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Blocking drainage ditches aids peatland restoration

A recent study suggests that blocking ditches originally dug in peatlands to drain water is an effective restoration method, but is influenced by local conditions. Restoration efforts should therefore be monitored over long periods of time at the landscape level to fully evaluate their impacts.

As well as providing clean water and storing significant amounts of carbon, peatlands are important habitats for birds, animals and plant life. However, many peatlands have now been drained using a network of ditches to allow animals to graze.

Allowing water tables to rise again by blocking drainage ditches is one method used to help restore drained peatlands. Partly funded by the EU's LIFE programme[1], this study assessed at the landscape level and over the longer term, how effective this restoration measure has been in rehydrating a degraded blanket bog (a type of peatland) at Lake Vyrnwy in mid-Wales, UK. There, peat and heather bales were used to block about 100,000 m of ditches between 2007 and 2010.

The researchers measured the depth of water tables together with the presence or absence of surface waters at various points in the catchment area. Using geographical and climate data, they then used computer modelling to determine water table responses to drain blocking. Overall, more water was stored in the peat following restoration, indicating a return to the healthy functioning of the peatland.

Following blocking, water tables were found to rise after rainfall, which did not occur in non-restored sites. In particular, water tables down-slope of ditches rose by an average of 2cm, with the response being influenced by local factors, such as the slope of the ground and the depth of the peat. In connection with rising water table depths, the occurrence of surface waters increased after blocking by up to 40% in some places. This was especially noticeable within 2m of the drains, where previously, unblocked drains significantly decreased surface water.

Previous studies have indicated that raised water tables result in increased discharge rates into drains and streams. However, this study resulted in both higher water tables *and* reduced frequency and severity of peak flows, as blocking lowered the rate at which water was discharged into drains and streams, keeping water tables higher for longer between rainfall events. This implies that restoration could potentially reduce the flood risk further downstream in the catchment area. Two separate papers further discuss the impacts of peatland restoration on flood risk reduction[2] and carbon flux balance[3].

Variations in the recovery rates of the water table and surface waters in different catchment areas suggest local conditions significantly affect the extent and speed of recovery. This suggests that the water-table restoration potential of peatlands is underestimated and further studies over longer periods and at the landscape scale to effectively monitor their recovery.

1. EU LIFE Programme. See: http://ec.europa.eu/environment/life/
2. Wilson, L., Wilson, J., Holden, J., Armstrong, A., Johnstone, I., Morris, M., 2011. The impact of drain blocking on an upland blanket bog during storm and drought events, and the importance of sampling scale. *Journal of Hydrology.* 404, 198-208.
3. Wilson, L., Wilson, J., Holden, J., Armstrong, A., Johnstone, I., Morris, M., 2011. Ditch blocking, water chemistry and organic carbon flux: evidence that blanket bog restoration reduces erosion and fluvial carbon loss. *Science of the Total Environment.* 409, 2010-2018.

Source: Wilson, L., Wilson, J., Holden, J. *et al.* (2010) Recovery of water tables in Welsh blanket bog after drain blocking: Discharge rates, time scales and the influence of local conditions. *Journal of Hydrology*. 391: 377–386

Contact: sula.consulting@gmail.com **Themes**: Soil, Water