Feature article: Peat wastage and wetland archaeology

10 January 2002

United Kingdom of Great Britain and Northern Ireland (Overseas territories)

Peat Wastage and Wetland Archaeology

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There is much common ground in the biodiversity and heritage management of wetlands. Both depend on maintaining these places, since their destruction destroys both its natural and cultural heritage. Decision makers and managers of the natural and the cultural features of wetlands are, however, not always fully aware of the benefits of working together to jointly strengthen the safeguarding of this heritage. -- Nick Davidson, Deputy Secretary General, Ramsar Convention on Wetlands (Davidson 2001)

Background

Somerset County Council’s Archaeology group have undertaken a desk top study into the threat posed to wetland archaeological remains in Somerset by peat wastage. The funding came from the Environment Agency as part of their Water Level Action Plan for the Somerset Levels and Moors. The study suggests that all the known waterlogged sites of national importance in the Somerset moors will be destroyed by desiccation and peat wastage by the end of the present century. This includes numerous prehistoric trackways and the Iron Age ‘Lake villages’ at Glastonbury and Meare.

When peat is drained it shrinks and the ground levels lowers because of the loss of water and the oxidation and decay of organic matter. Undrained, heavily waterlogged anaerobic peat is up to 90% water, so a lot of peat bulk is lost by drainage and evapotranspiration. The change from anaerobic to aerobic conditions allows oxidation to take place and the loss of organic matter through microbial decay.

How rapid is peat wastage?

Measurements taken over the last 10 years from ground anchors suggested that peat wastage in pasture fields was occurring at rates of 0.44 m to 0.79 m over 100 years. In future wastage rates may be significantly increased by climate change. It is estimated that by 2050 AD the UK will be on average 2º C warmer and have 10% more rainfall than now (May 1997). This is likely to produce an increase in the peat wastage rates because summers, when most wastage occurs, are likely to become hotter and drier with the increased rainfall occurring mostly in the winter.

No comparable measurements are available for peat wastage in arable fields in Somerset. In the fenland two assessments of wastage rates have been made suggesting a loss of 3.83m per 100 years (Hutchinson 1980) and 2m to 3m per 100 years (French and Pryor 1993). The latter tallies with the estimated rate of loss of an inch a year by Somerset farmers (Andy Hicklin pers comm.)

The historical evidence for peat wastage is complicated by the loss of peat due to peat mining in the Brue valley. One recent study comparing ground surface heights to subsurface peat stratigraphy in the area (Housley et al 2000, 16) has shown that the eastern edge of the former raised bog on Glastonbury Heath must have existed to a height of at least +5.5 to +6 m -- instead of the present day ground surface levels of +1.8 to +2 m -- a loss of at least 4 m since the Medieval period.

In the last 200 years waterlogged archaeological sites have often been discovered when peat wastage reveals oak
wood, often causing damage to agricultural machinery, such as the Bronze Age pile alignments of Harters Hill and Ivythorne (Brunning 1998) and the dug out canoe known as “Squire Phippen's big ship” that made its appearance partially in very dry seasons in the Brue valley until it was broken up in the dry weather, and used by the cottagers for fuel (Stradling 1849, 52). No discoveries like the ones outlined above have occurred in areas where peat is overlain by a covering of clay greater than 0.5 m thick. This supports the hypothesis that such a deep clay cap helps to prevent peat soil wastage.

What sites are at risk?

The density of archaeological sites in the Somerset peatlands has been estimated in a recent study at 3.4 sites per km², using information from the peat extraction areas of the Brue valley where intensive archaeological survey work has been carried out (Van de Noort et al. 2001). Even this is probably an underestimate of the resource because much peat was extracted from the study area before systematic archaeological recording began.

A total of 1066 archaeological sites are recorded in the Somerset moors of which 115 sites are known to contain waterlogged archaeological remains. Many of the others may also contain such deposits but detailed information is normally not available to confirm or refute this possibility. Of the 115 waterlogged sites a total of 62 are known to be totally excavated or destroyed. Some of these sites are chance finds of single items while others are structures such as trackways which were destroyed or excavated during peat extraction.

In terms of peat wastage the most relevant part of the archaeological resource are the sites containing waterlogged remains which are known to survive wholly or partially in situ. These 53 sites are composed of 32 prehistoric trackways and ritual pile alignments, four prehistoric wetland settlements, 16 prehistoric stray finds and a single Roman or Medieval causeway.

The causeway, three of the wetland settlements and 11 of the trackways are wholly or partially designated as Scheduled Monuments. All the waterlogged archaeological sites on the levels and moors designated as Scheduled Monuments exist within 90cm of the ground surface and are therefore likely to be totally destroyed by desiccation within the present century if peat wastage in grassland continues at the present rate.

All the sites that have been subjected to recent investigation have shown varying degrees of damage due to desiccation and associated cracking and decay of organic material. The most thoroughly investigated are the three sites listed in the case studies (Brunning 1998 and Brunning et al. 2000). Similar effects have been recorded at two Scheduled Monuments, the Neolithic "Abbot's Way" track (Cox et al. 1992) and the Iron Age settlement at Meare (Coles et al. 1986). The only site that appears secure from the threat of desiccation is the section of the Sweet Track that benefits from a pumping system in Shapwick Heath National Nature Reserve (Brunning et al. 2000).

Solutions to the problem

· **Water level management.** Detailed studies in Somerset have shown that ditches only affect the area within approximately 15m and that the rest of the field water table is dependant on the balance of evapotranspiration against rainfall (ADAS1996; Spoor et al. 1999). The most recent and detailed study suggested that ditch spacings should not exceed approximately 40m and 60m on the less and more permeable soils respectively, if significant peat deterioration is to be avoided, and that peat wastage and deterioration is likely to increase significantly if summer water tables fall below approximately 50cm (Spoor et al. 1999, 36-7).

· **Site specific hydrological mitigation.** If monitoring of significant sites suggests that a threat exists the possibilities of increasing irrigation (see above) should be considered. This could include new irrigation channels, bunds and possibly pumping systems. The Environmentally Sensitive Area (ESA) scheme which operates in the area provides the best option for implementing such measures as it can provide grants towards much of such work. In some cases land purchase may be required to secure the long term future of sites.

· **Rescue excavation.** Where monitoring suggests that medium term preservation is impossible, rescue excavation must be considered to retrieve archaeological information before it is lost.

· **Recreation of wetlands.** It may be possible to recreate some natural wetland habitats such as wet fen or reed bed. This is being implemented in East Anglia and on the continent (eg. Rasmusssen 1999). In Somerset the Parrett Catchment Project considered such possibilities for some parts of the floodplain.
In order to decide on the most appropriate courses of action, additional information is required on the condition of the waterlogged archaeological resource within the known sites and the current hydrological conditions. The Environment Agency, Somerset County Council and DEFRA are developing a project for the 2002-3 financial year to assess the threats posed to the internationally important remains on the Somerset moors and to tackle the issue of peat wastage within the wider landscape. It is hoped that English Heritage will also be a major partner in the project.

References


