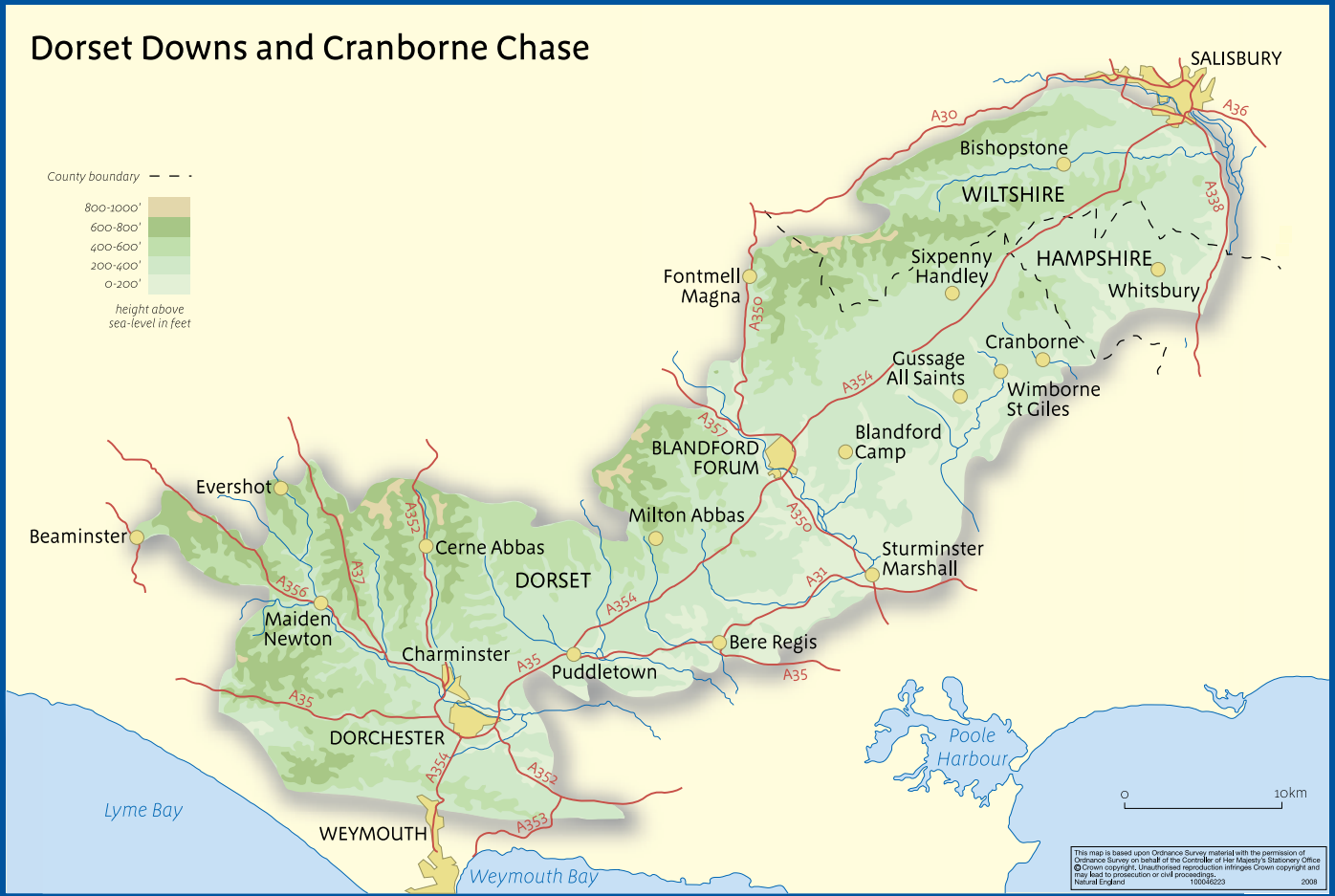
Responding to the impacts of climate change on the natural environment: Dorset Downs and Cranborne Chase

A summary

www.naturalengland.org.uk

NATURAL ENGLAND

Dorset Downs and Cranborne Chase



Introduction

Natural England is working to deliver a natural environment that is healthy, enjoyed by people and used in a sustainable manner. However, the natural environment is changing as a consequence of human activities, and one of the major challenges ahead is climate change.

Even the most optimistic predictions show us locked into at least 50 years of unstable climate. Changes in temperature, rainfall, sea levels, and the magnitude and frequency of extreme weather events will have a direct impact on the natural environment. Indirect impacts will also arise as society adapts to climate change. These impacts may create both opportunities and threats to the natural environment.

Natural England and its partners therefore need to plan ahead to secure the future of the natural environment. One way in which we are doing this is through the Character Area Climate Change Project.

The project aims to identify the local responses required to safeguard the natural environment and our enjoyment of it. In the pilot phase we are focusing on four of the 159 'Character Areas' in England, one of which is the Dorset Downs and Cranborne Chase. The others are the Cumbria High Fells, Shropshire Hills, and the Broads.

This leaflet is a summary of the more detailed findings from the pilot project (these are available on our website at www.naturalengland.org.uk). The leaflet:

- identifies significant biodiversity, landscape, recreational and historic environment assets;
- assesses the potential risks climate change poses to these assets; and
- suggests practical actions that would make them more resilient to the impacts of climate change.

What we learn from the four pilot projects will be used to extend the approach across England as part of our aim to build a healthy and resilient natural environment for the future.

Although the project is primarily concerned with the natural environment, it has also considered the impacts of climate change on other areas of Natural England's remit, including access and recreation, landscape, and the historic environment.

A Byway open to all traffic © Natural England

About the project

The objective of the Character Area Climate Change Project is to ensure that when decisions on the future of places like the Dorset Downs and Cranborne Chase are made, proper account is taken of impacts on the natural world, as well as on communities and their livelihoods. It is not Natural England's role, or intention, to take such decisions, but to initiate debate on the impacts of climate change on the natural world, so that well informed decisions about its future can be taken.

Communities and their livelihoods are vital considerations in the development of any future strategy to respond to climate change. This leaflet does not attempt to cover these issues, not because they are unimportant, but because our role is primarily in relation to the natural environment.

Ensuring a strong, healthy, diverse and inclusive society that lives within environmental limits is the key objective of sustainable development. Natural England seeks to contribute to this through its management of the natural environment. We recognise that environmental and social solutions need to proceed in tandem. Informed by this project, we will engage with communities, other organisations and Government to find approaches that deliver successful and long-term adaptation to climate change.

Taking action to respond to climate change will also depend on the cooperation of those who own and manage the land. We do not take that cooperation for granted and are aware that many measures will require appropriate incentives. At this stage we wish to explore with others potential responses which are feasible and acceptable in principle, and have not yet considered the detailed mechanisms of change.

Significant natural assets

The Dorset Downs and Cranborne Chase Character Area is a high, rolling chalk landscape extending from Salisbury to south of Dorchester. It covers 116,500 hectares (ha). Most of the area is included in the Dorset Area of Outstanding Natural Beauty (AONB) and the Cranborne Chase and West Wiltshire Downs AONB, and contains a wide range of wildlife, historic and landscape features.

The north facing scarp, creased by steep, dry combes has substantial areas of calcareous grassland. The undulating top land mostly contains open, arable fields enclosed by fences or sparse hedges. The arable and grassland mix is important for farmland birds and arable plants. The chalk stream valleys of the Frome, Piddle, Stour, Allen and Ebble dissect land dipping to the south-east. Here, wet grassland occurs around the surviving water meadows. Broadleaved woodland and conifer plantations exist around Cranborne Chase. The area contains a wealth of archaeological features, including the remains of prehistoric, Roman and medieval settlements, field systems, and also Bronze Age barrows, hill forts, marl pits and parkland features.

The most significant biodiversity assets found in the Character Area are:

- 855 ha of internationally important 'Natura 2000' habitat and associated species; including chalk grassland and scrub (marsh fritillary and early gentian), mixed alder-ash wet woodlands (marsh fritillary), and yew woodlands;
- 3,460 ha of nationally important Sites of Special Scientific Interest (SSSI) and 10,250 ha of Biodiversity Action Plan (BAP) habitat; and
- iconic species including Adonis blue butterfly, Atlantic stream crayfish, grey partridge, otter, Bechstein's bat, and the rare arable flower pheasant's eye.

Significant landscape assets include:

- rolling, chalk landscape of international importance, with dramatic scarps and steep-sided, sheltered valleys;

- north and west facing scarp slopes with species-rich grassland indented by combes and valleys;
- south and east facing dip slopes of open, mainly arable land with occasional downland on steeper valley slopes, isolated farmsteads and few trees;
- sheltered valleys, often containing chalk streams, and varied with woodlands, hedged fields, and flood meadows;
- woodlands containing ancient hazel coppice, and substantial parklands; and
- timber framed buildings, flint and clunch walling, and thatched roofing.

The Character Area is widely used for recreation and tourism, and assets include:

- 1,897 km of public rights of way;
- 7,987 ha of open access land;
- National Cycle Route 26, which runs between Dorchester and Castle Cary;
- 4,575 ha of woodland and associated agricultural land; and
- clean chalk rivers, which yield good quantities of fish and game.

The most significant 'ecosystem services' provided by the Dorset Downs and Cranborne Chase, from which we all benefit, include:

- clean drinking water, mainly drawn from the chalk aquifer;
- food and fibre, primarily from cereals and sheep; and
- flood protection, with water storage in the flood plains providing natural protection from fluvial flooding.

© Nick Smith

Likely impacts of climate change on the Dorset Downs and Cranborne Chase

Evidence from the UK Climate Impacts Programme (2002) shows that the climate in the Dorset Downs and Cranborne Chase over the coming century is likely to become warmer and wetter in winter, and hotter and drier in summer. In addition, rainfall intensity will probably increase. Extreme events such as heat waves and storms are predicted to increase in frequency and severity.

By 2080, if we do not reduce greenhouse gas emissions, the climate of the area may resemble that of Portugal. The mean temperature in January could increase by 3°C and in July by 6 C, while average rainfall may decline by 12%. Portugal has arid chalk landscapes where the impact of drought, floods, and soil erosion are already being felt, and some parts of the country experience water shortages every other year.

Biodiversity, landscape & recreation

The composition of the natural communities that are characteristic of chalk downland, woodland, streams and arable fields will change. For example, the shallow rooting beech, which is common in Dorset woods, parks and estates, does not thrive on dry soils and is likely to decline, but small leaved lime needs warmth to set seed and will probably increase. Veteran trees of all species are more likely to be felled by storm force winds. However, in woods the impact of these storms can be positive, creating glades that species adapted to sunlight can occupy.

Diverse natural communities of plants and animals are most likely to survive on soils and in streams with low nutrient status and in large patches of habitat. Drought and lower summer rainfall is likely to

result in a contraction of the chalk stream network. Freshwater species will be lost from some of the winterbournes (the chalk stream headwaters that usually flow only in winter), while some perennial streams will become seasonal winterbournes.

We can expect an increase in the popularity of woodland and streamside recreation as people seek shade in the hottest months.

Natural resources

Human beings could not survive without goods and services derived from the natural environment. For example, up to 80% of the drinking water supplied to towns and villages in this area comes from the chalk aquifer. More rain will fall in winter deluges when the ground is already saturated. This is already happening. An increase in soil erosion can also be expected, resulting in damage to historic features and more silt, nutrients and pesticides washing into rivers. These inputs come predominantly from arable farmland and already have a significant impact on water quality and freshwater biodiversity.

Indirect impacts

Changes in farming systems, the economy, population patterns and cultural values will also affect the natural environment of the Dorset Downs and Cranborne Chase. Our project does not try to assess these, although they will have significant implications for the area and any proposed adaptation measures.

Changes in the types and varieties of crops, sowing dates, irrigation, pests, diseases and soil erosion are all likely. Arable farming may expand into the floodplains and valleys in response to longer growing seasons and new crop varieties, with potentially negative impacts on grassland and wetland wildlife, landscape character, buried archaeology and access.

Cowslips and green-winged orchids in chalk grassland © James LePage

The imperative to reduce greenhouse gas emissions and concerns over security of energy supplies are likely to lead to an increase in renewable energy generation. Exposed sites such as the chalk plateau could be favoured for wind turbine development, eroding the character of the landscape as currently perceived and valued.

Adaptation options

Responding to the impacts of climate change requires adaptation to prevent natural environmental assets and the social and economic benefits that they provide from being lost. The following adaptation responses could be employed within the area:

Biodiversity, landscape & recreation

- Continue to improve the condition of existing habitats. Eighteen percent of nationally important habitat within the area is in unfavourable condition as a result of management neglect in woodlands, under grazing, excessive nutrients and silt in water bodies, and agricultural intensification. Rectifying this would increase the resilience of habitats and wildlife populations.
- Create or restore new areas of habitat. As part of the South West Regional Biodiversity Partnership, Natural England has helped to produce the South West Nature Map. This identifies the best areas in the region to conserve, create and connect wildlife habitats at a landscape scale, in order to enhance resilience to climate change.
- Plant locally native replacements for existing mature trees, avoiding those species susceptible to drought.
- Re-establish pollard regimes. This will reduce the susceptibility of trees to drought and storms by reducing the root to crown ratio.
- Learn from past extreme weather events that may occur more frequently as a result of climate change, such as our response to the tree damage caused by the storm of 1987.
- Identify research needs and commission appropriate studies to build adaptive capacity. For example, there is an urgent need to quantify the relative impacts of native woodland and other forms of land cover on water quantity and quality, particularly the contribution that floodplain woodland can make to mitigating large flood events.


© Nick Smith

Lower Bockhampton, Dorchester © Peter Wakely

Natural resources

- Install or restore water storage on farms, particularly dewponds.
- Re establish chalk grassland or native woodland adjoining water courses to improve recharge of the chalk aquifer and reduce downstream flooding.
- Employ methods on farms that protect water quality and soil resources, such as maintaining vegetated field margins and avoiding bare fields in autumn and winter.
- Create more naturally functioning floodplains to allow greater water storage and the evolution of new wetland habitats. There are existing or potential floodplain restoration projects on the Stour at Kingston Lacy, Frome, Maiden Newton and Cerne.

Planning for an uncertain future

- Adopt a partnership approach between statutory bodies and planning authorities to maintain adequate land for the natural environment and ensure resilience to climate change at all scales.
- With 'growth points' as the priority, guide development away from sensitive environmental zones. Option appraisal should consider the value of ecosystem goods and services, so that, for example, the full impacts of building on floodplains can be assessed; and the full costs of conventional development versus development adapted to future climate can be compared.
- Install Sustainable Urban Drainage Systems (SUDS) in new developments to intercept and store water. SUDS aim to mimic as closely as possible the natural drainage of a site and will reduce the impact of urban development on flooding and the pollution of waterways.
- Ensure that renewable energy infrastructure is strategically planned. A landscape capacity study for the Character Area would help to ensure that infrastructure is sited in the best locations and would also help to develop markets, for example, by encouraging farmers to diversify into wood fuel.

Next steps

This project on how climate change is likely to affect the natural environment of the Dorset Downs and Cranborne Chase Character Area, and the adaptation responses required, is a significant first step but cannot be conclusive. It provides an indication of what may happen. However, the future impacts of climate change are still uncertain and are partly dependent on the amount of greenhouse gases that society releases and how much is released by natural feedback loops from the environment (one of our biggest unknowns).

When identifying adaptation actions, existing strategies, policies and initiatives need to be considered. Some actions defined as climate change adaptation are already occurring under a different name and it may be possible to modify existing programmes to provide a mechanism for delivering adaptation. An example of this is the planned incorporation of climate change adaptation into Natural England's Environmental Stewardship Scheme.

Natural England is now working on the following:

- An implementation plan, which may include a demonstration project. Natural England will work in partnership with local stakeholders to ensure that this builds upon and dovetails with other initiatives.
- Learning from the pilot process to assess likely climate change impacts and the required adaptation strategies for other Character Areas both regionally and nationally.

The future of the Dorset Downs and Cranborne Chase depends on the actions we all take today to reduce our greenhouse gas emissions. This, combined with decisions we make about managing our landscapes to adapt to unavoidable climate change, will determine whether we continue to have a high-quality landscape that is cherished and respected by all.

Hambledon Hill national Nature Reserve © Peter Wakely

Front cover photograph:
Arable buffer strip at the base of the chalk scarp slope
© M.Southon

NATURAL ENGLAND

Natural England is here to conserve and enhance the natural environment, for its intrinsic value, the wellbeing and enjoyment of people and the economic prosperity that it brings.

© Natural England 2008

ISBN 978 1 84754 087 2

Catalogue Code: NE116

www.naturalengland.org.uk

Natural England publications are available as accessible pdfs from: www.naturalengland.org.uk/publications

Should an alternative format of this publication be required, please contact our enquiries line for more information: 0845 600 3078 or email: enquiries@naturalengland.org.uk

Printed on Defra Silk comprising 75% recycled fibre.