significant constraints that are currently integral to the program and to the general context of federally funded initiatives, would make it even more effective and useful.

The evident community research capacity in several parts of the north is remarkable, considering the lack of consistent institutional support for this kind of professional development. Research capacity at Canadian universities – and indeed in government and corporations – is developed and sustained by consistent funding for salaries and infrastructure. This is lacking in Northern communities. Should a project similar to CCHAP be developed again, it would be sensible to ameliorate this deficit by including a line of funding available to community organizations as core funding. Consideration could also be given to creating a line in funding applications to support administrative stability.

Similarly, it would be beneficial to supplement the available administrative support to communities that are new to self-generated research. There might perhaps be a non-mandatory 'first step' opportunity to apply for funding for preparatory work: project design, partnership development, and training in applied research methods for community members. The product of this phase of funding would be a proposal for project funding. As one informant said, *the research institution in Canada on one hand is saying we want to do community-based research, so they are allocating money the same way they would for a research capacity when communities don't have that capacity.*

It would also be beneficial to review certain constraints on the program's effectiveness in supporting community capacities to adapt to the health impacts of climate change. Two important ones are the constraint of spending within one fiscal year (discussed above), and the nature of reporting that is required. As one respondent commented above, *...we weren't able to take as much direction from the community as we might have liked to have done, because of the deliverables and outputs we were obligated to produce for the funders.* Within the limits of federal accountability regimes, it might be possible to address each of these constraints, which certainly do limit the program's effectiveness.

Theme 2: Developing scientific and community-relevant information to support Northern First Nation and Inuit communities in adaptation to climate change

Taken as a set, CCHAP projects can positioned along an awareness-action continuum. Some addressed awareness, bringing people together to focus on the health impacts of climate change and to share their perceptions of this. Awareness leads to empirical research, and many community projects emphasized discovery and documentation. Community researchers were interested in determining what changes were occurring in water levels, water quality, species behaviour, and vegetation. Other projects took the next step towards identifying necessary actions. One example of this was the strong finding from several Yukon projects, that continued monitoring was essential to keep on top of the changes that are underway to landscape and fish stocks. Mittimatalik's plans to protect its water supply and community health include continuous monitoring and identifying necessary changes to infrastructure. Virtually all of the projects had immediate "outputs" and yielded information useful to community members.

There are too many examples to list here, but we would like to give a sense of the diversity of effective projects that combined scientific and community-relevant information about adaptation and health impacts.

Video productions and community collaboration were important in a series of food security projects in Arviat, Nunavut. These projects developed a constituency in the school and engaged numerous community members directly in conducting the research, for example growing food in project-supplied grow boxes as a means to offset high transportation costs and carbon impacts of importing food. Several videos of the projects were produced, and these have been viewed widely in the community and elsewhere.[32] The community research on gardening and grow boxes continues.[33] While community members drew on multiple sources of funding and strategic collaborations, our assessment is that CCHAP funding made a significant difference in Arviat. It did so by enabling research on problems that had earlier been identified in the community (such as food insecurity for children), supporting the community research enterprise and engaging community members in measures to improve food self-sufficiency.[34] The "outputs" of this sequence of projects included food, equipment for growing food, expertise in growing and food waste management, knowledge about appropriate technology, and general awareness in the community of what was possible. In a real sense the Arviat projects can be said to have been holistic, responding to community concerns by generating knowledge, engaging problem solvers, and building capacity.

In Mittimatalik, two projects on water quality were designed in response to community concerns about water quality. This knowledge was put to immediate use, as "*people are now more careful about the water they drink.*" Many people are concerned to have their water tested, and plans have been made to fence the community water supply to reduce bacterial contamination. Probably an equally important consequence of this project was the strengthening of community

[32] These are available on IsumaTV http://www.isuma.tv/es/DID/tv/Arviat/arviat-greenhouse-2015-1, as well as YouTube and Twitter.
[33] http://www.huffingtonpost.ca/2016/05/19/arviat-greenhouse_n_9995270.html
The videos are available at https://www.youtube.com/watch?v=e6t4ch9YnQM and https://www.youtube.com/watch?v=GYi3Zx6aTtg. More details about the Arviat projects are available in Appendix B.

capacity and confidence to conduct research that will help them make plans to adapt to climate change:

> *There is a lot of interest by locals wanting to get involved in research and research jobs; they want to learn more. I've learned a lot through building capacity to get me to where I am today. It wasn't easy. Our community is getting more attention. The community is getting more involved. They want to get more involved in research. People ask me almost every day if there's anything available [*for similar research related work*].*

> *This project made people think more about climate change. People in Pond are very interested in the impacts of climate change. The Elders report had all the Elders' observations about climate change in Pond. Everyone was interested in Elders' knowledge about climate change….. I think communities need this program, especially with more communities wanting to get involved with research. This project inspired more – after going on the news – inspired communities to get more involved in research. So we need more of this kind of funding for communities.*

> *I really hope that they find the funds to continue this program. It's important for communities. There definitely is capacity to coordinate or do their own work; so I really hope they continue the program.*

Another project involving water, in Yukon, had a number of significant consequences, including a boost to more effective regional water monitoring:

> [O]*ne thing that came out…when we were measuring water temperatures...we started to look at other places and discovered that different agencies don't measure water temperature the same way, which makes it difficult to compare these things. So we ended up putting together a little conference for Yukon and Alaska people to put together a protocol for how to measure water temperature, especially those agencies related to fish.*

> *I found the knowledge* [gained during this project] *useful for my participation in other activities. I use it to inform my participation in environmental assessment, and it is very useful when* [the First Nation] *participates in assessments as well.*

In these projects and in many others, increased public awareness of the impacts of climate change and a more systematic approach to responding to these are evident. An interviewee who had a pan-Nunavut perspective commented:

> *Yes it's made a difference. It increased awareness of health impacts of climate change. Very rare that the federal government is ahead of the game, being proactive instead of reactive. Lots of people are talking about health impacts of climate change now because of all these community projects. The projects themselves as well as the results workshops were really helpful in fostering connections between communities and finding alliances and shared approaches. Results workshops are really inspiring and important for sharing research across the North. These projects help to spawn innovative thinking.*

Where the CCHAP projects were successful, they also usually created demand for more climate change-related knowledge and resources for research and planning.

Communities that have made a good start on climate change and health-related projects now identify a need for funding for additional research or for community-driven adaptation projects. Many respondents agreed with the sentiment expressed by one, that "*now I'm aware of the impacts of climate change, I see how important these projects are."*

Where community research revealed a potential problem – for example, with water quality – there is now a recognized need for measures to deal with the problem, while other communities, learning of the water quality research that has been conducted, have expressed an interest in doing their own.

There is unlikely to be any single source of funding for all of the needs revealed by the CCHAP research; some measures fall within territorial or provincial jurisdiction, while others could be funded under a revivified or revamped successor to CCHAP. Many of the next steps indicated by work done to date would best be undertaken by First Nation or hamlet governments, but others are of regional Indigenous or territorial scope.

While many of the specific measures indicated by health impact research are outside the programmatic ambit of CCHAP – and potentially even outside federal constitutional responsibility – it seems wasteful to ignore entirely the challenges arising in the *implementation* of CCHAP-funded research findings. Consideration should be given to providing funding for a 'phase 3' of research projects: communities that have completed a successful research venture could apply for funding to develop an implementation plan that identified responsible levels of government and sources of funding. This would address a frequent problem in Northern communities – the gap between accessible and timely funding, on the one hand, and community-identified needs on the other. It would also address the lack of follow-up funding that vitiates the value of some climate change adaptation projects.

Labbé et al (2017) assessed "the current state of government-driven climate change adaptation policies, planning and programming in...Nunavut." After an analysis of nearly 200 such initiatives (including but not limited to studies focussed on health impact) they determined that there were:[35]

> few examples of concrete actions for planned adaptation, such as changes to or creation of policies that enable adaptation, alterations to building codes and infrastructure design with changing geo-hazards, or enhanced disaster planning and emergency preparedness in light of projected impacts. This study indicates a need for formal adaptation plans for the Governments of Canada and Nunavut, emphasis on adaption monitoring and evaluation, and a greater role of Inuit traditional knowledge and cultural values in adaptation policy.

[35] The embedded quotation is from p 13; the second indented one is from the abstract on p 12.

The Labbé study is pertinent in two respects. First, it reinforces the finding of the present project that more attention must be paid to means to support communities in acting on the research they complete, including supporting them to identify appropriate funding opportunities from other levels of government. Secondly, it endorses the CCHAP program's emphasis on traditional knowledge research, and the suggestion made elsewhere in this report that CCHAP could be consider a model for a broader federal initiative.

CCHAP projects both supported and revealed substantial community research capacity.

A review of the 95 CCHAP research projects reveals an important, and often overlooked, strength of many Northern communities: they have long experience in assessing research projects and working with researchers, as well as the capacity to identify their own research needs and to design projects that meet them. The ways this was demonstrated are many and various.

As one interviewee commented:

> [This project] *showed that we could do research that the community wants. The feedback is one of the most important parts of this program, the feedback from the community. Many people have it in their heads that researchers have to be from out of town, but we are doing our own research by interviewing Elders. That's our own style but it's just as important, or more important, to document our community's knowledge. We are doing other research too…*

In some cases, regional research capacity was mobilized for community purposes. For example, the Arctic Institute of Community-Based Research in Yukon undertook several CCHAP projects at the request of Yukon First Nations. The Arctic Institute is a non-profit organization founded in 2007. It describes its mandate as follows:

> [The Institute] works to bring together multiple groups and sectors on issues that are identified by and relevant to our partners....Our approach prioritizes the principle of community-based research, youth engagement, collective impact, partnership development, community capacity building, knowledge sharing, intersectoral collaboration, and evaluation.

Similarly, the CCHAP program was available to respond to community needs that had been identified, but required further funding. In Jean Marie River, elders were concerned about the changes in the climate that they were observing. One person involved in the project explains:

> *I went to two conferences to look where to source funding for studies the community wanted to do. The Elders were very strong at that time. They wanted all projects to be community controlled. That was the strongest feature – it is coming from the community.*
>
> *...We are a very small community and have very limited resources. We have to reach beyond our community – even beyond the NWT to find others who are willing to work with us (scientists for example) and we were quite pleased with those we were working with. We were on another project with PACTeam out of Edmonton. They were doing another project with us when I approached them to see if they were interested in working*

with us on these climate change projects. They were interested and from there we worked through our application for funds and we continued on with them to do the studies.

With our second year, with permafrost, I was in Edmonton and met with the scientists from the University of Alberta and talk with him about whether he would be interested in doing the permafrost study with us. And he was and so he came on the team. And then there was a Doctor out of University of Athabasca who was also willing to be involved. So that was great.

The CCHAP projects responded to needs identified by community members for appropriate training.

Many, many spontaneous comments were made about the value of guided on-the-job training in research and communication skills for young members of the community. As one project lead said:

After all the training, I wanted to continue and prove I can do the project. I did feel empowered.

The community projects were valuable for public education as well:

People learned about research and how it could be useful – people got money for attending the focus groups and they got a certificate to do another project like this. There were more than 50 participants. Some people hang their certificates on their walls and put them in their resumes. I learned about food, saving, budgeting, sharing, cooking. I learned how to translate, transcribe, present information, interview people, lead surveys, I learned how to analyze data, communicate with researchers, I learned how to work with people …

Skills that were transferred range from biological sampling techniques to videography, research planning, gardening and cooking healthy foods. Knowledge that was gained was similarly broad, rangıng from increased familiarity with research design to the complex impacts of climate change.

Community members figured out innovative ways to share what was learned: Another strength … was that the program included an educational component: they set up a booth at the local flea market and would show community members the invertebrates they had collected from their water samples and teach others what they were learning. Some people kept coming back to learn more and were really interested in the project.

As another said:

Looking back, I would have to say that the model that we developed for student involvement and training was definitely a strong feature. It stands out in my mind as one of the strengths.

We built this into the work plan for summer student, and we trained a number of Environmental Technician students. We trained them in this analytical process, which is interesting and engaging.

We demonstrated effectiveness of this model. You can train community people for scientific work.

Not all of our informants shared these views. Some academic researchers involved with community projects commented on the question of community capacity:

There's a huge gap in skills. The community needs help [to develop projects and prepare research proposals]. A missing step in this whole project …They want the community to do the research but they ignore that community doesn't have that capacity. BUT also they didn't want researchers [to do the research]. They wanted me to train people to do my job (that I trained for how many years?) to train people for that in three months. The expectations didn't match community capacity. And when the community did articulate what they wanted, they were told the project wasn't academic enough.

This appears to have been a minority view. Respondents elsewhere in the North did note that the program was suited to well-organized, active communities that already had the capacity to develop projects and apply for funding. One respondent noted that "*if you look at where the projects were – the same communities get funded over and over because they are organized and have research capacity or research savvy. Lots of communities got very little attention*."

It is evident that more knowledge transfer among communities taking the CCHAP opportunity would be valuable. Besides large meetings and webinars discussed earlier, it might be advisable to identify individuals who have led successful projects in the more experienced communities and provide funding for them travel to other communities who are just beginning to plan their work in this area. Some CCHAP recipients have pioneered with this approach, as in the inspiration provided by an Iqaluit-based Nunavut Research Institute water project to a similar initiative in Mittimatalik, which was in turn shared with Arviat.

One of the people we interviewed summarized the situation as follows:

Self-governing First Nations have a lot of pressures on the staff…so they want to get the work done, but they don't have the research capacity…but the very nature of - the research institution in Canada on one hand is saying we want to do community-based research, so they are allocating money the same way they would for a research capacity when communities don't have that capacity. It's about building infrastructure of the First Nation.

Adaptation planning is well-established in some communities, but less familiar in others.

Often, Elders' concerns about the changes in the environment launched community CCHAP projects, and Elders' concerns about the well-being of youth – who are growing up in very different circumstances from their parents and grandparents – shaped project design. These Elders saw land-based education and research to be a means of adaptation, to prepare the next

generation for a changing world and to ensure that valuable intergenerational knowledge was not lost.

Recognizing the great diversity of circumstances among CCHAP communities, it is important not to over-generalize. Our impression is that there are also communities where the idea of planned adaptation seems foreign. One observer commented:

> *The communities understand adaptation as a long-term thing. We did work on a climate change adaptation plan [funded by other means] … and it included indicators such as harvesting food and how the caribou migrate, housing and housing construction, the ice and the ability to travel on the muskeg. The people would tell you that making that report helped to identify the issues. But they believed that people have always adapted and always will. And so will the animals. They would say it's beyond your control. You can do your best with some things but sometimes it's out of your hands and you gotta go with the flow. They laugh, "how are you going to change the weather? You can't control it!" Being on the land helps you understand what's happening, but making a plan to adapt – they weren't too convinced. Adaptation is a western concept. I tried it out and we did some work, but I'm not sure how they would view the adaption plan.*

Theme 3: Combining Traditional Knowledge with formal science through community based research to support sound adaptation policy development

Particularly in public policy documents and regulations, the term traditional knowledge is often misused. Indigenous knowledge or traditional knowledge is treated as an item that can be 'collected' and then applied to a problem defined in externally determined terms.[36]

An insightful discussion of the concept of traditional knowledge in the context of understanding the health impacts of climate change appears in the 2004 Arctic Council publication, *Arctic Climate Impact Assessment:*[37]

> Indigenous knowledge is far more than a collection of facts. It is an understanding of the world and of the human place in the world….From observations, people everywhere find patterns and similarities and associations, from which they develop a view of how the world works, a view that explains the mysteries surrounding them, that gives them a sense of place….In the Arctic, parallels may be drawn, for example, in the migrations of caribou, cranes and whales….Systems of resource use are developed to make efficient use of available resources….Hunters develop rituals and practices that reflect their view of the world…Stories, dances, songs and artwork express this worldview….In turn, culture shapes perception and the world is interpreted according to the way it is understood. When personal memories and stories are retold to family members, relatives, neighbours and others, as is common practice across the Arctic, an extensive local record is built. Non-verbal transmission of knowledge and skills, for example through observation and imitation, is also common. It often extends over several generations and represents the accumulated knowledge of many highly experienced and respected

[36] See Wenzel 1999; Wilson 2008; Abele 2006.
[37] http://www.acia.uaf.edu/pages/scientific.html. Chapter 3, p61.

> persons. Learning the knowledge of one's people involves absorbing the stories and lessons, then watching closely to figure out exactly what is meant and how to use it, and adapting it to one's own needs and experiences. In these ways, indigenous knowledge is continually evolving.

This characterization of traditional knowledge[38] makes obvious why research projects designed, led and interpreted by community researchers are likely to generate the deepest and most sophisticated understanding of the health impacts of climate change –and the most accurate and prudent ideas about adaption.

Direct funding to community researchers encouraged research that drew upon traditional as well as scientific knowledge.

CCHAP guidelines enabled community researchers to choose their scientific research partners, and to determine what blend of scientific and traditional insights were most appropriate. As a part of their traditional knowledge, they also knew the most effective means of intra-community communication and analysis, and how the project itself should be discussed. In the words of one person interviewed for this study:

> *Let's say a researcher from south comes up here, it takes them more time to figure out how to do things. An Inuk would know what to do. When a researcher comes up and asks on a map, and asks which location would be the best location to tag narwhals, for an Inuk they would already have that knowledge where to go without a map. They could pack up and go for wherever they want to go for research….Whoever is coming up to do the project, should be, they should have an Inuk as a leader. We live here and we know what's around, the environment around the town. Local people should be able to be leaders of the project, because they know the environment.*

While it is often held that 'combining' traditional and formal scientific knowledge can be challenging, this was not an issue that the people who were interviewed for this study raised. Rather, community researchers designed projects that included scientific research and the full range of traditional or local knowledge that seem to them to suit the tasks the communities had identified. This is another important consequence of putting research funding and research design directly into the hands of community researchers.

[38] Respecting contemporary usage in the North, we use the term traditional knowledge in this report, rather than Indigenous knowledge (per the Arctic Climate Impact Assessment) or the even more accurate Dene knowledge, Metis knowledge or Inuit knowledge.

Culturally appropriate and on-the-land research has more impact. It yields results in the form of new knowledge, while also bringing other positive impacts, By responding to community priorities and strengthening social bonds, among young people and across generations, the chance of the research being useful is increased.

Several respondents stressed that projects designed to harmonize with the community way of life yield better results and also ensure that community awareness of the results is sustained:

> *It is important to have projects that work with the community lifestyle, involve people going out on the land. People work better that way….The project was extremely beneficial …having the elders and youth out at the camp together through the project created a lot of learning, and the opportunity to initiate new projects.*

Another observed:

> *Land programming is such a central part of community life here…. so it connected in that way. Anytime people can get out on the land it's a good thing.*

Community members designed the projects and they did so to get knowledge they needed. Most designed effective community engagement processes:

> *We are knowledge users of the project. Our work is health promotion and working with the community. The information that comes out of the research becomes part of our messaging. The beluga and safety on the land are two important things. If we learn about this then it becomes part of our messaging.*

From another community:

> *The right target audience was the young people, and grassroots community engagement. The funding turned into local jobs, and the local community was able to access expertise from outside the territory, and the researchers were able to access expertise within the territory. This built important partnerships.*

Projects that engage elders and youth support effective knowledge transfer.

The importance of bringing youth and Elders together on the land was mentioned in many parts of the North:

> *A real strength of the project was the fact that elders and youth were brought together. You hear that all the time up here, but it really is important. Our project allowed for considerable knowledge transfer in both directions. Largely because of what seems to be a fairly common-sense notion, but we were able to hire an interpreter who was also a knowledge holder. This was brought up by several of the participants as a really great component of the project. The elders realized that the youth agreed with them about more*

things than they had previously thought. And the youth realized that the elders supported them more than they had thought.

Also, the importance of being able to run on the land programming can't be overstated. We were only able to do a little of it, but the on the land component was significant for this project.

A very important aspect of the projects that were successful in mobilizing traditional knowledge was their incorporation of elders, who are the living 'research libraries' and moral guides in every community. The concerns of elders were frequently cited as the impetus for particular projects. One elder explained her concerns this way:

Government must be aware of climate change and we're glad they are – How will it be for future generations? What will climate be like for future generations? What can we do? This is a big question – young people need to be educated on climate change. Some have no skills, no knowledge – either for employment or for being on the land.

If the goal of CCHAP is to enable communities to prepare themselves to adapt to and deal with the health impacts of climate change, it is extremely important that *the process of* completing the research support this end. This includes engagement of elders and youth, community-wide support for and interest in the work, and opportunities for going on the land. As one informant explained:

There is a real need for increased research on the benefits of being on the land, and to facilitate programming on the land. Even though this funding pot was not specifically designed for on-the-land intervention or for programming per say, we were able to use it to support things that were already under way. And in doing that, the project was able to facilitate the participation of some elders and some youth in activities in a way that might not otherwise have been possible. I mean, those activities happen in communities anyway – people do go out on the land and there are some meeting of elders and youth, but not everyone has access to it in the same way.

The CCHAP program was flexible enough to respond to these community practices, enabling community researchers to conduct research in a fashion appropriate to local circumstances. A similar degree of flexibility was evident in the handling of the issue of intellectual property. Beyond control over the process of research is control of research findings. In response to community concerns about reporting research results, Health Canada program administrators were able to secure a program policy decision that required reporting on project processes, but not findings. Community researchers were thus in a position to disseminate findings at their own discretion. Most chose to share results widely.

A strongly valued feature of most projects was the opportunity they created for elders to be engaged with youth, especially going out on the land, and for elders' knowledge to be recorded. For virtually all of the people we interviewed, the health impact of climate change was a consequence of changes to the productive capacity of the land, as well as human safety and reliance on it. In all of the North's societies, elders are recognized as the experts concerning all matters to do with the land. Their knowledge is keyed to the landscape and shared in that

context. Given this, engagement of young people with elders in various forms of land-based research and activity advanced, and was widely understood to advance, community understanding of the changes that are a result of climate change. These aspects of the projects also contributed to community solidarity and education of the youth.

Many project leaders and observers noted the effectiveness of projects that brought elders and youth together, and that allowed community members to go out on the land. These are highly valued activities that align with cultural traditions for knowledge dissemination.

In many communities, the people interviewed for this project stressed that older elders are passing away, and with them knowledge and language that was not necessarily held by younger elders (people in their sixties now). CCHAP projects created an opportunity for young people to learn from the older elders, and to record the elders' knowledge. This knowledge is particularly important in understanding climate change and its impacts, because in many parts of the North, it is these older people who have a deep knowledge of the land and its cycles, over a long period of time. Their moral leadership concerning how humans should respond to these changes is crucial in developing effective community responses to the changes that are coming.

One person responded to a question about the best feature of the project:

> *I guess seeing the self-esteem in the youth…I seriously believe that* [the lead community researcher] *saved their lives. He showed them that they could do something in their lives.*

Projects engaging elders and youth provided an opportunity for the generations to develop a way to mediate the intergenerational differences, and between the traditional worldview and that of the youth. In all regions of the North, our research revealed a hunger to bridge this gap, which has many aspects:

> *Youth think about language the western way – they use their iPods to look things up. But elders learn from experience….from when* [I was] *a baby. And there are certain things you do to learn from experience. [*The youth*] grow up on the way the governments do things….and the elders say they won't get the language back that way….language is a sacred, spiritual guidance to each individual person and it's so powerful…the language is just like a bible.*
>
> *….when hardship comes, we want to prepare young people for it….because we went through that and First Nations have survived in all those cases.*

Reliance upon and transmission of traditional knowledge preservation is a priority. Projects that incorporate this will have higher community engagement and longer lasting impacts.

Several of those we interviewed stressed the importance of recording interviews with elders who have now passed on, and preserving their knowledge also by ensuring that it is passed on to younger community members. The community research projects created the occasions for this important work of preservation. As one person commented:

> *Speaking with the elders will be important for this work – it isn't just about the changes in the environment it is also about what happens to the humans who are faced with these challenges -- changes in identity caused by climate change.*

Youth valued the opportunity to learn from elders on the land. Some spoke about the depth of understanding of human responsibilities they learned from elders, as well as the sense of rejuvenation and confidence that came from being on the land with elders. These consequences of the means that communities chose to combine traditional and scientific knowledge contribute directly to communities' capacities to adapt to the health impacts of climate change.

Implementing recommendations is challenging because funding may not be available when it is time to act on the results of the research. This can be addressed by the development of better linkages across government programs.

While most of the CCHAP projects met their research and awareness goals and many exceeded them, it is evident that there are factors that interfere with maximum benefits of the projects being realized. One common problem was the lack of funds available in appropriate "envelopes" and at appropriate times for implementing community recommendations. In other cases, other resources are missing; for example, consumption of healthy country food was promoted by some of the awareness projects but the food itself is not always readily available. Sometimes also, research projects' findings and recommendations were not within the jurisdiction of the local government to implement. Implementation of findings to realize the full impact of projects is a complicated matter.

These are some issues that might be addressed if project leaders and researchers were to have opportunities to discuss not only their findings, but the consequent implementation issues. In addition, it would perhaps be appropriate to build stronger linkages between territorial and provincial government offices charged with climate change adaptation, and CCHAP recipients. Given the small size of all such offices particularly in territorial governments, the development of regular and simple-to-use lines of communication among funded projects and outwards towards appropriate government ministers might be helpful.

There is unlikely to be any single source of funding for all of the needs revealed by the CCHAP research; some measures fall within territorial or provincial jurisdiction, while others could be funded under a revivified or revamped successor to CCHAP. Many of the next steps indicated by work done to date would best be undertaken by First Nation, band or hamlet governments, but others are of regional or territorial scope.

Effective community engagement arises from community-driven knowledge creation.

Community members designed the projects and they did so to get knowledge they needed. Most designed effective community engagement processes:

> *We are knowledge users of the project. Our work is health promotion and working with the community. The information that comes out of the research becomes part of our messaging. The beluga and safety on the land are two important things. If we learn about this then it becomes part of our messaging.*

From another community:

> *The right target audience was the young people, and grassroots community engagement. The funding turned into local jobs, and the local community was able to access expertise*

from outside the territory, and the researchers were able to access expertise within the territory. This built important partnerships.

A researcher and community member elsewhere explained:

The best feature of the program was the communications aspect – the relationship between researchers and the community. On the community side, we do radio shows, we have Facebook and we do videos of what research is happening and people really appreciate that. Video is super important because it allows you to picture what's happening. It's way easier to see what you're doing than interpret scientific words. It helps engage people. For the researchers it's beneficial –they want to reach out to the community –they want to show what they're doing but they don't know how….

Theme 4: Understanding the CCHAP in International Context

Adaptation to climate change has received massive international attention. Community-based adaptation has been an important theme in the international development literature for at least ten years; usually climate change adaptation is taken to include health-related adaptation.[39] As might be expected given the degree of warming experienced in the Arctic, circumpolar nations – particularly the United States, Scandinavian countries and Canada – have paid particular attention to these matters. Ford, McDowell and Jones identified 157 "discrete adaptation initiatives" undertaken in the circumpolar Arctic between 2003 and 2013, counting only those reported in English-language academic publications.[40]

In this international arena, it would be unusual for a single, rather modestly funded[41] initiative such as CCHAP to receive much attention, even though its methodology may be ground-breaking.[42] In fact, several CCHAP funded projects have received the attention of international organizations, including the United Nations Framework Convention on Climate Change (UNFCCC). CCHAP funded projects were showcased at UNFCCC's 16th annual meeting, a forum in which actions aimed at climate change mitigation and adaptation are discussed. Two additional projects were invited to present at the following UNFCCC annual meeting in South Africa. In 2014, CCHAP was presented at a joint meeting of the UNFCCC Adaptation Committee and Nairobi Work Programme, focussed on available tools for the use of Indigenous and traditional knowledge and practices for adaptation, needs of local and Indigenous communities, and the application of gender-sensitive approaches and tools for adaptation.

A substantial number of the CCHAP projects have shared their findings on the internet. It is beyond the scope of this study to trace international viewings and downloads of these many postings, but it is surely the case that projects shared on IsumaTV's Digital Indigenous Democracy project and Northern websites have found international viewers.[43]

A few projects involved international collaboration. One example of this is a collaboration among communities in Nunavut, Alaska and Greenland with researchers from each country to study climate change related impacts on the sea ice. This research was published on an

---

[39] For example, in 2008, a special issue of *Tiempo*: *A Bulletin on Climate and Environment* (published by the Stockholm Environment Institute) was devoted to community-based adaptation, detailing projects in the Canadian Arctic, South Africa and Bangladesh, among others.

[40] Ford et al 2014; see also Alaska Sea Grant n.d. and Canada 2014, Canada 2016, and Commissioner of the Environment and Sustainable Development 2014.

[41] According to a Government of Canada backgrounder, ten climate adaptation projects were funded in 2011, with an allocation of $148.8 million over five years. CCHAP was one of the ten, receiving $10 million –about 7% of Canada's total federal effort. http://ec.gc.ca/default.asp?lang=En&n=2D1D6FA7-1&news=B67A7995-A1CA-4DE3-89D2-E4E3C0E24BFB

[42] Few of the international projects we examined provided research funding directly to Northern Indigenous communities, although in 2015, the United States president announced about $40 million in funding to Alaskan communities and organizations for climate change adaptation. https://www.whitehouse.gov/the-press-office/2015/09/02/fact-sheet-president-obama-announces-new-investments-combat-climate

[43] For example, at http://www.isuma.tv/DID/tv/Arviat, one short film about climate change had had 2795 views on July 31, 2016. IsumaTV records viewers and video uploaders on every inhabited continent. For other examples, see http://www.srrb.nt.ca/index.php?option=com_tags&view=tag&id=22-climate-change (recent Sahtú, NWT project) and for Jean Marie River, http://jmrfn.com/climate-change/.

interactive website, in academic articles, and in an award-winning volume, *The Meaning of Ice: People and Sea Ice in Three Arctic Communities.*[44]

Academic publications arising from CCHAP-funded research have found an international audience. Among seventeen such publications identified to date, we found a total of 112 instances of these papers being cited by other authors, mostly in journals with an international readership. Researchers associated with the journal publications are part of international research networks, making it likely that their research (including CCHAP-funded research) is being read internationally.[45] The sole article published to date that deals directly with CCHAP has been cited in 19 publications. Aside from the four doctoral dissertations in which it is cited, all are likely to have an international readership.[46]

All of these data suggest that there is international interest in the Canadian experience with adaptation to the health impacts of climate change, and international research on approaches to adaptation that suggests that Canada is in a leadership position. For example, an Australian study examined 128 English language academic publications dealing specifically with community-based climate change adaptation. The findings are pertinent:[47]

> Commencing in the early 2000s, the literature detailed the emergence of community-based adaptation (CBA), driven by a number of factors: recognition of the human dimensions of changes; appreciation of the role of local knowledge for strengthening adaptive capacity; and a push to focus on the scale at which impacts are felt and link this action with pro-poor development outcomes. A more substantial body of work emerged in the literature from 2010 onwards, defining a series of key enablers for effective CBA, which included: use participatory approaches; recognise that adaptation is a social process; and support CBA at multiple scales. More recently, there has been a growing emphasis in the literature to re-conceptualise CBA, which will require focusing on innovation, learning and multi-sectoral approaches.

Generally speaking, all of these features are evident in the research supported by the CCHAP program for its entire duration – with the exception of support for community-based adaptation at multiple scales and with multi-sectoral approaches.

In summary:

- Adaptation to climate change (including the health impacts of climate change) in the circumpolar region has received substantial international attention.

---

[44] Fox Gearhard et al 2013 won the international Polar Libraries William Mills prize for the best non-fiction book in 2014.

[45] Likely both our list of publications and the citations are underestimates. Typically, Web of Science and Google Scholar do not identify citations that might appear in edited books or in reports published by governments or non-governmental organizations—the so-called grey literature.

[46] McClymont Peace and Myers 2012. For the full list of publications citing this article, see the Bibliography for this project, heading: Publications that have cited McClymont Peace and Myers**.**

[47] The quotation is from the abstract of McNamara and Buggy 2015. This publication cites McC lymont Peace and Myers.

- The CCHAP program has received international attention through major conference presentations and international attention to publications about the program itself, and publication of the results.
- The CCHAP program meets the highest international standards for successful climate change adaptation programs.

Conclusions

In the 2004 *Arctic Climate Impact Assessment*, Henry Huntington and Shari Fox offer an important and apposite explanation of the perspective that should guide adaptation to climate change:

> Climate change is not an isolated phenomenon, but one that is connected to the web of activities and life surrounding indigenous peoples. Thus, it must be understood and assessed in terms of its interactions with other phenomena and with current and future societal an environmental changes. Responses to climate change will not be effective unless they reflect the particular circumstances of each place. Increasing resilience is a useful way to consider the merits of various response options, which are best developed and evaluated iteratively to promote adjustment and improvement as experience and knowledge increase. Indigenous perspectives on climate change offer an important starting point for collaborative development of effective responses." (ACIA Chapter 3: The Changing Arctic: Indigenous Responses p62)

To an impressive degree, the Climate Change Health Adaptation Program of Health Canada was designed and operated along these lines. It was but one of many federally funded adaptation initiatives in Northern Canada. In Nunavut alone, Labbé et al documented 700 discrete adaptation initiatives. They concluded that "[t]he focus on adaptation to-date has primarily been at the groundwork level, aimed at informing and preparing for adaptation through impact assessments, adaptation planning exercises, and stakeholder engagement." They found "few examples of concrete actions for planned adaptation, such as changes to or creation of policies that enable adaptation, alterations to building codes and infrastructure design with changing geohazards, or enhanced disaster planning and emergency preparedness...."[48] This conclusion too is supported by the findings of the present study. In the words of one of our informants:

> *My work is on building community capital. I would say that, at the moment, communities are coping with climate change – at best. Adaptation is a word that's often used – but really what is needed is transformation. And communities need knowledge, as well as support through that process. So what is really needed is the opportunity to mobilize with long-term support, to build trust*.

How does CCHAP reflect these perspectives? Useful analyses appeared in two earlier research initiatives – a formal program evaluation conducted in 2010, and an interim analysis conducted by program administrators, published in 2011.

In 2010, consulting firm PRA Inc. Research and Consulting completed an interim evaluation of the CCHAP, arriving at a generally positive assessment:

> [F]unded communities and organizations were generally successful in achieving their objectives, though many participants noted that much more work remains to be done. Projects successfully conducted climate change research, and identified a

[48] The quotations are from the abstract, Labbé et al 2017.

> number of key issues relating to human health. Projects also developed a range of adaptation and educational tools, including videos, books and publications, and presentations. These tools are expected to contribute to communities' knowledge archives, and to be shared with others to inform future adaptation work. Projects were also successful in involving youth and elders, and in partnering with academics; scientists; or Inuit, First Nations, and Northern organizations.[49]

The Report noted that "the Program was able to build capacity through its funding and briefing activities" in among community members who gained new skills related to "adaptation science, community-based project management, and proposal and report writing."[50] It also stated that the CCHAP was able to generate successful collaboration among "AFN, ITK, CYFN…., Indian and Northern Affairs Canada (and) other departments and organizations participating in climate change work."

Based in part on the feedback from participants at the 2011 Pan Arctic Results Workshop, Diane McClymont Peace and Erin Myers similarly conclude that the project was successful, writing that:

> The results of this program will be used to develop innovative human health risk management plans and tools, including culturally-sensitive educational and awareness materials, to improve decision-making regarding local response plans/health adaptation measures and to raise awareness of potential vulnerabilities at community, regional, national, and international levels.[51]

They cite high community engagement and that "having Northerners participate in the selection committees to determine who would receive funding" were key factors that contributed to the CCHAP's success. Community engagement helped project proponents "develop and manage research projects that were meaningful and beneficial for their communities". Further, the selection committees had the necessary "experience and understanding of Northern issues and challenges" to provide important ideas on how the program could be enhanced.[52]

In 2012, Peace and Myers identified three challenges with program design and implementation. First, building relationships with participating Northerners was difficult given the program's location in Ottawa, a long distance away from project sites. Secondly, administrative delays in the release of funding made project implementation more difficult, and finally, the "requirements of ethics review… which do not consider the unique nature of community-based participatory research and the incorporation of traditional knowledge."[53]

---

[49]PRA Inc. Research & Consulting. 2010. "Review of Health Canada's Adaptation Measures Related to the Clean Air Agenda." Prepared for the First Nations and Inuit Health Branch, Health Canada. p. ii.
[50] Ibid.
[51] Peace, D. and Myers, E. 2012. "Community-based Participatory Process – Climate Change and Health Adaptation Program for Northern First nations and Inuit in Canada." International Journal of Circumpolar Health.Vol 12. P. 6.
[52] Ibid.
[53] Ibid.

Program administrators made progress in dealing with each of these challenges, but as we note above, there is a need for diversified funding opportunities and the possibility of multiyear funding.

This study found that the overwhelming strength of the CCHAP was the practice of direct funding of community research. This single measure, along with active engagement by funding decision-making committees and supportive Health Canada staff had two strong effects, each of which marks a breakthrough in federal capacity to support communities to adapt to the health impacts of climate change.

Direct funding to community researchers enabled the effective incorporation of traditional knowledge in the process of research, so that it was conducted in a way that could be of maximum benefit. It also ensured that the knowledge held by elders and others in the community was directly available to the projects, so that it could be used to guide and inform their work. This in turn made appropriate blending of scientific and traditional knowledge feasible. It also enabled a form of adaptation planning appropriate to Northern Indigenous communities, quite distinct from that practiced in southern cities and towns, which have a different demographic makeup and may lack the capacity for organic community development that is present in the North.

Secondly, the program supported the development of community research capacity. Several communities in Northern Canada have developed significant expertise in research management, research design and interpretation of results –despite the obvious constraints of location and small population size, and the difficulties of gaining access to post-secondary education. The CCHAP model suited these communities, and provided them with an opportunity to design research programs (extending over several projects) that responded to community priorities. This was notably the case for those communities where there was advanced capacity for conducting and communication about research using video, radio and documentary films. These advances should be widely disseminated, as they are likely to be of wide public interest wherever community development is an issue.

Recommendations

The basic structure of the CCHAP program is sound and effective, and appropriate to the needs of northern First Nation and Inuit communities. It has had a substantial and visible positive impact. With an eye to the future, we recommend the following:

1. The capacity afforded Health Canada staff for outreach should be expanded, and the most active and successful CCHAP project leaders should be invited and supported to assist interested parties in other communities to develop their own projects.

2. Consideration should be given to differentiation among options for funding. This would make the program more accessible, by directly addressing the differing situations of communities in need of climate change health adaptation research and planning. Specifically, it should be possible for applicants to seek

- seed funding, to support community members in taking the first steps necessary to complete a full application;
- multiyear funding for projects that would benefit from this;
- 'aftercare' funding for completed projects, to enable community members to explore and take measures to act upon research results;
- core funding for community organizations focussed on climate change adaptation, or at least, project-related funding to support administrative stability.

3. Interdepartmental and intergovernmental coordination mechanisms should be developed to support completed projects whose results warrant this. While these actions may not be the statutory responsibility of Health Canada, the department could improve its capacity to play a brokerage role in ensuring that successful projects have an opportunity to be acted upon.

4. In order for CCHAP to reach all communities who wish to participate, new measures for engagement should be introduced. We recommend extension of the already operative 'peer-to-peer' learning opportunities that have characterized the first eight years of the program. Funding should be provided for face-to-face or digital meetings in which experienced community researchers could share their knowledge with communities just beginning research in this area, and for individual 'mentor' visits of experienced community researchers to communities in the early stages of planning their work.

Bibliography

Abele, Frances. 2006. "Between Respect and Control: Traditional Indigenous Knowledge in Canadian Public Policy" in Michael Orsini and Miriam Smith, eds. *Critical Policy Studies: Contemporary Canadian Approaches*. Vancouver: UBC Press.

Alaska Sea Grant Marine Advisory Program. n.d. *Annotated Resources on Climate Change Adaptation for Alaska Communities*. Fairbanks: University of Alaska.

Cameron, Emilie. 2012. "Securing Indigenous Politics: A Critique of the Vulnerability and Adaptation Approach to the Human Dimensions of Climate Change in the Canadian Arctic" *Global Environmental Change* 22: 103-114.

Canada, 2014. *Canada's Sixth National Report on Climate Change.* Ottawa: Minister of the Environment.

Canada, 2016. *Canada's Second Biennial Report on Climate Change.* Ottawa: Minister of the Environment.

Commissioner of the Environment and Sustainable Development. 2014. *Fall Report.* Ottawa.

Ballantyne, Erin Freeland. 2014. "Dechinta Bush University: Mobilizing a Knowledge Economy of Reciprocity, Resurgence and Decolonization" *Decolonization: Indigeneity, Education & Society* Vol. 3, No. 3, 2014, pp. 67-85.

Ford, James D., Ellie Stephenson, Ashlee Cunsolo Willox, Victoria Edge, Khosrow Farahbakhsh, Christopher Furgal, Sherilee Harper, Susan Chatwood, Ian Mauro, Tristan Pearce, Stephanie Austin, Anna Bunce, Alejandra Bussalieu, Jahir Diaz, Kaitlyn Finner, Allan Gordon, Catherine Huet, Knut Kiching,Marie-Pierre Lardeau, Graham McDowell, Ellen McDonald, Lesya Nakoneczney, Mya Sherman. 2015. "Community-Based Adaptation Research in the Canadian Arctic" *Wiley Interdisciplinary Reviews: Climate Change* Vol. 7 Issue 2.

Ford, James D., Graham McDowell and Julie Jones. 2014. "The State of Climate Change Adaptation in the Arctic" *Environmental Research Letters* 9 (10): 109.

Ford, James D. 2012. "Indigenous Health and Climate Change" *American Journal of Public Health* 102 (7): 1260-6.

Fox Gearhard, Shari, Lene Kielsen Holm, Henry Huntington, Joe Mello Leavitt, Andrew R. Mahoney, Margaret Opie, Toku Oshima and Joelie Sanguya, eds. *The Meaning of Ice: People and Sea Ice in Three Arctic Communities.* Hanover, NH: International Polar Institute Press, 2013.

Government of the Northwest Territories. 2008. *NST Climate Change Impacts and Adaptation Report.* Yellowknife.

Haalboom, Bethany and David C. Natcher. 2012. “The Power and the Peril of ‘Vulnerability’: Approaching Community Labels with Caution in Climate Change Research” *Arctic* 65(3): 319-327.

Hall, Elizabeth F. and Todd Sanders. 2015. “Accountability and the Academy: Producing Knowledge About the Human Dimensions of Climate Change” *JRIA Journal of the Royal Anthropological Institute* 22 pp438-461.

Hassol, Susan Joy. 2004. *Impacts of a Warming Arctic.* Arctic Climate Impact Assessment. Cambridge: University of Cambridge Press.

Institute for Circumpolar Health Studies. 2015. *Implementation and Evaluation of Community-based Adaptation to Climate Change in Alaska: Highlights Report*. Anchorage: University of Alaska.

Kunuk, Zacharias and Ian Mauro. 2010. *Inuit Knowledge and Climate Change.* Documentary film. Igloolik: Isuma Productions.

Labbé, Jolène, James D. Ford, Malcolm Araos, and Melanie Flynn. 2017. “The Government-Led Climate Change Adaptation Landscape in Nunavut, Canada” *Environmental Review* 25: 12-25.

McClymont Peace, Diane, and Erin Myers. 2012. "Community-based participatory process-climate change and health adaptation program for Northern First Nations and Inuit in Canada." *International Journal of circumpolar health* 71.

Nickels, S., C. Furgal, M. Buell, H. Moquin. 2006. *Unikkaaqatigiit – Putting the Human Face on Climate Change: Perspectives from Inuit in Canada*. Ottawa: Joint publication of Inuit Tapiriit the Ajunnginiq Centre at the National Aboriginal Health Organization.

Northern Premiers Forum. 2009. *A Northern Vision: Building a Better North: Pan-Territorial Adaptation Strategy*. http://www.aNorthernvision.ca/strategy/

Reid, Hanna, Terry Cannon, Rachel Berger, Mozahalul Alam, Angela Milligan. 2009. Guest Editors. Special Issue of Participatory *Learning and Action 60: Community-Based Adaptation to Climate Change.* International Institute for Environment and Development.

Schipper, E. Lisa F., Jessica Ayers, Hannah Reid, Saleemul Huq, Atiq Rahman. 2014. *Community-Based Adaptation to Climate Change: Scaling it up.* Routledge.

Publications that have cited McClymont Peace and Myers

Aylward, Erin. *Northern youth abroad: Exploring the effects of a cross-cultural exchange program from the perspectives of Nunavut Inuit youths*. Diss. Université d'Ottawa/University of Ottawa, 2012.

Berner, Jim, et al. "Human health." *Arctic Climate Impact Assessment (ACIA). Cambridge, UK: Cambridge University Press* (2005): 863-906.

Bradford, Lori EA, et al. "Drinking water quality in Indigenous communities in Canada and health outcomes: a scoping review." *International Journal of Circumpolar Health* 75 (2016).

Champalle, Clara, James D. Ford, and Mya Sherman. "Prioritizing Climate Change Adaptations in Canadian Arctic Communities." *Sustainability* 7, no. 7 (2015): 9268-9292.

Churchill, Mackenzie Elaine. *Defining and Evaluating Cultural Safety at Seventh Generation Midwives Toronto: Exploring Urban Indigenous Women's Perspectives on Culturally Safe Maternity Care*. Diss. 2015.

Driscoll, David L., et al. "Assessing the health effects of climate change in Alaska with community-based surveillance." *Climatic Change* 137.3-4 (2016): 455-466.

Ford, James D., et al. "Adapting to the effects of climate change on Inuit health." *American journal of public health* 104.S3 (2014): e9-e17.

Ford, James D., Trevor Bell, and Nicole J. Couture. "Perspectives on Canada's North Coast Region"

Ford, James D., Graham McDowell, and Julie Jones. "The state of climate change adaptation in the Arctic." *Environmental Research Letters* 9.10 (2014): 104005.

Ford, James D., et al. "Evaluating climate change vulnerability assessments: a case study of research focusing on the built environment in Northern Canada." *Mitigation and Adaptation Strategies for Global Change* 20.8 (2015): 1267-1288.

Ford, James D., et al. "Community-based adaptation research in the Canadian Arctic." *Wiley Interdisciplinary Reviews: Climate Change* (2015).

Geary, Janis, Cynthia G. Jardine, Jenilee Guebert, and Tania Bubela. "Access and benefits sharing of genetic resources and associated traditional knowledge in Northern Canada: understanding the legal environment and creating effective research agreements." *International journal of circumpolar health* 72 (2013).

Johnson, Rhonda M. "Editorial: Addressing challenges in participatory research partnerships in the North: opening a conversation." *International journal of circumpolar health* 71 (2012).

Johnson, Noor Jehan S. *Mobilizing Inuit Knowledge: Representation and Institutional Mediation*. Diss. McGill University, 2012.

Kulmann, Kassandra. *"We Should be Listening to Our Elders": Evaluation of Transfer of Indigenous Knowledge between Anishinabe Youth and Elders*. Diss. The University of Western Ontario, 2012.

Labbé, Jolène, et al. "The government-led climate change adaptation landscape in Nunavut, Canada." *Environmental Reviews* 999 (2016): 1-14.

Larsen, J.N., O.A. Anisimov, A. Constable, A.B. Hollowed, N. Maynard, P. Prestrud, T.D. Prowse, and J.M.R. Stone, 2014. "Polar regions" in: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova,B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1567-1612.

MacDonald, Joanna Petrasek, et al. "Youth-Led Participatory Video as a Strategy to Enhance Inuit Youth Adaptive Capacities for Dealing with Climate Change." *Arctic* (2015): 486-499.

McNamara, Karen Elizabeth, and Lisa Buggy. "Community-based climate change adaptation: a review of academic literature." *Local Environment* (2016): 1-18.

Nilsson, Lena Maria, and Birgitta Evengård. *Food and water security indicators in an arctic health context: a report by the AHHEG/SDWG, and the AMAP/HHAG during the Swedish chairmanship of the Arctic Council 2011-2013*. 2013.

Panic, Mirna, and James D. Ford. "A review of national-level adaptation planning with regards to the risks posed by climate change on infectious diseases in 14 OECD nations." *International journal of environmental research and public health* 10.12 (2013): 7083-7109.

Snodgrass, J.Josh "Health of indigenous circumpolar populations." *Annual Review of Anthropology* 42 (2013): 69-87.

Starkes, Jill M., and Lola T. Baydala. "Health research involving First Nations, Inuit and Metis children and their communities." *Paediatrics & child health* 19.2 (2014): 1.

Tishelman, Carol, et al. "Beyond the visual and verbal: Using participant-produced photographs in research on the surroundings for care at the end-of-life." *Social Science & Medicine* 168 (2016): 120-129.

Wenzel, George W. "Traditional ecological knowledge and Inuit: Reflections on TEK research and ethics." *Arctic* (1999): 113-124.

Wilson, Shawn. 2008. *Research is Ceremony: Indigenous Research Methods.* Fernwood Publishing.

APPENDIX A: RESEARCH METHOD

The review and impact analysis of the Health Canada Climate Change and Health Adaptation Program (CCHAP) was conducted in two phases between December 2014 and June 2016. Since the final fiscal year for CCHAP was 2015-16, this research project and the active period of CCHAP overlapped.

During Phase One (2014-15), researchers completed a preliminary overview analysis of all project reports provided from internal Health Canada files. They reviewed previous evaluations and individual workshop evaluations. They prepared a program biography, a preliminary analysis of the program, and a review of the academic literature. Although it was not identified as a Phase One deliverable, the research team also provided an Excel database that collected in searchable format all available information about each of the funded projects. This database was updated regularly, as Health Canada provided more information. At the conclusion of Phase One, a detailed research design for Phase Two was submitted.

In Phase Two (2015-16), the research team documented program output, outcomes and impacts, by way of assessing the overall impact of the program in Northern communities, in Canada as a whole, and internationally. This work included 118 telephone and in-person interviews, site visits to nine communities, and on-going review of both internal and public documents related to the projects as these became available. Direct CCHAP project outputs were identified from internal Health Canada records as well as Internet and database searches (Web of Science and Google Scholar).

The Excel database of project information that had been produced in Phase One was completed, and verified, based on information collected in interviews and available in additional files provided by Health Canada.

Early interview results and documentary information were analysed. Based on this analysis and limited by considerations of time, the research team identified four project clusters for further investigation in eleven communities in Nunavut, Northwest Territories and Yukon. Once licenses had been issued, researchers arranged to visit each community to conduct interviews with individuals who had been involved in CCHAP projects. Communities visited included , Arviat and Iqaluit in Nunavut, Deline, Yellowknife and Behchokǫ̀ in the Northwest Territories, and Whitehorse, Carcross, Little Salmon Carmacks First Nation, Tröndek Hwech'in First Nation (Dawson City) and Selkirk First Nation (Pelly Crossing).

Telephone and in-person interviews were coded and entered in an NVivo database for descriptive and qualitative analysis. Initially, interviews and site visit results were analyzed thematically. The results of this work were then validated and cross-checked using queries of the NVivo database.

Further bibliographic work was completed, to cross-check project impact, to track academic publications and their impact, and to identify international comparisons. Finally, this draft report was prepared. It is being circulated to a small group of reviewers. On the basis of all comments received, a final version of this report will be prepared.

Research Team

The research project was designed by Frances Abele and Joshua Gladstone in collaboration with Deborah Simmons of the Sahtú Renewable Resources Board and Health Canada staff: Erin Meyers, Paul Hemming, Constantine Tikhonov, Mary Ooi and Daniel Brown. The project was completed by Abele and Gladstone, as well as interviewer-analysts Tara Cater, Margaret Crump, Sheena Kennedy Dalseg, Nick Falvo, Dana Holtby, Katalin Koller, Andrew Muir, and Jennifer Spence and community advisors, researchers and interpreters Jody Inkster, Ivan Koonoo, Michael Neyelle, Joe Pintarics, James Simonee, Deborah Simmons, and Tim Soucie.

Ethics and Licensing

The research project followed local requirements for community research as well as the ethical principles of Ownership, Control, Access and Possession (OCAP).[54] The research team applied for ethics review by Carleton University's Research Ethics Board and received clearance on December 14, 2015 based on a minimally intrusive research design.

Research licenses were sought during fall 2015 and winter2016. The team hoped to conduct in-person interviews in communities in Yukon, Northwest Territories, Nunavut, Nunavik, and Nunatsiavut, but after multiple attempts we were unable to contact the appropriate personnel in Nunavik and Nunatsiavut within the available timeframe.[55] Due to these difficulties the research design was modified to include in-depth investigations of project clusters in Yukon, NWT, and Nunavut.

The research in Yukon, NWT, and Nunavut was conducted under the following licenses:

- Yukon-Canada Scientists and Explorers Act License #16-23S&E issued on March 18, 2016.
- Northwest Territories Scientific Research License #15839 issued on March 2, 2016
- Nunavut Scientific Research License #06 008 16N-M issued on February 1, 2016.

Each of these jurisdictions authorized the research team to conduct project lead interviews by telephone prior to the issuance of the research license. Community visits and in-person interviews were conducted only after research licenses were granted.

[54] The principles are explained here: http://www.naho.ca/documents/fnc/english/OCAP.pdf

[55] In June 2016 the research team made contact with relevant personnel in Nunatsiavut and work is underway to complete a series of telephone interviews with project participants there. The research team will update this report once these Nunatsiavut interviews are complete. In Nunavik the research team contacted Makivik Corp. and the Renewable Resources, Environment, Lands and Parks (RRELP) Department, Kativik Regional Government, to explore research licensing requirements. Kativik's RRELP Department put us in touch with the Nunavik Nutrition and Health Committee, which declined to comment on our project beyond suggesting we secure the support of Makivik. After repeated attempts to contact the appropriate Makivik representative by email and telephone, the research team concluded it would need to remove Nunavik projects from the in-depth component of Phase Two.

APPENDIX B: CITATIONS OF CCHAP-FUNDED WORK AND INTERNATIONAL ATTENTION

The following publications are the result (in full or in part) of CCHAP-funded research. In red following each publication is the number of times it had been cited by other authors up to June 30, 2016. Citations by other scholars indicate, of course, that published research is found to be useful. A further indication of influence is the extent to which the research has been used by networks of scholars. Some of these connections are traced in the section below, titled International Networks.

CCHAP-Funded Research Publications

Beaumier, Maude C., Ford, James D, and Tagalik, Shirley. 2015. "The food security of Inuit women in Arviat, Nunavut: The role of socio-economic factors and climate change" *Polar Record* 51(5) pp 550 – 559 (cited by 2)

Bennett, B. A. and S. Withers. 2010. "Spike Saxifrage (*Saxifraga Spicata)*: Rediscovered in Canada after 100 Years" *The Canadian Field Naturalist.* 124(1): 57-58. (0)

Calmels, Fabrice, Cyrielle Laurent, Ryan Brown, Frédérique Pivot, Margaret Ireland. 2015. "How Permafrost Thaw May Impact Food Security of Jean Marie River First Nation, NWT" Presented at GéoQuébec 2015, September 20-24. Quebec City. Available on ResearchGate. (24 reads on Research Gate)

Ford, James D., Kenyon C. Bolton, Jamal Shirley, Tristan Pearce, Martin Tremblay and Michael Westlake. 2012. "Research on the Human Dimensions of Climate Change in Nunavut, Nunavik and Nunatsiavut: A Literature Review and Gap Analysis" *Arctic* 65 (3) September pp 289-304. (21)

Ford, James D., Ashlee Cunsolo Willox, Susan Chatwood, Christopher Furgal, Sherilee Harper, Ian Mauro, and Tristan Pearce. 2014. "Adapting to the Effects of Climate Change on Inuit Health" *AJPH* Volume 104, Issue S3 (June). (12)

Gearheard, Shari Fox, Lene Kielsen Holm, Henry Huntington, Joe Mello Leavitt, Andrew R. Mahoney, Margaret Opie, Toku Oshima, and Joellie Sanguaya. 2013. *The Meaning of Ice: People and Sea Ice in Three Arctic Communities.* Hanover, New Hampshire: International Polar Institute Press. (10)

Giles, Audrey R., Strachan, Shaelyn M., Doucette, Micelle, Stadig, Gwenyth S., and the Municipality of Pangnirtung. 2013. "Adaptation to Aquatic Risks Due to Climate Change in Pangnirtung, Nunavut" *Arctic* 66 (2) pp. 207-217 (2)

Healey, G.K. (2015) *Exploring human health-related indicators of climate change in Nunavut*. Iqaluit, NU: Qaujigiartiit Health Research Centre. (0)

Healey, G. K., et al. 2011. "Community perspectives on the impact of climate change on health in Nunavut, Canada." *Arctic* 64 (1) 89-97. (16)

MacDonald, Joanna Petrasek, James Ford, Ashlee Consuolo Willox, Claudia Mitchell, Konek Productions, My Word Story-Telling and Digital Media Lab, and Rigolet Inuit Community Government. 2015. "Youth-Led Participatory Video as a Strategy to Enhance Inuit Youth Adaptive Capacities for Dealing with Climate Change" *Arctic* 68 (4) December pp 486-499. (0)

MacDonald, Joanna Petrasek, Sherilee L. Harper, Ashlee Cunsolo Willox, Victoria L. Edge. 2013. "A Necessary Voice: Climate Change and Lived Experiences of Youth in Rigolet, Nunatsiavut, Canada" *Global Environmental Change* 23 (1) February pp 360-371. (9)

Mackin, Nancy. 2015. "Moss Houses in the Circumpolar North." *International Journal of Climate Change* 8(1-2) pp. 1-14 (0).

Ostapchuk, Joshua, Sherilee Harper, Ashlee Cunsolo Willox, Victoria L. Edge, Rigolet Inuit Community Government. 2012. (published online in 2015). "Exploring Elders' and Seniors' Perceptions of How Climate Change is Impacting Health and Well-being in Rigolet, Nunatsiavut*" International Journal of Aboriginal Health* pp 6-24. (0)

Peace, D.M. and Myers, E., 2012. Community-based participatory process-climate change and health adaptation program for Northern First Nations and Inuit in Canada. *International Journal of circumpolar health*, *71*. (24)

Wilcox, Ashlee Cunsolo, Sherilee L. Harper, Victoria L Edge, My Word: Storytelling and Digital Media Lab, Rigolet, Labrador. 2012. "Storytelling in a digital age: digital storytelling as an emerging narrative method for preserving and promoting indigenous oral wisdom" *QR Qualitative Research* 13 (2) pp127 – 147. (6)

International Networks

Gearheard, Shari Fox, Lene Kielsen Holm, Henry Huntington, Joe Mello Leavitt, Andrew R. Mahoney, Margaret Opie, Toku Oshima, and Joellie Sanguaya. 2013. *The Meaning of Ice: People and Sea Ice in Three Arctic Communities.* Hanover, New Hampshire: International Polar Institute Press. (10)

Harper, S. L., et al. "Acute gastrointestinal illness in two Inuit communities: burden of illness in Rigolet and Iqaluit, Canada." *Epidemiology and infection* 143.14 (2015): 3048-3063. This group acknowledges a number of international collaborators.