



Nature-based solutions for hydro-meteorological risk reduction and nutrient removal in the Nordic and Arctic regions

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Natural ecological functions provide essential and fundamental benefits to mankind, but can also be actively employed in nature-based solutions to specific challenges in society. For example, water-related ecosystem services have a role in such societal benefits as flood protection, erosion control, and excess nutrient removal. Ecosystem services may be produced and consumed in different locations, and research has recently attempted to formalize this discrepancy in identifying service providing areas (SPAs), service benefitting areas (SBAs), and service connecting areas (SCAs). However, in terms of water-related services, there is a lack of formal evaluation of how SPAs, SBAs, and SCAs are related to hydrological measures such as discharge, flood recurrence, excess nutrient removal, etc. We seek to map SPAs, SBAs and SCAs for a number of key ecosystem services in the Nordic and Arctic region through established ecological definitions (typically, based on land use) and evaluate the findings alongside metrics of hydrological connectivity (river networks), provisioning areas (runoff generating areas), and benefitting areas (river stretches where water flow is moderated). We make use of extensive GIS analysis using both high-resolution land cover data and river network maps. In the end, the results are expected to contribute to identifying how water-related ecosystem services can be employed as nature-based solutions for hydro-meteorological risk reduction and nutrient removal in a changing climate in the Nordic and Arctic regions.