



# FORESTS & Climate Change

## Part 2: A Challenging Conundrum

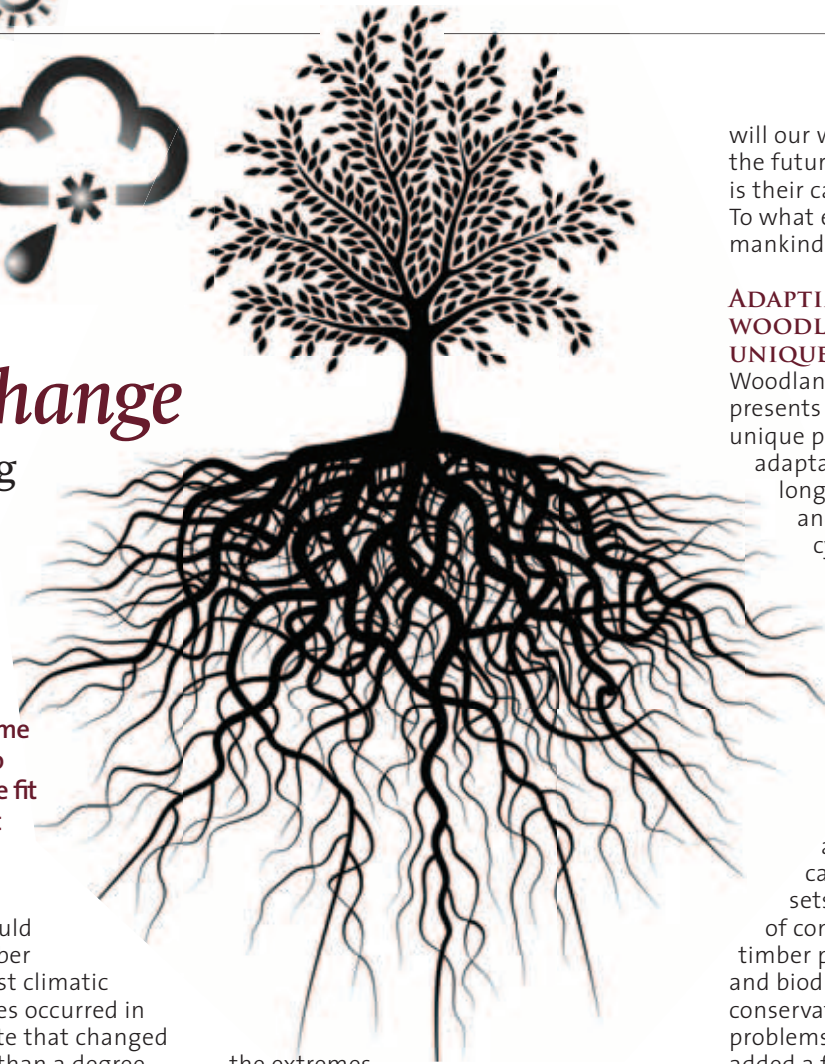
In the previous issue, Forestry Commission Director General Tim Rollinson outlined how forests can help tackle climate change. Here Mark Broadmeadow, FC England's Climate Change Programme Manager, explores what we need to do to ensure that our woodlands are fit to face that challenge – actions that the arboretum can help to guide.

### RESILIENT WOODLANDS

Trees and woodlands are resilient to what is thrown at them – our veteran trees are testament to this. They have survived the 'little ice-age', the extreme cold of the winter of 1962 and the drought and heat of the summers of 1976, 1995 and 2003. But that does not mean that they can cope with what is around the corner.

We should remember that past climatic extremes occurred in a climate that changed by less than a degree over 500 years or more. In the next 100 years, projections are that the UK's climate will warm by between 2 and 6 degrees accompanied by changes in rainfall. Of course, it is not only changes to the mean climate that will affect our woodlands, but

the extremes – which will become more severe than those that our veteran trees have faced. As the climate changes there are a number of questions we need to answer to ensure the long-term success of Britain's trees and woodlands. How resilient



will our woodlands be to the future climate? What is their capacity to adapt? To what extent should mankind intervene?

### ADAPTING WOODLANDS – A UNIQUE CHALLENGE

Woodland management presents two almost unique problems for adaptation. First is the longevity of trees and the forestry cycle – whatever we do must be appropriate to both the current and the future climate. The second is that we have to balance the needs and, in some cases, conflicting sets of objectives of commercial timber production and biodiversity/nature conservation. To these problems must be added a further issue – uncertainty; we just don't know how climate change will unfold. But we do need to ensure that our woodlands continue to be productive and satisfy the needs of future generations as a source of renewable energy and sustainable

products. To help address uncertainty, monitoring programmes are needed to identify the effects of climate change as they start to bite and, also, to test the effectiveness of adaptation measures. A good example is the Environmental Change Network site in Alice Holt Forest in Hampshire, operated by Forest Research.<sup>†</sup>

### ADAPTING ANCIENT AND SEMI-NATURAL WOODLANDS

Where timber production is not the main objective for existing woodland, there is no need for intervention specifically to address climate change. However, we should ensure that woodlands are well managed and resilient to the influences of mankind, including climate change. This means thinning out trees to allow more light to reach the forest floor to encourage woodland regeneration and a greater diversity of plant and animal life. Control of deer, squirrels and invasive plants may also be necessary to allow young trees to thrive. By encouraging natural regeneration, natural evolutionary processes

“CLIMATE EXTREMES WILL BECOME MORE SEVERE”

are promoted – i.e. the survival of the fittest, or the best adapted. We can also expand existing woodlands and link them better in the landscape – an approach that the Forestry Commission are promoting through focusing tree planting on 'woodland habitat networks' in Southwest England.\* These actions will help more mobile species to move and redistribute as climate change progresses and, by extending woodlands, a more diverse range of site conditions will become available for trees and other plants to exploit. *Nothing earth-shattering – just what we should be doing.* »







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» **PLANTING NEW WOODLANDS**

Where we are creating new native woodland such as at Jeskyns in Kent<sup>A</sup>, we can do more. Simply by planting a diversity of species we provide insurance – we don't know exactly how any one species will respond to extreme events such as extended summer droughts and we certainly don't know how pest and disease outbreaks will change in frequency or severity – but species diversity does cover the bases.

We can also try to ensure that species we plant are broadly compatible with a warmer, drier climate. Tree species native to the UK have a large geographic range, in many cases stretching to southern Europe. This means that there is genetic variability and individuals from further south are likely to be better adapted to hotter drier climates. However, only planting trees with more southerly 'provenances' or origins is a high risk strategy as they are more prone

to frost damage – but including them in a mixture makes sense. We might also include non-native species as a small component of a mixture to widen the range of species. But caution and careful monitoring is needed, so we don't introduce species that run amok and damage our native woodland ecosystems. *Diversification provides insurance – but no seismic shifts to current practice needed.*

**ADAPTING OUR PRODUCTIVE WOODLANDS**

For woodlands where timber production is the principal objective, adaptation is, at first sight, a relatively straightforward task. We have a general idea of how the climate will change and how individual species will respond. So it should be simple enough to choose appropriate species for restocking woods, »

“ **NATURAL EVOLUTIONARY PROCESSES ARE PROMOTED – I.E. THE SURVIVAL OF THE FITTEST** ”



John McErlaine

An avenue of beech trees



“SIMPLY BY PLANTING A DIVERSITY OF SPECIES WE PROVIDE INSURANCE”



Mediterranean olive grove

Woodland cover in the Great Britain.

Based on Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright - Forestry Commission Licence No: GD272388

Low (above left) and High (left) emissions scenarios showing where in Europe currently experiences a climate most similar to that projected for Westonbirt in the 2050s. The red grid squares are the closest match.

» although we may also need to look to species that have not been grown on a commercial scale in the UK.

We have already seen that provenance or origin can make a difference and that species diversity – whether within a group of trees or different areas in a woodland – will increase resilience. This equally applies to commercial forestry. The difficulty is in taking the leap of faith that must stand the test of time until trees are harvested in 40 to 100 years – from crops that we know and have markets for, to new species or management systems with an unknown future. But those business risk decisions, when considered at a national scale, will determine whether woodlands can contribute fully to combating climate change and providing high quality timber

in the future. *Changes to current practice needed, but as part of business planning.*

**AN URGENCY FOR ACTION**

Climate change is upon us and its impacts will, inevitably, become increasingly serious. The real problem in

planning for change is uncertainty in the future climate. Some argue for a cautious approach – doing nothing, yet. The stronger argument is for a precautionary approach to limit the impacts of climate change on our woodlands. The bottom line is that uncertainty is not an

excuse for inactivity, but it highlights the need for measured activity. We need to proactively ensure that our woodlands continue to provide the timber, renewable energy, habitat, landscape and recreational opportunities that we all enjoy. ■

† <http://www.forestresearch.gov.uk/ecn>  
 \* <http://www.forestry.gov.uk/ccWHN>  
 Δ Climate change demonstration plot:  
<http://www.forestry.gov.uk/ccjeskyns>

Keep up-to-date with developments by visiting [www.forestry.gov.uk/climatechange](http://www.forestry.gov.uk/climatechange)  
 Part 3: Westonbirt Arboretum concludes our Climate Change series in the next issue.