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Effects of peatland burning on hydrology, water quality and aquatic ecosystems

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Controlled burning is used worldwide for the management of vegetation, yet there is serious concern about the environmental implications of such practices. Across the UK many peatlands are burned to encourage and maintain heather growth. However, detailed evaluations of the costs, benefits and sustainability of burning are hampered by a lack of basic scientific data. This paper will present the outline of a new three year NERC-funded project called EMBER which provides the first co-ordinated evaluation of vegetation burning on peatland hydrological and ecological processes. Case study sites influenced by prescribed burns will be established in internationally important sites in the Peak District and North Pennines, UK. EMBER will increase understanding of the processes linking prescribed peat vegetation fires, hydrology, water quality and stream invertebrate communities in upland peat dominated catchments. Four work packages will aim to: 1) increase understanding of the effects of moorland patch burning on the hydrology and physicochemistry of peat, through examination of changes in soil hydrology and water quality; 2) provide a better understanding of the effects of moorland patch burning on basin runoff quantity and quality, through examination of river flow regimes, suspended sediment concentration and water chemistry; 3) assess the influence of changes in stream hydrology, water quality and sediment fluxes on stream ecosystems through examination of stream invertebrate community biodiversity and fish abundance and 4) gain a more fundamental understanding of some environmental drivers of upland aquatic community response to burning by experimentally manipulating fine sediment flux under controlled conditions using a series of streamside mesocosms. Taken together these packages will provide a holistic patch- to basin-scale evaluation of burning from the perspective of peat hydrology, chemistry, river water quantity and quality, and stream ecosystems, thus providing the balanced knowledge base which is currently lacking for peatlands.