

DEVELOPMENT OF FINNISH PEATLAND AREA AND CARBON STORAGE 1950 – 2015: REVIEW AND UPDATE

Jukka Turunen^{1*} and Samu Valpola²

¹ *Geological Survey of Finland, Kuopio Unit, P.O. Box 1237, 70211 Kuopio, Finland*

² *Geological Survey of Finland, Vaasantie 6, 67100 Kokkola, Finland*

**Corresponding author: jukka.turunen@gtk.fi*

Over 2/3 of the carbon (C) reservoir of ecosystems in Finland is in peat. In 1950, almost 90% of the Finnish peatlands were in a natural state. The use of peatlands for forestry drainage, agriculture and peat harvesting has changed the nature of Finnish peatlands and has had large impacts on their overall role in the national C balance. The present peatland area is estimated at 8.9 million ha, 4.8 million ha of which has been drained for forestry. In the 2008 study, the knowledge of mire area change since 1950 was considered relatively reliable, whereas the net changes in the actual C sequestration and the actual C storage change were much less certain. Since 2008, there have been several new gas balance and C storage change studies of forestry drained peatlands. The results of these studies indicate that a crucial update is needed to evaluate the impact of forestry drainage on C storage changes since 1950. In the 2008 study, the total C storage of Finnish peatland ecosystems was estimated at 5960 Tg. The actual C storage in peat had decreased by 73 Tg since 1950. However, the total C storage of Finnish peatlands, which includes both peat and living plant biomass, was estimated to have increased by 52 Tg because the intensive peatland drainage has significantly increased the total C storage of vegetation. In the present study, the most critical update considers the greenhouse gas emissions of forestry drained peatlands. The newest studies indicate that the drained peatlands can be either large C sinks or large C sources depending on their nutrient status, forest coverage and geographical location. A large synthesis is needed to develop a more reliable picture of the development of peatland area and C storage from 1950.

Keywords: *Finland, peatlands, peat, vegetation, carbon storage*