



## Impacts of erosion and restoration on POC flux and pollutant mobilisation in the peatlands of the Peak District National Park, UK

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Peatlands represent major carbon stores. However, much of the UK's blanket peat is significantly degraded and actively eroding which significantly impacts carbon storage through the physical export of particulate organic carbon (POC). The stability of peatlands is therefore important for the preservation this carbon store and the restoration of the eroded peat of the Peak District, southern Pennines, UK has been a major conservation concern for several decades. The near-surface layer of these blanket peats is severely contaminated with high concentrations of atmospherically deposited lead – a legacy of Britain's Industrial Revolution. Recently there has been growing interest in the mobilisation of this heavy metal which has been shown to be associated with POC. However, little is known about the source and quality of sediment still entering the fluvial system in revegetated catchments. Understanding the physical process dynamics relating to revegetation and sediment flux is required in order to assess the efficacy of peatland restoration operations in reducing POC and lead release.

Three sites have been studied in the Bleaklow area of the Peak District; each representing different surface conditions: (i) actively eroding, (ii) recently revegetated and, (iii) intact. The contaminated nature of the near surface peat distinguishes POC mobilised from the peat surface from that eroded from gully walls. This has allowed a fingerprinting approach to be adopted as a means of characterising and identifying the sources of sediment entering the fluvial system. A survey of surface lead concentrations at each site was conducted and other catchment sources were identified and their relative contribution to the suspended load assessed. POC fluxes are greatly reduced following restoration to levels comparable to intact sites. Lead flux is also significantly reduced but surface condition makes little difference to the quality of the sediment, i.e. the concentration of lead associated with POC. Restoration is reducing areal rates of POC production through surface stabilisation rather than being a function of changes in the relative importance of surface and gully wall sediment sources.