International Arctic Science: A Look Forward

2007

An International Review and Strategy
for
the IASC Council

Summary and Recommended Actions

In early 2006, the Council of the International Arctic Science Committee (IASC) appointed an international group of experts to evaluate IASC activities over the 10-year period, 1996-2005, and recommend strategies for the future. This report is the culmination of their investigations and strategic thinking. The Review and Strategy Group (R&S Group) talked with many scientists knowledgeable about IASC and considered many proposals and ideas offered by the polar research community.

The R&S Group found a healthy organization, but one in need of revitalization; one which needs to better respond to environmental, social, economic and scientific changes taking place in the Arctic. The Group felt that the mission of IASC remains valid, but new realities, such as the emergence of new organizations engaged in scientific undertakings in the Arctic, rapid climate change as highlighted in the Arctic Climate Impact Assessment, and increased linkages to the global system, to name a few, demand that IASC embrace *a new vision.* This new vision is one in which IASC upholds a holistic and multidimensional perspective needed in the decades ahead and addresses the Arctic as part of the global process; and one in which IASC plays a central role as THE international organization in the North to harness the scientific expertise of the Arctic. The R&S Group believes that IASC must find a way to bring the full body of scientific knowledge of the Arctic together so that it can provide collective international advice on science issues in the North.

In accordance with this new vision, the R&S Group suggests four major initiatives:

IASC should consider:

- Adopting a new organizational structure to reflect the progressively more integrative nature of today's polar science.
- Expanding its functions to embrace various science policy issues such as new technology, data management, education and public outreach.
- Strengthening its relations with the Arctic Council, social science organizations representing constituencies in the North, and other global organizations interested in the science of the Arctic region.
- Reorganizing and revitalizing the Arctic Science Summit Week as a major cross-disciplinary venue.

In addition, the R&S Group suggests some changes internal to IASC to improve its public image and efficiency.

Recommended Actions

Initiative 1: A new organizational structure to reflect the progressively more integrative nature of today's polar science.

- Given the changing landscape of science in the North and the need for integration of science across disciplines, the R&S Group suggests that the Council consider restructuring IASC activities along Working Group lines with an important integrative layer to ensure multidisciplinary efforts. (A draft organizational chart with explanation and further suggestions is included in Annex 1.)

- Install more transparent and better-publicized procedures for the establishment of Working Groups and post them on the IASC web site. More attention should be given to including early career, indigenous, industry and female scientists in these groups.

- Given the need to create a strong nexus of science in the North that includes the marine component, the R&S Group suggests that the Council enter into face-to-face discussions with the AOSB to discuss the possibility of merging the two organizations. Such a merger, the R&S Group feels, should be based upon mutual respect for the significant contributions both organizations have made to promote science in the Arctic. In order to balance the discussions between the organizations, a renaming of IASC and AOSB may be called for. Should that be necessary the R&S Group suggests: the International Committee on Arctic Research (or Science) (ICAR or ICAS).

Initiative 2: Expand IASC's functions to embrace various science policy issues such as new technology, data management, education and public outreach

- Create Working Groups to address critical science policy issues, keeping in mind new activities being generated during the preparation and implementation of the IPY 2007–2008. (See the proposed organizational chart in Annex 1 for further suggestions.)

Initiative 3: Strengthen IASC's relations with the Arctic Council (AC), social science organizations representing constituencies in the North, and other global organizations interested in the science of the Arctic region.

- Initiate an MOU between the AC and IASC. The MOU should define IASC's role as one of advisor, linking the science to the needs of the AC. IASC could develop, for example, a list of tasks and issues for cooperation.

- Revise the IASC mission statement to read:
  The mission of IASC is to encourage, facilitate and promote basic and applied inter-disciplinary research in or concerned with the Arctic ***and its residents*** *at a circumarctic or international level; and to provide advice on scientific issues* ***to the Arctic Council and other interested organizations***.

- To eliminate redundancy, IASC should consider abolishing its Regional Board.

- IASC should continually improve its outreach to global programs with an interest in the arctic region, especially ICSU and its sponsored programs. The Council should consider which ICSU-related unions should be invited to affiliate with IASC.

- Continue efforts to improve relations with SCAR with an emphasis on collaboration in areas of mutual interest and in support of creating an IPY legacy.

- IASC should put a renewed emphasis on the human dimension in arctic science by creating a scientific Working Group dedicated to human and social studies and a policy Working Group addressing the issues important to the residents of the North.

- IASC should reach out to IASSA and organizations representing indigenous residents of the Arctic to determine ways to improve communication and cooperation. Those organizations should be invited to participate in the planning of the ASSW and participate in science presentations as they see fit.

- The IASC Council should make every effort to include Arctic indigenous people in Working Groups and look to their leadership of Working Groups of particular importance to northern residents.

Initiative 4: Reorganize and revitalize the Arctic Science Summit Week (ASSW) as a major cross-disciplinary venue

- Organize major ASSW meetings every second year. These meetings should be aimed at attracting the larger scientific community by providing a science forum meeting, replacing the project and science days and serving as a kind of "mini ICARP" focused on strategic science issues. In the off years, a smaller ASSW focused on business of the various organizations should be held but with an emphasis on inter-organizational meetings (at least between the executive committees) to identify critical issues and common objectives and to plan for the next science-focused ASSW the following year.

- Move the responsibility for the organization of the biannual, science-focused ASSW to the international coordinating group chaired by IASC.

- Invite IASSA and organizations representing polar residents to take a more active role in planning for the ASSW and to hold their executive sessions during that time to facilitate interactions between scholarly community and polar residents.

Internal Affairs: Positioning IASC as THE focal point for arctic research

- Update the IASC handbook to reflect changes made as a result of this review and strategy effort and make it available to the science community via the IASC web site.

- Define membership selection, even if it is different from country to country, and define membership terms and duration.

- Communicate an annual message from IASC to increase the visibility of IASC in member states.

- Reinstate Working Groups to harness the scientific talent of the IASC membership. Working Groups may establish Action Groups to deal with new, emerging issues on a term-limited basis. Working Groups and Action Groups should include both members and non-members of the Council.

- Consider with AOSB increasing national membership in a new organization with increased responsibilities and activities.

- Consider ICSU membership requirements when determining national membership.

- Address issues relating to perceived marginalization raised by new and emerging arctic science member nations. (See page 19.)

- Encourage early career scientists to participate in Working Groups and Action Groups, thereby empowering them for the future. Include an early career scientist on the IASC Council.

- Increase the size and funding for the IASC secretariat.

- Require all Working Groups and Action Groups to produce annual reports. When a Working Group is terminated, a final report should be published and made widely available through IASC.

- Encourage Working Groups and Action Groups to support activities that lead to peer-reviewed articles and journals and track all publications that are subsequently generated from their affiliation with IASC.

- Continue to improve the IASC web site by including publications, as well as adding information that heretofore has been not publicly available, such as how members are appointed by the member nations and internal procedures for the establishment of Working Groups.

- As much as possible, hold IASC meetings, except executive sessions, in public and encourage participation in IASC activities.

- Consider adopting a set of ethical standards on conducting research in the North or make an explicit statement on IASC's adherence to certain ethical policies and intellectual property rights guidelines.

Background

The International Arctic Science Committee (IASC) appointed a review and strategy group (R&S Group) in November 2005. The Group was invited to study and evaluate the scope of IASC activities over the past decade (1996-2005), since the previous external review of 1996; suggest and justify any major changes to be undertaken; and, in particular, suggest forward-looking strategic actions to be taken for fulfilling the IASC mission. In addition the IASC Council asked that the R&S Group clarify issues such as project initiation, gender balance, inclusion of young scientists, and appointment procedures; consult the user community, and learn from the recent SCAR review; review the past; and present a strategy for the future. (The terms-of-reference for the R&S Group is attached in Annex 4. The full list of R&S Group members is included in Annex 5.)

The R&S Group first met in Stockholm, Sweden at the Swedish Polar Research Secretariat in April 2006. Subsequent communications between the members of the Group took place over the summer and fall of 2006 and culminated in a meeting at the National Science Foundation in Arlington, Virginia, USA on January 3, 2007

The R&S Group determined at its spring 2006 meeting that in order to get more input from the broader arctic science community, a representative sample of the IASC "stakeholders" should be surveyed for perspectives on the issues critical to IASC performance, as well as on major achievements and gaps in the organization's activities during 1996-2005. A short questionnaire was developed by the Group and sent in the summer of 2006 to approximately 25 past IASC members and an equal number of external organizations with an interest in arctic science and research. (The survey is attached in Annex 3). The individuals and organizations that responded provided valuable input to the review process; but the overall response rate was insufficient (eleven of 50) to provide meaningful statistical analysis. Therefore, wherever appropriate, remarks and citations from respondents' written comments have been inserted into the text of the final document, but without attribution. The R&S Group is grateful to all individuals who did respond with detailed and thoughtful input and who contributed their experience to the evaluation of IASC activities over the review period.

During its deliberations the R&S Group made the observation that the arctic science landscape has changed substantially since IASC was created. In light of these many changes and believing that IASC has not kept up with the evolving nature of science in the Arctic, the R&S Group determined to take a prospective and bold outlook, hoping to move IASC into the next decade as a confident leader in arctic science. Some of the ideas and recommendations suggested below may require generating additional resources, beyond the current levels of IASC budget. The R&S Group believes that the benefits of expanded IASC activities far outweigh the prospect of increased costs of operation.

Introduction

The mission of IASC is to *"encourage, facilitate and promote basic and applied interdisciplinary research in or concerned with the Arctic at a circumarctic or*

international level; and to provide scientific advice on arctic issues." In 1996, when IASC underwent its first international review, that review group noted that "…the original concept of IASC was to create a non-governmental international scientific forum which would allow the engagement of the former Soviet Union with other arctic and some non-arctic nations in wider collaborative scientific ventures, recognizing that some 50% of the circum-arctic coastal fringe is former Soviet territory."

While the IASC mission remains the same, the scientific, environmental, economic and political realities of the North have changed dramatically since IASC was founded fifteen years ago. One of the key findings of the Arctic Climate Impact Assessment, co-sponsored by IASC states that:

> "The Arctic is extremely vulnerable to observed and projected climate change and its impacts. The Arctic is now experiencing some of the most rapid and severe climate change on earth. Over the next 100 years, climate change is expected to accelerate, contributing to major physical, ecological, social and economic changes, many of which have already begun. Changes in arctic climate will also affect the rest of the world through increased global warming and rising sea levels."

In addition, in light of the recent multi-year efforts in planning and implementation for the International Polar Year (IPY) 2007–2008, more visibility than ever is now placed on the Arctic. The imperative, therefore, is that at this crucial junction some organization serves as a nexus of scientific information and knowledge for this critical region of the world. The R&S Group believes that IASC can be that central forum for arctic science but it must recognize and respond to its growing responsibilities. In the next decade, how IASC responds to this new environment where the scientific issues are critical to regional and global well-being and where international collaboration is the norm, not the exception, will determine whether or not it emerges as the scientific leader in the Arctic.

It is important to note that IASC is by no means an organization in crisis and that its role is generally very highly regarded within the arctic science community. As one survey respondent noted when asked if IASC is fulfilling its mission: "Yes. Without doubt the original vision and mission is being continued. Of special note is the maturing acceptance of the need for bridges between social and natural sciences and the need for a holistic view of the Arctic and its place in the Earth system. There is still much further to go but IASC, with its modest resources, has contributed to a positive paradigm shift in how arctic science must be done." Other responses also pointed to the value of IASC and its role in promoting arctic science.

Among its many significant contributions to arctic research over the past decade (1996-2005) are the establishment of the Forum of Arctic Research Operators (FARO) in 1998, the Pacific Arctic Group (PAG) in 2003, the creation of the Arctic Science Summit Week (ASSW) in 1999, the co-sponsorship of the Arctic Climate Impact Assessment (ACIA), the coordination of the Second International Conference on Arctic Research Planning (ICARP II) in 2005, the creation of the International Study on Arctic Change (ISAC) in

2005, contributing to the initiation of the IPY 2007-08, the engagement of young scientists through workshops and participation in IASC projects, and an increased awareness of the importance of bringing together the social and natural sciences in arctic research. A by-product of the accomplishments listed above is that over its existence IASC has contributed substantially to raising the level of global knowledge and public awareness about the Arctic

Survey respondents overwhelmingly pointed to IASC's co-sponsorship of the seminal ACIA study and production of the final ACIA report (2004) as its most critical contribution to the development of international and interdisciplinary arctic scholarship over the past ten years. The second most often mentioned IASC success by external reviewers was the creation of the ASSW. Finally, survey respondents pointed to the recently completed ICARP II as a significant contribution to arctic science.

At the end of ICARP II, as part of its concluding statement, conference participants noted that: "Since the first Conference on Arctic Research and Planning held in 1995 in New Hampshire, there has been a paradigm shift to a more holistic and multidimensional perspective in the Arctic. This perspective includes more integrally the human dimension, the social sciences, and indigenous insights as well as a recognition that the Arctic is a system that can no longer be divided into traditional disciplines nor treated as separate from the planet as a whole and hence requires integration of Arctic processes into the earth system."

This widely recognized paradigm shift gives rise to the need for IASC to embrace *a new vision*, one it which IASC upholds the holistic and multidimensional perspective needed in the decades ahead and addresses the Arctic as part of the global process; and one in which IASC plays a central role as THE international and interdisciplinary organization to harness the scientific expertise of the Arctic. IASC must find a way to bring the full body of scientific knowledge of the Arctic together so that it can provide collective international advice on science issues in the North to the Arctic Council and other international organizations.

In accordance with this new vision, the R&S Group suggests four major initiatives for IASC's consideration.

- Adopt a new organizational structure to reflect the progressively more integrative nature of today's polar science.
- Expand its functions to embrace various science policy issues such as new technology, data management, education and public outreach.
- Strengthen its relations with the Arctic Council, social science organizations representing constituencies in the North, and other global organizations interested in the science of the Arctic region.
- Reorganize and revitalize the Arctic Science Summit Week as a major cross-disciplinary venue.

In addition, the R&S Group suggests some changes internal to IASC to improve its public image and efficiency.

Initiative 1: A new organizational structure to reflect the progressively more integrative nature of today's polar science.

Critical Issue 1: A Return to Working Groups

Over the past decade, the R&S Group found that IASC gradually has migrated, seemingly without a conscious decision, from a "working group" structure to a "science project" structure. If one looks at the IASC Founding Articles (1990), it states that the IASC organization includes the Council, Regional Board, Working Groups, the Arctic Science Conference and a Secretariat. However, only one Working Group remained in place by 2005. On the other hand, 25 projects have been initiated over the past decade and they have been of variable usefulness and significance.

The R&S Group, as well as many of the survey respondents, feel that establishment of new projects, by itself is of questionable value. The R&S Group found significant shortcomings in the current procedures for setting up such projects; in monitoring them; and in disbanding the projects when their work is concluded or no visible progress is being made. One survey respondent summarized the views of many with the statement that, "…[the organizational] seed money does not cover the full range of topics and is not as useful to the community as IASC might be led to believe."

Annex 2 contains a spreadsheet prepared by the IASC secretariat that lists all IASC projects initiated over the past decade, including years in which the projects received funding. Overall, the R&S Group feels that the results are quite mixed. 25 supported projects over the past decade transforms into a surprisingly low turnaround, particularly since several projects lasted 7-8 years (some even more than ten years, like LOIRA and MAGICS), and many have been discontinued prematurely, without producing any substantial results, not even conference reports. In addition, while the geographical mix of scientists and inclusion of female researchers in IASC-sponsored projects was quite good on the whole, the inclusion of young scientists, an important role for IASC, has been less than 10 percent in the projects launched during the review period.

The R&S Group discussed the continuation of seed money and determined that eliminating this function and returning to its working group structure would better serve IASC. Seed money should be diverted to support meetings of the Working Groups and any Action Groups that may be formed to address issues on a term-limited basis.

Recommended Actions

- Given the changing landscape of science in the North and the need for integration of science across disciplines, the R&S Group suggests that the Council consider restructuring IASC activities along Working Group lines with an important

integrative layer to ensure multidisciplinary efforts. (A draft organizational chart with explanation and further suggestions is included in Annex 1.)

- Install more transparent and better-publicized procedures for the establishment of Working Groups and post them on the IASC web site. More attention should be given to including early career, indigenous, industry and female scientists in these groups.

Critical Issue 2: The Role of Arctic Marine Sciences

In the past few years, IASC has made significant strides in improving its relationship with AOSB but has not yet concluded an agreement on cooperation. Given that AOSB is actively initiating and promoting marine science in the Arctic Ocean and adjacent seas, it would behoove IASC to form an alliance with this organization. It is indeed difficult for IASC to call itself the "leading arctic science organization" when it does not have a clear role to play in the marine field. New members on the Council with marine backgrounds and with membership on the AOSB pave the way for a clear linkage with AOSB in the years ahead.

Therefore, the R&S Group believes that the partnership with AOSB would be enhanced if the two organizations consider merging to make a new organization, perhaps called the International Committee on Arctic Research (ICAR). Such a comprehensive science organization, with scientific Working Groups as defined above and policy Working Groups as outlined below, would enhance IASC's ability to address critical gaps in knowledge as well as to respond to external requests for scientific advice on policy issues.

Recommended Action:

- Given the need to create a strong nexus of science in the North that includes the marine component, the R&S Group suggests that the Council enter into face-to-face discussions with the AOSB to discuss the possibility of merging the two organizations. Such a merger, the R&S Group feels, should be based upon mutual respect for the significant contributions both organizations have made to promote science in the Arctic. In order to balance the discussions between the organizations, a renaming of IASC and AOSB may be called for. Should that be necessary the R&S Group suggests: the International Committee on Arctic Research (or Science) (ICAR or ICAS).

Initiative 2: Expand IASC's functions to embrace various science policy issues such as new technology, data management, education and public outreach

Critical Issue 3: A New Emphasis on Science Policy Issues

While IASC has made significant contributions to the science of the North, it so far has applied little effort to addressing some crosscutting issues that many scientists face today in their work in the Arctic. These include: data management and data sharing; availability

of new technology; commercial development across the arctic regions; and relations with northern stakeholders. These and other issues related to science policies are in urgent need of a respected international discussion forum. IASC could make an instant and highly visible impact in this area by applying its available resources and human talent.

One such issue of growing importance that the R&S Group highlighted is the increase of commercial interests in the North. A key finding of the ACIA study is that reduced sea ice is very likely to increase marine transport and access to resources. This has profound effect on shipping, fisheries, oil and gas exploration and issues of sovereignty, security and safety. Increased industrial exploration of the North also has a growing impact on polar residents and on the arctic environment.

A second issue highlighted by the R&S Group is the need to maintain and increase infrastructure to support science in the Arctic. One need not look far to become concerned about the need for new research vessels to supplement an increasingly aged fleet. This is our responsibility to the future generation of scientists.

Finally, the R&S Group noted the important role that the IPY 2007–2008 is playing in addressing critical issues such as data management, education, and public outreach. But the span of IPY-generated research will be but two full years, after which most of the IPY-supported structures will cease operations. Therefore, IASC should position itself to become the legacy implementation vehicle for the important contributions which IPY 2007–2008 will make on these and other important policy matters. IASC can only do so if it takes the swift action to establish Working Groups to address these issues in close coordination with the groups involved in IPY planning and implementation.

Recommended Action:

- Create Working Groups to address critical science policy issues, keeping in mind new activities being generated during the preparation and implementation of the IPY 2007–2008. (See the proposed organizational chart in Annex 1 for further suggestions.)

Initiative 3: Strengthen IASC's relations with the Arctic Council (AC), social science organizations representing constituencies in the North, and other global organizations interested in the science of the Arctic region

Critical Issue 4: Relationship between IASC and the Arctic Council

The establishment of the AC and of its numerous working groups has created both a challenge and an opportunity for IASC. Over the past several years, the number of the organizations listed as "observers" to the AC has increased substantially, including IASC. Some members of the AC have repeatedly expressed confusion about the role of IASC and uncertainty about how IASC operates. For example, questions about IASC's relationship to national governments and whether or not it is truly a bottom-up science

organization are mentioned in many survey responses. These are important constraints to IASC's ability to provide advice on scientific issues to the AC.

As it is today, it does not seem likely to the R&S Group that IASC will remain the only, let alone *the leading*, adviser on scientific issues to the AC, since active and well organized scientific communities exist in each of the eight arctic member states. There are other vocal science organizations not belonging to IASC. Furthermore, some of the Arctic Council working groups have managed to build scientific networks that recruit members based on upon recommendation from the member states directly, and these should not be ignored.

However, the R&S Group sees the potential for IASC to increase its role in the AC by linking the growing need for scientific knowledge in the AC and its working groups with the ongoing scientific research in the larger science community, even beyond the eight circum-polar nations. If IASC can position itself, through implementation of the recommendations found herein, it can become the nexus of international knowledge on science in the Arctic. Such a force will become a valuable tool for the AC and other organizations interested in the Arctic.

Even where there has been successful cooperation, as in the Arctic Climate Impact Assessment (ACIA) and Arctic Human Development Report (AHDR), there is a need for better communication and guidelines between the AC and IASC. For example, the lack of agreed guidelines on the roles of IASC and AC in the ACIA process led to confusion. As a result, the process has been presented in different ways to various audiences. In other similar jointly initiated studies (such as AHDR), the role of IASC was seemingly downplayed. Therefore, any project anchored in both IASC and AC should have an agreed terms-of-reference.

Finally, the R&S group believes that IASC's Regional Board is a remnant of history that has been made redundant by the very establishment of the Arctic Council. The R&S Group further believes that the RB may even create some difficulties for the IASC Council in its relationship with the AC. The Arctic Council now provides the much-needed political framework for discussions among the eight circum-arctic nations, for which the RB was once created. It is difficult for the IASC to be a truly independent science body as long as the RB has oversight. Therefore, the R&S Group advises that the RB should consider whether it does more harm than good.

Recommended Actions:

- Initiate an MOU between AC and IASC. The MOU should define IASC's role as one of advisor, linking the science to the needs of the AC. IASC could develop, for example, a list of tasks and issues for cooperation.

- Revise the IASC mission statement to read:
  The mission of IASC is to encourage, facilitate and promote basic and applied inter-disciplinary research in or concerned with the Arctic ***and its residents*** *at a*

circumarctic or international level; and to provide advice on scientific issues ***to the Arctic Council and other interested organizations****.*

- To eliminate redundancy, IASC should consider abolishing its Regional Board.

Critical Issue 5: IASC and its relations with Global Science Organizations

As stated in the introduction, the R&S group believes a paradigm shift is occurring that will have a profound affect on how science in the North is carried out and perceived. Many global organizations such as the International Council for Science (ICSU), the World Meteorological Organization (WMO), and others are taking a leadership role identifying the Arctic as a region of strategic importance to the well being of the entire planet. IASC, therefore, needs to continually update and strive to improve its relations with global science organizations. Several survey respondents noted that in order for IASC to become a true contributor to the science of global change with a vision not limited by the polar circle, it has to develop true links with global programs and global research.

IASC has begun this process by affiliating with ICSU in 2004. This will help IASC form alliances with ICSU programs with interests in the Arctic. A continuation of this effort by inviting relevant ICSU scientific unions to join as affiliated members of IASC might be in order. Further, IASC should consider inviting global organizations with an interest in the Arctic to assist in the preparation of the Arctic Science Summit Week (ASSW) and to hold meetings in conjunction with those already planned for the ASSW.

Recommended Action:

- IASC should continually improve its outreach to global programs with an interest in the arctic region, especially ICSU and its sponsored programs. The Council should consider which ICSU-related unions should be invited to affiliate with IASC.

Critical Issue 6: IASC and the Scientific Committee on Antarctic Research (SCAR)

In 2006, IASC and SCAR took an important step and signed a letter of agreement to strengthen their relationship by combining efforts in mutually selected fields and activities. To that end, in 2008, the two organizations will jointly sponsor an Open Science Conference in St. Petersburg. In addition, both organizations hold ex-officio seats on the Joint Committee (JC) for IPY 2007–2008, and several joint IASC-SCAR events have been discussed as the prospective vehicles for IPY implementation and for broader dissemination of the scholarly results produced by IPY research projects.

SCAR represents the science interests in the Antarctic in much the same way that IASC does in the Arctic. Issues facing the scientific community in the Arctic have a critical human dimension, which is not present in the Antarctic, but both organizations have similar goals and objectives. These are to promote international scientific cooperation in the regions they represent and provide objective and independent scientific advice to the

Arctic Council, in the case of IASC, and the Antarctic Treaty Consultative Meetings for SCAR. The R&S Group took careful note of the SCAR reorganization and has suggested an IASC reorganization strategy that will mesh nicely with the way in which SCAR is now organized. Both organizations will have standing science Working Groups as well as policy Working Groups. The recommendation of the R&S Group is that the science Working Groups in both organizations be organized around the same themes but with the inclusion of the social sciences in the North. This should simplify interaction between both organizations and make the pursuit of close cooperation a lasting legacy of IPY 2007-08.

Recommended Action:

- Continue efforts to improve relations with SCAR with an emphasis on collaboration in areas of mutual interest and in support of creating an IPY legacy.

Critical Issue 7: IASC's involvement in Social Sciences

Social and human science topics are featured prominently in many of IASC official statements and publications. The official IASC mission statement cites "encouraging cooperation and integration of human, social and natural sciences concerned with the Arctic" and "addressing the concerns of those who live in and near the Arctic." IASC should be commended for making the cause of collaboration among scientists one of its key priorities and for advancing interaction among physical, natural, and social sciences in its many documents, events, projects, and forums over the last ten years.

With regard to the genuine IASC contribution to the advancement of arctic social science in interdisciplinary research over the past decade, some of the efforts during the review period had very substantial social science input, whereas many others had few (if any) social scientists. This is also true with regard to indigenous participation. Low or purely symbolic representation of arctic residents has been a perennial problem at IASC-sponsored events because of the difficulty in mobilizing the indigenous participants. Perhaps some seed money could be used to fund their travel.

A substantial step to advance IASC's relationship with the arctic social science community would be a deliberate effort to bring more indigenous participation into IASC activities. Still another strategy would be to look beyond the areas of collaboration that have been promoted by the earlier IASC initiatives, such resource use, sustainability, local economies, contaminants and human health, in favor of some new venues, such as indigenous knowledge, ecological monitoring by polar residents, changing value systems, political and institutional response to societal and environmentally-induced change, and the like. The R&S Group, therefore, recommends that IASC initiate a re-evaluation of the issues it address to reflect the recent changes in the structure of multi-disciplinary arctic science and the growing competition from many new players and programs advocating collaboration with social sciences and northern residents.

IASC relations with the major professional association in the field of arctic social research, the International Arctic Social Science Association (IASSA), established in

1990 have never been close. Though official letters of collaboration were exchanged between the two organizations in the early 1990s, for most of the review period, IASSA, with over 500 members in 22 countries, has not been substantially represented in IASC activities. IASC also plays no role in a major new program in polar social sciences and humanities, BOREAS, established by the European Science Foundation, that has strong interdisciplinary and environmental focus. Fostering stronger institutional partnership with the most active professional groups and ongoing programs representing arctic social scientists is thus long overdue.

The same recommendation is even more salient regarding IASC relationships with arctic indigenous organizations and northern residents. Again, despite IASC's many efforts to promote the role of indigenous people in its many documents and conference statements, the IASC role in this field can be seen as modest at best. No indigenous person has ever chaired (or co-chaired) a project initiated by IASC.

Recommended Actions:

- IASC should put a renewed emphasis on the human dimension in arctic science by creating a scientific Working Group dedicated to human and social studies and a policy Working Group addressing the issues important to the residents of the North.

- IASC should reach out to IASSA and organizations representing indigenous residents of the Arctic to determine ways to improve communication and cooperation. Those organizations should be invited to participate in the planning of the ASSW and participate in science presentations as they see fit.

- The IASC Council should make every effort to include Arctic indigenous people in Working Groups and look to their leadership of Working Groups of particular importance to northern residents.

Initiative 4: Reorganize and revitalize the Arctic Science Summit Week (ASSW) as a major cross-disciplinary venue

Critical Issue 8: Reorganize and Revitalize the ASSW

The IASC handbook states that IASC should "achieve its mission and provide additional value by: providing a forum in which other arctic science organizations may join in such effort." One way in which IASC has effectively accomplished this is by partnering with other organizations such as the European Polar Board (EPB) and AOSB to create the ASSW. IASC organized the first ASSW in 1999. At that time, only a few other organizations joined the event. Seven years later, four other organizations routinely hold their annual meetings during the ASSW. A host of other organizations also hold side meetings. Additionally, science day, organized by the host country, and project day, organized by the International Coordinating Group (ICG) of which IASC is a member along with AOSB, EPB, PAG, FARO and EPB, are regular offerings during the ASSW.

Most people attending ASSW find it to be a very valuable opportunity for sharing information, forming alliances, and meeting collaborators.

The experience so far shows that the ASSW provides a very useful tool for enhancing cooperation but this opportunity is not used to its full potential. The week has become long and repetitive with many presentations being given multiple times to various organizations. Many of the meetings are closed, most notably IASC strategy groups, IASC Regional Board meetings, and IASC Council meetings. Some meetings are overlapping and there is not enough opportunity for sharing of information between the various organizations.

The idea of science day and project day was to increase the scientific content of the ASSW and hence to attract more of the active scientists (and the younger members of the community) to the meetings. However, this ambition has, in our opinion, been only partially successful. The quality of science day is not uniform as it is left to the host country, which does not always manage to identify critical issues to be addressed or to find speakers to present them.

As one of the founding organizations of the ASSW, IASC should play a role in revitalizing and redirecting the ASSW. A crucial step towards a more effective organization of the ASSW is to more clearly separate administrative issues from the scientific discussions and bring the science more closely together with all the members of ASSW involved. The week, while it leads to good inter-organization informal discussions, has no forum for all the organizations to sit together and decide on some common goals and directions for arctic science in the upcoming year. This is unfortunate. With so many arctic science policy makers in the same place at the same time, ASSW provides the opportunity for issues and initiatives to be discussed and jointly undertaken over the coming year. Mechanisms for sharing resources could be found and international multidisciplinary activities promoted.

While the ICARP conferences succeed in attracting a great number of scientists and hence become an important vehicle for the progress of arctic science, the ASSW attracts primarily scientists who are involved in the business of arctic science organization plus a few curious scientists from the local community. The difference between ICARP and ASSW is primarily time (approximately every ten years versus annually) and the amount of planning efforts and preparations. Taking note of this experience, the R&S Group suggests that a new model for the ASSW be explored, where the annual cycle of meetings is replaced with a bi-annual cycle, in the following way:

> 1) Organize major ASSW meetings every second year. These meetings should be aimed at attracting the science community at large by providing a science forum meeting, replacing the project and science days and serving as a kind of “mini ICARP” focused on strategic science issues. This science forum should be open and include all relevant arctic science organizations. It should be prepared and organized by an international coordinating group led by IASC. The R&S Group suggests that science be the primary focus of this biannual ASSW with three days

of science meetings. The days may be organized in such a way as to highlight science of the host country, discuss logistics issues, and highlight the science of international collaborative efforts. At the conclusion of the science program, meetings of the participating bodies may take place with identification of critical and common issues the emphasis.

2) On the off years, the ASSW should be restricted to a smaller format meeting primarily for business meetings of Arctic science organizations. To the extent possible, these should be open meetings.

Finally, the R&S Group feels that in recognition of the outcome of ICARP II indicating the strong movement toward a fully integrated science approach in the Arctic, the family of ASSW organizations should be extended to include social science (IASSA) and indigenous organizations. Further, the AC, SCAR, and others should be invited to the biannual science forum.

Recommended Actions:

- Organize major ASSW meetings every second year. These meetings should be aimed at attracting the larger scientific community by providing a science forum meeting, replacing the project and science days and serving as a kind of "mini ICARP" focused on strategic science issues. In the off years, a smaller ASSW focused on business of the various organizations should be held but with an emphasis on inter-organizational meetings (at least between the executive committees) to identify critical issues and common objectives and to plan for the next science-focused ASSW the following year.

- Move the responsibility for the organization of the biannual, science-focused ASSW to the international coordinating group chaired by IASC.

- Invite IASSA and organizations representing polar residents to take more active role in planning for the ASSW and to hold their executive sessions during that time to facilitate interactions between scholarly community and polar residents.

Internal Affairs: Positioning IASC as THE focal point for science in the Arctic

Critical Issue 9: Clarity of procedures

A certain amount of opaqueness has crept into IASC's operations, creating the appearance of a somewhat closed organization. For example, rules relating to membership are vague at best. While it is clear that each nation makes its own decision about how members are selected, this should be articulated clearly and where possible the selection process within a country should be identified and available for the general public. Membership terms are undefined which is unusual and leads to the perception of an "old boy's network."

In the founding articles for IASC, it is presumed that each national member organization has its own mechanism to provide ongoing contact between the Council and its own arctic science community. How this works varies from country to country, but the connections should be explained and transparent. In addition, while the science community in some member states is quite well informed and aware of IASC, this is not the case in all states. Therefore, to increase the visibility of IASC in member states, an annual message from IASC to the science community could be communicated.

As stated, procedures for establishing and terminating Working Groups are not well defined and transparent to the science community. In addition, most IASC meetings are closed during the ASSW and that lends a cloud of obscurity to the organization that the science community finds baffling.

Many IASC procedures will need to be re-written should the Council undertake the reorganization recommended by the R&S Group. When it does so, all procedures should be well publicized on the IASC web site and in an IASC publication outlining the organization, its mission and objectives.

Recommended Actions:

- Update the IASC handbook to reflect changes made as a result of this review and strategy effort and make it available to the science community via the IASC web site.

- Define membership selection, even if it is different from country to country, and define membership terms and duration.

- Communicate an annual message from IASC to increase the visibility of IASC in member states.

Critical Issue 10: Mobilize human resources

The SCAR reorganization of 2000 lead to the definition of five strategic, interdisciplinary independent and internationally-reviewed research programs. With these five strategic research programs, SCAR was able to successfully improve the network of its members and utilize their valuable intellectual talent.

Like SCAR, IASC's greatest asset is its human and intellectual resources. With members from 18 countries and various disciplines, the organization has the ability to harness a significant amount of energy and expertise in order to fulfill its mission. The organization has been fortunate over the past decade to have a secretariat with a vision and with the skill to keep the organization moving forward. But the secretariat, at times, has received very little assistance from the large Council. Individuals on the Council seem to provide input and assistance only sporadically and mostly only in preparation for meetings. They are not called upon to provide time and talent between meetings and this has led to an ineffective use of this important resource.

In addition, because IASC has let the network of its Working Groups lapse, it has lost the ability to utilize the talent of a large number of active scientists to provide initiatives and directions for arctic research. This is an important loss to the organization in providing a leadership role in arctic science. IASC must reconstitute the Working Groups in an effective way in order to better utilize the human resources at its disposal. Each Working Group and Action Group must have an active liaison from the Council who is also providing direction and oversight. This will utilize the Council membership inter-sessionally.

If IASC seeks to reorganize itself as recommended by the R&S Group, an increase in membership is going to be necessary to fill the increased Working Groups and Action Groups which will be created and to address issues which it has not traditionally addressed, such as marine sciences. Council needs to consider in its reorganization, what would be the ideal size. Should it be one member and one alternate from each country, thus ostensibly doubling the size of IASC, or should it be some other variation on membership? This should be a topic on the table when IASC meets with AOSB to discuss a possible merging of the two organizations. Another consideration is ICSU rules for membership. If IASC wants to further align itself with ICSU, adhering to ICSU membership guidelines will be essential.

If IASC expands in the manner suggested by the R&S Group, it seems inevitable that the secretariat must grow with the organization. Even without the reorganization, the R&S Group feels that the size of the current secretariat is too small to undertake all the tasks required of it. The past and current executive secretaries have done an outstanding job with few resources, but should IASC move to establish itself as the premier scientific body of the Arctic, the secretariat is clearly going to need to expand to keep pace with its heightened visibility and responsibilities

With the addition of new member countries with little experience in arctic sciences, IASC faces the problem that some member countries feel marginalized. The R&S Group found that those countries that are relatively new to arctic research do not feel a close affiliation to IASC and do not feel that IASC has much bearing on their arctic activities.

The Asian Forum of Polar Science (AFOPS) was established in 2003, and has held three meetings. China, Korea and Japan form the core of the organization and members from India, Malaysia and Thailand have been asked to join. While AFOPS is still in its formative stage, IASC should consider forging a close relationship with it in order tap the growing pool of Asian arctic scientists. IASC should also actively court new members from countries beginning to show and interest in arctic research from other areas around the globe.

IASC successfully recruited many early career scientists to participate in ICARP II and to play a role in the development of many of its projects. But the effort to involve early career scientists has been unsystematic. There should be clearly stated rules on the involvement of early career scientists in IASC-supported activities like Working Groups

and international conferences, and IASC should consider having an early career scientist on its Council.

Recommended Actions:

- Reinstate Working Groups to harness the scientific talent of the IASC membership. Working Groups may establish Action Groups to deal with new, emerging issues on a term-limited basis. Working Groups and Action Groups should include both members and non-members of the Council.

- Consider with AOSB increasing national membership in a new organization with increased responsibilities and activities.

- Consider ICSU membership requirements when determining national membership.

- Address issues relating to perceived marginalization raised by new and emerging arctic science member nations.

- Encourage early career scientists to participate in Working Groups and Action Groups, thereby empowering them for the future. Include an early career scientist on the IASC Council.

- Increase the size and funding for the IASC secretariat.

Critical Issue 11: Public image

The secretariat has actively promoted IASC in the Arctic and in various bodies such as ICSU and IPY. However, it needs to do more to improve its visibility and public image. Opening meetings will be a good first step. Publication of clear membership procedures and clarified internal operating procedures will also help.

With a few exceptions, most of the science projects supported by IASC did not materialize in substantial summary publications. Several have been discontinued without any major deliverables (see Annex 2). The level of accountability in IASC-sponsored research is surprisingly low in terms of publications, particularly, in terms of books and edited peer-reviewed volumes. Some projects in the IASC annual catalogues enjoyed IASC financial support over 6-8 years; yet many produced no substantial publications over several years, or those publications have not been accounted and cannot be tracked via IASC reports.

This gives ground to a vision shared by many scientists that IASC-sponsored initiatives have limited impact upon the overall advancement of fundamental research and, therefore, IASC should be considered for networking, conferences, and travel funds only. The latter perspective naturally transforms into relatively modest science outcomes produced under the IASC funding in the long term.

In order to change this perception, the R&S Group suggests that the IASC require annual reports from all Working Groups and Action Groups, regardless of their longevity, and that these reports be made publicly available through publication and on the IASC web site. Where possible, IASC should support activities through its Working Groups which lead to peer-reviewed articles and journal issues, and it should make every attempt to track all publications that emanate from IASC activities. In addition to the newsletter "Progress," the Secretariat should produce an annual report. Finally, the R&S Group notes recent improvements to the IASC web site. Such improvements should be made regularly.

A major high visibility activity of IASC is the ICARP process. Not only does it engage many scientists in the field, but it also produces results that have implications for arctic science in the years ahead. IASC should make certain that as a principal promoter of ICARP (in terms of funding and organization) that its imprimatur is on ICARP.

To the R&S members' knowledge, IASC so far has not made a concerted effort to produce a statement on its governing ethical principles in promoting polar research. In addition, it has neither subscribed to nor endorsed any of the existing ethical science policies or guidelines on intellectual property rights that have been in place in several northern countries or internationally. Whereas some people may consider holding to certain sets of ethical guidelines in science a marginal issue, the R&S Group believes that a special clause or statement on ethical standards in IASC-sponsored research would be a great asset to IASC. Adopting guidelines will work strongly to improve the organization's public image among northern constituencies, the academic community, northern advocacy groups, and the general public.

Recommended Actions:

- Require all Working Groups and Action Groups to produce annual reports. When a Working Group is terminated, a final report should be published and made widely available through IASC.

- Encourage Working Groups and Action Groups to support activities that lead to peer-reviewed articles and journals and track all publications that are subsequently generated from their affiliation with IASC.

- Continue to improve the IASC web site by including publications, as well as adding information that heretofore has been not publicly available, such as how members are appointed by the member nations and internal procedures for the establishment of Working Groups.

- As much as possible, hold IASC meetings, except executive sessions, in public and encourage participation in IASC activities.

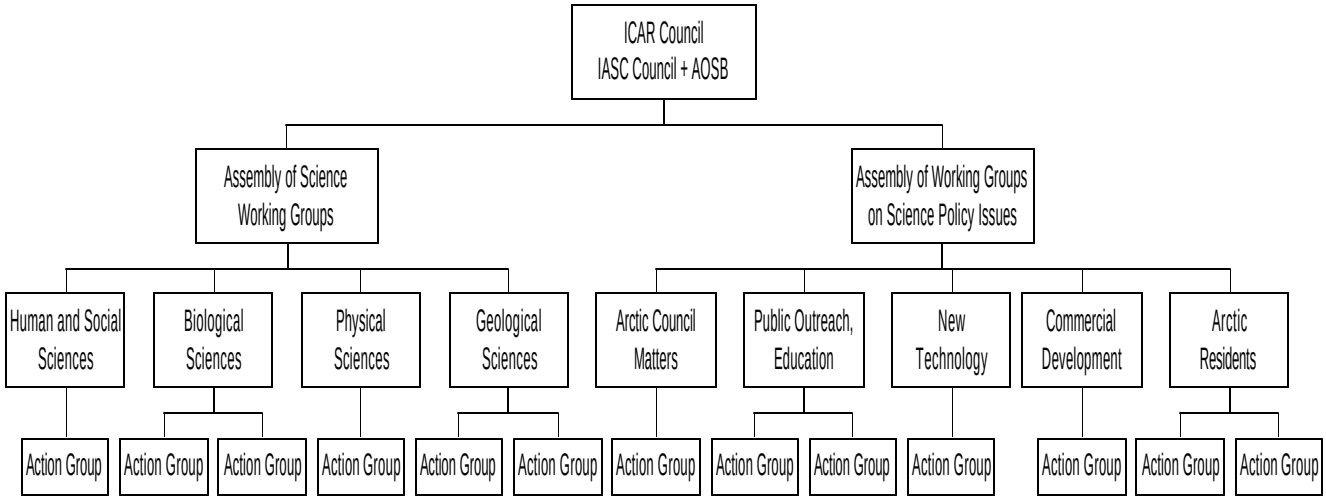
- Consider adopting a set of ethical standards on conducting research in the North or make an explicit statement on IASC's adherence to certain ethical policies and intellectual property rights guidelines.

References

ACIA. 2005. *Arctic climate impact assessment*. Cambridge: University of Cambridge Press

Annex 1

International Committee on Arctic Research



1. The structure proposed recognizes that science is developed along disciplinary lines, but that in the new environment of today, issues must be then considered from a multidimensional perspective. It is the intention of the R&S Group that this broader perspective would be considered at the Assembly level in the chart.

2. Science Working Groups would have the responsibility for identifying priority science issues in the Arctic. They would be standing committees with indefinite life spans. They should be required to submit annual reports to the Assembly and the Council. All reports should be made available to the public through IASC publications and on the IASC web site.

3. The Working Groups should have the capacity to address specific issues of scientific importance, either to address perceived gaps in knowledge or at the request of outside organizations. This can be done through Action Groups with limited life spans of no more than three years.

4. Science Policy Working Groups would have an indefinite life-span but should be required to submit a report to the Assembly and Council on an annual basis. All reports should be made publicly available through the IASC web site and in IASC publications. The Council may appoint new science policy Working Groups as needed and disband those that are no longer fulfilling a useful function.

5. The Science Policy Working Groups should also have the capacity to address specific issues of importance identified by the Council or at the request of outside organizations. This can be done through Action Groups with limited life spans of no more than three years.

Annex 2

List of IASC Projects 1996-2005

Annex 3

Survey

Dear Colleague:

I hope you will be able to help the International Arctic Science Committee (IASC) and me by completing this questionnaire. Even a partial response will be helpful.

IASC has asked me to chair an international team of outside reviewers to assess progress and to suggest strategies for its future. Of course, we have our own ideas, but we want to be informed by other stakeholders, with experience in Arctic affairs, in general, and with IASC in particular. The views of both "insiders" and "outsiders" are sought.

There is now significant impetus to Arctic research, given increased attention to climate change, and there is support for many new Arctic programs under the IPY. As Arctic science plays an even bigger role on the world stage, Arctic programs may wish to expand to global partnerships or change ways we meet and/or do business. Your input in this process will help us provide strategies to IASC to address its role in the future. If you are unfamiliar with IASC programs and activities, please feel free to indicate, "I don't know" to any of the questions below.

Please complete the survey and send it via return email to Sara Bowden, Secretary to the Review and Strategy Group, by July 31.

I thank you in advance for your help

Sincerely,
Thomas Pyle
Chair, IASC Review and Strategy Group

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International Arctic Science Committee (IASC) Performance Survey

(1) In your opinion, what are three most critical contributions by IASC to the development of international and interdisciplinary polar scholarship over the past 10 years (1996–2005)? Please rank them, according to their value. (Feel free to put 'I don't know' if you are uncertain about the IASC role or unfamiliar with IASC major contributions).

(2) Do you believe that IASC has mostly fulfilled its original mission, which is defined as "to encourage, facilitate and promote the full range of basic and applied research encouraging cooperation and integration of human, social, and natural sciences concerned with the Arctic at a circumarctic or international level; and to provide scientific advice on arctic issues (IASC Project catalogues for the years 1997–2005)?

You may respond 'yes,' 'no,' or 'I don't know' – or, you may offer a more detailed perspective

(3) If you were asked to trim and/or modify one particular current activity of IASC, in order to redirect the organization's limited resources to other venues, what would be your first choice:

a. Seeding funds for IASC research projects and project meetings
b. Supporting major discussion forums and big science conferences, like ICARP
c. Forging more integration among existing arctic science organizations through ASSW or other venues
d. Establishing expert groups to provide scientific insight on particular arctic issues (like climate change, human development, resource preservation, etc.).

Which of those (or other) activities have to be strengthened or improved, if money is redirected?

(4) What science or policy priority for the Arctic would you consider the most critical for IASC to address over the next five years (next decade)?

(5) From your perspective, should IASC improve its relationships with any particular organization(s) representing polar scientists, educators, funding agencies, and/or Arctic residents? Is there any reason to change the existing relationships between IASC and the Arctic Council (AC)?

(6) How useful do you find the present format of the Arctic Science Summit Week and what, if any, actions would you recommend to improve it:

- Streamlining the ASSW agenda, so that more time is allocated to the discussion of science issues and/or to presentations by scientists
- Putting ASSW science planning and agenda more firmly under IASC control
- Rotating/alternating the focus of the ASSW, so that some meetings are more like agency 'summits', while other are more like 'science days'
- Other (please specify)

Annex 4

TOR

TO: **IASC EXECUTIVE COMMITTEE**

FROM: **ODD ROGNE**

DATE: **25 NOVEMBER 2005**

IASC REVIEW AND STRATEGY

In 1995, an IASC Review Group was appointed by Council and their report was delivered in the autumn of 1996. (A copy of the report is available on request from the IASC Secretariat.)
Taking into account the time that has elapsed since the last review, ongoing changes and challenges ahead, the Executive Committee suggests that a new "Review and Strategy Group" be appointed.

TERMS OF REFERENCE (TOR)

The last review of IASC was undertaken in 1995 – 96 focussing on the first 5 years of IASC activities. Since then, several changes have occurred and many challenges and opportunities lie ahead.
The IASC Review and Strategy Group is invited to:

- Study and Review the IASC activities since 1996
- Suggest and justify any major changes to be undertaken, and
- in particular, suggest forward-looking strategic actions to be taken for fulfilling the IASC mission.

At the 2005 IASC Council Meeting the following additions were made:

- clarify issues such as project initiation, gender balance, inclusion of young scientists, appointment procedure
- consult the user community, and learn from the recent SCAR review
- two components: review of the past and a strategy for the future
- the mission of IASC to be re-visited

TIMELINE AND OTHER ISSUES

An interim report should be delivered by 1 March 2006, and be on the Council agenda for April 2006. Final report to be expected one year later, and be delivered for the ASSW 2007 meeting.
The Group is free to request information from any parts of IASC, including the Executive Secretary. However, the latter should not be involved in this work in any other way.

Annex 5

R&S Group Members

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