IASC Project "Dynamics of the Tundra - Taiga Interface"

Audited Minutes of the second Steering Committee meeting

Quebec City, 29 and 30 September 2001.

The meeting started at 10.00 h on Saturday 29 September 2001. Committee Members present during the meeting were Prof Terry Callaghan (Chairman), Prof Serge Payette (Deputy Chairman, Canada), Prof Bjartmar Sveinbjörnsson (USA), Dr Oddvar Skre (Norway), Prof Matti Eronen (Finland), Dr Tatiana Vlassova (Russia), Dr Gareth Rees (UK) and Dr Ben Werkman (Secretary). Dr Annika Hofgaard (Sweden) and Prof Robert Crawford (Senior Advisor) sent their apologies.

Agenda Item 1. Election of two auditors

Serge Payette and Bjartmar Sveinbjörnsson volunteered to act as auditors of the minutes from this meeting.

Agenda Item 2. Minutes from the previous meeting

The minutes from the meeting in Edinburgh in November 2000 were formally approved.

Agenda Item 3. Election of Officers

Before the meeting a secret ballot was held amongst the Committee Members to determine the Officers for the Initiative for the period until the next Meeting. Seven Members voted, and the rest were assumed to be abstentions. This meant that the current Officers were voted in for another year: Terry Callaghan as Chairman, Serge Payette as Deputy Chairman, and Ben Werkman as Secretary. Terry Callaghan remarked that he has no long-term intentions to continue as Chairman, and Ben Werkman informed the Committee that his availability as Secretary will depend on him finding employment that will allow him to continue as such.

Agenda Item 4. *Ambio* publications

The seven papers currently under consideration for the Special Issue of *Ambio* were studied by the Committee Members. *Ambio* was considered a good place for publication, considering its wide audience, both in terms of geography and fields of interests. The presentation of each of the papers was discussed, including their length and use of images. The order in which the papers should be published was also discussed, see Appendix 1. Then there was a consensus that there should be an eighth, concluding paper in the Special Issue, built on some sections of the introductory chapter, as well as the minutes from last year's meeting. The

external review process has been designed to establish linkages with the Finnish Timberline project and the ACIA (Arctic Climate Impacts Assessment) process.

Agenda Item 5. Student funding

Terry Callaghan informed the meeting that he has recieved $2000 from IASC to involve a young researcher in the work of the Steering Committee. However, despite considerable effort, particularly in Russia, no suitable candidate had been found, and the money Probably needs to be spent this year. Possibilities were discussed, and ideas and request will be sent to the Secretary by 12 October 2001.

Action. Ben Werkman will collate the submissions and send them to the Committee Members for a vote on the preferred use of the funding.

Agenda Item 6. New meetings

Next year's Steering Committee meeting could be in Anchorage, Alaska, between the middle of August and the middle of September.

Bjartmar Sveinbjörnsson reported on a possible symposium on the treeline at the Ecological Society of America meeting in Tucson, Arizona in early August. More information was given under Agenda Item 8.

Action. Ben Werkman will ask Committee Members when they can attend a Steering Committee Meeting, to avoid conflicts with field work or other meetings.

One of the targets adopted by this Committee is the organisation of an international treeline meeting every three years, and the next is to be held in 2003. This avoids conflicts with the Timberline meeting organised in Finland on behalf of the Arctic Council, although at present no dates are available for that meeting. A suggestion was to combine it with the Arctic Science Summit Week. Another possibility might be to hold it in Tromsö, Norway, possibly in collaboration with the Norwegian Polar Institute, who would need to be contacted.

Agenda Item 7. Planning new projects

First a number of known existing and proposed projects relevant to the Arctic treeline were mentioned: two large European Union projects, one British project; three large projects in the USA (plus some smaller alpine projects); a German project studying the Siberian treeline; and the Taiga Rescue Network.

After this the main subject of the meeting was addressed: planning new research. This could be either by using existing projects and monitoring schemes, ie without additional funding being required, or by submitting new applications for project funding. Sources known to Committee Members include: NSF in the USA; IARC in Fairbanks, Alaska (possibly); NSERC in Canada; the EU Framework VI

(possibly less useful); NMR in the Nordic countries (smaller grants); the Darwin programme on biodiversity and the Environmental Policy Division of the Foreign Office in the UK; NATO (supports workshops); and the European Science Foundation. Other opportunities may be through national Academies, and/or reciprocal arrangements between them. However, all of these require a conserted effort.

New experiments and collaborations were then discussed, some based on the discussions in Edinburgh last year.

A website will be very useful to help coordinate, integrate and support new research. Initial requirements for this are a server (cost estimate $1500) and 2-4 weeks of staff time by someone with relevant experience (cost estimate $1500). After this the Committee's Secretary should be able to update the website as and when required.

Action. Terry Callaghan and Ben Werkman will contact IASC to see whether funding for this purpose can be provided.

Action. Bjartmar Sveinbjörnsson will contact a student in Anchorage who has already set up a website before on whether he can do the initial job.

Key components of the website will be a meta-database with information on photographs, maps, satellite images, etc., a database with relevant literature (as an Endnote library), and another meta-database with information on past, ongoing and future research projects and sites (for instance: GPS info on sites, tree ring chronologies with data banks available in Tucson Arizona and Iceland, human influences with a link to the large database held in the Arctic Centre in Rovaniemi Finland, and climatic data; for a full list see the minutes of the Edinburgh meeting).

Action. Gareth Rees will start to collate data on existing photograps, maps and satellite images, and will then report back to the Committee on the options that are feasible.

Action. Ben Werkman will start to build an Endnote library from the references used in the *Ambio* Special Issue, and will supplement this with information from the Scott Polar Research Institute (Gareth Rees to check options and costs) and the Institute of Geography of the Russian Academy of Sciences (Tatiana Vlassova to check costs).

Action. Oddvar Skre will start collecting project and site information by developing a questionaire to be sent out to the research community at large.This work will require additional funding.

Next, new research was discussed (see also the Edinburgh meeting minutes). This should include:

- Monitoring along transects
- Meta analysis of existing and new data
- Experimental approach, existing and new experiments
- Modelling approach, existing and new models
- Social interactions

All of these need to be applied at an ecosystem level, not to individual plants. They also need to address regional similarities and differences.

In the following discussion Treeline was seen as equivalent to Forest Tundra zone.

Research Priorities were constructed to build on the knowledge base prsented in the *Ambio* Special Issue (Appendix 2). Each of these priorities was then divided into tasks to be carried out. As not all of the priorities and tasks are of equal interest to all researchers involved, it seemed appropriate to find individuals who can co-ordinate project development in each of the questions.

Action. Gareth Rees will co-ordinate the project development on research into the current treeline.

Action. Serge Payette will co-ordinate the project development on research into the recent changes of the treeline.

Action. Bjartmar Sveinbjörnsson will co-ordinate the project development on research into the future changes of the treeline.

Action. Tatiana Vlassova will co-ordinate the project development on research into the human impacts on and feedbacks from the treeline.

Action. Terry Chapin will be approached (Bjartmar Sveinbjörnsson to ask him) to co-ordinate the project development on research into the impacts of the physical environment on the treeline, and feedbacks of changes in the treeline on their environment.

All of these actions will build on these Minutes of the Meeting. The respective co-ordinators will refine the objectives and tasks, they will identify interested people and groups, and the project proposals must then be drafted and submitted.

Agenda Item 8. Any other Business

Bjartmar Sveinbjörnsson reminded the Committee about a possible symposium on the treeline at the Ecological Society of America meeting in Tucson, Arizona next summer (subject to approval), and invited Committee Members to attend. He will represent our Committee.

Tatiana Vlassova again mentioned the Timberline meeting to be organised in Finland on behalf of the Arctic Council, and Matti Eronen promised he would try to obtain further information about it. Both Tatiana Vlassova and Terry Callaghan are on the Advisory Committee for the Timberline meeting, and will continue to forge linkages.

Finally, Terry Callaghan thanked Ben Werkman and Serge Payette for organising the meeting.

Agenda Item 9. Close of meeting

The meeting was closed at around 1400h on Sunday 30 September 2001.

Appendix 1: Papers in the *Ambio* Special Issue and current progress.
Appendix 2: Agreed Priority Project Developments.

17-Oct-01: Minutes prepared by Ben Werkman and Terry Callaghan.

xx-Oct-01: Minutes audited by Bjartmar Sveinbjörnsson and Serge Payette.

Appendix 1

Papers in the *Ambio* Special Issue on the tundra - taiga boundary

Callaghan, T.V., Werkman, B.R. & Crawford, R.M.M. 2001.
The tundra - taiga boundary and its dynamics: concepts and introduction.
Current stage: External review

Payette, S., Eronen, M. & Jasinski, P. 2001.
Late Pleistocene and Holocene changes in the tundra - taiga interface.
Current stage: External review

Sveinbjörnsson, B., Hofgaard, A. & Lloyd, A. 2001.
The natural causes of the tundra - taiga boundary.
Current stage: External review

Vlassova, T.K. 2001.
Human impacts on the tundra - taiga zone dynamics: the case of Russia with some international comparatives.
Current stage: Redrafting by author

Harding, R., Kuhry, P., Christensen, T.R., Sykes, M.T., Dankers, R. & Linden, S.vd 2001.
Climate feedbacks at the tundra - taiga interface.
Current stage: External review

Skre, O., Baxter, B., Fedorkov, A. & Crawford, R.M.M. 2001.
How will the tundra - taiga interface respond to climate change?
Current stage: Redrafting by authors

Rees, W.G., Brown, I.A., Mikkola, K., Virtanen, T. & Werkman, B.R. 2001.
How can the dynamics of the tundra - taiga boundary be remotely monitored?
Current stage: Final changes by authors

Callaghan and all Committee Members 2001.
A co-ordinated and integrated approach to research on the dynamics of the tundra - taiga boundary.
Current stage: Manuscript preparation by authors

Appendix 2

Research priorities and their tasks on the tundra - taiga boundary

Priority 1. Where is the circumarctic treeline now, what are its characteristics, and what is changing?

Tasks:

1.1 Define treeline, forest tundra, etc

1.2 Identify its location

1.3 Identify its characteristics, ie species, area occupied, spatial patterns, etc (see Appendix 3 of the Edinburgh meeting minutes)

1.4. Identify the correlation between the location of the treeline and aspects of its physical environment

1.5 Determine how the location is changing

Priority 2. How has the circumarctic treeline responded to environmental change in the last 100 yrs?

Tasks:

2.1 Review the literature, identify the regions where studies were done, with their processes, and identify other regions without information

2.2 Collate information from photographs, old maps, and satellite images

2.3 Initiate baeline measurements in regions without information

Priority 3. How will circumarctic treelines respond to predicted environmental change, and what are the mechanisms?

Tasks:

3.1 Review vegetation and ecosystem models to analys the range of model outputs

3.2 Review the information obtained when addressing Priority 2

3.3 Simulate experimentally responses to future climates

3.4 Produce refined models

Priority 4. What are the environmental impacts of changes in the location and the characteristics of the tundra taiga boundary?

Tasks:

4.1 Review the results from Priority 3

4.2 Identify environmental impacts at a regional scale on hydrology, sociology, biodiversity, climate systems, etc

4.3 Identify feedbacks into the models used to address Priority 3