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Restoration of shallow peatlands on Exmoor (UK): initial effects on water quality

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Historical and recent anthropogenic pressure has had dramatic effects on peatlands throughout the UK. In the South West, drainage for agricultural reclamation and peat cutting since the 19th century has progressively altered the hydrological behaviour of the peatlands of Exmoor and Dartmoor National Parks. Lower water table levels have caused increased oxidation, erosion and vegetation change, further affecting the storage of carbon and the provision of other ecosystem services (i.e. supply of drinking water, biodiversity). Moreover, the location of these peatlands at the southernmost margin of the UK peatlands' geographical extent makes them extremely vulnerable to the predicted effects of climate change, i.e. increased temperature and change in rainfall pattern. An extensive programme of peatland restoration is currently underway on Exmoor. Drainage ditches were blocked to reinstate the hydrological behaviour, reduce the outflow of dissolved organic carbon and, in doing so, improve other ecosystem services delivered by peatlands.

This paper will report on the water quality monitoring results from a small headwater catchment in Exmoor. We will show results comparing changes in Dissolved Organic Carbon (DOC) losses and colour pre- and post-restoration. Our experimental approach uses event-based water quality monitoring across three drainage ditches that are representative of the different scales of damage in the area. Samples were taken back to the laboratory and analysed for DOC and colour, using UV spectrophotometry and UV-vis spectrometry respectively. DOC loads were calculated using discharge for each drain.

Overall, DOC concentrations ranged between 3 and 30mg/L. Both pre and post- restoration datasets presented high seasonal variability, with higher concentrations measured from June to September. No significant change in DOC concentrations was observed in the 6 months after restoration. It is hypothesised that the effects of restoration could be hidden by inter-annual variations in total and mean rainfall over the period monitored. However, significant changes in water quantity, such as a reduction in storm flow following restoration, means that, overall, DOC loads have decreased at the scale of the catchment. These results show the need for an integrated approach in catchment management, considering all trade-offs between ecosystem services before assessing the effects of restoration.