MANAGEMENT OF SULFIDE-INDUCED ACIDITY IN PEAT HARVESTING (SUHE): METHODS FOR PREDICTING AND MANAGING ACIDIC LOADS TO WATERS FROM PEAT EXTRACTION AREAS

by

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Different methods are being tested for the prediction and/or more rapid detection and treatment of acid sulfate soil drainage in peat extraction. The acidity of the runoff waters can either be induced by the oxidation of sulfur-rich soils containing sulfidic minerals (mainly iron sulfides) or by leaching of organic acids (mainly fulvic and humic acids) (Andriesse and van Meensvoort 2006 & Kortelainen 1993).

There are two common types of sulfide-rich regions in Finland, Sweden and Estonia: (1) sulfide-bearing marine sediments that have emerged from the former Baltic Sea due to postglacial isostatic land uplift, and (2) coastal and inland black schist areas including the bedrock and/or the corresponding overlying till within their immediate glacial dispersal area. Undisturbed sediments/tills are normally harmless, but when excavated or drained, the oxidation of sulfides in contact with air and water produces extremely acid soils with increased acidity and metal loading in recipient streams. In addition to changes in catchment hydrology, climate change may increase the environmental impacts induced by land use.

This study is focusing on peat lands underlain by sulfide-bearing sediments/till and the purpose is to develop new methods for the prediction and rapid detection of acidic discharge from areas used for peat extraction. In addition, continuous and transient passive treatment methods will be developed for acidic runoff management. Although the methods developed in this study are being optimized for peatland conditions, it is expected that the results could also be exploited within other types of land use.

One of the main aims of this study is also to determine potential regional differences in the acidification capacity of peatlands in sulfide-rich regions. In particular, we aim to evaluate the different impacts of the abundances of ferrous sulfides and disulfides in coastal sediments and sulfides in black schist materials. The results will be utilized in developing more accurate tools for sulfide area

Fig. 1. A typical drainage network in a peat extraction site.

risk assessment, assuming that clear and classifiable differences will be discovered. Moreover, the suitability of different adaptation methods (e.g. growing of sphagnum, rewetting, etc.) to be used on peatlands after peat extraction has ended will also be evaluated.

The study is being conducted within a project entitled 'Impact Management of Sulphide-Soil-Induced Acidity in Peat Harvesting (SuHE). Partial funding is being provided by the European Regional Development Fund (ERDF) via the Centres for Economic Development, Transport and the Environment in North Ostrobothnia and Lapland. Other funding entities include the Council of Oulu Region, Vapo Oy, Turveruukki Oy, Nordkalk Oy Ab, SYKE, the University of Oulu, Metla and Åbo Akademi. More information on the project can be found from the internet site: www.environment.fi/syke/suhe.

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