18 September 2024
Climate Change Committee & Met Office consortium

Historic England response to first call for evidence to inform CCRA4-IA technical report

1. About Historic England

Historic England is the Government's statutory adviser on all matters relating to the historic environment in England. We are a non-departmental public body established under the National Heritage Act 1983 and sponsored by the Department for Culture, Media and Sport (DCMS). Our strategic aim is to protect England's historic places by providing expert advice to local planning authorities, developers, owners and communities to help ensure our historic environment is properly understood and cared for.

Advising government on matters related to the historic environment is a core part of our role. While sponsored by DCMS, we provide advice across the whole of government and its departments, including its many arm's-length bodies.

We are responsible for the care and operation of the National Heritage Collection – a diverse portfolio of over 400 English historic buildings, sites and monuments under the nation's ownership or protection. It includes World Heritage Sites, industrial monuments, castles, historic houses, abbeys, stone circles, forts, and a significant proportion of Hadrian's Wall. English Heritage Trust manages the National Collection on our behalf under a Property Licence and Operating Agreement.

Since 2010, Historic England's Grant in Aid has declined by as much as 60%. We have received no additional government funding to cover climate change activities beyond that which we have raised through external funding (such as Research Council funding). We are having to reprioritise work and be very selective about that which we carry out: this limits our ambition, capacity, and ability to rapidly produce new information and strategies.

We would welcome the opportunity to work further with the Met Office consortium in the production of CCRA4-IA though the evidence gathering process or the drafting of the heritage risk section and to provide further detail on any points raised in our submission. We would be happy to liaise with the chapter authors, particularly for the Built Environment and Communities chapter.

2. Summary

We understand that this initial call for evidence will be used to refine the CCRA3 list of risks as well as being an important part of the CCRA4-IA Technical Report methodology.

Historic England's key messages within this response are:

- The scope of the cultural heritage risk (H11) in CCRA3 does not adequately cover the broad range of assets that make up the historic environment which are at risk from climate change.

- Due to this, many risks and adaptation requirements for the historic environment are unintentionally scoped out of CCRA3, and therefore the Third National Adaptation Programme (NAP3), because the historic environment is only discussed in a section on buildings and local communities.
- This means the Climate Change Committee's advice to government on cultural heritage is limited in its scope and ambition. Key hazards and risks are not considered, and the full range of adaptation requirements and opportunities are not being highlighted.
- For multiple other risks in CCRA3, historic assets make up a subset of the sectors discussed. To better identify risks to cultural heritage, given the lack of existing evidence, it would help for CCRA4 to more fully acknowledge and consider the historic subset of other risk sectors.

Following this initial call for evidence response, Historic England and English Heritage Trust will submit a joint Climate Change Adaptation Report to Defra as part of the fourth round of reporting under the Adaptation Reporting Power. This report will contain further information for consideration within CCRA4-1A.

3. Evidence highlighting the range of hazards and heritage assets at risk from climate change

The cultural heritage sector is a guardian of our nation's historic environment, protecting and conserving heritage assets and landscapes for future generations. As set out in our Heritage and the Economy publications, the sector also wields a substantial influence on our national and local economies, however many heritage assets are already recognised to be at risk from, or are already impacted by, climate change without additional resource or capacity to cope with increased rates of change. Heritage assets vary in size and scale, from individual buildings to whole landscapes. Those within Historic England's remit include but are not limited to historic buildings and structures, collections, landscapes, buried archaeology, marine landscapes and wrecks.

Heritage attracts millions of visitors annually, playing an important role in the visitor economy and attracting people to places. It supports the growth of the creative economy – serving as inspiration for new works and innovation that can increase entrepreneurship and foster local growth. Cultural heritage is also recognised as an important part of the wellbeing economy – with visiting and volunteering at heritage sites demonstrated to increase life satisfaction and productivity. Using the latest national statistics, England's heritage sector is estimated to have contributed £45.1 billion in Gross Value Added to the UK economy in 2021 and employed over 538,000 workers.

CCRA3 acknowledges potential climate change risks to cultural heritage (H11), but only discusses a subset of cultural heritage in any detail. CCRA3 also highlights a lack of evidence, so Historic England made commitments in NAP3 to work towards addressing evidence gaps. It is essential that CCRA4 recognises risks across the full range of heritage assets to ensure that government is aware of these risks so it can commit resource through its own fourth risk assessment process and develop a resulting targeted and informed set of commitments in NAP4.

We now have further evidence for and a fuller understanding of the climate hazards likely to affect heritage assets, and their impacts. We acknowledge that we do not yet have a complete picture of the risks to heritage in England and that gaps remain in our understanding; we are currently undertaking research and developing a programme for future work to address this shortfall, although the breadth and depth of our ambition depends on our future resource allocation from government (see Section 3B for further details).

Recognising the broad range of hazards, heritage asset types and impacts in CCRA4 will allow for the planning and resourcing of future work to fill these gaps as well as recognising a fuller range of adaptation options through NAP4 and succeeding adaptation plans for aspects of the cultural heritage sector within Historic England's remit. This will strengthen NAP4, ensuring it is more robust and less open to legal challenge than NAP3, currently under scrutiny by various groups.

To support this, we offer the following new evidence and developing work that will feed into the CCRA4 evidence gathering stage:

- Strategic work to identify and understand relevant hazards (see Section 3A).
- A research review into climate change and heritage, including links to sources from a range of academic and research institutions, and sector organisations (see Section 3B).
- A table of evidence sources for consideration (see separate document: Sept 2024 CCRA4 Historic England Evidence Table).

The separate Historic England Evidence Table document contains:

- Full references for the strategic hazard work and research outlined in Sections 3A and 3B.
- Additional sources of evidence which our ongoing work is built on, including research on climate hazards and risks, and our third ARP Climate Change Adaptation Report with the English Heritage Trust (2022).
- Summary information for each source and links as requested in the call for evidence.

A. Strategic work to identify and understand relevant hazards

CCRA3 noted a lack of standardised recording of risk within the heritage sector and a review of risk assessment methods for heritage published by Historic England (2023) also identified a lack of agreed risk terminology and definitions of climate hazards impacting on heritage assets.

Since 2022 a collaborative doctoral partnership between Historic England and UCL has been progressing research to develop a scalable methodology for conducting multi-determinant climate change risk assessment for the historic environment. This PhD is expected to run until 2027 and the intention is to develop a methodology that can work across heritage contexts, using England's heritage as a case study, particularly the National Heritage List for England (NHLE), the National Record of the Historic Environment (NRHE), and Historic Environment Data.

A project between Historic England, UCL and the Heritage Adaptation Working Group (UK and Irish heritage agencies, English Heritage Trust, National Trust, and National Trust for Scotland) has developed a climate hazard vocabulary of standard terms covering over 50 hazards. Historic England has published a research report (13/2024) and structured terminology on the Forum for Information Standards in Heritage (FISH).

The creation of standardised terms will allow heritage professionals to consistently record climate change risks across individual heritage sites and the wider historic environment. We are developing a mechanism for local Historic Environment Records (HERs), a primary source of information for planning, development and land management, to use the vocabulary through the ARCHES for HERs software. HERs are information services that provide access to comprehensive and dynamic resources relating to the archaeology and historic built environment of an area, usually within a digital mapping system. There are over 80 HERs in England maintained and managed by local authorities as the essential core of historic environment services. As such, they can play a vital role as repositories for information on climate change hazards to the historic environment.

In parallel, Historic England ran a project to catalogue up to date climate data for priority hazards within the vocabulary to enable internal risk assessment and to further evaluate asset-based climate change risk assessments for their applicability to the heritage sector. This is published as a research report (16/2024) and accompanying Zenodo database.

Historic England is currently analysing the number of designated heritage assets potentially impacted by these hazards under the scenarios considered in the CCRA. This builds on a 2022 research report by 3Keel for Historic England to map a number of hazards to historic sites under scenario RCP8.5 (27/2022).

The hazards covered in this initial phase are average temperature patterns and high temperature events, average precipitation patterns and high-precipitation events, as well as geo-hazards such as shrink-swell. The analysis considers potential impacts of these hazards across all designated asset types on the National Heritage List for England including listed buildings, scheduled monuments, registered parks and gardens, registered battlefields, and protected wrecks; it also includes UNESCO World Heritage Sites.

B. Research review into climate change and heritage

In 2023, Historic England commissioned a research review of climate change and heritage (Research Report 28/2024), carried out by JBA Consulting. The intention of this work is to better understand the large amount of research already underway with the ambition to develop a coordinated plan with UK and Irish agencies and sector organisations for further collaborative research, to map past and future work, and to ensure that scarce resource is used efficiently.

The review aimed to understand a) what ongoing research activity directly relates to threats and risks to heritage from climate change and human responses to it; b) what ongoing research activity directly relates to improving adaptation options; and c) understand which organisations are funding these types of research.

The review identified six research areas of particular interest:

1. Research developing models and assessing long-term impacts of climate change on heritage
2. Research on the impact on heritage of flooding and coastal erosion and of human responses
3. Research on climate change and its potential impact on intangible heritage
4. Research to inform best practice methods of maintenance, repair and adaptation of the historic building stock, including retrofit and energy performance
5. Research on embodied carbon and comparative carbon accounting relating to historic assets
6. Research on the role of historic landscapes and seascapes in carbon sequestration and offsetting.

The project developed an Excel matrix to capture the information, including links to publicly available research, to allow for analysis of key themes and to highlight trends and gaps. Historic England is working to analyse and share this information to inform research priorities in discussion with key sector organisations across the UK and Ireland.

Full references for this research are in the Evidence Table and an Excel Matrix document recording all identified research, RRS28-2024_ResearchMatrix (up to date as of 04/09/2024), has been supplied as a separate document.

4. Risks and adaptation requirements of the historic environment scoped out of CCRA3

Many risks and adaptation requirements for the historic environment are unintentionally scoped out of CCRA3, and therefore NAP3, because the historic environment is only fully considered in the chapter on communities and the built environment. Other risks where heritage is mentioned do not include detail on the types of assets at risk, the impacts they may face or the range of adaptation options appropriate for such assets.

This means the Climate Change Committee's advice to government on cultural heritage is limited in its scope and ambition. Key risks are not included, and adaptation requirements and opportunities are not being highlighted. To strengthen NAP4, and ensure it is less open to challenge, CCRA4 needs to acknowledge the full range of hazards and heritage assets at risk from them, including those that are outside Historic England's remit.

To varying degrees climate-driven risks have the potential to impact all types of heritage asset, including but not limited to historic buildings and structures, collections, landscapes, buried archaeology, marine landscapes, and wrecks. Historic fabric is at risk from hazards such as changing precipitation patterns, increased humidity, drought, landslide, coastal erosion, and changes in ocean chemistry. New or increased levels of invasive species or biological growth threaten building fabric and collections, and historic landscapes through damage to trees and other plants. Relevant hazards include, but are not limited to, those noted as priorities within CCRA3 and NAP3 – increased rainfall, sea-level rise, and extreme weather.

The scope of the heritage section in CCRA3 inadvertently implies that some asset types are not at risk, or that management at scales different to urban local communities is not needed. Without the necessary hooks in CCRA4 it will be more difficult to justify and make a case for government resource and commitment for adapting the full range of heritage assets to climate change, despite the importance of the broader cultural heritage sector to multiple aspects of the UK economy and the large number of jobs it supports.

It would be helpful if the Climate Change Committee could consider describing the broad nature of cultural heritage more accurately to ensure the full range of internationally and nationally significant assets and the risks that they face are not underrepresented. Historic England would be happy to work with the Committee and Met Office consortium to develop appropriate content within the heritage risk section and across other relevant risks.

Historic England is not the only arms'-length-body within the cultural heritage sector in England and the risk to the full spectrum of cultural heritage is broader than our remit. We recommend that the Committee and the Met Office consortium engage further with bodies such as Arts Council England and their representative organisations in sectors including arts and museums to fully scope the relevant risks.

Table 1, after Section 5 below, includes information on CCRA3 risks relevant to heritage assets within Historic England's remit and where similar risks could be included in the cultural heritage section to ensure CCRA4 covers a wider range of climate hazards and heritage assets at risk.

5. Acknowledging and considering the historic environment as a subset of other risk sectors

As noted above, CCRA3 acknowledges evidence gaps for cultural heritage, and we recognise that there are still gaps in our understanding of risk, which we are working to fill. For multiple risks

beyond H11 in CCRA3, historic assets make up a subset of the sectors discussed. Yet this is not fully recognised, representing a missed opportunity to include further relevant evidence due to a lack of integration between cultural heritage and other risks.

To better identify risks to cultural heritage and tap into further evidence sources given the acknowledged evidence gaps, it would help for CCRA4 to recognise and consider the historic subset of other risk sectors. Cultural heritage is discussed in CCRA3 mainly in the context of historic buildings and communities. Yet there are no links drawn between risk H11 (Cultural Heritage) and H5 (Buildings) despite the UK having the oldest building stock in Europe with around 21% of buildings constructed pre-1919.

Furthermore, there are no links drawn between heritage and Natural Environment risks such as N4 (soils), N6 (agriculture and forestry productivity), N8 (forestry pests), N10 (aquifers and agricultural land), N11 (freshwater species and habitats), N14 (marine species), N17 (coastal species and habitats) and N18 (landscape character). This is despite the large number of nationally significant protected parks, gardens, and designed landscapes (over 1700), and the many historic assets in rural areas and marine and coastal environments. We have no truly 'natural' areas left in the UK. All of our 'natural' environment has been shaped by human activities and cultural practices over millennia. By recognising the significant and protected historic components of the 'natural' environment it may be possible to gain further insight into the risks facing cultural heritage to fill some of the gaps in knowledge, but it would also help to highlight that management and adaptation approaches that deliver for biodiversity, heritage protection, and climate action could offer a triple win scenario and should be pursued.

Further links could also be drawn across other risks where heritage is a subset. This includes risks across multiple sectors including agriculture and infrastructure, as well as within marine, coastal and inland landscapes. Risks to infrastructure, particularly I4 (bridges and pipelines), I5 (transport and slope failure) and I7 (subsidence), could reference the significant number of designated heritage assets that are also significant infrastructure assets such as road and railway bridges, railway tracks and canal infrastructure and note that a range of adaptation options may need to be considered for such assets due to their construction, materials, and historic significance. As an example, the Canal & River Trust manages canals, river navigations, docks, and reservoirs – including around 2500 listed buildings and scheduled monuments in England. Much of this is critical infrastructure of national significance, supporting telecoms, electricity, transport, and other networks.

Recognising the intrinsic links between heritage assets and other risks would help to encourage a more joined up approach to adaptation across government and its separate departments when developing NAP4.

Historic England would be happy to work with the Committee and the Met Office to help identify where heritage may be a subset of other sectors and where heritage can be drawn out and cross-referenced in other risks within CCRA4 beyond the H11 risk in the Built Environment chapter.

The Table below, produced by Historic England and the English Heritage Trust, sets out: a) the CCRA3 risks where heritage could be cross-referenced, b) why these are relevant to cultural heritage and c) where similar risks could be included for cultural heritage (indicated by CH*.).

Table 1: Heritage and CCRA3 risks

CCRA3 risks which could cross-reference heritage	Relevance to cultural heritage	Similar risk which could be included for Cultural Heritage (CH*)
H1. Risks to health and wellbeing from higher temperatures	Higher temperatures and risks from overheating can be exacerbated by the maladaptation of historic buildings. There is a risk of unintentional negative consequences due to not understanding the construction of our older buildings.	CH1.Risks to built heritage from maladaptation
H3. Risks to people, communities and buildings from flooding	This includes flooding risk to the historic environment within those communities and the responses to flooding for the historic environment, which are likely to be different than those for modern structures.	CH2. Risks to cultural heritage from river, surface water and groundwater flooding
H4. Risks to viability of coastal communities from sea level rise	For coastal communities at risk from sea level rise, this includes their cultural heritage and historic environment.	
H5. Risks to building fabric	This includes risks to the fabric of our built historic environment. For instance, over 20% of our homes are more than 100 years old and require different approaches to both adaptation and mitigation responses to climate change.	
N4. Risks to soils from changing climactic conditions, including seasonal aridity and wetness	Our archaeological sites are closely connected to the condition of soils. Changes in extremes of wet and dry will affect the preservation of archaeological sites, in particular those with waterlogged archaeological remains (for example, peatlands).	CH3. Risk to buried archaeology from changing climatic conditions, including seasonal aridity and wetness
N6. Risks to and opportunities for agricultural and forestry productivity from extreme events and changing climactic conditions (including temperature change, water scarcity, wildfire, flooding, coastal erosion, wind and saline intrusion)	Changes in land use through changes in forestry and agricultural practices can impact the historic environment. Around 78% of Scheduled Monuments, 100% of Registered Battlefields and 67% of Registered Parks and Gardens are on agricultural land. Changes in extreme events and changing climatic conditions will affect cultural heritage. Some of these risks are covered under other statements, but wildfire already has an impact on cultural heritage.	CH8. Risks to cultural heritage from extreme events and changing climatic conditions (including wildfire)
N8. Risks to forestry from pests, pathogens, and invasive species	Those risks for forestry will also affect historic landscapes, parks and gardens, buildings, and collections.	CH4. Risks to cultural heritage from pests, pathogens, and invasive species
N10. Risks to aquifers and agricultural land from sea level rise, saltwater intrusion	Saltwater intrusion may affect buried archaeological deposits, designed landscapes and planting in historic parks and gardens.	CH5. Risks to cultural heritage from sea level rise, saltwater intrusion
N11. Risks to freshwater species and habitats from changing	Many freshwater habitats are also part of the historic environment or are heritage assets.	

climactic conditions and extreme events		
N14. Risks to marine species, habitats and fisheries from changing climactic conditions	Marine changes will also affect the marine historic environment.	CH6. Risks to marine archaeology from changing climatic conditions (including ocean acidification and higher water temperatures)
N17. Risks and opportunities to coastal species and habitats due to coastal flooding, erosion and climate factors	Coastal changes will also affect our marine and coastal historic environment. Some of these habitats will themselves be heritage assets.	CH7. Risks to cultural heritage from coastal flooding and erosion
N18. Risks and opportunities from climate change to landscape character	Landscape character is the result of human activity and natural processes. They are a vital part of our Historic environment. Changes to landscape character are changes to the historic environment.	
I4. Risks to bridges and pipelines from flooding and erosion	Many of our road and rail bridges are also heritage assets, whose construction may require different adaptation options than modern structures.	
I7. Risks to subterranean and surface infrastructure from subsidence	Changes in subsidence risk will also affect historic buildings and buried archaeology.	CH9. Risks to building fabric and buried archaeology from subsidence
I*. Risks to * from high and low temperatures	High and low temperatures, and their resulting effect on relative humidity, will affect cultural heritage by altering the rate of deterioration of materials.	CH10. Risks to cultural heritage from high and low temperatures (and high and low relative humidity)
I5. Risks to transport networks from slope and embankment failure	Slope and embankment failure will also affect cultural heritage, for example historic road and railway bridges	CH11. Risks to cultural heritage from slope and embankment failure
I11. Risks to offshore infrastructure from storms and high waves	Storms and increased wave height will both impact on the historic environment.	CH12. Risks to marine and coastal heritage from storms and high waves

(Table adapted from Climate Change Adaptation Report (2022), 8.3, p37)

6. Outline of emerging work on climate change risk to the historic environment

The below paragraphs set out both ongoing work which we may be able to provide information about during the CCRA4-IA evidence gathering period as well as developing research projects to further understand climate change risks to heritage.

Projects for inclusion within CCRA4-IA evidence gathering period

Ongoing hazard map analysis: Historic England is carrying out further analysis on priority hazards for heritage in England as identified in the recent hazard vocabulary for heritage. Historic England will share the results of the first phase of analysis before the end of the collection gathering phase for CCRA4-IA.

Property Flood Resilience Outliers report: Historic England undertook a pilot study with the Environmental Design Studio to better understand the impact of flooding on historic and traditionally constructed buildings and to examine why some historic buildings fall out of scope for receiving Property Flood Resilience (PFR) grants. A research report will shortly be published on our website.

Climate Change Adaptation Report: The joint Historic England and English Heritage Trust report will soon be submitted to Defra in response to the fourth Adaptation Reporting Power request from Government and available for CCRA4-IA. The report includes:

- Our organisational adaptation plans
- Our adaptation plan for work impacting the wider sector
- The current and future projected impacts of climate change on both organisations
- An assessment of progress towards implementing the policies and proposals set out in previous reports.

Longer-term and developing research projects

Developing a framework for adaptation, including responding to loss of heritage assets: The need for the heritage sector to consider ways to manage climate-driven loss was highlighted CCRA3. In response, Historic England has committed to develop a decision-making framework and toolkit to help owners and managers prepare for and manage climate-change driven impacts to heritage sites, including the unavoidable loss of heritage assets. We are only likely to have an internal consultation document available within the CCRA4-IA evidence gathering period.

Pilot study into Historic Environment Record data for adaptation decision-making: As part of the project noted above to develop a framework to manage climate-driven impacts and loss, Historic England intends to undertake a pilot study to develop a tool with which to plan for climate adaptation using HER data, if resources allow. HERs are a primary source of information for planning and land-management.

Heritage assets at risk from coastal erosion, 'A Matter of Time and Tide': Historic England is developing a project to understand the risk to heritage assets from coastal erosion once the Environment Agency releases updated flooding and coastal erosion risk management data (expected early 2025). The project will initially consider Scheduled Monuments, examining individual monuments and asset types against the NCERM2, UKCP18 Sea Level Projections and OS Terrain Slope datasets. The developing methodology will then be used to expand the analysis to other asset types.

Contributing to climate change research within academic institutions: Historic England supports academic research to understand risks to particular heritage asset types from climate hazards. This currently includes projects to understand risks to historic masonry structures, many of which are also significant infrastructure such as road bridges and railway lines:

- **RAIL_M2R (University of Bath):** This project aims to develop understanding of the resilience of coastal masonry railway seawalls, many of which are of historic construction, to future climate and develop maintenance and resilience guidelines.
- **Flood Resilience of Masonry Arch Bridges (University of Salford):** This project proposes to investigate flood-induced forces and structural responses of masonry arch bridges spanning watercourses to develop quantitative and practical assessment methods.

Collapse of ruined masonry walls: Historic England regularly receives queries requesting guidance on the repairs of ruins, often raised after a collapse related to climate change impacts or when a structure is in immediate danger. The scope of this research is to review underlying causes of failure of ruined masonry walls, based on a range of case studies, and provide guidance regarding suitable diagnostic tools and survey methods, including how to identify warning signs preceding such failures.

Conserving ruined Masonry: This collaborative doctoral research between Historic England and Oxford University focuses on conservation strategies to protect ruins. Unroofed historic structures such as buildings and archaeological sites are more vulnerable to changing climatic conditions. The study is likely to include conservation interventions such as hard capping and pointing as probable solutions to increase climate resilience by managing moisture movement in masonry systems.

7. Conclusion

This response presents the currently available evidence, and that likely to be ready for inclusion during the evidence-gathering phase, to allow CCRA4-IA to consider a broader range of hazards relevant to cultural heritage and the full range of heritage assets at risk from climate change.

Per CCRA3, we acknowledge that there remain gaps in our understanding of climate change risk to heritage but having the full range of risks and heritage asset types reflected within CCRA4-IA would help with the resourcing of action to fill these gaps, and the inclusion of targeted and informed actions in future NAP cycles and adaptation planning within the wider cultural heritage sector.

We would welcome the opportunity to work with the Climate Change Committee, the Met Office consortium and chapter authors to develop the sections of the CCRA4-IA technical report considering cultural heritage.