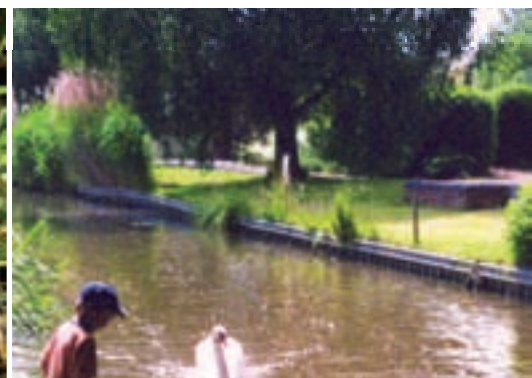




Biodiversity and adaptation to climate change

– an advice note for local authorities



1: The imperative for adaptation

This note explains why adaptation is an important issue for local authorities, and will become increasingly so, alongside the already urgent mitigation agenda.

It provides a concise explanation of the potential impacts of climate change on biodiversity. It also sets out the drivers for action and includes a set of adaptation principles to address the impacts of climate change on biodiversity. On the final page of the note are links to further resources to help you develop truly sustainable strategies to deal with biodiversity under the impacts of climate change.

"Our wildlife has never been stable, it has always been in flux, but we're now entering a radical period of flux which is possibly unprecedented in human history"

*Matthew Oates, National Trust
The Guardian,
27 December 2007*

According to the Intergovernmental Panel on Climate Change (IPCC) we already face many years of continuing unavoidable climate change¹. Even if we were able to stabilise atmospheric concentrations of greenhouse gases (GHG) immediately, we would need to cope with rising temperatures for several more decades (and centuries of sea level rise) – as a result of past and present day emissions. The climate is already set over this time period and the consequences cannot be ignored.

Therefore

- It is imperative that we plan to adapt by reducing vulnerability to the impacts of climate change;
- We must act now to reduce greenhouse gas emissions to minimise future climate change.



2: Climate change – the driver

The UK government has recognised the pivotal role of local government in tackling climate change for several years, and some local authorities have developed action plans (examples are provided at the end of this note). To be effective, these plans should include adaptation.

Councils can act in three main ways to help their community adapt to the impacts of climate change²:

- **As estate managers, councils should consider how their estate can be better adapted to a changing climate;**
- **As service providers, councils should ensure that the impacts of climate change are properly taken into account in all service delivery areas, from emergency planning to social care;**
- **As community leaders, councils should work with public and private agencies through Sustainable Community Strategies and Local Strategic Partnerships to develop an integrated response to climate change adaptation.**

¹ Climate change 2007: The physical science basis. February 2007. Summary for policymakers. IPCC.

² Outlined in the Nottingham Declaration on Climate Change Action Pack

Change adaptation ers for change

To help local authorities to embed climate change at the heart of all council approaches, central government is developing a set of consistent national policy drivers and support frameworks.

These include:

- **New Performance Framework for Local Authorities**

This set of 198 national indicators was developed as part of the 2007 Comprehensive Spending Review, and will replace all other sets of indicators. The Environmental Sustainability indicators include, for the first time, an indicator on adaptation to the impacts of climate change (N188). More details at www.defra.gov.uk/environment/localgovindicators/documents/ni188-guidance-2008.pdf

- **The Natural Environment and Rural Communities Act**

This places a duty on all local authorities and other public authorities to have regard to the conservation of biodiversity in exercising their functions. Defra's *Guidance for Local Authorities on Implementing the Biodiversity Duty* presents biodiversity conservation as a core component of sustainable development, and says "A key area for more urgent action is the need to develop and integrate adaptation policies throughout local authority services to help increase the resilience of the natural environment to climate change."

- **Climate Change Bill**

This includes a statutory requirement on all government departments, including those responsible for setting policy on local government, to report regularly on the risks of climate change for the UK. It is intended to provide a framework for action to tackle the unavoidable effects of climate change and to ensure adaptation is integrated into decision-making.



Seabury Salmon

Spatial planning should take account of the unavoidable consequences of climate change, like increased heavy downpours

- **Planning Policy Statements**

The new PPS1, *Delivering Sustainable Development*, contains a supplement which sets out how spatial planning should take into account the unavoidable consequences of climate change. PPS25, *Development and Flood Risk*, provides guidance on sea-level rise and river flows (based on climate change scenarios) to inform flood and coastal defence strategies.

In addition to these central government initiatives, the **Nottingham Declaration on Climate Change** has been developed by councils in partnership with various climate change agencies. Over 200 councils have now signed up to this declaration, pledging their authority to adapt to the inevitable impacts of climate change and to take action to reduce greenhouse gas emissions. These organisations have produced the Nottingham Declaration Online Action Pack, to provide support for local authorities responding to climate change. Access it at www.energysavingtrust.org.uk/housingbuildings/localauthorities/NottinghamDeclaration

3: The climate is changing: what can we expect?

The future climate of the West Midlands will be different from today's. According to the UKCIP02 scenarios³, the following are some of the key climate changes projected for the region by the 2020s and 2050s, as compared to the baseline period of 1961-90:

	By the 2020s	By the 2050s
Hotter, drier summers	<ul style="list-style-type: none"> • Average summer mean temperatures to increase by 0.5-1.5°C • Summer precipitation to decrease by up to 20% • Decrease in soil moisture 	<ul style="list-style-type: none"> • Average summer mean temperatures to increase by 1.5-3.0°C • Summer precipitation to decrease by up to 30% • Decrease in soil moisture
Milder, wetter winters	<ul style="list-style-type: none"> • Average winter mean temperatures to increase by 0.5-1.0°C • Winter precipitation to increase by up to 10% 	<ul style="list-style-type: none"> • Average winter mean temperatures to increase by 1.0-2.0°C • Winter precipitation to increase by up to 20%
More extreme events	<ul style="list-style-type: none"> • An increase in the number of very hot days; heat waves to become more frequent • Increases in intense precipitation, particularly in winter; a greater proportion of rainfall to occur as heavy downpours. 	

The range of projections in the UKCIP02 scenarios reflects some of the uncertainty attached to future economic and social activity, and associated amounts of greenhouse gases released to the atmosphere.

³ Hulme, M., et al. (2002) *Climate Change Scenarios for the United Kingdom: The UKCIP02 Scientific Report*, Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia, Norwich, UK. 120pp

Climate change will bring more extremes of weather, including heavy downpours



4: How will climate change affect biodiversity?

Climate is a key determinant of the structure, function and location of natural ecosystems. In the current climate, for example, wading birds depend on wet areas for nesting, while some flowering plants need a period of winter cold in order to flower.

Biodiversity has been much affected by climate change in recent years. The earlier onset of spring coaxes many species out of hibernation before prey is available. Heavy rains can reduce butterfly and bee numbers, with knock-on consequences for habitats (and agriculture) due to reduced pollination, as well as for species higher up the food chain, like bats.



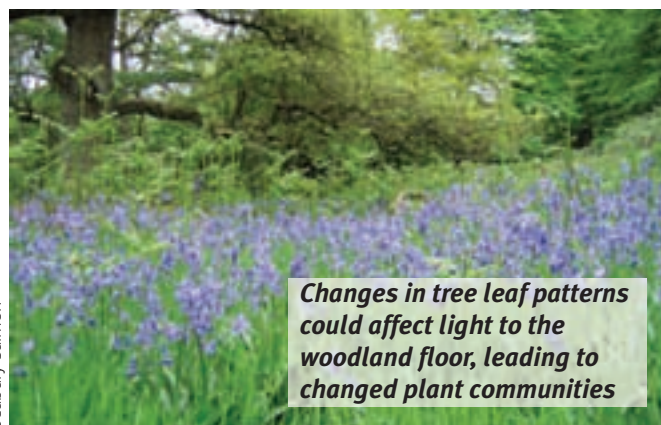
Heavy rains can reduce butterfly and bee numbers with consequences for wildlife habitats and agriculture

Seabury Salmom

As the underlying climate continues to change, wildlife will be increasingly affected. Predictions about the ways in which species respond to climate change can be broadly summarised in the following categories⁴:

- **Impacts on 'climate space':** species distributions will shift, typically toward the poles and uphill, as favourable climate conditions move. Northern species may be lost, whilst new species may colonise from the south.
- **Changes in the timings of seasonal events:** a range of ecological mismatches is likely to occur, such as the time lag between earlier hatching of birds (in response to warmer temperatures) and the population peak of the insects they need to eat.

- **Impacts of extreme weather events:** storms, droughts and heat waves can have significant effects, particularly as they become more frequent, on species populations.
- **Changes in community ecology:** changes to competitive advantages between species, such as the earlier leafing of some trees shading out later-leafing tree species, are likely to lead to markedly different communities of plants and animals than those we know now.



Seabury Salmom

Changes in tree leaf patterns could affect light to the woodland floor, leading to changed plant communities

- **Changes in land use and management:** changes to farming, forestry, water management and many other land uses are likely to occur at the same time as, and sometimes in response to, climate change. For example, farmers may make more extensive use of irrigation during hot, dry summers with knock-on consequences for biodiversity.



Susan Jarvis

If chicks hatch earlier, they could be short of the insects they need

⁴ Adapted from *Climate change, wildlife and adaptation: 20 tough questions, 20 rough answers*. 2007. RSPB.

5: Planning ahead for biodiversity

Local authorities are being urged to shape sustainable communities that are resilient to the climate changes now accepted as inevitable, and this should include planning ahead for biodiversity.

There is a pressing need for local authorities to act now to help ensure that wildlife can respond to the impacts of climate change.

The extent to which species can adapt depends largely on how easily they can move through a landscape where suitable habitats have become increasingly fragmented. Species must have suitable habitats to travel through and towards⁵. Local councils should try to enhance the resilience of these landscapes and reverse their fragmentation by expanding the extent of habitat available and creating more wildlife friendly areas.

It is important that these issues are addressed when compiling local development documents and when considering applications for new development.

A changing climate means a dynamic natural environment, and local authorities should be prepared to respond flexibly in order to manage impacts on biodiversity⁶.

The West Midlands Biodiversity Partnership has developed the following set of principles to guide local authorities in planning adaptation of the natural environment to climate change.

1. Develop ecologically resilient landscapes

- **Conserve and enhance variation within the landscape.** This means retaining habitat variety on a landscape scale, including variation in vegetation structure, slope/aspect, altitude, water regime.



- **Make space for the natural development of rivers.** The principle is to work with natural processes; for example, managed realignment of flood defences along rivers allows space for such processes to occur.
- **Establish ecological networks.** There is a need to think in terms of habitat networks and linking corridors, rather than considering individual sites in isolation. The landscape-scale approach involves taking larger areas into conservation management and linking habitats via corridors and stepping-stones.

2. Conserve existing wildlife habitats and species

- **Conserve protected areas.** Protected sites will inevitably see changes. Nevertheless, the existing protected sites are likely to continue to



Natura England

⁵ BRANCH partnership (2007), *Planning for biodiversity in a changing climate – BRANCH project Final Report*, Natural England.

⁶ *What policies present barriers to adaptation in the UK and the Netherlands?* 2007. ESPACE Project Extension Action 1b, report by Acclimatise.



River management must entail working with natural processes

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be of highest wildlife importance, so need to be maintained. They will act as core areas for populations as well as components of ecological networks.

- **Conserve range and ecological variability of habitats and species.** There is a need to retain the full range of ecological situations within which species and habitats occur.

3. Reduce sources of harm not linked to climate

- **Appropriate management is required to reduce other threats so that species and habitats are less vulnerable to the stress of climate change impacts.** Effective implementation of management plans for sites is key, though some impacts need to be addressed at the landscape scale.

4. Make sound decisions based on analysis

- **Analyse causes of change.** Identify where climate change is the cause of biodiversity change, and where it must be attributed to other factors, both direct and indirect.
- **Set up and implement monitoring systems.** In order to identify and adapt to trends due to

climate change, there is a need for regional and local biodiversity monitoring programmes, utilising appropriate indicators for climate change.

- **Use adaptive conservation targets and priorities.** There is a need to regularly review conservation targets, and to adapt management practices in a dynamic/flexible way. Habitat creation and ongoing management must allow for the likely 'future ecology' rather than simply reproducing current conditions.



Natural England

5. Communicating Issues

- Awareness-raising (of both positive and negative changes) amongst policy-makers and the general public should lead to greater understanding and willingness to adopt adaptation principles.



Alexandra Robb and Joe Pecorelli

6: Further information

Guidance documents

BRANCH partnership (2007), *Planning for biodiversity in a changing climate – BRANCH project final report*, Natural England, UK. www.branchproject.org.uk

Climate change, wildlife and adaptation: 20 tough questions, 20 rough answers. 2007. RSPB.

Guidance for local authorities on implementing the Biodiversity Duty (2007), www.defra.gov.uk

Integrating biodiversity into climate change adaptation planning. Web based guidance provided by the Convention on Biological Diversity at adaptation.cbd.int/

Climate change and nature: adapting for the future. Produced by English Nature, IUCN, RSPB, UNEP's World Conservation Monitoring Centre, and the World Wide Fund for Nature. Available from naturalengland.communisis.com/naturalenglandshop/docs/CC3.pdf

Regional biodiversity partnership

West Midlands Biodiversity Partnership, www.wmbp.org

Biodiversity Action Plans

Herefordshire Biodiversity Action Plan, www.herefordbap.org.uk/

Shropshire Biodiversity Partnership, www.naturalshropshire.org.uk/

Staffordshire Biodiversity Action Plan, www.sbap.org.uk

Warwickshire Biodiversity Partnership, www.warwickshire.gov.uk/biodiversity

Wildlife Trust for Birmingham & the Black Country Biodiversity Action Plan, www.wildlifetrust.org.uk/urbanwt/ecorecord/bap/html/main.htm

Worcestershire Biodiversity Partnership, www.worcestershire.whub.org.uk/home/wcc-bio-index.htm

Local authority climate change adaptation strategies

Rising to the Challenge – the City of London Corporation's Climate Adaptation Strategy. January 2007. www.cityoflondon.gov.uk/Corporation/living_environment/sustainability/climate_change/

Worcestershire Climate Change Strategy. worcestershire.whub.org.uk/home/wcc-sustainability-hottopics-climatechange

Birmingham Climate Change Strategy and Action Plan. www.bebirmingham.org.uk/

Manhood Peninsula Partnership Adaptation Action Plan. www.climateforchange.org.uk

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