

## **Summary Report on the 5th Assessment Steering Committee (ASC) Meeting, June 15 - 16, 2000, Danish Polar Centre, Copenhagen, Denmark**

ASC Chairman Bob Corell opened the ASC meeting at 8:30 a.m. on Thursday, June 15, 2000. Hanne Petersen of the Danish National Environmental Research Institute welcomed the group to Copenhagen and to the facilities of the Danish Polar Centre.

The draft agenda (Appendix 1) that had been distributed prior to the meeting was approved. It was agreed that during the course of the meeting there would be a brief report on the Senior Arctic Officials meeting in Fairbanks, discussion of the results of a recent workshop at Airlie House on assessment methodologies, consideration of groups that are asking for presentations about ACIA, and scheduling of the next ASC meeting.

Participants are listed in Appendix 2.

### **Agenda item 1. Author nominations.**

- Selection of chapter headings and lead and contributing authors

The group agreed to begin by defining the chapter headings of the assessment, and then to consider nominations of lead authors.

As background to the discussion of chapter headings, Bob Corell presented outlines of the three principal sections of the IPCC Third Assessment Report that is now under government review. Bob also outlined the principal sections of the U.S. National Assessment that is now available for public comment.

With this material as background, Bob proposed a draft structure for the Arctic Climate Impact Assessment (ACIA). After prolonged discussion, the group arrived at an outline for a 14-chapter assessment. It is to be organized in three main sections that are concerned with the Arctic as part of the global climate system, impacts on physical and biological systems, and impacts on humans and their activities. A final synthesis chapter will attempt to give an integrated description of climate change impacts on ecosystems, economies, culture, human well-being, etc. Participants further specified a number of topics that should tentatively be dealt with in each of the 14 chapters. The structure of the ACIA scientific document as outlined in Appendix 3 was approved by the Committee.

It was decided that there will not be a separate chapter on the impacts of increased ultraviolet (UV) radiation on the Arctic. Instead, the impacts of increased UV will be treated in all relevant places in the 14 chapters of the assessment. There will be particular

attention to the impacts of increased UV in the chapters on terrestrial and marine ecosystems and human health.

Participants next turned to consideration of authors for the assessment chapters. Bert Bolin noted that IPCC had convened leading authors, lead authors and contributing authors. The ASC members decided that they would use the simpler terminology of lead authors and contributing authors, with one or two lead authors and about four to seven contributing authors per chapter. Lead authors will become members of the ASC -- a subject dealt with at greater length below under agenda item 3.

The group sought lead authors who are both knowledgeable scientists and leaders who could effectively organize the work of teams of contributing authors. The Committee agreed that, while the ASC had just arrived at an initial specification of topics that were to be taken up in each of the 14 chapters, the lead authors would have considerable leeway in this regard.

Prior to this meeting, in response to a broadly distributed solicitation, the Executive Director had received nominations of lead authors from a number of sources in Canada, Finland, Sweden, Norway, and the U.S. All of these nominations as well as others were carefully considered. It was not required that every lead author be from an Arctic country. Rather, the group was looking for the best qualified and available people.

The ASC expressed its gratitude to those who suggested more than 300 authors or lead authors for various parts of the assessment.

After lengthy deliberation and review of nominees' curricula vitae, the Committee decided who should be invited to serve as lead authors of most of the assessment chapters. The group also made back-up selections in case they are needed. There was insufficient information for the group to decide on the best lead authors for the chapters on impacts to subsistence (chapter 9) and infrastructure (chapter 13). There was no attempt to choose a lead author for the synthesis chapter (chapter 14).

It was agreed that the Chair and Vice Chair of the ASC and the ACIA Executive Director will make phone calls in the very near future to invite the chosen persons to serve as lead authors. A small sub-group of ASC will seek more information on potential lead authors for chapter 9, and the ACIA Secretariat and the ASC Executive Committee will seek additional nominations for chapter 13. Once lead authors have been successfully recruited, their names will be made public and attention will then turn to recruitment of contributing authors.

Next, the group once again reviewed all suggestions of lead authors that had been received from any source in answer to the solicitation from the ACIA Executive Director. In this way it was verified that due attention had been paid to all lead author nominations.

- Planning of the next ASC meeting with the lead authors

It was decided that the next ASC meeting will be held in early fall with participation by all the lead authors. Snorri Baldursson agreed to look into the possibility of holding this meeting in Iceland on September 13 - 15, 2000. He will also look into available flights to Reykjavik. If there is a problem with Iceland as a site for the ASC meeting with the lead authors, Toronto will be considered. Bob Corell said he would try to visit all the Arctic countries and give presentations on ACIA before September 13.

- Financial support for lead and contributing authors

As had been stated from the beginning of planning for this assessment, participating countries are expected to provide financial support for their own lead authors. This is in accord with the section on "Resources and Financial Considerations" in ACIA Implementation Plan version 3.4.

It was acknowledged that the ACIA Secretariat budget is sufficient to support Russian participation in the assessment.

More on the subject of finances can be found under agenda item 4 below.

## **Agenda item 2. Modeling and Scenario Groups**

- Report on the IPCC scenario workshop (Tom Murray or Betsy Weatherhead)

Tom Murray reported briefly on Betsy Weatherhead's and his attendance at a meeting of the IPCC Task Group on Climate Scenarios for Impacts Assessment (TGCIA), May 15 - 17, 2000, at Columbia University. Betsy's summary report on the meeting is Appendix 4; Tom's, Appendix 5.

Tom recommended that a couple of members of the ACIA community should join TGCIA in order to profit from what that group has experienced and learned over the past several years and to ensure a degree of harmony between assessments done by IPCC and ACIA. He also recommended that the ASC try to capture the attention of selected members of TGCIA to help with the development of Arctic scenarios.

Note that Betsy and Tom gave a joint presentation on ACIA on the second day of the TGCIA meeting. It was well received and gave rise to a number of perceptive questions and comments.

- Review of the Terms of Reference for the ACIA modeling and scenario groups

Gunter Weller introduced the draft terms of reference for the modeling and scenario task groups that had been written and distributed prior to this meeting.

John Calder suggested that we secure lead authors for the chapters of the assessment and let them help us better define our approaches to modeling and scenarios to be handled in chapter 3. He pointed out that we were really using the word "scenario" to include many things: climate variables, impacts, emissions, socio-economic assumptions, etc.

Bert Bolin pointed out that there are four types of scenarios relevant to this discussion:

- Macro-economic models to derive emission scenarios (e.g. the IPCC SRES scenarios),
- Going from emissions to atmospheric concentrations, particularly for carbon dioxide (e.g. chapter 3 of Working Group 1 in IPCC Third Assessment Report),
- Climate change scenarios based on greenhouse gas concentration changes, and
- Impact scenarios based on regional climate change.

The term should be clarified when it is used.

Bert also raised a question about what would be used as input to the impact assessment: Only material that is already in the scientific literature? Or can writers use things that they know to be true but that are unlikely to ever be in the literature? The ASC members decided that the assessment should be based on published, or about to be published, material.

Bert suggested changes in the terms of reference, and his suggestions were accepted. It was also decided that the Executive Committee of ASC should select members of the task groups on modeling and scenarios. The terms of reference for the modeling and scenario task groups, as modified by this discussion, are in Appendix 6 of this report.

Gunter Weller noted that John Walsh will lead a workshop in Fairbanks in the following week to begin development of a community Arctic model. The resulting model will be similar to the NCAR global model in that it will be open for use by scientists at their own remote sites.

- Discussion on how to establish these groups as quickly as possible

There was general agreement that establishment of the modeling and scenario task groups and holding the task group workshops are the highest priority items for immediate action.

John Calder asked how we should organize the workshops: Ask the Secretariat to do it? Or, preferably, ask the co-lead authors of chapter 3 (Future Changes of Climate and UV: Modeling and Scenarios for the Arctic Region) to provide intellectual leadership of the workshops, with logistic support by the Secretariat? He noted that the terms of reference

call for the two task groups to meet jointly for the first time, and after that they are due to meet either together or separately as seems best.

Snorri Baldursson suggested that we use the meeting of the ASC and lead authors in September as an occasion to plan the modeling and scenario workshops.

The Committee finally decided that planning of the workshops will start as soon as co-lead authors are recruited for chapter 3 of the assessment, and the meeting of the expanded ASC in September will be used as an opportunity to complete the plans. The ACIA Secretariat will help provide logistic support for the workshops.

### **Agenda item 3. ASC**

#### ○ Membership of the ASC

Snorri Baldursson said that CAFF has not yet settled on its two representatives on the ASC. He asked if the CAFF, AMAP and IASC Secretariats can have observer roles on the ASC if they are not appointed as members of the ASC.

It was agreed that the Executive Committee of the ASC (Bob Corell, Pål Prestrud, Jan-Idar Solbakken, Gunter Weller and Lars-Otto Reiersen) would formulate operating guidelines on the subject of observers to the ASC.

Bob Corell pointed out that the ASC still does not have a second representative of Arctic indigenous peoples. He said he would try to settle that matter shortly through discussions with indigenous peoples' organizations. See agenda item 6 below.

Lars-Otto Reiersen noted that the ASC could become very large if all lead authors of assessment chapters become members of the ASC and some chapters have co-lead authors. He suggested that it might be preferable to have only one lead author or co-lead author per chapter as a member of the ASC. The ASC Executive Committee discussed this topic and recommended that only one co-lead author should be a member of the ASC, with the other co-lead author serving as an alternate. (See the second part of Appendix 7 on this topic.) The ASC accepted this recommendation of its Executive Committee.

The question of Arctic country representation on the ASC had been raised at the Senior Arctic Officials (SAOs) meeting in Fairbanks. The SAOs were assured that, one way or another, every Arctic country would have representation on the ASC. The ASC Executive Committee recommended, and the full ASC approved, the following general guidelines on ASC membership:

- The ASC operates on the basis of consensus.
- Every Arctic country should be represented on the ASC.
- AMAP, CAFF and IASC will each be represented by two ASC members.

- Indigenous Arctic people will be represented by two ASC members.
- Lead authors and co-lead authors of chapters in the Arctic impact assessment will be chosen on the basis of their qualifications to do the job; nationality is a secondary consideration.
- The lead author of each chapter of the assessment will be an ASC member.
- When there are co-lead authors of any chapter in the assessment, one co-lead author will be an ASC member, and the other co-lead author will be his or her alternate. When one of the co-lead authors is from a country not otherwise represented on the ASC and the other co-lead author is from a country already represented on the ASC, then the co-lead author from the country not otherwise represented will be chosen as the ASC member.
- If, after recruitment of all the lead authors, any Arctic country is still not represented on the ASC, then that Arctic country will be asked to name a representative to the ASC.
- Liaison participation in the ASC will be extended on a case-by-case basis.
- The ASC Executive Committee will address the topic of observers on the ASC.

ACIA Implementation Plan version 3.4 and Appendix 7 of this report contain more details on this subject.

- o Executive Director and Deputy Director Positions

On the subject of the ACIA Secretariat and the Executive Director, the ASC Executive Committee recommended that the ASC:

- Endorse the proposal of the U.S. to establish the ACIA Secretariat at the University of Alaska Fairbanks,
- Endorse the appointment of Dr. Gunter Weller as the Executive Director of the ACIA Secretariat, and
- Recognize that the Executive Director of the ACIA Secretariat has full responsibility for implementation of the ACIA Secretariat (organizational arrangements, budget, personnel matters, etc.).

The ASC approved these recommendations. It also encouraged the Executive Director to broaden, where possible, the professional staff with qualified individuals from other countries. The report of the ASC Executive Committee on this subject is contained in the first section of Appendix 7.

- o Relationship to IPCC

Bob Corell said that he and Bob Watson had drafted a document on "modes of cooperation" to specify how the two organizations intend to cooperate with one another. Others familiar with the operation of both IPCC and ACIA, along with the ASC Executive Committee, have reviewed the document and found it satisfactory.

It was decided that Bob Corell should discuss the document again with Bob Watson in order to arrive at a final draft. This draft will then go by e-mail to ASC members for their approval and to AMAP, CAFF and IASC leadership for their approval. Once all these approvals are in hand, Bob Corell and Bob Watson will sign it on behalf of the two organizations.

#### **Agenda item 4. ACIA 5-year budget**

- Discussion of budget

Gunter Weller introduced the draft budget he had prepared. It is Appendix 8 of this report. Gunter noted that, in accordance with the assessment timetable in Implementation Plan version 3.4, no substantial activity is planned for the fifth year. So it is really a 4-year budget, with provision for a small amount of possible follow-up activity in the fifth year.

Bob Corell noted that the U.S. National Science Foundation is only providing financial support for 3 years of this activity, with a possible extension to a 4<sup>th</sup> year if that can be justified. NOAA has not put any such limit on its support.

Lars-Otto Reiersen reminded the group that the leaders of ACIA are expected to report to the Arctic Council ministers in 2004. Working backwards, it was clear that any gathering of new data would have to begin by this fall. This led to a brief discussion of what role new data could play in the assessment. John Calder said that ACIA might be a small driver of new research efforts, at least in the U.S., but new climate research and ACIA are not strongly coupled. Lars-Otto pointed out that some countries may use ACIA as an opportunity to fund new climate-related research, and this should not be neglected.

Participants turned to the schedule of the assessment process. Hanne Petersen said she would like to see the modeling and scenario workshops held before the actual impact assessment starts. Harald Loeng said he would prefer to have the first draft of the assessment available for review by 2002. Bert Bolin and Bob Corell expressed their agreement that, based on IPCC experience, plenty of time must be left for the review process. A more detailed schedule will have to be established at a forthcoming ASC meeting.

The Committee decided that the lead authors must be involved in settling the final schedule of the assessment. So it was set aside for further discussion at the lead authors meeting in September.

It was also decided that there will not be any public assessment report until 2004 when the review process has been completed. Of course, the Arctic Council SAOs and Ministers will be given regular progress reports.

Note: Pål Prestrud chaired the following discussion of items in the draft ACIA budget. It was judged inappropriate for Bob Corell to participate in a discussion of a budget that is being predominantly supported by the U.S. National Science Foundation.

Gunter Weller described the items in the draft ACIA budget, acknowledging that some items were under-budgeted and some were over-budgeted. The budget had been developed on the basis of a 12-chapter study rather than the 14-chapter that is now being planned. The whole enterprise was projected to cost about \$3.7 million, with the U.S. paying about 2/3 of the cost and other countries expected to pay the remaining 1/3. It was specified that the U.S. part of the budget would pay for some Russian participation.

The CAFF Secretariat had reviewed the draft budget and suggested some changes.

Bert Bolin told the group that IPCC generally had four meetings per chapter: one to get started, one to finish putting the first draft together, one to respond to the first review, and one to respond to the second review.

It was asked whether ACIA really needed the thematic data center contained in the budget. It was decided by the Committee that the thematic data center should be dropped in favor of an item labeled simply data support. These funds might be allocated to the lead authors to help them do their jobs.

The Committee decided that tables 1 (Secretariat) and 3 (Report preparation) were in generally good shape. Gunter Weller was asked to make revisions in table 2 (Manuscript development), taking into account the increased number of chapters and a decreased number of open meetings. In-kind contributions will be shown in terms of level of effort -- not in U.S. dollars. Each country can present its in-kind contributions in its own currency and in terms of its own level of costs. Suggestions on the budget are sought from ASC members by July 15, 2000.

Note: Bob Corell resumed the chair of the meeting at the conclusion of the budget discussion.

- Funding by Arctic and other countries (Bob Corell)

As stated under agenda item 1 above, participating countries will be expected to provide support for their own lead authors. The Secretariat budget includes funds to support Russian participation in the assessment.

Pål Prestrud felt that, except for the U.S., the ASC should begin to gather support from institutions and governments in other Arctic countries. AMAP, CAFF and IASC can help with this job.

Support for authors from non-Arctic countries was not discussed.

## **Agenda item 5. Arctic Council Interactions**

- Action items from the April SAO meeting in Fairbanks

Gunter Weller gave a very brief summary of national reactions to Bob Corell's presentation on ACIA at the SAO meeting in Fairbanks. In general, the SAO's continued to be supportive of the ACIA effort, and some thought it was one of the most important projects the Arctic Council would undertake over the next few years.

Tom Murray was asked to develop a new list of action items outstanding from past ASC meetings and resulting from this ASC meeting.

- Preparations for the October Ministerial meeting at Barrow (Bob Corell)

Bob Corell said he is willing to deliver a progress report on ACIA, if the SAOs or Ministers so desire. It was pointed out by Hanne Petersen and Lars-Otto Reiersen that the ACIA progress report should go to the SAOs through AMAP and CAFF. We have, after all, not created a new working group under the Arctic Council that should report directly to the SAOs. It was agreed by the group that they were not attempting to create anything like a new working group under the Arctic Council.

Bert Bolin stated that a progress report is simply a report on what has been done. The AMAP and CAFF representatives on the ASC can make sure that AMAP and CAFF are informed about the progress of ACIA and approve what ACIA has done. The same goes for communicating with IASC.

There was general agreement that the ASC must prepare good material that the SAOs can use in their report to the Ministers so that a strong declaration of support for ACIA will be approved by the Ministers. AMAP and CAFF Secretariats can help prepare good material for the SAOs' report to the Ministers.

- Arctic Climate presentation/public event at Barrow?

Lars-Otto Reiersen asked whether the ASC wanted a round table discussion at the Ministerial meeting in Barrow, as had been discussed at the Fairbanks meeting of Senior Arctic Officials. It could be either an open event or a closed-door session among the Ministers.

Gunter Weller said that the ASC might prefer to give a short presentation on climate assessments in general, followed by an extended presentation on the Alaska assessment. This would be scientifically solid but not get ahead of the circum-Arctic assessment.

The group asked Bob Corell to confer with Ray Arnaudo to see what is being planned for the Ministerial meeting and how ACIA might most effectively be presented there.

#### **Agenda item 6. Indigenous people**

- Addition of a second indigenous person to the ASC (Bob Corell)

Bob Corell reminded the group that they had promised to add a second representative of the Arctic indigenous people to the ASC. Tove Petersen said that the Indigenous Peoples' Secretariat could assist in identifying an appropriate person, after consultation with that organization's representative on the Arctic Council.

John Calder stated a preference that the additional person be from North America; and Lars-Otto Reiersen suggested that it be a person with expertise in marine science.

It was agreed that Tove Petersen, Jan-Idar Solbakken and Bob Corell would consult on this subject off-line and report back to the ASC.

- Native people involvement in the ACIA (Bob Corell)

With regard to indigenous peoples' knowledge of climate change and its impacts and the role it should play in the impact assessment, the group agreed that this should be discussed with the lead authors when they meet in September.

#### **Agenda item 7. Communications and outreach**

- Strategy document (John Calder and Snorri Baldursson)

John Calder presented the strategy document that he and Snorri Baldursson had developed. It is Appendix 9 of this report.

Bert Bolin expressed his worry that publicity could get ahead of the impact assessment. He thought we must not express views on the results of the assessment until the assessment itself is complete. There is a special danger with regard to policy recommendations that AMAP and CAFF will make to the Arctic Council after the scientific assessment is complete.

Tom Pyle warned the group about building a self-promotion mechanism. He thought it was important to get solid results before attempting to put them before the public.

The Committee decided that nothing from ACIA will be published before the assessment has been published. Nothing that has scientific content will go on the ACIA website

before it has been approved by the ASC. This should not inhibit telling people about the ACIA process.

John Calder pointed out that the publications section of the strategy document focuses on publishing the results of the assessment. So the publications will not be put out before the assessment is done.

The outreach and communications strategy was accepted by the ASC.

- ACIA one-pager and the ACIA website (Gunter Weller)

Participants considered what they wanted to see on the ACIA website.

Bert Bolin thought it should tell people where to get information on the Arctic, but it should not pre-judge the results of the assessment before it is done in 2004.

There was general agreement with this approach. There was also consensus that the ACIA website could be a significant educational asset.

Bob Corell noted that he has a set of viewgraphs that he prepared for his presentation to the SAOs' meeting in Fairbanks. He will make those viewgraphs available to be placed on the website.

Several participants remarked the numerous opportunities to give presentations on ACIA. It was agreed that ASC members should try to accept invitations to give presentations, but that they should be careful not to get ahead of the writing teams.

Bob Corell suggested that the ASC might want to put out a three-fold paper that tells the public what ACIA is all about.

### **Agenda item 8. Revisions of the ACIA Version 3.4 (Gunter Weller)**

Gunter Weller said that the ACIA Implementation Plan version 3.4 is in basically good shape, but that corrections remain to be made. The chapter list in Appendix 1, for example, will have to be revised as a result of this meeting.

Suggestions for corrections or changes to the Implementation Plan are due at the Secretariat by July 15 at the latest. Then the Secretariat will put together version 3.5 which will go to AMAP, CAFF and IASC for their approval before it is formally transmitted to the Ministers.

After Ministerial approval, the Implementation Plan will be put on the ACIA website.

## **Agenda item 9. Other business**

Snorri Baldursson reported on a possible ASC meeting with the lead authors sometime in mid-September. He thought the meeting could be held there on September 13 -15. He suggested that curricula vitae of potential contributing authors be distributed ahead of the meeting. Snorri said that the Icelandic SAO could not at this time commit resources to hold the meeting in Reykjavik; that was something that could probably be handled in the following week.

It was agreed that Pål Prestrud would attend the joint AMAP-CAFF meeting and report on ACIA. Gunter Weller and Patricia Anderson agreed to make a presentation on ACIA at the upcoming AAAS meeting in Whitehorse.

Bob Corell reported on the Airlie House workshop on the assessment process. He suggested that ACIA might want to apply a vulnerability assessment strategy to one chapter in the impact assessment -- perhaps the chapter on human health. The group was invited to think about this question. Bob volunteered to put some viewgraphs on the vulnerability assessment process on e-mail for use by ASC members.

The meeting was adjourned at 4:25 p.m. on Friday, June 16.

Respectfully submitted,

Tom Murray

## Appendix 1

### AGENDA

#### ASSESSMENT STEERING COMMITTEE MEETING, JUNE 15 - 16, 2000

Danish Polar Center, Copenhagen

#### **Thursday, 15 June, 0830-1800:**

1. Author nominations
    - o Selection of chapter headings and lead and contributing authors
    - o Planning of the next ASC meeting with the lead authors
    - o Financial support for lead and contributing authors
  2. Modeling and Scenario Groups
    - o Report on the IPCC scenario workshop (Tom Murray or Betsy Weatherhead)
    - o Review of the Terms of Reference for the ACIA modeling and scenario groups
    - o Discussion on how to establish these groups as quickly as possible
  3. ASC
    - o Membership of the ASC
    - o Executive Director and Deputy Director positions
    - o Relationship to IPCC
  4. ACIA 5-year budget
    - o Discussion of budget
    - o Funding by Arctic and other countries (Bob Corell)
  5. Arctic Council Interactions
    - o Action items from the April SAO meeting in Fairbanks
    - o Preparations for the October Ministerial meeting at Barrow (Bob Corell)
    - o Arctic Climate presentation/ public event at Barrow?
  6. Indigenous People
    - o Addition of a second indigenous person to the ASC (Bob Corell)
    - o Native people involvement in the ACIA (Bob Corell)
  7. Communications and outreach
    - o Strategy document (John Calder and Snorri Baldursson)
    - o ACIA one-pager and the ACIA website (Gunter Weller)
  8. Revisions of the ACIA Version 3.4 (Gunter Weller)
  9. Other business
- Dinner together in the evening

#### **Friday, 16 June, 0830-1800:**

Continue discussions on the above topics

## Appendix 2

### ASC Meeting, May 25 - 16, 2000

#### Participants

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## Appendix 3

### ACIA SCIENTIFIC DOCUMENT CHAPTER STRUCTURE – 16 June 2000

The following outline of the different chapters of the assessment scientific document should be viewed as indicative. The more specific structures for the different chapters will be worked out by the lead authors and the Assessment Steering Committee.

#### THE ARCTIC AS PART OF THE GLOBAL CLIMATE SYSTEM

Chapter 1: Climate System and the Roles of Ozone and UV Processes on the Planet and the Arctic

- a. Reference IPCC conclusions, TAR Working Group 1, Chapter 1, global
- b. Reference IPCC conclusions, TAR Working Group 2, Chapter 16, Polar (Arctic subset)
- c. Reference AMAP (Table of Contents, Chapter 11, items 1-6)
- d. Reference UV: AMAP Chapter 11, IASC UV report, WMO Ozone Assessment, Solomon's Nature paper
- e. Feedbacks

Chapter 2. Past and Present Changes of Climate and UV: Climate Variability and Change, Ozone Processes and UV Increases in the Arctic Region

- a. Arctic paleoclimate and historic record
- b. Arctic observational (climate, ozone, UV); indigenous/local knowledge
- c. Note sub-regional variability (present vs. paleo)

Chapter 3. Future Changes of Climate and UV: Modeling and Scenarios for the Arctic Region

- a. The arctic region as part of the global climate system
- b. Focus on the Arctic; regional modeling
- c. A set of scenarios and their interpretation, uncertainty and limits of predictability (with or without stabilization)
- d. Changes in frequency and extent of extreme events
- e. What can be said about future changes for the sub-regions?

#### IMPACTS ON PHYSICAL AND BIOLOGICAL SYSTEMS

Chapter 4. Hydrologic Aspects, Snow, Ice and Permafrost. Consider across time scales.

- a. Precipitation minus evaporation; river runoff; effects on ocean circulation and sea ice
- b. Glacier mass balance changes; effects on sea level rise
- c. Extent and thickness changes of seasonal snow cover
- d. Thawing of permafrost and its effects on structures and ecosystems

- e. Changes in river and lake ice and their effects on humans and ecosystems

#### Chapter 5. Terrestrial and Freshwater Ecosystems

- a. Function and structure of arctic terrestrial and freshwater ecosystems
- b. Past changes in arctic terrestrial and freshwater ecosystems
- c. Vulnerability of the ecosystems to changes in climate and UV
- d. Effects of changes in climate and UV on:
  - Carbon and nutrient cycles, soil processes
  - Vegetation: productivity, distribution and biodiversity
  - Fauna: Abundance, distribution and biodiversity

#### Chapter 6. Oceanic and Marine Systems

- a. Effects on physical environment. Recent variations in:
  - Water mass distribution (temperature / salinity / stability)
  - Sea ice distribution / ice thickness
  - Circulation pattern
  - Thermohaline circulation
  - Atmospheric forcing (AO/ El Niño)
  - Teleconnections
- b. Effects on marine ecosystems
  - General description of marine food web, production processes
  - Impacts on:
    - plankton production (primary, secondary)
    - fish stock population parameters (recruitment, growth, migration, distribution)
    - marine mammals

### **IMPACTS ON HUMANS AND THEIR ACTIVITIES**

#### Chapter 7. Indigenous Peoples and Native Lands.

- a. Different arctic indigenous peoples and their way of living, including diet
- b. Land and water rights
- c. Traditional land use, including spiritual sites
- d. Social and cultural activities

#### Chapter 8. Wildlife and Conservation Issues

- a. Selected rare and endangered species. Risk analysis
- b. Selected wildlife species of societal interest
- c. Migratory birds
- d. Introduction of alien species
- e. Functionality and use of protected areas
- f. Management strategies

#### Chapter 9. Subsistence (reindeer, hunting, marine mammals, fishing, etc.)

- a. Fishing – freshwater and marine

- b. Hunting/herding – terrestrial and marine (animals/birds)
- c. Gathering – berries, mushrooms, etc., firewood
- d. As social/cultural activities
- e. Change in sea ice/permafrost
- f. UV radiation effects on hunting and fishing

#### Chapter 10. Fisheries and Aquaculture

- a. Historical yields of fish stocks, and of aquaculture
- b. Analysis of yields versus past climate variability and trends
- c. Analysis of UV-B effects on key fisheries and food web species, and aquaculture
- d. Projected impacts on fisheries and aquaculture of future climate and UV-B variability and change

#### Chapter 11. Forestry and Agriculture

- a. Animal husbandry (health of species, e.g., cows, sheep)
- b. Food crops, e.g., grass, potatoes, barley
- c. Productivity and economic value of northern forests
- d. Forest health (e.g., insect pests, wildfires)

#### Chapter 12. Human Health

- a. Distribution and pattern of diseases (temperature-related, contaminant-related, etc.)
- b. Water supply and sanitation
- c. Population growth and demographic change
- d. Air pollution
- e. Highlight increases in UV

#### Chapter 13. Infrastructure, including business/industry

- a. Hazards due to floods, erosion, permafrost thawing, sea ice changes, etc.
- b. Buildings and other structures
- c. Oil and gas resource development; mining; pipelines
- d. Transportation systems, roads, ports, airports, railroads
- e. Communities: waste disposal, water supply, settlement relocation

### **SYNTHESIS**

#### Chapter 14. A Synthesis: Implications of Climate Variability and Change and UV Increases for the People and Institutions of the Arctic Region

- a. Major patterns and variabilities of the change and impacts for the arctic region
- b. Implications of such changes for ecosystems and their services across the arctic region
- c. Main consequences of socio-cultural change, impacts and vulnerabilities across the Arctic
- d. Economic and infrastructural consequences of these changes for the people and institutions of the arctic region

## Appendix 4

### Summary of IPCC Scenarios meeting NYC May 15-17, 2000

**Betsy Weatherhead**

Roughly 15-20 people attended the meeting chaired by Martin Parry. The meeting was attended by most of the members of the committee, who have clearly met together many times before. Neal Leary of the Working Group 2 Technical Support Unit also attended. The meeting dealt with some administrative issues, such as management of the web site, but also enabled a good deal of free-thinking about the future priorities and scope for this group.

The stated purpose of this group is to act as a liaison, of sorts, between the impacts community and the GCM community. Perhaps it is useful to think of this as a link between working groups 1 and 2 of IPCC.

Much of the discussion was on the scenarios and the mitigation and stabilization levels used as reference in IPCC in the assessment soon to be published, the “Third Assessment Report” or “TAR.” The word “scenarios” is used in a fairly specialized way in this group. It primarily refers to the set of assumptions brought together as input to the global climate models. For the TAR, scenarios were developed under a large project, Special Report on Emissions Scenarios (SRES), funded specifically to forecast energy use, population and land use, and other variables. Because of the complexity of forecasting such things, no single storyline was concluded. Instead, forty storylines were developed which have been grouped in four classes referred to as, A1, A2, B1 and B2. Of these forty scenarios, four are considered to be “illustrative” and an additional two are also highlighted for special attention. To be exceedingly brief, the A2 illustrative scenario implies a worst reasonable case scenario with no clear attempts at mitigation, while the B2 illustrative scenario implies perhaps a more reasonable expectation (This is my judgement—IPCC people do not make such judgements and we in ACIA probably shouldn’t either).

The GCM community is being strongly encouraged to run the A2 and B2 illustrative scenarios if they are only going to run two scenarios. Seven or eight groups are believed to have run the SRES a2 and B2 scenarios: CCC, CCSR, GFDL, HadCM3, PCM, LSM, CSIRO and MRI. I know only half of these groups.

The development of the SRES scenarios involved population and gridding information to a 1 degree by 1 degree resolution. No information was gridded any more finely than that. I’m not sure how much of the SRES scenario information is currently available. There is a summary document, “SRES for Policymakers,” but most other documentation is either not written yet or not being circulated to the general public. The web site where much of the information is kept requires a password and is currently disabled, in part because it contains outdated information. In fact, the SRES scenarios themselves underwent some

development after the first set was released. This updating of SRES scenarios means that there is some inhomogeneity in the GCM results.

In addition to these in-depth scenarios, there are two stabilization scenarios being examined: they address the situation of CO<sub>2</sub> stabilizing out at either 550 or 750 ppm. These two levels were chosen by Bob Watson.

We have a great deal to gain from the experience of the SRES. Because of the level of involvement from a number of sources, including the energy industry, we would be wise to heed their experience. Some of their experience has become manifested in their use of language. For instance, they have chosen not to use terms such as “predictions” or even “best guess” because it implies an endorsement of a particular vision of how the future may unfold.

There was very little representation of regional modelers or specialists in downscaling techniques that might be particularly useful for Arctic assessments. Again to be brief, regional modelers generally put their computing efforts into modeling current climate or future changes in a region of the world (e.g. Western Canada or the whole Arctic), often with their model linked in some form to a GCM. Downscaling involves taking output from a GCM and using statistical techniques to estimate how the predicted changes may manifest on a sub-grid scale, making use of information such as orography and weather patterns. Both techniques are useful for addressing predictions of change at the sub-regional level.

It was noted that there is a tremendous diversity of regional models. John Mitchell from the Hadley Center has ideas for offering a single regional model that could be adapted for “any” region of the world with some training. In reality, the implementation of this idea is likely to be expensive and a couple of years to fully develop. The resulting model, though, would be of known quality and would be designed to run on a PC.

WCRP has a meeting at the end of May in Copenhagen of an ad hoc group on Regional Climate Models.

Linda Mearns (USA), who works closely with Amanda Lynch (Arctic regional modeler) was in attendance along with Tim Carter (Finland, originally UK). They were able to discuss some of the current issues with Arctic regional modelers. A meeting was held recently in Tromsø, but unfortunately was not well attended. Regional modelers are at work at a number of places in and near the Arctic. These groups are working in Denmark, Sweden, Finland and Norway.

Tim Carter and Mike Hulme wrote a very nice paper explaining types of scenarios based on the GCM view of things. Among the highlights of this paper was a listing of the types of scenarios used in GCM work: I’ve included an excerpt to allow us to mesh our vocabulary and scenario work with their framework.

Excerpted from Tim Carter and Mike Hulme's paper:

*Scenarios have been applied in climate change analysis for many years, and scenario development is now an expanding branch of climate change science. It is helpful to list the types of scenarios that are of potential relevance in considering different aspects of the climate change issue. These include scenarios of:*

1. *global demographic, socio-economic and technological "drivers" that underlie greenhouse gas emissions (labeled GLOSOC);*
2. *regional/national demographic, socio-economic, technological changes that condition vulnerability and adaptive capacity to climate change (REGSOC);*
3. *future greenhouse gas and aerosol precursor emissions at global or continental scale (GLOEMI);*
4. *global (or large region) atmospheric composition responsible for climate forcing - i.e. concentrations of greenhouse gases and aerosols (GLOCON);*
5. *regional atmospheric composition and other environmental changes of importance for climate change vulnerability, such as atmospheric pollution, UV-B, water availability/ quality; marine pollution, etc. (REGENV)*
6. *the global-mean temperature response to concentration scenarios (GLOCLI);*
7. *regional patterns of climate change of importance for impacts (REGCLI);*
8. *the global-mean response of sea-level to global temperature scenarios (GLOS-L);*
9. *regional patterns of sea-level change (REGS-L).*

In general scenarios usually involve assumptions which go into a GCM, or represent commonly evaluated output from a GCM. There can be some overlap depending on the scenario.

It is likely that for the Arctic we will want to alter the list of scenario types. For instance, it may be useful for assessing effects to shoreline animals, to develop a scenario on the change of sea ice extent, in a similar manner to scenarios developed in IPCC on the level of CO<sub>2</sub> (“assume that CO<sub>2</sub> is maintained by some means at a global average of 550 ppm” or “assume that sea ice recedes by some means a total of 25%”).

Another issue from which we can gain some insight and can then work to coordinate are the time steps viewed as critical for IPCC. Currently three years are highlighted as markers: 2020, 2050 and 2080. I did not see any work that showed data beyond 2100. There was some call for work to be extended beyond 2100 but this was not discussed much nor was it explained.

The web site that the group maintains was discussed at some length. Decisions were made to continue working with CIESIN and to continue to encourage the development of mirror sites, to allow easier access of the data. CDs were also agreed to be very useful particularly for developing countries because downloading large amounts of data is very

difficult across continents. One web site that works well is the UK's <http://link6.cru.uea.ac.uk/>, including the "scenarios related links" page.

One of the primary purposes of the web site is to disseminate GCM scenario output to the impacts community. There was considerable discussion on whether raw data should be supplied as "value added" information at the web sites. The "value added" information may be politically difficult as it would imply that output from some groups is simply better than others—always a very difficult thing to communicate but potentially very valuable. No resolution was reached on this issue, although it was agreed that "Provision" of information was different from and preferred to "Guidance." Along these lines, the issue was raised over whether this group and their web site should accept all modelers' output. The issues in favor of being open were diversity, funding and politics. The issues in favor of being restricted were standards, cost and simplicity. One criterion to be potentially used is whether a particular model had been through either the Atmospheric Model Intercomparison Project 2 (AMIP2) or the Coupled Model Intercomparison Project 2 (CMIP2) process. It was not clear whether the AMIP2 process was still accepting new input, but it was agreed that the CMIP2 process was still open.

There was also considerably discussion on whether "scaling techniques" could be used to produce more output for the web site. Simply put, "scaling techniques" involve extrapolating one's estimates of future change. For instance, if one has GCM output for the case of 550 ppm CO<sub>2</sub> and knows how their model would respond on a global level to an additional 500 ppm CO<sub>2</sub>, the entire global field of data from the first run could be "scaled up" by an appropriate amount. The Hadley Center has done considerable work to show that this technique works; the rest of the group showed hesitancy in supporting this approach for a number of reasons.

Another issue discussed which has strong impact on (and effects from) the Arctic was the partition of greenhouse gases. In the past, many models were run with virtually all of the greenhouse gases being represented by CO<sub>2</sub>. In the future, more effort will be put to partitioning appropriately the various greenhouse gases. This is crucial for the Arctic because the stratospheric temperatures are very sensitive to relative amounts of CO<sub>2</sub> versus methane for a fixed CO<sub>2</sub> equivalent level. This is also where Arctic work can be important because the amount of methane stored in the Arctic is likely to change as permafrost changes and land uses change.

An important document referenced in the discussions was "Guidelines on the use of scenario data for climate impact and adaptation assessment" Dec 1999 written by Tim Carter, M. Hulme and M. Lal. We can get a draft from [http://ipcc-ddc.cru.uea.ac.uk/cru\\_data/support/guidelines.html](http://ipcc-ddc.cru.uea.ac.uk/cru_data/support/guidelines.html). This 77-page paper is very useful for making use of GCM data, particularly IPCC output.

Tom Murray and Betsy Weatherhead made a joint presentation on the second day. It was well received with a number of questions and comments. There seemed to be no concern about ownership of the assessment process. Tom arranged for a short private discussion

with Cynthia Rosenzweig about how ACIA should proceed on scenarios. Dr. Rosenzweig was very much in favor of a workshop to discuss this and tentatively agreed to participate. Three other people stood out as being potentially very useful to the ACIA process. Tim Carter (Finland) shows a broad understanding of scenarios and particularly of the Arctic regional modeling community. Hugh Pitcher (USA) showed very broad and in-depth understanding of the socio-economic factors going into many of the IPCC scenarios. Linda Mearns showed clear interest in the Arctic and was particularly interested in exploring techniques for developing scenarios for the Arctic.

Three words kept running through all threads of conversation: mitigation, adaptation and stabilization. These three themes seem to provide a framework in terms of how this group thinks about impact of future climate change.

One final comment on word usage: IPCC WG3 does **not** offer policy advice, but does offer “policy relevant information.” This appeared to be a critical distinction. Tom Murray was clear that AMAP and CAFF would take our assessment and offer policy advice to the Arctic Council. It may be important whether the final documents can be included as an IPCC co-sponsored output. There were some words exchanged with some of the people about making this activity co-sponsored by IPCC. Two possibilities are to make this an “IPCC sponsored activity” or an “IPCC Special Report.” Bob Watson may be able to OK an “IPCC sponsored” status, but becoming an “IPCC special report” is more difficult. Lots of specific steps are required for the “IPCC special report” including the manner in which we solicit authors--all IPCC countries must be contacted through their IPCC lead contact, etc. and text must go through a governmental review as well as the scientific review.

## Appendix 5

### Summary report on TGCIA meeting, May 15 - 17, 2000, in New York City

by Tom Murray

Betsy Weatherhead and I participated as guests in a meeting of the IPCC Task Group on Climate Scenarios for Impacts Assessment (TGCIA). We were invited to participate in this meeting so that we could become better acquainted with TGCIA's work and inform other meeting participants about progress to date of the Arctic Climate Impact Assessment (ACIA).

To the extent a newcomer could tell, the purposes of this TGCIA meeting were:

- to plan the advancement of the art of climate scenario development over the next few years,
- to bridge any perceived gap between those who develop scenarios of climate change and those who examine the impacts of climate change,
- to promote consistency in scenario usage among IPCC Working Groups 1, 2 and 3, and
- To discuss a number of technical matters such as pattern scaling, regional climate models, usefulness of scenarios on regional and national scales, operation of the IPCC Data Distribution Centre (DDC), utility of writing a special IPCC report on scenario development, etc.

The TGCIA has helped to generate a standard, published set of quality-controlled projections of climate variables and non-climate variables applicable over the next century. This set of data is made available on the DDC website -- <http://ipcc-ddc.cru.ac.uk/>. The members of TGCIA believe that development and delivery of IPCC scenarios is relevant to policy formulation as well as to the study of impacts. Their working assumption is that there will be a fourth IPCC assessment, though they are not at this time making any explicit assumptions regarding its structure. By and large, participants in the meeting appeared quite interested in the IASC-AMAP-CAFF attempt to carry out an assessment of the potential impacts of climate change on the Arctic region -- something that could interface with a fourth IPCC assessment and provide an example of a comprehensive regional climate impact assessment.

A report on the meeting and its conclusions is supposed to be available shortly. Betsy and I may be invited to contribute to it. When it becomes available, we will share it with the Assessment Steering Committee.

My own scattered reflections and recommendations resulting from the TG CIA meeting:

- The whole business of studying the potential impacts of climate change at any scale is terribly dependent on the use of quantitative models. It will be difficult to introduce non-quantitative variables, such as anecdotal information, into the analysis.

I was confirmed in my suspicion that we are really dealing with two quite different kinds of models: climate models such as GCMs or RCMs, and non-climate models that project variables such as population, GNP/GDP, per capita energy usage, etc. into the future. Combining the two is not easy; but, to some extent, it is essential to impact analysis.

- If the results of ACIA are to be integrated with those of IPCC at a later date, we in the ACIA community must continue to participate in the scenario development work of TG CIA. Otherwise, we may arrive at final reports that are regarded as fundamentally flawed and not welcome in the world of IPCC. But this does not imply that we should rush to adopt the structured IPCC ways of doing business.
- Betsy and I gave a presentation on ACIA and answered a number of perceptive questions. From the tone of several of the questions, it appeared to me that some meeting participants envy the freedom ACIA currently enjoys to operate outside IPCC-style rules.
- Bringing the results of GCMs down to the regional level is still very much a work in progress.
- I wonder whether non-climate data available from the DDC or CIESIN will be much help to ACIA. It may be that we will get better non-climate data directly from the eight Arctic nations.
- Meeting participants were aware of the problems created when IPCC Working Groups I, II and III simultaneously developed and used their own separate scenarios that may not be consistent with one another. TG CIA is gently trying to persuade the working groups to use common scenarios available through the DDC. It will be advisable for ACIA to pay attention to these common scenarios -- especially the six SRES scenarios that have been marked for "special attention."
- If TG CIA decides to do a special report on development of regional climate change scenarios, members of the ACIA community should ask to participate in it. But I wonder whether it would be done in time to be really useful to ACIA.

- John Mitchell of the Hadley Centre for Climate Prediction and Research seems to be a highly gifted climate modeler. All the other meeting participants looked to him for leadership on that subject.
- Hugh Pitcher of the Battelle Pacific Northwest Laboratory is very knowledgeable about non-climate socio-economic and impacts models. At one point during the meeting, he volunteered to take the lead in organizing data on population, income and emissions that will be put on the DDC website. Hugh works in Washington, DC. I will try to keep in touch with him.
- Tim Carter was, in my judgment, the most knowledgeable and respected person present on the use of scenarios for impact assessment. He was one of the coordinating lead authors of the chapter on "Developing and Applying Scenarios" in Working Group 2 and one of the lead authors of the chapter on "Climate Scenario Development" in Working Group 1 in the IPCC Third Assessment Report that is now under review. I recommend that ACIA try to capture his talents.

I talked with Tim about his availability to help with the scenario construction effort in ACIA. He agreed to think about working on ACIA. But he pointed out that IPCC will absorb most of his attention for the next year. I recommend that we invite Tim to the ACIA scenario development workshop. The worst he can do is say no, and he might say yes.

- I asked Cynthia Rosenzweig of the Goddard Institute for Space Studies whether she would be willing to give a primer or briefing on scenario construction to those of us who need it. She responded that she would be quite willing to provide such a briefing, perhaps during one of her frequent visits to Washington, DC. But her clear preference is that we invite her to participate in a two-day meeting or workshop when we begin the Arctic scenario development process.

## **Appendix 6**

### **Terms of Reference for the ACIA Modeling Group**

The ACIA Modeling Group will assess, compare and use climate models to provide future climate scenarios as needed for the Arctic Climate Impact Assessment. The group will have experts from different countries and organizations, selected by the Executive Committee of the Assessment Steering Committee (ASC) already established for the ACIA, and it will be guided by the ASC.

The responsibilities of the group are to:

1. Review the current state of Arctic climate models (both GCM and regional models) in terms of the simulation of present day climate and climate change.
2. Coordinate this review with IASC and other Arctic-interested modeling groups.
3. Review the role and requirements of modeling of the Arctic climate for the ACIA.
4. Establish the extent to which GCMs and limited area (regional) models can be used to meet the requirements of the ACIA.
5. Explore the statistical predictors of climate change, e. g. regression analysis models and model output statistics.
6. Work closely with the ACIA Scenario Group in assembling and coordinating the ongoing development of climate scenarios for the Arctic to serve the ACIA effort.

The ACIA Modeling Group will meet initially in a workshop in summer 2000; this may be followed by other workshops as needed. These workshops will be organized through the ACIA Secretariat. The group will also meet with the ACIA Scenario Group which will have a parallel workshop in summer 2000. Following the workshop(s) the group will report to the ASC on progress and to discuss any problems.

### **Terms of Reference for the ACIA Scenario Group**

The ACIA Scenario Group will produce, in conjunction with the ACIA Modeling Group, climate and other relevant scenarios as needed for the Arctic Climate Impact Assessment. The group will have experts from different countries and organizations, selected by the Executive Committee of the Assessment Steering Committee (ASC) already established for the ACIA, and it will be guided by the ASC.

The responsibilities of the group are to:

1. Review the current state of Arctic climate and other relevant impact scenarios.
2. Coordinate this review with IPCC and other groups developing impact scenarios.
3. Review the role and requirements for Arctic scenarios of the ACIA.

4. Establish the extent to which scenarios can be used to meet the requirements of the ACIA.
5. Construct climate and other scenarios as required by the ACIA.
6. Work closely with the ACIA Modeling Group in assembling and coordinating the ongoing development of climate scenarios for the Arctic to serve the ACIA effort.

The ACIA Scenario Group will meet initially in a workshop in summer 2000; this may be followed by other workshops as needed. These workshops will be organized through the ACIA Secretariat. The group will also meet with the ACIA Modeling Group which will have a parallel workshop in summer 2000. Following the workshop(s) the group will report to the ASC on progress and to discuss any problems.

## Appendix 7

# Report of the ASC Executive Committee to the ASC Concerning Secretariat and Membership on the ASC

June 16, 2000

### Concerning the Secretariat:

The Executive Committee of the ASC has reviewed the needs of the ACIA and the various potentials for an ACIA Secretariat. Concerning the Secretariat, the Executive Committee recommends:

- The ASC endorses the proposal of the United States to establish the ACIA Secretariat at the University of Alaska Fairbanks,
- The ASC endorses the appointment of Dr. Gunter Weller as the Executive Director of the ACIA Secretariat, and
- The ASC recognizes that the Executive Director of the ACIA Secretariat has full responsibility for the implementation of the ACIA Secretariat (organizational arrangements, budget, personnel matters, etc.). In this context, the ASC encourages the Executive Director to broaden, where possible, the professional staff with qualified individuals from other countries.

### Concerning Participation in the ASC:

The basic framework for the establishment of and appointments of individuals to the ASC is addressed in ACIA Implementation Plan version 3.4. It is recommended that the ASC expand its understanding of participation in the ASC and incorporate such into the next draft of ACIA Implementation Plan by including the following additional matters:

- The ASC operates on the basis of consensus.
- When lead chapter author appointments for specific chapters involve the appointment of Co-Lead Chapter Authors, one of the Co-Lead Chapter Authors will serve as a participant in the ASC (as required by Implementation Plan version 3.4) and the other(s) Co-Lead Chapter Author will be an alternate(s). Whenever one of the Co-Lead Chapter Authors enables the ASC to have full participation by all Arctic-rim countries, then that Co-Lead Chapter Author that provides that participation shall be the participant in the ASC, and
- The participation by individuals outlined in Implementation Plan version 3.4 should be amended to include the appointment of individuals as liaison to the ASC. Liaison participation will be extended by the ASC on a case-by-case basis. The ASC has already extended, as of June 16, 2000, liaison participation to (i) two representatives of the principal funding agencies (NSF and NOAA) supporting the Secretariat, and (ii) a representative of the IASC Secretariat.

Any future liaison participation shall be reviewed by and approved by the ASC and reported to AMAP, CAFF, IASC, and the Senior Arctic Officials of the Arctic Council.

Appendix 8

Draft Budget for ACIA

TABLE 1 – SECRETARIAT OPERATIONS

POSITION	TIME	SOURCE OF FUNDS	Year 1 Cost 2000	Year 2 Cost 2001	Year 3 Cost 2002
ASC Secretariat staff & operation	1 person and 1/2 admin.	U.S Others	\$225,000 0	\$225,000 0	\$225,0
Extra experts & Indigenous People	20 people per year (\$2,500 x 20)	U.S. Others	\$50,000 0	\$50,000 0	\$50,0
Thematic Data Center operation	1 admin., 1 program	U.S. Others	0 0	\$150,000 0	\$150,0
Data Gathering <i>(deleted—provided by other projects)</i>					

TABLE 2 – MANUSCRIPT DEVELOPMENT

ACTIVITY	NUMBER OF MEETINGS	NUMBER OF PEOPLE	SOURCE OF FUNDS	Year 1 Cost 2000	Year 2 Cost 2001
Overall ACIA scoping meeting	1	30 invited @ \$2,000 ea.	U.S. Others	\$60,000 0	
ASC Meetings	2 per year for 5 years	20 invited @ \$2,000 ea.	U.S. Others	\$20,000 \$20,000	\$20,000 \$20,000

Workshops, specific issues (e.g., Modeling Workshop)	1 per year for 2 years	40 invited @ \$2,000 ea.	U.S. Others	\$40,000 \$40,000	\$40,000 \$40,000	
Open Meetings	1 per year for 2 years	40 invited @ \$2,000 ea.	U.S. Others		\$40,000 \$40,000	
Chapter Drafting Meetings	1 per chapter per year for 2 years	80 invited @ \$2,000 ea.	U.S. Others		\$80,000 \$80,000	
Cross-Fertilization Meetings ( <i>deleted—provided by other projects</i> )						
Lead-authors' Work Time		10 @ \$15,000 ea. for 3 yrs	U.S. Others	\$30,000 \$120,000	\$30,000 \$120,000	
Co-authors' Work Time		100 @ \$1,000 ea. for 2.5 yrs	U.S. Others	\$20,000 \$80,000	\$20,000 \$80,000	

**Table 2 Totals:    \$430,000    \$610,000    :**

**TABLE 3 – REPORT PREPARATION**

POSITION/ACTIVITY	TIME	SOURCE OF FUNDS	Year 1 Cost 2000	Year 2 Cost 2001	Ye
Journalist drafting	1 person	U.S. Others			
Technical Editing	1 person	U.S.			
Technical support ( <i>deleted—see Technical Editing</i> )					
Review Panel for each chapter (est. 10 chapters)	6 people for each chapter @ \$2,000 ea.	U.S. Others			

Graphical Production and Layout	3 months	U.S. Others			
Layout ( <i>deleted, see above</i> )					
Communication (outreach)		U.S.			
Printing of Reports, Internet		U.S. Others			
Distribution of Reports		U.S. Others			

**Table 3 Totals:                      \$0                      \$0**

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<b>GRAND TOTALS (TABLES 1–3)</b>		<b>U.S.</b>	<b>\$445,000</b>	<b>\$655,000</b>
		<b>Others</b>	<b>\$260,000</b>	<b>\$380,000</b>
		<b>Combined</b>	<b>\$905,000</b>	<b>\$1,035,000</b>
<b>Total for U.S.:</b>	<b>\$ 2,490,000</b>			
<b>Total for Others:</b>	<b>\$ 1,225,000</b>			
	<b><u>\$ 3,715,000 GRAND TOTAL</u></b>			

## ACIA Outreach and Communications Strategy

### Draft (20 June 2000)

**PURPOSE:** To inform participants, stakeholders, Arctic residents, and national policy-makers of the progress and results of the ACIA, to seek their guidance on ways to strengthen the ACIA, and to promote the scientific and policy recommendations resulting from the ACIA.

**AUDIENCE:** The audience consists of the scientific community; the lay public, especially the native and other residents of the Arctic; and policy- and decision-makers in government and industry.

#### **COMMUNICATIONS TOOLS:**

(Note: It is intended that all communication of scientific information will be based on reviewed scientific information from ACIA activities or elsewhere, and will not be based on ACIA interim documents or discussions in-progress.)

##### **1. Internet-based tools:**

A. Develop and maintain the ACIA Web Site:

- Home Page with ACIA overview.
- Frequently Asked Questions (to provide more detail than the overview).
- Relevant Documents (e.g. ACIA Implementation Plan version 3.4).
- Plans, dates, contact points, etc.
- Interactive tool (e.g. guest-book) for receiving comments on the ACIA.

B. Ensure that links to the ACIA site are placed on important Arctic and Climate-related web sites internationally.

##### **2. Mail (including email) lists:**

**Develop mail and email lists to distribute relevant information, *inter alia* to notify about important events and new documents mounted on the ACIA Web Site.**

##### **3. In-person Presentations:**

A. Briefings<sup>i</sup> – develop a “canned” computer-based slide show that can be replicated and used by anyone at any time. Emphasize graphics and animations. Update the slide show as the ACIA progresses.

B. Open Meetings, e.g., ACIA Symposia for scientists and stakeholders (do we want to do this? How frequently?) Perhaps held in conjunction with another event to enhance attendance.

C. Presentations at Scientific Conferences, Industry Fora, and at Meetings of Indigenous People or Stakeholders<sup>1</sup>

**4. Publications<sup>ii</sup>:**

A. Articles in Popular Scientific Magazines<sup>2</sup>

B. Publication of Summary Scientific Findings in Scientific Journals, primarily developed by the Lead Authors.

C. Posters - designed for school children and the lay public, using images and pictures to the greatest extent possible for the benefit of the Native communities

D. Final Reports (3 products) on Web Site, CD-ROM, Paper

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<sup>i</sup> These activities may be carried out by the ASC Chair or Vice-chair or other ASC members, including the Lead Authors, as arranged by the ASC.

<sup>ii</sup> These will mainly focus on the findings of the ACIA.