

Quantifying N, P and C losses to waters from Fennoscandic/Baltic forests and the effect of various forestry operations

The overall goal of this project is to build a meta-database which identifies and documents forest research sites in Fennoscandia and the Baltic states where water chemistry data have been measured. The meta-database locates and catalogues studies where nitrogen (N), phosphorus (P) and dissolved organic carbon (DOC) have been measured in soil and stream water from intact and harvested forests.



Map of sites.

Forests and Baltic Sea Eutrophication

Excessive inputs of N and P to the Baltic Sea cause eutrophication, leading to large algal blooms, oxygen depletion and other harmful ecosystem effects. While most of the nutrients entering the Baltic come from agriculture and point sources, the contribution of forests to overall N and P inputs must be further investigated. On an areal basis, agricultural and urban lands export more N and P than forests. However, forests cover almost half of the Baltic Sea catchment area and low areal export rates may be offset by a large area.

Assembling a meta-database which documents the location and available data from studies

where soil and stream water N, P and DOC concentrations have been measured is a first step towards improved estimates of forest land contribution to Baltic Sea eutrophication.

More than 600 unique sites

So far, the project is running according to plan with no major significant exceptions as yet. We have found that there might not be enough sites where treatments where data have been collected to facilitate the analyses we had originally proposed. However, this lack of treatment sites is in itself an important result. A prototype version of the meta-database is completed, a graphic overview of sites included, in total 630 entries is shown above. During the remainder of 2014 we will continue running quality checks on the meta-database and start to publish the summaries in relevant media format (e.g. fact sheets, reports and/or the internet).

New Insights

Nitrogen leaching from intact forests probably plays a minor role in Baltic Sea eutrophication. Intact forests in the northern part of the Baltic Sea catchment are generally N-limited and usually leach low amounts of dissolved inorganic nitrogen (DIN). A preliminary analysis of data from Sweden shows that more productive sites (with a higher site index) generally leach more DIN. Productivity co-vary with N deposition: more productive in the South are also subjected to higher N deposition. We hope that the data on site conditions, climate, N deposition, soil and stand management assembled in the meta-database will help us to understand the site specific factors controlling N leaching from intact forests in the Baltic Sea catchment, and how these factors varies across the Baltic Sea Catchment area.

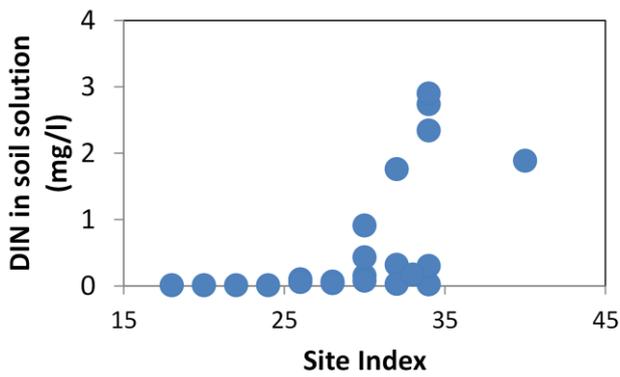


NBforest.info



norden

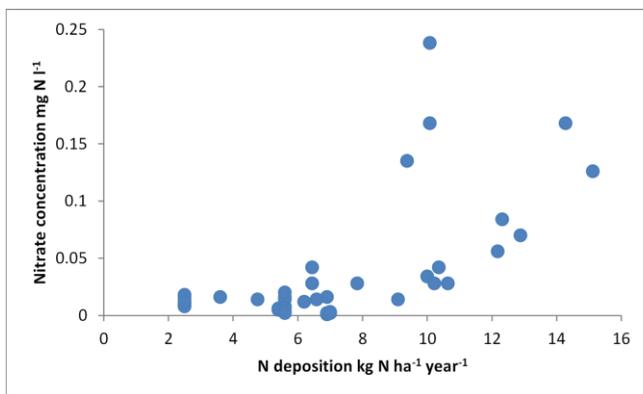
Nordic Forest Research
(SNS)



Plot showing N concentration in soil solution versus site index for a selection of Swedish sites.

Next Steps

Work is on-going to expand the geographic coverage of the database. Efforts are being made to identify additional sites elsewhere in the Baltic Sea catchment area. After quality control checks are complete, further analyses will be performed so as to better understand the relationship between forest lands and Baltic Sea nutrient problems.



Plot showing N concentration in brook water in forested ecosystems as a function on N deposition, for a selection of Finnish and Swedish sites.

NB Forest Policy and Research Briefs

Lars Högbom (Skogforsk) and Martyn Futter (SLU)

Published January 29, 2014

SNS-110: Leaching of carbon, nitrogen [...]

Nordic Forest Research (SNS) www.nordicforestresearch.org



NBforest.info



norden

Nordic Forest Research
(SNS)