



Peatland restoration and effects on groundwater, water quality and runoff

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There is increasing interest to restore degraded peatland, but long term effects of restoration are poorly known. Totally 46 boreal peatland were included in a study set, including 20 fens, 13 pine mires and 13 spruce mires, with peatland types ranging from nearly ombrotrophic Sphagnum bogs to rich fens. Study sites covered spatially almost whole Finland. Furthermore, 27 of the sites were previously drained and restored during the monitoring period, while the remaining 19 sites were in pristine condition. The pristine sites were held as paired counterparts of the drained sites and are located in the vicinity of drained/restored sites to ensure similar vegetation, nutrient and hydrological status. Since 2008, water table fluctuation (continuous measurement), pore water chemistry at all sites, and runoff and water chemistry (nutrients, DOC, ions with adjusted intervals through frost-free season) from 9 sites were studied. Drained/restored sites were monitored for 1 to 3 years before restoration. This presentation shows preliminary results and analysis of present dataset. Restoration operation increased water table (WT) in all study areas, but high variation was observed. Highest change in WT elevation was observed in spruce mires and smaller increases in fens. Disturbance of peat material and higher WT caused leaching of nutrients and ions from restoration areas, e.g. phosphorus, nitrogen and iron. Increase was highest during the first year after restoration, but showed decreasing trend almost in all study areas in pore-water samples. Generally it can be concluded that restoration have reached its main target for elevated WT, launching re-development of acrotelm peat layers. However, restoration operation caused disturbance and elevated nutrient loading to water courses. Preliminary results of statistical analysis revealed no significant differences of mean daily runoff between drained and pristine counterparts. After restoration, one study site showed decrease in mean runoff (0.67 mm/day to 0.54 mm/day), however, increase between 17 % to 80 % of mean runoff was observed for the rest of the runoff monitoring sites.