Historic England

Preserving Archaeological Remains *in situ* 6 conference. (PARIS6)
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Abstracts and speakers

Day 1 - Session 1 Climate Change Impacts

Climate-Driven Risks to Archaeological Sites in Greenland

Jørgen Hollesen, Henning Matthiesen and Anne Marie Høier Eriksen - National Museum of Denmark

Greenland's archaeological sites, like those across the Arctic, are increasingly threatened by climate change. Sites that have survived for millennia are now becoming susceptible to degradation, although the extent and timing of impacts vary widely: some sites are already undergoing rapid decay, others face imminent loss, while some may remain preserved for centuries to come. Safeguarding this irreplaceable record therefore requires a process-based understanding of how, where, and when climate change alters preservation conditions.

This presentation synthesises results from four research projects conducted in Greenland between 2010 and 2023, based on 14 field expeditions and investigations of 22 archaeological sites in the Disko Bay area, the Nuuk region, and Kujataa in South Greenland. By examining the interactions between regional climate variability, vegetation dynamics, soil temperature and moisture, and microbially driven degradation of organic archaeological deposits, the work has aimed to quantify the vulnerability of organic materials to changing environmental conditions. A central objective has been to move from site-specific observations towards predictive frameworks capable of estimating future preservation trajectories, while also developing scalable methods for establishing preservation baselines and detecting change across large geographic areas.

Climate change impact on Danish wetlands

Henning Matthiesen - National Museum of Denmark

Most of the Danish wetlands were drained and turned into farmland during the 19th and 20th century. This have had dramatic consequences for many archaeological wetland sites. Now policy is changing, and over the next twenty years 9% of Denmark's area will be transformed into forests or wetlands, where 140.000 hectares of low-lying peat soils will be re-wetted. This gives new possibilities to protect some of the archaeological remains in former wetlands, that have long suffered from drainage and degradation. At the same time, climate change predictions for Denmark point towards longer drought periods during summer that may impact wetlands and the effects of rewetting. The net effect on archaeological remains will depend on local conditions, and results from monitoring over the last decades illustrates how different wetlands respond highly different to drought. This emphasises the necessity of local monitoring. Three archaeological sites are presented as examples, where rewetting is either planned, too late, or not necessary from an archaeological perspective.

Where has all the wood gone? The impact of climate change on the buried timber forts on Hadrian's Wall

Andrew Birley - The Vindolanda Trust, Gillian Taylor - Teesside University

The Roman forts of Magna and Vindolanda on Hadrian's Wall hold a wealth of buried organic materials that are increasingly threatened by our rapidly changing climate. Out of the six wooden forts that were still preserved in 1980 at Vindolanda, only four remain today. Wetting/drying cycles and rapidly rising temperatures have resulted in a net loss of moisture from the soil and a net gain of oxygen, both of which have grave consequences for the long-term survival of organic remains. This is a pattern which is expected become increasingly extreme in the coming years.

Between 2021 and 2022, the Vindolanda Trust installed a series of underground continuous monitoring sensors at both sites, coupled with on-site weather stations, which continue to record soil and groundwater environmental data. This data is providing invaluable information towards future research, artefact preservation conditions, and resilience modelling. The fluctuating underground conditions at Vindolanda and Magna raises important questions about the viability of continued preservation in situ for buried archaeological sites with organic remains in northern Britain.

Monitoring the Lower German Limes. How can the impact of climate change on the World Heritage Site be assessed and managed?

Tessa de Groot, Adé Porreij-Lyklema and Gerard Boreel - Cultural Heritage Agency of the Netherlands, Tom Hazenberg - Limes Association of the Netherlands

The Lower German Limes (LGL), the former border of the Roman province of Germania Inferior along the Rhine, was designated a UNESCO World Heritage Site in 2021. A key component of the LGL's Outstanding Universal Value is the exceptional state of preservation of timber and other organic remains, which is due to the wetland conditions of the riverine area. These remains are crucial for dating purposes (dendrochronology) and offer unparalleled insights into areas such as military construction, shipbuilding, logistics, and supply.

The Dutch section of the LGL consists of nineteen archaeological sites. These sites are monitored at least every six years as part of the national monitoring program of scheduled monuments by the Cultural Heritage Agency of the Netherlands. The last monitor was carried out in 2025. In close collaboration with the Limes Association of the Netherlands — the site holder of the World Heritage — the results of the monitor will be evaluated over the coming months. A significant point of attention and concern is the impact of climate change (desiccation) on the World Heritage site and, more specifically, on its organic remains. This is a broader issue within the World Heritage cluster 'Frontiers of the Roman Empire' and will form part of a joint international research project.

Our contribution will explain the monitoring methods used and the results obtained. This will serve as a basis for discussing the key insights and challenges for World Heritage conservation. We will also briefly consider the proposed international cooperation.

Climate Change and In Situ Preservation of the Ai Loang Historic Shipwreck in Sumbawa: An Eco-Archaeological Approach

Ira Dillenia, Ofri Johan, Rita Rachmawati and Rina Zuraida - National Research and Innovation Agency (BRIN), Indonesia

Climate change is significantly affecting the *in situ* condition of underwater archaeological sites. This paper examines the historic shipwreck site of Ai Loang in the coastal waters of Sumbawa, Indonesia, as an example to illustrate how changes in the marine environment affect the preservation of underwater archaeological sites. The Ai Loang site is located in an active, continually changing tropical marine environment. Rising sea temperatures, changes in currents and sediment transport, increasingly frequent extreme weather events, and the rapid growth of marine organisms are affecting the physical condition of the wreck and the clarity of the archaeological information that remains recognizable and interpretable. This study uses an eco-archaeological approach to examine the relationship between the wreck, the surrounding coral reef, and the seabed as a whole. With this approach, the wreck is understood not only as a cultural relic but also as part of a constantly changing marine ecosystem. The results demonstrate that in-situ preservation can no longer rely on the assumption that underwater sites are stable. The Ai Loang case study demonstrates that understanding local marine environmental conditions, such as currents, sedimentation, growth of marine organisms, and exposure to extreme weather, is crucial for the long-term preservation of underwater archaeological remains. Therefore, this paper emphasizes the importance of more flexible management through continuous archaeological recording, marine environmental monitoring, and risk assessments that account for the impacts of climate change.

25 years counting: Lessons from monitoring and preservation at Schokland

Hans Huisman and Guido Mauro - Cultural Heritage Agency of the Netherlands

The Schokland UNESCO World Heritage in the Netherlands is one of many areas where cultural heritage (including archaeology) is under threat from lowering groundwater levels and soil cultivation. In the late 1990´ies, the creation of a “hydrological zone” with elevated groundwater levels for the protection of the archaeological remains and for countering subsidence of the former island of Schokalnd was combined with an intensive monitoring program. This program was developed to test the performance of the hydrological zone and to detect and mitigate threats to the archaeological remains. This monitoring program has continued uninterrupted (but not unchanged) for more than 25 years. Now we will discuss the lessons of 25 years of monitoring: Which parameters proved suitable, which less so (and were discontinued) and which would we want for the future. And can we detect long-term (e.g. climate change – related) trends in our data? And we will look to the future: How an extension to the hydrological zone has been designed and is being implemented at the moment – including monitoring. And how we look to the future of this monument.

Session 2 Climate Change Mitigation, adaptation and strategic planning

Conservation strategies for archaeological excavated structures in a climate change(d) future

Gavin Douglas - Historic Environment Scotland and Stirling University, Clare Wilson - Stirling University, Iona Murray - Historic Environment Scotland and Eileen Tisdall - Stirling University.

This study examines the long-standing assumption that archaeology, and archaeological structures in particular, constitute non-renewable resources, alongside the historical tendency for conservation during excavation not to be treated as an immediate priority. Focusing on drystone monuments, the research assesses how past excavation and conservation decisions have influenced long-term structural stability. A survey of previously excavated monuments was undertaken to identify evidence of conservation interventions and to evaluate how these structures have responded to such measures over time. To replicate and test the effects of these interventions, a series of experimental drystone structures was constructed and monitored to record changes attributable to specific conservation practices.

The research aims to develop a strategic framework for excavation and conservation that supports the effective preservation of archaeology. It argues that conservation approaches adopted during and immediately after excavation play a critical role in shaping a monument's long-term vulnerability to environmental change. This amongst other challenges includes the climatic pressures, the impact of increasing visitor numbers and the way they interact with sites. By integrating retrospective analysis with experimental evidence, this study suggests more sustainable, evidence-based approaches to the preservation of excavated archaeological structures.

Archaeological heritage management in the midst of the spruce dying in North Rhine-Westphalia, Germany

Eva Cott-Everding - LVR-State Service for Archaeological Heritage

From 2018 onwards, large parts of Central Europe experienced several summers of drought. As a result, spruce trees began to die at a rapid rate, leading to the complete disappearance of this tree species in many regions. This natural disaster caused a sharp increase in forestry activities in these calamity areas with deadwood clearance and reforestation measures. These activities, which were associated with considerable time and economic pressure, led to damage to archaeological sites in many places. In the German state of North Rhine-Westphalia, whose low mountain ranges are severely affected by spruce dying, this crisis situation was addressed on three levels:

Firstly, damage was quantified and recorded using remote sensing methods. Secondly, emphasis was placed on providing information and training at various levels of the forestry authority and in municipal and private forests. In addition, active consultations were held on site where archaeological monuments had been affected by forestry activities. Individual concepts for the management of calamity areas that were both economically viable and protective of archaeological monuments were agreed with those involved in forestry work. This crisis has resulted in stronger cooperation between archaeological heritage conservation and the various stakeholders in forestry.

Hurst Spit to Lymington Strategy: Adaptive Pathways for flood and coastal risk management strategy and heritage management.

Steven Kemp - Environment Agency

This Paper considers the environmental pathways to flood and coastal risk management as identified in the Hurst to Lymington FCRM Strategy and the assessment of effects and impacts to heritage assets as identified in the Strategic Environmental Assessment. The Paper will focus on a landscape of historically significant, undesignated, area of salt-working considering its vulnerability to sea level rise as coastal defences are maintained or retreated. The present character of the landscape is one of marsh and pasture in marked contrast to the industrial character depicted in late-eighteenth and early-nineteenth century maps, surveys and illustrations. The Paper will demonstrate the way in which Historic England's Adaptive Release Guidance might be used to ensure an equitable participation and knowledge transfer between communities.

The Paper will be presented by the Environment Agency supported by our Environmental Consultants JBA consulting, Historic England, and the EA's Strategy Partners Hampshire County Council and the New Forest District Council.

Recording Fylingdales After Fire: Landscape Archaeology as a Catalyst for Recovery on the North Yorkshire Moors

Andrew Burn - Historic England

The 2025 Fylingdales wildfires on the North Yorkshire Moors caused significant damage, exposing fragile peat systems, eroding earthworks and destabilising a historic landscape at scale not seen before in England. This paper examines how utilising a landscape archaeology approach to record affected heritage assets is becoming

a critical foundation, not only for heritage conservation, but for informing wider environmental recovery and planning future sustainable land-use across the moors.

A programme of rapid archaeological assessment, using drone-based LiDAR survey and AI-assisted change detection, is being implemented to document exposed archaeology, assess damage and prioritise urgent recording and conservation work. These datasets are providing an evidence base that is directly supporting partner organisations and local landowners in planning stabilisation, re-wetting, re-planting and access management. Moving forward archaeological mapping will inform peat restoration schemes, identify constraints and opportunities for forestry interventions, and help land managers avoid further harm in areas already weakened by erosion.

This paper argues that archaeological recording should be understood not as a secondary response, but as an enabling tool within climate adaptation and landscape recovery. By embedding heritage data within environmental decision-making, the ongoing Fylingdales response demonstrates how historic environment evidence can unlock benefits across sectors and drive integrated approaches to resilience at landscape scale.

Threat, money and knowledge – exploring strategic approaches to prehistoric wetland archaeology in Somerset, UK

Richard Brunning - South West Heritage Trust

The lowland moors in Somerset have Holocene peat deposits of varying depths that are known to contain a variety of significant prehistoric waterlogged monuments, such as settlements, wooden trackways and sites of ritual deposition. These deposits and sites are threatened by low summer water tables. Current climate change predictions suggest that summer droughts will become more frequent and more severe, so these issues are likely to worsen in coming decades.

What should a strategic response be to such landscape scale problems that affect dozens of known sites and numerous other ones yet to be discovered? How should finite resources be targeted? Are some sites more important than others? What can be preserved and what happens to sites whose future looks bleak? When and to what extent is mitigation by excavation the sensible solution? Is tacking the issue at landscape scale, rather than the site scale, the only sensible long-term option? What is the potential overlap with the nature conservation interest and government attempts to preserve and increase peatland carbon? All these questions will be explored theoretically for the Somerset Levels and Moors area but within the context of the wider prehistoric wetland resource in England.

The Experimental Earthworks Project and in situ preservation: Workshop

Martin Bell - University of Reading and Rob Janaway - Bradford University

This workshop is organised to discuss the future of this long-term project. It was established in 1960 with the making of an earthwork at Overton Down on chalk and in 1963 with another on Tertiary sands at Wareham. Within the earthworks were a range of inorganic and organic materials including wood, textiles, leather, bone and at Wareham glass and associations between organics and copper coins and iron discs. Excavations to retrieve materials have taken place at intervals of 2, 4, 8, 16 and 32 years. A monograph is nearing completion covering results to the Wareham 32 year stage (with other experiments on octagonal earthworks and roundhouses). The 32 year excavations included several innovations not foreseen by the original project design. Others have potential for the 64 year stage eg isotopic evidence, ancient and sedimentary DNA, and more detailed investigation of the metal and organic associations and glass than has so far been achieved.

The 64 year stage investigation is now due and the science community needs to decide if the project should continue. If so what specific and additional research objectives should form part of it, if any of the original objectives can be considered completed, and which organisation or individual will take the lead? A month before the conference the workshop organisers will prepare a short position paper for circulation as the basis for this workshop discussion session.

Day 2 - Session 3 New Techniques and Methodologies

The SoilVue Probe as a New Monitoring Tool

Vibeke Vandrup Martens and Sunniva Wilberg Halvorsen - Norwegian Institute for Cultural Heritage Research (NIKU)

This paper presents results from Norwegian pilot projects evaluating the SoilVue probe as a tool for archaeological environmental monitoring. The study compares results across contrasting archaeological and environmental contexts and assesses the probe's performance regarding installation, data quality, stability, sensitivity, and interpretability. In addition, the SoilVue probe is evaluated as a methodological mitigation tool, with particular emphasis on its strengths and limitations relative to other established monitoring approaches.

The SoilVue probe is a slim (5 cm diameter), vertically installed sensor capable of monitoring nine points in the upper metre of archaeological deposits directly from the surface. This enables targeted observation of the most vulnerable stratigraphic zones without the need for open sections or dipwells. Compared to traditional methods, the probe is less invasive, cheaper, faster to install, and more flexible in deployment. It has been tested at sites in Svalbard and Andøya (CULTCOAST), and Vektertorvet in Tønsberg (The Prestegaten Project), representing markedly different environmental conditions. Despite these differences, a consistent methodological framework was applied, providing a robust basis for assessing the probe's applicability, limitations, and potential role in future monitoring strategies.

Models of Decay: How can better geophysical models help us monitor the state of buried remains?

David Jordan - Liverpool John Moores University

The structure and composition of archaeological remains change as strata are damaged in situ. These changes have geophysical consequences which can be detected as they occur. As clayey ditch deposits dry their electrical resistivity will rise while their dielectric permittivity falls. Simultaneously the oxidation of organic matter within produces changes in their charge-retention behaviour which are detectable at the ground surface. As the stones of buried walls are pushed apart by roots and the mortar between them decays the pathways by which electric currents pass through them enlarge and their electrical resistivity falls while, simultaneously, the degree to which high-frequency radio waves are scattered increases as dielectric boundaries proliferate.

These effects suggest that, while the immense diversity of soils, sites and taphonomic environments resist simple geophysical analysis a deeper understanding of the relationship between states of decay and their geophysical consequences may help us use geophysics to detect and quantify specific destructive changes in buried remains as they occur and help us design a response.

This paper describes a series of geophysical surveys, excavations and analyses which explore geoarchaeological insights into the geophysical consequences of taphonomic change and the potential to use these to monitor sites at risk.

Heritage Crime in England: New Techniques and Advances in the application of scientific prevention and investigation capabilities

Mark Harrison and Paul Jeffery - Historic England

This paper considers how new technologies and methodological approaches have been developed to increase the protection of in situ archaeological sites in England. Archaeological sites, historic buildings and artefacts left in situ are subject to a wide range of environmental and human threats. This paper reviews the use of scientific tools and approaches applied in England as part of the Heritage Crime Strategy. This strategy includes other pillars such as legislative change, public engagement and the development of specialist police and heritage roles and skills.

The development of new scientific and technical tools and approaches underpin both preventative protection in situ and, when required, investigation and provide evidence for prosecution. Advancements in technology and collaborative protocols have strengthened efforts to protect archaeological heritage. New forensic marking products are now used to safeguard metals, such as those on church roofs, and to mark both metal and wooden artefacts on underwater sites. Satellite monitoring and the increased deployment of drones have enhanced surveillance and deterrence capabilities.

Collectively, these technological, legislative, and community-based approaches represent a comprehensive framework for safeguarding cultural heritage against crime..

The future of the waterlogged archaeological resource of York.

Virgil Yendell and Natalie Hamilton - AOC Archaeology, Kristina Krawiec and Tom Keyworth - York Archaeology

The city of York is known for its deeply buried waterlogged archaeological deposits which contain some of the best preserved Early Medieval structures in the UK. The continuing survival of these deposits is now at risk from a number of factors affecting the stability of the burial environment. These range from climate change and changes in hydrology, contamination from modern pollutants and direct impacts from the redevelopment of sites. In order to respond to these challenges, the City of York Council and Historic England commissioned York Archaeology and AOC Archaeology to undertake a three year project to create a fit for purpose deposit model for the entire unitary authority area.

The project is now in its final year and the new dataset is populated with both archaeological records generated over the last thirty years and data held by the British Geological Survey (BGS). The model is structured in a way that aims to work with FAIR principles in mind and make future updates simple to facilitate the management of the archaeological resource. The new deposit model maps archaeological remains, deposits with palaeoenvironmental potential, waterlogging and/or organic-preservation and pre-urban 'natural' topography with data reused form multiple sources so that these nationally important heritage assets can be appropriately managed. The model can also be used for decision-making, development design, and past landscape reconstruction. The model also allows data recovered from commercial and research-led investigations to be easily accessible to a wider audience. This is critical given the rapid nature of modern archaeological investigations. It also addresses issues of data access and dissemination within a sector under increasing pressure to deliver on ever shorter timescales with diminishing budgets.

Use of Airborne Laser Scan for evaluating erosion of burial mounds

Henning Matthiesen - National Museum of Denmark, Malte Skov Jepsen - Aarhus University, Michael Vennersdorf - Museum West Zealand and Jørgen Hollesen - National Museum of Denmark

Remote sensing methods are increasingly being used for monitoring changes to archaeological sites. In this study we have tested the use of repeated Airborne Laser Scans (ALS) to evaluate and quantify the erosion of unprotected burial mounds on arable land. This type of erosion has earlier been studied through field tests and individual case studies, but here it is attempted to get a regional overview and upscale the number of sites.

The gradual erosion of 2500 unprotected burial mounds on West Zealand, Denmark is analysed using three different versions of a height model measured by ALS in 2007, 2015 and 2024. The loss of height of the burial mounds is analysed and compared to random points in the same region. The analysis shows a mean loss of 5 cm for the burial mounds during the whole period, corresponding to an average yearly loss of ca 3 mm, while the random points showed no loss. Some of the advantages and shortcomings of the method are discussed, including some of the precautions that need to be taken if the method is used for individual case studies. A new project with monitoring of larger number of archaeological sites based on remote sensing is presented.

Archaeology-sustainable building in daily practice in The Netherlands: problems, challenges, and successes

Maarten Groenendijk – Green Archaeology, The Netherlands

Since 2020, my daily practice has consisted of advising developers and archaeologists on the options and dangers of an archaeology-sustainable building method. This building method is designed to develop or build on top of an archaeological site without significantly disturbing this site (with the exception of limited disturbance caused by piles), thus enabling the building development to continue while preserving the archaeological remains at the same time. When done correctly, this method can have considerable advantages for both archaeologists and developers. However, this comes at a price. Developers need to be willing to think outside the box, invest in archaeology-sustainable techniques and must commit to the boundaries of the building method, which has a significant impact on what they can develop. At the same time, archaeologists have to accept that a small amount of disturbance to a site is unavoidable and not problematic, that they will not be able to fully (or even partially) excavate an interesting archaeological site and must trust that this site will indeed be preserved beneath the building. This paper addresses all the issues, both positive and negative, that I have encountered during my work, and the solutions to the problems.

Session 4 Theory and Practice in Policy

ENDURE: Managing Change, Risk, and Decay in Underwater Cultural Heritage

David Gregory - The National Museum of Denmark and Ulster University, Henning Matthiesen - The National Museum of Denmark, and Chris McGonigle, Rory Quinn, and Craig Syms - Ulster University

Preservation in situ is widely promoted as the preferred management strategy for underwater cultural heritage (UCH), yet its effectiveness is increasingly challenged by environmental change and intensifying human use of the seabed. Natural processes such as erosion, corrosion, and biodeterioration interact with anthropogenic pressures including fishing, dredging, seabed infrastructure, and climate-driven change, often accelerating site degradation and increasing management uncertainty. Despite these risks, UCH remains weakly integrated within marine spatial planning (MSP), where heritage considerations are frequently secondary to ecological priorities. This paper presents the scientific approach and emerging results of the ENDURE project, which seeks to improve how change, risk, and decay are understood and managed for UCH preserved in situ. Building on advances in marine remote sensing, in situ environmental monitoring, materials science, and ecosystem modelling, ENDURE investigates how cumulative natural and anthropogenic decay processes can be identified, quantified, and compared across spatial scales. Central to this work is the concept of site entropy, used to characterise condition, stability, and future trajectories of underwater sites. By translating decay processes into measurable indicators, this approach supports predictive desk-based assessments and integration between archaeological science and marine planning.

In-situ vs ex-situ preservation – a choice between two evils? A case from Stavanger Cathedral, Norway

Hege Ingjerd Hollund - University of Stavanger, Line Hovd and Vibeke Vandrup Martens - Norwegian Institute for Cultural Heritage Research (NIKU)

Norwegian heritage legislation is closely linked to international treaties, particularly the Valletta Treaty emphasizing in situ preservation. Norway has played a key role in developing the European Standard for *Assessment and monitoring of archaeological deposits for preservation in situ* (CEN 17652:2022). Recent proposals for a Norwegian Environmental Heritage Act (Spring 2025) highlight the importance of monitoring, yet critical questions remain: How do we decide which sites or materials can be preserved in situ, and when is ex situ preservation preferable? Do we need adaptive measures to slow deterioration in both contexts?

During restoration of Stavanger Cathedral, a rescue excavation inside the church was accompanied by six years of environmental monitoring, including the impact of installing floor heating. In parallel, a research excavation outside the cathedral under the *Future Past* project provided comparative data. Results revealed striking differences in preservation between different burial environments, indoor and outdoor. How do these findings relate to museum-stored materials? A pilot experiment testing adaptive burial conditions added further insight. This presentation explores lessons learned from these case studies and their implications for future strategies in heritage preservation.

Geographical Indications as De-Facto In Situ Preservation Tools: Evidence from the Chanderi Handloom Cluster, India

Apurva Sweeten Bandodcar - GVM’s GGPR College of Commerce and Economics, Goa; and Goa University and Mrinal Vishnu Valke - ZBEF’s Narayan Zantye College of Commerce, Goa

Geographical Indication (GI) registration in India is primarily a tool for intellectual property protection. However, in the Chanderi handloom cluster (Madhya Pradesh), the ‘authorised user zone’ directly overlays Archaeological Survey of India (ASI) protected limits. The current research suggests that GI laws have unintentionally become the strongest tools for *in situ* preservation, thereby functioning effectively in the absence of heritage laws. Through a comparative analysis of the longitudinal hydrogeology datasets (Central Ground Water Board, 2018-2024) and multi-temporal Sentinel-2 satellite imagery, the study successfully reveals this measurable policy synergy. The findings indicate that the GI directive to use traditional methods of production, such as still using historic water bodies for textile washing, has contributed to the preservation of local groundwater levels in the 'Safe' category (approximately 6-10 mg/l). This is in contrast to the aquifer desaturation and soil drying noticed in the neighbouring factory blocks. The study establishes that this hydrological stability, driven by the living craft, helps maintain the soil moisture required to preserve unexcavated archaeological deposits against desiccation. Consequently, the framework is proposed for the 'Integrated GI-Heritage Zones' that links the requirements of Intellectual Property with the objectives of archaeological conservation, and thus, it presents a cost-efficient measure for the preservation of large industrial landscapes.

A review of policies, technologies and outcomes of preserving excavated archaeological sites in central Lisbon, with some comparisons of similar processes and achievements in London

Richard Hughes, IHCM

This presentation will examine how in situ preservation of archaeological sites is generally undertaken in Lisbon, examining policies, strategies, techniques and achievements. It will allow colleagues to compare with how this done in London, both cities having many commonalities regarding siting, historical uses, heritage asset types, and modern development impacts. It will provide an introduction to in situ preservation of more than 2,300 rural and urban archaeological sites worldwide, where my research programme is presently rigorously scrutinising collected metadata of site types, preservation technologies, and asset performance.

Flag Fen's Future?

Matthew Brudenell and Mark Knight - Cambridge Archaeological Unit (on behalf of the Flag Fen Futures Group)

This paper will focus on the long-term perspective of forty-four years of investigation (1982-2026) and lessons learnt concerning Flag Fen's interpretation and preservation. How, much of the early work (the first decade or so) concentrated on interpretation, establishing the Flag Fen post-alignment and Flag Fen platform as paired yet distinct Bronze Age timber structures. And how, later work (the more recent decades) turned its attention to the management of Flag Fen's preservation. Small, mostly monument-centred holes, monitoring condition, water levels and the presence or absence of wood became the overriding approach as large parts of the monument became increasingly dry.

In 2021, the Cambridge Archaeological Unit carried out a Historic England commissioned condition assessment which further demonstrated the monument's decline, whilst at the same time questioned some key components of the monument's interpretation. The assessment even went as far to say that certain attributes of the monument's preservation were instrumental to certain elements of the monument's interpretation – that the purported Flag Fen platform, for example, was in all probability just an edifice of better preservation. A distinction made all the starker by the much poorer preservation conditions associated with large parts of the kilometre long Flag Fen post-alignment. The contention being that the 'platform' is the post-alignment only in a zone of comparatively heightened preservation. It was attributes such as this that made us rethink the policy of preservation in situ, especially in relation to such an expansive yet completely hidden monument, and propose as an alternative a policy of active preservation by interpretation. To save Flag Fen we have to interpret Flag Fen, not piecemeal but at a scale commensurate with the monument.

* The Flag Fen Futures Group is made up representatives from the Flag Fen Archaeology Park, the Cambridge Archaeological Unit (CAU, Department of Archaeology, University of Cambridge), Historic England, Anglian Water and the McDonald Institute for Archaeological Research (University of Cambridge).

International instruments as nested practices of care in archaeological preservation

Charlotte Woodhead - University of Warwick

Laws, policies and guidance are central to caring for heritage. These form nested practices of care (Woodhead, 2024) which support communities of care together, caring about and caring for heritage. Instruments of different legal statuses, emanating from various international organisations add to these nested practices – some have the force of international law, whilst others provide aspirational norms. International conventions (legal treaties) ratified by the UK require legal implementation in the UK to ensure compliance with the obligations contained within them. On some occasions the UK is a simply a signatory to an international convention, having not taken the further step of ratifying it. Nevertheless, some UK organisations encourage or require within their policies, compliance with the obligations set out in those international instruments.

The sphere of influence, though, of certain international instruments is widespread, despite their non-binding nature in the UK; Australia ICOMOS' Burra Charter is one such document. Through the lens of the ethics of care, drawing on the author's earlier work on nested practices of care and communities of care striving to provide appropriate care (which is respectful, empathetic and dialogic), this paper explores the impact of international law, soft law and non-binding principles on UK archaeological preservation.

How the preservation of UNESCO designated sites can contribute to climate action and sustainability

Sarah May - Bureau for the Contemporary and Historic (ButCH)

When we think of preserving heritage it is crucial to consider what we are preserving it for. Preservation efforts at UNESCO designated sites offer the opportunity to develop 'living labs' – places with a nexus of heritage assets, resources and relationships that can support innovative research. Moving on from considering how climate

change will impact heritage, to exploring how heritage can contribute to wider research on climate change requires a strategic approach.

This paper will present the recently published UNESCO Climate Action and Sustainability Framework and its accompanying Research Agenda, which sets out a global approach for using UNESCO-designated sites as living laboratories for climate resilience and sustainable futures. It will discuss how Biosphere Reserves, Global Geoparks and World Heritage Sites provide real-world environments for understanding and responding to complex and interconnected 21st-century challenges.

PARIS policy breakthroughs, blind spots and the next 30 years

Peter Hinton – independent, and Taryn Nixon – Heritage Works

This paper will consider the policy context and ethical orthodoxy of the era when the first PARIS conference was called, and the questions posed and the ensuing responses. We will examine the challenges for archaeology and how policy influenced constructs such as *preservation by record*, presenting excavation as *mitigation* and a distinction between research and rescue/preventive archaeology.

We will look at work to consider how practice, policy and ethics have changed since, and how archaeologists now balance preservation and destructive investigation and their respective merits and hazards. We will show how practice, especially in development-led archaeology, is ahead of ethical documentation that has changed little since 1996, but how it frequently falls far behind some changed policy positions (an example being reluctance by many English archaeologists to make the most of a radical reform to policy).

We aim to offer new answers and direction to some thirty-year-old questions, including: How do we decide what to preserve in situ and how long for? How do both archaeology and preservation contribute to the United Nations Sustainable Development Goals? Why and for whom do we preserve in situ or excavate? How do we know a decision was right? When does destructive investigation create a net gain in significance? How can we extract the most from current policy – are there dangers in overlooking current incoherence in ethics, policy and practice or are changes needed in policy or ethical codes?

Posters

Preserving Lechaion harbour, Corinth

Angeliki Zisi - University of Oslo

This poster presents the *in situ* protection work at Lechaion, Corinth's ancient harbour in Greece, taken place during the underwater excavation seasons from 2015 to 2017. The focus is placed on the approach taken to protect the wooden archaeological remains which form a large part of the harbour's artificial infrastructure. More specific, the poster showcases the protection of the remains of the wooden caissons located at Mole L-M3, the wooden posts forming a retaining wall located at Mole L-M4, the wooden posts at Mole L-M5 in front of the mouth of the Entrance Canal, and the wooden caissons defining Area 1; altogether defining an underwater working area of approximately 0.3 km^2. Lechaion harbour was in use from the Late Bronze Age to Late Antiquity, corresponding to a life span of roughly 2,000 years, from c. 1380 BC to 1300 AD. The rather rare occasion of the harbour's archaeological wooden infrastructure being preserved to such an extent today, in the shallow, sun-washed, warm and saline seawaters of Southern Greece, adds to the historical significance of the find and justifies its nationwide recognition as unique. It also emphasizes our duty to study, publish and preserve it, insofar as possible.

Case Study for Preservation in Situ by HS2 of Grim's Ditch at Hunts Green Farm, Buckinghamshire

Sarah Revans - Headland Archaeology

The poster will demonstrate how 25,000m2 of archaeology including part of Grim's Ditch in Buckinghamshire has been permanently preserved in situ. The reburial objectives were permanent reburial beneath a 4m high embankment. The ditch was located during site evaluation. A decision was taken to preserve the ditch during construction rather than excavate. During evaluation the topsoil was removed from the footprint of the area. This enabled the course of the ditch to be plotted and sampled, to better understand it. It was then recovered in topsoil before permanent reburial. Grim's Ditch is an Iron Age boundary ditch scheduled in several locations, including one section of visible bank and ditch immediately adjacent. The site is of national importance and high significance. HS2's contractor ALIGN undertook an assessment of the settlement and demonstrated archaeological deposits are anticipated to experience a small amount of compression, limited to <10mm. The overall settlement caused by the earthworks is predicted to be <35mm. A protective starter layer and control measures were designed to ensure settlement occurs evenly across the area and prevent damage from construction plant. There has been strong stakeholder engagement with Historic England and the local authority planning archaeologist throughout the development of this scheme.

Aerating a Scheduled Monument, the Dirleton Castle Yews

Stefan North-Sagrott - Historic Environment Scotland

A novel technique of soil aeration is being trialled at Dirleton Castle gardens, which were likely first laid out in the 16th century and include an earthwork knot garden area. The yew trees within the historic gardens form an integral part of the Inventory Garden & Designed Landscape and are part of the Scheduled Monument. However, due to soil compaction and climate change, their health and condition has been declining, with 14% of the trees lost since 2009. It has been advised that soil decompaction, via the Vogt Geo-injection technique, may reverse the decline, and will also improve drainage within the gardens.

Whilst the technique is often used by gardens e.g. Kew Gardens and Royal Botanic Gardens Edinburgh the physical impact of it on the sub-surface features is unknown. An archaeological evaluation of the 16th century terraces is to be carried out in early 2026, before, and then repeated after, trial decompaction to assess the impact of decompaction on the soil structure and the archaeological deposits of the earthwork terraces that form part of the Scheduled Monument. This poster will outline further details of the technique and the results of the archaeological evaluation.

A Race Against the Wind: Links of Noltland, Westray, Orkney.

Richard Strachan - Historic Environment Scotland

In response to the catastrophic threat to the Neolithic and Bronze Age settlement site at Links of Noltland, Westray, Historic Environment Scotland commissioned rescue excavations combined with a programme of landscape management. This comprised a combined approach of dune recharging, marram and lyme grass planting and monitoring. A decade on, the area is now transformed and the risk to the archaeological remains has dissipated

Climatic change is leading to a worsening below ground preservation environment

Brian Huntley - University of Durham and Jacqui Huntley - The Vindolanda Trust

The policy of ‘Preserving Archaeological Remains in situ’ makes an implicit assumption that the preservation environment is stable. Key qualities of that environment include temperature, moisture and redox state, all of which are sensitive to changes in the aboveground environment. We have tested, indirectly, the assumption of stability by exploring the extent to which the aboveground environment has changed over the last 140 years in the area of the Hadrian’s Wall forts of Vindolanda and Magna. Meteorological records from the area have been compiled and examined for trends in temperature, precipitation and the balance of precipitation and evaporation, the latter being a principal determinant of belowground moisture. Temperature has increased both as an annual mean and in each of the four meteorological seasons. Total annual precipitation has also increased, but this increase has been principally in the autumn and winter months, with summer months experiencing either little change or a decrease in precipitation. Decreased summer precipitation, when combined with increased evaporation resulting from increased temperatures, results in markedly drier summer conditions. Below ground conditions are thus expected to have become warmer year-round, and drier in summer, leading also to a more oxidising environment and hence a worsening preservation environment. Given the meteorological changes are consistent with national and regional trends, similar deterioration in the belowground preservation environment is likely to be widespread.

Assessing Climate-Driven Exposure of Cultural Resources in the U.S. Southwest: The CREATE Geospatial Tool

Akriti Khadka - USDA Forest Service

Archaeological sites across the U.S. Southwest face accelerating pressures from climate change, including increased wildfire activity, erosion, flooding, and extreme heat. Despite the scale of these threats, cultural resource managers often lack accessible, spatially explicit tools to evaluate exposure and support proactive preservation. The Cultural Resources Exposure Assessment Toolbox Experience (CREATE) addresses this gap by providing a geospatial decision-support platform designed to assess the exposure of cultural resources to climate-related hazards in Arizona and New Mexico.

CREATE integrates multiple climate-risk layers, including projected temperature change, drought severity, wildfire probability, and hydrological impacts, to generate site-level exposure indicators. Developed in collaboration with federal land management agencies, the tool offers an entry point for identifying vulnerable sites, prioritizing management actions, and informing adaptation planning. This poster presents the tool’s conceptual framework, data architecture, and preliminary applications, highlighting how exposure mapping can complement in situ preservation strategies and long-term monitoring.

By situating CREATE within broader efforts to address climate-driven deterioration of archaeological resources, this work contributes to emerging methodologies that support evidence-based, climate-informed stewardship. The approach demonstrates how geospatial tools can enhance decision-making in regions where cultural heritage is both abundant and increasingly at risk.

Monitoring Peat Desiccation Using Drone Surveys

Franki Gilis – The Vindolanda Trust

Monitoring the condition of peatland heritage sites is becoming increasingly important as climate change continues to impact our wetlands. Empirical observations of the landscape allow a better understanding of what threats wetland heritage sites face and how much time is left before they are critically damaged. However, it is often difficult to undertake such monitoring on account of the high prices of continuous monitoring systems and/or the time and manpower needed for manual observations. Ecologists have employed drone surveys which offer a non-invasive method of surveying landscapes that can be done quickly and at a relatively low expense. Digital Elevation Models (DEMs) and Red Green Blue (RGB) surveys can obtain data within +/- 2cm of error and can be used to determine peat shrinkage and plant growth variations across large areas. The Vindolanda Trust has implemented annual surveys of Magna fort and Roman Vindolanda in order to develop these methodologies for use in the heritage sector. Preliminary analyses of surveys from Magna fort show peat shrinkage in distinct areas across site which demonstrates how climate change has already impacted the area. This poster will outline our preliminary methodology and results from these surveys as well as highlight the benefits and drawbacks of this method for monitoring wetland heritage sites.