



## **Assessing the catchment scale response of hydrology to ditch blocking in blanket peats: An example from Stean Moor, northern England.**

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Where peatlands are found in a degraded state it is often felt that interventions should be implemented to return these to a more 'natural state'. However there is a lack of long-term data from peatland restoration projects at scales greater than ditch network or hillslope scale. Within the UK significant investment has been made to block open-cut ditches in many upland blanket peatlands. It has been widely suggested that ditch blocking impacts both water quality and quantity. However, much of the work to understand these impacts has relied on studies focused at the ditch or slope scale.

Stean Moor is drained heavily at 15.8 km of ditches per km<sup>2</sup>. In 2009 investment was secured to block these ditches, with c. 30000 peat dams being installed over winter 2009/10 and 2010/11. At twelve stream monitoring sites (11 affected by blocking upstream and 1 control) discharge and turbidity has been continuously monitored since 2009. Stream water sampling has also been undertaken monthly and through storm event sampling using autosamplers and tested for water colour, DOC and suspended sediment concentration (SSC).

Overall there is a lack of significant changes to either discharge or water quality at the catchment scale. We suggest that drain blocking has not led to clear changes in streamflow hydrology due to i) two competing hydrological changes within the peatland cancelling each other out and ii) the severe nature of the peatland degradation at the site such that rapid recovery in some hydrological functions has not occurred. There has also been no rapid recovery (reduction) in aquatic carbon production due to the severe nature of the degradation caused by dense drainage and wider disturbances. In addition, wider degradation features such as some of the major sediment sources in the catchment were not dealt with by ditch blocking alone demonstrating that multiple interventions are required in some peatland systems to properly deal with site rehabilitation and ecosystem service delivery.