**Fading Star: understanding accelerated decay of wetland archaeology**

**NERC CASE studentship (University of York, York Archaeological Trust): Start date: 1st October 2010.**  
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Star Carr is a Mesolithic site of international renown due to the spectacular organic artefacts first uncovered in the late 1940s. The site dates to just after the end of the last Ice Age, c. 9000 cal. BC, and the assemblage of 21 red deer antler headdresses, 193 harpoon points, beads, wooden platform and faunal remains are unparalleled in Europe.

Unfortunately recent fieldwork has also revealed that the organic remains which made the site so famous, despite having survived for c. 11,000 years, have become seriously degraded since the initial excavations 60 years ago, and even since excavations in the 1980s (Mellars & Dark, 1998). All the bone and antler recently found in the wet deposits are severely deteriorated: pieces of antler were completely flattened and had the consistency of leather. One of the only two pieces of bone found was found to be completely demineralised (Fig. 1); wood showed serious deterioration when compared to wood uncovered in previous excavations, with decay of the cellulose and preservation of only a lignin-rich skeleton (Fig. 2).

Field and lab testing of the sediments showed that the artefact-bearing sediments are in a zone where the fluctuating water table causes maximum impact, with a “sulfur-pump” mechanism creating unprecedented high acidity, in some places <pH 3.0 (Boreham et al., 2009). Only preliminary studies have been carried out on the impact to the organic artefacts and the rates of decay are still an unknown, and therefore the rapidity of the potential loss of the archaeology. Understanding these outstanding issues is of key importance, not only to this unique site, but to other wetland sites in Europe.

The two overall aims of the project are to establish the rate of decay and a better understanding of the deterioration of the wood, bone and antler. This proposal brings together a team of specialists in archaeology, geochemistry and organic preservation to help answer these questions. This studentship provides a unique opportunity for training by the team in a suite of inorganic and organic geochemical techniques, from standard assessment tests to state-of-the-art analyses (macroscopic and microscopic analysis to determine structural changes (TEM & SEM, polarised light microscopy), alongside chromatography (HPLC, GC, pyrolysis GC for analysis of macromolecular complexes) and mass spectrometric (LC-MS, GC-MS) techniques to characterise protein, polysaccharide and lignin breakdown in the samples; XRF, soil petrography, LOI, elemental analyses and assessment of the microbiological activity on the soils, as well as practical experience in field archaeology), enabling crucial insight into the degradation of this vitally important site.

Milner, N. 2007. *Fading Star.* British Archaeology, 96, 10-14