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Climate Change Adaptation in the Heritage Sector

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Presentation developed with support from Prof. Caitlin DeSilvey and Ingrid Samuel

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About this talk

- Climate impacts on heritage assets
- National Trust and University of Exeter partnership shaping UK leadership
- Focus on resilience, evidence, and nature-based approaches

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Who am I: my professional journey

Martina Egedusevic, PhD

Impact Fellow, University of Exeter (LEEP Institute)
Expertise: nature-based solutions, water, climate adaptation, DRR
Experienced in stakeholder collaboration
Passionate about an inclusive academic

Link for Profile at University of Exeter
Link for LinkedIn profile

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The National Trust's Role

1. Major land and heritage manager
2. Need for consistent approaches across properties
3. Guidance supports risk-informed decision-making

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National Trust – Climate change adaptation guidance

1. Climate hazard mapping and UKCP18 data
2. Adaptive Release framework
3. Nature-based Solutions
4. Land and water stewardship
5. Community engagement

Why do we need to adapt to climate change?

Climate change refers to long-term shifts in temperatures and weather patterns. Since the 1800s, human activity has been a key driver of climate change, primarily due to the burning of fossil fuels (like coal, oil and gas), which produces greenhouse gases such as carbon dioxide.

We can see the impacts of climate change all around us. In recent years, we have experienced the highest temperatures since records began, as well as long-lasting droughts and more instances of flooding. In the future, sea level rise is likely to increase coastal flooding related to storm surges.

Climate change presents the single biggest threat to the places in the National Trust's care and the single biggest challenge to our mission – to look after nature, beauty and history for everyone to enjoy, now and in the future. We predict that more than 70 per cent of the places in our care will be at medium or high risk of climate-related hazards by 2060.

Climate change adaptation is about changing the way we manage our historic and beautiful places to reduce the risks posed by climate change. All aspects of our places are potentially at risk, from buildings, collections and gardens, to rivers, lakes, countryside and coasts. We need to act now in order to understand climate hazards, identify impacts and plan our response.

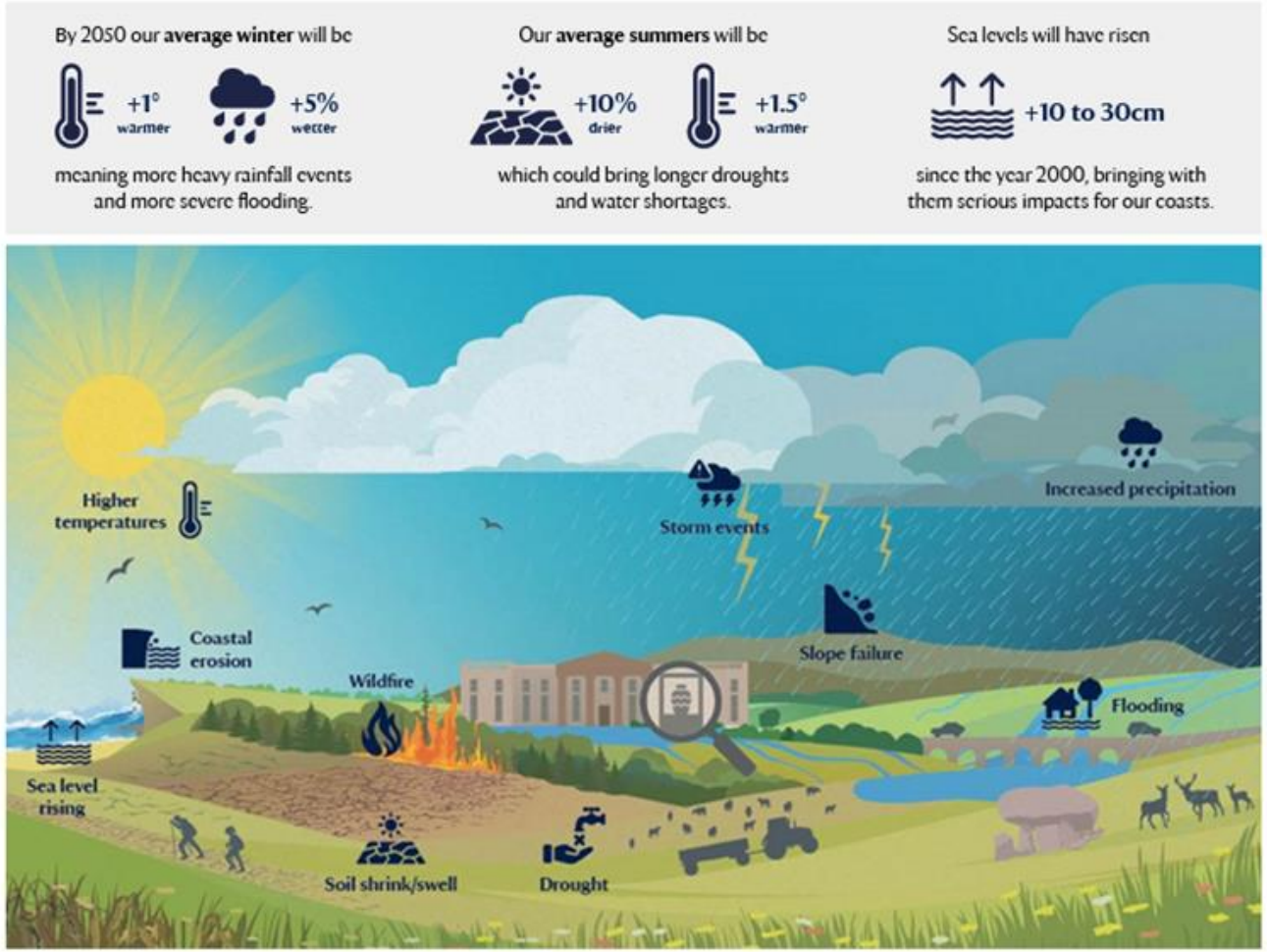

Image credit: top, Climate projections drawn from the Climate Change Committee's 2023 report to Parliament, *Progress in adapting to climate change*; below, infographic showing the range of potential climate hazards affecting a typical National Trust site.

What is climate change adaptation?

Climate change adaptation is about changing the way we manage the places in our care to reduce the risks posed by climate change. Adaptation is different from climate change mitigation, which is about reducing and capturing the greenhouse gas emissions that cause climate change.

Adaptation is one of the four key elements of the National Trust's climate RACE, which drives our ambition to protect our places and against which we can measure the changes we make:

RACE - reduce, adapt, capture, and engage

- We will **reduce** our carbon emissions from all of our activities, to be carbon net zero by 2030
- We will take account of the need to be resilient and **adaptable** to a changing climate in every choice we make
- We will **capture** more carbon from our land, to be carbon net zero by 2030
- We will **engage** others - telling our story widely to inspire action from supporters and policymakers

Our adaptation handrail

Working with staff and drawing on external expertise, the National Trust has developed a property-facing approach which we call the 'adaptation handrail'. This allows local property teams to identify those assets and activities that are most vulnerable at their sites, and to plan a tailored adaptation pathway. The handrail is flexible and allows for a measure of uncertainty around when impacts will occur, but it also proposes concrete, measurable actions. Other heritage organisations have implemented alternative methods – such as the Climate Vulnerability Index process developed for UNESCO World Heritage Sites, which looks at community vulnerability alongside the vulnerability of a site's outstanding universal value.

Develop an impact assessment for each property, using data from our hazard maps and the experience of those on the ground to assess current and future impacts of climate change.

→

Hold workshops with local teams to plan adaptation pathways for assets or activities identified as being at highest risk.

→

Use the Weather Impact app to identify when thresholds or tipping points for action are reached.

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Once thresholds are reached, implement the adaptive actions that have been identified as part of the pathway planning process.

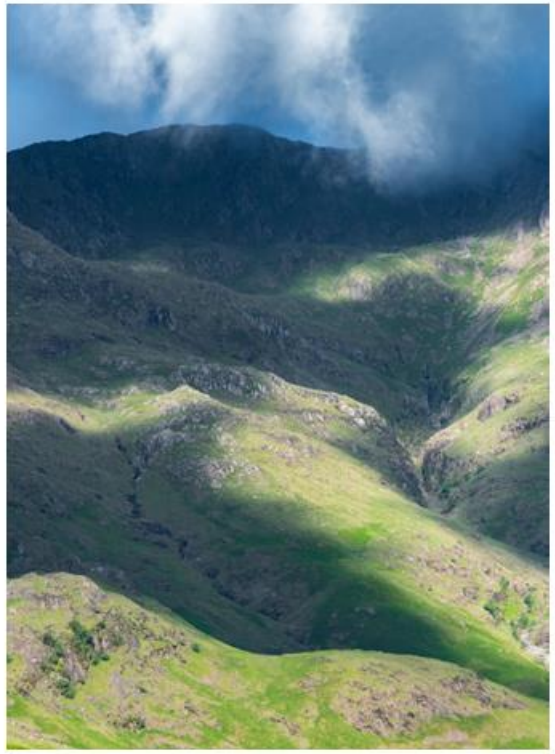

Image credit: The Langdale Pikes seen from Great Langdale campsite (© National Trust Images/Paul Harris).

Climate change adaptation – key considerations

Whether or not we meet the international goal of limiting global warming to 1.5 degrees centigrade, we still need to prepare for the effects of climate change that are already locked in. This means adapting beautiful and historic places so that they can cope with increasing climate hazards.

However, adaptation does not have to mean radical change. It may be incremental: often, the first step is to conduct research to better understand the problem. We might also start by implementing increased monitoring to gauge how quickly an asset is deteriorating as a result of a particular climate hazard. We can then use this information to explore a range of adaptive responses. For physical assets, there is likely to be a spectrum of possible adaptations, ranging from more frequent maintenance and small, sympathetic like-for-like changes to building fabric, through to landscape-level adjustments to the flow of water through a site, and – in some very rare cases – adaptive release.

Buildings, gardens and parklands, and wider landscapes can all be adapted to withstand the impacts of climate change. Spaces in which collections items are stored can also be adapted so that environmental conditions are more tightly controlled. But adaptation is not just about looking after physical assets; it is also about activities such as visitor operations. We need to plan for shifts in visitor numbers and behaviour; we also need to make sure our people (staff, visitors, members and supporters) are looked after. Adaptation includes any change in management strategy that takes account of present or future climate conditions – for example, simple steps such as directing visitors away from waterlogged lawns and paths, or adding temporary shelters to allow staff or visitors to escape from summer heat, are both adaptive actions.

Even if a site is not currently experiencing any climate change impacts, the team will need to make sure that any decisions they make are climate-informed. This means making sure that any plans – for instance, maintenance plans, or plans for new buildings or infrastructure projects – take account of climate projections. Our hazard maps are a good starting point for teams to find out what the major climate hazards will be for their sites between now and 2060.

Adaptation is as much about people and process as it is about physical interventions on a site. Within the adaptation handrail process outlined earlier, it is important to bring the whole team on board and to ensure that the process is documented for future reference. It is also important to engage the right people in the process. When dealing with any aspect of the historic environment, you may need to consult with experts and stakeholders to help you understand significance and where there might be capacity for change, and to identify what kinds of adaptation will be acceptable.

Designations and permissions

Before planning any adaptive measures, check whether your site, or the relevant assets within it, are designated and subject to statutory consents.

When planning adaptations to a historic building, for example, you should always consult an appropriate building professional such as a conservation-accredited building surveyor or architect, and the local authority (if the building is designated). Other assets may also be subject to special protections – for example, National Landscapes or Sites of Special Scientific Interest.

Image credit: The rear garden at Shugborough Estate, Staffordshire, under flood water (© National Trust Images/David Goacher).

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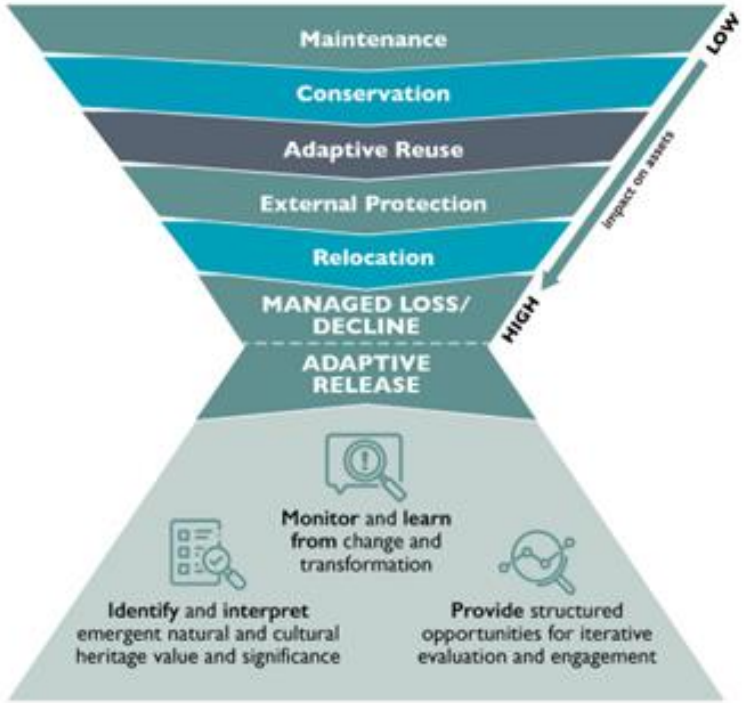
The Adaptation Pathway Logic

1. Avoid → Protect → Accept → Release
2. When each pathway applies
3. Supports long-term planning under uncertainty

Adaptation response options: from maintenance to adaptive release

The outputs from research on how to manage sites in a more holistic and sustainable manner are shown in the diagram below. The usual option of maintenance is at the top of the inverted pyramid and the infrequent option of Adaptive Release at the bottom. This collaborative research was carried out by Historic England, the National Trust and the University of Exeter.[1]



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Practical Examples from the Guidance

1. Gardens: climate-resilient planting
2. Built structures: managing damp, heat, storm damage
3. Landscapes: nature-based adaptation measures

Practical Examples from the Guidance

Case studies, signposting and references

These case studies show adaptation in action and the approaches that have been tried out across properties in care in the UK.

Following a successful small-scale natural flood management intervention in Upper Calderdale, near the National Trust's Hardcastle Craggs property, a more ambitious project is being designed to reduce flood risk to downstream communities in Todmorden, Hebden Bridge and Marsden. Through nature-based solutions, the project will create around 7,000 leaky dams to provide erosion control alongside new woodland and peatland restoration to attenuate flow and groundwater.

Dunham Massey, a large National Trust property outside Manchester, is located on the River Bolin. The riverbank has breached in a number of places already. One large flood is likely to breach this artificial embankment completely. When this happens, it could create a new equilibrium for how the river behaves in this location and force a decision about whether to reinstate the flood defence as an earthwork, or create a new solution to naturalise the watercourse in this location. The image here shows upstream and downstream bank failure caused by upstream backwash scour and downstream erosion.

On the National Trust Holnicote Estate, a Riverlands project has been underway to re-profile sections of the watercourse. This will reconnect the river with its floodplain, and increase resilience of the landscape by blocking land drains and changing the grazing regime to encourage a wetter meadow environment and groundwater retention. Elsewhere on the estate, beavers have been introduced in a large enclosure and significantly changed the state of the watercourse by constructing woody dams and creating new wet woodland habitat.

A log secured to the river bed to attenuate flow, Upper Calderdale (© National Trust Images)

Banks on the River Bolin (© National Trust Images/ Stewart Clarke)

The beaver enclosure on the Holnicote Estate (© National Trust Images/Imogen Wood)

Signposting & other guidance of relevance/use

The National Trust has detailed case studies for our Riverlands projects which can be shared on request.

Nature Scot (Scotland's Nature Agency) provides user-friendly online guidance about **nature-based solutions.** Available at https://www.nature.scot/climate-change/nature-based-solutions

The Environment Agency (England and Wales) has produced detailed guidance on **keeping rivers cool,** available at https://www.ecrr.org/Publications/id/624

When considering change to rivers, there are likely to be many implications for the historic and natural environment, as well as access, drainage, flooding and infrastructure. Always **consult a historic environment specialist** (such as a curator and an archaeologist), a natural environment specialist (such as an ecologist) as well as planning consultants, engineers and your local statutory bodies to check the implications of any proposal. Most changes are likely to require planning permission.

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University of Exeter Contributions

1. Climate modelling and scenarios
2. NbS and hydrological evidence
3. Digital decision tools
4. Heritage futures and adaptive release research
5. Natural capital valuation

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National Trust and University of Exeter Collaboration

1. Heritage Adaptation Impact Fellowship
2. NT climate guidance research
3. Flood/NbS projects (Holnicote etc.)
4. Cultural landscape adaptation research

HERITAGE ADAPTATION IMPACT FELLOW (HAIF) PROJECT

(EXAMPLE OF COLLABORATION PROJECT NATIONAL TRUST AND UNIVERSITY OF EXETER)

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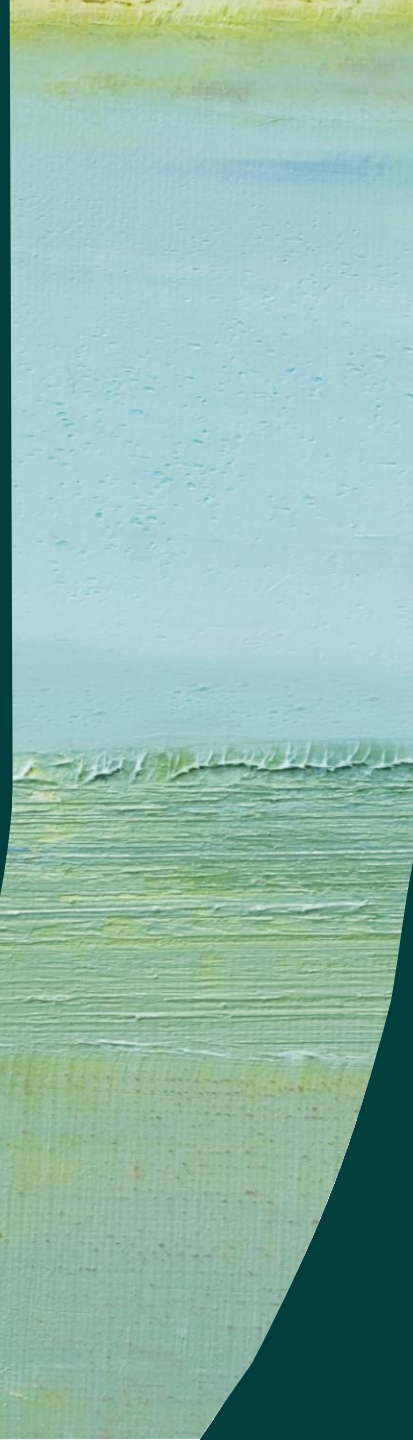
Project Overview

Project: Heritage Adaptation Impact Fellow
Theme: Managing Changing Landscapes
Funded by: NT and University of Exeter Collaboration Fund

Purpose:
Evaluate the implementation of NT's Climate Change Adaptation Guidance.
Explore demand for heritage adaptation solutions.
Bridge policy and practice with digital tools and cultural valuation.
Support long-term impact, including REF2029.



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Stakeholder Engagement

20+ interviews completed:
- National Trust leadership and property teams
- University of Exeter researchers
- Historic England, Cadw, HES, DfC Ireland, English Heritage

Themes explored:
- Practical use of climate guidance
- Digital tools and decision support
- Embedding adaptive release in practice
- Linking cultural and natural heritage
- Future CPD and commercial opportunities

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Key Findings: NT Perspectives

- NT guidance: Conceptually strong but underused.
- Adaptive Release: Widely supported in theory, needs practical embedding.
- Digital tools: High demand for hazard mapping and peer learning.
- Strong desire for case studies (e.g., Fountains Abbey, Stourhead).
- Interest in Nature-Culture integration (e.g., Nature Accelerator sites).
- Appetite for CPD linked to adaptive practices.

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What Practitioners Need

1. Accessible decision tools
2. Case study bank
3. Clearer communication of pathways
4. Support with culturally difficult decisions

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Bringing It All Together

1. Linking guidance to workflows
2. What is working well already
3. Opportunities to expand and embed use

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Why NT–Exeter Collaboration Is Important

1. Together, NT and UoE create a complete adaptation system:
2. University of Exeter- Evidence, modelling, future scenarios, theory, decision tools.
3. National Trust - Land, assets, heritage expertise, practical implementation.

   This partnership offers one of the most advanced adaptation ecosystems in the UK heritage sector.

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Adaptive Heritage Practice Lab (**AHPL**)

AHPL is a community of researchers and practitioners united by a shared interest in how we can care for places and things that are coming apart and coming together again in unpredictable ways.

Story Map Link: Changing Places

AHPL Exeter collective

Dr Jon Bennie (ecology, biogeography)

Dr Semih Celik (environmental history, museum studies)

Professor Caitlin DeSilvey (ecocultural geography, critical heritage studies)

Dr Tiago de Melo Cartaxo (environmental law, adaptive legal mechanisms)

Dr Martina Egedusevic (nature-based solutions, climate adaptation)

Dr Camille Mathieu (visual culture studies, landscape history)

Dr Robert Sherman (digital narrative design, interactive experiences)

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Great news from this morning!

The University of Exeter partnership with the National Trust has won a UKRI award for best 'strategic partnership', recognising its work to shape places where people and nature can thrive! 🏆 🏆 🏆

Note: Since May 2021, the Universityof Exeter and National Trust have been working together, with teams applying their academic expertise to real-world environmental challenges - from renewing biodiversity across the UK and developing new approaches to conservation, to engaging more people with the natural world. 🏞️

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Thank you for your kind attention!
Any questions?

Contact: M.Egedusevic@exeter.ac.uk