



Eva Ring, Skogforsk.

Eva Ring: "Estonia, Latvia and Norway have more explicit regulations for protection zones than Sweden and Finland."
Photo: Lena Gustafsson (landscape) and Skogforsk (portrait).

One metre or five kilometres – large variations in protection zone widths

There is strong consensus among the Nordic and Baltic countries about the value of protecting water in the forest landscape from nutrient input, sediment inflow and biodiversity losses. The measures to achieve this, however, do differ.

While law enforcement and detailed mandatory regulations apply in some countries, others rely on voluntary actions originating from concern about the environment. The SNS-supported network CAR-ES (see next page), together with the Future Forests research programme, has compared how legislation, certification standards and other policy instruments related to protection zones around water are applied in the five Nordic countries, as well as Estonia and Latvia.

The compilation, published in *Ambio*, revealed large discrepancies

and demonstrated that different major land use, history and political traditions were important.

Restrictions in protection zones

Protection zones along streams and lakes are intended to guard the water against the negative impacts of harvesting, soil disturbance and leakage of chemicals. In the protection zone, forestry activities may be restricted, adapted or even prohibited. Restrictions within protection zones may be enshrined in law, and be more or less detailed. Dialogue processes and voluntary agreements, such as through certification standards (FSC and PEFC), also play important roles.

The review shows that **Estonia, Latvia and Norway** have more explicit regulations for protection zones than the other countries. Latvia, with a historic legacy from the Soviet period, requires the widest zones. For

example, protection zones of 1 km are required along streams with spawning salmon. The most extreme regulations apply to forests along the Gulf of Riga, where harvesting methods are regulated in a 5 km zone.

Norway has mandatory regulations within the law, adopted directly from the PEFC standard. Zone widths for harvesting are dependent on site-specific conditions, starting from 10-15 metres.

Finland and Sweden are, in contrast, less regulated by the law. The Swedish forest law stipulates that damage to soil and water must be prevented or limited. How the law is implemented is left up to the forest owner. Since most forest owners are certified, the standards from FSC and PEFC govern the protection zones, but no detailed zone widths are given.



Finland, as well, lacks explicitly prescribed protection zones, but key habitats in riparian zones are protected from forestry operations.

Denmark and **Iceland** generally lack policies for protection zones in forests, a natural explanation since most of the land is subjected to other land uses. There are, however, other regulations in these two countries, which affect forestry activities.

Degree of prescriptiveness

The policy instruments can be classified depending on how prescriptive the regulations are. Eva Ring, hydrology expert at Skogforsk, explains:

– We classified the national legislation with respect to the “degree of prescriptiveness”. This term describes if the regulations are mandatory or voluntary, and if detailed zone widths and management

are prescribed. “Mandatory substantive regulations” have the highest prescriptiveness, and “voluntary procedural regulations” have low policy prescriptiveness.

– Here, we could place Norway, Estonia and Latvia in the “mandatory”, “substantive” box. Sweden and Finland were in a “mixed” box, where protection zones are mandatory but the width is not specified, she says.

The variation among countries can be explained by many factors, such as land-use distribution, forest ownership structure and political legacies.

– There may be good reasons for the variation, but we don’t yet know which type of policy is most efficient.

Country	Zone width	Comment
Norway	5-30 m	PEFC standard
Sweden	“to the extent needed”	25 metres for fertilisation
Finland	≥ 1-50 m	No changes in riparian key habitats
Denmark	2-50 m	
Iceland	≥ 5 m	
Estonia	1-200 m	
Latvia	10 m – 5 km	

Protection zone widths vary among the countries.

Read more: Ring, E., Johansson, J., Sandström, C., Bjarnadóttir, B., Finér, L., Libiète, Z., Lode, E., Stupak, I. & Sætersdal, M. 2017. Mapping policies for surface water protection zones on forest land in the Nordic-Baltic region: Large differences in prescriptiveness and zone width. *Ambio* 46, 878-893.

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CAR-ES provides knowledge about environmental services

“By Environmental Services we understand the suite of ecosystem services that provide people with environmental benefits, especially carbon sequestration, provision of clean water and maintenance of soil quality and functional soil biota.” (from CAR-ES III application)

The Centre of Advanced Research on Environmental Services from Nordic Forest Ecosystems (CAR-ES) is currently running its third programme period. Raija Laiho, Professor of peatland ecology at Luke, Finland, is the coordinator:

Environmental services is a subset of ecosystem services. Which do you focus on in CAR-ES?

We focus on carbon sequestration, provision of clean water, and maintenance of soil quality and functional soil biota.

Which services are at most risk of deteriorating?

All of these services are at risk if forests are managed unwisely. Soil functional diversity is the least well-known, so it may deserve a special mention. Soil microbiota are incredibly diverse, and mapping these communities and their functions is, perhaps, the field where the biggest breakthroughs are still to come. We are still far from knowing how soil communities respond to different forest management options, even though they “run” several crucial ecosystem functions.

CAR-ES has a high-profile aim to “provide the best knowledge for informed decision-making on forest management concerning continued provision of environmental services in the Nordic-Baltic region”. Can you give an example of useful results?

In Finland, for instance, we are currently studying whether continuous-cover management of peatland forests would provide a way to regulate water-table levels at least in part through the “biological drainage” caused by tree stand evapotranspiration. The incentives for this include environmental benefits as well as cost reduction for the land-owner through reduced or avoided ditch network maintenance, soil preparation and regeneration costs.

What are the benefits of cooperating in a Nordic-Baltic network?

The network provides a stable platform for exchanging new research methodologies and results, and ways to put science into practice. Further, we can apply our research in more forest types, management methods and societal

needs. Our national research can be coordinated to get the most out of it in relation to what is done in other countries. We can recognise “hot topics” that are emerging in one or more of the countries. We can also form strong consortia for multinational research, with a strong Nordic-Baltic perspective.

About CAR-ES

- CAR-ES III runs for the period 2016-2020
- Partners from eight Nordic and Baltic countries
- Four horizontal activities: Carbon sequestration, Functional biodiversity, Water quality, Soil quality.
- Studying impacts from: Silvicultural operations, Intensified harvesting, Land-use change involving forests, Climate change.

Read more:

<http://nordicforestresearch.org/car-es/>

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The uncertain impact of drained organic soils



The Nordic and Baltic countries possess 92% of the forest land on organic soils in the EU.
Drained spruce forest in Finland. Photo: Hannu Nousianen.

Peat and other organic soils play a major role in the greenhouse gas balance and overall carbon sink function of the Nordic and Baltic forests. A peatland may act both as a source and a sink for all three main greenhouse gases, CO₂, CH₄ and N₂O. But how much is a matter of debate. An SNS-supported project will add facts to the discussion.

The estimate of the greenhouse gas (GHG) contribution from drained peatlands under agriculture and forestry use is reported to IPCC, and is an important component of the whole GHG inventory for the Land Use, Land-Use Change and Forestry (LULUCF) sector. Peatlands are common in northern Europe, covering an area of 11.6 million hectares in the Nordic and Baltic countries alone. These countries, in fact, possess 92% of the forest land on organic soils in the EU.

The CO₂ and N₂O emissions are either calculated using default emission factors prepared by the IPCC (called *Tier1*), or from country-specific emission factors (*Tier2*). Irrespective of the method used, estimates currently involve large uncertainties. The uncertainties are due to the great variability in carbon

balance in organic soils with type of land use, vegetation type, nutrient status, water-table level regime and climate.

In addition, the amount of data available, how GHG estimates associated with different conditions are pooled in categories, and which methods and procedures are applied in GHG-data collection, all have impacts on the outcome from the analysis.

Uncertainties remain with new guidelines

In 2014, new guidelines for organic soils were approved by the IPCC. These guidelines updated the *Tier1* emission factors. They further added new categories to the reporting scheme, such as GHG emissions from CH₄ and dissolved organic carbon (DOC), even though some of these are still currently voluntary.

Even the updated guidelines involve large uncertainties in the *Tier1* emission factors. This, in a way, is unavoidable, since they are prepared simply as mean values from all accepted data sources per reporting category and broad climate zones.

Collaboration will improve data

This is where Nordic researchers can play an important role. As a spin-off from CAR-ES, the project

“*Anthropogenic greenhouse gas emissions from organic forest soils: improved inventories and implications for sustainable management*” began in 2016 and is now halfway through. Professor Raija Laiho at Luke is coordinating the project:

– We aim to improve the certainty of the emission factors for the Nordic-Baltic region based on collated data and modelling. Much work has been done in the region. However, the data have been split into several national projects and separate publications, and some countries still lack specific data. We can benefit a lot from coordinating our efforts.

The project team has collated a database of all peer-reviewed GHG data relevant to the Nordic-Baltic region. One task is to compare the different data-producing methodologies, to find out how data collection procedures and presentation in papers could be improved. Further, the potential use of GHG data not included in IPCC 2014 will be examined. Such data could include the large amount of GHG flux studies based on dark chamber measurements.

The team is also looking for ways to utilise information from multi-year measurement series more efficiently than simply averaging annual GHG flux balances.

– The results will support more accurate GHG inventories to be reported to IPCC, says Raija Laiho.

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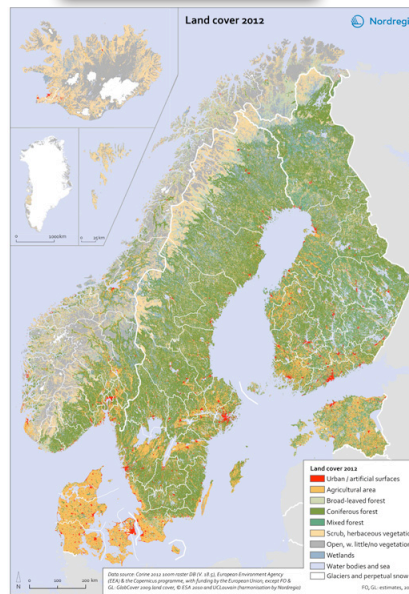
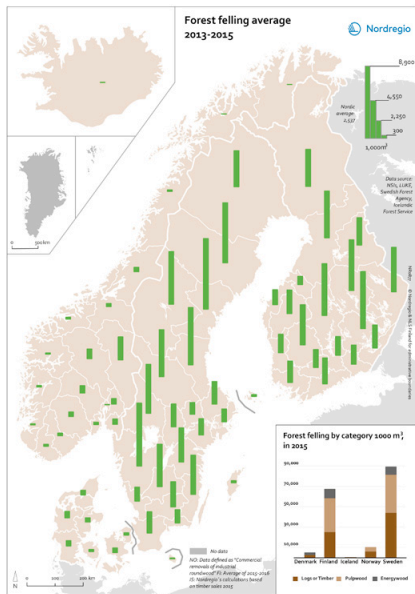
Raija Laiho. Photo: University of Helsinki.

Our Nordic countries in numbers and maps

State of the Nordic Region 2018 takes a closer look at the facts and figures behind the current development in the Nordic countries.

Here, you will find the latest comprehensive statistics available in terms of demographic change, labour market trends, education, economics and - not least - bioeconomy.

Download the report from Nordic Council of Ministers: www.norden.org/snr2018.



Maps from the State of the Nordic Region 2018 report. Left: Forest felling 2013-2015 (designer/cartographer Eeva Turunen). Right: Land cover 2012 (designer/cartographer Linus Rispling). Images are the property of Nordregio, www.nordregio.se.

Don't miss the Matchmaking Day

SNS and EFINORD invite to a new Matchmaking Day in Alnarp, Sweden, May 8th. The day is open for all who are eager to make new contacts and form new, creative research networks. A creativity

researcher from Lund University will guide the process. Deadline for application is April 17th.

Read more on SNS webpage, www.nordicforestresearch.org

Sweden: Exploitation threat to urban forests

The Swedish Forest Agency has launched a new report about the social values of forests. Actions are urgently needed to protect valuable urban forests from being converted to building grounds. The Swedish Forest Agency suggests new targets and financial support to protect close-to-urban forests, and also changes in the regulations for the forest law.

Source: www.skogsstyrelsen.se

Finland: A greater gift than expected

In 2017, Finland celebrated 100 years as an independent nation. The campaign "My nature gift" was a call to forest owners to set aside forest land for protection. The target was 1,800 hectares, but the final figure reached 3,064 hectares. The Finnish government has promised to match the gift by protecting the same area of forest.

Source: www.atl.se

Denmark: Forestry statistics 2016

The report "Skove og plantager 2016" gives an overview of the state of Denmark's forests with data assembled 2011-2016. The forest area amounts to 624,676 hectares, or 14,5% of the country. The largest areas with forests are found on mid Jutland in western Denmark, a result of intensive afforestation on former heathlands from 1850s and onwards.

Source: Dept of Geosciences and Natural Resource Management, University of Copenhagen, ign.ku.dk

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