

CULTURAL HERITAGE

& CLIMATE CHANGE

A SECTOR MOBILISED FOR ACTION

INTRODUCTION

WORKING TOGETHER

Heritage sector organisations in Scotland, Wales, England, Northern Ireland and the Republic of Ireland are all seeking to develop a clearer understanding of the impacts of climate change on our cultural heritage. This is in order to develop a strategic approach to managing these impacts, and to help safeguard our heritage for future generations. Our sector has developed a strong, collaborative approach to understanding these risks, with a community of practitioners sharing knowledge, resources and data freely between various organisations.

Central to this collaborative approach has been the formation of The Historic Environment Adaptation Working Group (HEAWG). This group has brought together representatives from a broad range of government agencies from across the UK, such as Historic Environment Scotland, CADW, the National Trust and the Ministry of Defence together to share experiences and promote a more unified approach to climate change adaptation. This poster will provide an overview of the types of research and partnerships underpinning the Cultural Heritage sector's approach to climate change. What we learn as a sector has wide-ranging benefits for others who are also looking to understand the impacts of climate change on their respective areas of interest.

While it is easy to see the negative effects of coastal change on the historic environment, natural processes such as erosion have led to some important new discoveries. Our approach to understanding risk has provided the opportunity for local people to interact and discover more about their heritage through participation in community projects that are being led around the UK, such as with SCAPE in Scotland, CITIZAN in England and CHERISH in Wales and Ireland. So even in amongst the challenges, we are finding opportunities.

WHAT IS THE RISK?

The very fact that we have a rich and diverse cultural heritage in the United Kingdom is testament to its ability to adapt to change. The threat today from climate change presents very new and uncharted risks that are challenging our traditional ways of managing these sites. Changes in the occurrence rates and severity of floods, more frequent and extreme weather events, altering weather patterns, the distribution of species and changing pressures on our coastline all have the ability to impact our cultural heritage. Structures that have stood for, in some cases, millennia and buried archaeology previously protected underground, are now facing new environmental challenges that are threatening their very existence. That being said, where looked after correctly, we can learn a lot from past practices that in some cases give the historic environment a resilience to climate change that is often lost in today's world.

The way that the historic environment is being conserved, preserved and researched is being constantly adapted to meet the new challenges arising from climate change. Through building resilience, gathering data, focusing research and the development of defensive measures, where possible, we are giving our heritage a fighting chance - but there is a great deal more still to be done. Engaging with communities and sectors outwith our own will be crucial going forward.

POSTER CONTRIBUTORS

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SCAPE: Scottish Coastal Archaeology and the Problem of Erosion

Much of Scotland's long coastline is composed of sand dunes and other 'soft' sediments, areas that are frequently exposed to damaging storms and other natural hazards. To help understand the threat posed by climatic events to coastal heritage, Historic Scotland and others established an independent organisation, SCAPE. For the last eighteen years, SCAPE has worked collaboratively on a range of projects all around the Scottish coast. They have managed coastal surveys since 2001 and completed a major project in 2010 that used the survey data to prioritise action at threatened sites. Partnership working with stakeholders, including local communities, has been key. In 2016, SCAPE concluded their four-year Scottish Coastal Heritage at Risk Project (SCHARP). This presented coastal survey data to the public, who then used a mobile app to navigate to sites, take photographs and update information on site conditions. This citizen science approach, subsequently adopted in other parts of the world, led to an updating of priorities based on the latest information. SCAPE also manages a range of practical projects that demonstrate possible actions at eroding sites. Collaborative work with local groups has included community excavations, 3D recording (both with high-tech laser scanners and using cameras to create models), creating interpretation boards and displays, filming video projects and even relocating two sites from eroding coastlines to local heritage centres, like Meur Bunt Mound, Sanday, Orkney (right). These projects have helped inform the public about heritage while highlighting current and future vulnerabilities.



CASE STUDIES

Historic Environment Scotland: Climate Change Risk Assessment

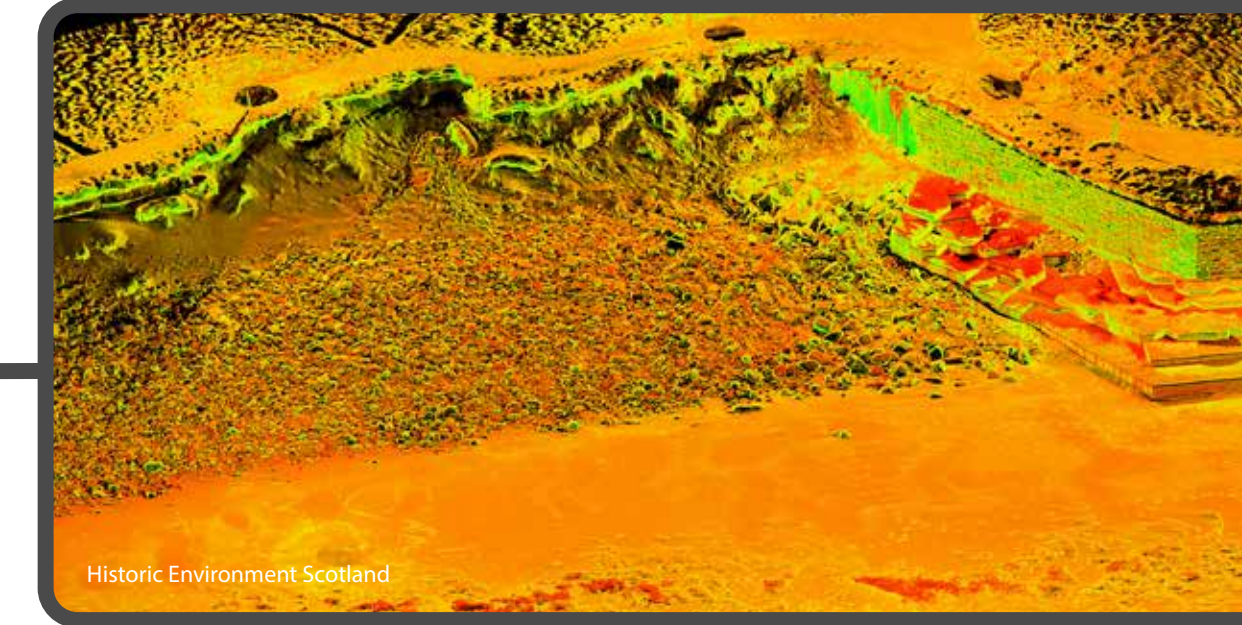
In January 2018 Historic Environment Scotland (HES) published the first phase of their climate change risk assessment project. This phase detailed the risk to its 300+ Properties in Care from natural hazards such as flooding and coastal erosion. The project was carried out in partnership with the British Geological Survey and the Scottish Environment Protection Agency. Of the 352 sites analysed, they found that 31 were at high or very high risk of coastal flooding, and 24 sites at a high or very high risk of coastal erosion. With many of HES' sites situated on the coast these results were expected (like Tantallon Castle, below). HES now plan to refine the results of this assessment through measures like incorporating the new UKCP18 climate change projections into the assessment, ground-truthing the data and carrying out more in-depth desk based studies of the properties to understand how the environmental conditions impacting their properties have changed in the past.



Dynamic Coast: Scotland's National Coastal Change Assessment

Scotland's 'Dynamic Coast' aimed to create a public evidence base to support more sustainable coastal and terrestrial planning decisions in light of a changing climate. Using over 1 million data points summarising 2,000 OS maps, the project mapped the changing position of Scotland's 'soft' coastline in 1890, 1970 and today, alongside future projections. The results show that since the 1970s there has been a 39% increase in the extent of erosion, with average erosion rates doubling to 1 m/yr, compared with the historic baseline. The research commenced in 2015 and the www.DynamicCoast.com website was launched by Roseanna Cunningham MSP Cabinet Secretary for Environment, Climate Change and Land Use in August 2017.

In January 2018 the second phase of the project started, also funded by CREW, led by SNH with a research team from the University of Glasgow. This phase will map and categorise the resilience of Scotland's natural coastal defences (i.e. identifying where low dunes may breach) and it will estimate how future climate change may exacerbate erosion on our soft (erodible) coast. At seven 'super sites' it will forecast future change, anticipated damage and develop adaptation plans with partners. This will help demonstrate the applicability and need for adaptation actions across the public sector. Skara Brae in Orkney, one of Historic Environment Scotland's 336 Properties in Care, is one of the 'Super-Sites'. 3D data captured by HES' Digital Documentation team will be used in this analysis (right).



Derry City and Strabane District Council: Climate Change Adaptation Plan

Derry City & Strabane District Council are leading the way across Northern Ireland through the development of the first local authority climate adaptation plan. Ensuring resilience and preparedness of the historic environment across the city and district is a key strand within the plan. Following analysis of risk and vulnerability mapping of the historic environment local policies and procedures will be developed to ensure adaptation is delivered to protect local heritage. This includes the current and projected impacts on the historic environment from coastal erosion, tidal and river flooding, wind damage and increased risk of changing temperatures and pests. These impacts are already being felt, like at Ballynaneen Bridge that was severely damaged during flooding in 2017 (right).



CHERISH: Climate Change and Coastal Heritage Project

CHERISH is a five-year (2017-2021) EU funded Ireland-Wales project, between the Royal Commission on the Ancient and Historical Monuments of Wales; the Discovery Programme, Ireland; Aberystwyth University; Department of Geography and Earth Sciences; and Geological Survey Ireland. It is a cross-disciplinary project aimed at raising awareness and understanding of the past, present and near-future impacts of climate change, storminess and extreme weather events on the rich cultural heritage of the sea and coast. It links land and sea and employs a variety of techniques and methods to study some of the most iconic and remote coastal locations in Ireland and Wales. These range from terrestrial and aerial laser scanning, geophysical survey and seabed mapping, through to palaeoenvironmental sampling, excavation and shipwreck monitoring. One of the study sites is Dinas Dinlle (left).



St Patrick's Chapel, Whitesands Beach in Pembrokeshire

St Patrick's Chapel lies buried in sand dunes immediately above the high tide level at Whitesands Beach in the parish of St Davids, Pembrokeshire (right). Coastal erosion has been affecting the site since at least 1924. Pembrokeshire Coast National Park Authority acquired the site in the 1970s and initiated a programme of stabilisation which included protecting the eroding face of the sand dunes with large boulders. These were washed away by the sea during the severe storms of the winter of 2013-14, were immediately replaced, only to be washed away again by more storms. Following the exposure of several long cists graves it was decided to undertake a programme of excavation to recover the archaeology before more was lost to the sea. Thus, between 2014 and 2016 a 5 metre wide and 18 metre long strip of the eroding edge of the sand dune was fully excavated, and new protection constructed in the hope of providing a buffer against future erosion for decades to come. The deep stratigraphy of the site provided a wealth of archaeology including a pre-cemetery phase of activity, and some 90 burials dating to the early medieval period. Dyfed Archaeological Trust undertook the excavation with funding from Cadw, The University of Sheffield and the Nineveh Charitable Trust with additional support from the Pembrokeshire Coast National Park Authority.



New Forest National Park Authority

Recent weather events along the New Forest coast have revealed a number of new sites and some others have clearly been subject of increased erosion. Some locations such as Hurst Spit are constantly being artificially recharged as protection for the adjacent salt marsh. At Pitts Deep the pier that once served the local brick-works and an earlier iron works has lost much of its core, exposing the timbers and chains that held the post-medieval structure together (right).

Many coastal underwater linear features were noted in 2006 through the 'National Mapping' work funded by the Minerals Aggregate Levy. Recent weather events have exposed vertical timbers, noticed by the New Forest District Council Coastal Team. On another site collaborative work has taken place between the CITIZAN project based at the Museum of London, The Maritime Archaeological Trust (MAT) based at the National Oceanographic Centre at Southampton University and the New Forest National Park, helped by volunteers.

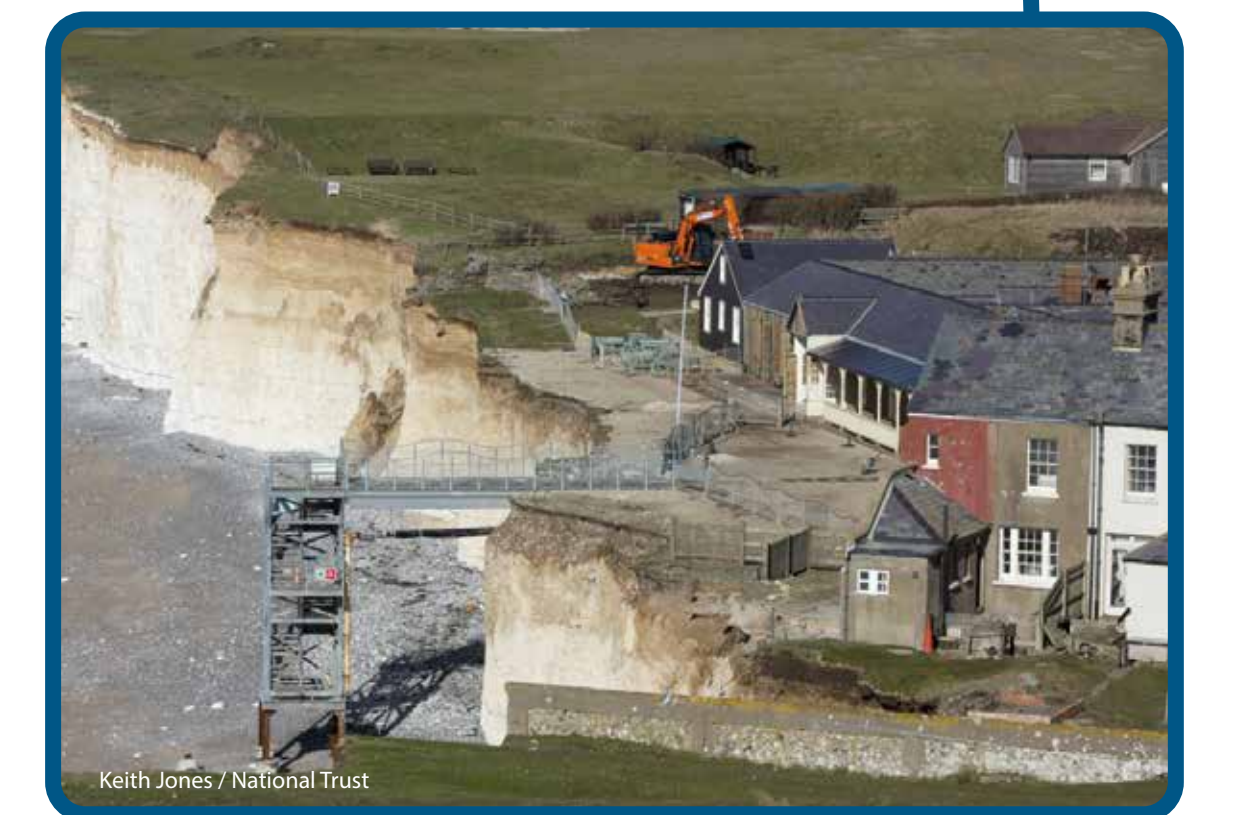
Underwater excavation work by MAT has revealed more details of the timber structure and has allowed sediment sampling and auguring of adjacent deposits to take place. Radiocarbon dates have indicated a long lived repaired structure from Bronze Age to Roman times across a small tidal creek.

Through such collaboration and developing networks of volunteers sites under constant threat can be regularly monitored and the work helps promote awareness of the damage to coastal heritage from increased storm events and rising sea-level. CITIZAN has a free mobile app <https://citizan.org.uk/app/> that allows anyone with a smart phone to quickly take pictures and provide location details of sites that newly appear and others that are constantly changing.



National Trust: Shifting Shores

The National Trust cares for 775 miles of dramatic, diverse and ever changing coastline around England, Wales and Northern Ireland. In their 'Shifting Shores' report they commit to addressing the issues of coastal change on their properties by: working closely with communities, acting across boundaries and joining forces with partners and people, innovating and having the courage to try out new ideas and finally, aspiring to have a healthy coastline, shaped by natural forces. At Birling Gap (below) in East Sussex, plans for new buildings have been drawn up so they can roll back in advance of the existing buildings being lost due to coastal erosion. By 2020 they aim to have coastal adaptation strategies in place as a framework to inform community engagement and decision making for all their 80 coastal 'hotspots'.



Discoveries through Flood and Coastal Risk Management

Significant discoveries have been made in England through the development of flood management infrastructure. Managed coastal realignment schemes at Steart in Somerset, Medmerry West Sussex and Skeffling on the Humber all revealed significant evidence on prehistoric settlement patterns in those areas, and of the adaptation strategies of people to changing coastal environments and sea level fluctuations during those times. These projects were just three of a huge number of flood and coastal risk management schemes being undertaken by the Environment Agency in close collaboration with Historic England, local authorities and local interest groups, many of which have led to important archaeological discoveries.

Discoveries through Coastal Erosion

Around 1 million years ago, the River Thames flowed further north than today and reached the North Sea near the modern village of Harrisburg on the Norfolk coast. The old river channel is buried by thick glacial deposits, but the silts laid down within it are briefly exposed as the sea erodes the overlying sediments. These deposits have produced the earliest known evidence of humans in Britain. As well as flint tools and butchered animal bones, in 2013 a series of human footprints, thought to be around 800,000 and 1 million years old, were found preserved in the mud (below © Simon Parfitt). The footprints were rapidly recorded by a team led by the British Museum before they were washed away.

