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Gully-blocking in upland blanket peat: effects on downstream water discolouration and carbon release high and low flows

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In the UK most peatland comprises blanket peat deposits found in upland areas, which for several utility companies form the dominant source of potable water supply and have been associated with elevated water colour and dissolved organic carbon. Blocking of erosional gullies is a technique increasingly being used in attempts to restore blanket peat to good ecological condition, and this is especially the case in the Peak District location of this study. Stream flow, water quality and water table levels were monitored in four study catchments (sub-catchments of the River Ashop) for the period October 2002-September 2006 and again for October 2008-September 2009. Mean monthly flow, colour and carbon flux for these sites have been reported previously, but the current analysis investigated effects of gully blocking at times of high and low daily flows.
The study demonstrated that gully-blocking in blanket peat had impacts on downstream water colour:
1. In the first year following gully-blocking, mean colour in high (Q10) flow conditions appears to reduce in comparison to non-blocked catchments
2. In the first 3 years following gully-blocking, mean colour in low (Q95) flow conditions increases significantly (trebles). However, no increase in DOC flux was identified and we suggest that the observed increase reflects changes in colour release cycles, where seepage of more higher coloured water pooled behind dam structures becomes a significant component of baseflow.