Forest Research

Adapting forest and woodland management to the changing climate

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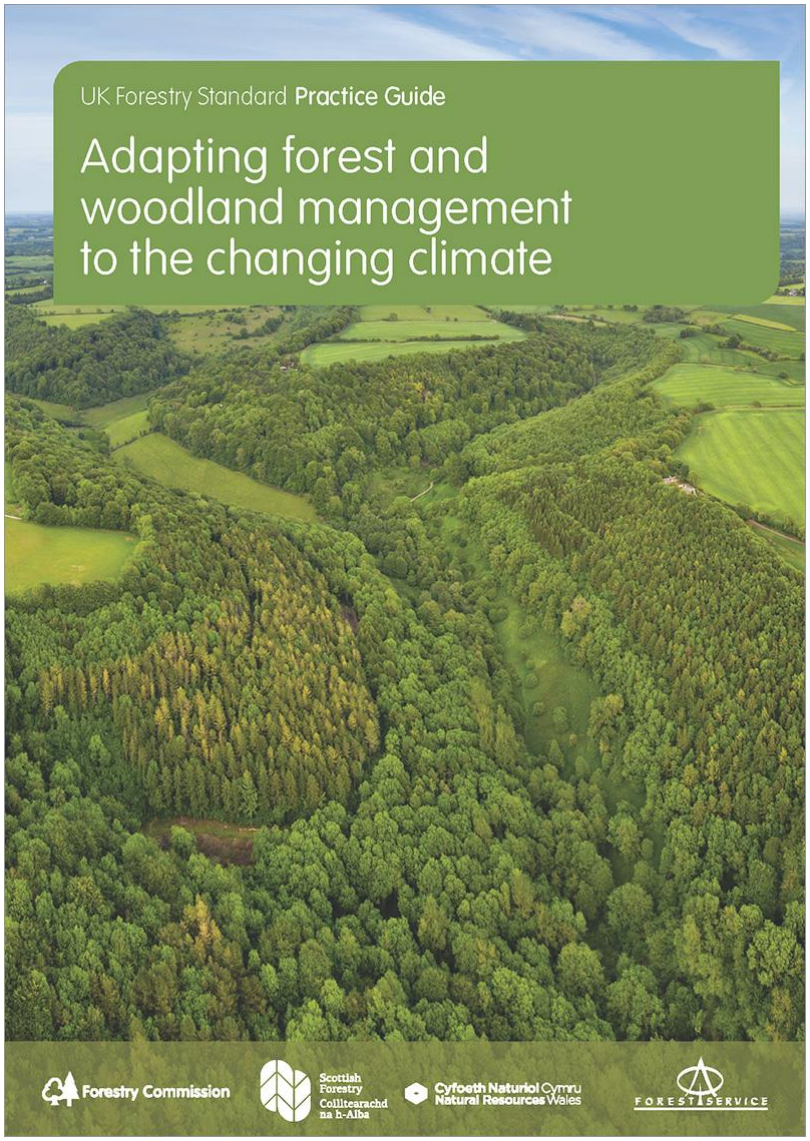
Forestry and Timber Knowledge Exchange and Networking Event
Bangor / Hybrid

13th June 2024

Update Topics

- UKFS Adaptation Practice Guide & Case Studies
- Climate Change Hub



Adaptation in context

Projections:

- Increased mean summer temperature
- Changing rainfall
- Extreme weather

Risks:

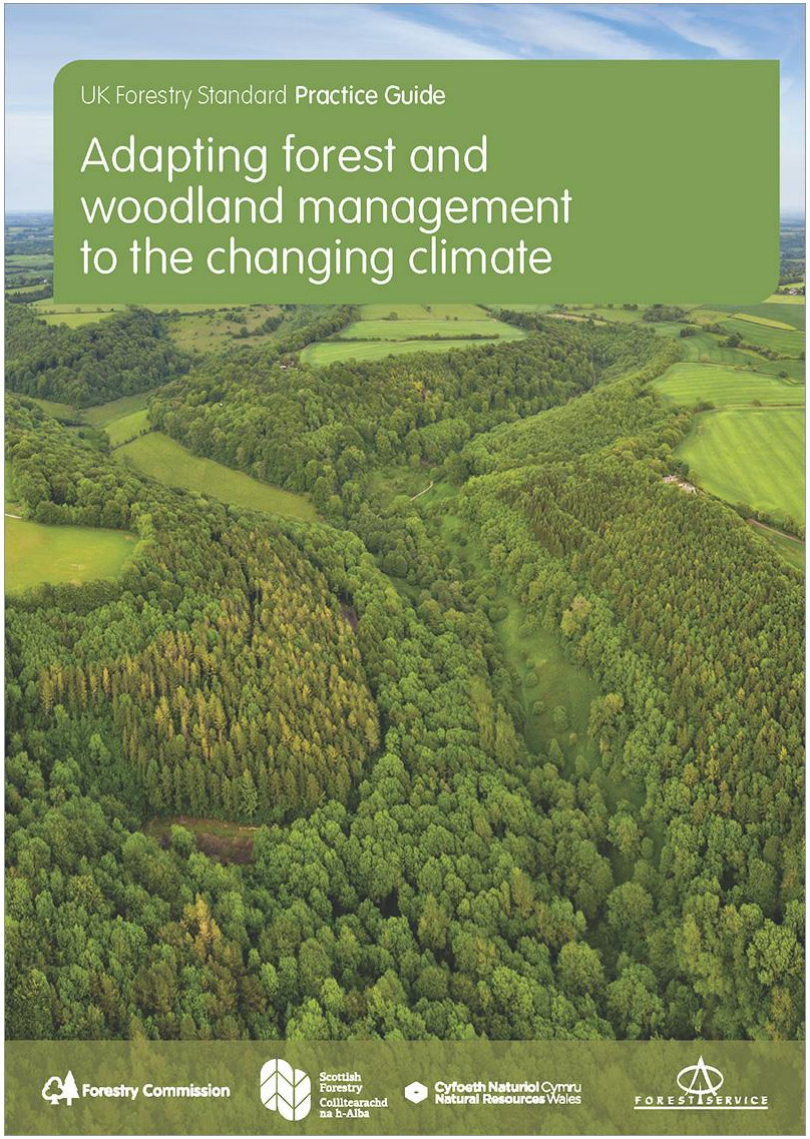
- Windthrow
- Wildfire
- Pest & Disease
- Drought
- Frost
- Flood

Addressing industry needs

"I just need something easy, clear and practical. It has to be based on science, yes lots of science, but I need language I can understand with advice I can actually act on"

Ambrose-Oji, Atkinson *et al*., (2019) Differentiating between land managers for understanding of "resilience", and factors influencing decision making.

UKFS Practice Guide



- Published May 2022
- Target audience: Owners, managers, planners and policy makers
- New 5-Step Adaptation Framework

Coverage

Feature

The New UK Forestry Standard Practice Guide *Adapting Forest and Woodland Management to the Changing Climate*

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Keywords: adaptation, climate change, forestry, trees, woodland

Our important forest and woodland habitats are experiencing increasingly rapid climate change which is accelerating the need to build resilience. How can we facilitate the necessary shift in practice and address barriers to change to help protect and sustainably manage our future forests and woodland? This article discusses the challenges facing the forestry sector and how our growing scientific understanding of adaptation measures needs to translate into practical guidance. We introduce the new UK Forestry Standard Practice Guide, which includes a five-step Adaptation Framework to help forest and woodland managers assess risks and select appropriate adaptation measures.

Introduction

The changing climate is affecting our trees, forests and woodlands; how they grow, survive and the suitability of certain tree species for different parts of the UK. This, in turn, is affecting their vulnerability to climate risks and potential to provide important ecosystem services including carbon sequestration, wildlife habitat, flood risk reduction, timber production and recreational space. For such services to continue, it is essential to take action to adapt existing woodlands to the changing climate, and to plan new woodlands appropriately. Research into how owners and managers are responding to environmental change has shown that owners commonly say that they plan to build adaptive practice into their decision-making (Ambrose-Oji *et al.* 2018). However, according to the British Woodlands Survey, uptake of adaptation measures has, until recently, been limited (Hemery *et al.* 2015, 2020).

Most woodland managers do not appear to have implemented change on the ground, unless they have been pushed to do so by an extreme weather event, disease outbreak or some other disturbance. This reluctance to act is partly linked to the long timescales associated with planning for forest and woodland management and also to different levels of understanding about future risks and how they might be managed. As most woodlands are managed with multiple objectives this adds to the uncertainty and complexity. There have also been mixed messages regarding the right way to build resilience. These factors are often intertwined and compounded by low levels of awareness of local climate change projections (Hemery *et al.* 2020). Where there has been adaptation activity it has mostly been concentrated on tree species diversification and, more recently, adoption of continuous cover forestry practices (Hemery *et al.* 2020), and the wider range of options has been largely overlooked.

Case study 7

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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.

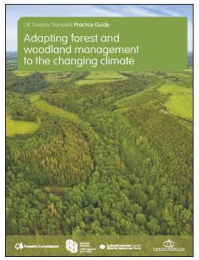
Management objectives

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

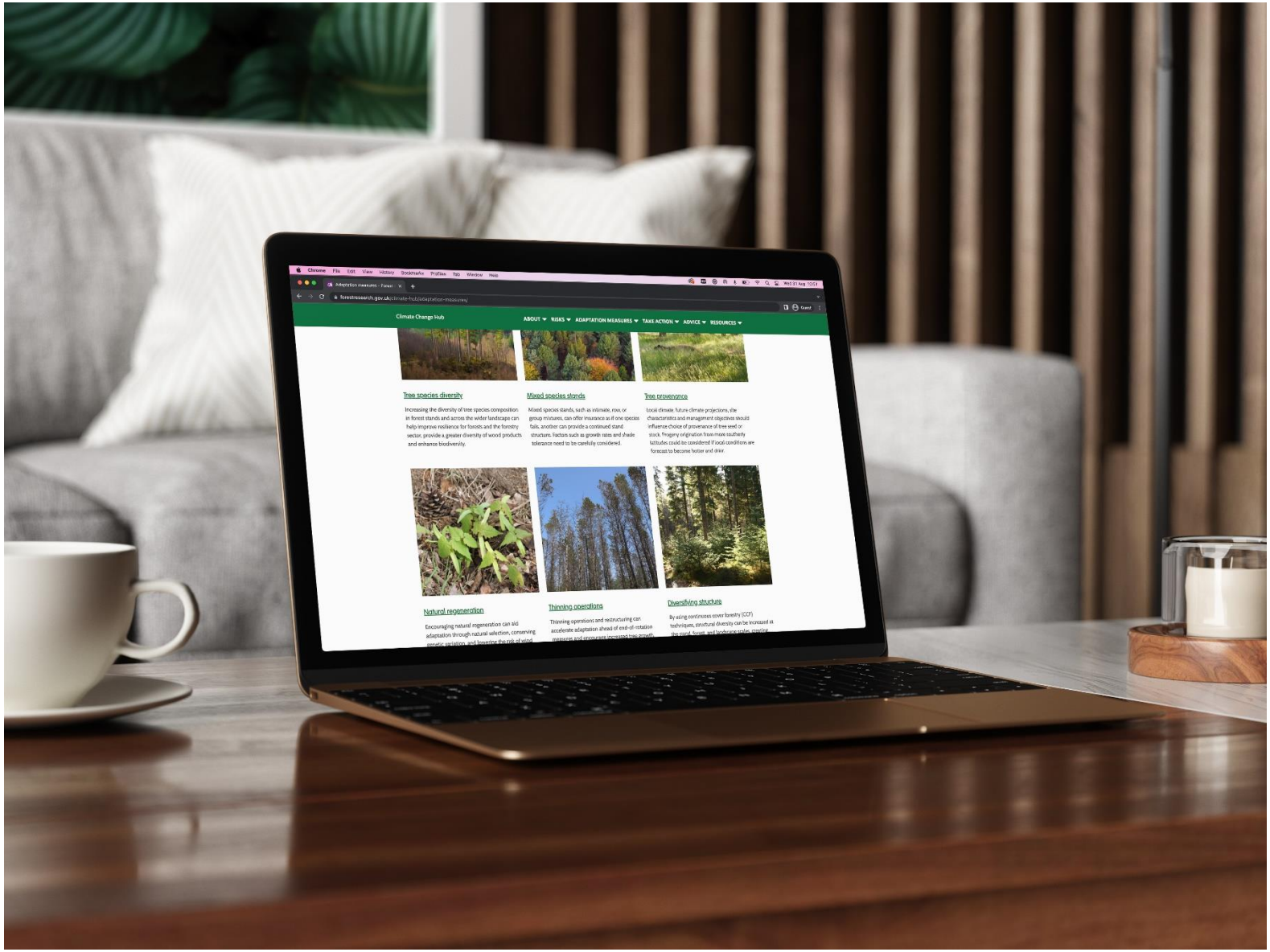
Climate change projections indicate that temperatures in the growing season will increase, potentially resulting in more rapid growth through to the 2060s; so there is an opportunity for an increase in productivity, where other factors are not limiting. The frequency of winter storms is also projected 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

Climate Change Hub



What is the aim?

"To encourage changes in UK forestry practice and management to address climate change threats"

Knowledge Hub for Woodland and Forest Resilience: Scoping Report
June 2021

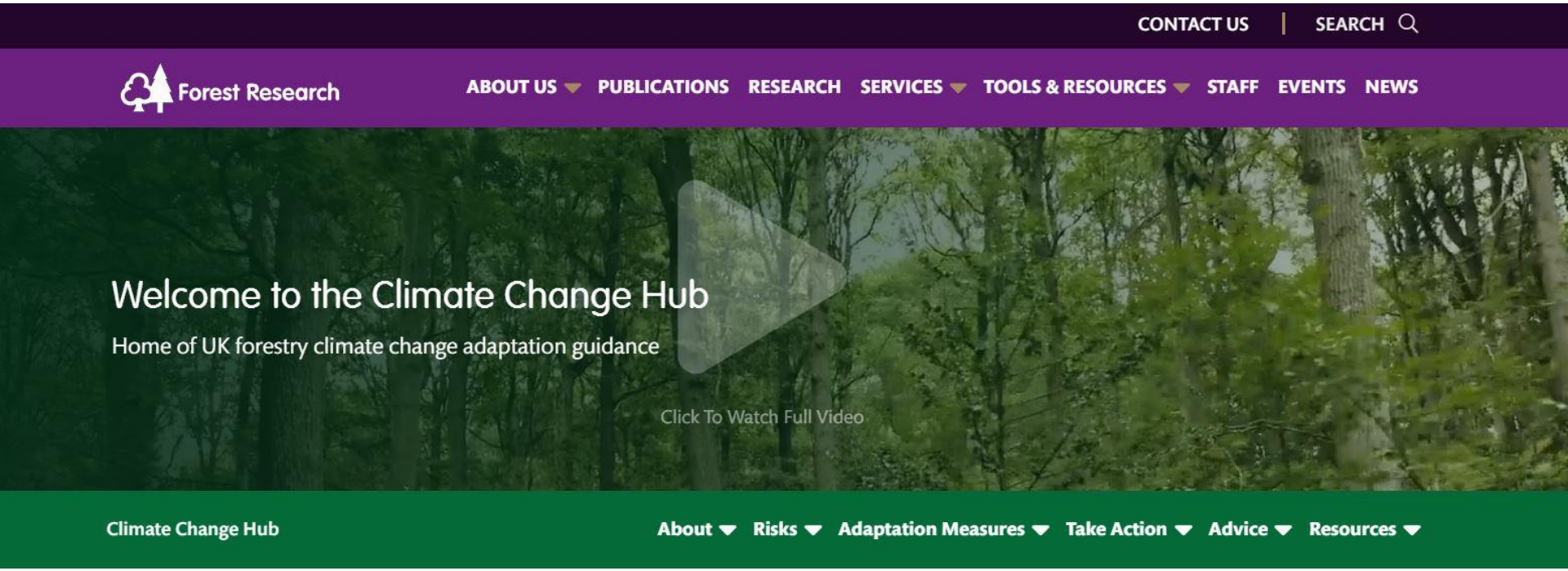
Who is the target audience?

Primary	Landowners, land managers and forestry practitioners
Secondary	Industry and woodland management advisors and non-governmental organisations
Tertiary	Local authorities, local interest groups, interested private individuals, DEFRA and devolved administrations, public bodies, UK research institutes, international research groups

What content is included?

- Climate change risks
- Adaptation measures
- Decision making tools
- 5-step Adaptation Framework
- Case studies
- Fact sheets
- Videos
- News

Virtual Adaptation Trail



- Information and guidance on climate change risks & adaptation measures
- Adaptation case studies
- Climate change fact sheets
- Videos
- Decision making tools
- UKFS Adaptation Practice Guide download
- 5-step adaptation framework
- Official country guidance
- Funding & support information
- Adaptation checklist
- FAQs

Risks

Windthrow

READ MORE

Flooding

READ MORE

Drought

READ MORE

Wildfire

READ MORE

Pest & Diseases

READ MORE

Frost

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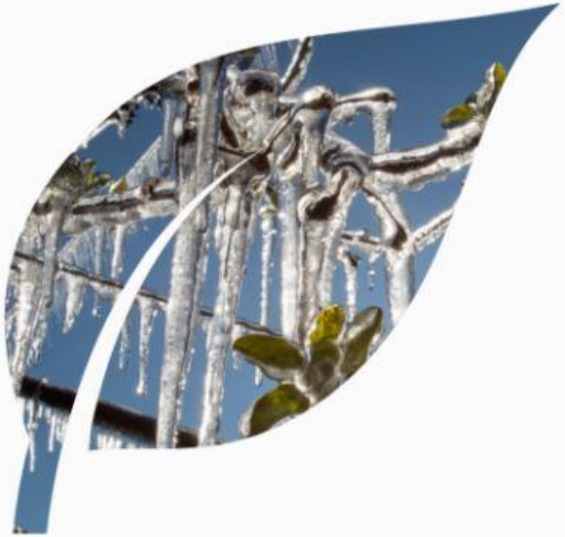
Frost risk

Adaptation measures

A selection of appropriate tree species, provenance and seed origin can reduce frost damage. Avoid frost-sensitive or marginal species, especially in vulnerable locations.

- Creating mixed species stands
- Choosing tree provenance



Adaptation measures

Possible adaptation measures for selected climate change risks

Measures	Risks					
	Windthrow	Wildfire	Pest/Disease	Drought	Frost	Flood
Increasing Tree Species Diversity	●	○	●	○	○	○
Creating Mixed Species Stands	●	●	●	●	●	– –
Choosing Tree Provenance	– –	– –	●	●	●	– –
Using Natural Regeneration	●	×	○	○	○	– –
Carrying Out Thinning Operations	●	●	○	●	– –	– –
Diversifying Structure	●	○	●	●	○	●
Considering Forest and Woodland Design	●	●	●	– –	– –	●
Establishment and Management	●	○	○	●	– –	– –
Adapting Infrastructure	●	●	– –	– –	– –	●
Contingency Planning	●	●	●	○	○	●

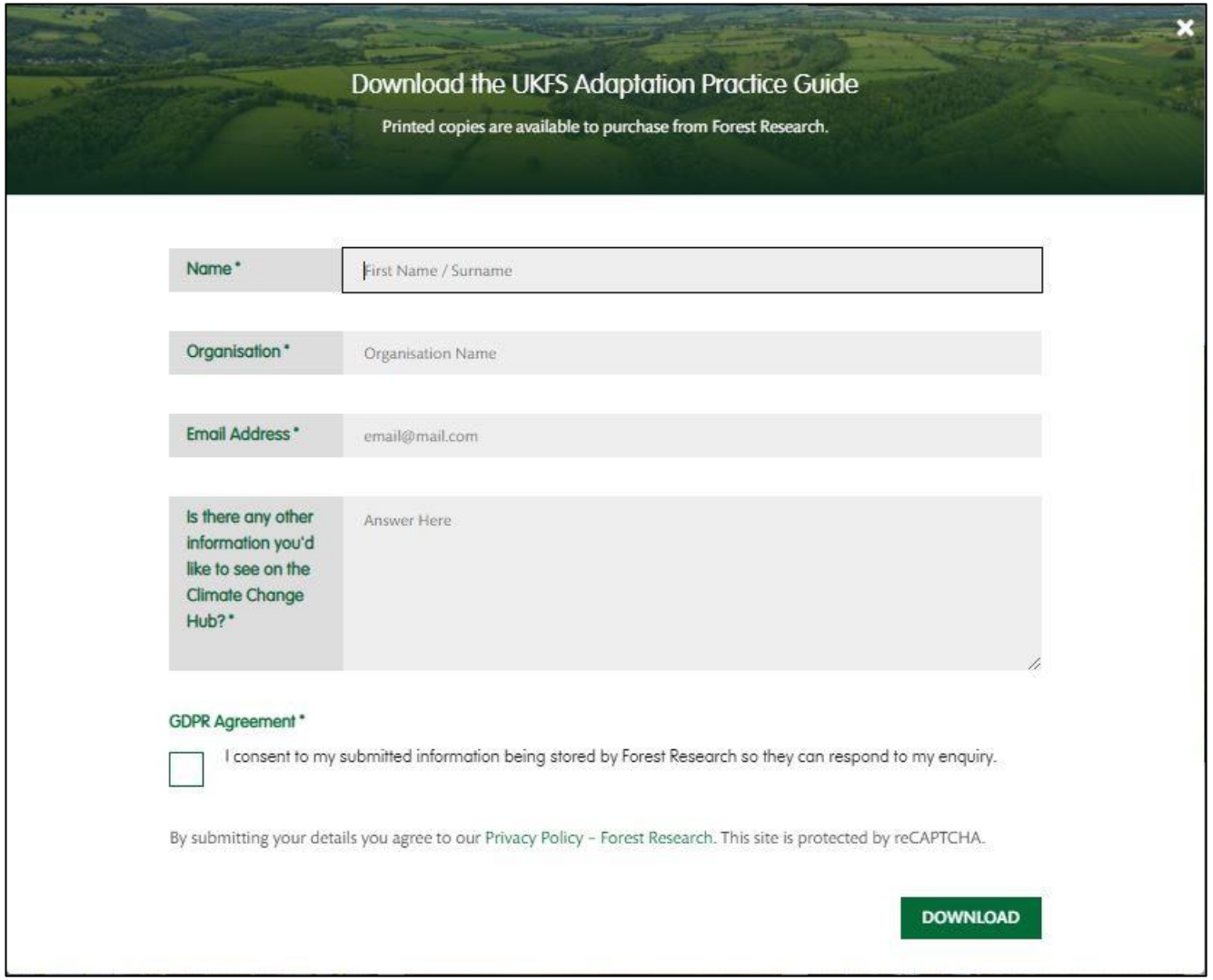
● Measure likely to reduce risk if applied appropriately

○ Measure may reduce risk but about which less is known

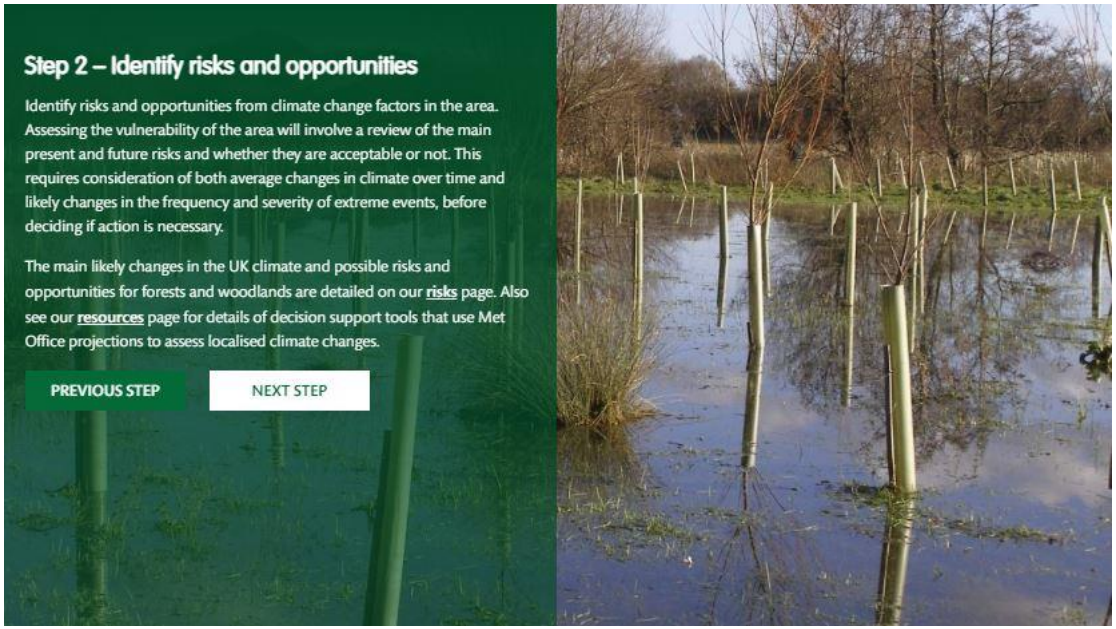
× Measure unlikely to reduce, and may exacerbate, risk

– – Lack of information or unknown

UKFS Adaptation Practice Guide



5-step Adaptation Framework



Adaptation checklist

Adaptation checklist

As you navigate the Climate Change Hub and plan to adapt your woodland, you may want to refer to the checklist below to ensure you have considered the following:

- [ ] How will climate change projections affect the risks to woodlands in your region? See our **decision support** page for guidance.
- [ ] Will site-specific factors and local conditions affect the level of risk to your woodland, such as soil type and aspect influencing drought risk?
- [ ] What are your current management objectives and what are the intended outcomes for the future?
- [ ] Could your current woodland management, or management history, influence how vulnerable the site is to various risks?
- [ ] How will the suitability of the current or planned tree species within the woodland change under future projections, and could alternative species be more suitable? The **ESC** species suitability and **ClimateMatch** tools can support decision making.
- [ ] What are your criteria for decision making?
- [ ] Which further **tools** and **resources** are required to support your decision making?
- [ ] Which **adaptation measures** are suitable for your woodland and when can they be implemented?
- [ ] Can measures be integrated into existing processes or are new practices needed?
- [ ] How you will record, monitor and review progress?

Official country guidance

- Climate change projections
- Forest governance
- Policy
- Case studies
- Further resources

Resources

Decision Support Tools

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Case Studies

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Publications

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Thank you for listening

www.forestresearch.gov.uk/staff/gail-atkinson/

www.forestresearch.gov.uk/climatechangehub