

PLOUGH DAMAGE

A new approach to mitigation

Solutions to plough damage, which has long been recognised as a threat to archaeological sites, are now being formulated in a joint project by DEFRA and specialist teams

Plough damage to archaeological remains is as old as farming itself and has been acknowledged as a problem for conservation since at least the early 17th century. Most recently, *The Monuments at Risk Survey 1995*, published by Bournemouth University and English Heritage in 1998, brought home the scale of destruction by ploughing, showing that agriculture is the largest single source of piecemeal damage to archaeology and that sites in areas of arable land use are at much greater risk of damage than those in other uses. After years of campaigning, these results directly provided the basis for English Heritage and the Council of British Archaeology (CBA) to encourage the government to undertake a study of ways to help farmers reduce such damage.

The Management of Archaeological Sites in Arable Landscapes project is being undertaken for the Department of Environment, Food and Rural Affairs (DEFRA) by the Oxford Archaeological Unit in conjunction with the CBA, Oxford University and Reading Agricultural Consultants. The objective is to develop a management strategy for preserving archaeological sites on arable land where damage is most serious and sustainable solutions urgently needed. Such solutions must be effective in substantially reducing the medium- to long-term threat of damage (knowing where it is most likely to occur) as well as in maintaining agricultural viability and minimising extra cost to the exchequer or loss of revenue to the farmer.

Archaeological site damage

The range and character of damage to archaeological sites in arable landscapes is well attested and varied. The archaeological complex at Knowlton, Dorset, is a good illustration. Even where earthworks survive as unploughed 'islands'

in arable land, they are not immune from damage – for example by scrub, rabbit and badger burrows. A recent condition survey of the largely arable landscape of the Avebury World Heritage Site has shown how threats to the archaeological monuments vary from one part of the area to another, reflecting detailed land use and topographical differences.

Though it is easy to demonstrate that damage has occurred, it is often a great deal more difficult to show how active or fast the attrition is. Often there is a threshold effect where critical evidence could be destroyed at a stroke by only slightly deeper cultivation, as at the Roman mosaic at the Stanwick Roman Villa in Northamptonshire and in many nearly-ploughed-out barrows where key evidence may survive in remains of old ground surfaces once sealed beneath substantial mounds. However, this threshold of damage can be buffered by a sealing layer of older ploughsoil, colluvium or alluvium, though even here damage may result from subsoiling or drainage.

Getting a grip on plough damage has also been hindered in the past by the sheer scale of the problem. Although some sites have been carefully examined (the scheduled Roman city of Verulamium, for example), it is plainly not feasible to carry out elaborate and possibly expensive archaeological evaluation of every threatened site. What is needed is a reasonably robust and simple method of assessing the risk of damage and location of its greatest threat. The DEFRA project has, therefore, been developing methods of risk assessment geared to key factors that affect damage, including intrinsic site characteristics and land management.

Assessing the risk of damage

At the site-specific level, two ways of assessing risk are currently being field-tested, a scoring method and a decision-tree approach. At national level, the extent and scale of the risk has been digitally mapped to indicate soil depth, erodability and drainage combined with cropping patterns. The national map correlates quite well with the sample of sites recorded by the MARS project. With further refinement, the map should

The effect of ploughing on ancient monuments. Damage to a Roman mosaic at Stanwick, Raunds, Northamptonshire



© English Heritage

help identify suitable areas for piloting remediation schemes and assessing the scale of resources needed on a national scale. It should also show where efforts might best be focused regionally in relation to other issues of agri-environmental policy.

Finding solutions

There are two means of stopping or at least decreasing the rate of cultivation damage. The first is to revert land to grassland or long-term 'set-aside'. The second is to adopt archaeologically benign methods of cultivation (or at least substantially postpone the point when damage will start to occur again). Either can be combined with additional measures to address problems arising from other threats to archaeology in arable landscapes, such as drainage, farm infrastructure requirements, burrowing animals and visitor wear.

Reversion to permanent grassland or long-term 'set aside' is archaeologically the most secure solution, and this also has numerous other potential benefits in terms of habitat regeneration, soil conservation and promotion of farmland bird populations – the key indicators for agri-environment policy. This is not, however, always practicable for arable farmers. They may have little or no use for such land if they have no livestock, and taking high-yielding arable land out of production can be relatively expensive. Direct drilling (or 'no-till cultivation') and various forms of minimum cultivation offer alternative approaches that potentially allow archaeological sites to remain in arable production without deep soil disturbance. Although there are some technical issues to be addressed, an encouraging finding emerging from the DEFRA study is that the areas where there is greatest risk of damage to archaeology are also those where direct drilling is most viable from a farming point of view. This type of cultivation also offers other environmental benefits, including better soil management, lower energy consumption, reduced use of agro-chemicals and potential for improving arable biodiversity (ground nesting birds, arable weeds).

Managing archaeological sites on arable landscapes

In addition to technical solutions, the study is examining what procedures – good practice codes, agri-environmental schemes, ancient monument management agreements – might deliver better management of archaeological sites

© NMR 1532611



Earthwork monuments. Aerial photograph of Knowlton, Dorset, showing the upstanding earthworks of a late Neolithic henge and round barrow (centre), with the cropmark traces of levelled earthworks all around

in arable landscapes. Consideration is also being given to overcoming barriers to reversion or benign cultivation solutions, through farm business types, capital investment strategies and crop rotation systems.

For some areas, neither reversion nor minimum cultivation offers a simple practicable and cost-effective solution. In the East Anglian Fens, deep cultivation for high-value root crops and drainage threaten exceptionally well-preserved archaeology that is steadily emerging from the shrinking peat. This situation is particularly challenging in terms of the farm economics of the area and the unsuitability of minimum cultivation methods for root crops. The Fens are likely to become a key test area for resolving conflicts between high-value farming and high-value archaeology.

More generally, there is a good chance that a practical scheme for encouraging farmers to conserve archaeological sites currently under threat can be developed. After two centuries of recognition by archaeologists, plough damage is being taken seriously as a primary issue for the conservation of non-renewable environmental assets in intensive arable landscapes. The potential for delivering other environmental benefits through archaeological conservation measures, and the prospect of the shift in farming support highlighted elsewhere in this issue, together offer further hope that sufficient resources might become available in the coming years to make a serious start on addressing this huge issue.

George Lambrick
Director, Council for British Archaeology

© DEFRA/OAU

Map of the risk of plough damage to archaeological sites. Key soil characteristics for England and Wales (based on data giving the predominant soils per 1km square supplied by the National Soil Resources Institute of Cranfield) are combined with data giving coverage and types of crops for England only provided by DEFRA's York office. Black crosses represent cases of plough damage recorded by the MARS project in a 5% sample of England

