Growing timber in a climate changing world

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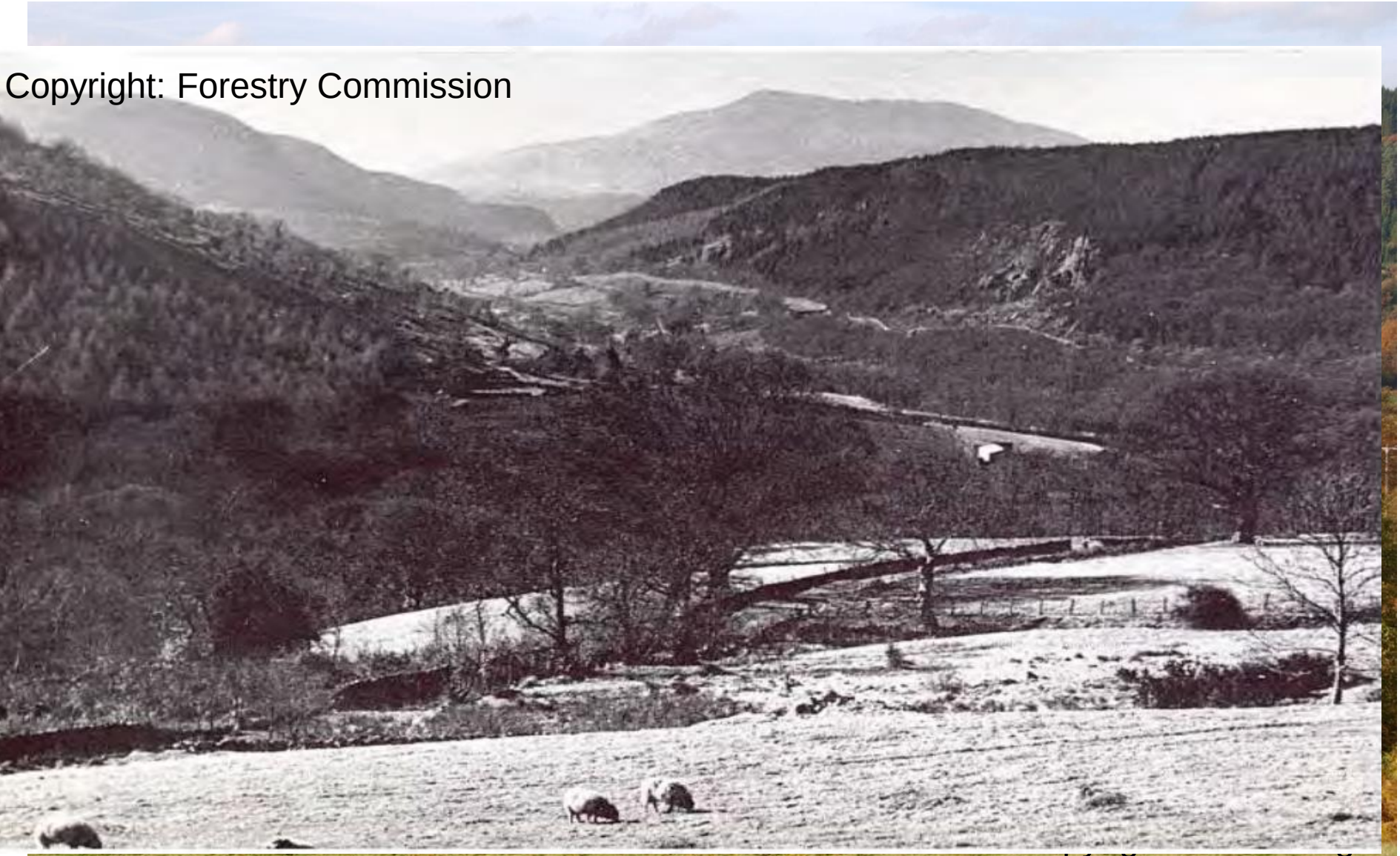
Tree Health and Knowledge Transfer

Forestry for the Future

Cyfoeth Naturiol Cymru



Setting the Scene: What do we have?

- 7% of Wales land area
- 10,000 ha of NNRs
- 123,000 hectares forest
- 40% of Welsh Forests

Setting the Scene: What do we have?

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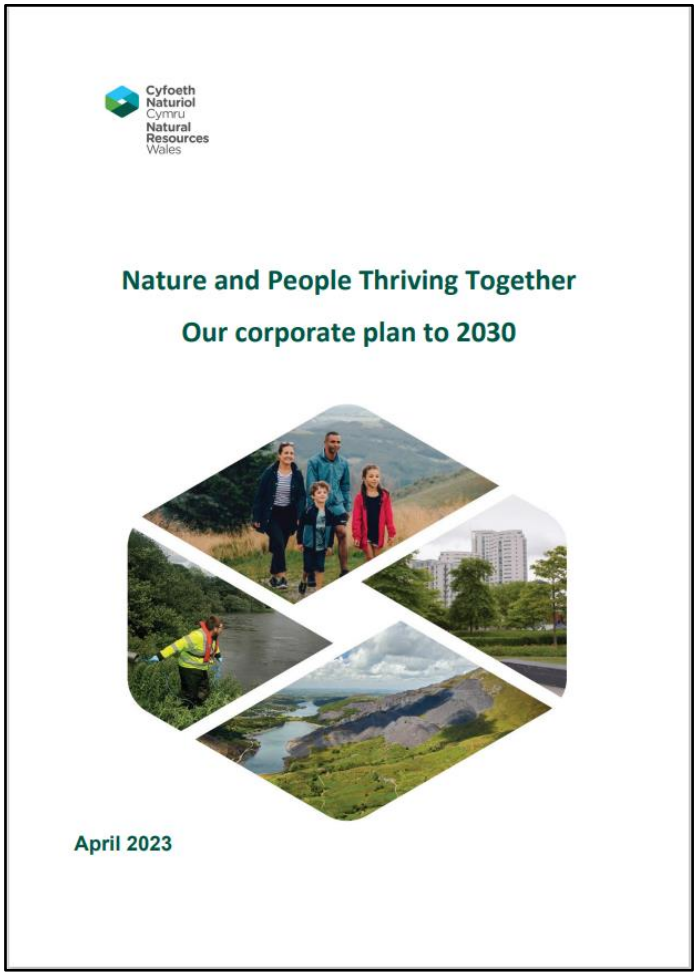
Natural Resources Wales

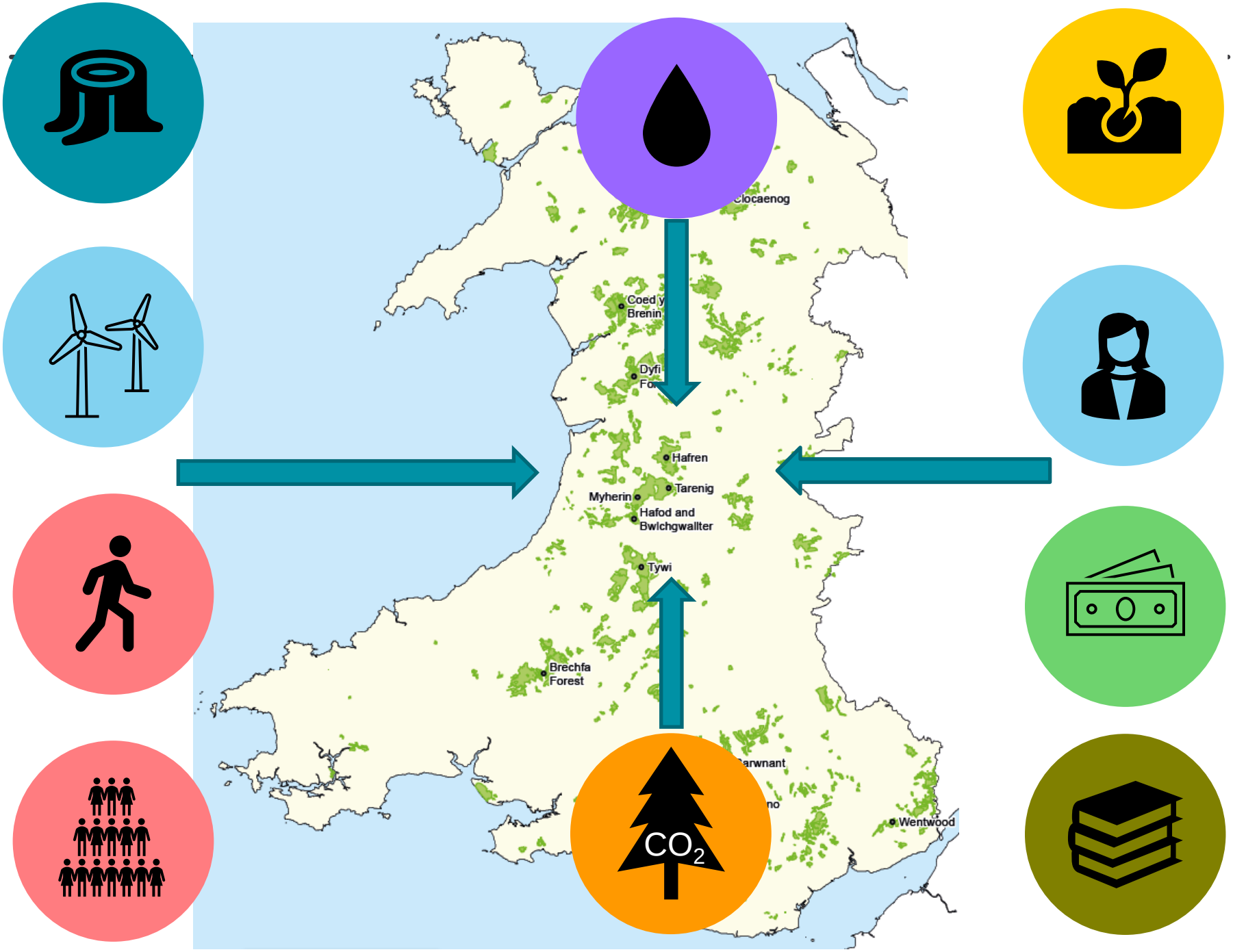
Timber & Trees:

- 21.2 million cubic metres standing volume
- Conifers (84%)
- Broadleaves (16%)
- 60% of Welsh wood processing
- 26.6MtC Stock

Corporate Plan



- **Reducing the risks to the natural resources from drought, disease and pests, wildfires and storm damage by diversifying tree species, restructuring woodland and other habitats, and greater tree thinning;**
- **Securing the timber producing potential;**
- **Protecting carbon stocks and optimising opportunities for sequestration;**
- **Building the resilience of high nature-value sites on the land in our care;**


Clocaenog
Coed y Brenin
Dyfi
Hafren
Tarenig
Myherin
Hafod and Bwlchgwallter
Tywi
Brechfa Forest
Wentwood
CO_2

Adapting the Land in Our Care

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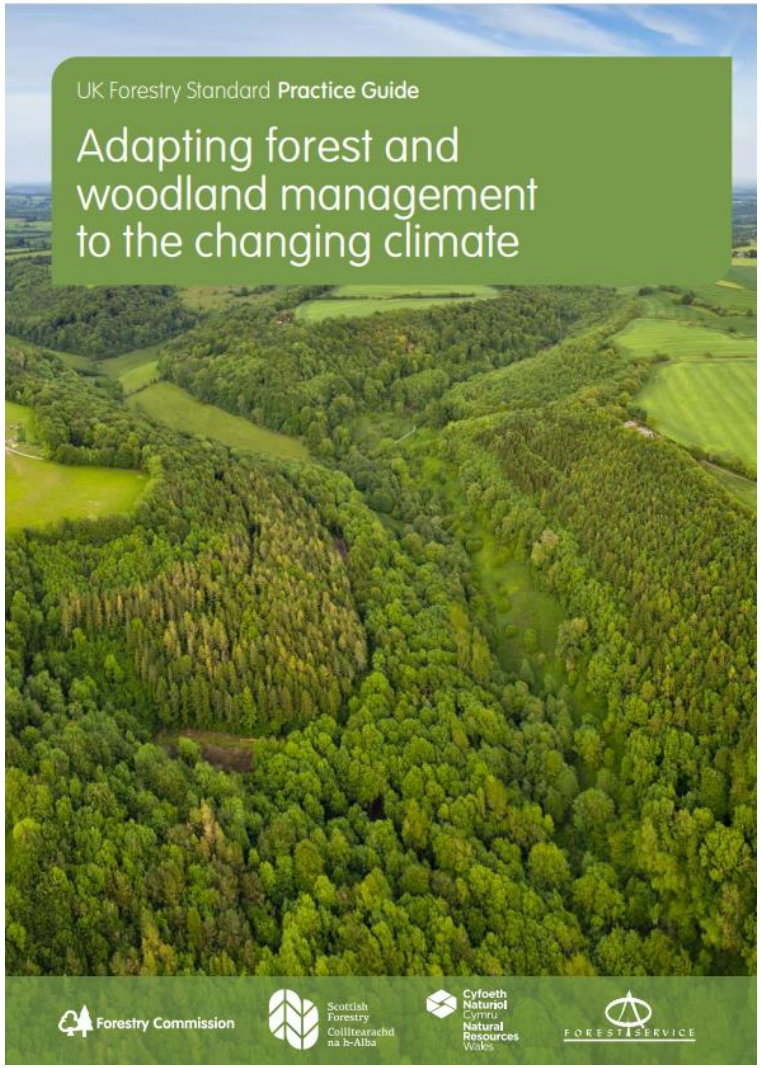
1. Increasing species diversity
2. Diversifying Structure
3. Creating mixed species stands
4. Increase thinning operations
5. Adapting infrastructure
6. Forest and woodland design



Increasing species diversity (Shannon Index)

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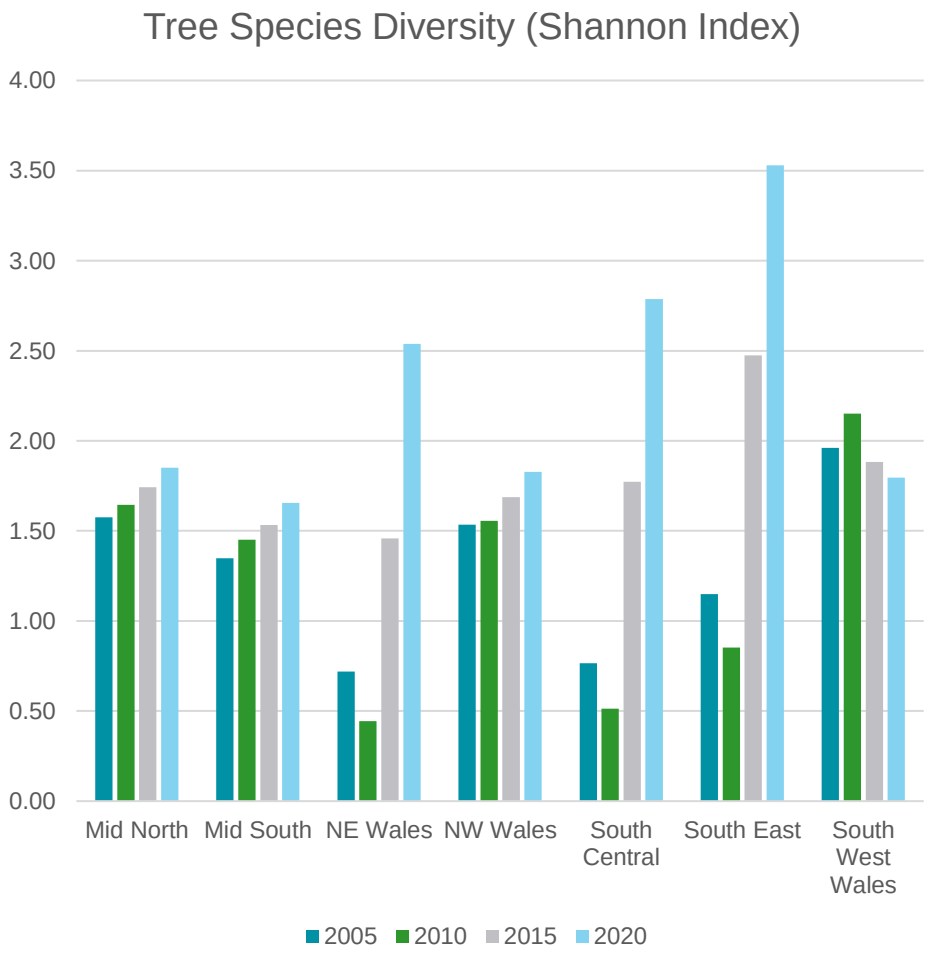
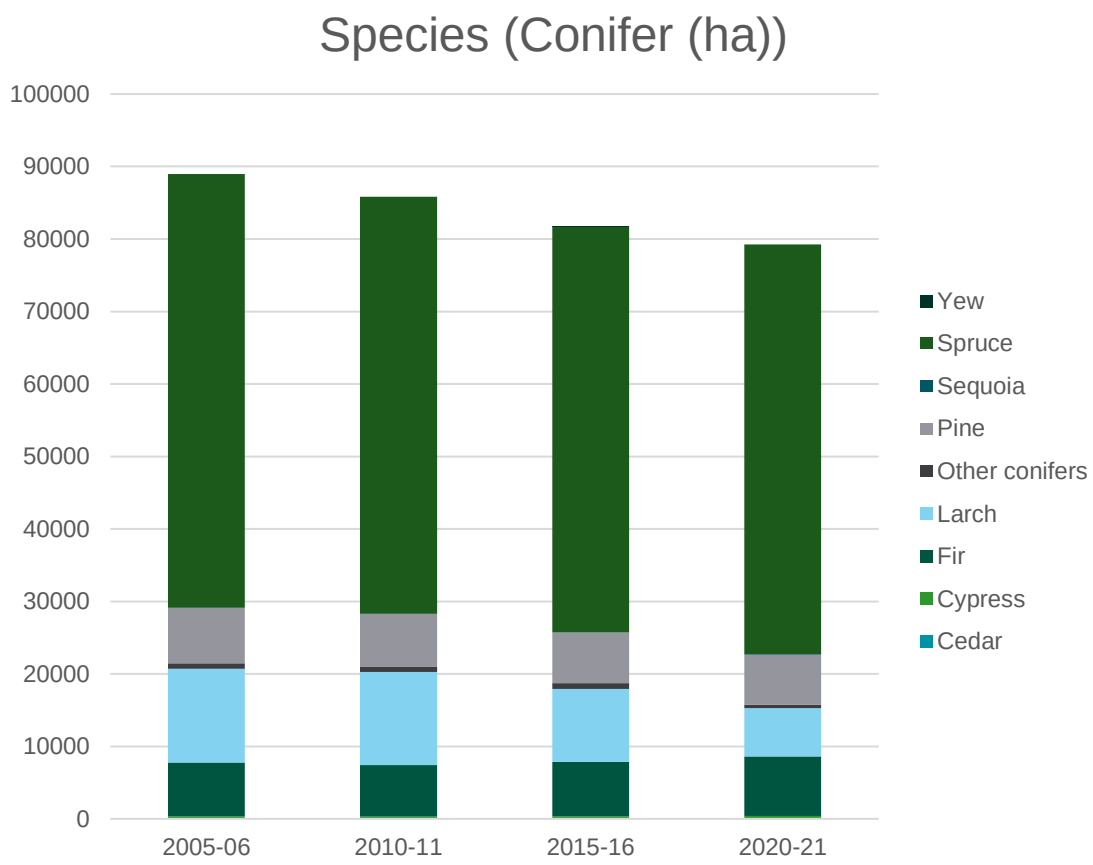
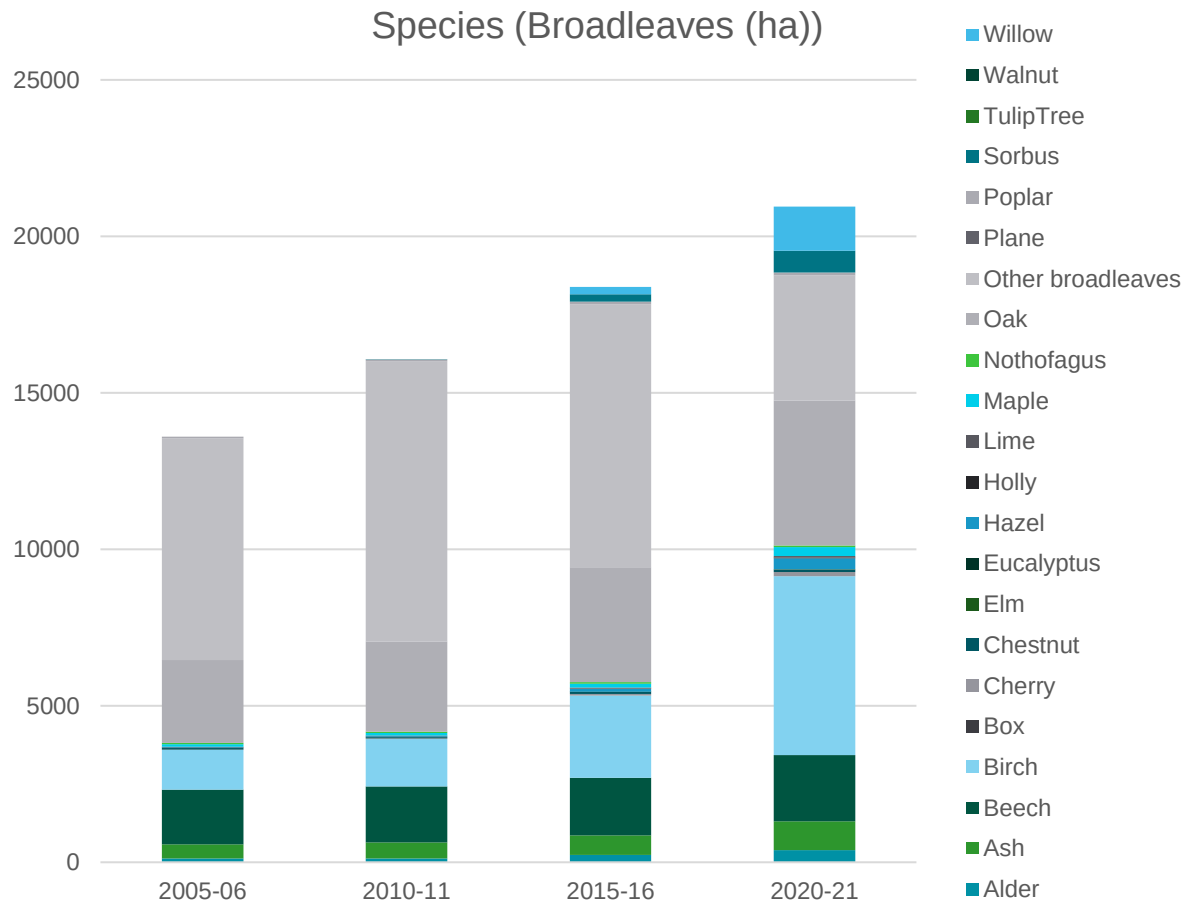
	2006	2010	2015	2020
Shannon Index	1.91	1.95	2.07	2.18
Max % of Dominant species	52.58	50.90	50.16	50.65
Species Richness	59	59	84	84



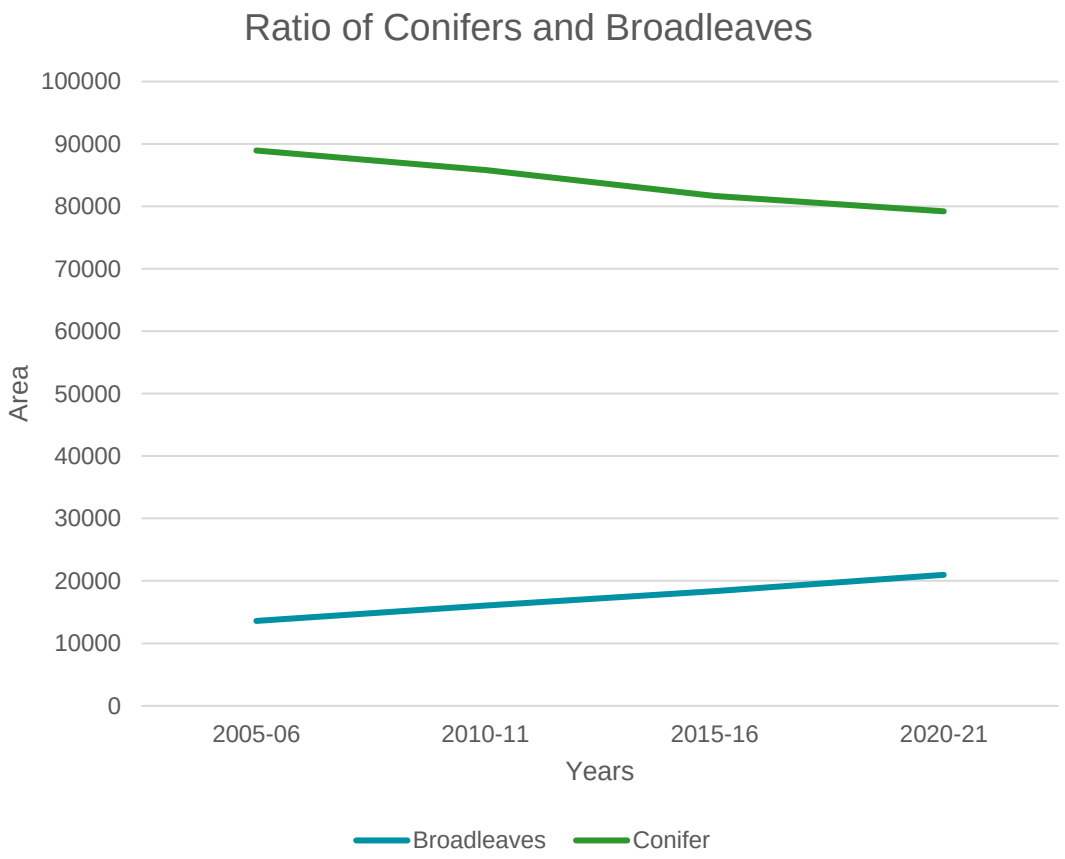
Increasing species diversity (Conifers)



Increasing species diversity (Broadleaves)



Increasing species diversity



Increasing Structural Diversity

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Case study 7

Forest Research

Transformation to continuous cover forestry at Clocaenog Forest

Clocaenog Forest is in Denbighshire, near Ruthin, in northeast Wales. The forest is managed by Natural Resources Wales and covers an area of more than 4000 ha. It was planted with predominantly coniferous species in the early 20th century and most stands are now in their second rotation. The climate is cool, wet and windy and much of the forest is over 350 metres above sea level and occupies a broad, rolling upland landscape.

In 2001, the Forestry Commission established a national network of continuous cover forestry (CCF) trial sites to increase understanding of continuous cover silviculture in British forestry. CCF is a silvicultural approach that seeks to create more diverse forests, both structurally and in species composition, by avoiding clear-felling and allowing regeneration after selective felling. Clocaenog Forest was one of the trial sites and large parts of the forest have been managed using CCF principles since then. In addition, the site was selected as an intensive research area to examine different methods of transforming even-aged stands to CCF, and to study their impacts on the growth and yield of stands and on regenerating trees in the understorey. CCF could be an appropriate adaptation measure, as the development of more diverse forests should reduce the risks posed by the changing climate and increasing biotic threats.

Management objectives

Clocaenog Forest is managed for a wide range of objectives, including timber production, recreation, tourism and conservation, with management for certain endangered species such as red squirrels and black grouse being very important. Stands are managed to ensure that a diverse and appropriate range of forest structure and species are present to deliver the management objectives.

Risks and opportunities

Main climate change risks

Climate change projections indicate that temperatures in the growing season will increase, potentially resulting in more rapid growth through to the 2060s; so there is an opportunity for an increase in productivity, where other factors are not limiting. The frequency of winter storms is also projected to increase, which could increase storm damage. Increased winter rainfall may further increase the windthrow of trees, due to reduced root-soil cohesion in saturated soils. Warmer conditions may increase the incidence of pests and/or disease outbreaks.

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

- Greater CCF or LISS,
- But there will be a place for Clearfelling systems
- Increased thinning across the land in our Care

Increasing Structural Diversity

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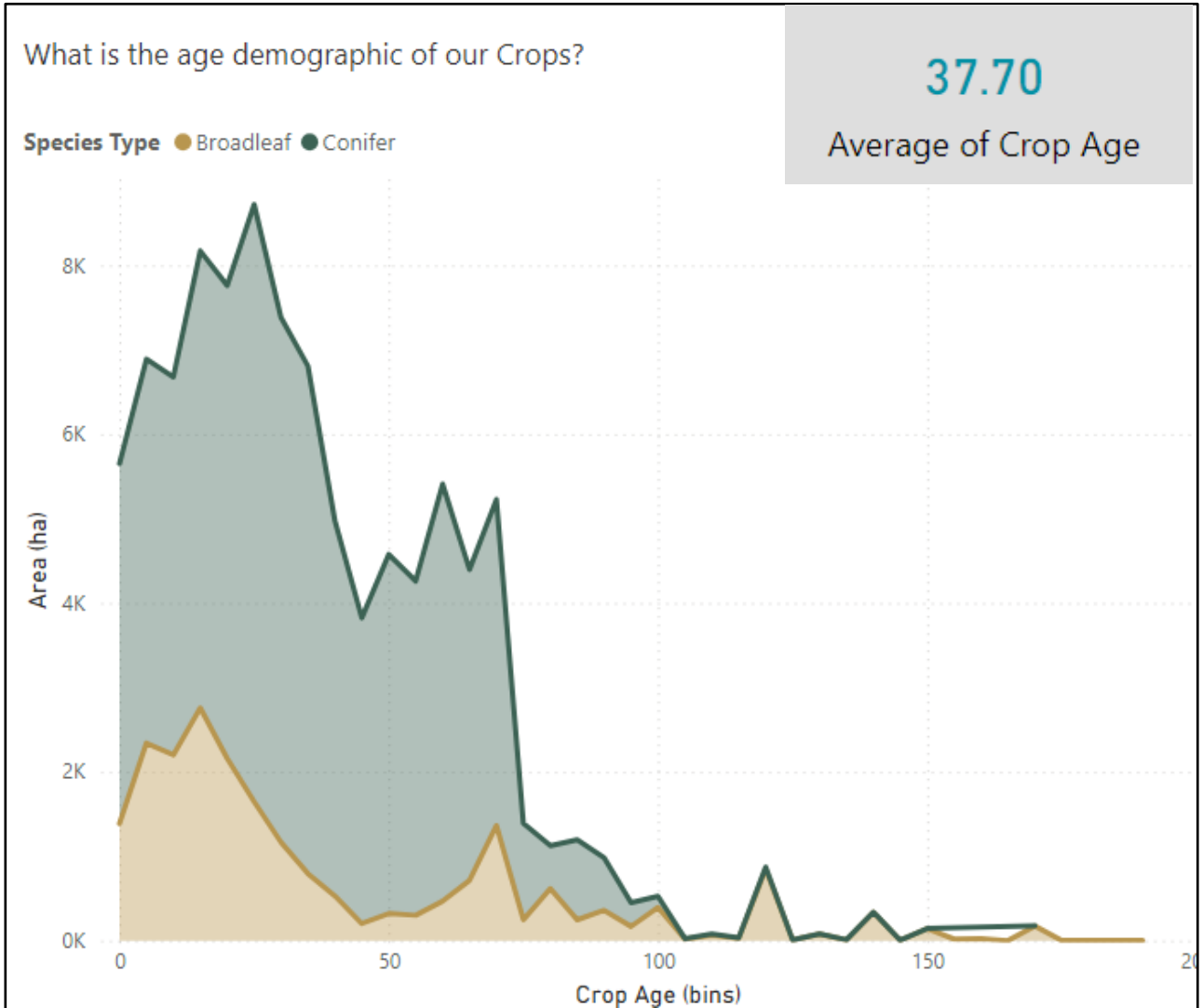

Wildfire

Natural Environment and Assets Technical Chapter, risk N6

Wind and Pests

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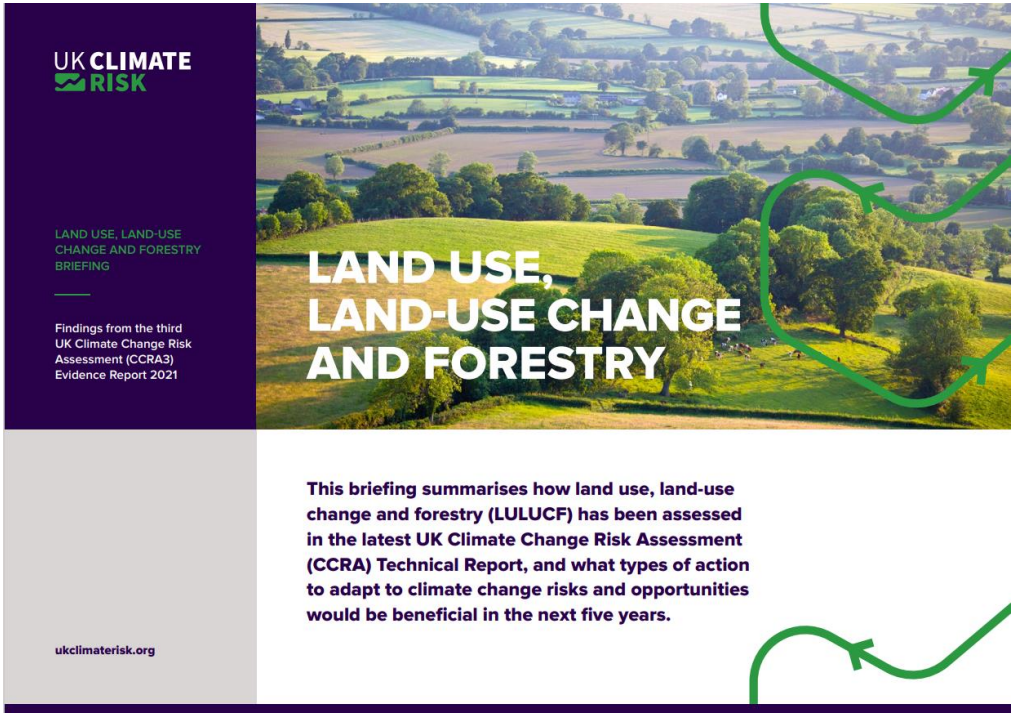
Extreme events create conditions for increases in pests and disease



Are we there yet?

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Discuss!