North by 2020 Research Synthesis Project: Learning from Local and Global Perspectives on the North during the International Polar Year 2007-09

Introduction

The International Polar Year (IPY), March 2007 to March 2009, highlights a suite of major interconnected transformations that are underway in the North. These include (1) regime shifts in climate and the environment that are near-unprecedented in the historical and recent geological record; (2) the sweeping effects of rapid change on Northern populations and cultures; (3) expansion of global geopolitical and economic interests into the North; and (4) increasing interdependence between the Arctic region and global processes (Chapin et al., 2006; ACIA, 2004). By focusing the attention of the world on polar regions, the IPY presents a unique opportunity to emphasize the quality of research and educative efforts already underway and to make the case for innovative work that contributes to Northern futures. In so doing strong new alliances will be forged among nations and peoples – new-world and indigenous – centered on a common interest in and commitment to the North. In particular, the IPY can serve as a forum to explore, discuss, plan and prepare opportunities for sustainable development in a North experiencing rapid transformation. Fourth in a series of such international endeavors that began in 1882, this IPY inherits a legacy and spirit of international collaboration and scientific trail-blazing that is the long-recognized hallmark of the IPY and International Geophysical Year (IGY) efforts.

As the nation's Arctic university and as a leader in Arctic research the University of Alaska (UA) has been playing a crucial role in exploring the key forces shaping the future of northern social and ecological systems. Because our institution represents a nexus of scientific, geopolitical, economic and public interests we have been exceptionally well-suited to investigate and develop sustainability strategies. Under the umbrella of the UA IPY Development Plan the implementation of a key component of this effort has been a Forum for Local and Global Perspectives on the North. The aim of this Forum initiative, *North by 2020*, has been to bring scholars, scientists and educators from UA and other key partners within the State of Alaska together with recognized stakeholders, outside experts, and the broader public to jointly assess the challenges facing the North, envision futures for our region, and seize emerging opportunities. The first steps in implementing the Forum have been successfully completed and both research and integration are well underway, as outlined in more detail in Section C-5 below. The aim of the present proposal is to provide funding support for the synthesis phase of the project that addresses research questions focusing on human and biotic systems in the North.

The cultural, economic, and political goals of the different interests in the North often overlap and at times conflict. Add to this the uncertainty of a changing climate and communities in flux due to historical and current social pressures and it is clear that North must be considered a social-ecological system in need of integrative research and cross-cultural and interdisciplinary communication in order to solve its most pressing problems. In light of the International Polar Year, *North by 2020* has focused on Alaska and the circum-Arctic to engage and challenge participants facing different problems (e.g. subsistence harvest of marine living resources with changing and increasingly unpredictable ice conditions, provision of freshwater to rural areas, coastal erosion and community relocation, expansion of oil drilling) to communicate across their industry, agency, and cultural standpoints because all of them share a desire to achieve goals in the comparably extreme environments of the northern polar regions.

North by 2020 Research Synthesis Project Objectives

Evidence ranging from observations of local indigenous experts, satellite and ground-based measurements and climate models suggests that the climate of the Arctic is undergoing rapid and significant change. In contrast with climate variations in the recent past, the Arctic may well be heading towards a regime that is vastly different from that governing the past few centuries. For example, a drastic retreat or potential disappearance of summer sea ice would engender substantial repercussions for the circum-Arctic and Earth as a whole. To this point, the discussion of global climate change and the fact that both in timing and amplitude it is felt most strongly in the North, has centered on detection and potential impacts on the Arctic. The initiative *North by 2020* recognizes that such impacts may be both positive and negative and will require substantial planning efforts. One of the principal aims of *North by 2020* is to bring together researchers, local experts, planners and decision makers to identify the key challenges and opportunities and help develop an action plan that draws heavily from local and international expertise in ways outlined in more detail below. The guiding vision for this concerted effort is to move beyond the notion of the Arctic as a helpless victim, or "the canary in the coalmine," towards its natural role as a leader in devising integrated strategies that adapt to and take advantage of change underway in the North. Native communities throughout the Arctic have demonstrated a remarkable resilience and capacity to adapt to extensive environmental change and associated hardships in the past. The present initiative takes this as an inspiration to ask what the North can do for itself and for the rest of the world.

North by 2020 can be viewed as a step-wise approach towards implementation of a Forum for Local and Global Perspectives on the North that would exist well beyond IPY-4, both in its aims and activities. We propose a combination of external experts from science, policy-making and business working in concert with UA faculty, staff, post-docs and students to initiate a dialogue about the next generation of questions concerning sustainability, survival, and improvement of the human condition in the North. The intent of such groups will be to engage both the academic as well as the stakeholder community and think broadly across economic sectors and academic disciplines in order to provide answers to pressing and difficult questions through scenario building, critical thinking, and visionary leadership in the service of others. The Forum will distill and synthesize complex interdisciplinary information and make it available to different stakeholder groups, the public, and governments in a variety of media.

Synthesis Questions

This proposal recommends a suite of synthesis activities as a form of research to answer five key questions in relation to Alaskan and Northern social-ecological sustainability in the near future. These questions will serve to guide each theme in its synthesis process as well as guiding the overall synthesis project, which considers Alaska and the pan-Arctic system as a whole, at the conclusion of IPY.

Question 1: How are the pertinent social and ecological components of the system coupled?

The first question for each theme sythesis is descriptive. Because ecological and social systems affect one another in a strong dynamic fashion they are best viewed as a coupled social-ecological system (Clark and Dickson 2003; Berkes and Folke 1998). Each of the *North by 2020* themes addresses complex relations between the human and natural worlds. Interdisciplinary analysis of the "coupling" of such systems is still in its beginning stages and it is of great value to unpack and describe the human–ecology relationships of each case in order to collectively synthesize how such dynamic interactions will affect the availability of different resources humans value under different scenarios of change. This focus on coupling inherently identifies and assesses human actions towards the ecosystem as well as the varying responses. For example, one aspect currently studied in the Forum is the threat of oil spills in coastal and offshore Arctic environments. What happens in the event of an oil spill in ice-covered waters? One must examine the geophysical properties and dynamics of ice and oil, the biological and human systems that depend on Arctic waters and sea ice, the governmental structure of rules and responsibilities, and cultural responses of communities dependent on this particular location. No single discipline can achieve the broad perspective and depth required to address such important issues, hence we propose this first question as the logical place to start for each group to begin synthesizing their research.

Question 2: How do different stakeholder perspectives agree and disagree about the key problems and potential solutions they face?
In each theme there are public and private stakeholders who have differing perceptions of how the pan-Arctic world is changing, what this means, and what should be done about it. Our Forum seeks to provide information pertinent across interests that can serve to reduce conflict through comprehensive communication rather than simply producing sets of facts devoid of context. In addressing such an issue, we consider the potential role of local, indigenous expertise and knowledge in guiding adaptation and mitigation strategies at the regional and pan-Arctic level. This raises the question of how to identify and develop successful approaches that take into consideration local and indigenous knowledge at higher institutional levels without misappropriation or misinterpretation. It also raises questions of scale. Many of the themes wrestle with how to consider local community concerns in light of national and international industries' interest in the North. As such, our second question relates to how case studies and past experience from different regions in the circum/sub-Arctic help inform effective responses to pressing issues in the North.

Question 3: What have been the significant findings related to the issues researched and what potential futures are possible?
Drawing from the results of questions one and two, the themes will explain their significant findings. They will also construct potential futures based on research of what the participants felt were likely outcomes from specific actions, cultural understandings, and plans proposed. The third question seeks to compile the information, across disciplines and belief systems, into a set of results about what stakeholders face in their respective social-ecological system. This question and portion of the synthesis product does not refute any claims made by participants but rather distills key findings specifically addressing the issues of concern and the different outcomes possible.

Question 4: What would a system of governance or institutional regime look like that is resilient and capable of adaptation in the face of significant social-ecological change?
We next ask each theme to create a series of policy relevant recommendations grounded in the experiences of stakeholders and looking towards the future. In particular we want the themes to consider how their research and activities reveal gaps in information or governance, or, on the other hand, what is working well. In some themes, for example offshore oil and gas, there is no integrated management regime for coastal sea ice, but what would the best possible regime look like? In other themes, such as freshwater systems, there is a governance regime for water but it is hampered by a need for comprehensive data – how could local, state, and national agencies create rules or programs to address this? Question four moves beyond constructing scenarios and futures to sets of recommendations about how we can move towards sustainable social-ecological systems.

Question 5: What are the specific information and capacity building needs of people and institutions facing rapid change in order to secure sustainable futures for different interests across the North?
The knowledge from answers to Questions 1-4 will leave stakeholders and governing institutions with the significant challenge of ensuring access to information that is required to adequately plan for a significantly different, uncertain future. As of now this discussion has been held at the most rudimentary level, where scenarios evolve almost exclusively on output from large-scale climate models (e.g., ACIA, 2005). This approach is inherently problematic, in particular when addressing key questions of scale and coupling in socio-ecological systems. Hence our concluding question, informed by local-scale, more penetrating investigation from the themes, aims to scope the directions for future collaboration and research.

Project Summary

This proposal lays out a three year plan to conduct a series of research synthesis activities – workshops, conferences, presentations, and analysis efforts – designed to establish the infrastructure, thinking, and collaborative contacts necessary to usher in an era of more effective Northern management. Our proposal guides a free-flowing exchange, with clear scientific underpinnings, among communities,

industry, government, and academia to provide the North with an intellectual platform from which to cope with the increasing and varied challenges already underway and yet to come. At the core of this vision is education and thus educational concepts flavor these efforts at a spectrum of levels – broadly, where all parties gain deeper understanding of the needs of the others, and more specifically, where young researchers and students are entrained as direct participants in this process. This effort is born out of the opportunity afforded by the International Polar Year 2007-09 (IPY), which is highlighting the major, interconnected transformations that are underway in the North. Well documented by now, these include climatic and environmental changes, impacts on Northern peoples, increased political and economic incursion, and increasing north-south interdependence. The IPY is essentially a forum to explore, discuss, plan, and prepare opportunities for northern sustainable development. In response to the IPY the University of Alaska (UA) established its IPY Development Plan. One of its initiatives was the establishment of a Research Project, the *North by 2020 Forum: Learning from Local and Global Perspectives on the North*. Well-established by now, the aim of the Forum is to bring together all stakeholders, including the broader public, to jointly assess the challenges facing the North, envision futures for our region, and seize emerging opportunities. This proposal represents a significant next step in the Forum's activities. As the nation's Arctic university UA is well suited to assume a leading role in exploring the key forces that are likely to shape the future of the North because here is housed a nexus of scientific, geopolitical, economic, and public economic interests that almost without exception are aligned in their Arctic focus.

The themes to be addressed in the context of the Forum are (1) Communities and infrastructure in a changing coastal environment, (2) Coastal and offshore oil and gas development (3) Freshwater systems (4) Resilient communities (5) Living Marine Resources, (6) The interface between indigenous, local knowledge and western science, and (7) Complex systems and the North. Our proposal recommends a suite of synthesis activities as a form of research to answer five key questions in relation to Alaskan and Northern social-ecological sustainability in the near future. Paraphrased, these ask how different key social and ecological components of the Alaskan and Arctic systems are coupled; how do different stakeholder perspectives agree and disagree about the key problems and potential solutions they face; what the significant findings related to the issues (e.g. offshore oil drilling, changes in freshwater availability, linkages between local and indigenous knowledge and policy) researched through North by 2020 are; what a system of governance or institutional regime look like that is resilient and capable of adaptation in the face of significant socio-ecological change; and what are the specific information and capacity building needs of people and institutions facing rapid change in order to secure sustainable futures for different interests across the North?

Relevance to IPY: Objectives in this proposal respond directly to six of the seven recommendations from A Vision for the International Polar Year 2007-2008. The *North by 2020* Forum components and activities are integrally related to all three emphasis areas in the International Polar Year program solicitation (NSF 07-536). This project is led by a multidisciplinary and international team who are involved in other IPY projects.

Intellectual Merit: The research synthesis component of this project includes critical elements of the overall IPY research campaign to explore new frontiers in polar science. Forum activities will build critical stakeholder community, strengthen existing partnerships, and forge new linkages. Durable outcomes and tangible legacy products will improve our understanding of the critical role of the polar regions in global processes.

Broader Impacts: Incorporating expert visitors, including international participation, provides for greater information exchange and education. Community participation in forum workshops and public presentations provides for informal education of the broader public and contributes to enlarging the IPY stakeholder community. In addition to presentations at scientific meetings and journal articles, the project provides many opportunities for training future leaders, including several graduate research assistant fellowships and components for undergraduate involvement, and it takes advantage of UA's IPY Post-Doctoral program. Value-added legacy products are anticipated to include: published minutes, proceedings, thematic monographs, a plan for a *North by 2020* synthesis general readership book, and multi-media products suitable for a broad general audience.