

## 4<sup>th</sup> Annual Report (2008) Centre of Advanced Research on Environmental Services (CAR-ES)

### People active in the centre 2008 (core group in italics)

Denmark (Forest & Landscape Denmark):

- *Per Gundersen* (co-ordinator)
- *Karin Hansen* (secretary)
- Jesper Riis Christiansen
- Morten Ingerslev.

Sweden (Skogforsk):

- *Jan Weslien*
- *Eva Ring*
- *Lars Högbom*
- Staffan Jacobson
- Ulf Sikström

Iceland (Agricultural University of Iceland and Icelandic Forest Research):

- *Bjarni D. Sigurdsson*
- Brynhildur Bjarnadóttir
- Jon August

Norway (Skog og Landskab):

- *Magne Sætersdal*
- Dan Aamlid
- Kjersti Holt Hanssen

Finland (METLA):

- *Leena Finér*
- *Ari Laurén*
- Hannu Ilvesniemi
- *Jukka Laine*
- Anna Tolvanen
- Harri Koivusalo
- Heljä-Sisko Helmisaari
- Sakari Sarkkola
- Riitta Väänänen
- Sirpa Piirainen

Lithuania (Lithuanian Forest Research Institute):

- Iveta Varangiryte

Latvia (Silava):

- Andis Lazdins
- Aigars Indriksons
- Dagnija Lazdina
- Andis Bardulis



### Objectives (summary from application)

In this Nordic centre, Environmental Services (ES) include i) C-sequestration, ii) water protection and iii) biodiversity.

With the general objective to strengthen Nordic collaboration and research innovation the specific objectives of CAR-ES are:

- To strengthen the knowledge base for counting and optimising environmental services in sustainable forest management (SFM).
- To quantify the environmental impact of different management strategies and practices in operational ways, that can support decision-making.
- To improve the knowledge and visibility of the environmental services provided by forests in the public as well as among forest owners and managers.

The ambition is to integrate and synthesise the knowledge base (conceptually, qualitatively and quantitatively) on environmental services to the level needed for developing a decision support system (DSS) for SFM. This knowledge base for a DSS may then be implemented by the partners in their internet based dissemination platforms that may target forest owners, decision-makers as well as the general public.

It is not the aim to perform detailed research within each of these three vast research topics. The aim is to focus on the interactions and the major gaps in knowledge from *a holistic view* where information can be integrated across the topics.

#### *Direct operational aims*

- Coordination of Nordic research in the area; eliminate potential overlap and promote effective use of Nordic R&D resources.
- Synergy among the three environmental services in research as well as in practice

### Status and results for 2008

The following co-operation has been brought about during 2008:

- We have succeeded in proposing SNS project 106 (Ash recycling - long-term effects on tree growth) launched as ideas during CAR-ES meetings. The project involves senior and junior researchers from Nordic Forestry Institutes as well as from Universities.
- A literature review on "Environmental Services provided from Forests by the Water" which include riparian management and buffer zones has been worked at. The draft paper had new sections developed from discussions at meeting in Nov. Final editing remain for beginning of 2009 and it will be submitted to Ambio in the spring of 2009. This product is a 100% CAR-ES product based on Nordic knowledge and data that would never have been gathered without the CAR-ES funding.
- A fact sheet on 'Forests Provide Clean Water' was produced and presented to the Nordic Council of Ministers meeting in Selfors, IS in August 2008.
- The research project formulated by the CAR and funded by SNS (SNS project 102) 'Environmental impact of shorter forest rotations' (Finland, Sweden, Iceland) submitted a peer-review paper to Scandinavian Journal of Forest Research (Weslien, J., Finér, L., Jónsson, J.A., Koivusalo, H., Laurén, A., Ranius, T. & Sigurdsson, B.D. (2009). Effects of increased forest productivity and warmer climates on carbon sequestration, runoff water quality and accumulation of dead wood in a Boreal landscape: a modeling study. Scand. J. For. Res., In press) and a communication presentation to end-users (Weslien, J., Finér, L., Jónsson, J.A., Koivusalo, H., Laurén, A., Ranius, T. & Sigurdsson, B.D. (2008). Kol, kväveutlakning och död ved I morgondagens skog. Resultat 11 Skogforsk, 4pp).
- Cooperation between Skogforsk, Sweden and Forest & Landscape Denmark on a peer-review paper (Hansen, K., Ring, E., Stupak, I. & Raulund-Rasmussen, K. (2009). The impact of forest management on soil quality. Annals of Forest Science, in preparation) has been ongoing during 2008, where Karin Hansen has visited Eva Ring at Skoforsk several times. The paper is a

result of a co-operation between the CAR-ES and the EU EFORWOOD project. The co-operation will continue during 2009. A second paper on 'Water quality' is under preparation and will be subject for a similar cooperation.

- A scientific conference on "Adapting Forest Management to Maintain the Environmental Services: Carbon Sequestration, Biodiversity and Water" has been planned. Additional funding has been sought and obtained from SNS and a private foundation. Programme, announcement ect. are in rapid progress (<http://www.metla.fi/tapahtumat/2009/koli/index.htm>).
- 3 open project seminars were held 10-12 January 2008, Frederiksberg, Denmark on 'Water and climate change in connection to environmental services', 27-29 May 2008, Nordberg, Sweden on 'Bioenergy and its consequences for environmental services' and 29-30 October 2008, Helsinki, Finland where papers and a coming conference were planned. At each meeting several hours are devoted to discuss current (inter)national research agendas: what are the current hot issues in each country; new projects; new publications etc.
- Web-page ([www.nordicforestry-cares.org](http://www.nordicforestry-cares.org)) maintained.

#### **Project seminars held during Year 4**

*10-12 January 2008, Frederiksberg, Denmark (Postponed from Nov. 2007)*

*Seminar on 'Water and Climate Change' and 5<sup>th</sup> Progress Meeting*

- 14 scientists from 6 countries participated.
- Excursion to the CLIMATE manipulation experiment at Jægerspris, to a site with greenhouse gas emission monitoring in wet gradients, and to a tree species trial
- Seminar including presentation from METLA projects on climate effects on water
- Scrutinising the draft on Forests by the Water, work on parts of the paper, decisions made for finalisation of paper to Ambio
- Report on Short Rotation project
- National research agendas and research ideas
- Discussing of ideas for an international workshop
- Update from secretariat, reporting and budget.
- Common application(s) in our area (EU)
- CAR Business meeting

*27-29 May 2008, Nordberg, Sweden.*

*Seminar on 'Bioenergy and its consequences for Environmental Services' and 6<sup>th</sup> Progress Meeting.*

- 19 scientists from 6 countries participated
- Excursion to Riddarhyttan where we saw ongoing activities covering bio-fuel/wood-ash research
- Seminar on *Bioenergy and ES*: 8 presentations were spanning issues
- Brain storm on Bioenergy and ES issues in Nordic context, outcome was 3 research ideas/proposals that participants decided to explore further.
- Planning of an international workshop on ES in Kola, Finland
- Nordic fact sheets to SNS/NMR – Forest & Water
- Presentation of the final outcome of the pilot project "*Environmental effects of shorter forest rotations*"
- National research agendas and research ideas
- Update from secretariat, reporting and budget.
- Common application(s) in our area (EU)
- Plan for dissemination fact sheets: 'translation' of national fact sheets
- CAR Business meeting

29-30 October 2008, Helsinki, Finland.

Planning seminar for international conference and 7<sup>th</sup> Progress Meeting.

- 11 scientists from 5 countries participated. No excursion was made
- Eva Ring: The *forest and water* talk held at ministers meeting in Iceland, August 08
- Workshop finalising sections of the *Synthesis on ES and Forests by Water*
- Planning of the international workshop on ES in Kola, Finland. Identification of potential keynote speakers. 1<sup>st</sup> circular and announcement plan
- Celebration of paper for submission from the project "*Environmental effects of shorter forest rotations*"
- National research agendas and research ideas
- Update from secretariat, reporting and budget
- CAR Business meeting, issues about reporting
- Planning 2009 in detail with discussions of future activities

### Use of 2008 budget

About 63,000 Euro was received and 29,000 Euro was remaining from 2007 budget. Total 79,000 were used in 2008, thus 14,000 remain for 2009. The main reason for remaining funds from 2008 was among other things that planned work (final rewriting of papers) had to be postponed to 2009 by the coordinator for personal reasons (10,000 Euro). Another 95,000 were used by the partners on activities directly related to the CAR-ES, leaving the SNS contribution at 45%.

### Total R&D turnover within the area

Based on reports from the five Nordic forest research institutes (Annex 2) the Nordic R&D turnover at the forest institutes on projects related to Environmental Services was estimated to 6.7 mill Euro (data from Iceland not update at this time, but will not change the amount significantly). The R&D represented by this turnover is the area coordinated by the CAR-ES, where we strive to avoid overlap and create synergy. Research on universities not counted here probably on the order of 25-50% additional turnover may be added.

### Main problems encountered

The co-operation has run smoothly. Enthusiasm seems larger than time and funds allow.

### Future activities

Two main events are planned:

A) *Ordinary meeting in Iceland June 2009*, main issue on the agenda:

- Field visit and discussion of the ForStream project that was funded in relation to CAR-ES.
- Preparations of our common contributions to our conference in Sept. (see next event).
- Further work (anticipated) on our submitted papers after review.
- Discussion of future cooperation, new CAR?
- Information exchange, National Research Agendas, new project started etc.

B) *The open international scientific conference in September 2009 "Adapting Forest Management to Maintain the Environmental Services: Carbon Sequestration, Biodiversity and Water"* to conclude our efforts in this CAR-ES. We expect up to 80 participants, including also stakeholder representatives (<http://www.metla.fi/tapahtumat/2009/koli/index.htm>). In connection to this event we will have a shorter meeting on CAR business issues and plan finalising the scientific and administrative conclusion of CAR-ES.

Other main activities (we anticipate several phone-meetings):

- Finishing synthesis papers
- Preparation of individual contributions to the above conference, including papers for a special issue.
- Work on the conference programme, announcement etc.
- Editing the conference special issue.

**Publications 2008**

Gundersen, P., Ring, E., Hansen, K., Finér, L., Laurén, A. & Högbom, L. (2008) Forests produce clean water. Factsheet, Nordic Forest Research Co-operation Committee (SNS), 2pp. Download [here](#).

Halldórsson, G., Oddsdóttir, E.S. & Sigurðsson, B.D. (eds). (2008) AFFORNORD: Effects of afforestation on ecosystems, landscape and rural development. TemaNord 2008:562, Nordic Council of Ministers, Copenhagen, 120 p.

Jonsson, J.A. & Sigurdsson, B.D. (2009) Short-term effects of thinning and fertilisation on soil temperature and carbon efflux of young black cottonwood stand in Iceland. Biogeosciences (Submitted)

Sigurdsson, B.D., Sverdrup, H., Belyazid, S. & Bjarnadottir, B. (2008) Effects of afforestation on the carbon cycle. In AFFORNORD: Effects of afforestation on ecosystems, landscape and rural development. Edited by G. Halldórsson, E.S. Oddsdóttir, and B.D. Sigurdsson. TemaNord 2008:562, Nordic Council of Ministers, Copenhagen. pp. 87-99.

Weslien, J., Finér, L., Jónsson, J.A., Koivusalo, H., Laurén, A., Ranius, T. & Sigurdsson, B.D. (2008). Kol, kväveutlakning och död ved I morgondagens skog. Resultat 11 Skogforsk, 4pp.

Weslien, J., Finér, L., Jónsson, J.A., Koivusalo, H., Laurén, A., Ranius, T. & Sigurdsson, B.D. (2009). Effects of increased forest productivity and warmer climates on carbon sequestration, runoff water quality and accumulation of dead wood in a Boreal landscape: a modeling study. Scand. J. For. Res. (In press).

The full accumulated list of publications is attached including a section with publication form the research area (Annex 1).