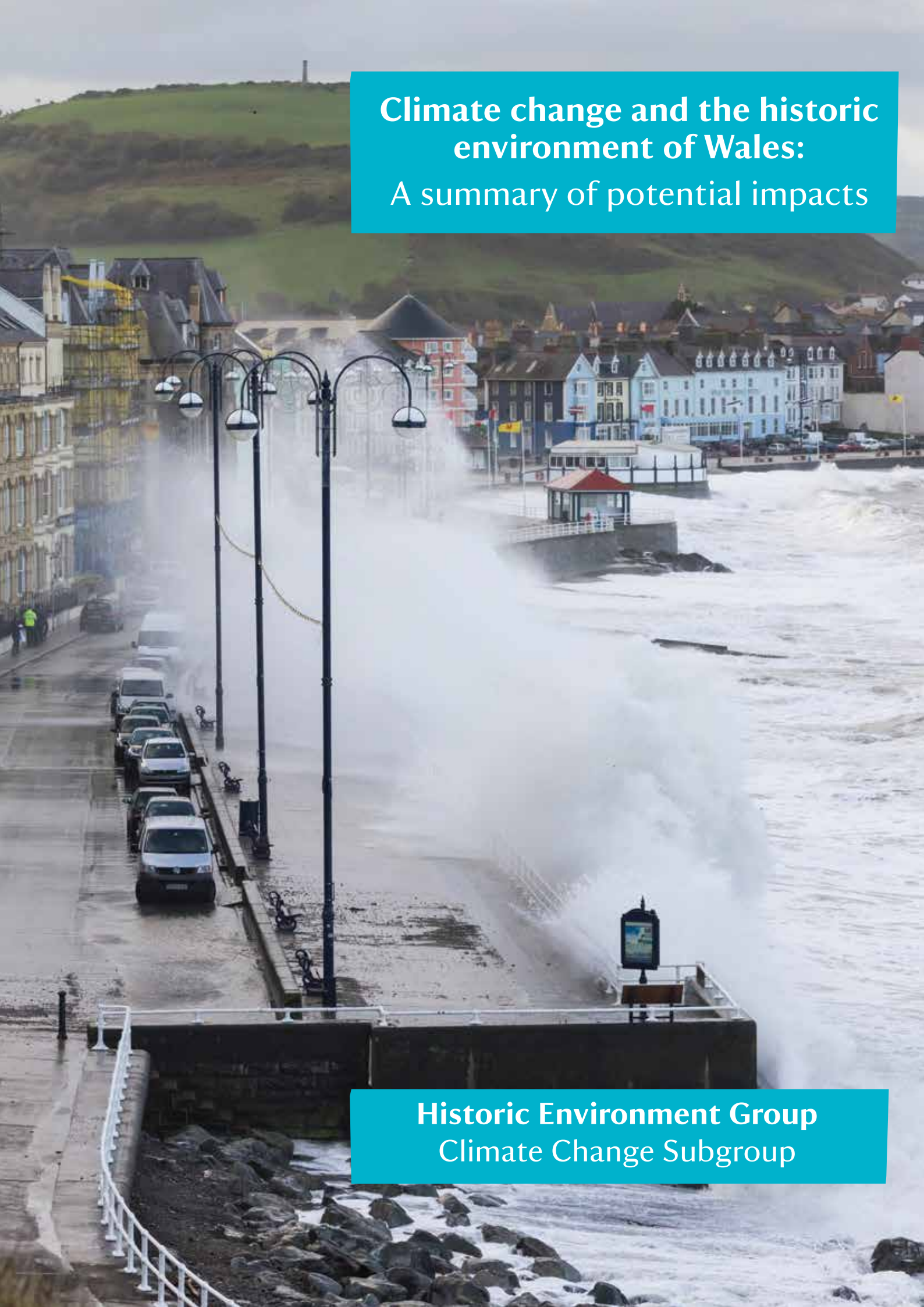

Climate change and the historic environment of Wales:

A summary of potential impacts

Historic Environment Group

Climate Change Subgroup

Text by K Murphy and M Ings, Dyfed Archaeological Trust on behalf of the Historic Environment Group (HEG) Climate Change Subgroup.

HEG is the heritage advisory group which advises Welsh Ministers and includes members representing stakeholder groups from national and local government, the third sector, owners of heritage assets and heritage funding agencies.

To access the main report visit:
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The HEG Climate Change Subgroup is made up of the following organisations:

- Cadw
- Royal Commission on the Ancient and Historical Monuments of Wales
- Natural Resources Wales
- National Trust Wales
- History Research Wales
- Institute for Historic Building Conservation
- Heritage Lottery Fund

Cover: Damage and inundation caused by storms, such as this one at Aberystwyth, will become an increasing familiar scene in many of Wales's historic towns. Photo: Alan Hale

Introduction

The climate change model developed by the UK Met Office predicts a rapid rise in global temperatures in the decades ahead. The projected size and speed of this rise are unprecedented in recorded history with the early effects already apparent in Wales.

In 2012, a report on a strategic approach for assessing and addressing the potential impact of climate change on the historic environment of Wales was produced for the Historic Environment Group, which advises Welsh Ministers. The report has been approved by both the Minister for Culture and Sport and the Minister for the Natural Resources and Food. The results are summarised in this booklet and will support the production of a sectoral adaptation plan for the historic environment of Wales.

Climate change projections

Although scientists are confident that global temperatures will continue to rise, the impact of these increases may be more complex at a regional level. For Wales, the UK Met Office (UKCP09) model predicts:

- higher mean temperatures throughout the year, with;
- hotter, drier summers or wetter summer conditions;
- warmer wetter winters;
- more frequent extreme weather, for example, flooding and droughts.

The assessment of the potential impact of climate change on the historic environment in Wales focuses on the direct impacts. However, adaptive responses to change, such as the construction of flood defences, and measures to reduce carbon emissions, such as the construction of wind farms, can also have a significant impact on historic character.

Potential impact of climate change on the historic environment

The potential impact of climate change on the historic environment will vary depending on the type of historic asset and its location.

What is the historic environment?

The historic environment comprises everything that results from the interaction between people and places through time. This includes all surviving physical remains of past human activity, whether visible, buried or submerged, and deliberately planted or managed. A historic asset is a component of the historic environment, such as an archaeological site, a historic building or part of a historic landscape.

Historic assets sites below the one metre contour and historic assets on the coast edge

Low-lying coastal areas face a significant threat from a predicted rise in sea levels of 0.4m by 2080 and from an increase in storm surges, predicted to be twenty times more frequent by 2100. Many of Wales's historic towns lie partially within this zone so the potential for damage to and loss of individual buildings and historic character is considerable. Mitigation, ranging from managed retreat to heavily engineered sea defences, is possible, but such defences could damage or affect the character of the historic assets they are designed to protect.

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Coastal erosion has already removed part of the Iron Age fort at Dinas Dinlle, Gwynedd . The rate of erosion to this site and similar sites will increase as sea levels rise and storms become more frequent.

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Damage caused by severe storms, such as the collapse of a chimney and walls at King's Court medieval house, Talley, Carmarthenshire, will become more frequent as the climate changes.

Historic assets on the foreshore

Foreshore areas and cliff edges are at risk from accelerating rates of erosion making all historic assets, such as cliff-top iron age hillforts, in these areas vulnerable.

Forestry and woodland

Ancient woodlands and hedgerows are not only important ecosystems, but are also historic assets containing evidence for past human use. The potential effects of climate change on forestry, ancient woodland and hedgerows may be gradual but significant. Soil erosion, land-use change and replanting could all damage individual historic assets.

Historic buildings

Historic buildings and their fittings could not only be severely affected by the sudden impact of flooding and storms, but also by a series of individually less severe - but cumulatively significant - impacts. These may include:

- insect infestation and fungal growth in warmer, more humid conditions;
- structural problems, for example, caused by soils shrinkage in hotter, drier summers;
- dilapidation to stonework caused by more frequent freezing/thawing;
- damage as a result of extreme weather;
- and the thermal movement of materials such as slate, lead, timber and paintwork.

At the very least, the result of climate change on historic buildings may be more frequent maintenance and higher insurance premiums.

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Although these historic farmsteads in the Towy valley, Carmarthenshire, occupy pockets of slightly higher ground on the floodplain they may become vulnerable to more frequent flooding events.

Historic assets on floodplains and valley bottoms

Floodplains and valley bottoms are at risk from an increase in the number and magnitude of floods caused by wetter conditions and more frequent storms. Over 5,000 listed buildings and 12,000 archaeological sites, 300 of which are scheduled ancient monuments, lie in these areas. The character of these sites may be altered by the construction of flood defences. Archaeological sites and structures, such as historic bridges, could be damaged or destroyed as rivers shift their courses.

Historic parks and gardens

Historic parks and gardens celebrated for their exotic species may benefit from climate change as some heat-loving plants may flourish in warmer conditions. In other well-managed sites the character of parks and gardens will be altered as trees and plants lost to more frequent storms and to pests and diseases are replaced, in some instances with more resistant species. However, in unmanaged sites losses will not be replaced and the rate of degradation of trees and plants, and 'hard' landscape features could accelerate.

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Sudden flooding events can have a devastating impact on the historic environment. Bodnant Garden, Conwy, 2012.

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Burial cairns, such as Bryn Cader Faner in Gwynedd, were constructed in remote upland environments about 4,000 years ago when the climate was slightly warmer and drier than today. They are now vulnerable to opportunities for new farming practices as the climate once again changes.

Archaeological sites in upland environments and peat, peaty soils and blanket bogs

Upland areas may be affected by hotter, drier conditions. This may result in the drying out and desiccation of peats and peaty soils which contain a large proportion of Wales's significant archaeological remains. Here, the loss of the organic content of peaty soils could transform the types of vegetation that can be supported and change the historic character.

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Hotter summers leading to the drying and desiccation of peats in combination with more frequent storms will lead to acceleration in erosion. Small-scale repairs such as these are not sustainable.

Historic assets in sand dunes

Coastal sand dunes in Wales cover and preserve prehistoric and later archaeological sites. These are dynamic ecosystems and likely to be sensitive to rising sea levels and more frequent storms, which will affect historic assets within them.

Historic landscapes

Historic landscapes may experience a series of effects which, cumulatively if not individually, could have a great impact. Trees may be lost to new or existing diseases; their vulnerability to disease increased by stress caused by changing conditions. Historic farmland and upland landscapes may come under pressure as longer growing seasons and warmer summers provide opportunities for the introduction of new crops and farming practices. This will not only alter the character of historic landscapes, but also threaten individual historic assets lying within them.

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Ancient woodland and hedgerows, such as these near Pwllheli, are important elements of the historic landscape. Their loss would be a historical, visual and ecological tragedy.

What next?

The next stage of work is to address the need for an improved and locally accurate evidence base of which historic assets could be at risk and where. Spatial mapping work with specialist and technical resources will produce a more accurate visualisation of risk areas. This work will focus on four of the principal areas identified from the report:

1. Areas below the one metre contour, affected by predicted sea-level rise
2. Coast edge and foreshore
3. Floodplains and valley bottoms
4. Peats

All of this work will help develop a plan for how the historic environment can adapt to a changing climate and this in turn will provide a framework for managing future change.

Reference to main report

Powell, J., Murphy, K., Ings, M., and Chambers, F. M. (2012) *A strategic approach for assessing and addressing the potential impact of climate change on the historic environment of Wales,* Report to Historic Environment Group – Climate Change Subgroup. CCRI: Gloucester.

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