Geophysical Research Abstracts
Vol. 18, EGU2016-17116, 2016
EGU General Assembly 2016

Blanket peatland restoration leads to reduced storm runoff from headwater systems

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This paper presents data on the impact of largescale peatland restoration on catchment runoff from peatlands in northern England. The blanket peatlands of the Pennine hills are important sources of water supply and form the headwaters of major river systems. These peatlands are severely eroded with extensive gullying and bare peat resulting from the impacts of industrial pollution, overgrazing, wildfire and climatic change over the last millennium. In the last decade there has been a major programme of peatland restoration through re-vegetation and blocking of drainage lines in these systems. The Making Space for Water project has collected hydrological data from five micro-catchments(two restoration treatments, a bare peat control, a vegetated control and a previously restored site) over a four year period. This has allowed for both Before-After-Control-Intervention and Space for Time analysis of the impact of restoration on downstream runoff. Catchments became wetter following re-vegetation, water tables rose by 35 mm and overland flow production increased by 18%. Storm-flow lag times in restored catchments increased by up to 267 %, while peak storm discharge decreased by up to 37%. There were no statistically significant changes in percentage runoff, indicating limited changes to within-storm catchment storage.

Natural flood management solutions are typically focussed around one of two main mechanisms, either enhanced storage of water in catchments or measures which slow transmission of water to channels and within channels. Upland peatlands are often mischaracterised as sponges and assumed to mitigate downstream runoff through additional storage. The results of this study suggest that whilst restoration of upland peatlands can lead to significant reductions in peak discharge, and has potential to contribute to natural flood risk management, the mechanism is an increase in catchment roughness and an associated decrease in flow velocities.