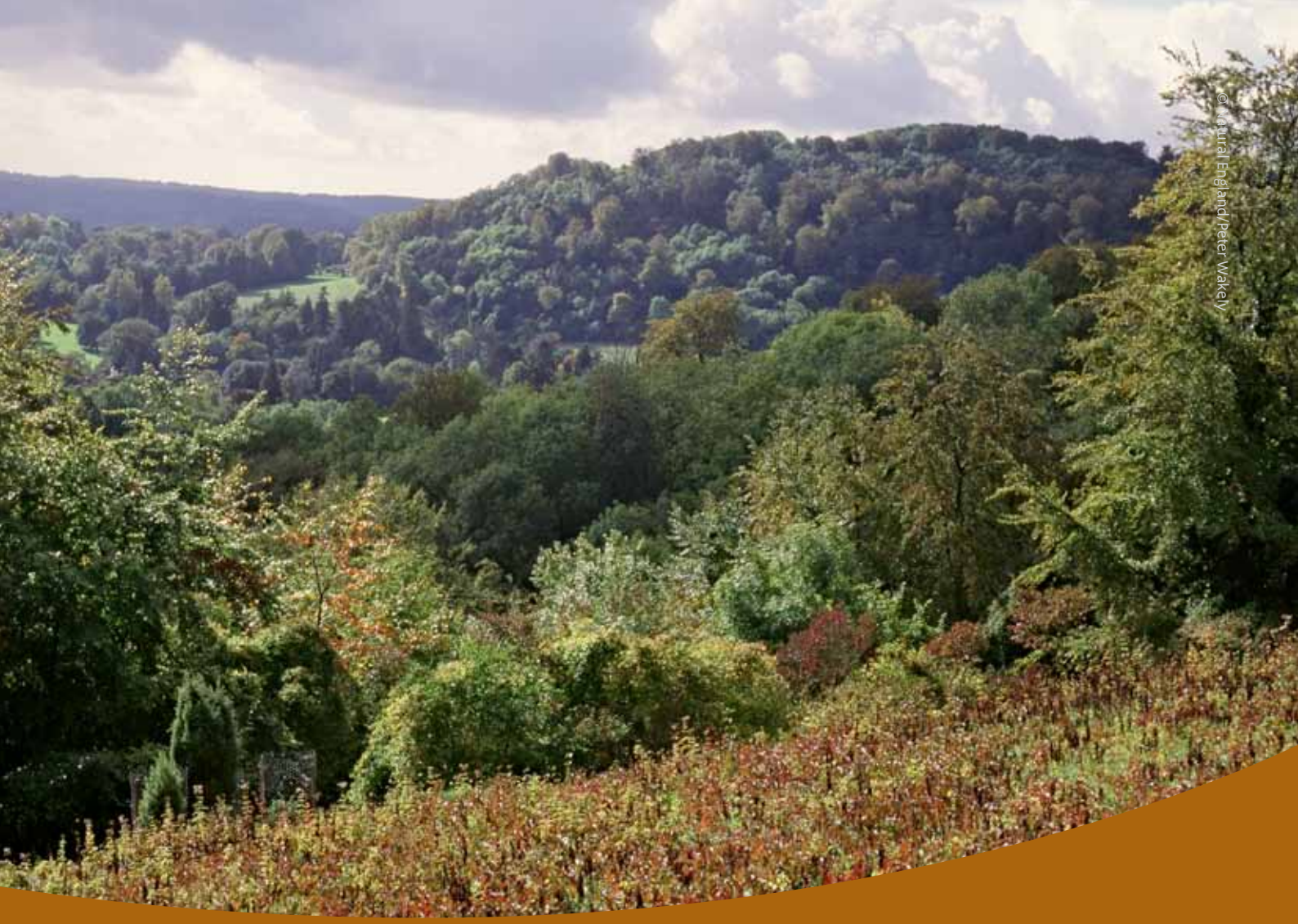

Beech and Yew – Wealden Edge Hangers SSSI, Hampshire

2. Beech and yew woodland

Climate change sensitivity: **Medium**

Introduction

Beech is sensitive to drought and is likely to be particularly vulnerable to the projected changes in rainfall and temperature in the south-east of England due to the large area planted on thin, freely-draining soils. However, widespread losses are unlikely, although on less suitable soils with a southern aspect the species is likely to decline. The climate is projected to become more suitable for beech in the north and west.

Being thin barked, beech is particularly vulnerable to climate change driven increases in mammal pest species such as grey squirrels. More generally, stressed trees are more susceptible to insect pests and diseases, and the majority of insect pests that currently affect UK forestry are likely to benefit from climate change as a result of increased activity and reduced winter mortality. These impacts are likely to affect the commercial value of beech and lead to changes in the composition of both the canopy and ground flora of beech and yew woodland.

Habitat Description

The composition of lowland beech and yew woodland varies according to soil and topographical conditions. Beech can grow on both acidic and calcareous soils, although its association with yew is most common on calcareous sites. They are often found as part of a mosaic with other mixed deciduous woodland communities.

Calcareous beech and yew woodland commonly occurs on the limestone and chalk outcrops of southern Britain and form perhaps 40% of the total lowland beech and yew habitat. The majority of stands have a high forest structure. The canopy can include a mix of beech, ash, sycamore, yew and whitebeam. Oak is less common than in the other beech woods, and pure stands of yew occur in places. Promotion of high quality beech for silviculture has often led to an artificial dominance of beech. Characteristic uncommon or rare plants associated with beech and yew woodland include box Buxus sempervirens, red helleborine Cephalanthara rubra, coralroot bitter-cress Cardamine bulbifera, and bird's nest orchid Neottia nidus-avis.

Beech woodland on neutral to slightly acidic soils comprises about 45% of the total habitat. It is usually found on heavier soils and often where the drainage is poor or impeded. The boundary with the other beech types is often defined by pH (in the range 7 to 4), drainage and soil texture; thus it is common to find this type grading into one of the others. Again, stands tend to be dominated by beech, but commonly contain English Oak Quercus robur and sometimes Sessile Oak Q. petrea. Bramble Rubus fruticosus forms a characteristic ground layer. Often there is no shrub layer, although holly can form a second tier of trees, occasionally with yew. Violet helleborine Epipactis purpurata is a rare plant found in these communities. Mosaics with oak/ bracken/ bramble woodland are common, and in some areas beech can be found colonising western oak woods. This woodland type tends to occur as high forest or relict wood-pasture (with pollards), and less often as abandoned coppice.

Acidic beech woodland forms the remaining 15% of the habitat type. This usually occurs as high forest, but also makes up a large percentage of lowland wood pasture sites. Acidic beech stands are usually found on light sandy or sometimes gravelly soils that are well drained (pH 3.5 to 4.5). Holly, and sometimes yew, is the main understorey species, with oak being the most common associated canopy species. Mosaics with oak/ birch/ wavy-hair grass communities are common. The western edge of its range is ill-defined, and beech clearance from and spread into western oak woods occur in almost equal measure.

There are no precise data on the total extent of native lowland beech and yew woodland in the UK. In the late 1980s the Nature Conservancy Council estimated the total extent of ancient semi-natural woodland of this type at between 15,000 and 25,000 ha, which with recent beech woodland planting brings the total area to about 30,000 ha.

Potential climate change impacts

Cause	Consequence	Implications
Drier summers	Drought	■ Mature beech trees are sensitive to drought and seasonally fluctuating water tables on less suitable soil types. This can lead to reduced growth, die-back and death (Hearn & Gilbert 1977, Geßler et al. 2007). ■ Reduced abundance of beech specialists (epiphytes, fungi, invertebrates). ■ Changed ground flora composition.
Wetter winters	Spring waterlogging	■ Reduced nutrient uptake and reduced vigour of beech (Carey 2013, Geßler et al. 2007). ■ Increased susceptibility to summer drought.
Warmer summers	Longer growing season	■ Increased sun-scorch, leading to bark-death in beech.
Warmer winters	Fewer frost events	■ Reduced winter cold periods leading to reduced bud initiation and a possible reduction in beech in parts of Britain. ■ Increased survival of mammal pests, resulting in more damage to thin barked trees and reduced regeneration. ■ More generations of insect pests per year (Read et al. 2009).
Increased frequency of extreme events	High winds	■ Increased loss of mature trees to wind blow. Most damage to woodlands is caused by extreme events, and the frequency of these is very difficult to predict.
In combination		■ Increased prevalence of fungal pathogens, including Biscogniauxia species which cause damaging strip cankers on beech (Hendry et al., 1998).

Adaptation responses

As with other woodland habitats, there are likely to be changes in both the abundance of the habitat and the composition of species within it. In the south and east, reduced water availability will drive succession to other woodland types such as oak (especially English oak on heavier soils) or to scrub habitat, depending on soil depth, soil water holding capacity and the change in rainfall seasonality. Conversely, the vigour of beech in the north of its existing range will increase, and it will become increasingly viable outside its existing range.

The acceptance of change will therefore be a key response, with management to increase the resilience of beech woodland focusing on the reduction of non-climatic pressures and reducing the impact of drought.

Some of the potential adaptation options for this habitat are outlined below.

- Reduce the impacts of other pressures, such as pests and diseases, pollutants, over-grazing and development pressures. Reducing deer pressure, for example, allows more flowering and seed setting of ground flora such as primroses, so increasing the potential for populations to survive drought years.
- In the southern and eastern parts of its range, and in locations prone to drought, increase the patch size of very small sites and ensure new planting is designed to reduce edge effects by avoiding linear planting. This would help reduce water loss and spray drift from adjacent farmland.
- Consider soil type, aspect and topography carefully when evaluating woodland expansion options, including assessment using Ecological Site Classification, and use these features to maintain/enhance future suitability of the species.

- Where new planting is being considered, potential refugia need to be identified where the direct impacts of climate change may be less than in the surrounding region. These could include north facing or more sheltered slopes and areas with more secure water supply (eg spring lines or low lying areas closer to the water table).
- Increase the age structure of high forest to reduce the susceptibility of beech populations to damage from droughts and storms.
- Accept a greater mix of native trees such as ash and oak within the canopy of 'beech woods'.
- Where the climate is projected to becomes suitable, accept beech as component of semi-natural woodland in areas beyond its current native range
- Take positive steps in all woodland situations to increase the proportion and diversity of decaying wood throughout sites so as to ensure both, resilience of dependant species, and the replenishment of woodland soils' organic content and hence capacity for moisture retention and provision of other essential ecological functions needed by trees and other species.

Mature beech in Buckholt Wood, Gloucestershire

Relevant Environmental Stewardship options

Maintenance of woodland (HC07)

Restoration of woodland (HC08)

The aim of these options is to maintain or restore farm woodlands to benefit wildlife and protect and strengthen the local landscape character. It is only appropriate where the woodlands are part of the farmed landscape.

Priority is given to woodlands with ancient semi-natural characteristics and sites with remnants of ancient semi-natural woodland such as planted ancient woodland sites (PAWS) and grazed woodland.

Relevant English woodland grant options

The majority of woodland grants available under the English Woodland Grant Scheme closed to new applicants before April 2014. The grants outlined below, as set out in England's next Rural Development Programme document, will be available when the new scheme opens in 2015 and, in some cases during the 2014 transition period. Up to date information is available from the Forestry Commission's **Grants and Regulations** web-pages.

Woodland Infrastructure Grant (replacing the **Woodfuel Woodland Improvement Grant**).
This grant supports the sustainable production of wood by improving access to woodland for management and harvesting purposes. The grant will cover a proportion of the cost of work, and will not take account of the timber income that results.

Woodland Improvement Grants
Grants to fund the improvement in the quality of woodlands to achieve specific objectives, through either capital investments or five-year revenue payments. Current priorities are: bringing priority habitats into target condition; supporting priority species (particularly birds and red squirrels); PAWS restoration through gradual conversion; and improving climate resilience through conversion to continuous cover approaches to management.

Woodland Regeneration Grant
Woodland Regeneration Grant (WRG) contributes to the costs of making changes to the composition of woodland within the normal cycle of felling and regeneration, under specific circumstances: following premature felling as a result of a pest or disease pest outbreak on the site; PAWS restoration following clear-fell. The objective is to support an increase in the capacity for sustainable management through this process.

Woodland creation grant
This grant provides funding for woodland creation to expand and join up existing woodland.

Woodland planning grant
Support for the drafting of a UKFS-compliant woodland management plan to promote appropriate management interventions and resilience planning.

Further information and advice

Buglife. Advice on managing BAP habitats **Lowland Beech and Yew Woodland**.

Forestry Commission **The management of semi-natural woodlands: Lowland beech–ash**.

Forestry Commission England 2010, Practice Guide **Managing ancient and native woodland in England**.

JNCC (2008) UK BAP habitat description **Lowland Beech and Yew Woodland**.

Relevant case study examples

Chiltern Woodlands Project
The aim of the Chiltern Woodlands Project is to promote and encourage the sensitive and sustainable management of Chiltern woods in order to protect the landscape of the Chilterns and maintain and enhance its biodiversity.

Key evidence documents

Broadmeadow, M & Ray, D (2005) **Climate Change and British Woodland**. Research Note. Forestry Commission.

Geßler A., Keitel C., Kreuzwieser J., Matyssek R., Seiler W. & Rennenberg H., (2007) Potential risks for European beech (Fagus sylvatica L.) in a changing climate. *Trees* **21**, 1–11.

Hearn KA & Gilbert MG. (1977) The effects of the 1976 drought on sites of nature conservation interest in England and Wales, Nature Conservancy Council.

Hendry SJ, Lonsdale D & Boddy L. (1998). Strip-cankering of beech (Fagus sylvatica): pathology and distribution of symptomatic trees. *New Phytologist* **140**, 549–565.

UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock) (2008).

Ray D., Morison J. & Broadmeadow, M. (2010). **Climate change: impacts and adaptation in England's woodlands** Research Note. Forestry Commission. 16pp.

Read, D.J., Freer-Smith, P.H., Morison, J.I.L., Hanley, N., West, C.C. and Snowdon, P. (eds). 2009. **Combating climate change – a role for UK forests. An assessment of the potential of the UK's trees and woodlands to mitigate and adapt to climate change**. The Stationery Office, Edinburgh.

UK Biodiversity Action Plan; Priority Habitat Descriptions. BRIG (ed. Ant Maddock) 2008.