

## **Summary Report on the Tenth Assessment Steering Committee (ASC) Meeting, 15-16 October 2003, London, U.K.**

### **Opening**

ASC Chairman Bob Corell opened the 10<sup>th</sup> Assessment Steering Committee (ASC) meeting at 8:30 a.m. in the Department of Environment, Food and Rural Affairs, London, U.K. He told the committee that the chapters of the draft Arctic Climate Impact Assessment (ACIA) scientific document had gone out for technical review and that a large number of responses had been received, with more arriving each day.

Bob reported on a meeting about the future of Arctic research that had been held by Arctic ministers in Norway in August. Following that meeting, a number of ministers of the environment and other officials participated in a cruise from Svalbard, a cruise that focused on climate change and its impacts. Pål Prestrud led the cruise. Bob also noted that an informal meeting of Senior Arctic Officials had recently been held to examine the progress of ACIA.

Helgi Jenson stated that a recent AMAP-CAFF meeting cut the draft policy document to five pages, but he noted that the scientific summary part of this document remained to be developed. On 15 November the entire policy document is scheduled to be circulated for review. He requested that any comments on the policy document be sent to him by mid-December at the latest.

Bob Corell said that Craig Dorman had distributed a one-page U.S. policy statement regarding the ACIA, and that the U.S. statement would be discussed by the Senior Arctic Officials at their next meeting. Bob pointed out that ACIA is acting under guidelines that were approved by the Arctic ministers and that the assessment would continue on its current course unless instructed otherwise by the ministers.

### **Chapter reviews**

Bob said that the day's primary job was to go through the technical reviews of the chapters in the scientific document.\* He asked lead authors present to tell the committee how they planned to respond to the reviews. He reported that the Assessment Integration

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\* Publications being developed by the Arctic Climate Impact Assessment (ACIA) include:

- the scientific document -- the detailed, fully-referenced text of the assessment
- the overview document – a short summary of the principal points in the scientific document, intended for the general public
- the policy document – a statement of policy recommendations formulated by AMAP and CAFF of the Arctic Council and intended for policy makers

Team (AIT) had met the day before and recommended that the size of the draft scientific document be cut approximately twenty percent overall. The AIT also recommended that each chapter in the assessment begin with a one-page summary and include a section on future research needs. In addition, Bob thought the deadline for receipt of final text could be extended from mid-December 2003 to 16 January 2004.

#### Chapter 1 – An Introduction to the Arctic Climate Impact Assessment

Gunter Weller presented viewgraphs summarizing the principal comments that had been received from reviewers concerning this chapter. Several shortcomings were noted, and Gunter assured the committee that they would be rectified. The AIT recommended that the term “indigenous people” be used throughout the assessment, not native or aboriginal or the like. Gunter said his writing team would re-write the history of ACIA within this introductory chapter and would discuss climate variability in addition to climate change.

#### Chapter 2 – Arctic Climate System and its Global Role

Gordon McBean summarized reviews of this chapter. He said his writing team would try to shorten the chapter. Some reviewers had commented on the “textbook” nature of the chapter, and Gordon said the team would look at this question again. He acknowledged that more references should be made to the basis that been laid by IPCC, especially in the section on attribution of global warming to human influences. He pointed out that modeling was omitted from this chapter since it is dealt with elsewhere in the assessment. He said that some indigenous perspectives and observations would be analyzed and added to the chapter.

#### Chapter 3 – Atmospheric Ozone and UV Radiation

Aapo Tanskanen reported on the large number of comments that were received on this chapter. Reviewers noted that WMO had recently published an ozone assessment that was not referenced in the draft assessment. Reviewers thought the chapter needed a map of the principal ozone monitoring sites. Aapo thought some reduction in the size of the chapter could be achieved, including perhaps one-third of the figures and some references. He wanted to examine the contents of the introductory chapter of the assessment in order to find out what things needed to be explained in chapter 3 and what did not. Authors of this chapter want it to be relatively independent so that it can be read and understood separately.

Lars-Otto Reiersen expressed the opinion that the chapter as it stood was too technical, including many equations that contribute little to the overall impact assessment. He suggested that the authors look at the human health chapter to see what material might better be located here. He recommended that the chapter be re-drafted by mid-November so that another set of reviews could be solicited before the mid-January deadline.

The committee asked the authors of this chapter to have it re-written by 1 December so that it can be subjected to another set of technical reviews.

#### Chapter 4 – Future Changes of Climate: Modeling and Scenarios for the Arctic Region

Vladimir Kattsov reported that twelve reviews of this chapter had been received, most of them rather favorable. Comments were on modeling of mean changes rather than extreme changes, use of the B2 scenario rather than the full range of SRES scenarios, the absence of regional climate models, the absence of an Arctic cooling scenario, and what appeared to be imbalance among sections in the chapter. He said the writing team is prepared to handle all these questions. Specifically, the writing team will strengthen the arguments for keeping only the B2 scenario rather than attempting to consider the full range of scenarios, and the team will explain their reasons for concentrating on mean changes. A meeting of the authors of chapter 4 is planned to fix any remaining problems.

Erland Källén said the major issue raised by the reviewers is the choice of the B2 scenario. He said an earlier Arctic climate modeling meeting had recommended that the chapter deal with only one scenario, and B2 seemed to be the right one. The second main issue is the current concentration on mean changes rather than extremes. This will need to be defended. In response to a question by Gunter Weller, Erland noted that the chapter does include some material on Arctic regional models.

Lars-Otto Reiersen asked if this chapter should not consider abrupt climate changes. Vladimir responded that he did not know of any models that dealt adequately with abrupt changes. Erland noted that IPCC tried to study this topic but did not get very far.

Bob Corell asked the authors of chapter 4 to at least tell readers how they attempted to consider the possibility of abrupt climate changes. He also asked them to reduce the size of the chapter.

#### Chapter 5 – Cryospheric and Hydrologic Variability

John Walsh said that he had received 66 pages of comments from reviewers. He thought the principal items concerned the need for an alphabetized list of acronyms, a glossary of discipline-specific terms, overlap with chapter 15 and other chapters, material on sea level rise, multi-year ice cover, redistribution of ice cover, adequacy of data on snow cover, material on glaciers, and the length of the chapter. He said the removal of “textbook” sections should reduce the size of the chapter by about 20%.

Mike MacCracken commented that it was important to deal with data that may show a warm period in the early 20<sup>th</sup> century. Terry Prowse noted that it was also important to consider river discharge data. John Walsh agreed with both of these comments.

#### Chapter 6 – Arctic Tundra and Polar Desert Ecosystems

[Terry Callaghan, lead author of chapter 6, was not present for this discussion.] Pål Prestrud reported that many technical reviews had been received on this chapter and that most of the comments were both constructive and favorable. Still, since the comments raised about 50 points that deserved careful consideration, it will be almost impossible to deal with all the comments by mid-January.

In response to a question by Gunter Weller, Pål Prestrud said that Terry Callaghan and the other authors of the chapter do intend to reduce its size.

Glenn Juday said that this chapter must address the topic of uncertainty as the term is used by scientists. Bob Corell agreed and said that a lexicon is important both for this chapter and for the entire assessment.

#### Chapter 7 – Impacts of Climate Change and UV Radiation on Freshwater Arctic Ecosystems

Fred Wrona reported that 24 technical reviews on this chapter had been received to date. Reviewers thought the authors should re-examine the balance among the topics in the chapter. The chapter contains a treatment of scientific uncertainty, and reviewers generally like it. Fred thought detailed comments on specific points in the chapter could be handled without great difficulty, and that a mid-January deadline could be met. Another authors' meeting will be held before mid-January. The authors can probably achieve a 20% reduction in the length of the chapter, especially in the fishery sections.

Jan-Idar Solbakken wondered whether Atlantic salmon were receiving due attention in the draft chapter. In response, Fred Wrona said this part of the chapter could be expanded, but the overall size of the chapter still had to be decreased. Bob Corell stressed that the people in all regions of the Arctic must be able to find their place in the assessment. Magdalena Muir wondered if the authors of this chapter were comfortable with their treatment of biodiversity and conservation issues. Fred Wrona answered that they could use help in this regard and would be willing to add a contributing author to deal with those topics.

#### Chapter 8 – Marine Systems

Harald Loeng reported that he had received about 30 pages of quite constructive comments on this chapter. Some of the principal comments dealt with the need of more regional perspectives on climate-related changes in marine ecosystems, use of a model that was not considered in chapter 4, the size of the chapter, the degree of emphasis on fish, suggested improvements in the section on benthic ecosystems, priorities for future research, and definition of terms and abbreviations for non-specialists. Reviewers were generally satisfied with the proposed boxes and summary tables in the text, and they liked the section on UV. Harald said he planned to have a writing team meeting before the mid-January deadline.

#### Chapter 9 – The Changing Arctic: Indigenous Perspectives

[Henry Huntington and Shari Fox, lead authors of chapter 9, were not present for this discussion.] Elizabeth Bush reported that this chapter had received generally favorable reviews. Reviewers especially liked the circumpolar perspective. With respect to possible overlap between this chapter and chapter 11, Elizabeth said she felt that the Assessment Integration Team and the lead authors of the chapters had already dealt with this issue in a satisfactory manner.

### Chapter 10 – Management and Conservation of Wildlife in a Changing Arctic

[David Klein, lead author of chapter 10, was not present for this discussion.] Patricia Anderson summarized concerns voiced by twelve reviewers in 21 pages of comments on this chapter. Some reviewers said there was insufficient focus on climate change issues. One reviewer commented that the draft chapter failed its stated objectives and instead focused on harvest regulations and quotas. Another reviewer stated that chapter 11 concentrates on herding, hunting and gathering so that chapter 10 should pay more attention to conservation. Still another noted a major problem in that the chapter should address climate change impacts on wildlife management and conservation rather than wildlife per se, but that it was written by a group of experts in wildlife biology/ecology rather than by experts on institutional issues.

Magdalena Muir said that the chapter needed another author who specializes on conservation issues. She offered to help identify such a potential contributing author. Snorri Baldursson stated that the purpose of the chapter appeared to have changed from the ACIA original operative outline. He thought a lot of re-writing was needed.

Bob Corell said that an AIT subgroup would continue to examine this draft chapter and that AIT may need to re-focus the chapter to follow the original operative outline.

### Chapter 11 – Hunting, Herding, Fishing and Gathering

Mark Nuttall summarized the technical reviews that had been received to date. Reviews were generally positive and constructive. Reviewers suggested fine tuning, polishing, clarification of several points, etc. Mark said that case studies in the draft chapter are quite long and some will be shortened. There were specific comments on the title of the chapter, connections to other chapters in the assessment, the need of a summary at the beginning of the chapter, and reformulation of major conclusions. Mark thought his writing team could meet a mid-January deadline for delivery of final text.

### Chapter 12 – Fisheries and Aquaculture

Hjalmar Vilhjalmsson said that all reviewers had found the draft chapter interesting, well written and a good attempt at the difficult task of synthesis. They found the layout of the chapter somewhat confusing. Reviewers noted the different levels of resolution for the Arctic regions, e.g. the text dealing with areas 1 and 4 focuses only on commercially important species, while the text on areas 2 and 3 gives full lists of species and their interactions. Reviews on aquaculture ranged from recommendations to drop the subject completely to requests for a much more comprehensive treatment. The writing team for this chapter intends to continue including aquaculture, but it must be realized that it is difficult to forecast the future development of this industry. Reviewers thought the historical material could be reduced by approximately fifty percent. The section on Bering Sea fisheries appears to need a substantial rewrite. Hjalmar believed that chapter could be shortened substantially, mainly by cutting historical material.

Pål Prestrud said that the authors of this chapter have two main challenges: aquaculture and Bering Sea fisheries. While Snorri Baldursson thought that aquaculture should be dropped entirely, Harald Loeng wanted the chapter to retain a treatment of aquaculture.

Hjalmar Vilhjalmsson replied the writing team has the right people to rewrite the section on the Bering Sea and they could do the job in time to meet the mid-January deadline. The steering committee decided that the topic of aquaculture should be kept in the chapter but that it should be dropped from the title.

#### Chapter 13 – Forests, Land Management, and Agriculture

Glenn Juday reported on material that had been received from 17 individual reviewers and one institutional review, with 58 pages of comments to date and more to come. Reviewers identified strong points as the direct use of scenarios, presentation of overviews, a comprehensive picture of past climates, and clarity in writing. Some issues that need attention include the need of a chapter summary, the length of the chapter, and excessive detail. Some reviewers said that Fennoscandia needed better coverage. Some found it hard to tell whether northern boreal forests are a source or a sink of carbon. The treeline issue was raised, but the writing team believes it has dealt adequately with this topic. The writing team intends to include a limited amount of material on biodiversity. There is a need to coordinate treatments of carbon cycling, biodiversity, and hydrology in various parts of the assessment; and the lead authors will have to confer on this. Glenn thought his team could meet a mid-January deadline and said they would try to reduce the size of the chapter by 20%.

#### Chapter 14 – Human Health

Chris Furgal reported on the general reviews he had received on the draft chapter, together with some very specific comments from people who commented on only one section. The majority of the reviews were positive and helpful, and concerns raised in them can be addressed by the mid-January deadline. Reviewers wanted more information on non-indigenous populations and how their health might be affected by climate change. He said their concerns will be addressed, but focus will remain on indigenous populations because they are more at-risk. Some introductory material on UV and the Montreal Protocol will be moved to chapter 3. A contaminants section was included as a result of the Durham meeting, but it needs to be tightened up and this will be done. The chapter will retain a section on diet and food security. Sanitation will be treated in the chapter, and it will be cross-referenced to chapter 15.

Helgi Jensson asked about the 90% of people in the Arctic who are not indigenous. He also wondered whether the title of the chapter should be changed. In response, Chris Furgal said he did not want to change the title of the chapter, but he said the writing team would deal more explicitly with non-indigenous Arctic populations.

#### Chapter 15 – Infrastructure: Buildings, Support Systems and Industrial Facilities

Arne Instanes reported on the general reviews he had received. Reviews pointed out that sewage belongs in this chapter, that tourism should be included, and that the chapter has little reference to military activity in the Arctic. There seems to be too much focus on Alaska and Siberia and lack of reference to Canada. Arne said that UV effects are not in the chapter since they are treated elsewhere, and neither are socio-economic issues discussed in this chapter.

Snorri Baldursson said that permafrost areas appear to be treated adequately, but that there is very limited consideration of non-permafrost areas – something that could become more important in the future. Mike MacCracken thought it might be good to use lessons learned from the experience of the oil industry and the military. Gunter Weller said it was necessary to have more attention in the assessment to both military and industrial development, and he thought chapter 15 was the right place for this material. He volunteered to help in this regard. Dave Roddick stated that industrial development in the Arctic is sure to grow, and he wanted to be certain that the topic found a home somewhere in the assessment.

#### Chapter 16 – Assessing Vulnerabilities: A Strategy for the Arctic

James McCarthy briefly summarized the technical reviews that had been received to date. Elizabeth Bush wondered about the fit of this chapter in ACIA, since it is not an assessment of impacts of climate change but rather an introduction of a methodology that would be useful in future studies. She also raised reviewers' concern about one of the case studies (Disko Bay) in which the local community had no input, especially since the chapter stresses the role that local communities should play in a vulnerability assessment. Hanne Petersen addressed the same point, noting that when you describe a particular geographical area, you must expect that people from that area will turn to read that section first. But the people from the Disko Bay area were not participants in the study.

Dave Roddick said that, while there were substantive criticisms of the Disko Bay part of the chapter, the Finnmark part of the chapter seemed to have involved local people. He found the chapter interesting, but he was not certain how it fit in the overall assessment.

Mark Nuttall said there was imbalance between the Finnmark and Disko Bay case studies. He said the Finnmark study was quite complete and excellently developed, while the Disko Bay study was not. He wanted to see the Disko Bay study worked out in more detail, if there is time to do the job by the deadline of mid-January.

Lars-Otto Reiersen said he had been interested in this chapter right from the start. He thought the ASC should make a decision on whether to include it in the assessment. He suggested that a smaller group meet to discuss changes that would be required before this chapter could be included in the assessment.

Pål Prestrud said he liked the idea of this chapter, since he thought it was a forward-looking way to perform an assessment. He asked a small group to sit down with James McCarthy and come up with something that could be presented to the ASC the following day. The committee agreed with this suggestion.

The following day, James McCarthy announced that an ASC subgroup had met to consider chapter 16 of the scientific document. (1) He accepted the group's recommendation to refocus the chapter to place climate change within the broader context of social, economic and other changes and point the way forward to thinking about new methodologies for vulnerability assessment. (2) The authors will provide a broader and more thorough review of the evolution of vulnerability assessment

methodology, including the integrated impact assessment and risk-hazard literature. (3) The authors will reconfigure the chapter to put primary emphasis on the Finnmark case study. (4) The Disko Bay case study will become just one of a handful of examples intended to represent the variation in the Arctic-human environment system for which vulnerability assessments could be applied. Because of the work completed to date, the Disko Bay case will likely be the most developed of these. The title of the chapter will be changed to something like “Climate Change in the Context of Multiple Stressors and Resilience.”

The steering committee approved the changes proposed for this chapter.

#### Chapter 17 – Synthesis of the Arctic Climate Impact Assessment

Gunter Weller thought this final chapter should be both a summary and a synthesis. He felt this would be the part of the report read by most people. He noted that the discussion of regional impacts is probably the weakest part of the entire assessment – something he is trying to rectify in this final chapter. He was also trying to include material on the importance of the Arctic to other parts of the earth. This is an admittedly incomplete chapter, and he asked for reactions from the lead authors of other chapters. In answer to a question, Gunter said the chapter includes some material that was not introduced elsewhere in the assessment, especially on development, tourism, etc.

Lars-Otto Reiersen considered the introduction of new material in the summary chapter 17 to be a problem. He thought the summary should refer only to things that had appeared in previous chapters. Helgi Jensson agreed, suggesting that, if important items were not introduced earlier, Gunter could ask the lead authors of earlier chapters to include them. Elizabeth Bush mentioned that the impacts of climate change on oil and development were not included earlier in the document, but she too felt that the summary chapter was not the place to introduce them for the first time. See the section below entitled "The Contents of Chapter 17."

Harald Loeng was surprised that members of the committee wanted Gunter Weller to tell authors of other chapters what they should include. He said lead authors and their writing teams should be responsible for deciding what is important. Terry Prowse thought it should be up to lead authors to decide what should be included in their chapters. Pål Prestrud suggested that all lead authors read the draft of chapter 17 and try to coordinate with Gunter Weller.

#### Reviews of the entire draft ACIA scientific document

Gunter Weller reported on several reviews of the entire document. Substantive comments included: the report is too long, each chapter needs a summary, there is too much historical material and not enough on impacts, there are too many references, the term “indigenous” must be used consistently throughout the assessment, there is duplication among some chapters, industrial development in the Arctic is neglected, the study needs an explanation of the causes of climate change, etc. Structural comments dealt with consistency of chapter layout, the uneven number of levels in the chapters, different scales in maps and figures, style of presentation, and need of a glossary. He

thought these were legitimate concerns and ones that ACIA authors could readily deal with.

### **Attribution**

Bob Corell requested the committee's view on the issue of attribution. He wanted to know "What is the cause of climate change? Is it due to human actions? Should we simply quote parts of IPCC reports?"

Mike MacCracken replied that attribution amounts to figuring out how much each influence (human, solar, volcanic, etc.) contributes to climate change. He said this is hard to do for the Arctic at this time. He and Erland Källén agreed that there is some evidence of human influence on Arctic climate change. Bob Corell said this subject must be carefully addressed in chapter 2, and he asked Erland Källén and Gordon McBean to write a statement on this topic and send it to other ASC members. Erland noted that the authors of chapter 2 must be very careful how they word the attribution of causes of climate change before it is used in other parts of the assessment.

### **Carbon cycle**

Bob Corell pointed out that the carbon cycle is a cross-cutting issue. He wondered how ACIA should deal with it. Should there be a comprehensive treatment located in one chapter?

Gunter Weller thought that it was hard to say anything definitive on this topic for the Arctic region. Fred Wrona noted that chapter 7 says something on carbon, but reviewers seemed to want more. He further noted that there are programs underway to monitor carbon, and it might be desirable to say something about the extent to which this is being done in the Arctic. Gunter Weller said that any comprehensive treatment of the carbon cycle should be done in terms of feedbacks, and he was willing to include something on this topic in chapter 17.

Mike MacCracken asked what policy makers want or need. This is not simply a scientist-to-scientist issue. Glenn Juday said that carbon cycling is becoming an important issue. Humans have some ability to manage the stock of carbon in the north, e.g. to control to some extent the number of trees that are burnt up in forest fires. This means there are some real but limited policy options.

Gordon McBean stated that direct human emissions in the Arctic are trivial by global standards. The important thing is the huge stock of carbon that exists there, both methane and non-methane carbon that can be released as climate warms. There is the possibility of humans significantly changing the release of carbon to the atmosphere. Lars-Otto Reiersen added that this is an important topic for the policy document part of the ACIA study.

Bob Corell asked where the summary section on feedbacks should be located. The committee agreed that the basic discussion of feedbacks should be in chapter 2, and that the topic will also be discussed in other chapters as appropriate.

A propos of this topic, Paul Grabhorn said that earlier chapters in the assessment should indicate where more in-depth treatments will be found in later chapters. The study will need a navigation system at the front of the volume.

### **Extremes, abrupt changes, and regime shifts**

Bob Corell asked if the lead authors were comfortable with their treatment of extremes, abrupt changes, and regime shifts.

Terry Prowse suggested that it would be advisable to pull these things together in chapter 17. The committee agreed with this suggestion.

### **Scenarios**

Bob Corell asked where things stood on the description of scenarios for the assessment. Why were only two selected? Are they the appropriate ones?

Erland Källén answered that ACIA is really only using the B2 scenario, though some reviewers did not like this. The B2 scenario was selected because it is in the lower range of SRES scenarios. It is a relatively conservative scenario.

Gunter Weller noted that chapter 1 will give a brief history of ACIA, including how the B2 scenario was selected. Bob Corell made the point that, while some data for the A2 scenario are now available, they were not available a couple of years ago when ACIA got underway. He recommended that background information on scenarios should be in both chapters 1 and 4.

### **Contaminants**

Bob Corell noted that the contaminants issue will be handled in both chapter 14 on human health and chapter 7 on freshwater ecosystems. He asked if this is adequate.

Lars-Otto Reiersen said that the second AMAP report on this topic was published last year and it should be referenced in the assessment. Arne Instanes said that, in response to some reviews, chapter 15 will contain something on contaminants and reference will be made to the AMAP report.

Bob Corell asked the lead authors of chapters that are concerned with contaminants to discuss it among themselves.

## **Biodiversity**

Bob Corell asked whether the lead authors were satisfied with their treatment of the connection between biodiversity and climate change.

Snorri Baldursson said that biodiversity is treated in several parts of the study and that a synthesis is needed in chapter 17. Magdalena Muir added that such a summary in chapter 17 is a good idea. Bob Corell then asked Magdalena and Snorri to write a summary on biodiversity and provide it to Gunter Weller for inclusion in chapter 17.

## **The Contents of Chapter 17**

The committee agreed that the final chapter 17 is to be founded on material that is located earlier in the ACIA study. Chapter 1 should reference IPCC, regional assessments that have already been written, AMAP, CAFF, etc., thereby setting the stage for the remainder of the study.

## **First Signal of Climate Change**

Susan Hassol asked whether the Arctic is the place where we will first see climate change effects. The steering committee discussed the issue of the Arctic as an early indicator of global warming. The discussion revolved about the difference between seeing, feeling and experiencing climatic changes in the Arctic region and the task of detecting an anthropogenic signal in a statistical sense within a pattern of Arctic climate change. The signal to noise ratio is high for the Arctic, and this makes detection of a signal challenging.

## **Overview Document**

Susan Hassol and Paul Grabhorn discussed the zeroth order version of the ACIA overview document that had already been delivered to lead authors. They said it is mainly a list of material that will be included, and they wondered if it includes what the lead authors want. They asked whether anything major is missing in the draft. They requested lead authors to send feedback on this initial draft to the ACIA Secretariat so it can be sent on to them within the next two weeks. The next draft of the overview should be complete by 16 January. There will be one week for lead authors to react to this next draft. The 23 January due date will be final. It will be necessary for the lead authors to read the entire text of the overview, since it is not going to be organized in the same way as the scientific document. If central findings are missing, they urged the lead authors to tell them promptly.

Susan and Paul pointed out that the overview document will contain a list of key ACIA findings. Susan promised to send lead authors an e-mail message containing a draft of these key findings accompanied by introductory text.

Harald Loeng asked whether the material in the overview document is fully based on the contents of the scientific document. Susan Hassol replied that she tried to base the overview on the key findings that were developed at the Durham meeting.

Mike MacCracken said that key findings quoted in the overview must clearly result from the contents of the scientific document. Snorri Baldursson thought the key findings should stick to the logical sequence of events, putting impacts on ecosystem before impacts on humans. Susan responded that she has rearranged key findings more in the order he is recommending.

In answer to questions from the committee, Paul Grabhorn compared the overview document to a master map. You turn a page to go to a smaller map. Turn a page again to go to a still lower level. That way, you don't have to wade through a lot of material before you get to what you are seeking. They want to shorten the route by which the reader can find what he is looking for. The general reader must not be compelled to slog through a scientific study in order to get to things that concern him.

Glenn Juday said he likes the work Susan and Paul had done already, since he believed it would meet the needs of the audience. Lars-Otto added that politicians don't want to wade through science to get to human impacts. They want to find human impacts right at the beginning of a document. Bob Corell summarized the committee's feeling that Susan and Paul are heading in the right direction.

Lars-Otto Reiersen said he understood a CD-ROM might be distributed with the overview document. He suggested that animation be included on the CD-ROM and said he had some suggestions in this regard. He asked whether the scientists around the table had material that might be useful. Bob Corell asked the ACIA Secretariat to send out a request for informative animation that could be used on such a CD-ROM.

### **Policy document**

Lars-Otto Reiersen told the committee that the AMAP-CAFF policy document drafting group needs the ACIA key findings by 15 November. He hoped the process of finalizing those findings could start at this ASC meeting.

Glenn Juday remarked that the biggest gap he sees is the missing positive impact on agriculture. He felt it should be among the ACIA key findings. Bob Corell wondered whether the committee or the current authors had sufficient expertise on agriculture to say who would likely benefit from the positive impact on agriculture. Glenn Juday responded that this was a good question, since government policies would be a huge political influence on who ultimately benefits.

Bob Corell asked the committee to consider the science section of the policy document. The policy drafting team in AMAP and CAFF needs this science summary, something not longer than five pages.

Helgi Jensson said that the entire policy document – science summary plus policy recommendations – will be distributed to the lead authors on 15 November, immediately after the science summary is received from ASC. He said that between 15 November and 15 December the lead authors will have an opportunity to identify any inconsistencies in the scientific part of the policy document. He asked that any comments be sent directly to Lars-Otto Reiersen. He also noted that the last chance to submit changes to the policy document is the beginning of March 2004, since the AMAP-CAFF policy group will meet at the end of March to finalize the text of that document.

The committee agreed that the AIT would be responsible for approving any suggested changes in the scientific section of the policy document.

### **Editing**

Bor Corell said that the ACIA Secretariat would send additional guidelines to the lead authors on editing of the scientific document. Carolyn Symon and Lelani Arris will handle the editing of the document. Patricia Anderson said that the scientific document would go to the two editors on 16 January, immediately following receipt of final text from the lead authors.

Carolyn Symon said that she and Lelani Arris will send the results of their editing work to lead authors and ask for responses. The scientific document must be finalized by the end of June 2004. It is essential that the meanings of terms not be changed from what they are in the mid-January version. She added that one of the editors would read through the entire scientific document, identify terms that appear to demand definition, and get back to lead authors for help in putting a glossary together.

### **Response to Reviewers**

Patricia Anderson said that she will send the collated technical review documents to lead authors for them to enter responses to the reviews. She stressed that there must be some brief response to each and every such review. These responses need not be complete by 16 January, but they should be done shortly thereafter.

### **Uncertainty**

Noting that scientists use the concept of uncertainty in a way that differs from how it is used by the general public and by politicians, Bob Corell asked whether the document needed a section on how the scientific community handles uncertainty. Mike MacCracken replied that the final paragraph of the draft policy document already deals with this issue. He said that IPCC handled uncertainty by giving ranges of values. IPCC asked participating scientists to give the reasons which led them to their stated levels of confidence. He suggested that ACIA might want to try a similar approach concerning key elements in the overview. Terry Prowse said that IPCC articulated the weight of evidence for all key findings and this “weight of evidence” approach was right up front in

the introductory chapter of the IPCC report. James McCarthy added that this process in IPCC left judgments about uncertainty up to the lead authors, but sometimes there were differences. He felt this matter could not be opened up to large groups of people. Glenn Juday said that any section on uncertainty should be located at the beginning of the assessment, not at any later point. He felt the reader must get the message right at the start.

Dave Roddick said the IPCC approach had led to a huge fight in the Beaufort Sea study. He preferred to see the ACIA authors simply keep the existing lexicon in mind as they write.

Harald Loeng noted that the ACIA authors had agreed on a lexicon that includes the concept of uncertainty when they met in Durham, and he wondered why any change was needed. The committee finally agreed to let Mike MacCracken write a section on uncertainty that can become part of the assessment's lexicon.

### **Symposium**

Pål Prestrud said that the "ACIA International Scientific Symposium: Climate Change in the Arctic" is scheduled for 21-24 September 2004 in Reykjavik, just prior to the Arctic Council's ministerial meeting. The ACIA scientific document will be central to the symposium. Bob Corell asked that the announcement of the symposium be sent to all authors and reviewers involved in ACIA. Gordon McBean suggested that every member of ASC try to send announcements to influential people in his country, specifically including politicians. Lars-Otto Reiersen asked that the symposium be advertised in relevant journals. He added that fund raising would be essential and that members of ASC should begin working on this topic in their home countries.

### **Communications**

Bob Corell raised the topic of communicating the message about Arctic climate change. He said it would be brought up with Senior Arctic Officials when they met the following week. He thought a video accompanying the overview document would be helpful, but he had to acknowledge that its production would be expensive. The committee agreed that the AIT has primary responsibility in this area.

### **The Future**

Mike MacCracken remarked that, after the assessment is done, there will not be a way to answer questions and keep groups working together. There will no longer be an ACIA Secretariat. Helgi Jensson noted that AMAP had kept its working group working for more than ten years and wondered why ACIA could not do something similar with its expert groups. Gunter Weller responded that there is strong interest at the University of Alaska Fairbanks in continuing an ACIA Secretariat. He thought some such office would continue to exist.

Bob Corell said that an assessment is more than a single event. It needs an ongoing element. He said this topic would be brought to the attention of the Arctic Council.

**Other matters**

Bob Corell instructed the Secretariat to send out an updated schedule via e-mail to all lead authors and members of the ASC. He said that the Executive Committee has asked Gunter Weller to look into the question of the “textbook” coverage in several of the chapters in the assessment. The committee agreed that the job of preparing chapeaux for the various sections of the assessment will be left to the AIT. The committee also agreed that the AIT will have authority to approve changes in the text of the assessment.

The ASC instructed the Secretariat to send letters of gratitude to the U.K. Foreign and Commonwealth Office and the Department of Environment, Food and Rural Affairs who hosted this meeting.

The meeting was adjourned at 5:15 p.m. on Thursday, 16 October 2003.

Respectfully submitted,

Tom Murray

## APPENDIX 1

**ACIA  
Assessment Steering Committee Meeting  
15-16 October 2003  
London, UK**

### AGENDA

#### **Wednesday, 15 October**

08:30 Lead authors summarize major reviewer comments: Chapters 1, 2, 3, 4

10:00 Break

10:30 Summary of reviewer comments (continued): Chapters 5, 6, 7, 8

12:00 Lunch

13:00 Summary of reviewer comments (continued): Chapters 9, 10, 11, 12, 13

15:00 Break

15:30 Summary of reviewer comments (continued): Chapters 14, 15, 16, 17

17:00 General discussion of reviewer comments

17:30 Close

Evening: Authors consult on cross-chapter issues

#### **Thursday, 16 October**

08:30 Discussion of review comments on the entire scientific report (including loose ends, missing pieces, etc.)

10:00 Break

10:30 Lunch

13:00 Stand back and make a “grand review” of both scientific and overview documents and discussion of action steps to respond to reviewer comments

15:00 Break

15:30 Other business: communications, symposium, etc.

17:30 Close

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**Assessment Steering Committee Meeting**  
**15-16 October 2003**  
**London, UK**

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