

MODEL-BASED ASSESSMENT OF SEDIMENT CONTROL STRUCTURES IN A DRAINED PEATLAND FOREST CATCHMENT

Kersti Haahti (1), Mika Nieminen (2), Leena Finér (3), Hannu Marttila (4), Teemu Kokkonen (1), Antti Leinonen (5), and Harri Koivusalo (1)

(1) Aalto University School of Engineering, Department of Built Environment, P.O. Box 15300, FI-00076 Aalto, Finland. (email of lead author: kersti.hahti@aalto.fi)

(2) Natural Resources Institute Finland, Latokartanonkaari 9, FI-00790 Helsinki, Finland.

(3) Natural Resources Institute Finland, Yliopistokatu 6, FI-80100 Joensuu, Finland.

(4) University of Oulu, Water Resources and Environmental Engineering Research Unit, P.O. Box 4300, FI-90014 University of Oulu, Finland.

(5) Finnish Forest Center, Kauppakatu 25 A, 87100 Kajaani, Finland.

Sediment loads released after ditch network maintenance (DNM) are addressed in operational peatland forestry by implementing sediment control structures in the ditch networks. This study computationally evaluates alternative sediment control scenarios in a 5.2 ha thick-peated catchment in Eastern Finland. Coupled to a distributed hydrological model, sediment transport was simulated for the first post-DNM year with scenarios consisting of individual structures (e.g. sedimentation ponds, peak runoff control) and their combinations. One scenario represented the prevailing post-DNM conditions with a V-notch weir at the catchment outlet. All scenarios were evaluated against a hypothetical reference scenario where the weir was moved further downstream to eliminate its effect on sediment processes within the catchment. Results suggest bed erosion can be prevented efficiently with well-located breaks in cleaning or structures ponding water. Transport of material eroded from ditch banks was harder to trap as deposition could only be marginally increased with e.g. sedimentation ponds.