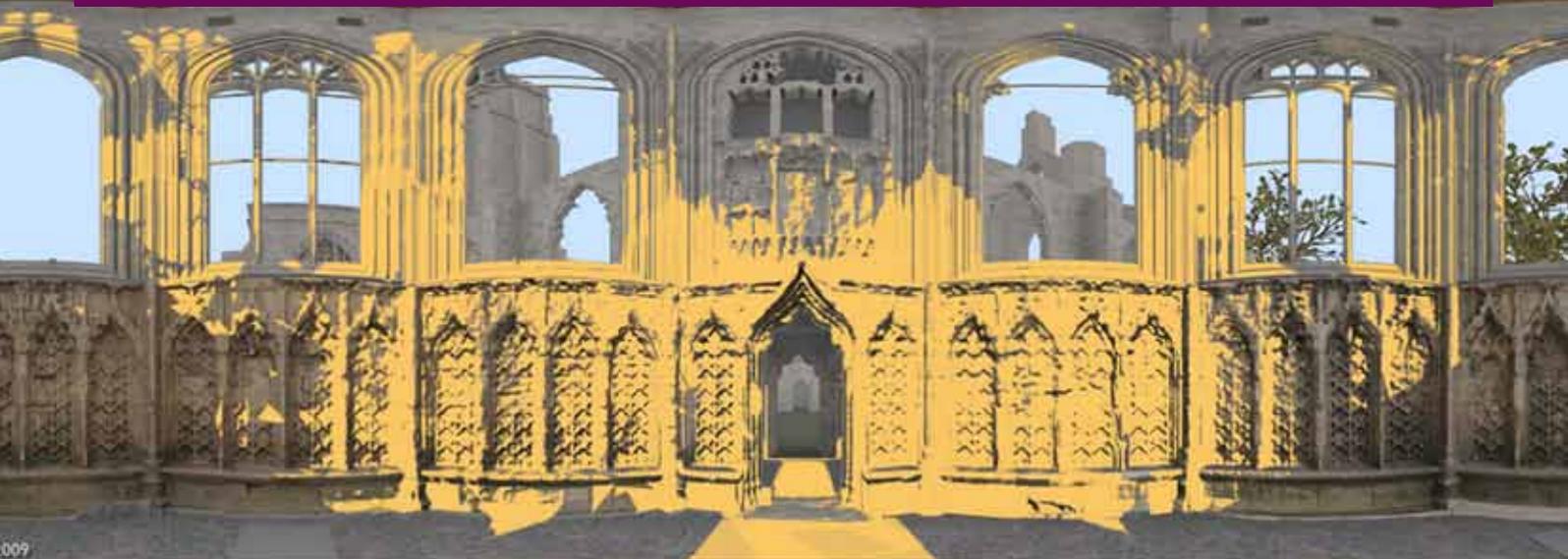


ENGLISH HERITAGE SCIENCE STRATEGY



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English Heritage archaeologist Mark Dunkley recording deterioration of an early iron cannon off the Farn Islands (NHPP Activity 6BI Strategic Condition Monitoring) Wessex Archaeology for English Heritage.

INTRODUCTION: A SCIENCE STRATEGY FOR ENGLISH HERITAGE

1. The role of English Heritage

The historic environment is “*All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora*” (National Planning Policy Framework 2012). English Heritage is the government’s expert advisor on the understanding, management and protection of the historic environment of England and its territorial waters. Research, including scientific research and development, is key to ensuring that our advice is based on adequate understanding of the historic environment: its scope, its condition and the threats that confront it. English Heritage science-based work is practical – focused on the needs and issues facing the historic environment – both the general, and the specific needs of particular known heritage assets. Our role as manager and guardian of more than 400 historic properties and sites, the holder of extensive museum and archive collections, and a funder of the sector giving over £24 million in grants each year gives us a unique opportunity to develop and apply exemplary science in the course of our work, and influence the work undertaken in the historic environment sector.

2. Aim of this strategy

The English Heritage Science Strategy (EHSS), set out below, aims to position the science-based work of English Heritage as both a contribution to the overall development of science work within the broader cultural heritage sector, and as co-ordinated action to support the National Heritage Protection Plan 2011-2015 (NHPP) established by English Heritage.

Specifically, the English Heritage Science Strategy has the following objectives:

- To provide a response from English Heritage to the National Heritage Science Strategy (NHSS) (published 2010), the House of Lords Science and Technology Committee Review of the NHSS published (2012), and the Department for Culture Media and Sport response to the House of Lords (2012).
- To direct the detailed planning of EH support for heritage science to those areas identified in the sector-wide National Heritage Protection Plan.
- To direct our support for heritage science in a way appropriate for an organisation principally funded by central government.
- To support the work of the National Heritage Science Forum, promoted by the NHSS.

3. English Heritage and Science

English Heritage uses heritage science to support three aspects of our work on the historic environment, and on individual heritage assets. These are what we do, what we fund and how we work with others:

What we do

- We conserve the historic environment, to ensure it is available for others to study and enjoy in the future.
- We discover, analyse and interpret previously lost or forgotten aspects of the historic environment, to ensure we have as full a knowledge of heritage assets as possible, both to learn about our past, and to make informed decisions.
- We document, analyse and interpret known aspects of the historic environment, to better understand its history and significance and inform its management.
- We pass on our expertise through publication, training and public engagement.

What we fund

- Science that improves our understanding of the significance of the historic environment, extending the knowledge base on which decisions, including which heritage assets to designate and protect, can be made.

- Science that investigates the causes and processes of decay in the historic environment, developing and evaluating practical interventions, so that we can better conserve our own collections and advise others.
- Science to better understand the environmental performance of heritage assets, so that inappropriate adaptations can be avoided.

How we work with others

- We monitor influence and promote scientific research and technological advances across a wide range of specialisms to assess their applicability in a heritage context.
- We give advice on methods and application of science to help others understand, manage change, and reduce risk to the historic environment.
- We provide training and professional development.
- We support and participate in university research, teaching and life-long learning.



Improving Methods: The Building Information Modelling (BIM) special interest group is developing a BIM strategy for EH. Harmondsworth Barn, Greater London, is one site where detailed laser scan data has been produced using our own Faro Focus3D laser scanner © English Heritage.

4. The broader context: Heritage Science in the UK

As a part of this heritage science work English Heritage has been closely involved with the development of the National Heritage Science Strategy (NHSS).

The need for a national strategy for heritage science was identified in 2006 by the House of Lords Science and Technology Committee (HoLSTC). A strategy steering group was set up and in 2009 produced reports on three areas (see Annex 2 for more details).

- The role of science in the management of the UK's Heritage (Themes 1-3).
- The use of science to enhance our understanding of the past (Themes 4-6).
- Understanding capacity in the heritage science sector (Themes 7-9.)

A final strategy was issued in March 2010. It identified two key aims and eight objectives which it recommended were delivered through the creation of a National Heritage Science Forum (see Annex 3).

In March 2012 the HoLSTC conducted a national review of science and heritage¹ to consider the impact of the NHSS reports. Edward Impey, the EH Director of Heritage Protection and Planning, gave evidence at this review. The review, published in May 2012, recommended the injection of greater effort into driving forward NHSS recommendations for heritage science.

In July 2012, DCMS laid the Government response to the HoLSTC review before Parliament² in which Arms Length Bodies (ALBs) were encouraged “**to consider their appropriate level of participation in the NHSS objectives**”. English Heritage was cited as exemplary in its proposed development of a strategy to contribute to both the NHSS and also to the heritage sector-wide National Heritage Protection Plan (NHPP).

5. Structure

The English Heritage Science Strategy which follows is presented in two parts:

¹ *Values and Benefits of Heritage* HLF November 2012, p 20 www.hlf.org.uk

² *Science and Heritage: Response to the House of Lords Select Committee on Science and Technology*, DCMS July 2012

The English Heritage Science Strategy

takes the recommendations from the NHSS reports and relates them to the work of English Heritage under three broad headings:

- Understanding materials and environments.
- Raising awareness, improving methods, access to information and advice.
- Capacity, capability and public benefit.

In each topic short and medium term actions are given. A number of overarching actions are listed at the end of the Strategy.

The English Heritage Science Strategy

Action Plan presents in tabular form how the strategy will be implemented, in support of Action Plans developed within the NHPP.

Annexes provide additional information about the NHPP and NHSS for reference.

6. Science Governance within English Heritage

A range of science-based activities take place within English Heritage. Heritage science is a part of the work of several departments within the organisation. These include:

- Heritage Protection and Planning: Investigation and Analysis – undertaking applied science related to the discovery, understanding, analysis and interpretation of sites, buildings and artefacts.
- Heritage Protection and Planning: Strategic Planning and Management – advising on the application of science to develop the capacity of the sector; providing foresight on new challenges to the historic environment.
- Heritage Protection and Planning, National Planning and Conservation – advising on development casework, identified Heritage at Risk sites and our historic properties.
- National Collections – maintaining and presenting 400 historic properties and their contents, curating and presenting the English Heritage Archive.

To better co-ordinate science-based work within English Heritage, and to raise awareness of the



Community Engagement: Investigating insects and the damage they can do to cultural heritage at a Festival of British Archaeology event © English Heritage.

current and potential contribution of heritage science to core English Heritage work, a new Science Network will be established in 2013, as the first step in implementing the English Heritage Science Strategy. The Science Network will include representatives from each department. Network members will:

- Advise EH senior managers on signing off this strategy, and support its implementation.
- Review and comment on new project proposals for science-based projects against corporate priorities (see below).
- Provide the body of expertise on science matters.
- Regularly review heritage science responsibilities across English Heritage.
- Act as the link to the National Heritage Science Strategy implementation.
- Report on EH heritage science to the National Heritage Science Forum.

The Science Network will be supported in delivering actions set out in this strategy by other English Heritage internal networks. Specifically these are the Guidance Group, focused on the



A Bronze Age cist (Monument 1376648, Dartmoor, Devon), that was under imminent threat from peat erosion, being sampled for a range of environmental remains. The excavation revealed an intact cremation burial associated with organic artefacts and is funded principally by the Dartmoor National Park Authority and English Heritage with some analyses being carried out by EH Environmental Scientists (NHPP Activity 8A5 Offsetting loss through Knowledge Dividend) © English Heritage.

co-ordinated delivery of all English Heritage sector guidance, the Training Group performing the same co-ordination role for delivery of training courses by English Heritage, and the NHPP Activity Teams – temporary teams established for the NHPP plan period to advise and monitor specific NHPP Activity Plans.

Corporate priorities for heritage science funding derive from: the English Heritage Corporate Plan 2010-15; the specific Activity Plans within the National Heritage Protection Plan 2011-15; and Supporting actions funded under the National Heritage Protection Plan.

Science funded and undertaken by English Heritage must first of all be science appropriate to a body funded in the main by the tax-payer, via our central government grant. Our funding

department, the Department for Culture Media and Sport makes clear that we need to avoid overlaps with other bodies, both those working directly in the sector and/or those providing grants. The emphasis therefore is on research and development, in particular applied research as defined under the Frascati Definitions of Research, which has identifiable outcomes that contribute to our corporate aims, as set out in the English Heritage Corporate Plan 2011-15 (May 2011).

Where work has been identified under a specific Activity Plan within the National Heritage Protection Plan 2011-15, funding is already agreed and will be managed by the nominated NHPP Activity Lead. The appropriate alphanumeric NHPP Activity / protection result code and EH project number is given in the Action Plan to cross-reference this strategy and the NHPP documentation.

Additional proposals for science-based projects may be funded through a modification to the relevant NHPP Activity Plan. In such cases the new proposal would be given priority over an existing commitment in the Activity Plan. The Activity Lead will manage this process.

Alternatively, additional proposals may be considered for funding as Supporting actions. The proposals will be considered by the Science Network, who will provide advice to the funding department, or National Heritage Protection Commissions team.

In all cases, the test for whether the science proposed should be funded is if it:

- Responds to a known or anticipated need.
- Advances an agreed historic environment research agenda at national, regional or local level.
- Has a good chance of resulting in better understanding, or in fuller assessment of values and significance, or in improved care and curation practice.

Projects will thereby promote protection of the most important and vulnerable aspects of the historic environment.

ENGLISH HERITAGE SCIENCE STRATEGY 2012-15

This document is an operational strategy for English Heritage covering activities in the remaining plan period of the National Heritage Protection Plan (NHPP) (see Annex 1). It draws on work carried out during the development of the National Heritage Science Strategy (NHSS) (See Annex 2), and discussion across the science teams within English Heritage.

The strategy adopts two planning horizons:

Short term – Actions to prioritise in the current NHPP plan period (until March 2015).

Medium term – Actions to feed into the next NHPP plan period.

Aspirational or embryonic ideas that need further clarification have not been included, but will assist in the future revision of this strategy.



EH Conservation Scientist Paul Lankester using XRF to assess the handling requirements for the bird collection at Audley End House, Essex © English Heritage.

Definitions

Historic Environment is defined as “All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora” (National Planning Policy Framework 2012).

Heritage science is used to encompass all technological and scientific work that can benefit the heritage sector, whether through improved management decisions, enhanced understanding of significance and cultural value or increased public engagement.

Heritage assets as used here includes artefacts and ecofacts, as well as the archaeological sites, monuments, buildings, and landscape areas covered by the use of the term in government planning policy.

Within the three NHSS reports, there is overlap between the nine themes. To reduce repetition in this strategy, these themes are distilled into three topics. In each topic, proposed short and medium term actions are listed and linked wherever possible to existing or future NHPP projects. Additionally, generic issues are listed as overarching actions for the Strategy at the end of this section.

The table below shows the relationship between these three broad topics, the Measures set out in the National Heritage Protection Plan, listed in Annex 1, and the nine NHSS themes, listed in Annex 2. For example English Heritage activities relating to NHSS themes 3, 4, 5, 6 and 8 are grouped below under the Topic ‘Raising awareness of existing techniques, improving methods, access to information and advice’.

| Topic | NHSS Theme (Annex 2) | NHPP Measure (Annex 1) |
|--|----------------------|-------------------------------|
| Understanding materials and environments. | 1, 2 | 1, 2, 3 |
| Raising awareness of existing techniques, improving methods, access to information and advice. | 3, 4, 5, 6, 8 | 3, 7, 8 Supporting actions |
| Capacity, capability and public benefit. | 5, 7, 9 | Supporting actions |

Topic 1 – Understanding materials and environments

NHSS themes 1 and 2 cover research needed to improve our understanding of the way heritage assets behave (at all scales), the impacts that different environments can have on them, and how we can best manage and adapt to those often changing environments. Our existing and future work to respond to change is detailed within NHPP measures 1, 2 and 3.

Short term Actions (See Table 1 for detailed implementation plan)

- Continue with and complete existing NHPP research to understand material decay (including modern materials) and environments (see Table 5 for more details).
- Continue and complete existing NHPP research that identifies heritage assets and assesses their significance including the risks and threats they face (see Table 5 for details).
- Prioritise further research into material decay and environmental factors relating to heritage

assets and prepare responses for inclusion in the next plan period of the NHPP.

- Assess whether our existing recording and monitoring systems are able to collect adequate baseline data to assist in understanding climate change impacts on heritage assets.
- Identify and compile baseline information on marine attritional threats to assets to help formulate plans for next plan period.

Medium term Actions

- Identify collections, artefacts and sites within the National Heritage Collection that could be used by internal and external researchers to research material decay / environment topics.
- Identify new material decay / environment research topics for inclusion within future NHPP period, particularly in the marine environment.
- Identify projects for maintenance / resilience of designed landscapes for the next NHPP plan period of NHPP.



Brice Girbal, a work placement with EH, using Portable XRF to characterise historic window glass (in this case probably early 19th century from Germany or Bohemia) at Walmer Castle, Kent <http://research.english-heritage.org.uk/report/?14954> © English Heritage.



EH scientific dating assistant Amanda Grieve sampling human remains for C^{14} dating and stable isotopic analysis. Guidance for this type of work is now available online <http://www.english-heritage.org.uk/publications/science-and-dead/> © English Heritage



Lidar derived image of Wrest Park, Bedfordshire using intensity data © English Heritage, source Infoterra.

Topic 2 – Raising awareness of existing techniques, improving methods, and access to information and advice

Many of the specific recommendations within the NHSS relate to improving tools and methodologies, increasing access to publications and to data (both published and unpublished) and to providing training and guidance. English Heritage excels in this area. The following Actions therefore cover work which is already current or is planned. They also include recommendations to help ensure that skills and knowledge within EH are available and appropriately shared and used across the organisation.

Topic 2 short term Actions (See Table 2 for details unless otherwise noted.)

- Work with English Heritage Guidance Group to continue to provide guidance on heritage science topics that is relevant, up-to-date, co-ordinated with other guidance for the sector, and delivered through the most appropriate formats for its audience (Table 6 lists current written guidance in development).
- Work with EH Training Group to develop and provide training to raise awareness of new / existing heritage science techniques and guidelines.
- Ensure scientific input is available to staff in the Development Management, Historic Places and Heritage at Risk teams of National Planning and Conservation Department, to provide strategic input to casework and to contribute to removing Heritage at Risk assets from the register.
- Ensure scientific input is available to underpin the maintenance and conservation programme to the EH estate.
- Contribute to national and international initiatives for setting and agreeing scientific standards.
- Continue research to improve current methods of identification and investigation of heritage assets (See Table 7 for further details).

- Raise awareness of scientific techniques and methods and engage the historic environment sector with heritage science.
- Disseminate the results of key heritage science research.
- Contribute to the implementation of an EH strategy for improving information access, including development of best practice in digital data collection, ordering and archiving practice.
- Ensure English heritage science results contribute to further development of appropriate research frameworks, e.g. at regional or local level, or to the development of other research tools.

Topic 2 medium term Actions

- Work with the English Heritage Guidance Group to identify topics and appropriate publication formats for heritage science guidance for the next plan period of the NHPP.
- Identify new internal projects to improve

practice and methodologies that will form the basis of projects within the next plan period of the NHPP.

- Work with the internal English Heritage Training Group to highlight future areas for training in heritage science topics.

Topic 3 – Capacity, capability and public benefit.

Consideration of practitioner capability and capacity within the NHSS focused on current numbers of practitioners working in heritage science, and looked at issues relating to education and training. The final theme (9) and much of the NHSS vision and strategy document focused on public engagement and public benefit. The actions below consider how to ensure that EH staff can access the knowledge and resources they need to do their work, how English Heritage can help train future heritage scientists, and how we can ensure that our heritage science work achieves the greatest public benefit.



Ground Penetrating Radar (GPR) survey being conducted over an area of approximately 1.5ha centred on the stone circle at Stonehenge, Wiltshire. This investigation formed part of a series of projects undertaken to inform the displays at the new visitor centre. <http://research.english-heritage.org.uk/report/215108> © English Heritage.

Short term Actions (see Table 3 for detailed implementation plan)

- Ensure that our staff are aware of the full potential of scientific techniques and how they can access advice and scientific support.
- Enhance historic environment sector capacity and capability through support for post-graduate training and other professional CPD.
- Support specialist professional groups.
- Improve public displays and interpretations of our properties and archives with the results from new heritage science research.
- Improve the presentation of heritage science on our websites to increase public awareness and appreciation.

Medium term Actions

- With the National Heritage Science Forum, consider ways of enhancing the role that heritage science can play in the teaching of science within secondary and tertiary education.

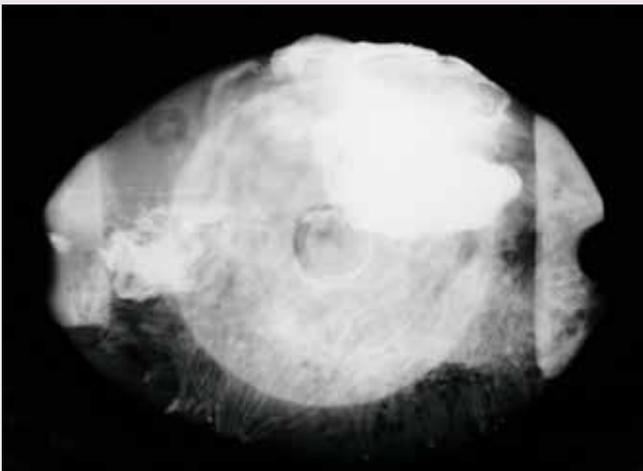
Overarching Actions

The following Actions address several of the objectives identified within the NHSS, detailed in the Annexes, and also a number of EH

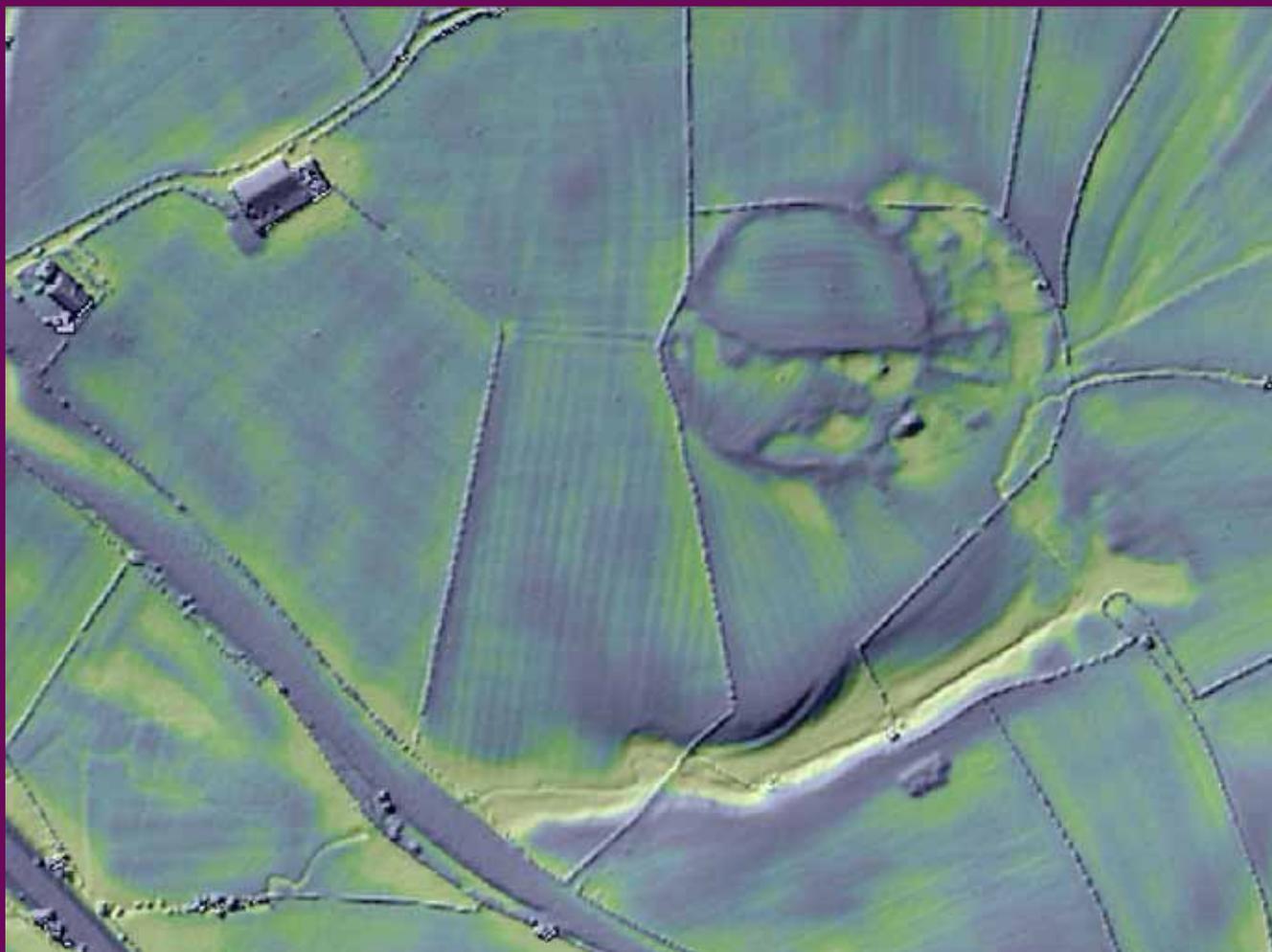
corporate aims and targets, though not, on the whole, falling under any specific NHPP action or Supporting action.

Short term Actions (see Table 4 for detailed implementation plan)

- Develop a science network within English Heritage to bring together EH Heritage scientists to discuss existing and future work and how this contributes to NHSS / NHPP priorities.
- Join and contribute to the National Heritage Science Forum.
- Contribute to an overall English Heritage response to the government-supported Finch Report (July 2012) on open access academic publication routes, covering specialist EH staff scientific work and that funded by EH.
- Raise awareness of our EH heritage science analytical facilities and services that could be shared, or performed for other internal departments.
- Increase access to our reference collections and promote their use by external researchers.
- Improve staff online access to key academic journals to improve knowledge transfer, i.e. staff training and development.



Wooden pulley block from *The London*: The x-ray (left) reveals the extent of shipworm damage which is visible as white-lined tunnels. A side view of the object is shown to the right for comparison. A blog by EH archaeological conservator Angela Middleton features this and other finds from the wreck <http://heritagecalling.com/2013/07/30/looking-inside-investigation-of-marine-archaeological-artefacts/> © English Heritage.



Lidar derived image of a prehistoric enclosure near Cowan Bridge, Lancashire visualised with a combination of viewing techniques to bring out the archaeology. This work forms part of the National Archaeological Identification Survey: upland pilot project (NHPP Activity 3A4 Identification of Terrestrial Assets) Image © English Heritage; Data source © Environment Agency copyright 2008. All rights reserved.

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