



## Using palaeoecological techniques to inform contemporary hydrological management of a peatland

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Realization of the economic and environmental value of upland peatlands has led both public and private organizations to implement 'restoration' schemes. The word 'restore' implies that we seek to reverse adverse effects that have occurred and return the ecosystem to a pre-disturbance state. Restoration schemes in UK upland peatlands focus on the objectives of raising the water table through blocking drainage channels and gullies and re-vegetating bare areas of peat that are prone to erosion. The target is often the reinstatement of Sphagnum as a significant part of the peatland flora as this will produce an accumulating peat system. Restoration of a peatland implies that we have knowledge of its previous ecological history from which we can attain a restoration blueprint but restoration schemes often take little, if any, account of the ecological history of the site.

This study is an example of how palaeoecological techniques have been employed at a UK upland catchment with findings to support the peatland restoration schemes. The study combined an extensive stratigraphic survey of the catchment and a detailed core-based analysis. Macrofossil, testate amoebae, humification and charcoal analysis were employed to determine the historical representation of Sphagnum at the site, the changes in water-table level, the degree of decomposition and also burning history. Stratigraphic survey and core results show that Sphagnum has played a significant role in parts but not all of the catchment, persisting in the main core until late 19th century. They also demonstrate that the loss of Sphagnum and subsequent abundance of *Calluna vulgaris* is coincident with evidence of wildfire. Continued absence of Sphagnum and abundance of *Calluna vulgaris* is coincident with further, less intense, burning likely due to grouse moor management. The 3000 year old record from the main core demonstrates the importance of historical climate change in changing water-table levels, vegetation, and degree of decomposition. There is little doubt that when faced with designing and implementing a 'restoration' plan for a site land managers will be able to make much more informed decisions if the ecological history of the site is investigated. At this site encouraging Sphagnum growth is shown to be valid. If this restoration aim is to be successful the removal of prescribed burning is probably required.