

Forests and waters in the Nordic-Baltic region

—highlights from the CAR-ES network



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Nordic Forest Research

During the past century, there has been an eightfold increase in the global human water use and a 50% increase in the per capita water consumption. Today, more than 50% of the available renewable freshwater runoff is used for societal needs globally, and for many drier regions this figure exceeds 100%. With the predicted continued rise in human water use, good water quality and sufficient water quantities are becoming even more important environmental services of our forests. Some aspects of this have been highlighted within the CAR-ES network during 2016-2020:

Forestry planning to protect surface water

Damages to soils and waters during forestry operations, especially harvesting, are a major concern. New research and digital planning tools and direct communication with forestry professionals have raised awareness of the problem. A communication package has been developed including field courses, handbooks and films.

<https://www.youtube.com/watch?v=xauLNORS4m0>

Riparian forests and forest buffers, on forest land, receive special attention in most of the Nordic and Baltic countries. A comparison of the policy settings in 2016 for surface water protection zones indicated that land-use distribution, forest ownership structure and historical and political legacies have influenced the varying degrees of prescriptiveness in the region.

<https://doi.org/10.1007/s13280-017-0924-8>

Peatlands cover 20 Mha of the land area in the Baltic Sea Region countries of which 10 Mha have been drained to improve forest growth. Currently, maintenance of existing ditch networks is the main activity. Careful planning and construction of water protection structures are essential when trying to reduce exports of sediments and nutrients from drained areas to surface waters. Good practices for this have been developed within the WAMBAF project.

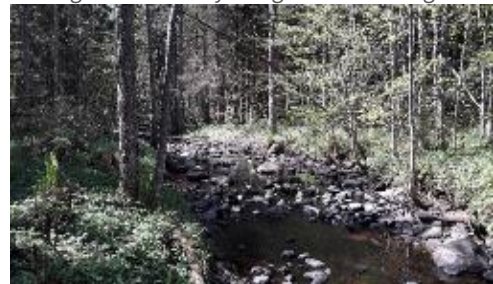
<https://www.skogsstyrelsen.se/en/wambaf/drainage/>

Beavers provide a number of ecosystem services, increase landscape heterogeneity, mediate sedimentation and contribute to water retention and biodiversity, but their activity may cause conflicts in managed landscapes. Also, there is evidence that new beaver impoundments may act as mercury methylation hotspots. Results from Sweden, Latvia, Lithuania and Poland (from the WAMBAF project) indicated increased mercury methylation in beaver dams and a decrease after dam removal.

<https://doi.org/10.1080/02827581.2020.1855364>



Driving on a corduroy bridge. Photo L. Högbom



Riparian forest in Latvia. Photo Z. Libiete



Wetland buffer in Finland. Photo A. Leinonen



Beaver in Sweden. Photo E. Ring

Key issues for future work

The participants of the CAR-ES network have during their work identified a number of key issues related to forests and water that warrant further investigation in the Nordic-Baltic countries.

Water quality and quantity in a future climate

According to the predicted changes in climate, the forest water cycle will be affected, not only by changes in average air temperature and precipitation, but also by changes in precipitation and runoff patterns.

- The water quality and quantity from forest land may change, for example with more dry periods which may require further development of water retention measures on forest land.
- Shorter forest rotations may change the current forest management regimes, which could affect water quality at a landscape level and require adjustments in the efficiency of water protection structures to reduce the transport of sediments, nutrients and hazardous substances to surface waters.
- Water protection measures should be planned at the catchment scale including the mosaic of agricultural and forest land use to ensure that they are cost- and site-efficient.

Forestry—more demands from society

Forestry planning has become increasingly challenging both due to changes in the operating environment, partly probably due to climate change, and demands from society on forest ecosystem services. Accordingly, alternative forest management regimes are receiving more attention, for example, continuous cover forestry.

- Alternative forest management regimes could change carbon and nutrient exports to aquatic ecosystems. More knowledge on their impacts is required if large-scale changes are made.
- Leaving forest buffer strips along surface waters is now the norm in Nordic-Baltic forestry. Management methods need to be developed to ensure continued beneficial effects of these strips.
- Beaver populations are increasing in some areas, especially in the Baltic countries, and beaver population management must be harmonized with forest production and biodiversity goals.
- More knowledge on the impacts of forest management operations on aquatic biodiversity is warranted, and also on how to construct green infrastructures to improve biodiversity.



Lake in Northern Sweden. Photo E. Ring

The CAR-ES network formed a basis for the EU Interreg project WAMBAF, running from 2016 to 2019, followed by the WAMBAF Tool Box project, ending in 2021. More information about these projects are available on <https://www.skogsstyrelsen.se/en/wambaf/the-wambaf-project/> Contact persons for WAMBAF Tool Box: Daniel Thorell and Linnéa Jägerud (Swedish Forest Agency)

