

OUR HERITAGE AND THE CHANGING CLIMATE

YORKSHIRE & THE HUMBER



Introduction

Climate change is now recognised as one of the defining issues of the current generation and increasingly people are considering how they can reduce their impact on the environment and adapt to increasingly changeable conditions.

The historic environment has always been, and continues to be, affected by the impacts of climatic change. Many historic assets are increasingly vulnerable to the direct impacts of climate change, threatening the non-renewable character of historic areas.

The historic environment has a role to play in helping to create a more sustainable environment. This document briefly illustrates some of the impacts of recent climatic events on the historic environment of Yorkshire and the Humber region and show how it is responding to the challenge through adaptation and mitigation.

ISSUES IN YORKSHIRE AND THE HUMBER:

Direct impacts of climate change on the historic environment in Yorkshire and the Humber Region may include:



- ▲ Increased frequency of intense rainfall periods causing erosion and flooding.
Image: Fountains abbey © Tessa Goldsmith, The National Trust.

- ▶ Rising sea levels and increased storminess causing damage in coastal areas.



- ▶ Extremes of wetting and drying increasing the risk of subsidence and altering the hydrology of buried archaeology.
Image: Ftoupe Brow © Neil Redfern.
- ▶ Changes to vegetation patterns affecting historic landscapes and archaeological remains.
- ▶ Changes in the spread of pests, vegetation, scrub, weeds and disease.



- ▲ Loss of sites through accelerated coastal erosion.
Image: WW2 defences at Ringborough, © English Heritage.

Adaptation – extending the useable life of materials and structures in order to adjust to climatic change.

The historic environment is not facing the challenge of climate change alone. Partnership working and information sharing can assist in the management of landscapes and the cultural environment. The Rapid Response Network Training Programme consists of 31 organisations who are now working together in an alliance, to develop joint training in Yorkshire and the Humber Region. With a grant from the Heritage Lottery Fund, it is helping to create a training programme for emergencies such as flooding affecting cross-sectoral heritage organisations in the region.

The Environment Agency has completed work to map historic flood events, illustrating the maximum extent of all observed fluvial and tidal floods since 1937. The maps, which will be updated to reflect new flooding events, are available to local authorities and may in the future be accessible to the public via the internet. An analysis of the regional historic flooding dataset by English Heritage showed that the following historic assets were affected in the period 1937-2007:

- 939 Listed Buildings
- 121 Scheduled Monuments
- 21 Registered Parks and Gardens of Special Historic Interest
- 3 Registered Battlefields
- 1 World Heritage Site

The high physical and financial costs of flooding were illustrated by the unusually heavy rainfall in June and July 2007 which caused disastrous floods in areas of the region. The severe direct damage to infrastructure, businesses and private households in the UK from the floods was estimated to amount to over £4.6 billion. In December 2007 the European Commission proposed to grant European Union Solidarity Fund aid, totalling more than £162 million, to help deal with damage caused by floods in England, Northern Ireland and Wales. The grant will go towards reimbursing part of the cost of emergency measures such as rescue services, cleaning up after flood damage, and restoring basic infrastructure.

The extent of the flooding in 2007 saw the government's (with the *Pitt Report* and *EFRA Select Committee Inquiry*), and public's focus on flooding issues sharpen. Since then the Environment Agency has undertaken an internal review of their response to flooding.

In Yorkshire and the Humber region the Strategic Partnership for the River Ouse and its Tributaries (SPROUT) was initiated by the Environment Agency in September 2004. The Partnership which includes English Heritage, The National Trust, Natural England, two National Park Authorities and two Areas of Outstanding Natural Beauty, aims to improve the environmental assets (including landscape and the historic environment) of the River Ouse and its tributaries, an area covering more than 6,000 sq km.

1 Aerial image showing the impact of the 2005 floods at Rievaulx Abbey in North Yorkshire. The site is one of eight English Heritage properties which were affected by an historic flood event in the period between 1937-2007 © Durham Police Air Support Unit.

2 The Environment Agency's historic flooding dataset and the designated area at Rievaulx Abbey. This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or criminal proceedings.

3 & 4 In 2008 English Heritage launched a website titled Climate Change and Your Home www.climatechangeandyourhome.org.uk with the aim of helping home owners to understand further the way in which climate change impacts on houses of traditional construction. The website will be the main conduit through which much of English Heritage's knowledge and technical guidance on climate change is disseminated to home owners. The user friendly website provides advice on how the consequences of climate change, for instance wetter winters and hotter summers, are likely to impact on traditional houses, along with information on how to improve the energy efficiency of traditionally constructed houses.



Mitigation – the actions taken to reduce the consumption of energy and water and the production of waste in order to ease future climatic change.

Reducing carbon footprint

NATIONAL TRUST – THE BIG SWITCH PROJECT

The National Trust has launched a *Big Switch* project to change light bulbs across its historic houses, offices, shops, restaurants and holiday cottages to low energy alternatives. In Yorkshire and the Humber and North East Regions this adds up to 2,100 lightbulbs changed at a cost of £17,458 but saving £35,805 and 190 tonnes of carbon dioxide each year.

Ground Source Heat Pumps

HELLIFIELD PEEL

No 6 & 7

Image 6 and 7 show geophysical work as part of a watching brief by York University Archaeology Department in advance of trenches for ground source heat pumps being installed at Hellifield Peel. The Peel, formerly on the English Heritage *Buildings at Risk* Register, has now been converted into a private residence.

6 & 7 Hellifield Peel ground source heat pumps © Touch the Earth.



Hydro Power

LINTON HYDRO-ELECTRIC SITE

No 5

Bonfield Ghyll is a tenanted National Trust farm in the North York Moors National Park. Up until recently the family living and working there were reliant on a diesel generator to light and heat their home. Apart from the pollution and noise, the generator was costly to run and offered the family no security of supply.

With the help of the National Park Authority, the National Trust and Forestry Commission, the family are now the proud owners of a hydro turbine which uses the falling water from the stream (at the bottom of their garden) to provide electricity in their home. They are now enjoying the benefits of reliable, clean and renewable energy. The environment benefits too, as the hydro turbine is saving approximately two tonnes of carbon dioxide each year; the average amount of carbon a person in the UK uses is around nine tonnes per year.

Recently the National Park Authorities in the region have been able to support several hydro-electric schemes through their Sustainable Development Fund (SDF) budgets. At Linton Falls near Grassington in the Yorkshire Dales National Park, a project has been developed for the re-installation of a hydro-electric generator into the old powerhouse. The scheduled site, set on the River Wharfe, was used for power generation in the early 1900s, originally for Linton Mill, but later for Grassington and the surrounding area. A grant was awarded in 2007 towards the design of a new scheme and works are expected to be completed shortly. At Lowna Mill near Gillmoor, the site of a historic tannery mill in the North York Moors National Park, the buildings and the mill race have been maintained in good enough condition to offer a rare opportunity to reinstate a water wheel, to once again harness the power of the River Dove as it flows out of Bransdale. The 21st century, however, will see a different use for this power – it will provide electricity to the farm house and holiday cottages, saving an estimated seven tonnes of carbon dioxide each year. What is not used directly is fed back into the National Grid. Support from the SDF is encouraging the owners to involve the local primary school, Gillmoor, in the project and develop educational resources in conjunction with Ryedale Folk Museum.

5 Linton hydro-electric site © Blaise Vyner, from Linton Hydro-Electric House, Wharfedale: Conservation Management Plan 2008, published by permission of J N Bentley.



Biomass

Heating of houses, particularly large historic houses, has become increasingly expensive in recent years and often presents a number of technical problems to their owners. The use of natural and renewable sources of energy to provide alternative supplies are now being considered more frequently. The fitting of biomass wood chip boilers which are able to use the by-products of woodland management operations have recently been installed on two Yorkshire estates. At Aske Hall, near Richmond, four biomass boilers now provide a heating and hot water supply to offices, buildings in the stable yard, and the main house, many of which are listed. The boilers have the potential to generate a total of 740kw and to save an estimated 500 tonnes of carbon dioxide per year (or 170 tonnes of carbon) using timber grown on the estate. At the listed Swinton Park near Ripon wood chip boilers were installed in 2006, the first installation of its kind for a hotel in the North of England. The boilers, which can generate up to 300kw of heat and also save up to an estimated 275 tonnes of carbon dioxide per year, are fuelled by timber from the surrounding estate.

Image: Stable Block Aske Hall © Sarah Tunnicliffe, English Heritage.



Moorland / Peat management

The National Trust's holdings in Yorkshire contain large areas of peat moorland. Marsden Moor near Huddersfield, at the northern end of the Peak District is one such area, covering c.1600 hectares, and Malham and Upper Wharfedale can vouch for c.1900 hectares. Peat in good condition acts as a carbon store, but when badly managed it can dry out and erode. This releases carbon into the atmosphere, and threatens the loss of the paleoenvironmental resource. A similar sized area of peat moorlands in the Yorkshire Dales National Park alone may store an estimated 8.4-10.5 million tonnes of carbon, thereby showing the importance of appropriate management.

Front cover and above: Extent of the fire damage at Brow Moor on Fylingdales Moor following a wildfire which destroyed the ground cover across an area of 250 hectares in October 2003. Extensive partnership work took place following the fire to stabilise and regenerate the area. English Heritage is currently providing funding to consolidate the archaeological recording and research of sites unearthed following the extensive wildfire, and to produce advice on lessons learnt from the fire and subsequent restoration project, as well as guidance on disaster planning for moorland environments that contain historic sites.

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Above: © Neil Redfern.

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FURTHER INFORMATION

Further information and guidance on climate change and the historic environment can be found at the following websites:

www.helm.org.uk/climatechange
www.english-heritage.org.uk/climatechangeandyourhome
www.nationaltrust.org.uk/climatechange



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