

## **ECOSYSTEM SITE DESCRIPTION – AN APPROACH TO QUANTIFY TRANSPORT AND ACCUMULATION OF MATTER IN A DRAINAGE AREA**

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The Swedish Nuclear Fuel and Waste Management Co. (SKB) presently perform site investigations at two sites in Sweden for a future repository of spent nuclear fuel. The safety assessment of a potential repository will, among other methods, use an approach where transport and accumulation of radionuclides is modelled by quantifying the pathways of carbon/nitrogen/phosphorous in the ecosystem. Since water is the most important medium for transportation of matter, the obvious delimitation of an area for quantification of matter transport is the drainage area. This study describes how site-specific data on surface water chemistry and hydrology, measured at several points along the flow paths of a drainage area, can be used to describe and quantify the flow of matter in terms of transport or accumulation. The approach was applied to the drainage area of Lake Eckarfjärden, investigated as part of the site investigation programme at Forsmark in central Sweden. By using data from inlet and outlet of the lake, together with data from the lake itself, we quantified the flow of matter in the drainage area, and also developed mass-balance budgets for important elements. The results were used to validate process-oriented terrestrial and aquatic ecosystem models, developed for the same drainage area in parallel to the present study. In conclusion, applying this approach will contribute substantially to our understanding of the processes controlling transport and accumulation of matter in a drainage area, and thereby reduce the uncertainties in estimating radionuclide flow and consequences to humans and the environment.