

Climate change and risks

What are key risks to our forests and woodlands?

Gail Atkinson, Bruce Nicoll and James Morison



There are many risks to UK forests, woodlands and trees from climate-change trends and extreme weather events. These risks can be managed to reduce the potential impact on our forests and the ecosystem services they provide.

Background

Risk is the potential for a negative consequence to something of value, such as woodland from an event or change in occurrence (trend). Risk is often represented as the probability of the occurrence of a hazardous event, multiplied by the consequence, should the event occur. Climate-change projections indicate trends of rising sea levels; milder, wetter winters; and warmer summers. Projections indicate an increasing frequency of extreme events such as floods, waterlogging, droughts, heatwaves and windstorms. There are also indirect risks from these climate changes, such as wildfire and an increasing incidence and likely severity of pest and disease outbreaks.

Owners and managers should take urgent action to assess the risk to their woodlands and improve forest resilience by implementing **appropriate measures** as soon as possible. Measures need to be appropriate for the location, management objectives and timescales. This factsheet highlights the main risks from climate change in the UK: wind, wildfire, drought, flooding and waterlogging, frost damage, pests and diseases. The UKFS Practice Guide *Adapting forest and woodland management to the changing climate* provides detail.

Wind risk

The UK is exposed to frequent storms and high winds are a major threat to our forests. The risk of wind damage is expected to increase as a result of more frequent storms and reduced root anchorage associated with waterlogging. Management measures that can reduce wind risk include increasing tree species diversity, earlier thinning and/or harvesting and use of low-impact silvicultural systems such as continuous cover forestry.



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Wildfire

Wildfires can start within forests or spread from neighbouring land. The changing climate is likely to increase the risk of wildfires and the length of the

fire season, which is currently during spring and summer. Young stands of conifers can have a higher risk than mature broadleaved and mixed species woodlands. Two main factors can increase wildfire risk: higher recreation use (leading to higher incidence of accidental ignition) and higher fuel loads from dead and dry material due to pests, diseases and drought periods. Forest and infrastructure design, contingency planning, cooperation with neighbouring landowners, and working with fire and rescue services can reduce the risk.

Drought

Prolonged dry periods can cause water stress in trees, impacting seed production, reducing growth and leading to dieback and mortality. Dry springs may affect the current year's growth whilst late summer droughts can affect the next season's growth. Repeated droughts may have a cumulative effect, leading to growth reductions several years later. The effects differ with species and age. Newly planted trees are particularly vulnerable, especially on exposed sites. Key factors include soil characteristics and rooting depth. For example, trees on shallow, lighter soils are more prone to drought stress than those on deeper, heavier soils. Adaptation measures include increasing species diversity, using mixed species, and reviewing establishment practices including more use of natural regeneration.

Pests and diseases

The changing climate will increase the risk from pests and pathogens, either through the direct impact on their abundance or distribution, or indirectly by affecting tree growth and vigour. Milder, shorter winters will enhance the survival and infection potential of tree pathogens and contribute to an increase in many woodland mammal populations including deer and grey squirrels. This increases the risk of damage to young trees (therefore poorer establishment and regeneration) and the form of older trees. Appropriate active management including monitoring will help manage these risks.

Frost

Frost can damage plant tissues, affect growth, seed production and increase susceptibility to disease. This damage can also impact timber quality. Frost risk tends to be greater inland than in coastal areas but is determined by the local microclimate. Trees

are more vulnerable to cold spells that occur outside their dormant period, causing damage to sensitive new growth in spring, or to the current year's growth in autumn. As the climate warms, the frequency and severity of frosts are reducing, and the length of the frost-free season has increased in many areas. However, the trend towards earlier budburst of many tree species in recent decades is increasing the risk of spring frost damage. Frost-sensitive species should be avoided in frost-prone locations, or their planting limited to a small component alongside less sensitive species, and choice of provenance considered.

Flooding and waterlogging

The frequency of flood events is expected to increase due to climate change. Forests and riparian woodlands can reduce downstream flood risk by slowing the flow of water. However, trees may themselves be damaged by waterlogged soil, especially during the growing season, leading to root death and greater vulnerability to infection and storm damage. Appropriate species choice, woodland design and management can be used to maintain healthy woodland and reduce downstream flood risk.

More information:

Practice Guide on *Adapting Forest and Woodland Management to the Changing Climate*:

www.forestresearch.gov.uk/research/climate-change-adaptation/adapting-forest-and-woodland-management-to-the-changing-climate/

Climate Change Hub:

www.forestresearch.gov.uk/climatechangehub

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