

## **Tundra-Taiga Initiative Steering Group meeting Tromsø 14-16 November 2003**

Present: Annika Hofgaard, Robert Crawford, Serge Payette, Gareth Rees, Tatiana Vlassova, Matti Eronen, Oddvar Skre

### *Election of auditors*

Gareth Rees and Serge Payette were elected as auditors.

### *Minutes of the meeting at Anchorage, 5 October 2002*

These were approved as a correct record of the meeting.

### *Matters arising*

Arctic Timberline meeting, Rovaniemi, 2002. The proceedings of this meeting have now been published: Northern Timberline Forests: Environmental and socio-economic issues and concerns. S. Kankaanpää, L. Ludger-Wille (eds). The Finnish Forest Research Institute. Kolari research Station. Research paper 862. 2002. The book can be obtained from The Finnish Forest Research Institute, Vantaa Research Centre, Library, P.O. Box 18, FIN 01310 Vantaa, Finland.

SCANNET and digital camera network. Tatiana Vlassova noted the desirability of including an 'indigenous knowledge' element in assessments of environmental problems and environmental change, and described the affiliation of such a programme to SCANNET. The approach to AMAP to fund a digital camera network had been unsuccessful.

### *Election of Officers*

It was agreed that Bjartmar Sveinbjörnsson would be asked to continue as chairman, and Annika Hofgaard as secretary, of the steering group. Although unfortunately not able to present at the meeting, Bjartmar had indicated his willingness to continue as chairman. In his absence, Annika Hofgaard chaired the meeting of the steering group.

### *Presentations of international and circumpolar projects Ongoing and planned projects*

Tundra-Taiga Initiative presented by Annika Hofgaard

Bob Crawford stressed the importance of placing research in a circumpolar context.

### Ecosystem Finnmark presented by Nigel Yoccoz

The focus of the research described was reindeer husbandry in north Norway, with the goal of understanding the spatial and temporal variability of reindeer numbers. Comments were made on the following aspects:

- importance of available calcium (which is critical for mammal lactation)
- complicated dependence of reindeer density on environment
- impact of increase in reindeer numbers on vegetation generally, and lichens in particular
- absence of scientific input to management processes in Norway
- complications introduced by legislative systems in Russia and possible analogues in Norway

### Relevant projects of NORUT IT presented by Bernt Johansen

Two projects were described, both involving the analysis of satellite remote sensing data. The first ('PhenoClim') relates satellite data to phenological observations, and has shown interesting spatial variations in trends in the growing season (it has lengthened in most of Scandinavia but has shortened in some northern regions). The second assesses changes in lichen cover in Finnmarksvidda from 1973 to the present.

### Disturbance ecology of the forest-tundra biome presented by Serge Payette

This was a wide-ranging review of research into factors affecting the relative proportions of forest and tundra in the tundra-taiga interface region in Canada, pointing especially to the varying roles of climate, forest fire and insect outbreaks, and also to the effects of changing water tables (which have risen since about 1600).

### Human impact presented by Tatiana Vlassova

The importance of accessing indigenous environmental knowledge has been stressed by Terry Callaghan in the context of SCANNET. Tatiana Vlassova has been coordinating RAIPON (Russian Association of Indigenous Peoples Observation Network) to investigate Russian IEK under the auspices of ACIA since 2000. Questionnaires have been sent to about 20 groups throughout Russia (50 questionnaires each). The preliminary results show that the environmental situation, especially as it relates to human health, is of great concern to all groups. They also demonstrate the great value of indigenous/local people as a means of obtaining data about changes in phenology, species distribution, hydrology etc.

### Human interaction with the mountain birch forest ecosystem (HIBECO) presented by Oddvar Skre

Subtitle of the project: Implications for sustainable development. EU funded project (coordinated by Kari Laine, Oulu, Finland) that began in 2000 and has now finished. Oddvar distributed copies of four posters that described various aspects of the project. Particular attention was drawn to the following:

- Disappearance of lichen cover from Finnmarksvidda, mostly through grazing and trampling rather than climate change, and the consequent increase of birch sprouting, *Vaccinium myrtillus* and mosses. There has been a little regeneration of *Cladonia mitis* and *Cladonia rangiferina* in some areas that have been undisturbed.
- Different response of polycormic and monocormic birch to insect outbreaks (polycormic regenerates well, as does *Betula nana*, while monocormic does not)
- Resource management alternatives

#### Dendrochronology project presented by Matti Eronen

7500-year sequence based on Scots Pine in Finnish Lapland, described in a special issue of *Holocene*.

#### Importance of what is below ground presented by Bob Crawford

Woody plants with waterlogged roots become weaker as a result of loss of carbohydrates and antioxidants. This is likely to be more of a problem if winters become warmer

#### Forest-tundra boundary changes and displacements: integrated dendroecological and remote sensing analysis, presented by Annika Hofgaard with contribution by Gareth Rees

Although the Norwegian side of this project has not yet got basic funding, work has proceeded anyway with local and internal funding, taking a three-dimensional transect approach with Scots Pine as the target species. Fieldwork took place in summer 2003, with tree layer and field layer characterisation from the closed pine forest almost to the sapling line. A proposal for connected remote sensing studies using the NERC Airborne Remote Sensing Facility was funded, and the NERC aircraft arrived in Tromsø in August but was not able to collect any data at all because of bad weather. NERC has made a commitment to repeat the experiment next year. The project is aiming at two main products: 1) New tool for analyses of changing vegetation boundaries for use in for example regions of the world where natural and/or human caused changes of boundary positions between biomes cause major socioeconomic and ecological consequences. 2) New and deepened knowledge of the spatiotemporal variation in environmental drivers of boundary changes

#### Role of outlying mountain birch individuals presented by Annika Hofgaard

This was a contribution to the EU-funded DART project (coordinated by Brian Huntley, University of Durham). Three regions of the Scandes Mountains were studied, four slopes at each, and data included both empirical field measurements of treeline markers and experiments with saplings in environmental enclosures. Main results:

- Most variation in treeline altitude can be explained by aspect and estimated relative radiation, but temporal shifts in regeneration conditions are apparent

\* Growth into tree size showed stable or possibly progressive treelines in the southern and middle region but recent recession in the north.

- Growth is significantly related to snow depth in the north but not in the south. It was commented that human impact in the form of logging is significant

Summary of other projects in which the UK has some involvement presented by Gareth Rees.

- STEPPS project: interdisciplinary, NERC-funded research project with (University of Durham, Centre for Ecology and Hydrology Wallingford, Sheffield Centre for Arctic Ecology, Department of Physical Geography, University of Uppsala). Investigates the effects of changing snow cover on soil biogeochemistry, hydrology, plant phenology and herbivory, trace gas flux and surface energy balance in a sub-arctic tundra ecosystem (Abisko)
- BOREAS machine: An Integrated Observing and Forecasting System to Understand the Ecological, Climatological and Anthropogenic Processes which Govern the Boreal Zone in the Context of Global Change. This proposal employs the opportunity of the new instrument “Integrated Project” of the Sixth Framework Programme to carry out an extensive interdisciplinary approach for one of the most important biomes of the Earth - whereas only components of the boreal biome could be studied in current initiatives: the terrestrial carbon and greenhouse gases (SIBERIA-II, TCOS Siberia), permafrost (Global Terrestrial Network-Permafrost (GTN-P), atmosphere (Circumpolar Active-Layer Monitoring (CALM), hydrology (GEWEX-GAIM), Ice (AICSEX- Arctic Ice Cover Simulation Experiment). Will be coordinated by Jena University.
- BALANCE: EU Framework V project on response of physical, ecological and socioeconomic components of the ‘Barents Region’ to climate and other change. Scott Polar Research Institute is responsible for reindeer husbandry aspects of the project, with particular emphasis on the Nenets Okrug but also a general overview of reindeer-vegetation-socioeconomic interactions throughout the Barents Region.
- Forest monitoring on the Kola Peninsula: Proposed project between SPRI and Geography Faculty of Moscow State University, assimilating forestry data and fieldwork from the Lake Imandra catchment.

*Funding possibilities and feasibility of broad international projects  
Science Plan*

It seemed sensible to merge these two items.

The desirability of broadening the geographical scope to take account of the wishes of potential funding bodies was discussed. For the EU, a more ‘European’ perspective (e.g. including Alpine); for NATO, a ‘North Atlantic’ perspective (trans-Atlantic) – although NATO is willing to fund projects focussed on e.g. Russia provided the project includes an approved combination of partner countries.

After a wide-ranging discussion, the following potential themes emerged for international projects:

- Spatial variation of dominant drivers of vegetation change. We talked about the main factors influencing vegetation development across the circumpolar forest tundra, but the theme was considered too general to be of some value for an international project.
- Sustainable use of natural resources (impact of human activity is implicit in this)
- Birch (perhaps ‘place of birch in the Arctic and Sub-arctic’), with focus on genetics, land use and traditional/indigenous/local knowledge, tree rings, experimental studies. Possible title: ‘the Birch Machine’!!

The steering group elaborated a science plan based on the last of these ideas, included as a separate document.

### *Thematic meeting on the Tundra-Taiga Interface*

#### General comments

After some discussion, it was agreed that this meeting should take place in Autumn 2005 rather than 2004. It was felt that Autumn was a better time of year than spring, since more people would be likely to be free then, and that a date in Autumn 2004 would allow insufficient time to organise the meeting and to cope with the potential delays involved in obtaining visas by delegates from Russia.

The steering group noted that the draft list of themes for the meeting that had been prepared at Anchorage in 2002 omitted the human dimension, and also consideration of soils and permafrost. The steering group noted that careful planning at this stage should ensure that the meeting would be suitably inclusive, both of relevant topics and also of people not originally involved in the TTI but willing and able to contribute to it.

Bjartmar Sveinbjörnsson suggested by e-mail that the meeting should be used to push for NSF and possibly other funding for TTI research. He also drew the steering group’s attention to the planning process for the International Polar Year (IPY) 2007-08, and suggested that this could provide a useful vehicle for raising the profile of the TTI.

The steering group recognised the desirability of communicating the Science Plan, including the proposal for the thematic meeting, to both ICARP-II and the IPY committee. (This was thought to be particularly important in the case of the IPY, since the documentation that has been seen so far suggests that the IPY committee has not perfectly recognised the importance of the vegetated environment as part of the polar regions.) It will be necessary to check with Odd Rogne whether this should be done directly or through IASC. **Action: Bjartmar Sveinbjörnsson.**

#### Funding

CEON (Circumpolar Environmental Observatories Network)

Norwegian Research Council – there is a small fund for US-Norwegian collaboration, but it is fully committed to the end of 2005.

#### Steering and Organising Committees

The Organising Committee will be the responsibility of Bjartmar Sveinbjörnsson. The Steering Committee is likely to be the same as the TTI Steering Group.

### Announcement and Call for Papers

#### Thematic programme and keynote speakers

The following (provisional) title and themes were agreed.

Proposed title: Circumpolar terrestrial ecosystems/biomes/environments: their stability, sensitivity and future development

1. Model predictions of tundra-taiga boundaries - patterns and processes.
2. Combining remotely sensed data with ground observations.
3. Determining past and current changes in treelines.
4. Key treeline species and their changing performance, population genetics, ecophysiology and biogeography
5. Reconciling biodiversity, fragmentation and ecosystem processes at the tundra-taiga interface
6. Vegetation - atmosphere feedbacks
7. Effects of herbivores, pests and pathogens.
8. Human impact on the tundra-taiga environment
9. Human responses and vulnerability to environmental change
10. Socio-economic development and land use change
11. Cultural and economic perspectives for indigenous peoples and other Arctic residents

#### (subtopics looking for a home)

conflicts between increasing carbon sequestration and decreasing albedo – snow and water discharge

Land-use predictions to be built into Global Digital Vegetation Models to predict treeline changes?

Consideration of potential keynote speakers was deferred. All members of the steering group are asked to suggest potential keynote speakers, tied to the 11 themes identified above, by the 31 January 2004. Suggestions should be sent to Annika Hofgaard. **Action: All.**

#### Invitation of students

Deferred.

#### Invitation of researchers from eastern countries

Deferred.

Publication of abstracts and full papers – journal, costs, ...?

Deferred.

Need for conference secretary

It was agreed that this need exists, but that it would be necessary for Bjartmar Sveinbjörnsson, as the local organiser, to decide what resources would be required.

Excursions

Deferred.

*IASC-TTI website and database – progress, responsibilities, costs*

This item was deferred because of Bjartmar Sveinbjörnsson's absence, since his input was felt to be essential.

*Other business*

None

*Next meeting of the steering group*

It was agreed that this should be held in Helsinki, with a provisional date of 17-19 September 2004.

*Close of the meeting*

The meeting closed at 14:00 on Sunday 16 November.

*Compiled by Gareth Rees, checked by Serge Payette*