Rehabilitating gravel extraction sites: The function of initial organic topsoil layer

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ABSTRACT: Gravel extraction, involving reduction of soil thickness above the water table and the removal of organic topsoil, accelerates the seepage of harmful substances into groundwater and produces adverse effects on the development of undergrowth and tree stands. That is quite problematic, because the gravel extraction sites and the most important groundwater aquifers are situated in the same deposits.

The spreading of topsoil material is an essential part of rehabilitation, because the most important actions affecting in the quality of groundwater occur in the upper part of the soil profile (A_0, A and B horizons), when rainwater percolates through soil to groundwater. Most suitable topsoil materials are good substrates for vegetation, protect groundwater against harmful substances and are not harmful to groundwater.

The purpose of this project is to promote economical and sustainable use of initial organic topsoil as cover material in gravel pits. The project focuses on monitoring the changes in seepage water quality as well as the changes in substrate caused by the removal, storage and spreading the topsoil in rehabilitated gravel pits. Six different topsoil materials are monitored with computer aided continuous monitoring system. In test squares soil temperatures and water content in each topsoil layer are monitored in natural conditions. The effect of percolation of rain water in the topsoil are tested in large cylinders in laboratory as well as in outside of laboratory. In addition fullscale rehabilitation experiment is conducted by using the same set of six topsoil. Also the vegetation establishment is studied in some rehabilitated pits.

The project started in 2002 and it will finish in 2003. The project is the cooperation between Finnish Environment Institute, Tampere University of Technology and Lohja Rudus Corporation.