

# Climate Change, Heritage Policy and Practice in England: Risks and Opportunities

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## Introduction

Our climate is changing (ASC 2017; IPCC 2013, 2014a, 2014b, 2014c, 2014d)<sup>1</sup> and implications for both the physical remains and the intangible nature of the historic environment have been widely examined.<sup>2</sup> However, the impact upon the ways in which we as practitioners currently conserve heritage, and how and whether practice and policy should be reconsidered, has perhaps been less so. The physical remains of England's past are protected via four mechanisms: designation, development management (planning), agri-environment schemes and ownership. Climate change will affect all of these, as well as present new challenges that may require novel approaches to heritage management. Building upon previous research undertaken by Historic England (formerly English Heritage until 2015), the public body that looks after England's heritage, this paper looks at how three of the main cross-cutting climate change issues (loss, maladaptation and resilience) could affect heritage protection in England.

<sup>1</sup> For UK climate projections, see Jenkins et al. 2009; Murphy et al. 2009.

<sup>2</sup> For physical remains see, for example, Cassar 2005; English Heritage 2008; UNESCO World Heritage Centre 2007. For intangible heritage, see Kim 2011; Lavrillier and Gabyshev 2017; UNESCO 2015, 2017.

## Heritage Protection

The ways in which heritage is protected and conserved in England can be broadly described as falling into four categories: through designation or ‘listing’, recognition in the planning process (often called development management), implementation of the Rural Development Programme (sometimes referred to as agri-environment schemes) and ownership that is benevolent to the curation of the heritage asset or assets. A ‘heritage asset’ is a building, monument, site, place, area or landscape identified as having meaning or significance because of its heritage interest. This is the term used in planning guidance and reflected in wider UK heritage policy. The mechanisms by which heritage is protected are by no means mutually exclusive, and many assets benefit from more than one type. However, it is also important to note that, while it is not the focus of this paper, a considerable proportion of heritage remains unprotected by any of the four methods listed above.

Designation, or ‘listing’, is the process by which the most important sites and buildings are identified<sup>3</sup> and added to the National Heritage List for England (NHLE), which is the official record of all nationally-protected historic buildings and sites in England.<sup>4</sup> Listed Buildings, Registered Parks, Gardens and Battlefields, Scheduled Monuments and Protected Wreck Sites are all included. Each of these categories has its own process of recognition. For Listed Buildings, Scheduled Monuments and Protected Wreck Sites, recommendations are made by Historic England to the Secretary of State, who has the final decision as to whether to designate and add them to the NHLE. For Registered Parks and Gardens and Battlefields, Historic England is enabled by the government to compile a register of those features that have particular historic significance. However, only Listed Buildings, Scheduled Monuments and Protected Wreck Sites have legal protection outside of the planning process (through the Planning [Listed Buildings and Conservation Areas] Act of 1990, the Ancient Monuments and Archaeological Areas Act of 1979

3 See Historic England’s heritage protection guide <https://historicengland.org.uk/advice/hpg/> for more details.

4 The NHLE is publicly accessible and can be searched online at <https://historicengland.org.uk/listing/the-list/>.

Designation Type	Number in England (2017)
World Heritage Sites	19
Scheduled Monuments	19,854
Listed Buildings	376,470 (this is the number of list entries)
Registered Parks and Gardens	1,635
Protected Wreck Sites	52
Registered Battlefields	46
Conservation Areas	7,000 (approximately)

Table 1. Total designated sites for England taken from the Historic England Heritage Protection Guide. Note that figures will change as the NHLE is updated.

and the Protection of Wrecks Act of 1973), in that certain activities and alterations are prohibited unless consent has been granted. In the case of Scheduled Monuments and Protected Wrecks, this is granted by the Secretary of State, while it stems from the local planning authority in the case of Listed Buildings. The Secretary of State also has powers to repair and compulsorily purchase Scheduled Monuments ‘at risk’. In addition to those designations that comprise the NHLE, areas of heritage significance can be designated as ‘Conservation Areas’ or ‘World Heritage Sites’. In the case of ‘Conservation Areas’, these are designated and administered by local planning authorities from whom consent must be sought for certain changes, such as alterations to buildings and removal of trees (guided by the National Planning Policy Framework 2012). World Heritage Sites are ‘inscribed’ by UNESCO for their ‘outstanding universal value’. There is no consent process through UNESCO for activities affecting World Heritage Sites, but a site can have its status removed or be identified as ‘at risk’ if it is determined by the UNESCO World Heritage Committee that the site is not properly managed or protected. Finally, for some archaeological sites of geological interest, the designation as a Site of Special Scientific Interest (SSSI) may apply (for instance, the Lower Palaeolithic site of Boxgrove in West Sussex is designated a SSSI). SSSIs are administered by Natural England,<sup>5</sup> and their focus is primarily upon nature conservation and geological interest, rather than their cultural heritage association.

<sup>5</sup> Under the Countryside and Rights of Way Act of 2000 and Wildlife and Countryside Act of 1981.

Not all of the most important heritage assets are designated and, while Historic England has its own programmes of heritage assessment, it is possible for anyone to propose a heritage site for designation. Each proposal is investigated by Historic England, and, in the case of Scheduled Monuments, Listed Buildings and Protected Wreck Sites, recommendations are made to the Secretary of State, who makes the final decision. However, the majority of heritage assets in England are not designated, and it therefore falls to other mechanisms to protect them.

As mentioned above, heritage assets<sup>6</sup> are a material consideration in the planning process, which, for the most part, is implemented at the local level through local planning authorities and guided by the National Planning Policy Framework (NPPF). Where designation does not afford legal protection (for example, World Heritage Sites, Registered Parks and Gardens and Battlefields), it does still carry some weight within the planning and decision-making process. Recognizing that many archaeological sites of national importance are not designated, provision is made in the NPPF to guide local planning authorities' decision-making, to wit: "Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets" (DCLG 2012: 139). But the development management process governed by NPPF is arguably most important for ensuring that undesignated assets, including those that are not of national significance, are given consideration. It is this mechanism that generates most archaeological interventions in England, through 'developer funded' excavations that seek to mitigate the impact of a development by identifying and recording archaeological remains. For archaeological sites, the mainstay of development management has been 'preservation in situ' and 'preservation by record', the latter being achieved through excavation only when the former is not possible.

For sites, monuments and buildings in rural areas, the Rural Development Programme for England 2014–2020 (RDPE) may be more relevant for

<sup>6</sup>"Heritage asset: A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing)" (NPPF 2012).

heritage protection. Around 70 per cent of land in the UK is managed by farmers; thus, the programme funds projects to improve agriculture, the environment and rural life. It is jointly funded by the European Union, through the European Agricultural Fund for Rural Development, and the UK Government. The programme has had a considerable positive impact upon the historic environment, principally through the 'LEADER' community-based approach to deliver benefits to the rural community (encouraging tourism activities, village renewal and conservation and the upgrading of rural heritage), and through 'Countryside Stewardship', a scheme, available to farmers, woodland owners, foresters and other land managers, that makes payments in return for certain 'stewardship' activities (including those that conserve heritage assets, particularly archaeological sites and farm buildings). The future of these schemes after the UK's exit from the European Union is uncertain. Indications are that some payment scheme centred upon "natural capital thinking and accounting to develop an approach which will help guide us" (Gove 2017) will be in place, although whether protection of the historic environment will continue to be recognised as an environmental benefit remains to be seen. Regardless of political actions, climate change is going to affect land use patterns in the UK, including which crops are grown when and where. Different crops and cropping patterns will employ different techniques, which may present new challenges and opportunities for rural heritage management. Any future replacement of the RDPE will need to be able to adapt to these new changes if it is going to continue to protect our rural heritage assets.

Finally, whether and how particular heritage assets are curated is closely associated with being owned and/or occupied by people sympathetic to and understanding of their needs. Benevolent ownership is extremely important for protecting both designated and undesignated heritage assets. However, there is more to benevolent ownership than the appreciation of the site's history, place or structure; without access to the right expertise, even the most well-meaning owners can undertake works that inadvertently cause harm. The local delivery of specialist heritage advice has been badly affected by recent cuts to public services, even against a backdrop of increasing planning applications (see Historic England 2017b). In particular, there has been a significant reduction in

the number of conservation officers<sup>7</sup> and local authority archaeologists (Historic England 2017b), who work at the front line and whose local knowledge and support is invaluable to owners and community groups.

### **Climate Change: A Risk Multiplier**

Work commissioned by Historic England (English Heritage at the time) to assess environmental risks to the historic environment identified the dangers of coastal processes, inland water inundation, extremes of wetting and drying, fire, pests and diseases and urban heat island effect (Croft 2013). The report also observed that climate change should be viewed as a ‘risk multiplier’, accelerating processes that are already occurring, rather than a risk in its own right (Croft 2013). Human action, often taken in response to climate change, is similarly a ‘risk multiplier’ (Croft 2013). The risks of climate change to heritage and to the ongoing work of Historic England are further explored in Heathcote et al. (2017) and the Historic England Climate Change Adaptation Report (Fluck 2016). These are summarised in Table 2. For the purposes of this paper, three topics that connect these specific risks and present challenges for the above-mentioned mechanisms of heritage protection are explored in more detail: loss, maladaptation and resilience. We will look at each of these in turn below and evaluate their implications for the mechanisms of heritage protection.

### **Loss**

Loss of heritage is not new. One of those aspects that gives heritage value, and one of the criteria on the list by which the Secretary of State makes their decision on designation, is rarity (DCMS 2010, 2013). There are two reasons why something might be considered rare: either there were originally very few of them or very few survive.

Processes of erosion have always affected our coast and land surfaces and resulted in important discoveries. Skara Brae in Orkney was famously discovered after a storm exposed part of the site, and the spectacular footprints at Happisburgh (the oldest evidence for human presence in Britain, almost one million years ago) were both revealed and lost again due to

<sup>7</sup> Conservation officers advise on and promote the conservation of the historic environment, particularly in the areas of long-term care, preservation and enhancement.

<b>Climate change risk</b>	
Unpredictability	Although the precise details may be uncertain, it is clear that change is already occurring and will continue to occur. Inevitably, this means a departure from the predictable seasonal weather patterns of the past. This increasing unpredictability impacts our ability to schedule weather-dependent work.
Precipitation pattern changes	Intense pluvial events and persistent periods of rainfall on saturated or impermeable ground can damage buildings, flood historic areas and landscapes, affect planting in designed landscapes, disrupt fieldwork and exacerbate erosion. With a projected increase in winter precipitation of around 33 per cent, these impacts will be felt ever more strongly. At the other extreme, drought, which is also projected to increase in frequency and intensity, can harm plants that make up designed and historic landscapes and affect the stability of buildings and other structures.
Increased rate and patterns of coastal change	Britain's coastline has always changed, but the rate of this change and sites of its greatest future impacts are being affected by sea-level rise, changes to coastal currents, storm patterns and other climate change-related factors.
Temperature increase	In the sea, temperature increase is affecting the conditions that have hitherto preserved a rich maritime heritage; changes to salinity, acidity and flora and fauna can harm archaeological remains (for example, see Dunkley 2013, 2015). On land, it may lead to changing patterns of land use that could also present challenges for terrestrial heritage. Increasing temperatures also give rise to different flora and fauna, some of which may be harmful to elements of our heritage. This is likely to have a major impact on the plants in designed landscapes, particularly trees, affecting the appearance of our designed landscapes. New pests and diseases may attack archive materials. Buildings may also be attacked, and traditional repair materials may become increasingly difficult to source.
Extremes of wetting and drying	Desiccation of wetlands can have a dramatic effect on the preservation of waterlogged archaeological and palaeo-environmental material (Heathcote 2012). The drying out of certain geologies (for example, clay) can increase subsidence, affecting historic structures.
Invasive species, pests and diseases	Our plants, animals, buildings and ourselves will be exposed to pests and diseases that might not previously have been able to survive in England. These will affect the appearance of our landscapes, parks and gardens and could threaten collections of historic artefacts, preservation of archaeological sites (for the example of shipworm, see Dunkley 2013) and building fabric (for example, Brimblecombe and Lankester 2012).

Table 2. Principal risks for the historic environment identified in Historic England Climate Change Adaptation Report (Fluck 2016).

ongoing coastal erosion (Ashton et al. 2014). Climate change will accelerate these processes, affecting where and how heritage assets are uncovered and/or lost. The scale and rate of coastal processes will increase as sea levels rise, and (sometimes unpredictable) changes in storm surge, currents and precipitation will also contribute. In some cases, this loss may be complete, as with the Palaeolithic footprints at Happisburgh. Though loss is not always absolute, it can still threaten elements seen as fundamental to a



heritage asset's character. Alternatively, although the asset itself may sometimes prove resilient, its setting might be permanently damaged, affecting how people perceive, enjoy or even access it. This is the case at Kilchurn Castle in Scotland, where regular flooding leaves the castle accessible only by foot at certain times of year (Historic Environment Scotland 2017).

Indirect effects of changing environmental conditions, like changes in the distribution of pests and diseases, are already threatening assets and landscapes in the UK. For example, changes in the distribution of 'shipworm' have been observed, posing a threat to our marine heritage (for example, Dunkley 2013). This is also true of a number of forest pests that threaten native UK tree species (Wainhouse and Inward 2016). Another indirect effect of a changing climate is a change in the distribution of vegetation and ecosystems, which will result in the loss of familiar landscapes and will alter our green heritage. This includes historic landscape character, parks, gardens and other designed landscapes, as well as the important green infrastructure of urban areas (for further information on gardens see Bisgrove and Hadley 2002).

For our archaeological heritage, there may be information loss, as extremes of wetting and drying (often a combination of climate change and human action) will particularly affect waterlogged and wetland archaeological deposits, where valuable palaeoenvironmental and organic remains are extremely vulnerable to changes in groundwater level (Heathcote 2012). For instance, re-excavation at the Mesolithic site at Star Carr in 2007 found changes in land management in the area had led to a reduction in the water levels, resulting in a considerable loss of archaeological information since the original 1940s–1950s excavations, such as surface detail of worked wood, palaeoenvironmental remains and degradation of bone (Boreham et al. 2011). Climate change will affect groundwater levels in many areas: directly through changes in precipitation and sea level, as well as indirectly through abstraction and changing uses of water in landscapes in response to the water needs of population, livestock and agriculture. This poses a very particular challenge to the 'preservation in situ' approach often taken to preserve archaeological deposits within development management contexts (see Historic England 2016). If environmental condi-



tions, such as groundwater levels, are liable to change, then is it possible to preserve sites in situ? Experience from Star Carr would suggest not.

The challenges that different types of climate change-induced loss present for our mechanisms of heritage protection are particularly acute for designation: there is a genuine question of whether to designate that which will be lost. Whether or not a heritage asset is threatened is one criterion for consideration in determining whether it should be designated, the presumption being that, if it is under threat, then designation will help to protect it. However, when faced with inevitable loss through factors beyond our control, designation itself takes on a different meaning. While the process of designation marks out a heritage asset as being important, if that heritage asset cannot be preserved, then, it could be argued, what is the point?

Caitlin DeSilvey (2017) challenges us to reconsider loss and heritage by exploring different examples of places where the processes of decay are embraced, observed or managed. For many archaeologists, the idea of loss is simply part of the archaeological approach: archaeological excavation itself results in the physical destruction of the very thing being investigated. Furthermore, the invention and reinvention of places and structures tells a human story of perseverance and adaptation. When bridges fall down, they are rebuilt, often better and stronger. Buildings that are unused do not last terribly long, but those we cherish through use are adapted for our needs, as electricity and running water are added to medieval homes and bathrooms created inside buildings that were originally constructed with outdoor facilities. This is explicitly recognized in Historic England's guidance for the adaptive reuse of traditional farm buildings (Historic England 2017a; Pickles and Lake 2017a, 2017b). Loss and change are part of life and part of the currency that gives our heritage value. It is not so much loss that is problematic, but how individuals, communities and societies choose to deal with it.

In England, as elucidated at the beginning of this article, the conundrum may be particularly poignant for coastal heritage, due to the dual risks of erosion and human action. However, even the decision to 'do nothing' in coastal management terms has an impact. It may be that designating heritage at risk from coastal change, knowing

that it cannot be preserved, serves to highlight its value and increase the chances of it contributing to knowledge and understanding of the past, as well as possibly contributing to its public appreciation.<sup>8</sup>

### **Maladaptation**

It is possible that how people respond to climate change will have a greater impact upon heritage than will the direct consequences of climate change itself. Maladaptation—physical alteration in order to mitigate a change or threat, which results in a detrimental outcome—can do great harm and often achieve the opposite effect to what is desired. It is most commonly associated with built heritage, although it is a problem for all types of heritage assets and is closely related to resilience. Maladapted places and buildings will not be resilient to the effects of climate change.

Maladaptation of heritage can be seen in the ways people seek to address the risk of flooding in traditionally constructed buildings (generally all those built before 1919) by seeking to ‘waterproof’ them. This response is often based upon a misconception that replacing traditional materials like lime mortars and plasters, brick, stone and wood—which are actually very resilient to flood damage—with modern materials will be most effective at keeping water out. In fact, as Robyn Pender (2016) eloquently explains, it is a question of physics. Although waterproofing may seem logical, it can do more harm than good. A well-maintained traditional wall will keep out water for many hours, provided it is dry in the first place, in the same way that a dry sponge will not easily absorb water. It is worth noting, however, that a poorly-maintained damp wall will draw water through itself very easily, like a damp sponge takes up water. Once water is within the building fabric or inside the building, a modern ‘water-

<sup>8</sup> In a controversial move, the Hull tidal surge barrier, one of the country’s most important pieces of flood defence infrastructure that protects the lives, homes and business of many the preservation of the structure for generations to come. However, the structure needs regular maintenance and modification, and, at some point within the next 50 years as sea levels rise, it will need to be replaced. thousands of people, was recently listed. The purpose of this designation is to identify the value of the structure to the heritage of Hull, rather than the preservation of the structure for generations to come. However, the structure needs regular maintenance and modification, and, at some point within the next 50 years as sea levels rise, it will need to be replaced.

proof' coating will reduce the ability of the building to dry out.<sup>9</sup> A building with a waterproof coating will be unable to fully dry out, as moisture is unable to move through the porous fabric in the way that it 'wants'. In a similar process, once wet, a plastic raincoat will keep water out, but it will also trap water that gets beneath it, causing more moisture to build up (for example, see Rushton and Danby 2016 for a comparison using 'overcoats and raincoats' as respective metaphors for traditional buildings and modern construction). In fact, maintenance in keeping gutters clear and ensuring building fabric is in good condition to begin with will have a greater effect in ensuring the building is resilient (see below).

The construction of flood defences often risks maladaptation. Concerned about flooding, a village church in the north of England constructed a bund, which affected the setting of the Grade One listed building. Unfortunately, despite this defence, the church was inundated during the December floods of 2015. During that flooding, which was a consequence of the river bursting its banks and increasing groundwater levels, the bund was overtopped and water came up through the floor of the church. Unfortunately, the bund was very effective at keeping the flood water in the building, so the church took longer to recover than would have been the case in the absence of that flood defence. In this instance, a greater understanding by all parties as to the nature of the flood risk at this location might have enabled the effectiveness of such a measure to be scrutinised before it was constructed, potentially avoiding both costly repairs and negative impact upon the heritage asset. Greater willingness to use knowledge from the past, such as historic flood extents, historic maps or even living knowledge, as well as awareness of the nature and risks from flooding by those working in the development management process, could facilitate securing sustainable solutions that work with heritage assets when facing challenges that will only increase with climate change.

The push to improve the thermal efficiency of buildings in order to reduce energy use and thus mitigate climate change has also resulted in maladaptation in some instances, particularly where those measures to improve

<sup>9</sup> A process that has been demonstrated to take less than two weeks for traditional building materials without a waterproof coating (for example, see Ridout and McCaig 2017).

thermal performance concern the building's fabric. Any adaptation of a building needs to take a holistic approach, considering how the building is used and how it functions as a whole. Over-insulation and inappropriate replacement of features like windows and doors do not just affect the appearance of the building and remove historic fabric, but they also often impede the building's ability to regulate moisture and temperature (for example, see Baker 2017; May and Griffiths 2015). Issues like damp, poor air quality and ventilation, mould and odours can result from poorly thought out 'adaptations' to reduce energy consumption. Furthermore, insulation of buildings to improve energy efficiency might inadvertently reduce a building's ability to cope with hotter weather.

The UK Climate Change Risk Assessment 2017 (see ASC 2017; Defra 2017) has recognized that traditionally constructed buildings are often better able to remain cool in hot weather than their modern counterparts, and this is becoming more important as higher temperatures are recorded in England. Designation is often presented as a barrier to improving buildings, particularly with regard to thermal efficiency (for example, see Hilber et al. 2017); however, the reality is more complex. Designated assets are hugely variable. In many instances, the need to consider bespoke solutions appropriate to the asset means that initiatives such as the 'green deal'<sup>10</sup> that seeks to provide uniform solutions are not appropriate. However, Historic England espouses 'conservation principles' (2015a) and has a wide range of advice about the many ways in which traditionally constructed buildings can be adapted and improved in terms of energy efficiency (English Heritage 2011).<sup>11</sup>

Maladaptation is also a point of concern for historic landscape specialists. Gardeners and landowners sometimes respond to climate change, spread of pests and diseases by taking extreme measures to replace planting or change management regimes, in the belief that this will increase resilience. However, in some instances, they might hastily remove and replace elements that are not currently at risk and may have the ability

10 A UK Government initiative to encourage the uptake of energy saving measures for homeowners, see: <https://www.gov.uk/green-deal-energy-saving-measures>.

11 <https://historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/>.

to adapt for some time (Jenifer White, pers. comm., 2016). Furthermore, any replacement species or management practices are, at this point, guesswork. Lastly, maladaptation may be less obvious within the RDPE, but any advice on land management that does not consider how climate change will affect future changes of land use, will face challenges.

In terms of heritage protection in England, maladaptation presents a challenge for all four mechanisms described above. To a certain extent, heritage practitioners, as well as asset owners and managers, need to understand the nature of future climate changes so they can ensure that they are making informed and sustainable decisions. They also need to be empowered with facts and practical suggestions. Clarity is also crucial, even if that means describing uncertainties. For owners of heritage assets, the advice they receive and, perhaps more importantly, whether they seek it at all will have the biggest impact.

## **Resilience**

Resilience is the capacity to recover quickly from difficulties. In terms of resilience to climate change, there are three aspects that are of relevance to this paper: resilience of heritage assets, resilience of communities and resilience of places and the wider environment. However, resilience is often confused with ‘resistance’, or the ability to prevent the environmental challenge affecting the heritage asset in the first place. Recent experience of working with the disaster recovery sector and local resilience fora illustrated the different definitions that various sectors have of ‘resilience’ (Neil Redfern, pers. comm., 2017).

The resilience of a heritage asset relates to its ability to survive the environmental challenges presented by climate change: for instance, the ability of a building to recover from being flooded, the ability of a designed landscape to survive periods of drought or waterlogging, the ability of an archaeological monument to not be adversely affected by increases in intense rainfall events. In order to be effective in their aim to conserve our heritage assets, decisions relating to all our mechanisms of heritage protection need to consider whether they are going to improve future resilience, as well as avoid maladaptation and deal with loss.

Heritage assets can also contribute to the resilience of places. The UN (2016) predicts that, by 2030, 60 per cent of the world's population will live in urban areas, which makes the protection and promotion of green infrastructure (much of which is historic in the UK) crucial to the health of both cities and their inhabitants. Furthermore, green heritage plays an important role in limiting the impacts of heat island effect (for example, Forestry Commission 2009) and, if well-maintained, can make towns and cities more resilient to the impacts of intense rainfall by absorbing surface water run-off.

Heritage also affects the resilience of communities to recover from impacts or adapt to environmental changes associated with climate change. While parks and green spaces might provide practical resilience through alleviating heat island effect and absorbing surface water, they also contribute to health and well-being, providing physical, social and psychological benefits to people (for example, Alcock et al. 2014; Cohen et al. 2007; Larson et al. 2016). Recognizing the importance of green heritage, both through designation within development management and support of owners and managers caring for it, can play an important part in our future resilience to climate change. However, our public parks face considerable challenges in securing their protection and curation (see Heritage Lottery Fund 2016).

Bridges are another important category of heritage asset with a role to play in community resilience, but they also face particular impacts from climate change and people's responses to it. They are critical structures, linking communities, providing vital transport links to local businesses, carrying utilities and contributing to historic character. In recent years, there have been several fairly high-profile incidents of historic bridges being damaged by high river levels, or even being blamed for contributing to flooding (for example, see The Guardian 2013). Many historic bridges are designated heritage assets, as both scheduling and listing apply, and, in these instances, consent is needed for repair, modification or removal. This can pose a challenge when proposals for changes go beyond simply repairing 'like for like'. However, bridges are functional structures and, although they have a heritage value, their role in connecting people and places is equally, if not more, important.

Bridges have always been adapted, altered or rebuilt in response to environmental and industrial changes, and it can be argued that their continued reinvention is part of this narrative. Contrary to popular belief, there is flexibility within granting consent for alterations to listed structures that take into account pragmatic needs, and some recent examples illustrate how this can work to the benefit of all. With increasing flood risk (ASC 2017; Defra 2017), the number of instances in which replacement or extensive remodelling of bridges is needed will rise.

At Charminster, Dorset, the eighteenth-century, Grade Two listed bridge was rebuilt with fewer and larger arches after it was shown that it had contributed to 2014 flooding, which badly affected the community's Grade One listed church (HM Government 2016a). The construction of the new bridge was preceded by archaeological investigations to record the original bridge, which improved understanding and contributed to local historical knowledge, and the construction both reused much of the original material and reflected the original design. There are comparable stories of lost, damaged and repaired bridges throughout England, and, in most instances, the reopening of these vital lifelines has been celebrated by the local communities, which often formally or informally name them after local people with a connection to those communities.

Those making decisions relating to heritage assets and their future management and adaptation are likely to face increasing pressure to accept changes that may potentially alter the assets' historic characteristics. In these instances, it may be useful to remember the vital role that historic assets can play within communities and to understand that change and adaptation are often central themes in the narratives that allowed them to be continually utilised over the years. Historic England's Conservation Principles (2015a) are intended to provide just such a framework, but any revision needs to be mindful of future pressures upon heritage arising from climate change.

Following some episodes of terrible flooding across the UK in the winter of 2014–2015 and previous years, the UK Government commissioned a *National Flood Resilience Review* (HM Government 2016b). This identified a need for “better management of rainfall in the natural environment” (HM Government 2016b: 2). Catchment management approaches to



flood risk management are those that consider not just the point of flooding, but the whole catchment of the river system. Recently, there has been increased interest in mechanisms of land management that ‘slow the flow’. It is likely that a future version of the RDPE will be framed by the need for managers and owners to demonstrate public and environmental benefits from their land management practices, and flood risk reduction is likely to be one of those benefits. This will have an impact on how heritage might be included within any future RDPE programme and could affect the historic landscape character and setting of heritage assets.

The ‘re-wilding’ movement is often allied with ‘natural flood management’ activities, such as expanding woodland, allowing scrub regrowth and re-introducing species that have been absent for many centuries. Quite apart from the fact that they are often ‘re-wilding’ to a landscape that has not existed for many millennia, these approaches, if poorly thought out, can pose a challenge for traditional conservation approaches because they affect character and setting, which are concepts deeply enmeshed in both planning and heritage protection frameworks. Furthermore, there are heritage assets that can, if well maintained, help reduce flood risk. Water meadows, for example, have been a characteristic of many English river valleys and can act as temporary water storage facilities in times of high river flow. There is potentially a wider role for heritage professionals beyond advising on the impact of land management practices on heritage assets. They have much to offer holistic approaches to land management, bringing with them the evidence of past experiences, stretching back many generations (see Rockman et al. 2016).

Some of the sagest lessons in resilient heritage come from studies of post-flood recovery (for example, Ridout and McCaig 2017a, 2017b). Following flooding in the winter of 2014–2015, a study of properties at Hebden Bridge (Ridout and McCaig 2017b) observed virtually no post-flood problems with those properties where people cleaned up the premises and continued on with everyday life after the flood water subsided. These were often people who did not have insurance and therefore had no choice but to return to their properties as soon as possible. On the other hand, those who (often following the advice of insurance companies) undertook remedial works, such as removing plaster and replacing it with modern materials, all

experienced problems in the months following the repairs, like damp mould growth. The important lesson from the flooding was that the traditionally-constructed buildings, maintained and repaired with traditional materials, were far more resilient. Raising awareness of this lesson and giving owners confidence in their buildings is important, not just in conserving those heritage assets, but also in supporting the resilience of communities.

## Conclusion

Climate change will continue to present challenges for the mechanisms by which heritage is protected in England. For many, designation is synonymous with protection, but increased awareness of the inevitability of the loss of heritage assets may mean we have to rethink how we conceive of, communicate and frame future designations. Greater scenario planning, horizon scanning and awareness of environmental challenges (as well as governmental, societal and individual responses to them) will help prepare those who are integral to these mechanisms to consider the future resilience of the heritage assets they are trying to safeguard. Development management and rural development programmes will play an important role, but more of an effort should be made to educate and inform interested parties about how to care for heritage assets in a way that avoids maladaptation.

However, it is not just a question of bringing climate change awareness into the heritage sector and to bear upon policy (for example, UCSUSA 2015).<sup>12</sup> There is also an important role for heritage to play in contributing to the wider conversation concerned with planning for and adapting to future climate impacts. There is much we can learn from the past about adapting to changing environments and creating resilient buildings, communities and places. Lessons from the past can even inform how we perceive and communicate change. As heritage professionals, it is our responsibility to share that knowledge, both with each other and with the public.

<sup>12</sup> *Pocantico Call to Action on Climate Change and Cultural Heritage* was drafted by representatives of 22 local, national and international organisations who came together at the Pocantico Center of the Rockefeller Brothers Fund, 2–4 February 2015, to consider strategies and develop an action agenda for preserving and continuing cultural heritage in a changing climate (see UCSUSA 2015).

Finally, we must remember that there is no heritage without people and that it is often the heritage of the everyday that is of the greatest relevance to communities. Recent ethnographic research in areas affected by coastal change has highlighted the value of ‘everyday’ heritage, such as country lanes, pilgrims’ routes, views of church spires and local pubs. People choose to live in places because of those places’ histories, and their relationship to the past through those places is important to them (Da Silva Sinha and Fluck in prep.; Heather Shepherd, pers. comm., 2017). As local government budgets continue to be cut and environmental pressures loom, it will fall to communities to stand up for the places and spaces they value, whether these are designated or undesignated. The democratization of expertise is crucial in order for this to work. The heritage of the future is in all of our hands, but a lack of awareness and access to information can easily result in maladaptation and unnecessary loss. Heritage, by virtue of the fact that it has survived, is almost by definition resilient: we can and should celebrate this.

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