

Climate change programme

Community

Economy

Environment



**natural
scotland**
SCOTTISH GOVERNMENT

Section 1: Introduction

Climate change is one of the single biggest threats facing us all and a sense of urgency is needed if we are to respond effectively.

This Forestry Commission Scotland climate change programme develops the commitments made in the [Scottish Forestry Strategy](#) which, since its publication in 2006 has given strong emphasis to the role of Scotland's forests in mitigating, and responding to, climate change. It explains what Forestry Commission Scotland will do over the next few years to increase the contribution of forestry to Scotland's climate change response, and to meeting the Scottish Government's climate change targets.

Scotland's climate change targets are set out in [Low Carbon Scotland](#) (the Scottish Government's report on policies and proposals for meeting the emissions reductions targets), and in Scotland's [National Adaptation Programme](#).

This Forestry Commission Scotland programme describes climate change predictions for Scotland and explains the role that forestry has in relation to climate change. The programme then explains what Forestry Commission Scotland will do to meet its objectives for reducing net greenhouse gas emissions in Scotland, and in making Scotland more resilient to the impacts that climate change will have on us all. Six objectives are described. Finally, the programme explains how the commitments will be delivered and monitored.



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Climate change projections for Scotland

During the last 40 years average temperatures in all parts of Scotland have increased in every season. In the north and west rainfall has increased by almost 60% in winter months. Climate impacts for Scotland have been summarised in the UK 2012 [Climate Change Risk Assessment \(CCRA\)](#) which explains that:

- Drier summers may reduce water availability, affecting both the natural environment and public water supplies;
- Changes in soil conditions and other aspects of the natural environment may affect biodiversity and the ability of many native Scottish species to thrive;
- Changes in climate will result in loss of species and changes in migration patterns;
- Changes in coastal evolution caused by more frequent extreme weather and by rising sea levels may impact on coastal communities and habitats across Scotland;
- Warmer conditions may lead to an increase in forest productivity and in yields of key agricultural crops, although there are likely to be increased threats due to new or more widespread pests and diseases;

- Increased coastal and inland flooding may affect people, property, infrastructure, natural habitats and a range of animal and plant species.

For the forestry sector in Scotland, the key risks and opportunities for woodlands from climate change appear to be increased problems of windthrow and drought, wildfire, pests and diseases, perhaps tempered by increases in productivity in tree species that are matched to the new conditions. Scotland's response to climate change – such as changing demand for energy from woodfuel and wind, or a desire to conserve peatland carbon stocks, will have additional impacts on the forestry sector – some positive, some negative.



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The role of forestry

The Read Report, an independent assessment of the potential of the UK's trees and woodlands to mitigate and adapt to our changing climate states that *"UK forests and trees have the potential to play an important role in the nation's response to the challenges of the changing climate. Substantial responses from the UK forestry sector will contribute both to mitigation by abatement of greenhouse gas emissions and to adaptation, so ensuring that the multiple benefits of sustainable forestry continue to be provided in the UK."*



The report explains that:

- **There is a clear need for more woodlands:** woodland creation provides a highly cost- effective and achievable abatement of greenhouse gas emissions when compared with potential abatement options across other sectors.
- **Existing forests are an asset which should be managed wisely:** sustainable forest management can maintain the carbon store of a forest at constant levels while the trees continue to remove CO₂ from the atmosphere and transfer a proportion of the carbon into long-term storage in forest products.
- **Ignoring climate change is not an option:** a move towards planned (rather than reactive) adaptation in woodland creation and management is needed, because the planning horizons for forestry are inherently long.
- **Harvesting and use of wood increases forestry's mitigation potential:** harvested wood products can be used to substitute for materials and fuels which involve high net emissions of greenhouse gases
- **Trees help people adapt:** trees have an important role in helping society to adapt to climate change, particularly in the urban environment through providing shelter, cooling, shade and runoff control.

These five principles underpin the objectives and actions in the Forestry Commission Scotland Climate Change Programme.

Section 2: The programme

Part one: Increasing forestry's role in mitigating climate change.

This part of the programme seeks to promote broader appreciation of the role of woodland creation and management in reducing Scotland's overall emissions and to ensure that forestry realises its potential to mitigate climate change. It elaborates and builds upon the commitments made in **Low Carbon Scotland** (the Scottish Government's report on policies and proposals to meet emissions reductions targets).

Objective 1: Promote woodland creation that fits with broader land use, and minimise the loss of woodland

Creating new woodlands provides a highly cost-effective and achievable way of abating future greenhouse gas emissions, but needs to be done in ways which integrate with other land-based objectives. We will support the **creation of 10,000 hectares of new woodland** each year until 2020 and **review this target** for the period which follows. We will work with others to implement the recommendations of the **Woodland Expansion Advisory Group** and ensure that woodland creation integrates with other land-based objectives. As part of this, we will ensure that forestry is an integral part of **strategic land use planning processes** aimed at delivering a broad range of priorities including adaptation and mitigation. We will also ensure that we are clear on the **carbon impacts of land use change** and this will help to inform decisions about site selection for woodland creation and woodland removal.

Much woodland creation is funded with public money but increasingly we are looking for ways to bring other finance to bear. We will support woodland creation by providing **grant aid** for owners wishing to create new woodlands that meet the required standards of good practice, and by **creating woodland on the national forest estate**. We will also support the **woodland carbon market** by promoting the Woodland Carbon Code and developing enhanced certification and carbon registry processes.

Woodland loss works against the gains that we make when we plant trees, and where onshore renewables developments such as windfarms are concerned, can undermine public confidence in their carbon benefits. We will support the implementation of the **policy on the control of woodland removal** with the aim of reducing the loss of woodland, and we will monitor rates of woodland loss and compensatory planting.

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Objective 2: Enhance land-based carbon stocks and increase the use of wood and timber

As forests develop they tend to become net accumulators of carbon. As well as continuing to **promote sustainable forest management** (being clear how this is affected by a changing climate), we need to better **understand the greenhouse gas dynamics** of forests and soils, including peatlands. We will develop guidance and action that **promotes forest carbon storage**, and restore peatlands that were planted with trees where this is the best thing to do.

Using wood and timber in place of more energy-intensive materials could support Scotland's emissions reductions targets. As part of our work to help Scotland achieve its renewable heat targets, we will continue to promote the use of **wood as a source of renewable energy**, and to **develop woodfuel markets** and create energy forests. We will also promote the use of **timber in construction**, and support this by publishing information on the **carbon value of alternative timber products**.

Objective 3: Reduce greenhouse gas emissions

The forestry sector needs to continue to minimise the emissions that it generates. We will review how we assess the **carbon impact of forestry operations**, and support the implementation of industry-wide guidance on **minimising carbon losses in forest engineering**. We also want to see the local use and processing of timber to **reduce timber transport** and the associated carbon emissions.

As an organisation, Forestry Commission Scotland has a responsibility to reduce its own carbon footprint and we will continue to pursue the challenging targets on travel and energy use set by our '**business sustainability**' programme as well as ensuring that our **environmental management** remains independently certified to international standards. As a public body we also have certain **duties** in respect of climate change which we are building into our corporate activity.

To contribute to the Scottish Government's renewable energy generation targets, we will continue to work with renewable energy developers to **implement wind, hydro and other renewable energy schemes on the national forest estate**, where we will seek to exemplify how such developments can benefit the nation.



Part two: Building resilience in a changing climate

This part of the programme aims to build the resilience of the forestry sector so that it can continue to provide benefits to Scotland, even as the climate changes. It also seeks to ensure that woodlands and forestry are being used to reduce the risk from climate change for the people and biodiversity of Scotland. This part of the programme builds upon the commitments made in the Scottish Government's National Adaptation Programme.

Objective 4: Help forest managers to adapt forestry practice to make forests more resilient to changing conditions

Forest managers need to factor the changing climate into the way that they manage forests so as to maximise the opportunities and minimise the risks. Projections suggest that future climatic conditions may not suit the forests that we have today, and scientists suggest that there could be an increase in extreme events such as storms, heavy rainfall or droughts that could damage forests. The forestry sector's response to the likelihood of climatic change is complicated by the long timescales of forest management and fact that climate projections do not allow future growing conditions at the forest level to be predicted with any certainty.

In response to change and uncertainty, we will ensure that **forest management planning** supports resilience-building in Scotland's forests and will **raise forest managers' awareness** of climate risks and opportunities. We will provide advice to forest managers to improve their capacity to adapt their forest management, which will include encouraging a sector-wide move towards planning and managing **well-structured and diverse forests** that can better withstand change and extreme events. We will develop our understanding of the impacts of climate change on biodiversity, and in priority native woodland habitats we will promote **actions to facilitate adaptation** including encouraging natural regeneration, **increasing native woodland creation** and developing **forest habitat networks**. We will also work to **halt the loss and fragmentation** of existing priority habitats

We will support research, trials and demonstration sites to identify appropriate **species and provenance choices** which take account of projected changes in climate, and support forest managers to use them. We will continue to carry out **research into forest adaptation** more generally, promoting the findings to those who need them. As part of this we develop our understanding of the benefits of **habitat connectivity and habitat networks**, including integrating forest and open habitat networks for biodiversity.

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Objective 5: Enhance capability to detect and respond to threats to forests

Climate change is already bringing a range of direct threats to forests and appears to exacerbate the threat posed by pests and diseases – but these threats come on top of a wide range of other pressures on forests that reduce their resilience. Our aim is to increase our understanding, detection and monitoring of these threats while increasing our capacity to deal with them.

We will enhance awareness, establish preventative measures and develop management methods to deal with **pests and diseases** that could affect forest productivity and the wider environment. As part of this we will maintain **heightened vigilance** against the introduction of new (or new strains of) pests and diseases and will put in place **practical responses to serious threats** to tree health. We will also work in a co-ordinated way with others to tackle new or increased threats from **invasive non-native species**.

We will **monitor principal risks** and, on the national forest estate, we will maintain **emergency response readiness** for biological and weather threats. We will raise forest managers' awareness of the need to plan to **reduce risks and prepare for disruptive events**, such as storms, fire and flooding, and to have in place contingency plans to deal with the consequences. As part of this we will work to **raise forestry civil engineers' awareness** of climate change projections so that culverts, drainage systems and road and trail design are appropriately specified.

Objective 6: Use trees and forests to reduce the risks of climate change to Scotland

Our aim is for forestry to be widely used to help communities and the wider environment to cope with the impacts of climate change, by minimising its adverse effects.

We will work with other stakeholders to develop and deliver **decision-making tools** that identify the role of woodlands in **natural flood management**, and will encourage the use of trees and riparian woodland to prevent riverbank erosion and reduce thermal stress on the flora and fauna living in the water.

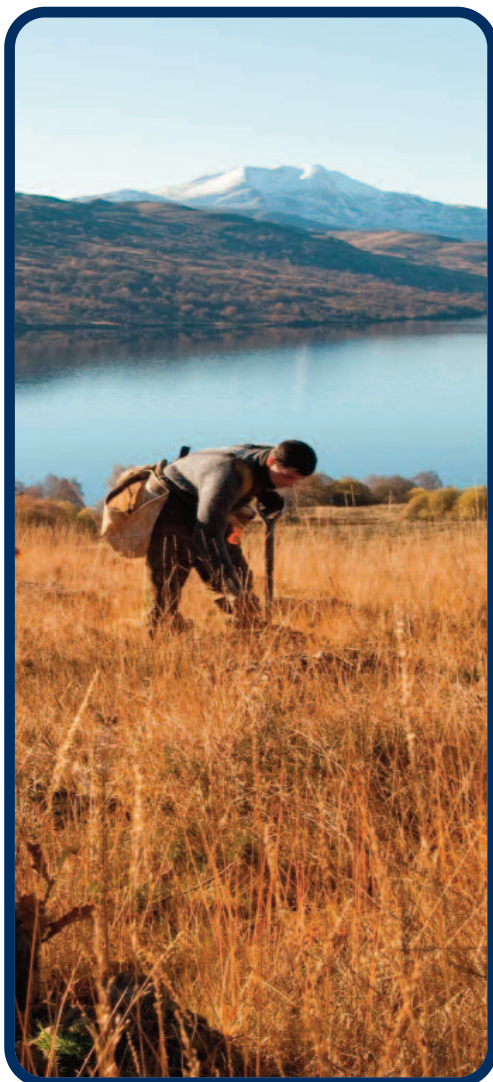
We will promote research findings that demonstrate the role of trees and woodlands in **urban climate control** in Scotland, and encourage the use of trees as part of **sustainable urban drainage systems**.

We will help forest managers to identify areas and causes of **slope instability** on their estates, and find site-appropriate solutions to erosion and landslide – particularly where this threatens Scotland's transport and other built infrastructure.



Section 3: Delivering and Monitoring the programme

Delivery of the actions listed in this plan will be undertaken by all parts of Forestry Commission Scotland working together. We will use all of the following mechanisms:



- **Grants and regulations:** forest management action will be underpinned by grants and regulations which take climate change into account.
- **Research:** The FC Science & Innovation Strategy will provide the basis for our research commissioning and scientific studies of carbon and greenhouse gas balance and adaptation actions will be undertaken at the Scottish Research Forest at Queen Elizabeth Forest Park.
- **Demonstration:** A variety of adaptation actions and adaptive management approaches will be demonstrated at sites such as the Scottish Research Forest and the Kilmun Arboretum.
- **Strategic land use planning:** regional Forestry and Woodland Strategies, regional Land Use Strategies and broader strategic approaches such as the Central Scotland Green Network provide opportunities to integrate climate change considerations into action on the ground.
- **National forest estate:** The Forest Enterprise Scotland strategic plan describes how climate change considerations influence the management of the estate.
- **Training and guidance:** The Forestry Commission Scotland website and existing programmes of outreach such as plant health days will incorporate climate change information.
- **Monitoring and surveillance:** A variety of monitoring and surveillance is carried out across the organisation, much of which is relevant to delivering climate change actions
- **Communications:** action on climate change will be incorporated into a range of communications materials produced by Forestry Commission Scotland.

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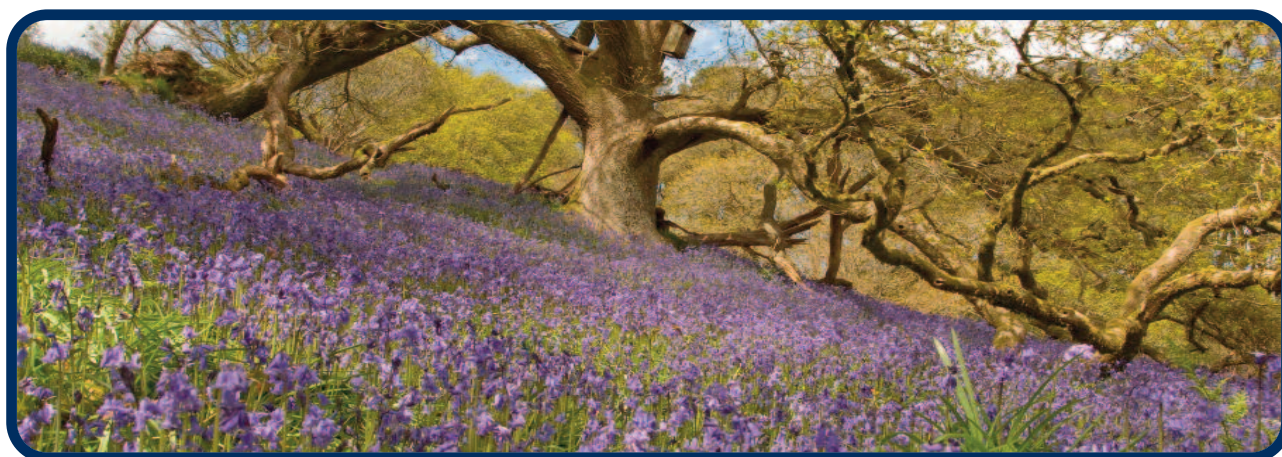
No new indicators will be developed to monitor this climate change programme. However, the following indicators are already being monitored (brackets denote the process through which these are currently monitored) and these are relevant to monitoring the effectiveness of this programme:

Increasing forestry's role in mitigating climate change

- Area of new planting (SFS)*
- Annual net carbon sequestration by new woodlands (SFS)
- Woodfuel usage (SFS)
- Installed capacity of wood energy plant (SFS)
- Actual wood production (SFS)
- Reduction in energy use (electricity, gas, coal and oil) (Greenerways)
- Reduction in Forestry Commission Scotland / Forest Enterprise Scotland administrative travel (Greenerways)
- Wind energy installed capacity on the national forest estate (FES Strategic Plan)
- Hydro-electric installed capacity on the national forest estate (FES Strategic Plan)

Building resilience in a changing climate

- Proportion of woodland area managed under low impact silvicultural systems (SFS)
- Proportion of woodland SSSIs in favourable or unfavourable recovering condition (SFS)
- Progress against HAP targets for native woodland condition (SFS)
- Progress against HAP targets for native woodland restoration (SFS)
- Proportion of woodland related UK BAP species and habitats identified as stable or increasing/ recovering or in favourable condition (SFS)
- Area of woodland with active, approved deer management plans (SFS)
- Public opinion on ways in which forests and woodlands can impact on climate change (Forestry Statistics)
- Length/area of baseline rivers/lochs in forested catchments where ecological quality is of good or high status (SFS)



* SFS - Scottish Forestry Strategy

Section 4: Fit with the Scottish Forestry Strategy and Corporate Plan

This table explains how each of the objectives of this climate change programme fits with existing programmes of work across Forestry Commission

Scotland. Relevant staff can be contacted using their email addresses in the form firstname.lastname@forestry.gsi.gov.uk

Objective	Corporate plan links	SFS 'Key Theme' links	Links to other published programmes of work (if applicable)	Contact
1. Promote woodland creation that fits with broader land use, and minimise the loss of woodland	Woodland creation	Climate change	Woodland Expansion Advisory Group implementation plan	Maida Ballarini
			Woodland carbon code	Chris Nixon
			Grants for woodland creation	Brendan Callaghan
			National forest estate strategic plan	Simon Hodge
			Control of woodland removal	Maida Ballarini
			Forestry and soils	Julia Garritt
2. Enhance woodland carbon stocks and increase the use of wood and timber	Industry development	Climate change	Greenhouse gas dynamics	Chris Nixon
	Renewable energy	Timber	Timber development programme	Cameron Maxwell
3. Reduce greenhouse gas emissions	Cross cutting	Climate change	National forest estate strategic plan	Simon Hodge
		Cross cutting	Greenerways	Chris Nixon
4. Help forest managers to adapt forestry practices to make forests more resilient to changing conditions	Industry development	Climate change	Resilience resources	Maida Ballarini
	Woodland expansion	Biodiversity	Woods for nature programme	Gordon Patterson

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Objective	Corporate plan links	SFS 'Key Theme' links	Links to other published programmes of work (if applicable)	Contact
5. Enhance capability to detect and respond to threats to forests	Industry development	Climate change	Pests and diseases	Hugh Clayden
	Woodland expansion		Resilience resources	Maida Ballarini
	Natural and cultural heritage	Biodiversity	Woods for nature programme	Gordon Patterson
6. Use forests to reduce the risks of climate change to Scotland	Natural and cultural heritage	Environmental quality	Water and flooding soils	Julia Garritt
			Slope instability	Kim Leech
	Urban forestry	Access and health	Woods in and around towns	Bob Frost
			Woods for health	Kevin Lafferty
			Central Scotland Green Network	Neil Langhorn



Forestry Commission Scotland serves as part of the Scottish Government's Environment and Forestry Directorate and is responsible to Scottish Ministers.

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