

IASC Project "Dynamics of the Tundra - Taiga Interface"

Minutes of the first Steering Committee meeting

Edinburgh, 17 and 18 November 2000.

The meeting started at 09.00 h on Friday 17 November 2000. All Committee Members and initiators of the project were present during the meeting, i.e. Terry Callaghan, Serge Payette, Bjartmar Sveinbjörnsson, Oddvar Skre, Annika Hofgaard, Matti Eronen, Tatiana Vlassova, Gareth Rees, Robert Crawford and Ben Werkman.

Terry was *ad hoc* Chairman, and Ben Werkman was *ad hoc* Secretary.

Terry presented a previously agreed agenda and gave a general introduction to the meeting, including a history of the initiative on the Tundra - Taiga Interface to date.

Agenda Item 1. Formal election of Officers and Committee Members

Terry was elected as Chairman, which he accepted for a year, but subject to an annual review. Serge was elected as Deputy Chairman. Ben was elected as the Secretary.

Decision: In the future officers should be chosen anonymously by ballot before the meetings.

Agenda Item 2. Definition of terms of reference

The terms of reference for this IASC initiative were discussed and defined, see Appendix 1.

Agenda Item 3. *Modus operandi*

The *modus operandi* of the Tundra - Taiga Interface initiative was defined as follows:

- To hold Steering Committee meetings and attached meetings on general and/or targeted topics:
 - Committee meetings to be held one per year unless there is a specific need for more
 - Associated meetings to be held one per year on specific topics
 - Major meetings to be held every three years
 - Subgroup meetings to be held as required
- To gather and disseminate information e.g. on funding by various means including a web page
- To further stimulate and facilitate international collaboration by arranging exchange visits among researchers, training, and providing access to networks

- To determine priorities for relevant research
- To implement top priorities
- To make policy makers aware of funding requirements
- To provide advice and assessments required by national and international processes/organisations through the Secretary and relevant Committee Members and their networks

Agenda Items 4, 5, 6 and 7. Priority objectives, resource requirements, implementation strategy, and next steps

The following key objectives were recognised:

- a) Standardised terminology
- b) Monitoring networks
- c) Standardised experiments
- d) Meta-database construction or participation in existing ones

Considerable time was allowed for discussion of each of these in turn.

a) Standardised terminology

Terminology and linguistic aspects need to be standardised in various languages. This will be implemented with information sent from Committee Members to Ben, who will then circulate suggestions back to the Committee Members. Following approval, these terms will be described in the introductory paper in the Special Issue of *Ambio*. The terms will be translated into various languages.

b) Monitoring networks

The Steering Committee agreed on the necessity to monitor changes in the ecotone and it will seek to establish monitoring networks using:

1. the same variables at each site
2. standardisation of measurements
3. ground and remote characterisation and monitoring of the ecotone
4. digital photographic records

Standard variables should be measured at each site using a standard protocol (for an initial list of variables see Appendix 2). The choice of site will be dependent on scale of interest (global, regional or local). A transect approach should be included. Transects should run from continuous forest to tundra, the transect length will depend on the local characteristics of the ecotone. Locations should be accurately determined, using standardised GPS measurements (Gareth to specify). Members will identify existing transects and historical data, as well as current observations and methods.

c) Standardised experiments

The Steering Committee acknowledge the early success of ITEX in establishing a network of field observations by designing simple, cheap and standardised experiments at a range of sites. This “fast track” approach could be combined with a parallel approach of developing larger experiments that require significant

funding. Standardised experiments at the tundra - taiga interface should be organised by:

1. inviting, stimulating and encouraging proposals
2. linking with other interested groups
3. helping to identify funding possibilities
4. providing endorsement for proposals
5. advising on approaches and content, and filling gaps
6. strengthening proposals
7. suggesting best sites

An example of such a proposal could be the quantification of feedbacks to climate system at the ecotone and arising from shifts from the tundra to taiga landscape.

d) Meta-database

A meta-database of existing information and activities should be established, or be contributed to an existing system. The meta-data base could include:

1. old photographs
2. information on old experimental/observational plots
3. tree ring chronologies
4. historical human records (e.g. land use and exploration)
5. maps

The contents for the meta-database (and possibly a real database) will be established using a questionnaire asking for (a) type of data available; and (b) details on how to gain access to available data. It is likely that the implementation will need (at least) one full-time, qualified person.

Actions. Applications for funding will be submitted in Canada, USA, and the EU. Initially Ben will send a short first questionnaire to Committee Members to develop the full questionnaire which can then be sent to the relevant scientific community. The Northern Science Network will be contacted by Serge, and GRID Arendal will be approached by Terry for further information on database management. Applications for a Tundra - Taiga Interface Secretariat should also be considered.

Agenda Item 8. Any other Business

Terry informed the meeting of the Arctic Climate Impacts Assessment, and it was decided that the Committee as a whole would contribute to the assessment as and when required.

The state of the papers for the *Ambio* Special Issue was discussed, and it appeared that it is possible to get all eight chapters completed by the end of the year, or possibly early January 2001. Part of the funding is available.

Action. Terry will contact the Royal Swedish Academy of Sciences to discuss the remaining funds required.

Agenda Item 9. Close of meeting

Quebec City was suggested as a venue for the next meeting, probably in September 2001. Serge will investigate the possibilities.

The meeting was then closed at around lunchtime on Saturday 18 November 2000.

Appendix 1: Terms of Reference.

Appendix 2: Committee Member contact details

Appendix 3: Sampling Protocol for a Monitoring Network

Appendix 1

IASC Project “Dynamics of the Tundra - Taiga Interface”

Terms of Reference

The Project “Dynamics of the Tundra - Taiga Interface” is an approved project of the International Arctic Science Committee (IASC). It is operated by a Steering Committee of national representatives with Arctic territories or interests, and Officers who are not necessarily national representatives. The Steering Committee was nominated at the first international workshop held by the project at Abisko in April 2000, and after consultation with IASC. Officers will be elected by ballot before each annual meeting of the Steering Committee.

The Projects current objectives are:-

- ✧ *to assess the vulnerability of the tundra - taiga interface and its associated human societies to environmental change*
- ✧ *to identify and quantify interactions, including feedbacks, between the biosphere and atmosphere related to the dynamics of this interface*
- ✧ *to model and predict future changes in the location and characteristics of the interface*

The Steering Committee will, within its field of scientific interest,

- ✧ *stimulate international and interdisciplinary collaboration*
- ✧ *provide expert advice to regional, national and international processes*
- ✧ *standardise terminology*
- ✧ *determine the current state of the tundra - taiga interface, e.g. its location and characteristics*
- ✧ *continue to develop the scope and representation of our initiative*
- ✧ *disseminate relevant information at various levels of scientific understanding*

The foci of interest of the Project are,

- ✧ *In space, the tundra - taiga ecotone between the closed forest to the South, and the open treeless tundra to the North*
- ✧ *In time, the Holocene, the recent past (200 years), the present, and the next 100 years.*
- ✧ *In scope, cross-cutting issues such as environmental degradation and change, monitoring and detection of change and sustainable resource use.*

November 2000

Appendix 2

IASC Project “Dynamics of the Tundra - Taiga Interface”

Composition of the Steering Committee approved by IASC (including countries represented)

Chairman: Terry Callaghan	-
Deputy Chairman: Serge Payette	Canada
Secretary: Ben Werkman	-
Bjartmar Sveinbjörnsson	USA
Oddvar Skre	Norway
Annika Hofgaard	Sweden
Matti Eronen	Finland
Tatiana Vlassova	Russia
Gareth Rees	UK
Senior Advisor: Robert Crawford	-

The disciplinary scope of the Committee is

- ✧ *plant ecophysiology*
- ✧ *ecosystem science*
- ✧ *dendrochronology*
- ✧ *paleoecology*
- ✧ *landscape ecology*
- ✧ *socioeconomics*
- ✧ *remote sensing*
- ✧ *plant population ecology*

Additional fields of interest of the project and Committee are traditional lifestyle and knowledge, plant-animal interactions and biodiversity.

Address and brief description of the Steering Committee members:

Prof Terry Callaghan (Chair), Abisko Scientific Research Station, Box 62, SE-981 07 Abisko, Sweden. E-mail terry.callaghan@ans.kiruna.se. Arctic Plant Ecologist with wide interest in polar ecology, particularly adaptation, population dynamics and global change issues.

Prof Serge Payette (Deputy Chair), Centre d'etudes Nordiques, Universite Laval, St Foy, Quebec G1K 7P4, Canada. E-mail serge.payette@bio.ulaval.ca. Sub-Arctic Plant Ecologist and Paleoecologist with experience of tree line dynamics in eastern Canada.

Dr Ben Werkman (Secretary), Climate Impacts Research Centre, Box 62, SE-981 07 Abisko, Sweden. E-mail ben.werkman@ans.kiruna.se. Plant Ecophysiologicalist with interest in computer modelling and in the remote sensing and validation of changes in the tundra - taiga boundary of Sweden and northern Russia.

Prof Robert Crawford, Sir Harold Mitchell Building, University of St Andrews, St Andrews, Fife KY16 9AL, UK. E-mail rmmc@st-and.ac.uk. Plant Physiologist with wide interest in vegetation of stressed / marginal habitats and detailed knowledge of plant responses to anaerobic conditions and paludification (flooding or in thermokarst forest areas).

Prof Matti Eronen, Department of Geology, University of Helsinki, PO Box 11, FIN-00014 Helsinki, Finland. E-mail matti.eronen@helsinki.fi. Paleoecologist with expertise on Holocene tree line changes in Finnish Lapland and northern Russia.

Dr Annika Hofgaard, Climate Impacts Research Centre, Box 62, SE-981 07 Abisko, Sweden. E-mail annika.hofgaard@ans.kiruna.se. Vegetation Ecologist with particular interest in tree line dynamics and associated biodiversity in Sweden and Norway.

Dr Gareth Rees, Remote Sensing Group, Scott Polar Research Institute, Lensfield Road, Cambridge CB2 1ER, UK. E-mail wgr2@cam.ac.uk. Physicist and Remote Sensing Scientist with interest in application of remote sensing techniques to detect environmental impacts on forest and tundra vegetation at and beyond the tree line in the Russian North.

Dr Oddvar Skre, Norwegian Forest Research Institute, Fanaflaten 4, N-5244 Fana, Norway. E-mail oddvar.skre@nisk.no. Plant Physiologist with interest in tree performance and distribution in Scandinavia.

Prof Bjartmar Sveinbjörnsson, Dept of Biological Sciences, University of Alaska Anchorage, 3211 Providence Drive, Anchorage, Alaska 99508, USA. E-mail afbs@uaa.alaska.edu. Boreal Plant Ecologist with experience of tree line dynamics in Sweden and Alaska, using physiological, population and ecosystem approaches.

Dr Tatiana Vlassova, Institute of Geography, Russian Academy of Science, Leninsky prosp. 61/1, 46, 117333 Moscow, Russia. E-mail marianna@orc.ru. Social Scientist with interest in environment - people interactions in the North of Russia.

Appendix 3

IASC Project “Dynamics of the Tundra - Taiga Interface”

Draft sampling programme for a monitoring network

For each site

1. Standardised methods are needed to measure the following parameters

Biological

- Phenology observations of coniferous trees
 - bud swelling and burst
 - branch and apex elongation
 - bud formation
 - pollen production period
 - Leaf area index - LAI (2nd order of interest)
 - cone opening (3rd order of interest)
 - root production
- Phenology observations of deciduous trees
 - LAI
 - senescence and leaf fall
 - flowering dates
- Phenology requirements
 - remotely operated cameras
 - LAI meter and calibration
- Growth (annually or retrospectively)
 - LAI (wood and leaves)
 - extension growth
 - number of shoots
 - diameter change
 - leaf longevity
 - shoot demography
 - tree demography
 - tree vitality (to be decided)
 - root growth (2nd order of interest)
- Reproductive ecology
 - seed production
 - seed fertility
 - pollen production
 - pollen fertility
 - seedling demography
- Biodiversity and abundance
 - dominant trees and shrubs
 - dominant understorey species
 - dominant animals
- Plant-animal interactions
 - animal (vertebrate and invertebrate) impacts on trees and understorey vegetation
- Human pressure

impact on trees and ground vegetation
land use and settlement

Disease

nature / organism
distribution
severity
specificity

Damage

fire
thermocarst
human disturbance
wind
desiccation
growth form
wind throw
snow
frost
contaminants

Physical parameters: See existing manuals (ITEX, LTER), but also:

snow (quality, density, liquid water etc)
temperature, wind speed, humidity (at heights appropriate
for forest tundra), soil moisture
flooding (surface water, duration, depth to water table)
UV if possible
fire interval
solifluction
GPS standardisation
albedo, spectral reflectance, cover, distribution of cover,
canopy height
mathematics of tree patterns (refer back to standardisation)
snow blast
plant exposure during winter

2. Ground and remote characteristics and monitoring

A strength of the network is to combine capabilities for ground measurements with expertise in remote sensing. The Committee will strive to produce a circumarctic map of the Tundra – Taiga Interface using satellite and air photograph images. These will be used for monitoring

3. Digital photographic images

These will provide a higher resolution base line data set for sites included in a monitoring network