

## Impact case study (REF3)

<b>Institution:</b> University of Winchester		
<b>Unit of Assessment:</b> UoA15 Archaeology		
<b>Title of case study:</b> ARCA: geoarchaeological approaches to cultural resource management		
<b>Period when the underpinning research was undertaken:</b> 2002–2020		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>  Keith Wilkinson	<b>Role(s) (e.g. job title):</b>  Professor of Geoarchaeology	<b>Period(s) employed by submitting HEI:</b>  2005–2020
Period when the claimed impact occurred: September 2004–July 2020		
<b>Is this case study continued from a case study submitted in 2014?</b> N		
<b>1. Summary of the impact</b> (indicative maximum 100 words)		
<p>The ARCA geoarchaeological consultancy (<a href="http://www.ARCAuk.com">www.ARCAuk.com</a>) has impacted on English planning authorities, Historic England officers working on cultural heritage and resource management policy and commercial archaeological companies in respect of:</p> <ol style="list-style-type: none"> <li>1. Deposit modelling of deeply stratified deposits in urban environments. ARCA's deposit models are used by planning authorities in Bristol and Winchester, while ARCA made important contributions to Historic England's (2020) national deposit modelling;</li> <li>2. Assessing the Palaeolithic archaeological potential of Pleistocene deposits. Maps of the latter have been used by Hampshire County Council since 2004, while ARCA has developed a national version for use by English planning authorities on behalf of Historic England.</li> </ol>		
<b>2. Underpinning research</b> (indicative maximum 500 words)		
<p>ARCA is the consultancy and contracted research arm of the Department of Archaeology, Anthropology and Geography at the University of Winchester and is a Registered Archaeological Organisation with the Chartered Institute for Archaeologists (5.2). It was set up in 2005 to formalise geoarchaeology consultancy activities carried out within the Department since 2001. ARCA is directed by Keith Wilkinson [0.2 FTE], has two permanent employees (Nick Watson [1.0 FTE] working on commercial geoarchaeology projects and Monika Knul [0.5 FTE] working on the development of Palaeolithic archaeological potential maps), and employs other staff on a casual basis. Its activities comprise (i) research on the basis of original funding proposals submitted to local authorities and national government quangos (Hampshire County Council, Historic England, English Heritage), (ii) contracted research commissioned by the same types of organisation (Winchester City Council, Historic England, the Environment Agency) and (iii) fully commercial endeavours won on the basis of competitive tenders (private and public organisations). The focus for all three has been topographic situations where geoarchaeological approaches will be particularly effective or even the only means of investigating archaeological importance. These are wetland areas, urban situations on river floodplains and in the intertidal zone, and Pleistocene deposits.</p> <p><b>2.1 Deep stratification and deposit modelling:</b> ARCA developed borehole-based methods for assessing the impact of Environment Agency flood remediation works on the Somerset Levels, as well as determining the same for the construction of overhead pylons of that will link the Hinkley Point C nuclear reactor to the present national power grid at Avonmouth (3.7). Such</p>		

works demonstrated the presence of extensive Mesolithic organic strata beneath the well-known Neolithic-Bronze Age deposits, and were instrumental in attracting English Heritage funding (together with Prof Martin Bell of the University of Reading) for *The Mesolithic of the wetland/dryland edge in Somerset* (5.5). ARCA's work on urban archaeological sequences has focussed on utilising borehole-based approaches in order to develop chronometrically anchored deposit models for planning and assessment purposes. Wilkinson was conducting such work in Bristol before ARCA was founded, while ARCA has continued to carry out geoarchaeological studies in that city (3.6, 3.8), culminating in the production of a deposit model for planning purposes (3.5, 5.1). ARCA conducted similar work in Worcester and Droitwich between 2007 and 2013 (3.1), in Gloucester since 2016 and in Winchester from 2012. A deposit model was developed for the Historic Environment Record (HER) of the latter, was published by Ottaway (5.9), while in 2020 Winchester City Council provided funds for ARCA to revise the model and develop a new groundwater model for central Winchester – the latter to predict areas with waterlogged archaeological preservation (5.10).

**2.2 Predicting the Palaeolithic archaeological resource:** Until the last decade, projects to assess the Palaeolithic potential of development sites were few, but thanks in part to ARCA's influence, they have become much more common in recent years. ARCA has been instrumental in developing both investigative approaches (3.2, 3.3), e.g. by the combined use of test pits, boreholes, ground-penetrating radar and optically stimulated luminescence on a site in the Isle of Wight (3.9), but also in producing cartographic resources that enable planning authorities to manage Pleistocene deposits (3.4). In respect of the last, ARCA has recently completed a study for Historic England that maps the Palaeolithic archaeological potential of the entire country (5.6, 5.8).

### 3. References to the research (indicative maximum of six references)

NB: names of ARCA staff are in bold.

- 3.1 Hurst, D., Daffern, N., **Wilkinson, K.N.** and Howard, A.J. (2014) Droitwich urban waterlogged deposits: collation and synthesis. Unpublished report 97/2014 to Historic England, Worcestershire Archaeology, Worcester. Available at: <http://research.historicengland.org.uk/Report.aspx?i=15781&ru=%2fResults.aspx%3fp%3d1%26n%3d10%26a%3d4608%26ns%3d1>.
- 3.2 Wenban-Smith, F.F., Hardaker, T., Hosfield, R., Loader, R., Silva, B., **Wilkinson, K.N.**, Bridgland, D. and Cramp, K. (2014) The Lower/Middle Palaeolithic resource assessment and research agenda. In Hey, G. and Hind, J. (2014) *Solent-Thames Research Framework for the Historic Environment Resource Assessments and Research Agendas*. Project Report. Oxford Wessex. <https://library.thehumanjourney.net/2597/> (chapter 3).
- 3.3 **Wilkinson, K.N.** (2002) Prospecting the Palaeolithic: strategies for the archaeological investigation of middle Pleistocene deposits in southern England. In Wenban-Smith, F. and Hosfield, R. (Eds) *Palaeolithic archaeology of the Solent river*. Lithic Studies Society Occasional Paper 7, London, 99-109. Available from the HEI on request
- 3.4 **Wilkinson, K.N.** and Hennessy, S. (2004) An assessment of the archaeological potential of Pleistocene deposits in Hampshire. Unpublished report for Hampshire County Council, Department of Archaeology, University of Winchester, Winchester.
- 3.5 **Wilkinson, K.N.**, Jones, R. and Meare, R. (2013) The Distribution and Significance of Urban Waterlogged Deposits in Bristol. Unpublished report 82/2013 to Historic England, ARCA and Cotswold Archaeology, Cirencester. Available at: <http://research.historicengland.org.uk/Report.aspx?i=15778&ru=%2fResults.aspx%3fp%3d1%26n%3d10%26a%3d4608%26ns%3d1>. (NB: Jones is Bristol City Council's Archaeological Officer)
- 3.6 **Wilkinson, K.N.** and Head, K. (2013) Borehole stratigraphy and sedimentology; palynology; radiocarbon dating; Period 1: Broadmead landscapes in the Holocene. In Ridgeway, V. and Watts, M. (Eds.) *Friars, Quakers, industry and urbanisation: the archaeology of the Broadmead Expansion Project, Cabot Circus, Bristol 2005–2008*. Cotswold Archaeology

Monograph 5/Pre-Construct Archaeology Monograph 16, Cirencester and London, 319–336. Available from the HEI on request

- 3.7 **Wilkinson, K.N.** and **Watson, N.** (2014) Hinkley Point C Connection (Appendix 11E): geoarchaeological desk-based assessment report and field survey. In National Grid Environmental Statement: Historic Environment Appendix 11E. <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN020001/EN020001-000877-5.11.2.10%20ES%20Historic%20Environment%20Appendices%201D%20to%2011E.pdf>.
- 3.8 **Wilkinson, K.N.** (2015) Geoarchaeology. In Alexander, M. (Ed.) *Medieval and Post-Medieval occupation and industry in the Redcliffe suburb of Bristol: excavations at 1–2 and 3 Redcliff Street, 2003–2010*. Cotswold Archaeology Monograph 8, Cirencester, 132–136. Available from the HEI on request
- 3.9 **Wilkinson, K.N., Watson, N., Bethell, P.** and **Toms, P.** (2018) Modelling Pleistocene deposits and the Palaeolithic archaeological potential of a site at Pan Lane, 39 Newport, Isle of Wight. In Carey, C., Howard, A.J., Knight, D., Corcoran, J. and Heathcote, J. (Eds.) *Deposit modelling and archaeology*, University of Brighton, Brighton, 39–50. Available at: [https://www.brighton.ac.uk/\\_pdf/research/set-groups/deposit-modelling-and-archaeology-volume.pdf](https://www.brighton.ac.uk/_pdf/research/set-groups/deposit-modelling-and-archaeology-volume.pdf).

#### 4. Details of the impact (indicative maximum 750 words)

ARCA's impact has been in terms of (i) policy, (ii) practice and (iii) methodology and on (a) archaeologists working for local authority planning authorities, (b) those formulating national policy in Historic England, and (c) commercial archaeological companies and planning authorities.

##### 4.1 Policy

Requirements with respect to archaeological works conducted as part of the planning process in England are governed by statute (the Ancient Monuments and Archaeological Areas Act 1979), but also non-statutory means (National Planning Policy Framework 2012) and is implemented by archaeologists working for local planning authorities, the latter employing national and regional guidance. ARCA has been at the forefront in developing such guidance (3.2) and thus policy with respect to Palaeolithic archaeology. A key national example is ARCA's Historic England-funded *Palaeolithic Archaeological Potential of Pleistocene deposits in England* project, a predictive model – the first of its kind in the UK – that is made available to all local authority planning authorities in England stating the estimated Palaeolithic importance of an area on the basis of its geological properties (5.6). This model is linked in Historic England's draft policy statement on the Palaeolithic as a fundamental resource in determining whether and what sort of archaeological investigation should be carried out in advance of development (5.8).

Implementation of the *Palaeolithic Archaeological Potential of Pleistocene deposits in England* predictive model and Historic England's *Curating the Palaeolithic* guidance have been delayed (by a year) until spring 2021 because of (i) the COVID pandemic and (ii) changes that are to be made to planning policy in England in the aftermath of the December 2019 general election. However, the ARCA Palaeolithic predictive model for England is based on criteria published by Wilkinson (3.3) on Palaeolithic archaeological significance (and specific protocols that he developed for their determination in Hampshire [3.4]). These and an associated predictive GIS resource have been used by Hampshire County Council to determine whether and what type of archaeological works should be carried out in advance of developments since 2004 (3.4). Since that date, all development proposals thought by planners to have an archaeological impact have been cross-referenced to the Wilkinson and Hennessy GIS resource (3.4). Indeed, Wilkinson incorporated ideas and data from *An assessment of the archaeological potential of Pleistocene deposits in Hampshire* (3.4) within the Thames-Solent Regional Research Framework (3.2, 5.7), resulting in strategic recommendations that are incorporated in Hampshire County Council's guidance (5.3).

#### 4.2 Practice

Before 2005 archaeological works carried out in advance of development comprised three stages: (i) desk-based assessment (DBA), (ii) evaluation and (iii) mitigation, all of which were undertaken using conventional archaeological approaches (e.g. documentary/cartographic study and excavation) and based on information on the relevant local authority's HER. In its applied research and commercial work ARCA has argued the case for geoarchaeology as an intermediate step between (i) and (ii) in situations where archaeology-bearing deposits are deeply stratified (3.7, 3.9). As a direct result, Bristol and Winchester City Councils have adopted a 'geoarchaeology first' response (5.1, 5.10). Further, ARCA pioneered the development of deposit model approaches in HER's, giving archaeologists working for local planning authorities predicted depths and thicknesses of archaeologically important deposits and enabling them to design informed evaluation and mitigation strategies accordingly. ARCA developed the first such HER deposit model in England for Bristol City Council in 2013 (3.5, 5.1), developed a second model for use in Droitwich (3.1) and subsequently built a more detailed model for Winchester City Council (5.9, 5.10). Given this history of research, ARCA was invited to contribute to Historic England's deposit model guidelines (5.4), these latter becoming a national statement of recommended protocols. ARCA's contribution relates to sample size and model precision, and representing uncertainty in such models (3.9, 5.4).

#### 4.3 Methods

In carrying out its commercial activities onwards, ARCA has developed borehole-based approaches for investigating deeply stratified urban locales as a means of evaluation. Logistical and health and safety constraints mean that such environments cannot be investigated by standard archaeological techniques (e.g. trenching), while high water tables restrict the utility of geophysical approaches to prospection. ARCA have developed and formalised a suite of borehole and laboratory assessment methods (the latter encompassing magnetic susceptibility and pXRF measurements) used for geoarchaeological evaluation in such deeply stratified urban environments. The ARCA-recommended methodologies are requirements that are included in briefs produced by Bristol, Gloucester and Winchester City Councils (5.10).

#### 5. Sources to corroborate the impact (indicative maximum of 10 references)

- 5.1 Baker, N., Brett, J. and Jones, R. (2018) *Bristol: an archaeological assessment*. Oxbow, Oxford (chapter 2).
- 5.2 Chartered Institute of Archaeologists (CIfA) Registered Archaeological Organisations (RAO). <https://www.archaeologists.net/civicrm-contact-distance-search/34797>.
- 5.3 Hampshire County Council (2020) Archaeological advice for planning. <https://www.hants.gov.uk/landplanningandenvironment/environment/historicenvironment/planners> (see links to guidance documents and strategy).
- 5.4 Historic England (2020) Deposit modelling and archaeology. <https://historicengland.org.uk/images-books/publications/deposit-modelling-and-archaeology/>.
- 5.5 Historic England (2020) Understanding Mesolithic settlement and environments, <https://historicengland.org.uk/images-books/publications/deposit-modelling-and-archaeology/>.
- 5.6 Historic England (2020) Mapping Palaeolithic potential <https://historicengland.org.uk/research/current/discover-and-understand/early-prehistory/mapping-palaeolithic-potential/>. (the first featured project is ARCA's *Palaeolithic Archaeological Potential of Pleistocene deposits in England*)
- 5.7 Hey, G. and Hind, J. (2014) *Solent-Thames Research Framework for the Historic Environment Resource Assessments and Research Agendas*. Project Report. Oxford Wessex. <https://library.thehumanjourney.net/2597/> (chapter 4)
- 5.8 Hosfield, R., Green, C., Fluck, H. and Batchelor, C.R. (2020) Curating the Palaeolithic: guidance (consultation draft). <https://historicengland.org.uk/content/docs/guidance/curating-the-palaeolithic-consultation-draft/>.

- 5.9 Ottaway, P. (2017) *Winchester: Swithun's 'City of Happiness and Good Fortune': an archaeological assessment*. Oxbow, Oxford, p29–37 (chapter 1)
- 5.10 Winchester City Council (2020) Archaeology and Central Winchester Regeneration. <https://www.winchester.gov.uk/projects/archaeology>.