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INTERNATIONAL POLAR YEAR AS A CATALYST FOR SUSTAINING ARCTIC RESEARCH

by Karen Kraft Sloan & David Hik*

INTRODUCTION

The Arctic covers an area of more than thirty million km², and is home to a population of about four million, including over thirty different indigenous peoples. The Arctic is also a region experiencing rapid environmental, economic, social, and political change. The health and well-being of northern people and their environments, the sustainability of northern communities, and the future development of northern resources, will increasingly define global issues in this century.¹ The success and sustainability of an Arctic-focused agenda requires meaningful and sustained engagement, and leadership from indigenous and non-indigenous northern peoples, governments and institutions, in partnership with a wide variety of national and international interests. This concept has been affirmed, although not always embraced, by indigenous organizations, many regional and national governments, the Arctic Council, and other intergovernmental bodies.²

One important role of science and research is to assist governments in effectively discharging their responsibilities and mandates.³ In the Arctic, these mandates are necessarily far reaching, diverse and include a broad range of disciplines, from the natural sciences, the human behavioral, social and historical sciences, medical sciences, engineering and applied sciences, and research in the managerial, economic, and legal fields. This research is characterized by an abundance of cross-cutting issues that require interdisciplinary or multidisciplinary approaches, and the knowledge provided by research must address questions on a wide range of scales from local to global, and from immediate to long-term. It is also recognized that advanced technological knowledge and fundamental or theoretical research must be combined with the holistic observations and knowledge of indigenous northern peoples.⁴

Some of the most compelling examples of scientific cooperation in the Arctic have been the diverse scientific activities conducted under the banner of the International Polar Year (“IPY”) on four occasions during the past 125 years.⁵ The present International Polar Year runs from March 2007 to March 2009, and involves approximately fifty thousand participants from over sixty nations, engaged in about two hundred international research projects in the Arctic and Antarctic regions. The major objectives of IPY include efforts to obtain a ‘snapshot’ of the state of the Polar Regions, to explore new frontiers of science, and to promote scientific cooperation, training, and outreach.⁶

Recently, there has been increased discussion of the legacy of this IPY,⁷ and promotion of the notion that IPY will be

a “catalyst” for sustaining future Arctic and Antarctic research efforts. History would suggest this outcome is possible, but what efforts are required to secure a legacy of sustained interest and investment in Arctic research?

LESSONS FROM THE INTERNATIONAL GEOPHYSICAL YEAR

The scientific outcomes of the International Geophysical Year (“IGY”) of 1957–1958 (which began as the third IPY) are remarkable and have been summarized elsewhere.⁸ But IGY catalyzed more than just innovative research. Halfway through the IGY, Dr. Laurence M. Gould, while delivering the American Geographical Society Bowman lecture, declared: “The IGY may turn out to be a brilliant new approach toward international understanding and organization.”⁹ Indeed, a few days after Gould delivered his address, the Special Committee on Antarctic Research (“SCAR”) was officially organized in The Hague and became a permanent committee of the International Council for Science. SCAR then prepared a plan of Antarctic research that went beyond the original IGY program.

Subsequently, the United Kingdom, followed by other governments, expressed interest in finding an international solution to competing Antarctic territorial claims. This quest led to the creation of the Antarctic Treaty in 1959.¹⁰ The Treaty is a remarkable document. It was signed by the twelve nations active in Antarctica at the time, all of which participated in IGY and nine of which had made territorial claims in Antarctica or reserved the right to do so. At the present time, 46 countries are signatories to this treaty.¹¹ In a preamble and fourteen short articles, the signatories agreed, among other considerations, that Antarctica should be used “exclusively for peaceful purposes;”¹² to “promote international cooperation in scientific investigation in Antarctica;”¹³ and to “the establishment of a firm foundation for the continuation and development of such cooperation . . . as applied during the International Geophysical Year accords with the interests of science and the progress of all mankind.”¹⁴

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All of this was agreed to in the shadow of the Cold War “in a remarkably short time, by disparate, thinly acquainted, mutually wary cultures—military, scientific, and diplomatic,”¹⁵ and in the language of the preamble, “shall continue forever.”¹⁶ In 1958, Gould hypothesized that the IGY approach “could provide a pattern that will move over into other areas and result in further working together of all nations.”¹⁷ The Treaty proves him prescient, by serving as an apt example of how the IGY’s legacy was both broadened and sustained beyond the immediate scientific program. By inspiring a multinational diplomatic conversation about the future of a continent, and the security for scientific activity conducted within its borders, the IGY continues to influence the world.¹⁸

TOWARD AN ARCTIC TREATY?

Given this, what promise does the current International Polar Year hold for formalizing international support for Arctic science cooperation? What kind of practical measures are needed to ensure this? Many of the relevant issues have already been clearly articulated, including reviews of the options that should be considered to develop a comprehensive Arctic legal regime.¹⁹

More recently, a 2006 editorial in *Nature* argued for G8 leaders to commit to improving links between Arctic research communities, “on the model that has been tried and tested in the Antarctic.”²⁰ The editorial underlined the value of IPY, noting that it too provides an opportunity for a case to be made for a “more concerted, international effort” to support research in the Arctic. The authors asserted that “scientists working in the Arctic are well connected with each other,” and goes on to say that while an Antarctic treaty exists that “obliges its signatories to collaborate in scientific research,” no formal or political framework exists for collaboration on Arctic science.

Nevertheless, what worked in the context of the Antarctic is not directly applicable to the Arctic. The physical, political, economic, ecological, and historical realities of the poles and their occupation and traditional use by indigenous peoples and national governments are very different. Gould reminded us in 1958 that the poles “are distinguished by their dissimilarities rather than by any common characteristics.”²¹ In a recent issue of *Foreign Affairs*, Scott Borgeson agreed: “Although it is tempting to look to the past for solutions to the Arctic conundrum, no perfect analogy exists. The 1959 Antarctic Treaty . . . provides some lessons, but it concerns a continent rather than an ocean.”²² He goes on to say, “there is simply no comparable historical example of a saltwater space with such ambiguous ownership, such a dramatically mutating seascape, and such extraordinary economic promise.”²³ In this context, it is unsur-

prising that there is so much attention on the seabed mapping and claims process laid out under the United Nations Convention on the Law of the Sea, whereby nations bordering the Arctic Ocean may be able to extend their sovereignty beyond the usual 200-nautical mile limit recognized in international law, if the seabed is an extension of the continental shelf.²⁴

Given the unique contexts of the two poles, a different institutional arrangement to support international Arctic science cooperation is needed. It should be pointed out that the Circumpolar North is not without efforts to increase international cooperation. In fact, there has been a “recent proliferation of efforts to enhance international cooperation,”²⁵ reflecting the mix of

institutions and organizations in the region. However, solutions that will be acceptable to most stakeholders, especially Arctic nations, and that will strengthen and support research and monitoring, regulatory arrangements, and adaptation to rapid climate change will require ingenuity and commitment over the long-term.

Along with regional efforts to provide opportunities for bi-lateral and multi-lateral cooperation, is the maze of global multi-national environmental agreements (“MEAs”)

that affect the Arctic. Attempts have been made to better understand how various global agreements impact the region. Oran Young suggested that due consideration should be given to how “nesting of regional arrangements” could fit with existing global MEAs; for example the programs of the Arctic Council’s Working Group on the Conservation of Arctic Flora and Fauna could operate within the larger framework provided by the Convention on Biological Diversity.²⁶ There has also been discussion of establishing the Arctic Ocean as a Marine Protected Area.²⁷

IPY has added to this mix by promoting a Circumpolar Biodiversity Monitoring Program.²⁸ Other international conservation non-governmental organizations, like the World Wildlife Fund have also called for a “new approach, which includes thinking about a solid Arctic Treaty and a multilateral governance body.”²⁹ And last year an editorial in the *New Scientist* concluded, “What more fitting conclusion could there be to this event [IPY] than for scientists to call for the same protection in the north—for an Arctic Treaty? Or have scientists lost the nerve to make such grand demands?”³⁰

In 2006, United Nations Environment Program (“UNEP”)/Global Resource International Database-Arendal and the Standing Committee for Parliamentarians of the Arctic Regions sponsored a seminar to investigate the implications of global MEAs for the Arctic in order to better understand the “fit” of current circumpolar-arctic initiatives with these global agreements. Key recommendations include the need to: undertake an audit of the

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effectiveness and relevance of current MEAs; identify gaps in coverage; evaluate whether or not a unified legal regime, such as a treaty or a framework convention would be appropriate for the Arctic region; and explore mechanisms to enhance institutional cooperation such as a permanent Arctic secretariat, Arctic MEA implementation strategy.³¹ The seminar report and its recommendations were submitted to the UNEP, the Arctic Parliamentarians, the Arctic Council, the Nordic Council of Ministers, and the governing bodies and secretariats of MEAs, along with being distributed to Arctic stakeholders.

Despite this discussion and activity, the idea of an Arctic Treaty may be unattainable.

Timo Koivurova has recently warned that there are potential down-sides to negotiating an Arctic treaty, including lengthy and costly preparatory and negotiation processes, the risk of legalizing lowest common denominator standards, and contributing another layer of complexity to the already fragmented array of multilateral environmental agreements.³² There is also a growing recognition that indigenous peoples organizations, such as the Inuit Circumpolar Council, have legitimate interests in these discussions that have not been fully recognized.³³ However, all of the recent attempts to provide for greater cooperation in the Circumpolar region bode well for enhancing international support for Arctic science and research. Countless individuals from many polar and non-polar nations have exerted tremendous energy in securing scientific, political, and financial support for IPY. But since these are not easily garnered, the question remains—how will activity be sustained in the long-term?

A ROADMAP FOR SUSTAINING ARCTIC SCIENCE AND RESEARCH?

The Arctic research community and northern residents cannot act alone. Governments have significant responsibilities for improving international Arctic science cooperation, and therefore the support of governments is required. The Arctic Council has most notably advanced cooperation for broader collaboration in the Circumpolar North. Within the Arctic Council, indigenous peoples of the Arctic have representation as Permanent Participants, for active engagement, and full consultation on Council activities. Under the leadership of the Arctic Council, seminal work has been produced including the Arctic Climate Impact Assessment³⁴ and the Arctic Human Development Report.³⁵ Both featured excellent research work, including traditional and local knowledge and peer-reviewed science.³⁶ A high level of international cooperation and a commitment to extend this work continues.

More recently, emphasis has been placed on the need for a well coordinated and sustained Arctic Observing Network that

meets scientific and societal needs.³⁷ In November 2006, Arctic Council Ministers urged all member nations to maintain and extend long-term monitoring of change in the Arctic, with a view to building a lasting legacy of the International Polar Year.³⁸

The success and sustainability of an Arctic-focused agenda requires meaningful and sustained engagement, and leadership.

There is a strong consensus that scientific understanding of the changing Arctic system and its global connections and consequences requires improved Arctic observing capabilities that are linked to global observing activities. Numerous observing sites, systems, and networks already exist in the Arctic, and more are being initiated during IPY. In order to maximize the likelihood that these disparate activities can be integrated into a sustained network for long-

term observation that will support the scientific study of Arctic system change in a global context, there is, among other things, a vital need to:

- Improve *coordination* to avoid repetition, duplication and overlap, and promote synergies;
- Assess user needs, and identify and fill *gaps in spatial, temporal and disciplinary coverage* to achieve a circum-Arctic observing network;
- Guarantee *access to data and information* in an easy, free, open and timely fashion, and in standard, internationally accepted formats, to the broadest possible community of users;
- Ensure *sustainability* through long-term funding and commitments; and
- Establish *links to global observing* activities, networks, and systems.

Additionally, many non-Arctic nations have strong Arctic science programs and interests, yet are restricted from full membership within the Arctic Council. Capturing the enthusiasm and interest of these nations could contribute greatly to strengthening international collaboration on Arctic science. Indeed, this is the intended role of the International Arctic Science Committee.³⁹

THE LEGACY OF IPY 2007

Some of the legacies of IPY 2007–2008 may transpire regardless of whether efforts are made to secure them, and some may only come about with some exertion. Collectively, however, they would undoubtedly result in a significant, broad, and far-reaching impact for IPY, for example:

- Establish permanent observation and monitoring networks;
- Improve the link between observation and monitoring to modelling;
- Manage the explosion of data that IPY will create, and ensure access to it;
- Raise the public profile of the polar regions;

- Link science and policy more effectively;
- Improve opportunities for northerners by increasing linkages to higher education;
- Ensure that there is a “critical mass” of northerners in the next generation of Arctic science researchers; and
- Share logistical information more broadly and more efficiently.

There is still a need to define and pursue the next steps in securing a broad legacy for IPY, as envisioned by so many of the scientific and governmental participants. These efforts to secure the IPY legacy could include:

1. Making the IPY legacy part of the IPY process itself, like the efforts to secure Sustained Arctic Observing Networks.⁴⁰
2. Identifying partners in order to link with and build upon other efforts, through Arctic Council and other organizations, including national governments.
3. Learning from other efforts to formalise international polar science cooperation, especially from the implementation of the Antarctic Treaty System and from the first fifteen years of the evolution of the Arctic Council.
4. Being opportunistic and identifying fora to engage governments and other potential partners and supporters.
5. Identifying champions and providing them with resources to promote the global and local value of enhancing Arctic science, research, and knowledge capacity.

In many ways, IPY has already succeeded in inspiring a discussion about the future of Arctic research. The Arctic research agenda has been dynamic and full over the past couple of years, with a number of parallel processes occurring that collectively have provided space for exploring the future of science and research in the Circumpolar North. We are well into the fourth IPY; we must ensure that the opportunity IPY provides as a catalyst to sustain international cooperation for Arctic science and research is not lost. In doing so, we should remember that those of us calling to formalize international support for Arctic science are not the first to do so. That honor belongs to Karl Weyprecht and his contemporaries in the challenge they made to convene the first polar year of 1882.⁴¹

We should be mindful that like its predecessors, International Polar Year 2007–2008 can serve to advance science, and to focus the attention of the world on the Polar Regions. IPY honors the dedication and affirms the contribution to polar research of so many, past and present. If we are diligent and act to use the opportunity that International Polar Year provides by demonstrating to humanity how international science can create broader societal benefits, then as Dr. Gould put it, competing interests can be addressed “by the friendliest kind of cooperation from all of the nations involved.”⁴²



Endnotes: International Polar Year

¹ Welcome to ACIA, Arctic Climate Impact Assessment website, <http://www.acia.uaf.edu/> (last visited Apr. 25, 2008) [hereinafter Arctic Climate Impact Assessment]. Arctic Climate Impact Assessment evaluated and synthesized knowledge on climate variability, climate change, and increased ultraviolet radiation and their consequences. The aim was to provide useful and reliable information to the governments, organizations, and peoples of the Arctic on policy options to meet such changes.

² See generally Arctic Council website, http://arctic-council.org/section/the_arctic_council (last visited Apr. 17, 2008); Mich elle Jean, Governor General, Canada, 2007 Speech from the Throne (Oct. 16, 2007), available at <http://www.sft-ddt.gc.ca/grfx/docs/sftddt-e.pdf> (last visited Mar. 23, 2008); YUKON GOV'T ET AL., NORTHERN VISION: A STRONGER NORTH AND A BETTER CANADA (2007), available at http://www.anorthernvision.ca/photogallery_0526.html (last visited Mar. 24, 2008). In the 2007 Northern Vision document, the territorial leaders in Canada called for partners to aid in developing healthy, viable communities of self-reliant individuals, in a context where Aboriginal rights have been successfully negotiated and implemented, and where northerners are the primary beneficiaries of northern resource development. These goals are similar to those articulated by the federal government, which has placed priority on (1) strengthening Canada's sovereignty and protecting Canada's environmental heritage; (2) promoting economic and social development; and (3) improving and devolving governance so that northerners have greater control over their destinies.

³ CANADIAN CENTRE FOR MANAGEMENT DEVELOPMENT, Action-Research Roundtable on Science and Public Policy, CREATING COMMON PURPOSE: THE INTEGRATION OF SCIENCE AND POLICY IN CANADA'S PUBLIC SERVICE (2002), available at http://www.cspse-efpc.gc.ca/Research/publications/pdfs/create_e.pdf (last visited Mar. 20, 2008).

⁴ See E. F. Roots, *Environmental Research in Arctic Canada: Bringing Global and Local Science Together*, 51:7 MEMOIRS OF THE NATIONAL INSTITUTE OF

POLAR RESEARCH 24 (1996); C. M. FURGAL, C. FLETCHER & C. DICKSON, WAYS OF KNOWING AND UNDERSTANDING: ENVIRONMENT 73 (Canada, Ottawa, 2006); Don Russell, Gary Kofinas & Brad Griffith, *Need and Opportunity for a North American Caribou Knowledge Cooperative*, 19 POLAR RES. 117, 117–30 (2000); see also TASK FORCE ON NORTHERN RESEARCH 2000, FROM CRISIS TO OPPORTUNITY: REBUILDING CANADA'S ROLE IN NORTHERN RESEARCH (Sept. 2000), available at <http://www.nserc.ca/pub/crisis.pdf> (last visited Apr. 13, 2008); CANADIAN ARCTIC RESOURCES COMMITTEE, NORTHERN PERSPECTIVES: RENEWING THE NORTHERN STRATEGY (Winter 2006), available at http://www.carc.org/pubs/v30no1/CARC_Northrn_Perspectives_Winter_2006.pdf (last visited Mar. 24, 2008).

⁵ M. R. Albert, *The International Polar Year*, 303 SCI. 1437 (2004), available at <http://www.sciencemag.org/cgi/content/summary/303/5663/1437> (last visited Apr. 4, 2008); INTERNATIONAL COUNCIL FOR SCIENCE, A FRAMEWORK FOR THE INTERNATIONAL POLAR YEAR 2007–2008 (2004), available at http://www.ipy.org/index.php?ipy/detail/a_framework_for_the_international_polar_year (last visited Mar. 22, 2008).

⁶ Albert, *id.*

⁷ David Hik & Ian Church, *Securing an IPY Legacy*, (Mar./Apr. 2007), available at <http://www.innovationcanada.ca/27/en/articles/hik.html> (last visited Apr. 17, 2008); see also Editorial, *The ends of the Earth: International Polar Year 2007 can leave an imprint*, 446 NATURE 110 (2007); Jeffrey Mervis et al., *IPY means doing what it takes to get to the ends of the Earth*, 315 SCI. 1514, 1514–17 (2007); Editorial, *All eyes north*, 484 NATURE 781 (2008).

⁸ Behr et al., *IPY history reflects progress in science and society*, WITNESS THE ARCTIC, Spring 2007, at 1–4.

⁹ LAURENCE M. GOULD, THE POLAR REGIONS IN THEIR RELATION TO HUMAN AFFAIRS 54 (New York: American Geographical Society, 1958).

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- ¹⁰ Antarctic Treaty System is the whole complex of arrangements made for the purpose of regulating relations among states in the Antarctic. Treaty documents are available at <http://www.scar.org/treaty/> (last visited Mar. 22, 2008).
- ¹¹ The Antarctic Treaty art. I, Dec. 1, 1959, 12 U.S.T. 794 [hereinafter Antarctic Treaty].
- ¹² Antarctic Treaty, *id.* art. I.
- ¹³ Antarctic Treaty, *id.* art. III.
- ¹⁴ Antarctic Treaty, *id.* pmbl.
- ¹⁵ Dian Olson Belanger, *The International Geophysical Year in Antarctica: Uncommon Collaborations, Unprecedented Results*, 30 J. GOV'T INFO. 482, 482–89 (2004).
- ¹⁶ Antarctic Treaty, *supra* note 11, pmbl.
- ¹⁷ GOULD, *supra* note 9.
- ¹⁸ Behr et al., *supra* note 8.
- ¹⁹ LINDA NOWLAN, ARCTIC LEGAL REGIME FOR ENVIRONMENTAL PROTECTION (ICUN 2001), available at <http://www.iucn.org/themes/law/pdffdocuments/EPLP44EN.pdf> (last visited Apr. 17, 2008).
- ²⁰ Editorial, *Coming in from the Cold*, 441 NATURE 127 (2006).
- ²¹ GOULD, *supra* note 9.
- ²² Scott G. Borgerson, *Arctic Meltdown: The Economic and Security Implications of Global Warming*, FOREIGN AFFAIRS, Mar./Apr. 2008, at 63–77, available at <http://www.foreignaffairs.org/20080301faessay87206/scott-g-borgerson/artic-meltdown.html>. (last visited Apr. 13, 2008).
- ²³ Borgerson, *id.*
- ²⁴ Oceans and Law of the Sea, United Nations website, <http://www.un.org/Depts/los/index.htm> (last visited Apr. 21, 2008).
- ²⁵ ORAN YOUNG, THE INTERNATIONALIZATION OF THE CIRCUMPOLAR NORTH: CHARTING A COURSE FOR THE 21ST CENTURY (Stefansson Arctic Institute, 2000), available at www.thearctic.is/articles/topics/internationalization/enska/index.htm (last visited Apr. 13, 2008).
- ²⁶ YOUNG, *id.*
- ²⁷ D. Hik, *Voluntary Moratorium on Resource Exploitation in the Arctic*, MARINE PROTECTED AREA NEWS, Aug. 2007, at 1–2, available at <http://depts.washington.edu/mpanews/MPA88.pdf> (last visited Apr. 13, 2008).
- ²⁸ The CBMP is a mechanism for harmonizing and enhancing long-term biodiversity monitoring efforts across the Arctic in order to improve the ability to detect and report on significant trends and pressures. Home, Arctic Portal website, <http://arcticportal.org/en/caff/cbmp> (last visited Mar. 22, 2008).
- ²⁹ WWF-UK News, *New Rules Needed to Regulate Arctic Activities*, Says WWF (Aug. 17, 2007), available at http://www.wwf.org.uk/news/n_0000004250.asp (last visited Apr. 18, 2008). Dr. Neil Hamilton, Arctic Programme Director, WWF argues for sound international co-operation between Arctic nations to guarantee that the region's development is sustainable.
- ³⁰ Editorial, *Save the Arctic Ocean for Wildlife and Science*, NEW SCIENTIST, Sept. 1, 2007.
- ³¹ The Arendal Seminar on multilateral environmental agreements and their relevance to the Arctic was held in Arendal Norway, 21–22 Sept. 2006. Information is available at the UNEP Arendal GRID website, http://polar.grida.no/_documents/mea_recommendations.pdf (recommendations); <http://polar.grida.no/activities.cfm?pageID=5> (conference page); and http://polar.grida.no/_documents/mea_report.pdf (report) (last visited Apr. 18, 2008).
- ³² Timo Koivurova, Background paper prepared for the joint seminar of University of the Arctic Rectors' Forum and the Standing Committee of Parliamentarians of the Arctic Region (Feb. 28, 2008, Arctic Centre in Rovaniemi, Finland.), available at www.uarctic.org/Timo_Koivurova_FINAL_web_g0gNj.pdf (last visited Apr. 16, 2008).
- ³³ The Inuit Circumpolar Council (ICC) is the body that represents all Inuit from Alaska, Canada, Greenland, and Chukotka on matters of international importance. See generally About ICC, Inuit Circumpolar Council website, <http://www.inuit.org/index.asp?lang=eng> (last visited Apr. 20, 2008).
- ³⁴ Arctic Climate Impact Assessment, *supra* note 1.
- ³⁵ The Arctic Human Development Report was the first comprehensive assessment of human well-being covering the entire Arctic region. See STEFFANSON ARCTIC INSTITUTE, ARCTIC HUMAN DEVELOPMENT REPORT (2004), available at <http://www.thearctic.is/AHDR%20chapters.htm> (last visited Mar. 22, 2008).
- ³⁶ Arctic Council, Common objectives and priorities for the Norwegian, Danish and Swedish chairmanships of the Arctic Council (2006–2012), available at <http://arctic-council.org/filearchive/Formannskapsprogram—ArcticCouncil.pdf> (last visited Apr. 17, 2008).
- ³⁷ See Sustaining Arctic Observing Networks website, <http://www.arcticobserving.org> (last visited Apr. 17, 2008) [hereinafter SAON]; see also International Conference on Arctic Research Planning website, <http://www.arcticportal.org/iase/icarp> (last visited Mar. 22, 2008).
- ³⁸ Salekhard Declaration on the occasion of the tenth Anniversary of the Arctic Council and the Fifth Arctic Council Ministerial Meeting on Oct. 26, 2006, Salekhard, Russia, available at http://arctic-council.org/filearchive/SALEKHARD_AC_DECLARATION_2006.pdf (last visited Mar. 24, 2008).
- ³⁹ The International Arctic Science Committee is a non-governmental organization whose aim is to encourage and facilitate cooperation in all aspects of Arctic research, in all countries engaged in Arctic research and in all areas of the Arctic region. See The International Arctic Science Committee website, <http://www.arcticportal.org/iase> (last visited Apr. 17, 2008).
- ⁴⁰ SAON, *supra* note 37.
- ⁴¹ Behr et al., *supra* note 8.
- ⁴² GOULD, *supra* note 9.