

# ArcticNet

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The Integrated Natural / Human Health / Social Study of  
the Changing Coastal Canadian Arctic

Strategic Framework (2008-2011)

Last updated August 01, 2007



Networks of Centres  
of Excellence  
Réseaux de centres  
d'excellence

“... adapting the coastal Canadian Arctic to environmental and societal changes.”

## 1. INTRODUCTION AND OVERVIEW

The Arctic is the region of the globe impacted earliest and most severely by the present warming of Earth’s lower atmosphere. Many of the symptoms of a warming Arctic anticipated by climate models have already been verified by observations on land, at sea and from space. Presently, by 2007, observations indicate that the warming of the Arctic cryosphere is progressing at a rate significantly faster than anticipated by standard climate models. As summarized in the Arctic Climate Impact Assessment of 2004, the multiple environmental, socio-economic and geopolitical perturbations taking place in the Arctic will interact to bring about an irreversible transformation of the North (Figure 1).

Figure 1. ACIA’s summary of the multiple impacts of climate warming in the Arctic.



### 1.1 ArcticNet

Understanding the present transformation of the Arctic environment and anticipating its consequences is one of the great challenges faced by Canadians, the Canadian government and the national and international scientific community. In Canada, climate warming will have tremendous environmental, socio-economic and strategic consequences that will be felt first and most severely in arctic communities and regions.

ArcticNet is a Network of Centres of Excellence that brings together scientists and managers in the natural, human health and social sciences with their partners in Inuit organizations, northern communities, government and industry to help Canadians face the impacts and opportunities of climate change and globalization in the Arctic. The central objective of ArcticNet is to generate the knowledge and assessments needed to formulate the adaptation strategies and policies that will help northern societies and industries prepare for the full impacts of the transformation of the Arctic.

As we reach the end of our first funding phase (2004-2008), over 100 ArcticNet researchers and 350 graduate students, post-doctoral fellows, research associates and technicians from 28 Canadian universities and 5 Federal departments collaborate on 30 research projects with more than 100 partner organizations from Canada, the USA, Japan, Denmark, Norway, Poland, the United Kingdom, Spain, Russia, Greenland and France.

## **1.2 ArcticNet Vision**

A future where, thanks to two-way knowledge exchange, monitoring, modeling and capacity building, scientists and Northerners have jointly attenuated the negative impacts and maximized the positive outcomes of the transformation of the Canadian Arctic.

## **1.3 ArcticNet Mission**

- To build synergy among existing Centres of Excellence in the natural, human health and social arctic sciences.
- To involve Northerners, government and industry in the steering of the Network and scientific process through bilateral exchange of knowledge, training and technology.
- To increase and update the observational basis needed to address ecosystem-level questions raised by climate change and globalization in the Arctic.
- To provide academic researchers and their national and international collaborators with stable access to the coastal Canadian Arctic.
- To consolidate national and international collaborations in the study of the Canadian Arctic.
- To contribute to the training of the next generation of experts, from north and south, needed to study, model and ensure the stewardship of the changing Canadian Arctic.
- To bring together Canadian and international arctic expertise to conduct Integrated Regional Impact Studies (IRISes) of the consequences of climate warming, environmental changes and societal changes in key regions of the coastal Canadian Arctic.
- To translate our growing understanding of the changing Arctic into impact assessments, national policies and adaptation strategies.

## **1.4 ArcticNet Scope**

Geographically, ArcticNet focuses on the *coastal* Canadian Arctic for several reasons. First, the largest fraction of Arctic and sub-arctic Canada is primarily a maritime territory. Second, Canadian Inuit are a coastal maritime people. Third, while continental regions of Arctic Canada (e.g. Mackenzie Basin, Northern Quebec) are relatively well studied, the coastal Canadian Arctic encompasses some of the least studied regions of the Canadian Arctic (see the Northern Climate Exchange-GAP Assessment 2001). Fourth, the logistic support provided by the research icebreaker *Amundsen*, the central infrastructure of the Network, is limited to coastal marine and terrestrial regions.

Temporally, ArcticNet will address the present state of the coastal Canadian Arctic, and try to anticipate the nature and magnitude of the impacts of climate warming on this region at the horizons of 2025, 2050 and 2100. Paleoclimatic studies and Regional Climate Models will reconstruct conditions in the coastal Canadian Arctic over the last several millennia to help cast present observations in a

long-term perspective. However, ArcticNet will focus on the short term evolution of the coastal Canadian Arctic environment and the strategies needed for communities and industries to adapt to the impacts of incoming warming and modernization.

Culturally, ArcticNet focuses on the impacts of environmental and societal changes on Inuit dominated regions and communities that fall within the boundaries of ArcticNet's geographical domain of research activity.

### **1.5 ArcticNet at the end of the current funding cycle (2011)**

By the end of the first funding cycle, the IRISes will be implemented and the first Regional Impact Assessments will be published. ArcticNet will then be a unique supplier of expertise (1) to inform northerners of the potential impacts and opportunities that climate change will bring to the North; (2) to help decision-makers and the industry cope with a changing Arctic; and (3) to help build capacity at all levels of northern societies.

This document is the updated version of ArcticNet's **Strategic Framework** at the time of the mid-term review of the first 7-year funding cycle (2004-2011). The Strategic Framework integrates the objectives of the **Updated Research Plan** and the **Updated Business Management Plan** for Phase II of the current funding cycle. These objectives are categorized as completed initial objectives, on-going initial objectives, and new objectives.

## **2. UPDATED RESEARCH PLAN**

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The Updated Research Plan to achieve ArcticNet's vision is based on 6 research objectives that transpose the goals and objectives of the Network of Centres of Excellence program to the study of the changing Canadian Arctic. We emphasize here the key on-going and new research objectives for Phase II (2008-2011) of the current funding cycle (2004-2011). For sake of continuity, the initial research objectives achieved during Phase I of the Network (2004-2007) are also listed and briefly discussed.

### **2.1 To build synergy among existing Canadian Centres of Excellence in the natural, human health and social arctic sciences (an initial objective achieved during Phase I and to be consolidated during Phase II).**

The holistic, ecosystem-level, issues raised by environmental and societal change in the Arctic, and the need to develop policies and strategies to adapt to its impacts, require that research results and knowledge be merged among the natural, health and social sciences. Specialists of the natural sciences need to scale down their observations and model predictions of environmental change to the scale of the region and the community. These are the scales at which social scientists and epidemiologists can assess the impacts of environmental changes on social and economic systems and on individuals.

Since its inception in 2004, ArcticNet has built this cross-sector synergy by engaging the best Canadian specialists in the natural, health and social sciences and their international collaborators. Participation of the three sectors in the various planning workshops, the IRIS workshops, and the general meetings has enabled the Network Investigators to maximize the cross-sector dimension of each of the funded projects and to further identify cross-sector collaborations among projects. Preliminary cross-sector syntheses of observations and potential impacts have been published to inform policy makers.

During Phase II, this cross-sector synergy will be further encouraged in the call for new and renewed projects (fall 2007), through the implementation of the IRIS framework (Objective 5) and through the formulation of the Regional Impact Assessments (Objective 6).

## **2.2 To engage Northerners in the scientific process through the bilateral exchange of knowledge, training and technology (an initial objective achieved during Phase I and to be consolidated during Phase II).**

The case for the direct involvement of Northerners in the study of the impacts of climate change in the Arctic is clear. First, people living in the Arctic have a lot of knowledge (traditional, local and recent) to contribute to the research process. Second, they are, of course, in the best position to identify research priorities towards adapting to the impacts of climate change in the North. Third, the training of Northerners is necessary for Northern communities and governance bodies to achieve self-reliance in the scientific study, management and stewardship of a changing Arctic.

With ArcticNet, a true and meaningful partnership with the Inuit world has signaled a change in the research approach to one that is enriched by Inuit knowledge. First, Inuit are directly involved in the steering of the Network. From the start, ArcticNet has established operational links with the major Inuit organizations in Canada. Inuit representatives sit on the Board of Directors, the Research Management Committee and the Inuit Advisory Committee. In an alliance with the Northern Contaminant Program (NCP), a program of the Department of Indian and Northern Affairs Canada, and Nasivvik, ArcticNet has hired Inuit Research Advisors in each of the four Inuit regions of the Canadian Arctic (corresponding to the 4 targeted IRISes). The mandate of the IRAs includes identifying existing and new research opportunities, facilitating ArcticNet researchers in undertaking projects in their regions, assisting researchers in consultation and dissemination of results, ensuring research coordination in each Inuit region and, engaging in training opportunities to help build research capacity in each region

Second, Inuit are directly involved in the research conducted by ArcticNet. A first call for Northern-led projects has been made and several projects jointly managed by Northerners and academia have been funded and completed. The majority of the other projects focus on answering concerns or questions raised by Inuit stakeholders. They often incorporate Inuit expertise and, with the help of the Inuit Research Advisors, have identified and engaged Inuit participants.

Furthermore, northern industries are increasingly involved in steering ArcticNet and its research program. Three of the private-sector seats on the Board of Directors are occupied by industries operating in the Canadian Arctic and representatives also sit on the RMC.

## **2.3 To provide Network Investigators and their national and international collaborators with coordinated access to the coastal Canadian Arctic and to Inuit communities (an initial objective achieved during Phase I and to be consolidated during Phase II).**

In addition to field work facilitated through vital logistical support from partner institutions such as the Polar Continental Shelf Project (PCSP), Québec-Océan, the Centre d'études nordiques (CEN), the Centre for Earth Observations Sciences (CEOS) and northern research institutes, ArcticNet researchers from various disciplines have access to the Canadian research icebreaker CCGS *Amundsen*, the network's major research infrastructure, to study the vast expanses of the coastal Arctic. A dedicated research icebreaker is the most efficient way to support large-scale, multidisciplinary efforts in the marine (e.g. CASES) and terrestrial (e.g. Tundra99) coastal Arctic. However, the costly deployment of a research icebreaker necessitates long-term planning and coordination to maximize scientific yield. Starting in 2004, ArcticNet researchers in the natural, health and social sciences have coordinated field efforts around the research icebreaker *Amundsen*. As the main single user, ArcticNet has led the planning of the ship's schedule until 2006, taking into account the needs of other Canadian and foreign projects. Starting in 2007, ArcticNet has played a critical role in the planning of logistics and operations of the *Amundsen* for the Canadian International Polar Year (IPY). From its inauguration in August 2003 to the end of the IPY operations in November 2008, the *Amundsen* will have logged 1020

days at sea in support of science, providing Canadian specialists and their international collaborators with unprecedented access to the Canadian Arctic.

During Phase II, ArcticNet will continue to coordinate access to the Arctic for Canadian and international researchers. In close collaboration with the newly-formed Board of Directors for the *Amundsen* project, the Network is exploring all avenues to secure additional funds for the operation of the ship beyond the IPY. Our goal is the full funding and use of the ship for the 152 days it is available every year, and eventually, for more.

#### **2.4 To train the young experts (including Northerners) needed to study, model, manage and ensure the stewardship of the changing Canadian Arctic (an initial objective achieved during Phase I and to be consolidated during Phase II).**

Understanding the present transformation of the Arctic environment and anticipating its consequences is one of the greatest challenges faced by the international scientific community. Unfortunately, after 20 years of downsizing its scientific effort in the Arctic, Canada is missing a complete generation of the field scientists acutely needed to study and monitor the present transformation of the North. Since its inception, ArcticNet and its central infrastructure have provided a unique scientific environment for the training and establishment of young arctic specialists. Students are exposed to the multidisciplinary, trans-sectoral and international science needed to address the ecosystem-level, holistic issues arising from the on-going transformation of the Arctic.

Up to now, over 220 students have or are completing their academic degrees and more than 30 postdoctoral fellows and 120 technicians are trained within ArcticNet's scientific program. Since 2005, the ArcticNet Student Association has promoted full participation of Highly Qualified Personnel (HQP) in the Network's activities, being cited as a model for other NCEs. With the help of the Inuit Research Advisors, some Inuit students of different levels have been recruited for training within the scientific program of ArcticNet. ArcticNet's Training Fund has funded the participation of our students in international Arctic schools and the Network is sponsoring its own International Graduate School onboard the *Amundsen* during the IPY. The "Schools on Board" program for the involvement of secondary schools in Arctic research has been integrated within ArcticNet's scientific program. Most importantly, ArcticNet and its core infrastructure the *Amundsen* have contributed to the establishment of at least 18 new researchers in universities and Federal departments, ensuring the continuing growth of the Canadian research effort in the Arctic.

During Phase II, ArcticNet will continue training HQP in a trans-sectoral context that will be encouraged by further implementation of the IRIS framework. Special efforts will be deployed to increase the recruitment of young Northerners in undergraduate and graduate training.

#### **2.5 To implement Integrated Regional Impact Studies (IRIS) of key regions of the Canadian Arctic (a central objective initiated in Phase I of the current funding cycle).**

To anticipate the impacts and socio-economic costs of climate warming in the Arctic, national and international strategies advocate an approach based on Integrated Regional Impact Studies (IRIS). In a nutshell, an IRIS summarizes and combines knowledge and models of relevant aspects of the ecosystems of a region affected by change, with the objective of producing a prognosis of the magnitude and socio-economic costs of the impacts of change (Yarnal 1998. Integrated regional assessment and climate change impacts in river basins. *Climate Research* 11: 65-74).

The implementation of an IRIS is an iterative process, each cycle starting with the consultation of the stakeholders. The typical iterative roadmap for the implementation of an IRIS includes the following steps (several of which are developed simultaneously):

- 1) With the input of stakeholders, identify indicators of environmental, health and societal vulnerability.
- 2) Document past and present changes in climate and in different components of the regional environment.
- 3) Identify present environmental, health and societal vulnerabilities, vulnerability being defined as (sensitivity – adaptability) \* exposure.
- 4) Based on observations and experimental studies of processes, develop Impact Models that describe the response of an exposure unit (i.e. a natural component/ecosystem, a component of human health, or a societal/economical sector) to external changes (climate and modernization determinants). These Impact Models range in complexity from simple conceptual models or statistical relationships to sophisticated numerical simulations.
- 5) Identify linkages between environmental change and health/societal impacts.
- 6) Downscale General Circulation Models (GCMs) to Regional Climate Models (RCMs).
- 7) Force the Impact Models with the scenarios produced by the RCM to provide insights into future environmental, health and societal vulnerabilities.
- 8) Analyse the prognosis with stakeholders and start over.

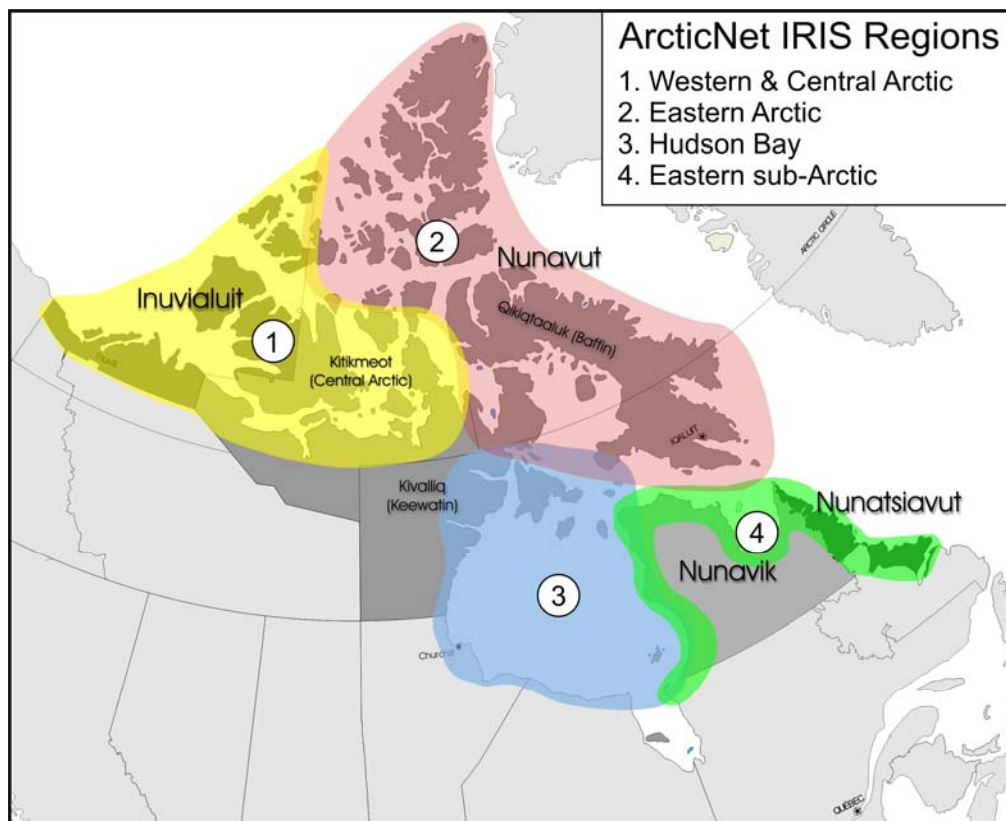


Figure 2. The geographical boundaries of ArcticNet’s Integrated Regional Impact Studies (IRISes).

The implementation of the IRIS framework, as proposed in the original application to the NCE program, is a difficult and ambitious project. However, it is the avenue we have selected towards prognoses of the future Arctic world that will be useful to decision makers in the formulation of policies and adaptation strategies. It can be achieved only through a network approach and, as such, it is the *raison d’être* of ArcticNet. During Phase I and in consultation with our stakeholders, the Network has progressed significantly towards this crucial objective.

The initial resistance of some researchers to the approach has been addressed and the Network Investigators and their students are now fully engaged in the IRIS framework. Through several Theme and plenary meetings, and in consultation with stakeholders, we have defined the boundaries of the 4 key regions of the Canadian Arctic in which IRISes will be developed.

Most importantly, research projects have identified indicators of change, documenting past and present change, identifying vulnerabilities, and developing Impact Models. They have initiated/pursued the field measurements, process studies, community consultations and long-term monitoring of these key indicators that provide the information on the state and evolution of the regions needed to constrain the Impact Models. Regional climate numerical models (oceanic, atmospheric and hydrologic) are in place, down-scaling hemispheric climate scenarios to the regional scale to produce the common scenarios that will force individual Impact Models.

Modernization trends (the equivalent of the climate scenarios) have been documented through projects such as the Nunavik Health Study (*Qanuippitaa? – How are we?*). All these activities and results correspond to steps 1 to 4 and 6 of the IRIS implementation roadmap (above).

During Phase II of the current funding cycle, emphasis will be on quantifying how environmental change and modernization will impact the health, culture, well-being, and economy of Northerners, modify the mandate of Federal departments with a stake in the Arctic, and affect the operations of northern industries. In particular, the different Impact Models will be forced with the regional climate scenarios and modernization trends to provide insights into future environmental, health and societal vulnerabilities. The output of Impact Models will be validated with historic data and new observations gathered by the continuing field program of ArcticNet as well as by several International Polar Year projects led by ArcticNet NIs.

Several objectives of the Updated Business Management Plan will aim at encouraging the implementation of the IRIS framework (see Updated Business Management Plan next). First, the 2007 call for research proposals will emphasize the necessity for new and renewed projects funded during Phase II to contribute to the IRIS framework and the formulation of Regional Impact Assessments (see next objective). Second, the Board of Directors and the Research Management Committee will foster the increased participation of decision makers in steering the science program. Third, the leadership of ArcticNet will proceed with the transformation of the present Theme-oriented structure of the Network to an IRIS-oriented structure that suits its objectives better. Fourth, in general, the implementation of the IRISes and the formulation of the first Regional Impact Assessments will become the central objective of ArcticNet defining the Network for the second funding cycle and beyond.

## **2.6 To formulate Regional Impact Assessments for each of the four IRIS regions and for the Canadian coastal Arctic as a whole (a new objective for Phase II of the current funding cycle)**

Communities, industries and utilities throughout the Canadian Arctic are experiencing significant changes in environmental conditions. These changes, concurrent with rapid social, economic, and political change, are posing significant risks to the culture, livelihood and health of northerners. Governments, communities, industries and individuals of the Canadian Arctic facing these changes need access to directly relevant information for the development of policies and adaptation strategies.

Until now, much of this information has been synthesized at the hemispheric scale in international assessments that provide an overview of the rapidly evolving situation of the Arctic as a whole. Among these, the Intergovernmental Panel on Climate Change periodically synthesizes our understanding of the evolution of Earth's climate at the global scale (IPCC, <http://www.ipcc.ch/>). The Arctic Monitoring and Assessment Programme focuses on informing Arctic governments in their efforts to take remedial and preventive actions relating to environmental threats and contaminants (AMAP,

<http://www.amap.no/>). The Arctic Climate Impact Assessment has synthesized knowledge on climate variability, climate change, and increased ultraviolet radiation and their consequences in the Arctic (ACIA, <http://www.acia.uaf.edu/>).

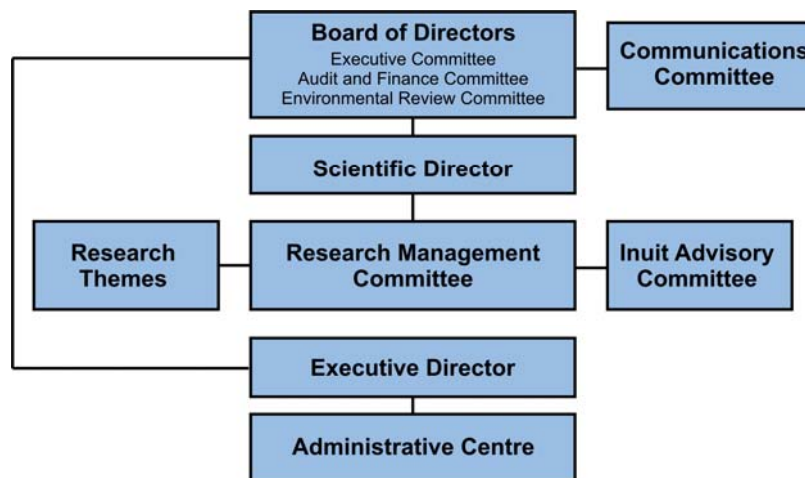
Although extremely useful in defining large scale trends in change and in convincing decision makers of the urgency to prepare for the transformation of the Arctic, these assessments seldom provide the regional-scale integrated information relevant for local communities and industries. The ultimate objective of each ArcticNet IRIS is to provide decision makers with an integrated Regional Impact Assessment (RIA) of the present situation and its potential evolution. The end product differs from previous international assessments not only in scale (regional vs hemispheric) but also in the expected level of integration that aims to identify potential interactions and synergies among impacts on the environment, human health, and socio economy.

This integrated Regional Impact Assessment (RIA) is by definition an evolving assessment that is updated with each iteration of the IRIS process. One of the most powerful conclusions of several ArcticNet planning workshops is that among the exceptional expertise assembled, we actually already have the knowledge for a first edition of the RIA for each region, before the IRISes are fully implemented. Accordingly, as a complement to objective 5, it was resolved to formulate an initial (time zero) RIA for each region during Phase II of the current funding cycle. All ArcticNet research projects (completed, new and renewed) are expected to contribute to at least one and ideally several of the four RIAs. The four RIAs will be complemented by an umbrella assessment for the overall Canadian Coastal Arctic. We aim at completing and editing this 5-chapter Assessment of the Canadian Coastal Arctic by summer 2010, in time for the network’s renewal.

The same several objectives of the Updated Business Management Plan designed to accelerate the implementation of the IRIS framework (Objective 5) will also encourage the formulation of the Assessment (see Updated Business Management Plan next).

### 3. UPDATED BUSINESS MANAGEMENT PLAN

The Updated Business Management Plan comprises 7 major objectives to maximize the engagement of stakeholders and the socio-economic benefits of the research program of ArcticNet. We emphasize here the key on-going and new management objectives for Phase II (2008-2011) of the current funding cycle (2004-2011). However, for sake of continuity, the initial objectives achieved during Phase I of the Network (2004-2007) are listed and briefly discussed.



ArcticNet Organization Chart

### **3.1 To develop the Network infrastructure needed to support and steer the scientific program of ArcticNet (an initial objective achieved during Phase I).**

As early as 2004, ArcticNet put in place the Administrative Centre, the Research Management Committee, the Board of Directors and various committees that support the Network's scientific operations, implement its strategic plan, and ensure the integration of the priorities of stakeholders in the research.

The Board and the RMC have been particularly active in overseeing the initial development of the Network, in engaging the stakeholders, in orienting the research plan, in developing the data management plan, and in establishing liaison between ArcticNet and the Canadian International Polar Year.

The Network has developed the expertise to manage the deployment of the research icebreaker *Amundsen* (its core infrastructure) in support of its field program by (1) creating a position of Coordinator of Ship-based Research; (2) developing an exemplary partnership with the Canadian Coast Guard for the planning of operations in the Arctic; and (3) forging close alliances with Québec-Océan at Université Laval, the Center for Earth Observation Studies (CEOS) at the University of Manitoba, and the Mapping Group at the University of New Brunswick. During operations for ArcticNet, Québec-Océan manages, maintain and deploy the oceanographic equipment of the *Amundsen*, CEOS deploys the atmospheric science instrumentation, and the Mapping Group operates the sophisticated SONARs of the ship. Together, Québec-Océan, CEOS and the Mapping Group have led the \$11M proposal to the Leading-Edge Fund of the Canada Foundation for Innovation to augment and update the pool of scientific equipment of the *Amundsen*. The main beneficiaries of these new equipments are the several ArcticNet projects using the *Amundsen*.

ArcticNet has developed close links with Inuit organisations in all four Inuit regions of the Canadian North, including our network of Inuit Research Advisors that facilitates connections between the researchers and the Inuit, coordinates access to the communities, and fosters the participation of Inuit experts and students in the research.

As well, in close collaboration with the Department of Fisheries and Oceans (DFO) and the Canadian Cryospheric Information Center (CCIC), ArcticNet has implemented a central data repository to archive the colossal data sets generated by its scientific program (see also Business Management Objective 5).

These initiatives of the Research Management Committee with guidance from the Board of Directors have provided tremendous support to the research program of ArcticNet. During Phase II, ArcticNet will consolidate these unique capacities to support Arctic research and will extend them in support of the several projects of the International Polar Year that complement its own scientific program. Thus, the Network's expertise in deploying the *Amundsen* and its equipment will help major IPY projects such as the Circum-polar Flaw Lead Study and the Inuit Health Survey. It is expected that the Canadian IPY program will use the repository developed by ArcticNet and its partners to archive the data generated by many of its projects.

### **3.2 To communicate the rationale, objectives and achievements of ArcticNet to the Canadian public, stakeholders north and south, and internationally (an initial objective achieved during Phase I and to be consolidated during Phase II).**

To meet its objectives, ArcticNet requires communication with a wide-range of audiences, including the general public, stakeholders in the north and south and the international community. During Phase I, ArcticNet has set up a Communication Committee to define a Communication Strategy and has hired a Communication Officer. Advice has been sought from experts in communications with northerners

(e.g. Northern Contaminants Program, Inuit Tapiriit Kanatami). As part of this strategy, the Network has implemented several communication mechanisms including a comprehensive website, annual community consultations, press releases, standard presentation packages (Power Point, meeting kits), fact sheets and brochures, and its annual report. Numerous reports on the radio, the printed press and television have featured ArcticNet objectives and field activities nationally and internationally. As a result, the Network has been remarkably present in the media, contributing to push Arctic issues to the forefront of the national agenda, and giving back to Canada its missing Arctic dimension.

During Phase II, the Network will consolidate its communication strategy, paying special attention in delivering to Northern communities the results of the research projects and the first general conclusions of the Regional Assessments.

### **3.3 To effect the administrative transition of the Network from a Theme-based structure to an IRIS-based structure (a new objective for PHASE II).**

Up until the end of Phase I, the 30 research projects making up the research program of the Network were organized around three research Themes that reflected essentially the different physical systems and ecosystems of the coastal Canadian Arctic, and a fourth Theme focusing on informing decisions and policies. These four Themes were: (1) Climate Change Impacts in the Canadian High Arctic: a Comparative Study Along the East-West Gradient in Physical and Societal Conditions; (2) Food, Water and Resources in the Shifting N-S Thermal Gradient of the Terrestrial Eastern Canadian Arctic; (3) Managing the Largest Canadian Watershed in a New Climate: Land-ocean Interactions in Sub-Arctic Hudson Bay; and (4) Adapting to Change in the Canadian Arctic: Knowledge Transfer, Policies & Strategies. Each Theme was headed by a Theme Leader responsible for the integration of the different projects and the administration of the Theme. This structure proved very useful in integrating the logistics of the field program, in allocating research funds among the projects and in reporting results to the NCE administration during Phase I of the current funding cycle. However, as the concept of Integrated Regional Impact Studies (IRISes) became increasingly central to ArcticNet, it became clear that structuring the research program of the Network into three geographical Themes and an integration Theme created artificial boundaries between the research and the application of the research to the formulation of policies. As well, some of the geographical boundaries of the Themes corresponded poorly to the political and administrative boundaries of the Inuit regions, which hindered the human health and social sciences components of the research program.

Accordingly, at several planning workshops, Network Investigators of the different Themes reached the unanimous conclusion that, in order to accelerate the implementation of the IRIS framework and the production of the Regional Impact Assessment, the structure of the research program should be re-aligned according to the new IRIS boundaries. With the approval of the Board, the RMC was tasked with planning the administrative transition of the Network from a Theme-based to an IRIS-based structure. In the call for new research proposals (fall 2007), funding will be conditional on the demonstration that projects will contribute to the IRIS framework. Starting in March 2008 (Phase II), the new and renewed projects will be organized around the IRIS framework, with the possibility for each project to contribute to several of the four IRISes. The Theme Leaders will be replaced by IRIS leaders who will be responsible for the integration of research results into the IRIS and the formulation of the Regional Impact Assessment. Each IRIS Leader will be assisted by an IRIS coordinator.

### **3.4 To prepare and broadcast the 2007 call for research proposals (a new objective in preparation for PHASE II).**

By nature, research projects addressing the response of ecosystems and communities to climate variability and change require long-term stable funding. This is why most of the ArcticNet initial projects were funded for 4 years. Additional projects were funded following a directed call for

proposals in 2005. Funding for all on-going projects terminates on 31 March 2008. The fall 2007 call for proposals will be the opportunity for the Network to recast its scientific program and further align it on the IRIS framework.

The outline of the 2007 call for proposals as prepared by the RMC requests that proponents demonstrate that their project contributes to the objectives of ArcticNet as described in the Strategic Framework, to the implementation of the IRISes, and to the formulation of the Regional Impact Assessments.

### **3.5 To further implement the archiving of ArcticNet's data and to extend to other programs access to the repository (an objective initiated during Phase I and to be consolidated during Phase II).**

Adequate archiving of data is a central element of the legacy of large-scale public-funded programs such as ArcticNet. The grouping and archiving of the data in relational banks enable today's scientists to synthesize the information available on a given issue, and tomorrow's scientists to go back in time to quantify variability and change. It is a particularly important exercise in the context of climate change as the information gathered now describes the baseline state of the changing systems and ecosystems. Increasingly, funding agencies in most G7 countries make awards conditional on the proper archiving of the data.

Prompted by the Board and in close collaboration with DFO and CCIN, the RMC is implementing a central repository for the immense data sets generated by ArcticNet's research program. During Phase II, ArcticNet will further implement the archiving of its arctic data sets in the natural, human health and social sciences. ArcticNet and its partners are also encouraging previous research programs such as the International North Water Polynya Study (NOW) and the Canadian Arctic Shelf Exchange Study (CASES) to archive their data in the same repository. Most importantly, the Network is working in close collaboration with the Canadian IPY to provide access to the repository for IPY-funded projects. Achieving this ambitious objective during Phase II would result in the creation of the largest and most updated repository for arctic data in Canada and one of the largest in the world.

### **3.6 To expand existing international collaborations into a Network of Arctic networks (a recent objective to be consolidated during the remainder of Phase I and during Phase II).**

Within the framework of the recent NCE's International Partnership Initiative (IPI), ArcticNet proposed to expand its existing international collaborations into a network of Arctic Networks. Four foreign networks sharing the Network objectives in the natural and human health sciences have joined forces with ArcticNet:

- The Russian/American-led NABOS (Nansen-Amundsen Basin Observational System) deploys Long-Term Oceanic Observatories (LTOO) on the Laptev Sea of the Siberian Shelf in collaboration with ArcticNet since 2003.
- Since 2006, the European DAMOCLES (Developing Arctic Modeling and Observing Capabilities for Long-term Environmental Studies) collaborates with NABOS in the deployment of LTOOs on the East Siberian Sea Shelf.
- The Norwegian ARCTOS (Arctic Marine Ecosystem Research Network) collaborates with ArcticNet on a range of initiatives including the exchange of students and data, joint publications, joint development and implementation of international efforts such as the Canadian Arctic Shelf Exchange Study (CASES) and the Circum-Arctic Flaw Lead Study (CFL).
- The USA-based Arctic Human Health Initiative (AHHI) is sponsored by the Arctic Council and aims at regrouping IPY-related human health research projects in the Arctic, including several

projects conducted in partnership with ArcticNet such as the funded International Inuit Cohort Study and the International Inuit Child Development Cohort Study.

The funds obtained from the IPI program (\$815 000) support (1) the Canadian participation in the Russian-led effort in the Siberian and European Arctic (2007 and 2008); (2) ArcticNet's contribution to the on-going series of international Arctic Schools sponsored by the different Networks; and (3) the organization of the International Arctic Change Conference in 2008. The Initiative will help ArcticNet maintain its leadership in the consolidation of the different international efforts that are rapidly expanding in response to the on-going transformation of the Arctic and the coming International Polar Year. The Board and the RMC will ensure that the specific objectives of the ArcticNet's IPI are met. These objectives are:

- to facilitate the transfer of information and data between ArcticNet and foreign networks and projects with similar objectives in Norway (ARCTOS), Russia (NABOS), France (DAMOCLES), and the USA (AHHI).
- to provide Canadian researchers and students with the stable access to the Siberian and European Arctic Ocean needed to achieve pan-arctic syntheses of the studied impacts.
- to engage the expertise of international partners in the development and implementation of the Integrated Regional Impact Study (IRIS) concept in the study of the changing Arctic.
- to enhance the interdisciplinary, trans-sectoral and international content of the training provided to ArcticNet's students.
- to make use of the international connections of our Inuit partners (e.g. the Inuit Circumpolar Conference) to the benefit of ArcticNet's IPI, and to engage directly our Inuit partners in the activities of the proposed network of Arctic Networks.
- to support Canada's contribution to the International Polar Year (2007-2009).

### **3.7 Planning the legacy of the International Polar Year (a recent objective to be consolidated during the remainder of the first funding cycle and beyond)**

*Science for climate change impacts and adaptation and the health and well-being of Northern communities* are the two research priorities of the Canadian IPY Program. These priorities clearly echo the central themes of the research program of ArcticNet. Hence it is no surprise that the Network's Investigators (NIs) are heavily involved in the Canadian IPY, leading 11 of the 44 projects funded by the Federal program and participating in 29 of them, and leading 6 of the 11 IPY projects funded by the Natural Sciences and Engineering Council of Canada (NSERC). Star projects of the IPY such as the Circumpolar Flaw Lead Study, the Inuit Health Surveys and the Canadian participation in the Mooring-based Arctic Ocean Observational System (MAOOS) are direct emanations of ArcticNet's research program. Furthermore, the pan-Canadian consortium of ArcticNet NIs led the proposals to the Canada Foundation for Innovation to retrofit the *Amundsen* into an outstanding research platform (2002), to modernize its scientific equipment pool (2006), and to develop *Qaujisarvik*, a network of eight land-based research stations stretching 3500 km from Radisson, Québec, to Ward Hunt Island, Nunavut. Totalling over \$49M, these infrastructure are playing a central role in supporting the Canadian contribution to the IPY. ArcticNet is also supporting directly several IPY programs through the scientific mobilization of the *Amundsen* and its data archiving system. In this context, the Canadian IPY program represents an extraordinary expansion of the objectives and activities of ArcticNet.

Previous International Polar Years (1882-83, 1932-33, and 1957-58) have left a significant legacy of international collaboration that led to several international treaties such as the Antarctic Treaty of 1961. However, in terms of scientific infrastructure, research capacity and scientific data, the impact of these IPYs has perhaps not always been maximized. Because of its potential relatively long-term duration

(14 years), ArcticNet is in a unique position to help promote the scientific legacy of the Canadian IPY. During Phase II and beyond, the objective of the RMC and the Board will be to work closely with funding agencies, the Canadian Polar Commission and partner universities and Federal departments to ensure that the IPY will contribute to build an enduring capacity for research in the Canadian Arctic.