

Jeskyns mixed broadleaf climate adaptation demonstration

Jeskyns Community Woodland is located to the east of London, in Kent. To increase the amount of publicly accessible greenspace in the area, 147 ha of agricultural farmland were converted to community woodland in 2006/7 by the Forestry Commission. This was part of their commitment to planting more woodland in and around urban areas. Due to considerable foresight at the time of planning, two small climate change adaptation demonstration areas were created, and species planted across the rest of the site were informed by climate projections. Two areas of mixed broadleaves are located side by side: 'Woodland Present' and 'Woodland Future'. Woodland Present was planted with a mix of species typical of the southeast of England at the time, Woodland Future with species and provenances that are expected to grow better in a future climate. The aim of these areas is to show climate change adaptation to the visiting public and highlight differences in tree growth between the two woodland areas.

Management objectives

The site was planted in 2006-7 and is managed by Forestry England for public benefit and other objectives, including education and recreation. Forestry England host an array of activities, welcoming visitors, school groups and walkers.

Risks and opportunities

Main climate change risks

When Jeskyns was being planned, the climate change scenarios prepared for the 2001 UK Climate Impacts Programme projected an increase in summer temperature of up to 3°C and a 20–30% reduction in rainfall by 2050. The increased frequency and severity of drought was identified as the factor that would have the most influence on tree growth, survival and function of the new planting. Were the site being planned and planted today, the 2018 projections would be used; and drought and summer temperatures would still be considered the main risk factors.

Vulnerabilities

Severe summer droughts are expected to become common and are expected to limit the use of certain native broadleaf species for commercial purposes.



Find detailed information in UKFS Practice Guide Adapting forest and woodland management to the changing climate.

Information on the UK Forestry Standard and supporting guidance is available at www. forestresearch.gov.uk/ukfs

Identifying and selecting measures

Several adaptive actions were chosen, including the selection of alternative species and a wider range of species and planting arrangements.

Jeskyns was assessed for current and future tree species suitability using ESC, the **Ecological Site Classification decision-support system**. Tree species for the Woodland Future were selected if they were expected to thrive compared with other species in Woodland Present. For example, beech and wild cherry were predicted to decline in their suitability for this part of Kent because they were expected to have a lower yield and survival rate due to increasing drought risk. Species such as hornbeam, walnut and small leaf lime were projected to grow better under future conditions.

Further species and genotype diversification were intended by using less common species projected to grow well in future climate conditions and the use of more southerly provenances matched to the climate of mid-France as a proxy for our future hotter, drier conditions. Given that there is uncertainty in the climate change projections, with different models predicting varying extents of change in both temperature and rainfall patterns, a mixture of provenances will provide some insurance, while also widening the genetic diversity of the developing stand. Although guidance at the time of planning advised the use of local provenances when planting new native woodland, the current guidance is to consider a wider range of provenances.

Implementing adaptation measures

The oak (sessile and pedunculate), ash, cherry and field maple planted in the Woodland Future area were of French origin, in contrast to the Woodland Present area, in which all species (apart from oak) were of native origin. The intention was to make any impacts of provenance selection more obvious, whether positive (e.g. improved growth and survival) or negative (e.g. increased susceptibility to late spring frost or pest/disease outbreaks).

The balance of native species in the planting mixture was adjusted compared with normal practice at the time, to reflect a higher drought resilience of some species over others. This has largely been achieved through considering a number of 'species pairs', with the proportion of non-native species being swapped between

Jeskyns Woodland Future edge (summer 2017).





Increasing drought frequency was one of the main risks identified and can influence the success of new planting. the two areas. Current species that are expected to suffer as a result of drought (e.g. beech) are not absent from the planting, but contribute less percentage cover and therefore fewer individuals of these species are present in the Woodland Future. Examples of species pairs include downy birch/silver birch, beech/hornbeam, sycamore/sweet chestnut and Scots pine/pinaster pine.

Monitoring and assessment

The two demonstration areas were assessed by Forest Research in March 2017, 10 years after planting. Both areas were mapped and the survival rate, height and diameter at breast height of all the surviving tree species were recorded.

Preliminary analysis of the results suggests a performance comparison between tree species in the Woodland Future and Woodland Present areas is more complex than a visual assessment of height or survival might indicate. Overall, there were no statistically significant differences between the condition and mortality of the two areas overall at 10 years. However, at individual species level, birch trees were significantly taller, with a larger girth in Woodland Future compared with Woodland Present, but as a species pair there was a higher percentage of downy birch in Woodland Future.

Monitoring at Jeskyns also showed that ash trees planted have been lost as a result of ash dieback disease, which may be an example of the expected increase in pest and disease outbreaks as the climate changes. Monitoring has also shown that there have been changes in phenology (i.e. the timing of re-occurring events in nature and their relationship with climate) such as bud burst as a result of rising spring temperatures.

Lessons learnt

Creating demonstration areas for climate change adaptation over 15 years ago drew on the foresight and expertise of pioneers in climate change and forestry. We can benefit from the establishment of these areas today, and Jeskyns is a valuable resource with which to draw attention to the impacts of climate change on woodland and the need to adapt.

The demonstration areas were not large enough to be set up as an experimental trial, which limits the conclusions that can be drawn. For many visitors, the differences between Woodland Future and Woodland Present will not be readily discernible, but as the stands continue to grow there will be more opportunity to show provenance and species differences and demonstrate how climate change is impacting trees and woodland in the southeast of England.

Intended future outcomes

In the future, regular monitoring of the two areas will generate a better understanding of the relative success of different species or provenance of species. This will inform management decisions across the rest of the site. Lessons learnt will be captured and shared with visitors and those working in forestry and woodland management.

This case study is one of a number supporting the UKFS Practice Guide on Adapting forest and woodland management to the changing climate