



Drain blocking: An effective treatment for reducing dissolved organic carbon loss and water discolouration in a drained peatland.

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Peatlands are an important terrestrial carbon store. However, heightened levels of degradation in response to environmental change have resulted in an increased loss of dissolved organic carbon (DOC) and an associated rise in the level of discolouration in catchment waters. A significant threat to peatland sustainability has been the installation of artificial drainage ditches. However, recent restoration schemes have pursued drain blocking as a possible strategy for reducing degradation, fluvial carbon loss and water discolouration. This paper investigates the effect of open cut drainage and the impact of drain blocking on DOC and colour dynamics in blanket peat soil-water solutions. Three treatments (intact peat, drained peat, and drain-blocked peat) were monitored in an upland blanket peat catchment in the UK. DOC and colour values were significantly higher on the drained slopes compared with those of the intact peat, which in turn had greater DOC and colour values than the drain-blocked slopes. Consequently, drain blocking is shown to be a highly successful technique in reducing both the DOC concentration and level of discolouration in soil waters, even to values lower than those observed for the intact site, which suggests a process of store exhaustion and flushing may operate. The colour per carbon unit (C/C) ratio was significantly higher at the drain-blocked site than either the intact or the drained treatments, whilst the E4/E6 ratio (fulvic acid: humic acid) was significantly lower at the blocked site compared to the two other treatments. The high C/C and low E4/E6 ratios indicate that drain blocking also modifies the composition of DOC, such that darker-coloured humic substances become more dominant compared to the intact site. This implies disturbance to DOC production and/or transportation processes operating within the

peat.