

Impacts of ditch blocking on peatland hydrology - the benefits of long-term monitoring

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A long-term field trial was conducted on a blanket peatland in North Wales. Twelve ditches were studied. After an initial monitoring period, eight of the ditches had peat dams installed a few metres apart along their entire length (dammed), four of these ditches were also partially infilled through bank reprofiling (reprofiled). Four ditches were left open with no dams or reprofiling (open). These 12 ditches and the surrounding peat were then monitored for a further 4 years. The effect of ditch blocking on local water tables was spatially highly variable but small overall (of the order of 2-3 cm) because the site, despite having ditches, already had relatively shallow water tables (medians within the upper 10 cm of the peat profile). An initial five-fold reduction in discharge occurred in ditches that had been dammed or reprofiled. However, there was evidence of a slow change over time in ditch flow at the site in subsequent years, with the overall volume of water leaving the dammed or reprofiled ditch weirs increasing per unit of rainfall to around twice that which occurred in the first year after the restoration. These changes were not observed in the open ditches. There was therefore clear evidence of the benefits of long-term monitoring as hydrological impacts in the first year after ditch blocking were very different from those in later years as the site conditions gradually changed. The additional water that flowed in later periods of the study from the blocked ditch catchments occurred in the form of a more continuously-flowing baseflow with fewer dry periods. The cause of this increase was related to changes in subsurface flow pathways in the peat in the aftermath of re-wetting. We show that these subsurface pathways mean that even in sloping blanket peatlands, the catchment areas for peatland ditches may be very different from that expressed by surface topography alone. Therefore, peatland studies that have estimated aerially-weighted water or carbon fluxes from one or two open or blocked ditches and where such data have also been used in upscaling estimates, need to be treated with caution.