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SPICe Briefing
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The Multiple Roles of Scottish Woodlands

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This briefing identifies the multiple roles of Scotland's forests, including their role in reaching net-zero greenhouse gas emissions by 2045, and addressing ongoing biodiversity declines. Insights from interviews with key experts are also provided. The briefing provides an overview of policy related to forests, and policy changes in Scotland.

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Contents

Executive Summary

1. This briefing provides an overview of existing policies and strategies related to forest creation, management, and use in Scotland, for multiple objectives, and the role of forests in light of the climate and biodiversity emergencies.

2. Stakeholder views were captured via semi-structured interviews with 16 key experts.

3. The terms *forests* and *woodlands* are used interchangeably in this briefing to describe a tract of land that is predominantly tree covered[i].

4. Over the last 100 years, Scottish woodlands have increased from 5% to 18.5% total land cover, due to changing needs, policy, and perceptions.

5. The Scottish Government has set targets to increase woodland cover to 21% of the total area of Scotland by 2032.

6. Evidence provided in this briefing reveals that woodland creation is far from simple, with suitability dependent on a number of social, ecological and economic factors.

7. Scotland's Forestry Strategy 2019-2029 outlines three core objectives reflecting economic, environmental, and social aspects.

8. Scotland's forests provide a range of economic benefits. In 2015 an estimated £771 million came from forestry and timber processing, and £183 million from forest recreation and tourism.

9. Bioenergy offers an opportunity for climate change mitigation and contributed to 4.4% of the Scotland's energy demand in 2016 but also has associated risks.

10. The social benefits of woodlands, although hard to measure, can include improvements in physical and mental health through recreation and exercise. These benefits have been promoted through innovative health initiatives, such as Branching Out.

11. Community woodland initiatives can support multiple objectives. The Scottish Land Commission suggests that more needs to be done to enable opportunities for community land ownership and a voice over land use decisions.

12. Scottish woodlands support a number of essential ecosystem services including carbon storage, water supply and regulation, timber, energy, and habitat for biodiversity, amongst others.

13. Forests are recognised in policy for their key role in mitigating and adapting to both the climate and ecological emergencies.

14. Scottish Government has recognised the interaction between climate change and biodiversity loss in the The Environment Strategy for Scotland: vision and outcomes.

15. Scotland has taken climate action by committing to become net zero, by 2045.

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i there is no standard definition in the policy literature.

16. Forests are a principal 'carbon sink' as identified in Scotland's Climate Change Plan 2018-2032 .

17. Scotland's Land Use Strategy, which underpins Scotland's forestry Strategy, emphasises that, to maximise the benefits that nature provides, requires a coordinated action at the landscape scale.

18. It cannot yet be determined if Scotland's Forestry Strategy itself will deliver on addressing the climate and ecological crises. The woodland creation targets are on track but the impacts on biodiversity are not yet known.

19. The Scottish Government, in response to the social and economic challenges of the coronavirus health crisis want to ensure Scotland has a green, just and resilient recovery.

20. Combatting the climate and ecological emergencies, can be part of a 'green recovery' in which Scotland's forests will have a strong role to play.

21. To achieve the multiple objectives outlined in the Forestry Strategy, Scotland's Land Use Strategy with Regional Land Use Partnerships are considered a necessity by the majority of the interviewees. Supporting a regional approach for land use decisions.

22. Full devolution of forestry to Scotland came into effect in April 2019, with the Forestry and Land Management (Scotland) Act 2018, leading to the establishment of Scottish Forestry and Forestry and Land Scotland.

23. The recent publication of Scotland's Forestry Strategy Implementation Plan 2020 - 2022 outlines the actions, monitoring (including indicators) and reporting for the Scotland's Forestry Strategy.

24. At the start of the century, forestry policy was mostly singular in focus, promoting timber production but over time has increasingly recognised forests as multi-functional.

25. Through the UK Forestry Standard (UKFS), regulation, and voluntary certification schemes the environmental impacts through forestry are being increasingly managed and mitigated to encourage sustainable practices.

Introduction

Trees, woodlands and forests[ii], have always been deeply intertwined in the lives of people. They offer timber, recreation, food, carbon storage, cleaner air, support biodiversity and more.

The extent of woodland in the past is contested. With some arguing that forests had covered northern Scotland, in contrast others suggest woodland had a patchy distribution across the landscape [1] . Yet over recent centuries Scotland's forests and woodlands are known to have been dramatically reduced through clearance for agriculture, in addition to demands for timber, charcoal and tanbark[iii]. By the early 20th century Scotland's forests were reduced to 5% of the total land cover [2] .

Scotland's woodlands are varied. They include ancient Caledonian Pinewoods and 'temperate rainforests', as well as more recent planting to generate fast growing timber. Scotland's woodlands, whatever the type, are increasingly recognised for the multiple benefits they provide, or could provide.

Over the last 100 years, woodlands have increased from 5% to 18.5% (1.4 million hectares) of Scotland's total land cover. The Scottish Government, in Scotland's Forestry Strategy (SFS) 2019-2029, aims to further increase woodland cover to 21% by 2032 [2] .

Expanding, protecting and enhancing forests and woodlands in Scotland are core aims of the SFS. These aims should contribute to the delivery of three social, economic and ecological objectives. Performance will be measured via indicators outlined in the Strategy's Implementation Plan.

This briefing is based on 1) collection and review of forestry related policies and forestry data and other related literature 2) stakeholder semi-structured interviews from January 2020 t0 March 2020, with 16 expert stakeholders[iv] [v]. More information on the briefing's methods can be found in Appendix 1.

The briefing is structured into two main parts: firstly an overview into the status and role of Scottish woodlands; and secondly an overview on the policy, directly and indirectly related to forests in Scotland.

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ii In this briefing the terms; *forests* and *woodlands* are used interchangeably to describe a tract of land that is predominantly tree covered.

iii *bark* which was/can be used for *tanning* leather.

iv interviews were conducted prior to the Covid-19 lock down measures.

v To note the range of views expressed are those of the stakeholders interviewed and do not represent the views held by SPICe or the author. All interview data has been anonymised.

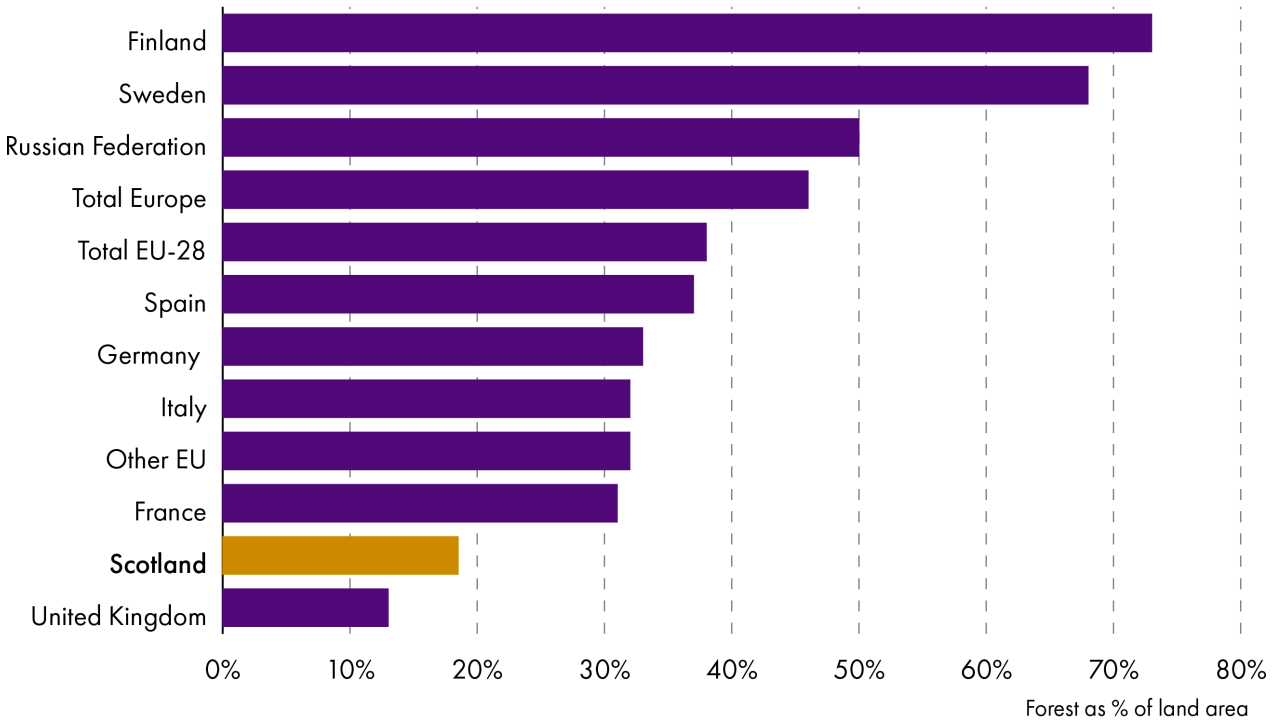
Forestry and Woodlands in Scotland

This section explores the resource itself providing an overview on the current status of Scotland's forest cover, species composition, replanting and restocking.

Total Area of Woodland

Scotland's woodland cover was estimated at 18.5 % of the total land area, covering 1,457 million hectares (ha) [3] in 2019. This is higher than the other nations within the UK. Yet when compared to the European average, of 43% of forest cover, it is still comparatively low as shown below [2] .

International comparison forest cover across Europe in 2015

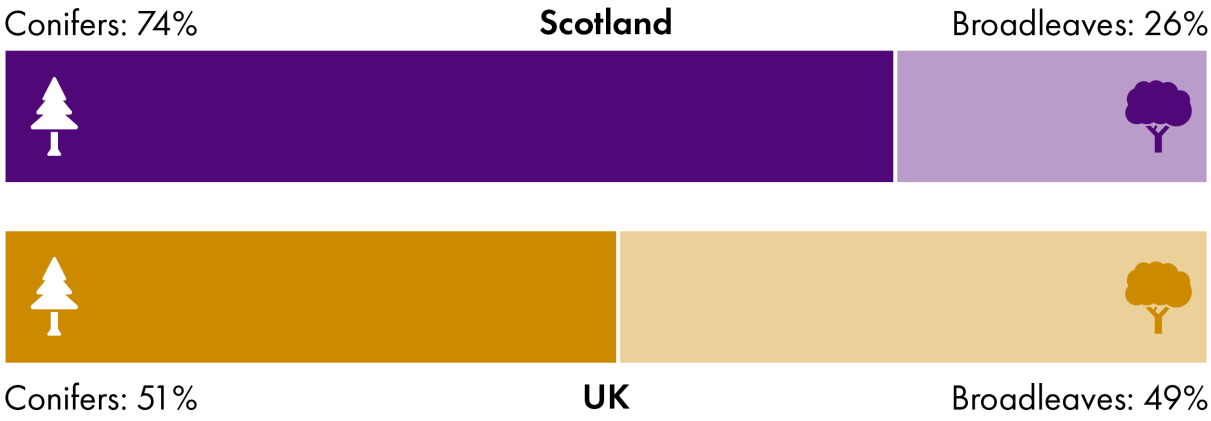


Forest Research 2015

Woodland Composition

As of 2019, the majority of woodlands (by area) in Scotland are conifers, at 74%. The remaining 26% are broadleaved species**.** The pattern differs across the UK; England has mostly broadleaved woodlands at 74%, and in Wales the woodland types are more equally balanced [4] .

Percentage of conifer and broadleaved woodland in Scotland and the UK in 2019



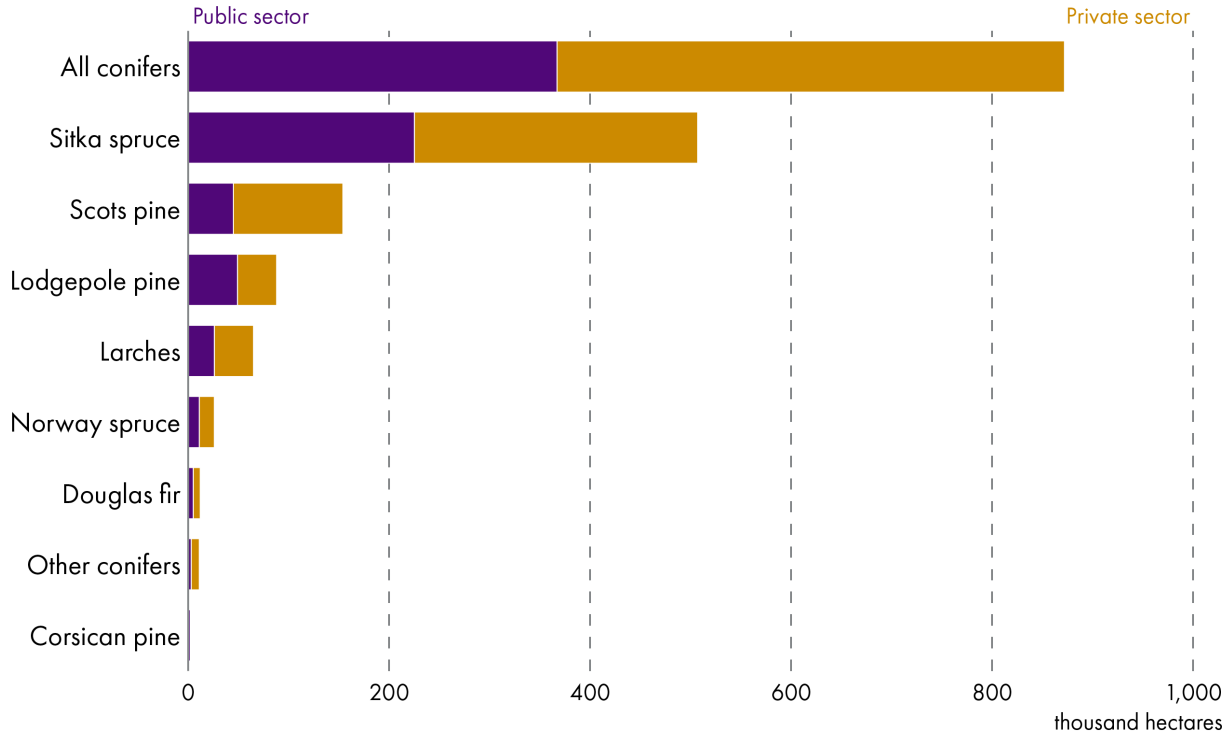
Forest Research, 2019[5]

Non-native Sitka spruce is the most common conifer tree species in Scotland, and grown primarily for productive purposes. It is known as a versatile softwood species used for paper, pallets and other commercial purposes. An estimated total of 507,000 ha of Sitka spruce are present in Scotland. Forestry and Land Scotland (FLS) consider Sitka to be [6] :

> " one of the most important tree species in the British forest industries today. Its timber is used for everything ..[]...depending on the maturity of the tree. Because of this versatility, Sitka accounts for about 50% of commercial planting in the UK. Sitka is fast-growing, even in poor soils and on exposed ground, making it perfect for the Scottish climate. "

Conifer woodland species: woodland area in Scotland by ownership and principal species

The area excludes felled areas and (for private land) open space.



Forestry Commission NFI 2012

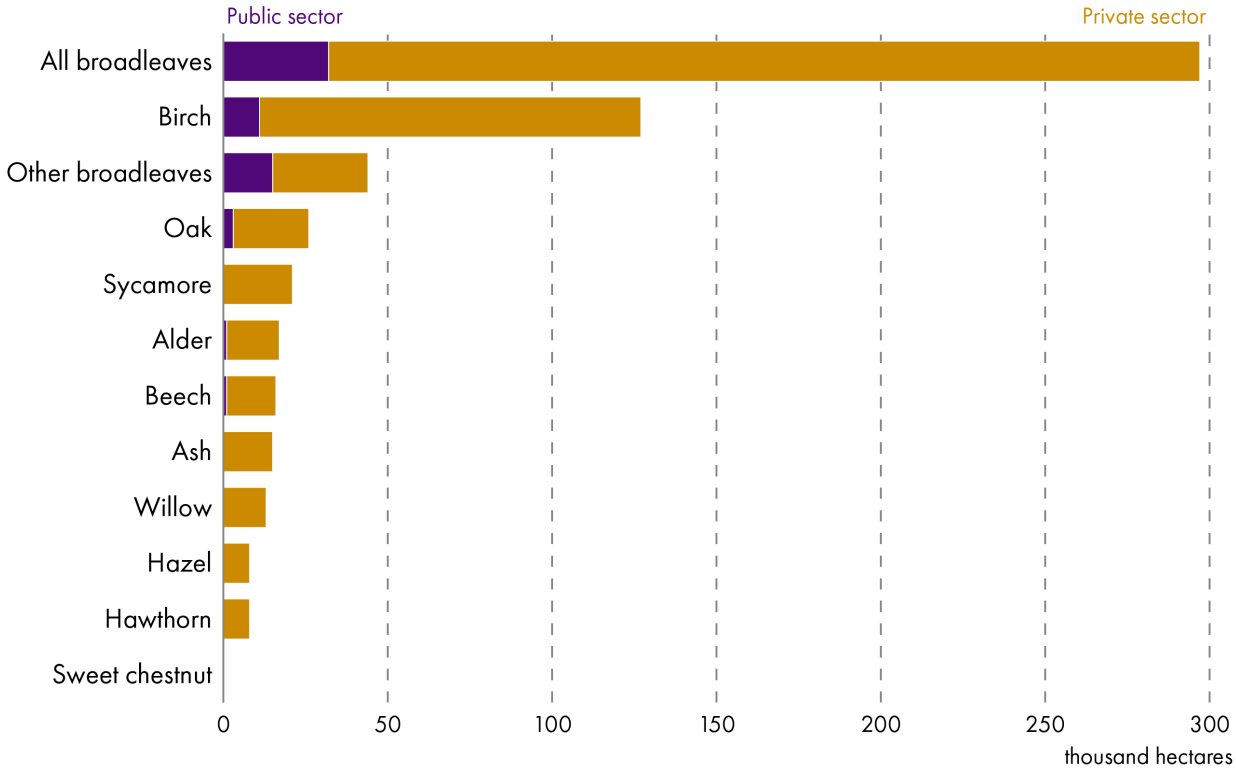
The second and third most common conifer species in Scotland are the native Scots pine (154,000 ha), characteristic of the Caledonian pine forests and also timber-producing; and lodgepole pine (88,000 ha).

Non-native conifers found in Scotland include: Sitka spruce, Lodgepole pine, Norway spruce, Douglas fir and Larches, amongst others. The Scottish Government defines non-native species as [7] ; "those that have been introduced - deliberately or accidentally - by humans."

Scotland's native broadleaved species include birch (downy and silver), alder, oak, ash, hazel, willow (various species), rowan, and aspen [7] . The most common broadleaved tree species in Scotland are birch, oak and then sycamore, as shown in the Figure below**.** In 2019 there were 128,000 ha of birch, accounting for 43% of the broadleaved woodland area**.**

Broadleaved woodland species: woodland area in Scotland by ownership and principal species

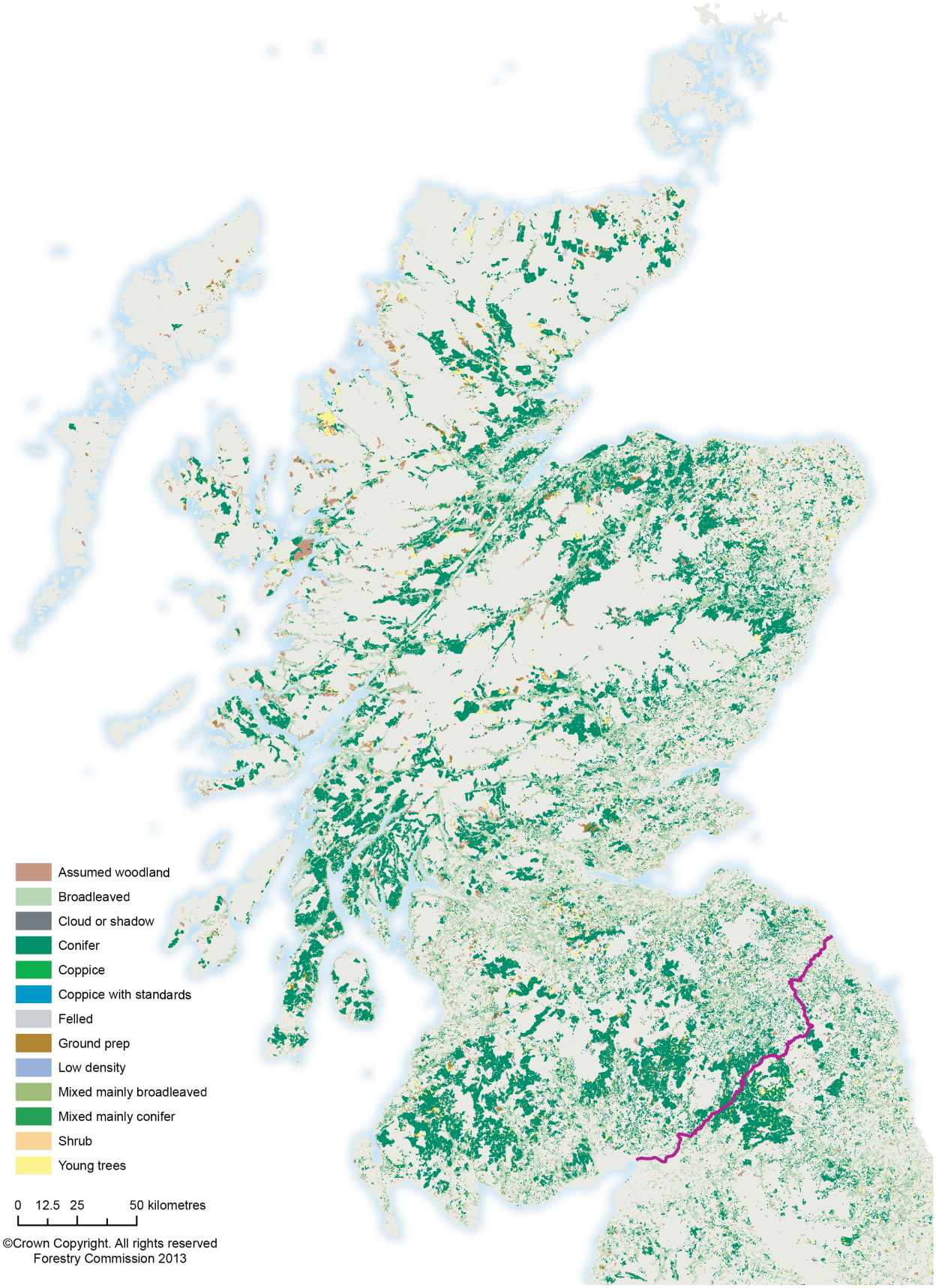
The area excludes felled areas and (for private land) open space.



Forest Commission NFI 2014

The map below illustrates the distribution of woodland in Scotland by type in 2011.

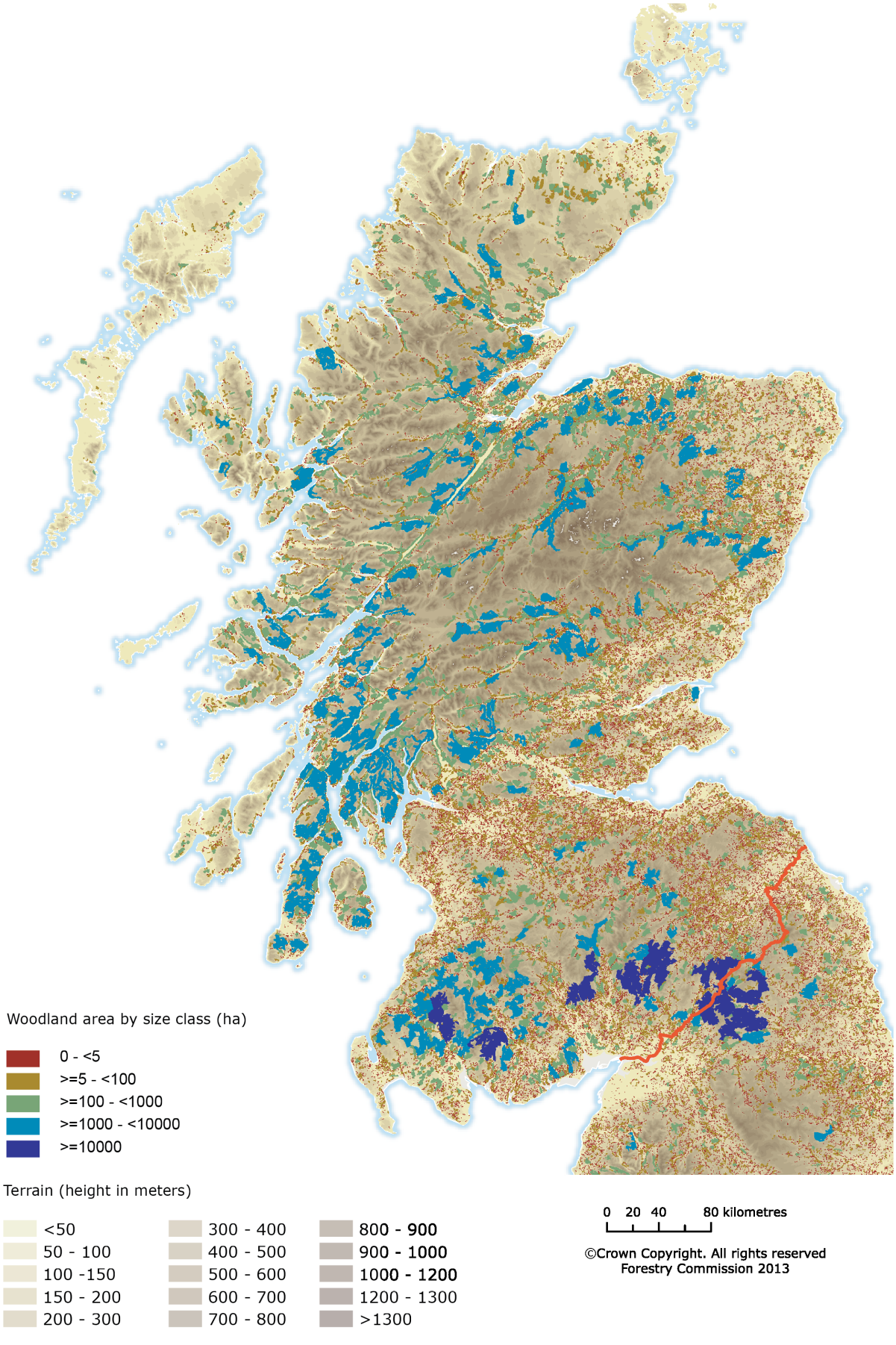
Distribution of woodland in Scotland by type in 2011



Forestry Commission 2013

The map below of woodland size indicates that the largest woodland areas are found in Dumfries and Galloway.

Distribution of woodland in Scotland by size in 2011



Forestry Commission 2013

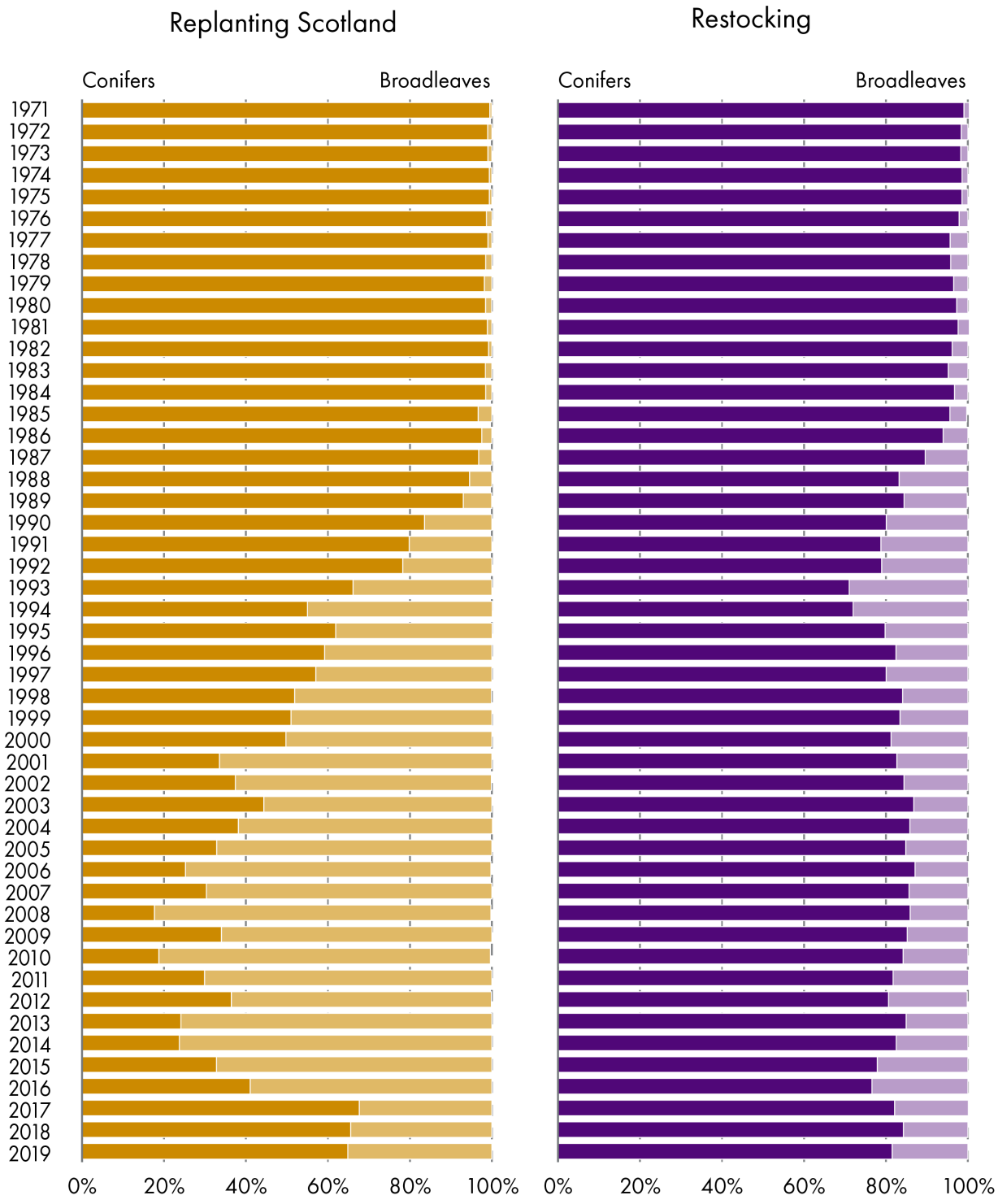
Planting and Restocking

The current coverage of conifer and broadleaved woodland in Scotland has been influenced by (new and previous) planting and restocking patterns.

New planting is the creation of new areas of woodland. Restocking is the replanting of areas of woodland that have been felled [8] .

In the Figure below, the planting regimes between 1971 and 2019 illustrate an overall preference for conifers. Between 1971 and 1991 planting of conifers was much higher relative to broadleaved, then in the early 1990s planting of broadleaved species began to increase. The planting pattern could indicate changing priorities, such as changes in EU funding mechanisms in regards to climate change and biodiversity, reflected on later in the briefing.

Replanting and restocking of conifers and broadleaved species in Scotland from 1971 until 2019.



Forest Research, 2019[5]

The CCC notes that UK wood production has increased over the last decade and that softwood production e.g from conifers, was most prevalent, stating [9] :

> " Softwood (from conifers) accounts for 94% of all removals from UK woodlands and total softwood production has increased by around a quarter since 2008. Hardwood production (from broadleaved trees) has increased by over 50%, however this still contributes a small proportion of the overall total."

Woodland Benefits

Forests and woodlands are known for providing a wide range of benefits. Scotland's Forestry Strategy (SFS) describes the contributions of woodlands in supporting the economy, enhancing the environment, and improving people lives in Scotland [2] . Scotland's Land Use Strategy (LUS) further highlights the multiple roles of forests, stating that the [10] :

> " sustainable management of Scotland's woodlands and forests makes an important contribution to Scotland's economy; it delivers health and well-being benefits for people and a range of other critical ecosystem services including climate change mitigation and adaptation. "

This section provides an overview into the economic, social and environmental benefits provided by Scottish woodlands.

Economic Benefits

Forestry contributes to Scotland's economy through timber and fibre production, recreation and tourism. Forestry in Scotland links to four of the main priorities outlined in Scotland's Economic Strategy:

- sustainably *investing* in people and infrastructure
- supporting a culture of *innovation*, research and development
- promoting *inclusive growth* and creating opportunity
- boosting *international* trade and investment.

The timber and forestry sector comprises [2] :

> " tree nurseries and businesses focused on planting, managing and harvesting forests and woodlands, as well as wood processors producing a range of wood products, including sawn timber, composite boards, paper, pallets, biomass and bark."

In 2015 it was estimated that Scottish forestry contributed almost £1 billion Gross Value Added to the economy every year. In addition Scottish forestry was estimated to support over 25 000 full-time equivalents (FTEs)[vi] [11] .

An estimated £771 million comes from forestry and timber processing, and £183 million came from forest recreation and tourism in 2015. Meanwhile FLS outlined key achievements from public forests as [12] :

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vi It was estimated in the report just over 12,000 in direct employment, the other employment figures were indirect or induced, or working in tourism [11] .

> “ £1 million [Gross Value Added] to the Scottish economy each day , supports 11,000 jobs, soaks up over 3 million tonnes of CO2 each year and hosts over 80 community projects.”

In the report Roots for Further Growth published in 2019, the Scottish timber industry provides a Strategy to 'double' the forestry sector's contribution to the Scottish economy by 2030. Five strategic priorities are identified to:

1. maximise the economic outputs of Scotland’s forests and fibre resource
2. improving the efficiency and safety of the wood fibre supply chain
3. developing markets and adding value
4. developing a workforce with skills for the future
5. understanding and communicating the forest and wood-based industries contribution to Scotland’s economy

Imported timber was said to be an important contributor to Scotland's forestry for those that process wood and wood products. Timber for wood processing is provided from countries such as Sweden, Russia, the Baltic states, and other parts of the UK [13] .

According to the same report, Scotland produces around 7 million m^3 of timber per year, and this production is set to increase over the coming decade, following the national woodland creation goals [13] . The recently published Implementation Plan aims to:

> “ support the Forest and Timber Technologies Industry Leadership Group to deliver its Strategy “Roots for Further Growth” and increase the sectors contribution to inclusive economic growth.”

Social Benefits

Woodlands can provide an array of social benefits, including benefiting physical and mental health. Woodlands can reduce levels of chronic stress, provide areas for recreation and exercise, contribute to fitness and improve concentration [14] .

There are several innovative NHS initiatives in place to connect people with nature, because of the associated health benefits. For example Branching Out provides a mental health service, connecting adults with woodlands. In a report from 2017 it was reported 2000 people had taken part [15] .

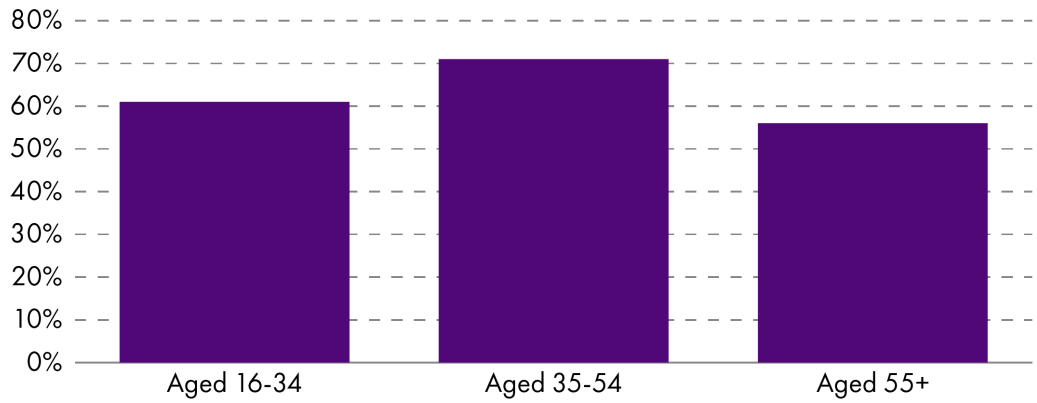
Likewise the Dundee Green Health Partnership (DHGP) is another initiative that aims to get more people out to green spaces, such as woodlands, to improve their health and well being. Efforts include a pilot initiative to offer ‘green health prescriptions’ as part of a patient's treatment and as a preventative measure.

Benefits are evaluated in the Forestry Strategy by two indicators: 1) the number of visits to forests and woodlands; and 2) the number of community groups that own and lease forests and woodland [16] .

In 2019 the majority of Scotland's population (63%) had visited woodlands, and these have been increasing. Based on outcomes from Scotland's People and Nature Survey 2017/18, Forest Research report [17] :

> “ an estimated total of 117 million visits to woodlands in Scotland. This is a statistically significant increase from the 2013 estimate of 90 million visits.”

Visitors to Scottish forest in 2019



Forest Research 2019

Community Forestry

Community forestry efforts are measured by the the number of community groups that own and lease forests and woodland [16] . There are estimated to be around 200 community woodland groups across Scotland managing woodland and open space. A community woodland is defined as [18] :

> “ [...] one partly or completely controlled by the local community, through a community woodland group. The woodland may be owned or leased by the group, or managed in partnership with a public or private sector landowner. ”

The Community Woodlands Association (CWA) highlights just over half of community woodland groups own their woodlands, with other groups either leasing, or working through partnerships. The size of woodlands can range between 1 ha to more than 1000 ha.

There are various types of community woodland, such as management of ancient semi-natural woods or extensive conifer plantations. Other examples include urban regenerative projects as supported by the Woods In and Around Towns (WIAT) programme.

The CWA highlights key benefits of community woodlands as:

- recreation
- biodiversity & Conservation
- economic development
- renewable energy
- social inclusion

F orest Research considers empowerment and enhanced community cohesion and creativity to be some of the benefits of community woodlands. Community woodland policy support is set out later in this briefing.

Environmental Benefits

Scottish woodlands support a number of essential ecosystem services including carbon storage, water supply and regulation, timber, energy, and habitat for biodiversity, amongst others [19] . In order to ensure all these services provided by Scottish woodlands are valued, along with their social and economic benefits, a 'natural capital' approach is applied by Scottish Government [2] .

"Natural capital", as defined by the World Forum on Natural Capital, refers to:

> “ the stocks of natural assets which include geology, soil, air, water and all living things. It is from this natural capital that humans derive a wide range of services, often called ecosystem services, which make human life possible.”

The contribution of woodlands to mitigate the impacts of climate change and support biodiversity have been recognised by the Scottish Government in a number of policies, described later in the briefing.

Scottish woodlands are important habitats for a variety of species. Woodlands provide a home for an estimated 172 of the country's protected species [2] . But the state of Scottish woodland's are a cause for concern as [20] :

> “ Native woodland now only covers 4% of Scotland’s land area and over half of those woodlands are in unsatisfactory condition for biodiversity.”

Further details on the linkages between climate and forests, and biodiversity and forests are provided in the following sections.

Climate and Ecological Emergencies

Currently the world is experiencing an immediate and unprecedented pandemic health crisis. The actions taken by governments across the world will serve as lessons on how to respond to other global emergencies.

A climate and ecological emergency have already been declared by the United Nations (UN). The UN warn that humans have already caused one degree Celsius (C) of warming to the Earth's atmosphere during the past century. The Intergovernmental Panel on Climate Change (IPCC) predicts a further 1.5°C of warming by 2030 with the potential to cause catastrophic impacts for the environment and society.

The UN outlines three established scientific links with greenhouse gas (GHG) emissions and climate change:

- the concentration of GHGs in the earth's atmosphere is directly linked to the average global temperature on Earth
- the concentration has been rising steadily, and mean global temperatures along with it, since the Industrial Revolution
- carbon dioxide (CO_2) is the most abundant GHG, accounting for about two-thirds of GHGs. CO_2 in the atmosphere is largely the product of burning fossil fuels

The UN stated in 2019 that "now is the time for bold collective action." In April 2019, Scotland's First Minister also declared a climate emergency.

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, which amends the Climate Change (Scotland) Act 2009, sets targets (from 1990 and 1995 baselines) to reduce Scotland's emissions of all GHGs to net-zero emissions by 2045 at the latest, with interim targets for reductions of at least 56% by 2020, 75% by 2030, 90% by 2040. These targets are based on advice from independent government advisers, the Committee on Climate Change (CCC), and are regularly reviewed [21] .

Alongside the pressing climate crisis is the need to address biodiversity declines both globally and domestically. Biodiversity is defined by the Convention of Biological Diversity (CBD) as the:

> " the variability among living organisms from all sources including [...] terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) stated [22] :

> " Global goals for conserving and sustainably using nature and achieving sustainability cannot be met by current trajectories, and goals for 2030 and beyond may only be achieved through transformative changes across economic, social, political and technological factors. "

Furthermore [23] :

> “ Nature across most of the globe has now been significantly altered by multiple human drivers, with the great majority of indicators of ecosystems and biodiversity showing rapid decline.”

The IPBES further found 75% of the land surface has been significantly altered [23] . Additionally, the average abundance of native species in most major land-based habitats have decreased by at least 20%, mostly since 1900 [24] .

In the Environment Strategy for Scotland: vision and outcomes published in 2020 [25] , the Scottish Government highlighted the need to avoid climate change impacts and halt global biodiversity loss. The First Minister stated in 2019 that [26] :

> “ Today’s climate and ecological emergencies are inextricably linked, and working to tackle one contributes to tackling the other. ”

Trees and woodlands, have a key role in mitigating and adapting to climate change and addressing biodiversity loses in Scotland, as set out in the Scotland's Forestry Strategy (SFS) 2019-2029 and Scotland's Land Use Strategy [27] [2] .

Climate and Forests

This section considers climate trends and impacts in more detail, followed by an overview of the role of forests in mitigating and adapting to climate change.

Climate Trends

Evidence of climate change impacts in Scotland over the past 10 years are provided in the Scottish Government's Climate Ready Scotland (CRS): climate change adaptation programme 2019-2024. This includes evidence of the hottest years on record and increases in rainfall, which are expected to "continue and intensify", with an increasing number of homes and businesses at risk of flooding [28] .

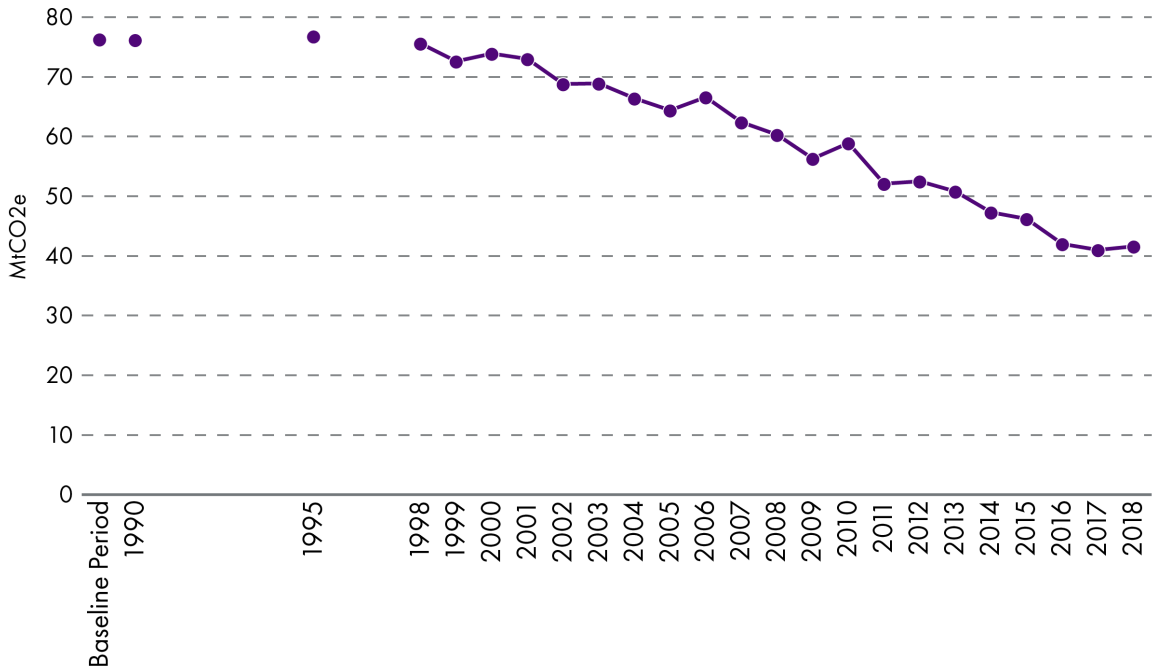
Scotland’s GHG emissions have been decreasing, and they have almost halved since 1990, illustrated in the Figure below **[29] .** Yet as GHGs continue to rise globally, extreme droughts, floods, extreme weather events, and sea level rise will continue to worsen for decades to come [28] .

It was outlined in the Scottish GHG emissions statistics for 2017 that GHGs had reduced by 3% between 2016 and 2017, compared to a 47% decrease between 1990 and 2017. This is due largely to decarbonising electricity, with minimal gains made in some other areas, e.g. transport and agriculture. Whilst reductions have been made, the recently published GHG emissions statistics for 2018 notes that an increase in emissions occurred, stating [30] :

> “ GHGs were estimated to be 41.6 million tonnes carbon dioxide equivalent (MtCO2e). This is 1.5 per cent higher than the 2017 figure of 41.0 MtCO2e; a 0.6 MtCO2e increase. ”

This increase has meant the 2018 target has not been met and was said to be "driven almost entirely by increased emissions from power stations."

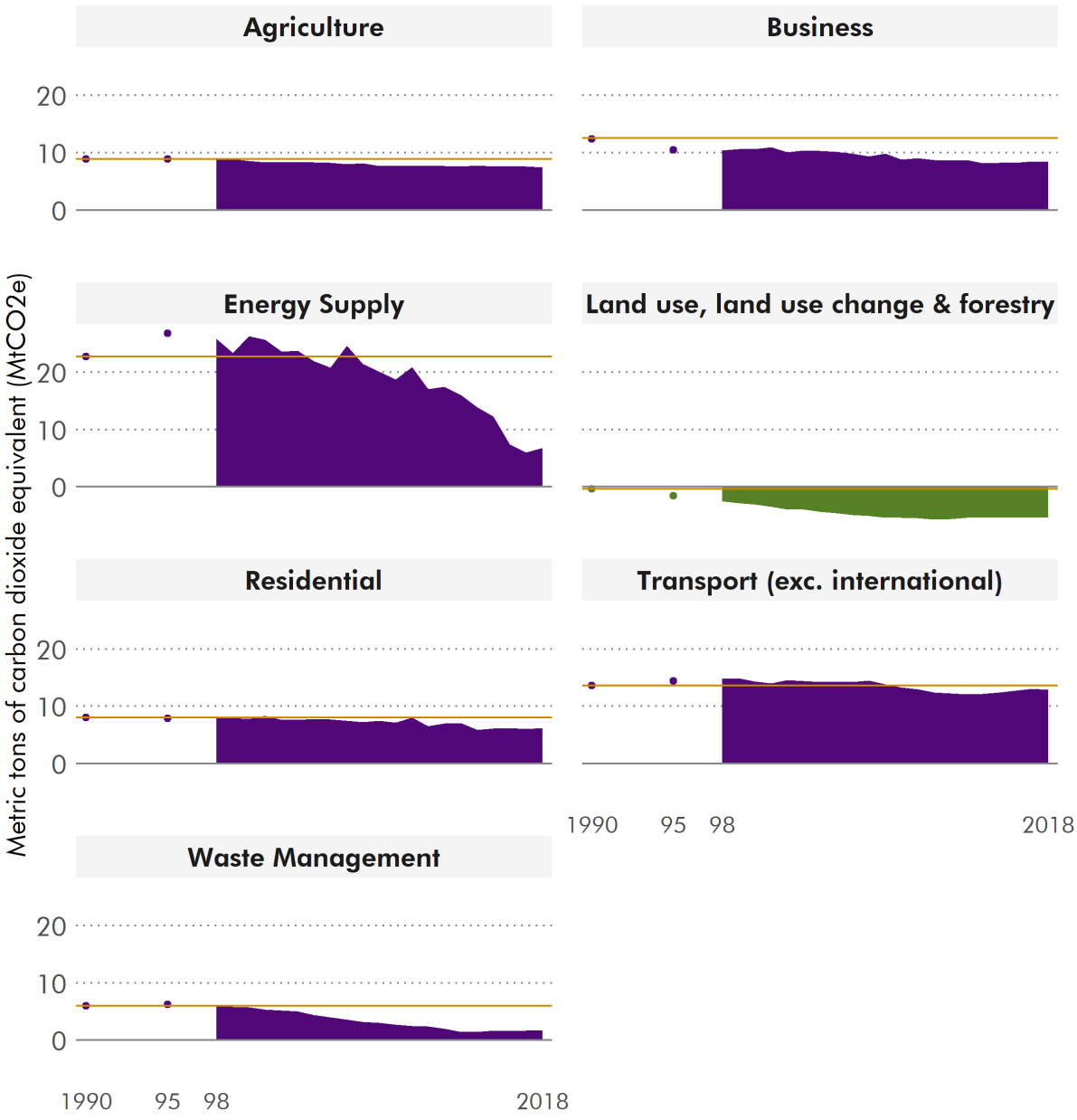
Scottish Greenhouse Gas Emissions, 1990 to 2018. Values in MtCO2e



Scottish Government 2018

Forests have a central role to play in climate change adaption and mitigation [31] . Land use, Land use Change and Forestry (LULUCF) is the only sector in Scotland that has negative emissions as shown below.

Main Sources of Greenhouse Gas Emissions in Scotland, 1990 to 2018. Values in MtCO2e



Scottish Government 2018

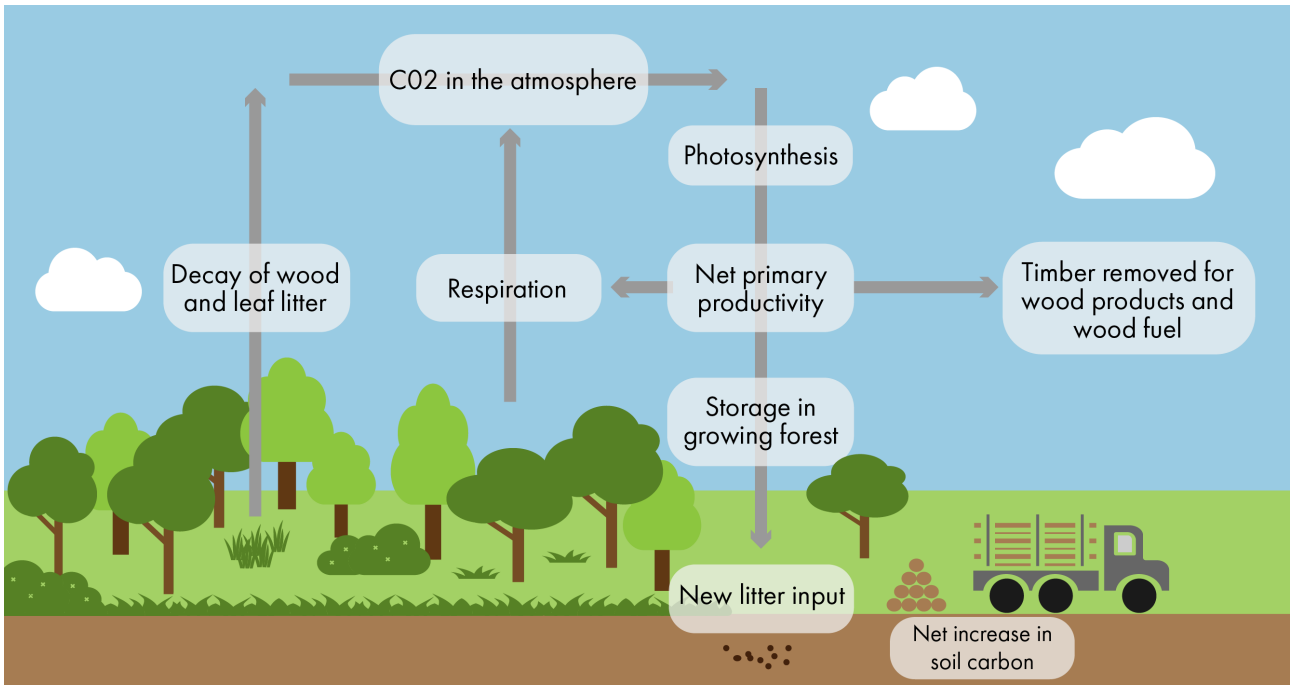
Scottish Environment LINK's report Scotland's Nature on Red Alert outlines how climate change will place additional pressure on biodiversity. The report further highlights that woodlands can contribute to mitigating climate change, as well as provide important and high quality habitats for biodiversity [20] .

Forests and Carbon

CO_2 is one of the main GHGs contributing to climate change, and forests and the soil in which trees grow, are widely identified as a principal 'carbon sink' including in Scotland's Climate Change Plan (CCP) 2018-2032 [32] .

The 'forest carbon sink' is the dynamic gain (e.g. sequestration, or in other words, absorption, by photosynthesis) and loss (e.g. emission by forest fires) of carbon [33] . Trees can remove CO_2 from the atmosphere and store it. The stored CO_2 can later be released either through decaying biomass as litter (foliage, deadwood etc.) or absorbed in the soil. Biomass can also be harvested for wood products or fuel, and CO_2 can be released through burning or decay back into the atmosphere. The forest carbon cycle is illustrated in the Figure below [34]

Forest carbon cycle

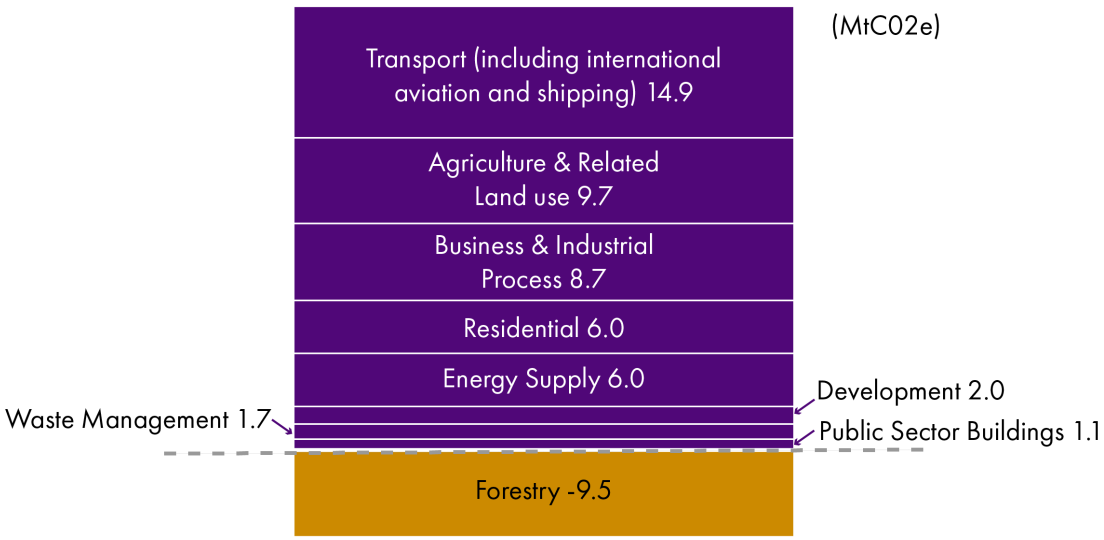


Adapted from Forest Research, 2020[34]

Forests have a central role to play as carbon sinks in climate change mitigation [31] . Therefore trees and woodlands are considered 'negative emitters' of GHGs. Yet the ability of forests to store and sequester carbon (and be a negative emitter) is impacted by how forests are managed, including deforestation; afforestation, and reforestation activities [29] .

The Figure below, shows Scottish GHG emissions from 2017 by sector. Forestry is a net emissions sink [29] .

Sources of Scottish Greenhouse Gas Emissions, 2017. Values in MtCO2e.



Scottish Government, 2017[29]

The CCC advises that increasing woodland cover is key to reaching 'net zero' [35] . The urgent need for afforestation to meet climate change goals, is further referred to in the CCP and other key documents.

Forests and woodlands can play a significant role in climate change mitigation, both through carbon sequestration and through the provision of timber and woodfuel. Timber and other wood products can provide a substitute for materials produced with high fossil fuel inputs, and woodfuel presents an alternative to fossil fuels for energy [36] .

Forests and woodlands, as carbon sinks, have an important role for mitigating climate change. Yet it is also cautioned, in a report by Forest Research, that any calculation of GHGs through 'productive' woodland creation [including that for biomass substitution for fossil fuels] also needs to account for the emissions generated via forestry [37] . In terms of "harvesting, transport, processing and combustion" [37] .

Old growth woodlands for storing carbon are also considered to be fundamentally important [36] . Yet, once woodlands reach maturity, carbon losses balance uptake through photosynthesis. It is highlighted that even though the woodland is no longer an 'active sink' it still represents a significant carbon store [36] . Other land use systems such silvopastoral agroforestry (i.e. land managed for both trees and agriculture) can also improve the carbon stock potential of that land [38] .

Furthermore it is important, Forest Research notes, that whilst 'planting' and 'restocking' woodlands is important for carbon removal, it is crucial to understand carbon stocks in not only the trees, but also the other vegetation and soils, and related processes [37] . The following sub-sections provide an overview of two areas, amongst others, that influence carbon stocks in woodlands.

STAKEHOLDER VIEWS

All those interviewed recognised that trees and **woodlands had a vital role in supporting Scotland's efforts to achieve net zero for 2045**. Many stated they felt the net zero goals would be 'impossible to achieve' without tree planting and woodland creation in Scotland.

The linkages between climate action and woodlands creation was a message well received by the public said some of the stakeholders. One interviewee stated that it "is the simplicity of the message that says planting trees is a good thing." Therefore to get this wider public support, they stated, was a great barrier overcome already.

Yet others warned that this **perceived 'simplicity' as an issue**, given interactions with biodiversity, the importance of the type of trees grown, and where they are grown (e.g soil type). As a respondent warned the key challenge is: "not trying to oversimplify something that's complicated."

It was strongly conveyed throughout the interviews the '**complexity around woodland creation'** and management. For example the long term goals, the value chain from seed to market, land use priorities, finance, land ownership, and possible conflicting policy objectives. Including possible trade-offs through land use change, influencing soil carbon stocks.

Soil Carbon

In a Forest Research report on Climate change and British woodland it was stated that [36] :

> " the carbon content of woodland soils is generally higher than that associated with most other vegetation covers."

In other research, the importance of peaty soils was emphasised as carbon content was over 5.5 times the amount estimated to be stored in the tree biomass. Due to the importance of woodland soil carbon, Forest Research states that [37] :

> " Any soil disturbance associated with forest management may release carbon to the atmosphere, and should be minimised to optimise soil carbon stocks."

This loss needs to be balanced against any potential carbon gains that are possible through fast growing productive practices [36] . In another report it was demonstrated that carbon in soils 'could' be lost through planting trees. A study on "the role of woodlands in meeting Scotland's GHGs reduction targets" revealed that [38] :

> " growing conifer forests, especially in peaty soils and in their first rotation, can decrease soil [carbon] stocks by as much as 30%."

This was related to Sitka spruce on unplanted natural grassland. Yet while carbon stocks declined over the first 40 year rotations they had increased near the end of the 2nd rotation "due to the incorporation of brash during clear felling".

Likewise, a recent study, undertaken by Stirling University with the James Hutton Institute, argued the planting of even native trees may not lead to the assumed carbon benefits if

planted in the wrong place [39] . For instance the study showed the planting of trees on moorlands in Scotland did not lead to an increase in net ecosystem carbon stock from 12 to 39 years after planting.

Forest Research outlines that details on the 'below ground' components are lacking, with few complete carbon balances for UK woodlands, accounting for the different carbon stocks and changes for particular woodland stands [37] .

STAKEHOLDER VIEWS

Scotland's woodlands are considered crucial to tackle climate change, but certain respondents highlighted that other land uses such as **peatlands were as important**. In some cases, it was about about removing trees from peatland areas, argued a carbon expert. It was highlighted that carbon storage in soils was more complicated to understand but also critical.

Others voiced concerns about biodiversity loss caused by **converting land used for other purposes to forest**. A couple of respondents noted how forestry trumped other land uses due to the economic pay-offs; consequently, land such as peatlands were unable to compete despite offering more long term carbon benefits. One respondent, resident in Dumfries and Galloway, said that forestry had often been prioritised over peatlands in that region. Furthermore efforts to correct mistakes of the past and remove trees from those peatland areas had been a struggle.

Ecosystems linked with trees and woodlands are complex. Another biodiversity expert reported the importance of the ‘ground flora’ in woodland systems. Such as **the importance of Mycorrhizal fungi** that live in soil and colonize roots, forming a link between the plants and the soil, important for ecosystems functioning and also for carbon capture. It is the fungi, for example, that holds the soil together, and traps flood water, and limits dust pollution in urban areas.

Deer Management

The link between woodlands, deer, and climate change was highlighted in a recent report on the Management of Wild Deer in Scotland. Deer populations[vii] in Scotland are estimated at 1 million and numbers are increasing [40] . It was stated that increasing deer numbers are due to more habitat availability, expanding range and climate change.

Scottish Natural Heritage (SNH), the Government agency responsible for connecting people with nature, has a "statutory responsibility to further the conservation, control and sustainable management of all wild deer species in Scotland".

Deer present a threat to woodland expansion and improvements targets in Scotland. The Native Woodland Survey of Scotland (NWSS) in 2014 emphasised that deer had a significant presence and were major contributors to browsing impacts, impeding woodland

vii SNH has recently been rebranded as NatureScot

regeneration. In areas where deer were culled, or where woodland was fenced, impacts were lower [41] .

In the latest National Forest Inventory (NFI) on woodland condition in Scotland, 61% of native woodland stands had signs of herbivore browsing damage[viii] [42] . Deer control is considered necessary to protect expansion efforts and to protect and enhance biodiversity, as recognised in the Forestry Strategy [2] .

SNH recently published a progress report on deer management for the Scottish Government. This states that improvements in the deer management planning process have been made. Yet the report also notes concerns [43] :

> " targets in which deer management has a role are unlikely to be delivered. The native woodland condition and restoration targets show insufficient progress and should be a priority for future focus."

STAKEHOLDER VIEWS

Deer management and the control of non-native invasive rhododendrons were seen as major barriers for native forest regeneration, by the majority of the interviewees. A cultural shift is needed, acknowledged one respondent, in regards to deer management, especially for sporting estates and the public, which needs the right incentives to be in place. The methane impacts of deer and their detrimental impact on woodlands were also noted. With certain interviewees advocating that the challenge of deer management could be an opportunity for locals, for example via venison sales.

Wood Energy

Scottish woodlands also provide bioenergy; this is power or heat produced through organic matter i.e. biomass such as wood. Biomass is a collective term for all plant and animal material.

Bioenergy products include; woodchips, sawdust and bark, recycled wood and wood pellets. It was estimated bioenergy contributed to 4.4% of the Scotland's energy demand in 2016 [44] .

The biomass boiler and combined heat and power capacity in Scotland more than tripled between 2012 and 2016 [45] . This increase was primarily driven by the Renewable Heat Incentive, which is due to close in 2021 for non-domestic, and 2022 for domestic users.

The Scottish Energy Strategy outlines an ambition for 50% of all Scotland's energy to come from renewable sources by 2030. This states that "biomass provides almost all (90%) of existing renewable heat in Scotland" [44] . The CCC note that [9] :

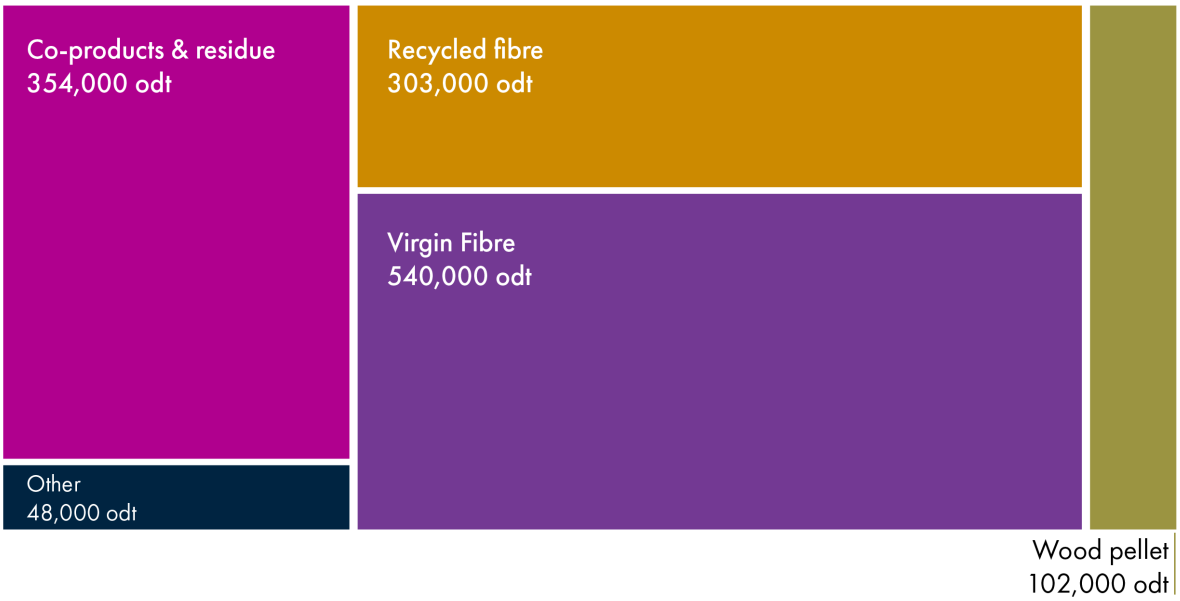
viii below 1.8 metres

> " harvested biomass can also reduce fossil GHG emissions by displacing fossil fuels as an energy source. For biomass used in this way to be low-carbon it must, as a minimum, be harvested from sustainably-managed land that has stable or increasing carbon stocks over time."

The greatest proportion of woodfuel used in Scotland in 2018 was virgin fibre (40%) followed by sawmill co-products and process residues (26%), and then recycled fibre (22%) shown in the Figure below [46] :

> " Woodfuel boilers operating across Scotland are estimated to have saved 1,643,000 tonnes of CO_2 over the course of 2018."

Woodfuel usage by fuel categories Scotland 2018



Energy Saving Trust, 2018[46]

Whilst biofuel can offer opportunities there are risks too. It was outlined by the CCC that [9] :

> " the production of biomass [] involves complex interactions with both biophysical and socio-economic systems and there are significant risks of high GHG emissions as well as other negative impacts if biomass is produced and used unsustainably. Furthermore, climate change mitigation is just one of a large number of social, economic and environmental drivers behind the use of land and biomass."

The CCC recommends that biomass, in an energy context, has the greatest potential benefit when used in combination with Carbon Capture and Storage (CCS) technology to sequester emissions. In their report they examine further evidence of the risks and opportunities of biomass production [9] .

Biodiversity and Forests

The ecological emergency has also been recognised by Scottish Government. The most recent State of Nature in Scotland report estimates that 49% of Scottish species have decreased [47] . The First Minster said that [48] :

> “ The challenges facing biodiversity are as important as the challenge of climate change, and I want Scotland to be leading the way in our response.”

Some of the key pressures on biodiversity, also for woodlands, in Scotland include land use intensification and change, the spread of invasive species and wildlife disease, as well as climate change [47] .

This section elaborates on the international biodiversity forest trends and the links between biodiversity declines and human health, followed by the biodiversity trends in Scotland and the relation with Scottish woodlands.

International Biodiversity Trends

On June 5 202o Parliament recognised the UN's 46th World Environment Day. The theme this year was 'time for nature' which [49] :

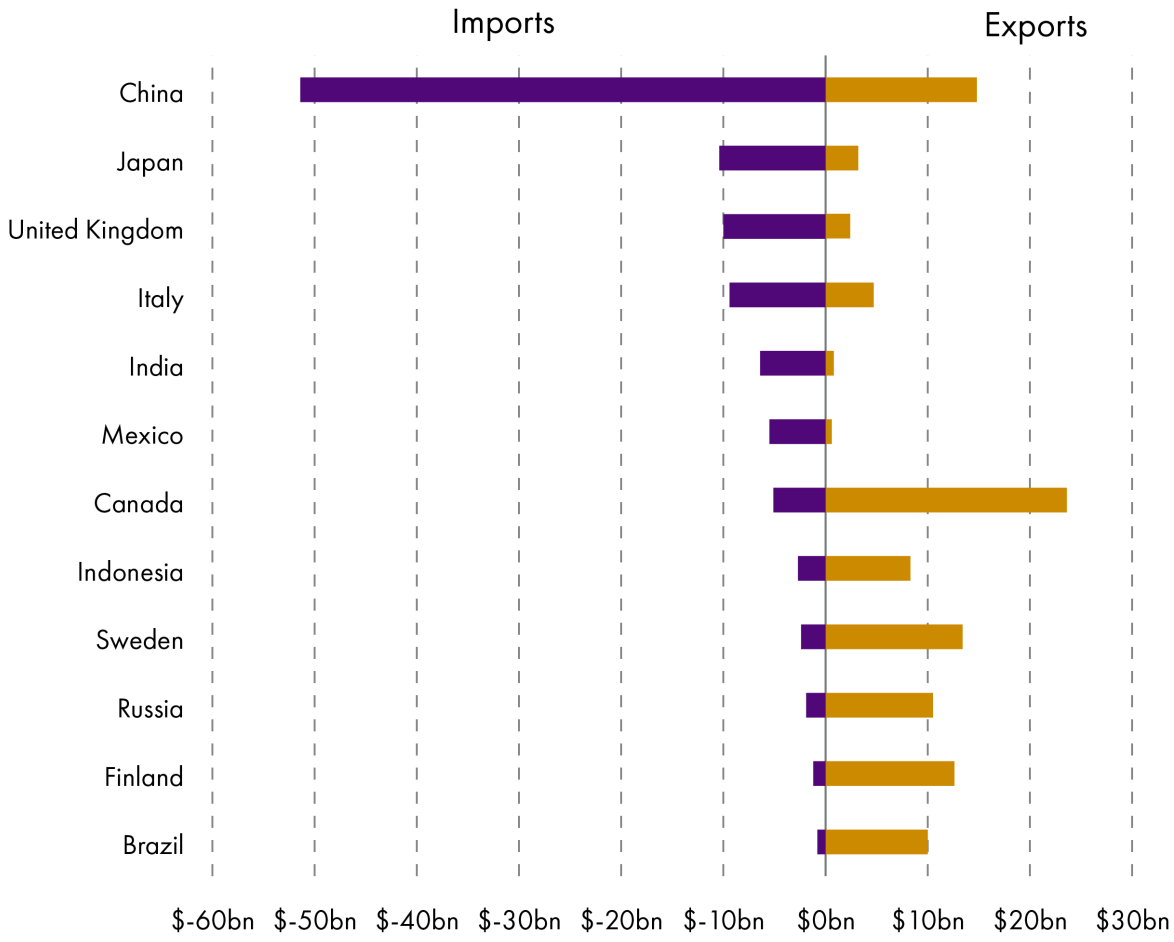
> “ promotes the protection of biodiversity, highlighting the crucial human dependency on a healthy planet [] and supports further work to ensure that Scotland plays its part in the international effort against climate change and the protection of biodiversity in its many forms.”

Habitat and biodiversity loss, including deforestation, has been linked to the rise of diseases such as Covid-19, states the UN Environmental Programme (UNEP); with a further warning that the Coronavirus outbreak highlights the need to address threats to ecosystems and wildlife due to the link between human health and the planets health. By protecting nature, UNEP argue, humans can prevent further disease outbreaks.

The international timber trade is part of this impact on biodiversity. It is estimated that global demand for wood may grow by 385 million m^3 over the next 15 years, with the main demand being for softwood [13] .

Furthermore, researchers have highlighted that increasing domestic demand for wood could increase foreign imports, and could have a negative impact on forest biodiversity elsewhere [50] . Forest Research reported that imports to the UK accounted for 81% of all wood products [51] . The Figure below illustrates how the UK is one of the biggest importers of wood in the world. Key import partners to the UK include China, Brazil, the US, Canada and Europe.

Largest net importers and exporters of forest products, 2017 ($billion)



Forest Research, 2019[5]

Scottish Government recognised in the Environment Strategy for Scotland: vision and outcomes that:

> " Some of the commodities we import are associated with deforestation, water stress and other ecological pressures in different parts of the world."

The authors of the paper 'importing timber, exporting ecological impact', published in Science, highlight [50] :

> " Nature conservation policy must therefore acknowledge biogeography and the interaction between domestic protection and international markets, which can cause exported environmental damage."

The environmental NGO[ix] World Wildlife Fund (WWF) advises that it is necessary to evaluate the 'ecological footprints' of timber imported from overseas in order to achieve 'zero deforestation' [52] . In a joint report by WWF and RSPB, named Risky business, it was reported that that the "UK's overseas footprint for timber, pulp and paper production far exceeds that of palm oil and soy combined." This impact could be minimised by certification schemes and by sustainable domestic timber production. WWF further

ix Non Governmental Organisation

suggest that the UK Government should "implement a robust legal framework and enforcement body to ensure only sustainable materials are being imported" [52] .

In a recent Confor report on biodiversity, forestry and wood the vital role of planted forests in the UK in order to reduce harvesting pressure on global forest resources was also emphasised.

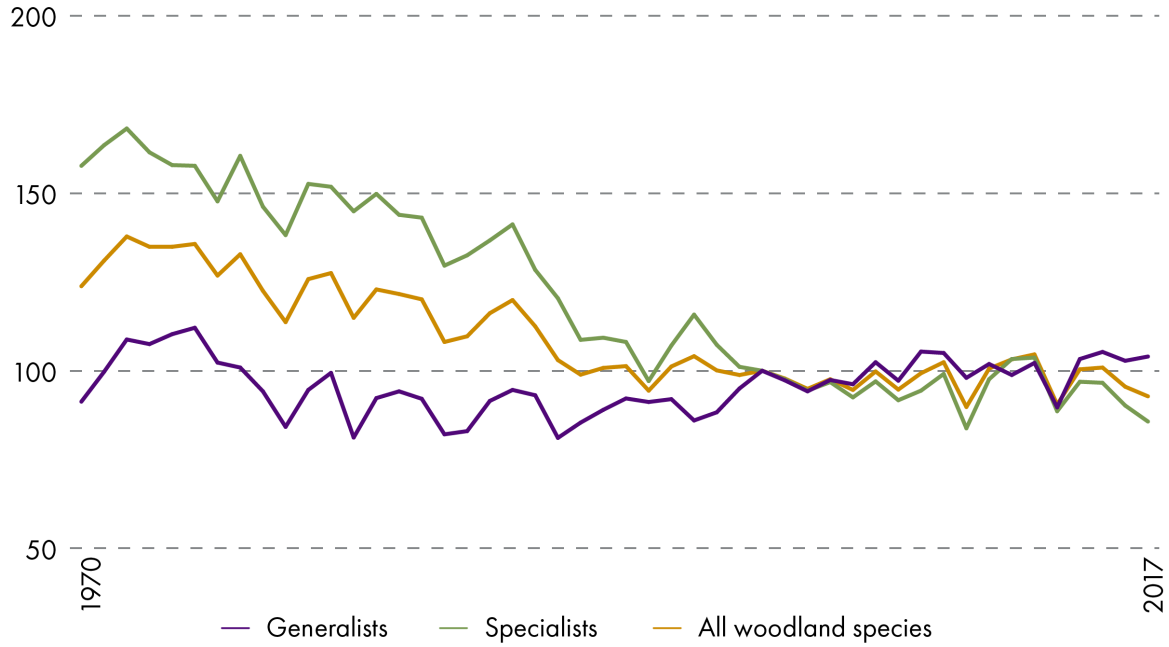
Biodiversity in Scotland

Declines in biodiversity are evident in Scotland. The 2019 State of Nature Scotland report [53] showed that whilst there had been increases in some species, the majority had declined rapidly. The findings highlighted the need to further protect and enhance Scotland's biodiversity [54] .

Scottish forests and woodlands are important habitats for numerous species including, pine marten, black grouse, capercaillie, and the majority of the UK's red squirrel population [2] . Furthermore woodlands support a number of essential ecosystem services such as carbon storage, water supply and regulation, timber, energy, and habitat for biodiversity, amongst other benefits [19] .

Current data on woodland bird species indicates their numbers are decreasing, as seen in the Figure below. This indicates that all woodland species have been decreasing since the 1970s.

Status of woodland bird populations in the UK, from 1970 to 2017



Source: British Trust for Ornithology (BTO), Department for Environment, Food and Rural Affairs (DEFRA), Joint Nature Conservation Committee (JNCC)

Scotland's native woodlands are thought to cover just 5% of total land area [20] . The condition of those native woodlands were found to be 'moderate' with less than 50% in 'satisfactory' condition. Woodland features on protected sites in 'favourable' or 'recovering'

condition were reported to have reduced from 68.1% in 2017 to 65.2% in 2019 [53] . In the native woodland survey for Scotland it was noted that [55] :

> " [...] from herbivore impacts, mainly through browsing and grazing. Invasive species, like *Rhododendron ponticum*, and non-native tree species are locally important threats to native woodland ecosystems, with climate change and new pests and diseases presenting additional challenges"

Scottish Forestry recognises that whether tree species are native or non-native, has policy relevance to biodiversity, as native species are able to contribute more. Acknowledging that all forest and woodlands, and associated open ground habitats, have 'some' biodiversity value, the most gains can be found via [7] :

> " suitably managed native, and in particular ancient and semi-natural woodlands, including appropriately restored plantations on ancient woodland sites."

Confor outlined in a recent report how wood production could improve the condition of native woodlands. The report highlights that active management of native woodlands should be as important as new planting. The report suggests this could be achieved in the following ways [56] :

- sensitive extraction such as thinning and coppicing
- promoting tree growth and forest regeneration for example by preventing browsing damage
- providing a sustainable income stream to fund active management and create value for the owner, as the basis for high quality native woodland expansion.

Three native species of trees the Scots Pine, Oak and European Ash, have been identified as indicators for genetic diversity in Scotland and used to measure progress t0wards the 2020 Aichi targets.

The Aichi Goals are a set of 20 global targets under the Strategic Plan for Biodiversity 2011-2020. The Plan serves as a framework for establishing national and regional targets promoting the objectives of the Convention on Biological Diversity. The Plan's vision is stated as [57] :

> " By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people."

Restoring Scotland's 'temperate rainforest', as 'Atlantic woodland', was called for in the State of Scotland's Rainforest report [58] . This noted that 0.2% of total woodlands are Atlantic woodlands, and located mostly in the West Highlands and Argyll. Forestry and Land Scotland (FLS) said these native woodlands have 'global significance', not just for trees but also mosses, liverworts, lichens, fungi and ferns [59] .

Atlantic woodland in Argyll

Forestry and Land Scotland, 2020[60]

Climate change can have detrimental impacts on woodlands from increases in temperature and changes in rainfall patterns, wind speed, cloud cover and humidity. These changes may affect the growth and distribution of tree species with implications for management [36] .

In a recent paper, it was set out how 'diversifying species' already present in British forests could help support resilience and mitigate damage through pest and pathogen transfer and invasive behaviours. The authors stated that [61] :

> “ Immediate increase in resilience is best achieved using native or well-established exotic species, rather than ‘alternative’ species.”

Deadwood is another important biodiversity feature of Scottish woodlands. Deadwood refers to the "dead and dying trees, debris and wood fragments" found in woodlands. FLS recognises this as essential for [62] :

“

1. many species of birds, amphibians, reptiles and mammals [who] forage, shelter and rear young in and around deadwood and old trees”
2. insects, lichens, bryophytes and fungi”
3. river and lochs – even small amounts of woody debris will increase salmon and trout numbers by providing high quality habitat for young fish”
4. supporting forest and aquatic ecosystems through processes such as soil nutrient cycling and carbon storage”

The State of Nature report highlights that much more needs to be done to protect native woodlands and its biodiversity. This includes efforts to not only manage the threats but also to revive and recreate native woodlands.

Large landscape scale native woodland restoration projects are underway including the efforts by Cairngorms Connect, which covers 60,000 ha of contiguous land in the Scottish Highlands. In addition the Borders Forest Trust, established in 1996, has acquired 3,100ha of land across Dumfriesshire and the Scottish Borders to restore native woodlands. Carrifran Wildwood is owned by Borders Forest Trust in association with the John Muir Trust, undergoing restoration, illustrated in the image below.

Carrifran woodland restoration in the Southern Uplands of Scotland

Borders Forest Trust, 2020[63]

STAKEHOLDER VIEWS

In relation to the ecological crisis most stakeholders felt more needed to be done in relation to forests and policy. The main areas of required action were on **native woodland creation, and management and strengthening of habitat networks**. It was stated that **building habitat networks is a key opportunity** and: "if you have a strong network in a wooded landscape this raises everything." They further argued that the woodland that connects them does not have to necessarily be 'high quality' but corridors were important for wildlife and had social benefits.

Some respondents argued there was also **too much emphasis on designated sites.** Focusing on these sites, they said, puts biodiversity at risk as the vast majority of woodlands are not found in designated sites.

Coordinated action at the landscape scale, was also recommended. As one person noted "if you look at scheme by scheme you can't see the bigger picture." Integrated land management was further advocated for. A respondent recommended that **native woodland creation should integrate with other farming practices.** In addition, stakeholders raised the benefit of promoting wet woodland creation i.e. associated with wetlands, rivers and lochs and helping farmers to establish woodlands to join up existing woodland patches.

Another respondent emphasised that to **enhance biodiversity in woodlands a certain amount of dead wood is needed**. It was acknowledged that dead wood targets were necessary but controversial as foresters were not keen, due to risk of disease, and visitors were opposed as it looks untidy.

Natural regeneration, some respondents noted, was comparatively neglected in the current SFS. Similarly another acknowledged that Scotland currently has a lot of forest, but a relatively low amount of native woodlands. By contrast, England has far more, and the current planting targets were an opportunity to rectify that. Native woodlands, with **growing genetic diversity, could also offer the greater resilience,** in the face of climate change argued one stakeholder.

Linking Biodiversity and Climate

Biodiversity and climate change are interrelated. However the pursuit over one issue in policy may put the other at risk; e.g. pursuing net zero goals whilst overlooking biodiversity declines. Yet efforts to tackle climate change and biodiversity declines needn't be mutually exclusive. Woodlands and forests are also recognised in the LUS for their part "in reducing the risk from climate change for the people and biodiversity of Scotland" [10] .

Both the Woodland Trust in their Emergency Tree Plan for the UK, and Scottish Environment LINK and WWF Scotland's Nature on Red Alert highlight the link between woodlands, enhancing biodiversity and tackling climate change. The Woodland Trust argue that there could be a win-win for the UK [64] :

> “ to tackle both its local biodiversity collapse and the global climate crisis by protecting, restoring and massively expanding its native woodland and tree cover.”

Natural Regeneration is associated with biodiversity gains. In addition the climate adaptive potential of native natural regeneration is also recognised. The Woodland Trust sets out four core benefits of natural woodland regeneration which supports woodland creation targets:

“

1. natural regeneration provides a variety of different habitat structures in young woodland for a wide range of wildlife ”
2. scientific evidence shows that the UK’s native tree species have a wide genetic diversity, which can enable adaptation to climate change (and other threats such as tree disease). Natural regeneration supports genetic mixing and the natural selection of the fittest ”
3. natural regeneration can help to reduce the need for importing tree stocks. Imported trees carry an increased risk of introducing new pests and diseases”
4. natural regeneration can be cheaper than planting. It can also be integrated with lower density planting to achieve the same objectives. However, in many cases self-seeded saplings will require protection and management of grazing and browsing animals”

The UK Forestry Standard (UKFS), described in further detail later in the briefing, recognises the dual role of woodland in tackling biodiversity loss and climate change.

The UKFS requirements and guidelines for 'forests and biodiversity' include [65] :

- priority habitats and priority species
- native woodlands
- ecological connectivity and processes
- tree and shrub species selection
- forest and stand structure
- veteran trees and deadwood
- open, scrub and edge habitats
- riparian zones
- habitat creation and restoration
- invasive species
- grazing and browsing

The UKFS regulation and guidelines for forest and climate change include [65] :

1. For climate change mitigation:
   - carbon in forest products
   - carbon in soils
   - carbon in forest ecosystems
   - operational carbon footprint
2. For climate change adaptation:
   - forest planning
   - adaptive management
   - tree and shrub species
   - ecological connectivity
   - environmental protection

The UKFS recognises multiple elements that are needed for sustainable forest management embracing its multifunctional roles, and requires forestry plans to have mixed systems. It is required, as the 'minimum', for forestry plans to [65] :

> “ Maintain or establish a diverse composition within the forest management unit; where only one species is suited to a site and management objectives, a **maximum of 75% may be allocated to a single species**. In all cases, incorporate a minimum of: ”
>
> - 10% open ground or ground managed for the conservation and enhancement of biodiversity as the primary objective”
> - 10% of other species”
> - 5% native broadleaved trees or shrubs”

Scottish Government, in the Programme for Scotland 2020-2021, set the intention to commission a pilot project called ‘Miyawaki’ mini forests to trial an approach to restoring biodiversity and fighting the climate crisis. It was noted this approach has the [66] :" potential to improve urban biodiversity and green space for local communities and to involve people as part of citizen science."

STAKEHOLDER VIEWS

Synergies between climate action and nature conservation were possible through planting mixed and native woodlands, a number of respondents noted. Some argued the synergy depended on the ratios of conifer and broadleaved planting.

For native woodland regeneration, it was argued by an interviewee, that there is the potential for both biodiversity gains and carbon sequestration. Yet, currently research and data is lacking on its potential and therefore needs further investigation.

In a **'dash for carbon'** another commonly identified concern was the **prioritisation for fast growing non-native species,** such as Sitka spruce. By having a heavy focus on woodland creation targets, some felt native woodland planting, natural regeneration and management were being overlooked. Some stakeholders believed that the SFS did not do enough to support native woodland creation. It was recommended, by some, that for woodland creation targets, half of all woodland planting should be native. Respondents further advised that other species and genetic diversity will also enhance climate, pest and disease resilience.

Overall it **cannot yet be determined if the SFS will deliver on addressing the climate and ecological crises**. The woodland creation targets are on track but the impacts on biodiversity are not yet known. It is complicated, noted several interviewees, as it depends on the location, the land and soil being converted to woodlands, the type of tree species being planted, under what type of management, amongst many other considerations.

Now is a **crucial moment to understand how best to proceed both for reducing carbon emissions and conserving biodiversity**. Whilst there is a need for haste it is also as crucial not to get it wrong. How the SFS might genuinely contribute to achieving net zero by 2045, and the biodiversity challenges and requirements for this to happen is an area of research that needs further attention.

Land

Land, land uses and land use decisions underpin how woodland benefits are realised.

Scotland has a total land mass of approximately 7.8 million hectares. The main land use type in Scotland is agriculture, at 73% of Scotland's total land area (7.8 million hectares). Just over half of Scotland's agricultural land is comprised of rough grazing [67] . Forests in Scotland cover an estimated 18.5 % of the total land area [3] .

In policy there is an increasing push for integrating land use, such as agriculture and forestry, amongst other land uses for delivering multiple benefits for Scotland. Key Scottish Government policies such as the National Planning Framework 3, and Scottish Planning Policy (SPP) both identify Scotland's Land Use Strategy (LUS) as crucial to achieving this. Scotland's LUS sets out core principles for achieving sustainable 'integrated' land use.

In addition the LUS notes that "maximising the benefits provided by nature often requires co-ordinated action at a 'landscape' scale." SNH is the statutory adviser on landscapes. SNH also partner with Scottish Forestry to deliver Scotland's Forestry Strategy. SNH, in a joint statement with Historic Environment Scotland, describes landscapes as:

> “ an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.”

As landscapes have changed, so have perceptions of that landscape, leading to ongoing debates about land management and the place of people in nature. Scotland's land and natural resource economy has multiple stakeholders, many with differing visions of how land should be owned, used and managed.

Recent Parliamentary Questions on Scottish woodlands have related to the impact of afforestation on curlews; action to restore damaged peatlands; and bringing woodlands back into favourable condition for biodiversity.

Many current debates about land relate to restoring landscapes and/or preparing for the future. For example some perceive the 'archetypal Scottish landscape' as a 'wilderness' depicted as "open, mostly treeless, wild and empty" [1] . A recent report on valuing Scotland's moorlands also emphasises that open moorland habitats are iconic, signature landscapes in which certain species thrive, such as the red and black grouse. The report argues for the need to "balance between retaining open ground habitats and more trees".

Others focus on 'repeopling' as a necessity, as supported by Community Land Scotland and examined by Professor James Hunter, to address population declines in rural areas of Scotland and promote renewal [68] .

Many environmental NGOs, e.g. Trees for Life, John Muir Trust, Scottish Wildlife Trust, and others, argue in favour of 'rewilding'. These groups have joined to form the Scottish Rewilding Alliance. Rewilding generates significant debate, given its range of definitions and the perceived risk to local livelihoods, as explored in a recent paper on woodland expansion in Scotland [69] .

With differing debates in how best to manage land, the Scottish Government sought to develop an integrated landscape approach through the LUS and as one of its core principles to make sure [10] :

> " [...] that we encourage and facilitate participation by everyone in the debates and decisions that matter to them most, regardless of their circumstances or backgrounds"

Land Ownership

A key part of the ongoing debates about land management, and the place of people in nature, is who owns the land, and whether that ownership plays a pivotal role in what it is used for, and who benefits. Andrew Thin, the Chair of the Scottish Land Commission, stated [68] :

> " The way we own and use land is central to big public policy challenges including climate action, productivity, and inclusive growth."

It has been widely quoted that Scotland has one of the most concentrated patterns of land ownership in the world [70] . Scotland's woodlands are mostly privately owned at 68% covering 988,000 ha [40] . It was reported by the Land Reform Review Group, an independent review group established by the Scottish Government, that [71] "currently 432 private land owners own 50% of the private land in rural Scotland." Another study on forest ownership by the Forest Policy Group also identified a similar pattern.

Scotland's woodland status relates to both land use and land ownership patterns [1] . For example, land use on some private estates prioritises maintaining land to allow for deer and grouse shooting to be maximised. In some cases this leads to poorer woodland condition as a result of high numbers of herbivores, or prioritisation of the moorland habitat.

A recent Investigation into the Issues Associated with Large scale and Concentrated Landownership in Scotland by the Land Commission consulted with over 400 stakeholders. The most frequently raised issue related to the links between land ownership and the ability of rural communities to realise their economic potential. Stating that certain patterns of ownership "frustrates economic development within fragile rural communities" [72] . For example, environmental land owners, including NGOS, were criticised by some for having narrow agendas that ignored communities.

The Land Reform Acts of 2003 and 2016 put in place a suite of rights to buy for communities, depending on circumstance, and some communities have taken advantage of this by purchasing woodland.

In 2005 the introduction of a National Forest Land Scheme (NFLS) allowed communities to buy or lease land on the National Forest Estate and ran from 2005 to 2016 [73] . Following this the Community Asset Transfer Scheme (CATS) was launched, and sets out how Forestry and Land Scotland (FLS) deliver the requirements of Community Empowerment (Scotland) Act 2015.

The CATS provides that [74] :

> “ Community organisations have a right to request to take over publicly-owned land or buildings that they feel they can make better use of for local people.”

An estimated 50 communities have engaged with FLS and the CATS in order to buy or lease woodlands. One of the successful applications includes Dronley Community Woodland who purchased 50 ha to provide multiple benefits for the community. Another example includes Eshiels Community Woodland, that succeeded in purchasing 6.9 ha of woodland in Peebles.

Eshiels Community Woodland, Peebles

Peebles Community Trust applied for an asset transfer request to purchase Eshiels woodlands. Their proposal was to improve biodiversity, sustainable productive management through community ownership and partnership, resurrect coppice management skills and provide a space for further skills training and nature learning. Their request was agreed to in 2018.

Forestry and Land Scotland, 2020[75]

The Scottish Land Fund is available to communities by giving financial support to buy woodlands and land, the fund aims to help them to:

> “ become more resilient and sustainable through the ownership and management of land and land assets.”

STAKEHOLDER VIEWS

Overall, whilst changes in policy have been taking place, the impact on landownership patterns, and progress in community woodland ownership is lacking, as argued by an expert stakeholder during the interviews. Furthermore, the Scottish Land Commission suggests [72] that more needs to be done to enable community opportunities for land ownership, and a voice over land use decisions.

Policy

Scotland's Forestry Strategy (SFS) 2019-2029 outlines a 50 year vision, seeking to expand, protect and enhance forests and woodlands, as well as aiming to deliver on multiple objectives [2] . This section provides a overview of the Strategy and its linkages to wider policy in Scotland.

Forest Governance

The Forestry Commission (FC) for the UK was established in 1919. Forestry was devolved under the Scotland Act 1998 when Scottish Parliament was established, and powers to introduce new laws on matters such as forestry were devolved.

However, the Scotland Act also set out that the FC remained a cross-border body. This meant that the Forestry Commission's Board maintained the same powers and duties that applied throughout the UK.

In 2003, following the Forestry Devolution Review, Forestry Commission Scotland (FCS) and Forest Enterprise Scotland (FES) were formed. These were responsible for management of the National Forest Estate - but still both as parts of the FC [76] .

Scottish Ministers decided on the policy and financial frameworks for how FCS operates, and the Scottish National Forest Estate was also managed in accordance with the priorities and objectives of the Scottish Ministers.

Full devolution to Scotland came into effect on the 1st April 2019, with the Forestry and Land Management (Scotland) Act 2018, repealing the Forestry Act 1967.

The new Act meant that the Forestry Commissioners, a UK Non-Ministerial Department, were no longer accountable for managing forestry in Scotland. FCS was replaced by Scottish Forestry and FES was replaced by Forestry and Land Scotland (FLS), who are both now directly accountable to Scottish Ministers.

FLS are responsible for managing public forests and woodlands and, as well as continuing to "provide vital timber supplies to support the rural economy", they aim to enhance [77] :

> “ biodiversity, support tourism and increase access to the green spaces that will help improve Scotland’s physical and mental health and well-being. ”

Scottish Forestry, is the government agency responsible for forestry policy, regulation, grants incentives, technical forestry advice and cross border arrangements. A new chief forester for Scotland, Dr Helen McKay , has recently been appointed. In her role, she will provide advice on technical and professional forestry matters to Scottish Ministers.

Under the new Act, the Scottish Government is required to develop Scotland's Forestry Strategy (SFS) with regard to:

- Article 2 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change

- the Land Use Strategy (prepared under section 57 of the Climate Change (Scotland) Act 2009)
- the Land Rights and Responsibilities Statement (prepared under section 1 of the Land Reform (Scotland) Act 2016)
- the code of practice on deer management (drawn up under section 5A of the Deer (Scotland) Act 1996)
- the Scottish Biodiversity Strategy (prepared under section 2 of the Nature Conservation (Scotland) Act 2004)

All of Scotland's forestry policies and practice must comply, as outlined in the Act, with sustainable forest management practices. The SFS 2019-2029 was developed as a key forestry policy document outlining Scotland's approach to forests and woodlands.

Woodland Ownership

Scotland's National Forest Estate (NFE), is public forest land owned by Scottish Ministers on behalf of the nation**.** The NFE covers 9% of Scotland's total land area [78] and constitutes one third of Scotland's forests (469,000 ha). NFE was previously the responsibility of the Forestry Commission, and now managed by FLS [4] .

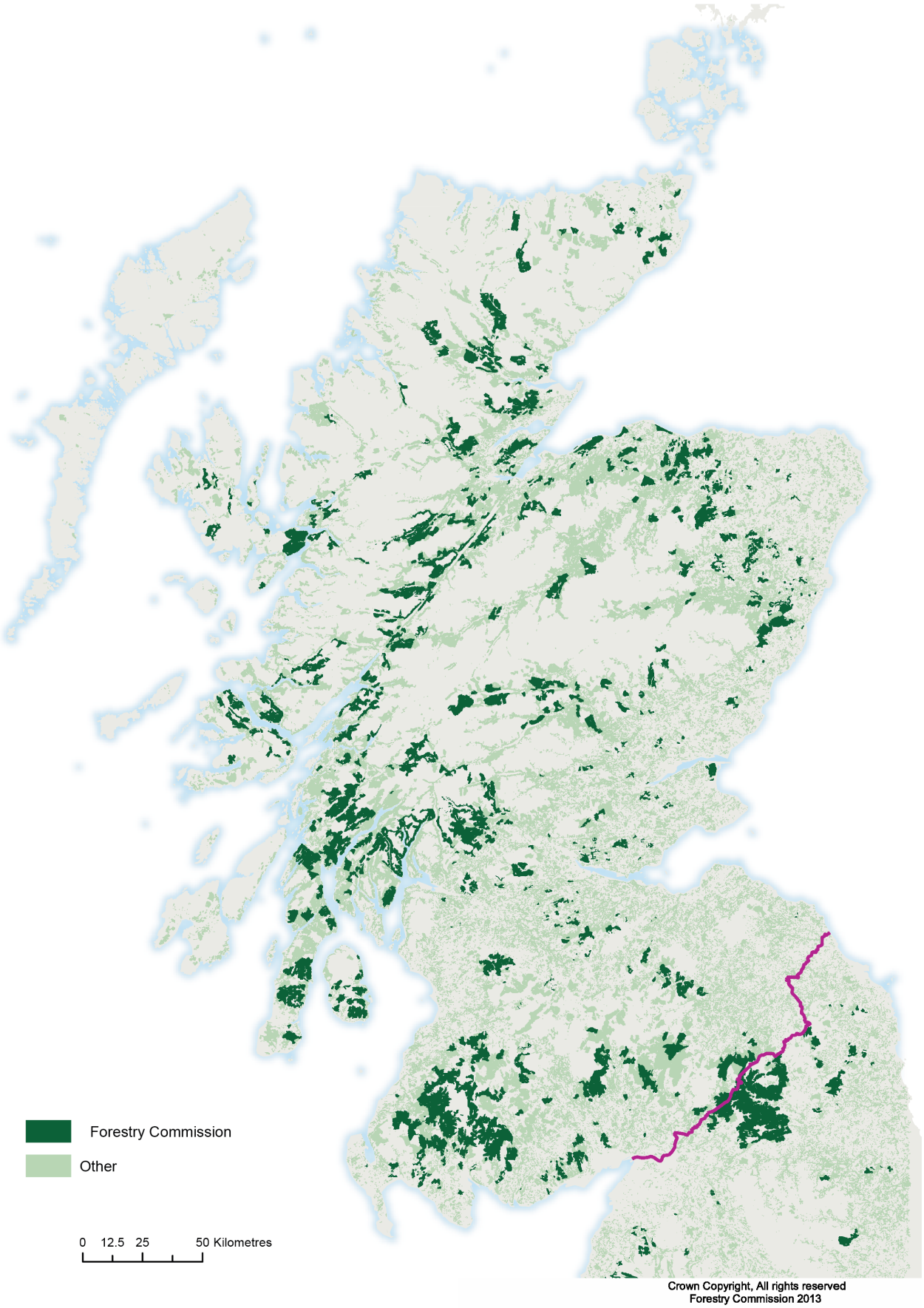
The majority of Scotland's woodlands (68%) are privately owned, as seen in the Figure below. The map below indicates the woodland divided by ownership in Scotland in 2011, which indicates NFE as 'Forestry Commission' and private as 'other'.

Available information on the ownership of Scotland's forests and woodlands is limited by the use of two ownership categories, NFE and private. All woodlands that are not NFE are automatically classified as private; despite that, a proportion is owned by other public bodies, such as local authorities, SNH and others [79] .

A more nuanced national classification would help distinguish between the different woodland ownership types to examine impacts on management. Transparency in types of forest ownership has been considered in reports such as the National Inventory of Woodland and Trees for Scotland, published in 2011. In this report forest ownership had several categories rather than two.

Distribution of woodland by ownership in Scotland, in 2011

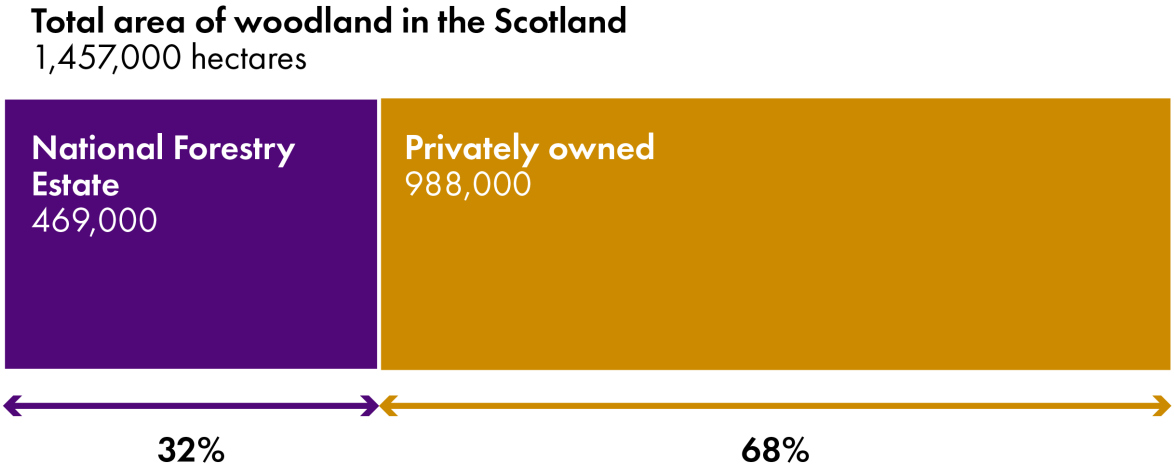
Recent NFE ownership spatial data for 2019 can be viewed here.



Forestry Commission 2013

Area of woodland under public and private ownership in hectares and percentages in Scotland 2019.

Privately owned includes 'all other woodland'.



Forest Research, 2019[5]

91% of Scotland's NFE woodlands are conifers with broadleaved species at 9% in 2019 [80] . For the woodlands classified as private, the majority, at 65%, are conifers and 35% as broadleaved species.

Percentage of conifer and broadleaved woodlands under public and private ownership in Scotland 2019

Forest Research, 2019[5]

Scotland's Forestry Strategy

SCOTLAND'S FORESTRY STRATEGY (SFS) 2000 & 2006

The first Scottish Forestry Strategy was published in 2000 by the Scottish Executive[x]. This was reviewed in 2005 and 2006, and was followed by a revised Strategy, published in

2006 [81] [82] . The 2006 Strategy included with it an 'Implementation Plan' on how the objectives were to be delivered. In addition there were a number of targets:

1. expand woodlands to cover 25% of Scotland's land area
2. ensure a consistent and predictable timber supply of about 8.5 million m3 per year
3. 35% of woodland area to be composed of native species
4. restoration of native woodland to be well under way in 70% of ancient woodland sites which have been converted to planted forests

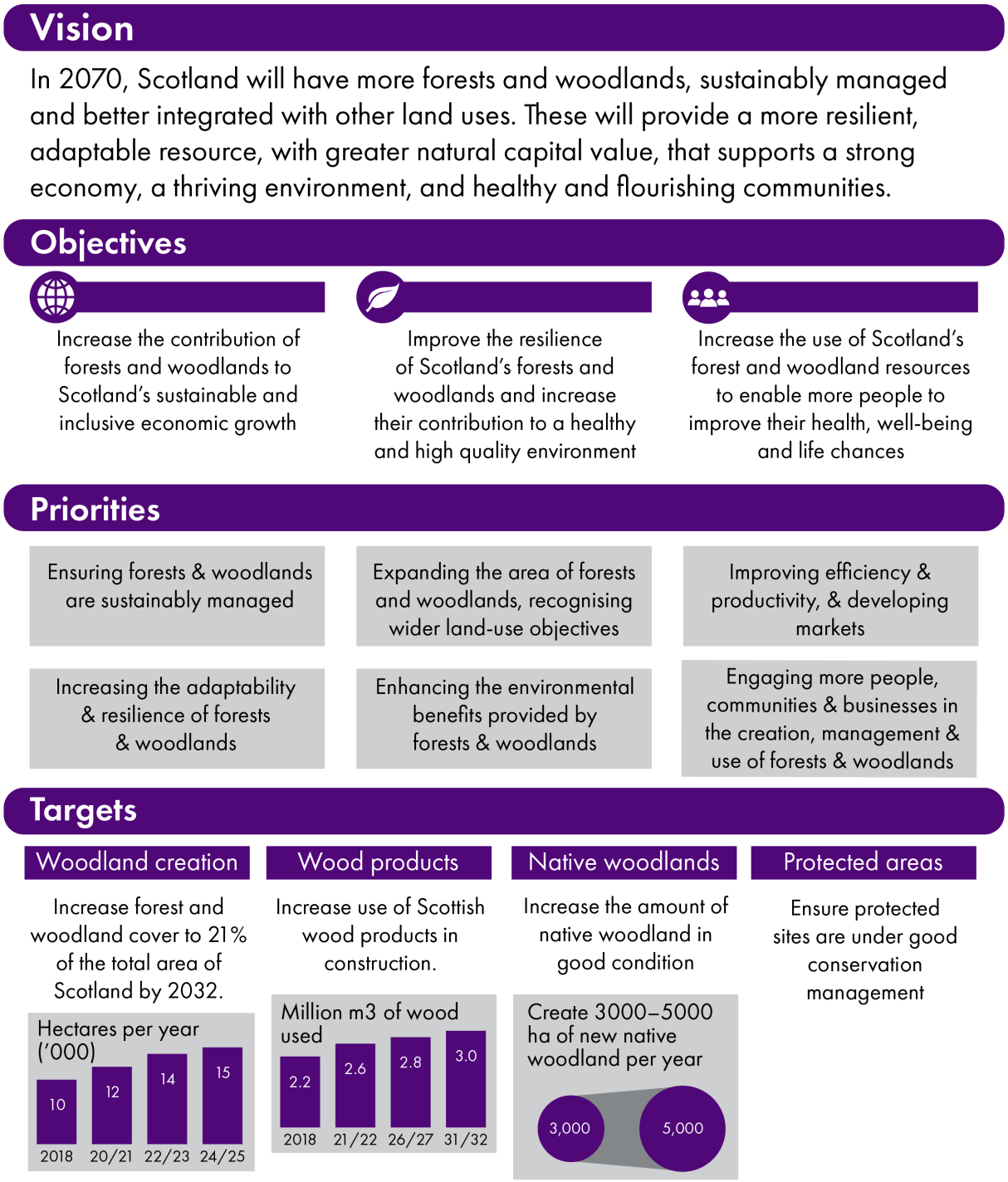
For monitoring and evaluating progress there were indicators for each objective. These are explored in detail in a 2016 SPICe briefing on Scottish Forestry.

SCOTLAND'S FORESTRY STRATEGY (SFS) 2019-2029

The SFS 2019 -2029 provides a ten year framework, supporting the 50 year vision [2] . Box 1 illustrates the key objectives, priorities, and targets of the new Strategy, which illustrates changes from the previous Strategy.

Three core forestry objectives of the Strategy are outlined for the next ten years, reflecting economic, environmental, and social aspects. These multiple objectives illustrate the Scottish Government's desire for [2] : "better integration of forestry with other land uses and businesses".

x Scottish Executive had its name formally changed in law to 'Scottish Government' by the Scotland Act 2012.



Key Objectives, Priorities, and Targets of the SFS

Scottish Government, 2019[2]

One key target is to expand forest areas from 18.5% to 21% of the total area of Scotland by 2032, a slightly lower woodland creation target than that of the previous Strategy. Other targets include: restoring 10,000 ha of native woodlands, and creating 3000-5000 ha of new native woodland per year [2] .[xi]

xi Native woodlands and the current composition of Scotland's woodlands are explained in more detail in another section.

The current Strategy lists a number of ways it hopes to achieve these woodland targets. Including support for a range of forest and woodland types and scales, for a number of purposes, including the production of timber.

The Forestry Grant Scheme (FGS), under the Scottish Rural Development Policy (SRDP) 2014-2020 is currently the main financial incentive for expanding and managing forests and woodlands. The FGS is described in more detail in a following section.

The links between woodland creation and mitigating climate change are explicitly noted in the SFS. For instance it states that [2] :

> “ For each new hectare of forest and woodland created, it is estimated that, on average, seven tonnes of CO2 will be removed from the atmosphere each year. The creation of new forests and woodlands is therefore recognised as an important tool for reducing GHG emissions and helping to meet our statutory climate change targets.”

The role of Scottish woodlands as important habitats providing 'biodiversity value' is further recognised [2] :

> “ The Scottish Government is committed to protecting, enhancing and valuing Scotland’s environment and increasing stocks of natural capital. Scotland’s forests and woodlands can help to support delivery of our biodiversity Strategy as well as the Scottish Soil Framework and our approach to River Basin Management Planning. ”

Furthermore the SFS outlines that biodiversity will be enhanced, supported and protected via improved woodland management. In particular the management and condition of ancient and semi-natural woodlands, including appropriately restored plantations on ancient woodland sites (PAWS), as a priority. The Strategy sets out the need for [2] :

> “ Maintaining and enhancing biodiversity, in particular by using the recruitment of natural regeneration and improving mitigation of the risks posed by invasive non-native species, deer and other herbivores.”

There are a number of existing examples in Scotland that have been applying these practices in woodland creation and management, in favour of enhancing biodiversity. Glenfeshie, located in the Cairngorms National Park, is an example of a shift from a deer oriented estate to a rewilding project promoting natural woodland regeneration. Other examples include; include the Alladale Wilderness Reserve and Dundreggan Estate.

Glenfeshie native woodland regeneration

Glenfeshie in the south-west corner of the Cairngorms National Park.

BBC Scotland, 2014[83]

A policy map in Appendix 2 provides a summary of and guide to key policies that relate to the Strategy. It is not an exhaustive list, but an overview of forestry policy links, with a specific focus on climate change and biodiversity policies and strategies relating to forests and woodlands. Some of the core polices associated with the SFS are reflected on further in the following sections.

STAKEHOLDER VIEWS

Scottish woodlands have the 'potential' to deliver multiple benefits, yet one interviewee remarked the: "biggest challenge is to get all the objectives to deliver at once - as there will be trade-offs depending on what action is taken." For instance, to balance national food production keeping land for agriculture along with the drive for woodland creation as part of climate change actions. Some interviewees reflected that the integration of land uses, such as farming and forestry was important, as was the need for compromise.

Overall, most interviewees agreed that for Scotland's woodlands to deliver multiple benefits and to achieve compromise, Scotland's Land Use Strategy and the Regional Land Use Partnerships were both crucial. To 'better' integrate forests with other land uses some stakeholders also emphasised the importance of the natural capital approach , to account for the range of benefits different land uses provide.

Forestry Strategy Implementation Plan 2020 - 2022

Scotland's Forestry Strategy Implementation Plan 2020 - 2022 was published in June 2020. It outlines a 2 year programme, developed with input from the Confederation of

Forest Industries, Institute of Chartered Foresters, Scottish Environment Link, Community Woodlands Association and Scottish Land and Estates.

The Implementation Plan was prepared prior to the Covid-19 crisis, however it was decided that it would still be made available as [16] :

> “ the information provides a baseline for the initial delivery of SFS 2019-2029 objectives; to expand Scotland’s forests and woodlands so future generations can realise the full range and extent of the associated economic, social and environmental benefits. Priority will be given to the actions that best support the forest sector to recover from the impacts of the coronavirus emergency. The two-year plan will be kept under review and discussions will be held with delivery organisations regarding the scheduling of associated actions.”

The Plan outlines what is needed to deliver on the SFS ambitions, including [16] :

> “ additional capacity will be needed across the forestry sector, to ensure the availability of adequate trees to plant and, that Scotland has appropriately skilled people to design, establish and manage our expanding forests and to ensure this work is carried out sustainably. ”

The two key SFS delivery mechanisms will be:

- financial support e.g. Forestry Grant Scheme and the Strategic Timber Transport Fund
- robust and proportionate regulation

In the plan's introduction it makes explicit reference to the role of forests in the climate emergency; biodiversity is also referenced throughout. It refers directly to 'addressing the global climate emergency' and the CCP and the crucial importance of woodland creation for mitigating climate change (further detailed in the climate change policy section of this briefing).

The Implementation Plan also outlines that [16] :

> “ The Scottish Government’s Budget for 2020-2021 increases funding for woodland creation, while the Programme for Government 2019- 2020 committed to consulting stakeholders on increased and accelerated woodland creation targets beyond 2021.”

The Plan then sets out key actions for each of the six priorities introduced in the SFS. The actions state what Scottish Government and its core partners will firstly continue to do, and secondly what is expected to be in place by 2022.

Monitoring is another core component of the Plan. It outlines a set of high-level indicators developed to monitor and demonstrate progress against the SFS, and it's activities. The indicators (categorised for this briefing) include [16] :

Economic indicators:

- contribution of forestry to the Scottish economy
- volume of available timber

Environmental indicators:

- area of UK Woodland Assurance Standard (UKWAS)
- certified forests and woodland forestry sector net GHGs
- woodland ecological condition score
- condition of protected forest and woodland sites
- index of Abundance for Scottish Terrestrial Breeding Birds – Woodland Species

Social indicators:

- number of community groups that own and lease forests and woodland
- number of visits to forests and woodlands

General indicators:

- total area of forests and woodland
- area of woodland creation
- area of forests and woodland covered by management plans

The general indicators i.e. the area of woodland under creation and total area of forests and woodland are relevant for monitoring progress towards climate change goals, whereas for monitoring biodiversity impacts the environmental indicators will be most relevant.

Reporting is referred to in the Plan's final section. Reporting requirements are outlined under the Forestry and Land Management (Scotland) Act 2018. The Act requires Scottish Ministers to:

> “ publish a report every three years on progress in implementing the Forestry Strategy, and to lay a copy of the report before the Scottish Parliament. The report will demonstrate progress in delivering the Forestry Strategy’s priorities for action and associated activities, focusing on actions and indicators set out in this Implementation Plan.”

The Act specifies the end of the first reporting period as 31 March 2022, therefore a report to Scottish Parliament should be ready following this date.

STAKEHOLDER VIEWS

Notably, at the time of the interviews the SFS Implementation Plan had not yet been published. An interviewee admitted that the Strategy was 'hard to scrutinise' without this. Most interviewees agreed, in principle, the whilst it covered multiple objectives, some felt that it only becomes meaningful in 'how' it is implemented. As the SFS was 'high level', some interviewees noted there were grey areas, and interpretations will vary.

Some interviewees highlighted that the previous Forest Strategy was published 'with' the Implementation Plan. Interviewees from commercial forestry as well as from an environmental NGO both argued that the previous SFS (from 2006) was a stronger document in comparison to the current Strategy.

The current Implementation Plan did however appear to align with certain views on what was needed to deliver the SFS. For instance the additional capacity across the forestry sector, to ensure the availability of adequate trees to plant, and to have a skilled labour force to plan and manage Scotland's growing forest.

Woodland Creation

The current SFS aligns with international commitments that the Scottish Government has made under the Bonn Challenge to restore woodlands. This aims to 'restore' 150 million ha of the world's deforested and degraded landscapes by 2020, and 350 million ha by 2030.

It was reported in 2018 that 43.7 million ha are under restoration which equates to 29% of the total Bonn Challenge target being met so far. Progress is still be updated and measured through a Bonn challenge barometer.

The Scottish Government's Bonn Challenge ambitions are to increase woodland cover; deliver greater carbon sequestration; and improve the condition and extent of native woodlands.

However there are a number of barriers to woodland expansion, as identified by the Woodland Expansion Advisory Group (WEAG); including: the deep cultural divide between forestry and farming, an overly bureaucratic grant system with stringent auditing, and an ability to access advice and facilitation [84] .

Guidance to planning forestry and woodland creation is provided in The Right Tree in the Right Place; published in 2010 [85] . In this, a land classification system identifies areas that are; *preferred, potential* or *sensitive*, helping to indicate the suitability of different locations for woodland creation for different woodland types.

The SFS and The Right Tree in the Right Place is supported by the Scottish Planning Policy; this is a regulatory framework that has [2] :

> “ the principles of 'sustainable forest management' at its core, including an adherence to the principle of ‘the right tree, in the right place, for the right purpose’. ”

A Confor Report on the woodland carbon targets for the UK indicated preferential woodland creation targets by Confor, the CCC, a number of environmental NGOs and the UK, Scottish and Welsh Governments. The report also listed practical constraints to setting higher targets as seed availability, nursery capacity, and skilled labour.

The CCC advised that a minimum of 15,000 ha should be planted in Scotland by the mid 2020s, if net zero goals are to be met. The Scottish Government set out to do this in the SFS [2] and progress towards the woodland creation targets are already evident.

Scotland has met, for the first time, its tree planting targets for 2018/19; planting over 11,000 hectares, equating to nearly 22 million more trees [86] . It was estimated that Scotland had delivered over 80% of all new tree planting in the UK. The Cabinet Secretary for Rural Economy and Tourism stating that, despite setbacks [86] :

> “ Scotland has produced the second highest planting figure in nearly 20 years and again exceeding our original planting target. ”

It was announced in the new Programme for Scotland 2020-2021 that woodland creation targets would be increased [66] : "from the current level of 12,000 hectares in 2020/21 up to 18,000 hectares in 2024/25." This target is seen as a "nature based investment" and woodland creation as a "nature based solution for climate change".

STAKEHOLDER VIEWS

The woodland creation targets are currently on track. In the stakeholders interviews all agreed that **woodland creation targets were needed to meet climate goals**. Yet many argued it was **essential for principles behind the 'right tree in the right place' to be followed** to ensure that biodiversity concerns, for example, were not being sidelined.

Some interviewees, more sceptical of target setting, argued targets **could lead to a drive for quantity over quality.** Others were concerned about the **barriers to woodland creation efforts**. Interviewees outlined the risks to woodland creation as:

- the consistency of grants incentives and subsides
- fluctuating markets
- ability to supply demand (in terms of seeds and number of tree nurseries)
- the lack of a skilled labour force (impacted by tighter immigration controls with the exit from the EU)
- risk to pests and disease and climate change

It was further argued by a carbon expert a fair proportion of trees across Scotland should be considered rather than 'saturating' certain regions. For example, it was felt that the south west of Scotland already has the highest tree cover percentage in Scotland. They emphasised that this was why regional forestry strategies are needed, to align regional contexts with the national priorities.

National Performance Framework

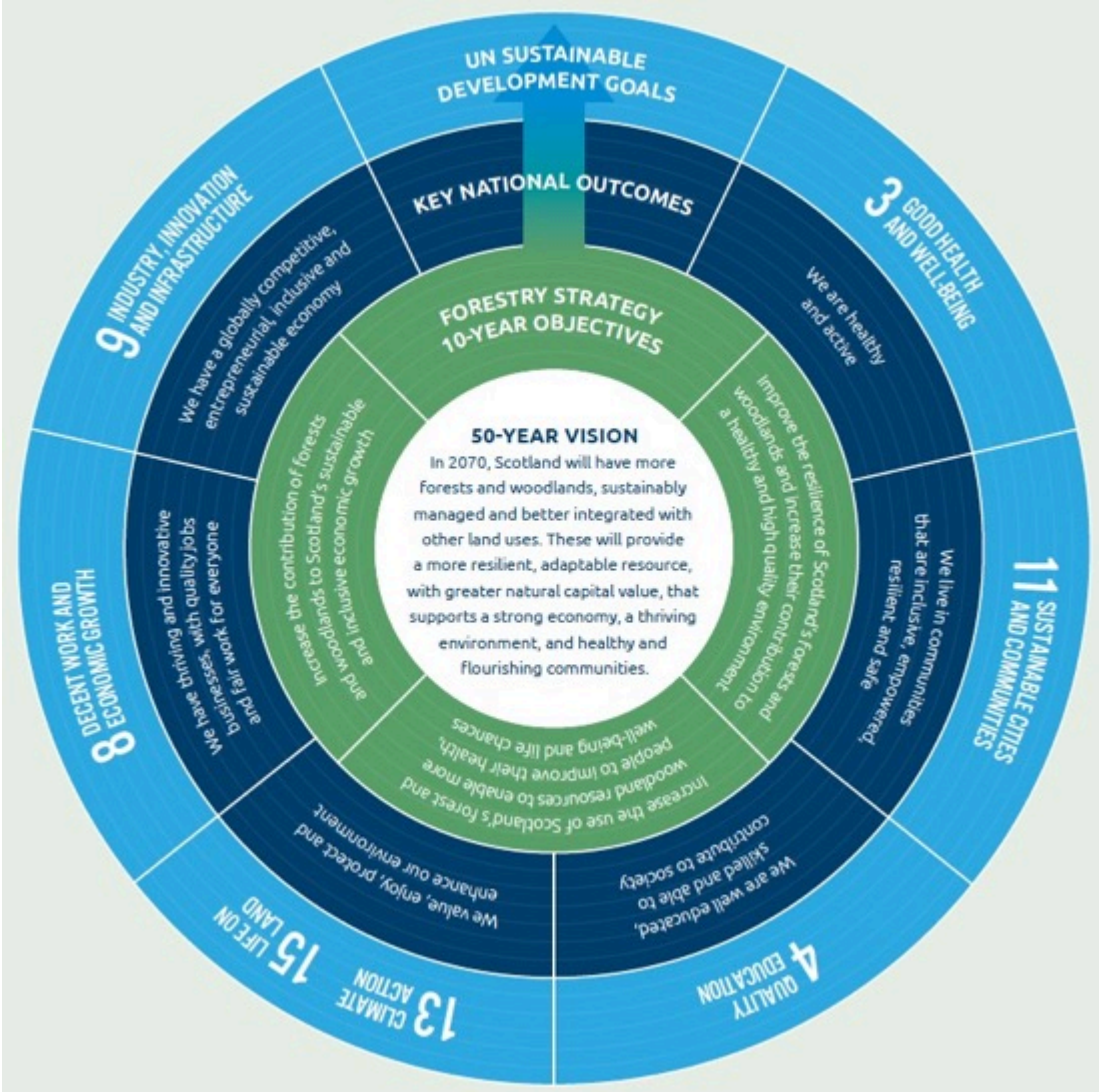
Based on the UN's Sustainable Development Goal (SDGs), the National Performance Framework (NPF) outlines the purpose and values that should be embedded in public policy. The NPF's aims are supported by a series of national outcomes including:

- the need to value, enjoy, protect and enhance the environment
- to live in communities that are inclusive, empowered, resilient and safe
- and to have a globally competitive, entrepreneurial, inclusive and sustainable economy.

Performance is measured against national indicators that also relate to woodland and forestry policy, e.g. the condition of protected nature sites, visits to the outdoors, carbon footprint and the natural capital index.

The multiple objectives of the SFS seek to align with the NPF national outcomes, and the UN SDGs as indicated in the following illustration.

The linkages between the SFS vision and objectives for forestry, key Scottish Government National Outcomes and the associated UN SDGs.



Scottish Government, 2020[16] :

STAKEHOLDER VIEWS

The majority of interviewees agreed that the Forestry Strategy managed to strike a balance between its multiple objectives at least on paper. As the SFS was situated within the National Performance Framework, it was argued this automatically connected it with other policies and objectives. A few stakeholders, more critical of the current SFS, believed it was still **'business as usual'**. With the Strategy appearing to be economically driven, and not providing enough emphasis on the social and environmental objectives.

Natural Capital

Natural capital, described in an earlier briefing section, is a concept embedded in the NPF, and the links between woodlands and the importance of natural capital are further made in the SFS, and linked to biodiversity, which outlines [2] :

> “ commitment to protecting, enhancing and valuing Scotland’s environment and increasing stocks of natural capital. ”

Scotland has developed a measure which tracks annual changes in natural capital stock called the Natural Capital Asset Index. This approach recognises the 'goods and services' that flow from natural capital, including [2] :

> “ timber, food, renewable energy, water purification, flood mitigation and cultural, recreational, educational and therapeutic experiences.”

Scotland's woodlands are important national assets capable of providing all of the above goods and services, as referred to in the Forestry Strategy [2] .

In the National Capital Index report for 2020, it was noted that timber in Scotland had been increasing both in production and value. The report outlined that [87] :

> “ Timber valuation for Scotland has steadily increased from £67.77 million in 2009 to its highest level of £226.40 million in 2018. This increase in the annual value was caused by trends in stumpage prices, which have increased from £10.67 in 2009 to £24.64 in 2018.”

When Scottish forests were valued for the regulatory services provided, in terms of carbon sequestration, the National Capital Index outlined the monetary gains for this service. For example highlighting that [87] :

> “ If we look at sequestration on a net basis, including emissions, 5.9 million tonnes of carbon dioxide equivalent was removed by nature in Scotland during 2017. Scottish forests removed 7.9 million tonnes of carbon in 2017 but croplands emitted 4.8 million tonnes. This means, whilst Scottish forests provided a £526 million service in 2017, Scottish croplands had emissions valued at negative £318 million.”

STAKEHOLDER VIEWS

The natural capital approach was largely supported by a number of the interviewees, to encourage a balanced and integrated land use approach. Such an approach would account for the range of benefits different land uses provide, which would support the principles behind the ‘right tree in the right place’, advised certain interviewees. Yet opinions differed. Some believed that forestry was already an exemplar for integrated land use and was well-coordinated at joining up outcomes. Others disagreed, arguing that forestry often trumped other land use uses.

Forestry Grant Scheme

Woodland creation and management grants are currently provided under the Forestry Grant Schemes (FGS), as part of the Scottish Rural Development Programme (SRDP) 2014-2020. The SRDP is the second pillar (the first pillar encompasses direct payments to farmers) of the EU Common Agricultural Policy (CAP).

The SRDP supports multiple objectives related to land management and rural development and is due to finish in 2020. This is also in line with the EU's multi-annual financial framework, and the UK's Exit from the EU, with the Brexit transition period ending on 31 December 2020. At the EU level this will be replaced by a new programme from 2021[xii]. It was noted in a SPICe briefing that [88] .

> " the future availability and quantity of grants for forestry and other competing land uses will therefore have a strong influence on activity within the sector."

However, the status of these grant schemes in uncertain, and any financial support from 2021 is still to be confirmed. The Scottish Government has stated its broad intention for continued stability in agricultural and land management policy. In 2018 the Scottish Government published a consultation on a five year transition plan aiming to provide 'stability, sustainability, simplicity and security'. The Scottish Government states that it wants to 'avoid major new initiatives and changes to existing schemes' unless those changes can improve delivery of policy outcomes. The Scottish Government also aims to continue to adhere to the EU environmental principles through the UK Withdrawal from the European Union (Legal Continuity) (Scotland) Bill.

Different Government agencies are responsible for different schemes under the SRDP. For example Scottish Forestry are responsible for the FGS , while SNH and the Rural Payments and Inspections Division (RPID) are jointly responsible for agri-environmental climate schemes as well as other agricultural support such as the Less Favoured Area Support Scheme.

For the SRDP 2014–2020, £252 million was available for the FGS. With regard to incentives for woodland creation provided by the SRDP FGS, the 2017 Climate Change Plan highlights that [89] :

> " The Scottish Government provides £2,500 per hectare of funding for woodland creation. This funding is matched by the EU. Funding from the Scottish Government and the EU together represent 80% of the total cost of establishment and maintenance."

The FGS has eight categories of support options available [90] :

- Woodland Creation: support the creation of new woodland that will bring economic, environmental and social benefits
- Agroforestry: integrated land management, where trees and agriculture co-exist to provide multiple benefits
- Woodland Improvement Grant: provide capital grants for a range of activities in existing woodlands such as regeneration, sustainable forest management, improving biodiversity etc.
- Sustainable Management of Forests: There are nine options with the aim to support the management of existing forests and woodlands with a high environmental value, for example to reduce deer impacts to a level on the woodlands

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xii A SPICe briefing, published in 2016 focused on the Implications of Leaving the EU- Forestry.

- Tree Health: support to prevent the spread of *Phytophthora ramorum* , an algae like organism that can kill oaks and other tree species
- Harvesting and Processing: supports the development of the small-scale premium softwood and hardwood processing sector
- Forest Infrastructure: supports forest access in small-scale or under-managed woodlands
- Forestry Co-operation: aims to encourage landscape-scale collaborations between multiple landowners

Silvopastoral agroforestry

In the UK, silvopastoral systems often feature trees that are planted with wide spacings into grazed pastures

The Farm Woodland Forum, 2020[91]

An early evaluation of the woodland creation schemes is due to be carried out in 2020, though may be delayed due to Covid-19.

STAKEHOLDER VIEWS

Considering Brexit, a number of respondents said this could be a opportunity for a 'new way of thinking' on how the FGS works**.** However, some were concerned that a drive for 'stability and simplicity', under the current approach, could mean the same flaws are perpetuated. The importance for the incentive mechanism to be **outcome driven, rather than process driven** was advocated for. Similarly the incentive system needed to be **less bureaucratic and promote creativity.**

It was emphasised that **incentives for woodlands and other land uses needs an integrated incentive system** as part of any new land use policy from 2024 (this is the date that has been set for a new policy to be in place), which requires everyone around the table. Another person highlighted that: "knowing that, what is suitable, we may not like the outcomes, but [it] needs to be about what is best for the land and seas, [this] requires a new funding model to breakdown silos."

Furthermore, a number of interviewees, advocated that the beneficiaries of FGS needed to be **more transparent**, with a grant system that's **more inclusive, and supportive of small scale practices,** and not just those already in 'good status'. This fits with the Scottish Government's 'inclusive' economic growth priorities and also to strive for 'a just transition for a net zero economy.

Woodlands in and Around Towns

Woodlands in and around towns (WIAT) are referred in the SFS as important for achieving social objectives but also for maintaining 'green networks' and providing additional ecosystem services. The Forestry Strategy states [2] :

> " The National Planning Framework (NPF) and the Central Scotland Green Network demonstrate how well-managed urban forestry can also make an important contribution to improving the **physical quality of urban environments** and to help mitigate the impacts of increasing urban development, for example, by **improving air quality and reducing rainfall run-off intensity and flooding.** It can also **help to economically regenerate degraded urban landscapes**."

As an urban forestry policy, A Strategic Framework Woodlands in and around towns (WIAT) Programme 2015 – 2020 includes woodland within 1km of settlements and with populations over 2000. The WIAT programme is focused on improvement of woodland management and creation for improving quality of life in urban areas.

A recent WIAT Progress Report outlined some achievements as having [92] :

> " created 1,400 hectares of new woodland, helped more than 610,000 people gain access to their local woodland, seen social returns on investment of £7 for every £1 invested in some areas and achieved positive feedback from local residents. "

Drumchapel Woods in north west Glasgow

Drumchapel Woods have benefited from the WIAT programme. Including 5km of paths being upgraded, and has been involved in the Branching Out programme for adults using mental health services.

Forestry and Land Scotland, 2020[93]

The WIAT report also gave various examples of urban woodlands supported by the programme, including a 40 ha riparian site in Aberdeen, leading to woodland management, improved footpaths and a community outreach programme [92] .

Part of the funding for over 150 projects is through the WIAT Challenge Fund grant and additional funding from the FGS. The FGS has the Woodland Improvement Grant available, aiming to:

- bring neglected woodlands into management
- develop opportunities to use and enjoy existing and newly created woodlands
- enhance woodland sites supported under previous programmes

STAKEHOLDER VIEWS

The role of urban forests and woodland and trees was mentioned numerous times in the interviews. Several interviewees reported the value of urban woodland places, not because they hold the rarest species, but because of what they offer the public. This is in terms of **opportunities to connect people with nature and raise awareness**.

It was a concern that **these places can be undervalued,** due to the absence of rare species or designations, while the public benefits were invaluable. One person warned: "if you don't rate these woodlands as valuable it would be easy to justify replacing them."

Trees and hedges in urban areas were considered to **improve air quality (removing pollutants), urban health, and to be good for mental health**, and were suggested to be easy wins for biodiversity and social objectives. This point of view was held by a number of those interviewed. It was further recommended it would be valuable to connect across wooded areas in the Central Belt, which requires a more structured planning approach.

Tax Incentives

Tax exemptions still serve as incentives for investing in forests. The main forms of taxation affecting forestry are income, capital gains and inheritance. A commercial forestry web page on 'taxation matters' states [94] :

> “ Investors can benefit from a range of grants and tax incentives designed to encourage private ownership of woodlands in the UK.”

The impact of these exemptions was covered in the Scottish Affairs Committee's inquiry into Land Reform in Scotland. For example the UK-wide estimate of the amount of tax forgone as part of the Conditional Exemption scheme is £60 million for financial year 2014-15. The Scottish Government's Land Reform Review Group also identified [95] :

> “ a lack of clarity over the public costs and public benefits that result from the current exemptions and reliefs for agricultural and forestry land in national and local taxation.”

With Government commitments for woodland creation targets to help reach net zero goals, such incentives could be seen as necessary. Yet, these may contradict other priorities such as addressing concentrated land ownership patterns in Scotland. For instance the Forest Policy Group stated that "forestry grants and tax incentives, and who they benefit, need to be questioned." Especially, they argue, when such systems favour those already wealthy, putting community and local forestry enterprises, as well as farmers at a further disadvantage. To better understand the scale of the issue, the Policy Group recommends [96] :

- more transparent land ownership data in Scotland
- information on who receives what public money, either as grants or tax relief, to gain an understanding on the scale and types of beneficiaries

STAKEHOLDER VIEWS

It was noted that tax exemptions, along with other barriers, meant that **purchasing woodlands was not an even playing field for certain groups**. With communities in particular having difficulties, as they are often priced out. One stakeholder, who works closely with communities, said: "the market value of the land bears no relation to its productive value ….Further that a more significant inflater of land and forest prices are subsidies and tax exemptions."

In contrast another argued that it "doesn't matter who owns woodland, its how that woodland is managed - what goes in, what goes on." Others disagreed, emphasising that **land ownership was an issue**, as it impacted who could make decisions over the land and what happens to that land. The Regional Land Use Partnerships were seen as having the potential to offer opportunities for communities, and other stakeholders, to feed into broader land use decisions.

Environmental Impact Assessment

Another policy requirement, to ensure any newly proposed forestry project limits any environmental harm, is Environmental Impact Assessment (EIA). This is required by the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017.

An EIA, as part of the regulatory responsibilities of Scottish Forestry, is required when significant environmental change is a possibility. In forestry this could be as a result of afforestation, deforestation, and forest roads and quarries. An EIA is used as part of the process to determine whether a project can take place.

A significant environmental change is identified if a proposed forest project area exceeds a certain threshold under certain conditions; e.g. if it exceeds 2 hectares in a National Scenic Area.

Land Use Strategy

Scotland's first Land Use Strategy (LUS) was published in 2011. It was produced as a requirement of section 57 of the Climate Change (Scotland) Act 2009, recognising the importance of land use in combatting climate change. The first LUS indicated a shift in Scottish policy towards a more integrated and strategic approach to land use.

In 2013, as part of the first LUS, regional land use pilot projects in Aberdeenshire and the Scottish Borders were established. Both focused on the development of tools designed to improve local/regional land use decision-making and ensure efforts were clearly communicated to stakeholders.

The second LUS 2016-2021 built on the first, and emphasises applying an ecosystem approach by [10] :

- considering natural systems
- taking account of the services that ecosystems provide
- involving people

The central framework of the LUS is it's vision, objectives, and principles for sustainable land use. The LUS vision for 2050 is described as [10] :

> " a high level strategic statement which reflects the varied nature of the interactions between different interests and land use. It is equally applicable across a wide range of interests for example land and water management, health, recreation, education and cultural heritage."

The LUS emphasises the importance of action at a 'landscape scale'; the UK is a signatory to the European Landscape Convention in 2006 and it provides a framework for Scotland's landscape policy.

The European Landscape Convention sets out five principles:

1. all landscapes - Every landscape is important because everyone has a right to live in and enjoy the benefits of vibrant surroundings
2. shared landscapes - Scotland's landscapes are a common asset and everyone has rights and responsibilities for looking after them
3. your landscapes - People and communities should always be involved in decisions that shape their landscapes
4. understanding landscapes - Decisions need to be based on understanding and awareness of both the cultural and natural dimensions of our landscapes
5. dynamic landscapes - Landscapes will continue to change, but change needs to be informed and managed to ensure they remain resilient

The linkages between landscapes, wider dynamic land uses and inclusive decision making are strong themes in the LUS, and the European Landscape Convention principles. All are integral for the long-term framework related to the expansion and sustainable management of Scotland's forests and woodland. The SFS, moreover Scotland's forest and woodlands, are noted as key to delivering on the LUS.

A third Land Use Strategy is planned as part of the Programme for Scotland 2020-2021 which is to outline an approach to maximise the contribution of land to tackle climate change.

Climate Change Policy

The CCC cautioned in their report on Land use: Policies for a Net Zero UK in January 2020 that:

> “ the goals to become net zero will not be met unless there are changes in how we use our land.”

Scotland is committed to the Paris Agreement which aims to limit global temperature rises to 'well below' 2 degrees Celsius.

Recently, a commitment to net zero emissions by 2045 (as part of a UK commitment to net zero by 2050) was made in the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. Updated interim targets were also agreed to.

STAKEHOLDER VIEWS

Woodland creation is seen as a key component for Scotland's climate goals, with an interviewee noting that: "you cannot get there without a significant shift in land use, and scaling that up is a big challenge." They noted Scotland’s importance in the UK meeting its net zero goals for 2050, due to the potential for nature-based solutions such as forestry, and that this would justify incentive support.

One interviewee, whilst supportive of the net zero goal, felt that this **does not address the adaptation story**. Trees and forests have a role in adaptation impacts from intense weather and disease outbreak, they stated, and felt this was underplayed in current policy. Trees and woodlands are important in building **‘climate resilience’** and this needed more prominence in the SFS, argued another.

Climate Change Plan

In February 2018, the Climate Change Plan (CCP) for 2018-2032 was published. The CCP sets out proposals and policies to reduce GHGs up to 2032 (against 1990 levels).

An updated CCP is also required by the 2019 Act, where 'land use, land use change and forestry' (LULUCF) is a key sector. The LULUCF chapter is divided into [97] :

> “ afforestation, baseline forest planting, harvested wood products, peatland restoration, development emissions (from settlements) and agriculture- related land use emissions.”

The CCP notes that LULUCF sought to sequester -6.7MTCO2e by 2032 [98] . Forestry and woodlands feature strongly in this chapter, with recognition that there are multiple benefits [97] :

> “ These new woodlands will absorb GHGs, as well as potentially helping to mitigate flood risk and improve water quality, improve biodiversity and provide opportunities for people to improve their health and wellbeing.”

There are two core policy outcomes for forestry outlined in the Plan. Policy Outcome 1 in the LULUCF chapter of the CCP states [97] :

> “ We will introduce a stepped increase in the annual woodland creation rates from 2020-2021 to enhance the contribution that trees make to reducing emissions through sequestering carbon.”

Policy Outcome 1 will be achieved through six sub-policies, which have associated indicators [97] :

1. forestry grants
2. woodland creation on the National Forest Estate
3. awareness-raising
4. woodland standards
5. woodland Carbon Code
6. forestry and woodland strategies

Policy Outcome 2 aims to [97] :

> " Increase the use of sustainably sourced wood fibre to reduce emissions by encouraging the construction industry to increase its use of wood products where appropriate."

For this outcome there is one sub-policy identified set out as [97] :

> " In collaboration with the private forest sector and other public sector bodies the Scottish Government will implement the Timber Development Programme through an annual programme of projects that support the promotion and development of wood products for use in construction."

Considering the planning implications of woodland creation the chapter also outlines:

> " National Planning Framework 3 notes that timber transport networks and requirements for processing facilities will need to be considered as forests mature. Planning authorities should take account of the National Planning Framework in the preparation of development plans for their area."

Peatland restoration is also fundamental for sequestering carbon. The CCP includes a target to restore 50,000 hectares of degraded peatland by 2020, with another 200,000 hectares restored over the following ten years [99] . This is relevant to the forestry sector, as some degraded peatlands were historically planted with forests and now need to be restored.

Peatland Restoration

The Peatland ACTION project is supporting the restoration of damaged peatlands in Scotland. Since 2012, action has been taken on over 25,000 hectares with funding provided by the Scottish Government.

Scottish Natural Heritage, 2019[100]

Within the woodland creation targets, the Forestry Strategy aims to increase the use of Scottish wood products in construction. The CCP outlines targets to increase the use of Scottish timber in UK construction to around 3 million cubic metres by 2031-2032 from 2.2 million cubic metres.

In relation to LULUCF, the CCP: monitoring report 2019 shows an improvement in woodland creation, with a 58% increase to the previous year, surpassing the set target.

The CCP is currently being updated to reflect Scotland's new GHG targets and was due out in April 2020. The update has now been postponed due to Covid-19 and is expected before the end of 2020.The CCC's response to this is further outlined in a following section.

STAKEHOLDER VIEWS

If ambitious climate targets are to be met, one interviewee argued that: "strong ambitious governments are needed" with "clear sighted policies [as there is] no pain free way to do this but society will have to take some things on the chin." These points reflect that it may be impossible to please everyone but that action is needed regardless in order to meet the net zero targets.

There was **widespread support for the aim to increase the use of timber**. The concerns outlined for some, were around **the 'type' of timber and what was produced**. Some respondents argued that to ensure carbon stayed locked up for longer, timber for construction was the better option as opposed to biofuel.

One respondent admitted there were **cultural barriers to overcome** in the construction industry. Suggesting we should be aiming to use 80% of timber in construction but in reality the rate was more like 20%. They suggested that local councils could be encouraged to have a timber first policy.

Another key concern raised was that: "we cannot just rely on forestry and peatlands to be our sink and let everything carry on as normal." Highlighting that whilst the land use sector has a role, **other actions are needed in conjunction** to reach the net zero targets and to avoid 'business as usual' in the other sectors.

It was recommended by one respondent that **all actions need to be climate proofed**, including **more on the transport and manufacturing** aspects. Further recommending that the forestry industry itself was a high GHG emitter. For example it needs a **critical analysis of current practice to minimise emissions from ground preparation.**

Climate Ready Scotland

As previously noted, climate change adaptation is addressed in Climate Ready Scotland (CRS): climate change adaptation programme 2019-2024. This provides a five year programme for climate change adaptation, acknowledging that along with efforts to mitigate climate change, action is needed to prepare for its impacts. There are several outcomes identified which are cross cutting and all applicable to forestry and woodlands. Including that [28] :

> “ Our natural environment is valued, enjoyed, protected and enhanced and has increased resilience to climate change”

As part of this outcome, SNH developed a series of adaptation principles [28] :

“

1. **Reduce other pressures on ecosystems, habitats and species** – e.g. pollution, unsustainable use, grazing, habitat fragmentation and invasive non-native species.”

2. **Make space for natural processes** including geomorphological, water and soil processes, and species interactions.”

3. **Enhance opportunities for species to disperse** by reducing fragmentation and increasing the amount of habitat available.”

4. **Improve habitat management** where activities such as grazing, burning or drainage cause declines in diversity or size of species populations, or where modifying management or increasing habitat diversity could improve resilience to climate change.”

5. **Enhance habitat diversity**, e.g. by varying grazing or plant cutting management on grassland or moorland, or creating new habitats on farms.”

6. **Take an adaptive approach to land and conservation management** e.g. by changing objectives and management measures in response to new information.”

7. **Plan for habitat change** where assessments indicate losses of habitats or species are inevitable, for example as a result of sea-level rise.”

8. **Consider translocation of species** in circumstances where assessments indicate the likely loss of a species despite new management measures, and where there are suitable areas for nature to adapt.”

The Programme also outlines the importance of understanding and managing for ecological resilience; arguing that there is a need to [28] :

> “ understand what makes species and ecosystems generally more resilient, and to develop management plans which aim to enhance resilience. ”

Scottish Forestry, the public body responsible for forestry regulation, policy and support, has defined forest resilience as [101] :

> “ those that can absorb and adapt to disturbances such as climate change and attacks by pests and diseases. This will let them stay healthy and sustainable into the future. ”

The forestry sector is also adapting to climate change, as highlighted in the SFS section on 'adaptation and resilience', which outlines the roles of forest to adapt to climate change events such as providing natural flood management [2] . In addition climate change can effect the trees themselves such as increasing tree growth rates or put them at risk from extreme weather events and wildfires.

Climate adaptation approaches are also being explored on National Forest Estate property. For example in Culbin Forest, which considers an adaptive approach to sea level rise, restoring the natural mobility of the Culbin sand dunes.

Fallen trees at the shore at Culbin

Culbin Sands is a coastal area on the Moray Firth in the north of Scotland.

Mcknee, 2017[102]

Woodland Carbon Code

An economic link between trees and carbon is well established, and underscored by the UK Woodland Carbon Code (WCC). By using the WCC, forest owners allow carbon credits to be sold from their woodland. These credits are then certified, and purchased to offset against their own emissions. The WCC is a [103] :

> " voluntary standard for UK woodland creation projects where claims are made about the carbon dioxide they sequester. Independent validation and verification to this standard provides assurance and clarity about the carbon savings of these sustainably managed woodlands"

This standard sets out guidance to ensure that the requirements of the Code are met for the design and management in the creation of new woodlands [103] . It accounts for the carbon sequestration of any new woodlands, whether through natural regeneration or planting. The standard aims to:

> " measure their carbon footprint; take steps to prevent avoidable emissions and reduce remaining emissions where possible. "

The carbon code does not account for the carbon in forest products nor changes in sequestration of carbon in existing woodlands through changes in management.

The WCC, which sits alongside the UK Forestry Standard (UKFS), already provides monitoring, reporting and verification systems for carbon capture.

In the Land use: Policies for a Net Zero UK report the CCC advise that carbon reduction in land use should be partly made via public funds to deliver on carbon 'public benefits',

whereas for carbon sequestered by forestry, these funds come from the private sector. The CCC state [104] :

> " The key measure for afforestation and some agro-forestry schemes should be **auctioned contracts** (e.g. similar to those offered for renewable electricity) or a **carbon trading scheme**. Either of these could be funded through a **levy on GHG emitting industries** (e.g. fossil fuel providers or airlines). These need to be carefully designed to **avoid potential negative impacts** and ensure carbon credits from land based solutions are not available to offset emissions reductions that are needed to meet net-zero in other parts of the economy."

Offsetting carbon emissions therefore may offer part of the solution assuming that there are actors that are willing to sell and use the credits. In an EU commissioned report it was found to come with high risk and therefore recommended it should only play a 'limited role' in countries emission reductions efforts.

In the Programme for Scotland 2021-2021 Scottish Government affirms its aim to see the wood and forestry based markets expand in Scotland. This includes [66] :

> " growing the woodland carbon market by 50% over the next 5 years through the Woodland Carbon Code, and working with partners to support new approaches to financing private sector investment in nature-based solutions."

A commitment to increasing the annual volume of Scottish timber going into construction from 2.2 million cubic meters (2018) to 2.6 million cubic meters in 2021/2022 is also outlined in the Programme [66] .

STAKEHOLDER VIEWS

Carbon markets provide an opportunity suggested a number of respondents. Someone suggested that to succeed, the price of carbon needs to be above costs. Others warned that the carbon market needed to **avoid green washing businesses**[xiii] . Alternatively others saw **corporate social responsibility (CSR)** as an opportunity to find financial support for woodland creation projects. This helped further if there is an **increasing market for biomass products, and wood for construction**, with a 'phasing out' of fossil fuels. One respondent stated that: "we're recycling, we're reusing, we're doing circular economy. So timber products are likely to be in greater demand."

Another frequently mentioned opportunity was **'offsetting'**. Offsetting and a carbon market could further incentivise woodland creation, and investment into woodland creation for offsetting against cities or business emissions. This presents an opportunity and a risk e.g. problems could arise if business and cities which sought to be net zero by 2030, were only buying carbon credits to offset rather than making genuine carbon reductions themselves. They argued this would be an incoherent strategy. Rather, they outlined, it would be better if they were using that timber for city construction along with others means to reduce city emissions.

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xiii the attempt of a business to market themselves under the pretence that they are environmentally beneficial, often in contradiction to their environmental and sustainability record in general.

Regional Land Use Partnerships

Regional Land Use Partnerships (RLPs) were first proposed in the first Land Use Strategy (LUS) and are now a requirement of the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 [21] . They seek to maximise the potential of Scotland's land in tackling climate change by facilitating an integrated approach to land use decision making [105] .

The LUS recognises that [10] :

> " In order to progress better integration of land uses and better understanding of land use and climate change issues there is clear value in bringing together local people, land users and managers into regional or local partnerships."

The LUS sets out nine policies and proposals, including to "encourage the establishment of RLPs", however this has not yet been delivered.

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 placed a statutory duty on Scottish Ministers to set out policies and proposals for the establishment and resourcing of RLPs and frameworks as part of the updated Climate Change Plan. As previously noted, the plan was due to be published in April 2020, but was delayed to late 2020 as a result of Covid-19.

In November 2019, the Scottish Land Commission were tasked with providing advice on the establishment of RLPs [27] .

The Scottish Land Commission Chief Executive, Hamish Trench, said that their role was to see [106] :

> " how best RLPs could be established, we should all challenge ourselves on what kind of structures and powers are needed, both to deliver the scale and pace of action required, and also to widen participation, empowerment and benefit in decisions about land."

An Interim Report has been published, with a final report due before the end of 2020 [106] .

The 2019 Climate Change Act placed a duty on Scottish Ministers to report annually to the Scottish Parliament on progress towards implementing policies and proposals in the LUS, as well as how policies and proposals are contributing to reaching climate change targets. The First Annual Progress Report for the LUS for Scotland 2016 - 2021 was published in July 2020. The report outlines that progress has been made on several of the key commitments of the Strategy, such as the continued work on delivering the RLPs.

STAKEHOLDER VIEWS

To achieve the multiple objectives outlined in the Forestry Strategy, **Scotland's LUS, with the RLPs** were considered a necessity by the majority of the interviewees. Supporting a regional approach for land use decisions. Some respondents, however, were cautious to put too much emphasis on the LUS or RLPs. Frequently mentioned uncertainties were the function of the RLPs, who would be involved, and at what scale would they operate.

Some felt that the LUS, whilst good in principle, did not deliver action as expected. Moreover, a number of interviewees advised that efforts should build on examples of 'best practice' of engaging people in decision making. Such as **the LUS pilot case study in the Tweed Catchment**.

There was a concern RLPs, despite their potential, may 'become a talking shop' and not lead to any meaningful action. It was suggested that for RLPs to work it was necessary to:

- break out of the silos and drive for collective action, bringing all sectors on board
- have strategic land use planning
- have a truly representative process
- prioritize public goods
- be more flexible, interactive, and organic
- articulate clear objectives of regional needs
- have funding streams to have credibility
- be part of a 'just transition' and not just a forum for the usual suspects
- have a 'strong facilitator' and a trusted intermediary

The necessity for wider public engagement was well supported by most of the stakeholders. It was mostly agreed that communities should have an increasing role in forestry and woodlands in Scotland, via:

- education and empowerment
- with the mechanisms in place to do so
- sustainable community revenue, looking at the way communities could benefit from woodlands. This could provide an opportunity to get the public more engaged. Similar to the renewable energy schemes e.g. Community and Renewable Energy Scheme (CARES)
- The Scottish Land Fund can provide opportunities for communities. One interviewee criticised the fund as it was often predisposed to immediate projects e.g. those managing existing forests, rather than woodland creation.

Encouraging community engagement and empowerment also aligns with Scottish Government priorities outlined in the National Performance Framework (NPF) argued one respondent. For instance the NPF's National Outcome that: "we live in communities that are inclusive, empowered, resilient and safe".

Green Recovery

A key document related to SFS 2019-2029 is the updated Climate Change Plan (CCP), expected towards the end of 2020. Scottish Government asked the CCC to provide further advice on:

> " the best way forward in these unprecedented circumstances and how the Climate Change update can contribute, in due course, to a green recovery for Scotland."

In response, the CCC agreed with the decision to delay the CCP in the wake of the pandemic in order for it to [107] [108] :

> " reframe that Plan in the context of a 'green pathway' to aid an economic recovery that is in line with Scotland's statutory net-zero targets."

The CCC laid out 6 core principles needed for a resilient recovery:

1. Use climate investments to support the economic recovery and jobs
2. Lead a shift towards positive long-term behaviours
3. Tackle the wider 'resilience deficit' on climate change
4. Embed fairness as a core principle
5. Ensure the recovery does not 'lock-in' greenhouse gas emissions or increased climate risk
6. Strengthen incentives to reduce emissions when considering fiscal changes

All 6 principles have relevance to Scottish forests and woodlands and to the Forest Strategy [107] . Yet with any intended actions comes the question of budget. The Government's budget plan for 2020-2022 indicated an increased budget for Scottish forestry. But in light of Covid-19, the Scottish Government's budget plans are going to be changed and the impact on the budget for forests and towards net zero goals and addressing ecological declines are uncertain.

It was reported that Scotland was to receive £780 million as a result of the UK Government's initial package of support. This financial support may help to mitigate impacts on other planned expenditure, such a forestry, outlined by Scottish Government prior to the pandemic.

Scottish Parliament's Environment, Climate Change and Land Reform Committee launched an inquiry in June 2020 into how Scotland can ensure that a green, just and resilient recovery is central in its response to the social and economic challenges of the coronavirus health crisis. Scotland's forests will undoubtedly have a strong role to play.

In the recently published Programme for Scotland 2020-2021 it is noted that Scottish Government will be investing £150 million over the next five years in forestry and to support the net zero goal and Scotland's green recovery. This budget, as part of a low carbon fund investment, will be allocated to the following:

- £100 million for Scottish Forestry to increase new planting
- £30 million for Forestry and Land Scotland to expand Scotland's national forests and land
- £20 million for further increasing tree nursery capacity, investing in new and redeveloped facilities to support higher production

Biodiversity Policy

The UN Convention on Biological Diversity (CBD) Strategic Plan for Biodiversity 2011-2020 and the Aichi Targets and the European Union's (EU) Biodiversity Strategy for 2020 [109] (which has been followed by the EU Strategy for 2030) provides the framework for Scotland's current biodiversity Strategy and policy.

The vision of the CBD's Strategic Plan, to support national biodiversity strategies and action plans was outlined as [57] :

> " By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people."

Scotland's original biodiversity Strategy – Scotland's Biodiversity: It's in Your Hands – was published in 2004. This was followed by the most recent Strategy: 2020 Challenge for Scotland's Biodiversity which was published 2013.

Scotland's Biodiversity Strategy (SBS), aka the 2020 Challenge, sets out the Scottish Government's core biodiversity policy, which makes clear the essential role that biodiversity has in meeting Scotland's National Performance Framework aim to be smart, sustainable and successful. SBS further accounts for the Aichi goals and targets and sets out the steps needed to improve the state of nature in Scotland. There is also the Route Map to 2020 which identifies large-scale collaborative projects that are needed to contribute to the Biodiversity Strategies targets [110] .

The SBS includes multiple objectives [111] :

“

1. protect and restore biodiversity on land and in our seas, and to support healthier ecosystems”

2. connect people with the natural world, for their health and wellbeing and to involve them more in decisions about their environment”

3. maximise the benefits for Scotland of a diverse natural environment and the services it provides, contributing to sustainable economic growth”

The SBS is governed by working groups tasked with helping to guide its delivery, chaired by Scottish Natural Heritage (SNH), who oversee the reporting and the delivery. SNH also partner with Scottish Forestry to deliver on the Scotland's Forestry Strategy (SFS).

The SBS aims to encourage an 'integrated approach to land and freshwater use and management.' The necessity to work at a landscape scale, build on the Land Use Strategy, and adopt an ecosystem approach are also outlined. In addition to "support[ing] ‘high nature value farming and forestry'", the Strategy states that work at catchment scale will be important to help tackle issues such as [111] :

“ diffuse pollution, flood risk, soil protection, peatland restoration and an expansion of woodland cover. ”

The SBS notes that to improve ecological health for woodlands requires [111] :

“

- restoration of native woodland, montane scrub and near-natural treelines where these have been suppressed or eliminated by grazing and burning”
- expansion of woodland in some catchments”
- restoration of riparian and woodland flora where invasive species such as rhododendron or Japanese knotweed are becoming dominant”

Rhododendron control

In 2010, FLS set out to remove rhododendron from Scotland's national forests and land. They estimated that nearly 50,000 ha of the land managed by FLS was affected, and it would take £15.5m and ten years to clear. Control methods include chainsaws, herbicides, heavy machinery and (hard) labour, with follow-up treatment often required.

Forestry and Land Scotland, 2020[112]

The Route Map also outlines the priority to [113] :

> “ improve the condition and extent of existing native woodlands and further increase new woodland planting.”

Woodlands are also protected under policies for protected nature sites, which aim to preserve terrestrial and marine habitats and the species supported by them. Protected nature sites most relevant to woodlands include:

- Sites of Special Scientific Interest (SSSIs)
- the Natura 2000 network of Special Areas of Conservation (SAC) and Special Protection Areas (SPA)
- nature reserves
- Other national designations (e.g. national scenic areas, national parks etc.)

In addition woodlands, hedgerows and single 'veteran' trees are also recognised for their biodiversity value and contributions to landscape character and quality [114] . These are protected under the policy on the control of woodland removal.

Recently, the Scottish Government outlined their commitment to 'invest in biodiversity and ecological health' in the Programme for Government 2020-2021. Support for biodiversity, will be provided through the continuation of the Biodiversity Challenge Fund, with £3m funding in 2021/22. The funding will aim to facilitate an array of biodiversity related activities, skills and jobs and 'improve the state of nature in Scotland.

In addition the Government, as noted in the Programme, will aim to publish a high-level statement of intent on biodiversity before the end of 2020 [66] .

STAKEHOLDER VIEWS

In the SFS the priority for 'enhancing the environmental benefits provided by forests and woodlands is outlined. Most interviewees agreed that the SFS addressed the biodiversity challenge sufficiently in its objectives. That said, one environmental NGO representative argued the **objectives were too 'woolly'**, as there were no related time scales or any measures of success or deliverables set out. Further criticism of the SFS was that it hadn't acknowledged the 'ecological crisis'.

In contrast one stakeholder felt biodiversity was not an issue for **modern forestry as practices now require more species diversity** in both the existing and new woodland base. In addition the conversion of low biodiversity land to forests could have lead to biodiversity transformations, they argued.

Some acknowledged that trees are a **nature-based solution,** however a few interviewees countered that they could be a **nature-based problem** if planting was carried out carelessly. Reflecting a common concern that past forestry practices had resulted in single-species plantations in unsuitable places, with negative environmental impacts. One respondent was concerned that the same may happen from a single-minded focus on carbon reduction. Noting that "net zero is hugely important but cannot be at the sole expense of everything else."

The concern was that **climate action would take precedence over other important issues**, such as the 'ecological crisis'; a concern voiced by several others. On the other hand it was recognised the risk could go both ways. If biodiversity objectives are over prioritised, then there is a risk of missing carbon targets. It was often noted that 'compromise' was required in order to ensure environmentally and financially sustainable practice.

Forests and Policy Change

Historically, forests have been shaped by changing economic, social, and environmental priorities, influencing their management and extent. In recent years Scotland's forests have been recognised for providing multiple benefits; i.e. economic benefits, carbon storage, recreation, well-being, biodiversity and more [81] [2] . Yet the ability of forests to provide those benefits is determined by forest design and management, and conservation efforts.

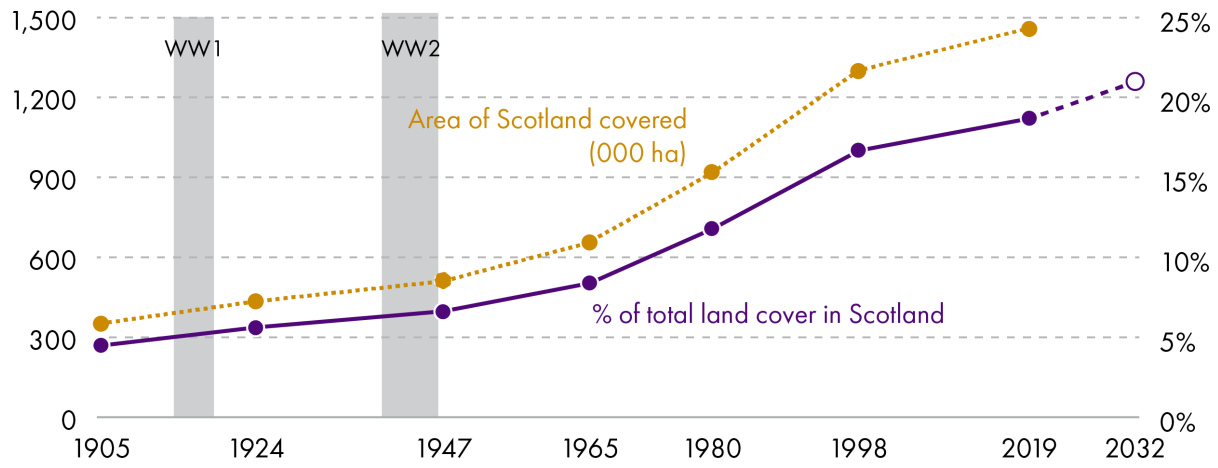
Scotland's woodlands have undergone massive changes, resulting in a period of net forest loss followed by net forest gain. Recent trends of woodland gain have been driven by changing needs, legislation, policies and incentive mechanisms [2] .

The following sections provide a overview of the changes in Scotland's forest policy over time. These policy developments indicate that at the start of the century forestry policy was mostly singular in focus promoting timber production, and over time has increasingly recognised forests as multi-functional.

Timeline

There have been major changes in forestry and woodland policy in Scotland since the early 1900s. Along with forest cover change, there have been key shifts in how woodlands have been valued; whether for production or for nature. The timeline below shows these key policy changes alongside changes to woodland cover.

Forest cover change in hectares (ha) and % in Scotland and Scotland's forestry policy changes in the the last 100 years



Key policy events related directly to forests

1919 — UK 1st Forestry Act

1945 — UK Forestry Act

1947 - 1981 — Dedication Scheme

1967 — Plant Health Act, UK Forestry Act

1998 — UK Forestry Standard (UKFS)

1999 — Woodland Assurance Standard

2000 — Scotland's Forestry Strategy

2000-2006 — Scottish Rural Development Policy (SRDP)

2006 — Scotland's Forestry Strategy

2008 — Woodland Assurance Standard

2007-2013 — Scottish Rural Development Policy (SRDP)

2013-2020 — Scottish Rural Development Policy (SRDP)

2017 — Forestry and Land Management (Scotland) Act (2018) Devolution of Forestry

2018 — Forestry (Environmental Impact Assessment) (Scotland) Regulations

2019 — Establishment of: Forestry and Land Scotland and Scottish Forestry

2019-2029 — Scottish Rural Development Policy (SRDP)

2019-2029 — Scotland's Forestry Strategy (SFS)

2020-2022 — SFS Implementation Plan

Forest data: Forestry Statistics 2019

The First Forestry Act

FOREST LOSS

Over the last 6,000 years forests in Scotland have mostly been cleared for agriculture and trees have been increasingly utilised for timber and bark charcoal. Timber, as a vital resource, was overexploited prior to, and during, the World Wars. By the early 20th century, following World War I, forest cover was estimated at 5% of the total land cover in Scotland [3] .

Following World War I, the lack of forests was recognised as a critical UK-wide issue. Then Prime Minister Lloyd George stated that the UK [115] "had more nearly lost the war for want of timber than of anything else."

In 1919 this led to the passing of the first UK Forestry Act and the establishment of the Forestry Commission. The Forestry Commission was responsible for ensuring a stable timber supply for the UK, restoring depleted woodlands and forests on lands owned by the state [116] .

Increases in Afforestation and Timber Production

During and after World War II the need for domestic timber led to further centralisation and control over forestry by the state [117] .

Planting emphasised quick growing productive species (e.g. Sitka spruce and lodgepole pine) leading to industrial, intensive, monoculture forest plantations. Scottish Forestry said the aim was [118] :

> “ To establish a strategic resource of timber for industry in the shortest possible time, the vast majority of the new forest plantations were established with introduced tree species.”

Whilst woodland cover began to increase, it led to large uniform planting regimes. As noted by Scott Wilson [119] , prior to 1960, tree planting matched the species to the site. However subsequent developments in industrial forestry machinery and a reduction in suitable land shifted emphasis to planting Sitka spruce, due to its versatility.

Planting efforts continued through the 1960s, 70s and early 80s, with private landowners incentivised to prioritise intensive planting practices through government grant schemes and tax break incentives. For example, the Dedication scheme (DED) ran from 1947 - 1981, and sought to encourage land owners to dedicate land for forestry. For 'Forest Enterprise' the main objective was [120] "producing wood as economically as possible."

Culbin Forest 1972

Culbin Forest aerial photograph circa 1972

Grading a new road, 1960

Moray and Aberdeenshire Forest District

By the 1960's forestry was flourishing. The mechanisation of the timber industry further catalysed growth and interest in commercial forestry. Forest cover increased between 1935 to 1974, by 15,433 ha in Scotland.

Changing Role of Forests

The Countryside Act 1968 expanded access to state owned forests across the UK, and it has been argued that growing interest in the natural environment and a desire for greater public access began a shift from 'mono-functional forestry' to 'multi-functional forestry' [121] [122] . This Act requires local authorities and other bodies to consider [123] :

> “ the conservation and enhancement of natural beauty and for the benefit of those resorting to the country-side.”

Furthermore, this Act required the Forestry Commission to take action to provide facilities for visitors. A new emphasis on the purpose of state owned forests evolved to promote amenity purpose and recreation in forest and woodlands, however these benefits were still considered secondary to economic priorities [120] .

Alongside increased public access, concern over the environmental and landscape impacts of planting started to grow [119] [84] . One regularly cited example is the public outcry over afforestation on the peatlands in the flow country of Caithness, which was seen to be driven by tax avoidance. As a result, this "loophole" was closed in 1988 and much of the planting was reversed to restore the peatlands.

The Land Reform (Scotland) Act 2003 further cemented public access to forests by providing for a broad right of responsible access; the Scottish Outdoor Access Code:

> “ gives everyone statutory access rights to most land and inland water. People only have these rights if they exercise them responsibly by respecting people’s privacy, safety and livelihoods, and Scotland’s environment. Equally, land managers have to manage their land and water responsibly in relation to access rights.”

The Crofting Reform etc. Act 2007 also signified change for integrating woodlands with crofting practices. Traditionally crofting has been based on agriculture, the Act provides the opportunity to create new crofts, and for [124] :

> “ crofts to be put to a 'purposeful use' other than cultivation. As a result it is now possible to create crofts from existing woodlands, manage them as woodland and run woodland-related businesses from them.”

A number of Non Government Organisations (NGOs) - including the Woodland Trust Scotland, Scottish Wildlife Trust, and RSPB Scotland- have also transformed how woodlands are valued and managed. Many of these organisations own and manage woodlands across Scotland. For example the Woodland Trust own around 60 woods covering more than 11,000 ha. NGOs can offer woodland and land use advisory support to the Government either individually or via partnerships such as Scottish Environment Link.

There are numerous collaborations that also focus on the wider landscape. For example in 2008 the Central Scotland Green Network was established, building on existing initiatives to work with a range of stakeholders to align efforts in restoring and transforming the

landscape in the region. There was also the Millennium Forest for Scotland Initiative, which worked to restore Scotland's forests at the turn of the century. Another example is Galloway and Southern Ayrshire UNESCO biosphere reserve which fosters partnerships between individuals, organisations and businesses to support nature and people.

The Figure below illustrates a number of key policies, Acts and strategies that have occurred since 1948 that can be linked to how forestry in Scotland has been shaped over time.

Policy changes relevant for Scotland's woodlands and forestry

1948
Agriculture (Scotland) Act

1949
National Parks and Access to the Countryside Act

1962
Common agricultural policy (CAP)

1967
UK joins the European Union

1968
Countryside Act

1981
Wildlife and Countryside Act

1985
Wildlife and Countryside Act

1991
Agricultural Holdings (Scotland) Act

1992
EU habitats Directive

1994
The Conservation (Natural Habitats, &c.) Regulations

1996
Code of practice on deer management (Deer (Scotland) Act

1997
CAP 'pillar 2' Rural Development policy

2000
- National Parks (Scotland) Act
- Water Framework Directive (WFD

2003
- Agricultural Holdings (Scotland) Act
- Land Reform
- Water Environment and Water Services (Scotland) Act

2004
- Water Environment and Water Services (Scotland) Act
- Nature Conservation (Scotland) Act

2008
UK Climate Change Act

2009
Climate Change (Scotland) Act

2011
Wildlife and Natural Environment (Scotland) Act

2012
- Agricultural Holdings (Scotland) Act
- The Conservation (Natural Habitats, &c.) Regulations

2014
- National planning framework 3 (Scotland)
- Regulatory Reform (Scotland) Act

2016
- UK signs Paris Agreement
- UN Sustainable Development Goals (SDGs)
- Land Reform update

2017
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations
- Scottish government member of IUCN
- Scottish Government commits to Bonn challenge

2019
- Climate Change (Emissions Reduction Targets) (Scotland) Act
- Planning (Scotland) Bill

2020
UK leaves EU

2019 to 2021
Agriculture Bill

Sustainable Forest Management

Policy changes directing how forests were managed began more earnestly in the 1990s. The United Nations Conference on Environment and Development (the Earth Summit at Rio de Janeiro, 1992) led to Agenda 21. This included the 'principles for the sustainable management of forests' agreed to by more than 178 Governments [125] .

In 1993 Forest Europe defined sustainable forest management as [126] :

> “ the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems.”

At the UK level the Woodland Assurance Standard (UKWAS) was introduced in 1999 as a voluntary certification standard, and is regularly updated. The UKWAS sets out to reflect the requirements of international forest certification schemes that support SFM i.e. Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) [127] . Therefore, for woodland owners, involvement in UKWAS is voluntary but certification provides international approval for their woodland management practices.

The UK Forestry Standard (UKFS) was introduced in 1998, with the latest version published in 2017. Scottish Forestry is responsible for co-ordinating work on the UKFS. The UKFS is the reference standard for sustainable forest management in the UK. It is a UK Government approach that states [65] :

> “ All forest managers and practitioners in the UK are expected to meet the UKFS requirements and the authorities will assess applications for forestry proposals against them before giving permission, and before offering grant aid.”

UKWAS draws on the UKFS as the basis for best practice and combines with the requirements from the two certification schemes; FSC and PEFC. UKWAS is independent of government and acts as an audit for the independent certification schemes, paid for by the forest or woodland owner. So although there are links between UKFS and UKWAS they serve different purposes further elaborated on in the UKFS report [65] .

The UKFS is divided into two parts; **legal requirements** which are statutory obligations, and **good forestry practice requirements**. The latter fits with sustainable forest management and international commitments and UK and Scottish policy, and implies efforts 'should' rather than 'must' be adopted.

The UKFS has several core areas with associated sustainable forest management guidance which are:

1. biodiversity
2. climate change
3. historic Environment
4. landscape

5. people
6. soil
7. water

The two UKFS aspects on biodiversity and climate change were outlined in a previous section.

STAKEHOLDER VIEWS

The view that Sitka spruce-heavy **plantations offer little biodiversity value** was fairly common. One respondent reflected on the wider ecosystem and associated poor quality under-story. Noting that while planting was essential to meet wood product demands it was about recognising that those trees are grown as “a crop”.

Another respondent however **countered the critique over 'blanket conifer'**. They said this approach was to fulfil the needs of the time; i.e. to recover timber supplies, and for that purpose it was successful. Highlighting that forestry today is very different to that of the past, the respondent argued that there are no more monoculture due to the UKFS, and that **by abiding by the UKFS all woodland creation projects have a mixed woodland system** that meets mandatory environmental requirements.

Yet other interviewees were not satisfied with the UKFS minimum requirements. They felt it did not go far enough to be sufficiently beneficial for biodiversity, further hampered by the lack of compliance evaluations once projects are approved.

In summary, through the UKFS regulation and voluntary certification schemes, the environmental impacts of forestry are being increasingly managed and mitigated to encourage sustainable practices. Yet whether these efforts have caused enough of a shift in forestry in Scotland to emphasise the value and recovery of woodland biodiversity is uncertain.

Appendix 1: Stakeholder Views Summary

Semi-structured interviews were held by the author with 16 expert stakeholders, from between January 2020 t0 March 2020[xiv].

The interviews provide new insights into the opportunities and challenges associated with Scotland's Forestry Strategy (SFS)[xv]. These insights are summarised throughout the briefing in relation to the Strategy's ability to: meet multiple objectives, in delivering net-zero greenhouse gas emissions by 2045 and to address ongoing biodiversity declines. In addition the role of the Regional Land Use Partnerships (RLPs) and communities with supporting delivery of the SFS objectives is considered. If stakeholder views have been provided these are included at the end of the relevant sections.

Stakeholders were selected due to their experience and interest across the topics covered by this briefing. Those interviewed represented a range of agencies and organisations including the; Committee on Climate Change (CCC), Scottish Forestry, Scottish Natural Heritage (SNH), Scottish Land and Estates, Scottish Land Commission, Confor (Confederation of Forest Industries (UK)), Agriculture and Climate Change Group (AACCG), ClimateXChange, RSPB, Woodland Trust, Crichton Carbon Centre, and the Community Woodlands Association.

From the interviews the main points provided include[1]:

- the **risk of trades offs when pursuing one objective at the expense of another**, such as a carbon dash with fast growing species overlooking biodiversity declines and slower growing woodland types, were a common concern
- the **‘right tree in the right place’** was often referred to in the interviews, noting the importance of considering the tree species suitability with the suitability of the location in woodland creation planning
- the need for a **natural capital approach** to account for the range of benefits different land uses can provide was advised to guide land use planning decisions
- the **biggest issues to native forest** regeneration was **deer management** and the **control of non-native invasive rhododendrons**
- the ability of the **UKFS to deliver sufficiently on biodiversity was a contentious issue** with some arguing it was sufficient, and others arguing that the minimum requirements, and lack of compliance as problematic
- a **cross sectorial and interdisciplinary approach is needed towards forest and land use policy**
- there was **wide support for Scotland's Land Use Strategy and its potential** to deliver multiple objectives and address the climate and biodiversity emergencies

xiv interviews were conducted prior to the Covid-19 lock down measures.

xv To note the range of views expressed are those of the stakeholders interviewed and do not represent the views held by SPICe or the author. All interview data has been anonymised.

- some interviewees suggested **Brexit could provide an opportunity to rethink the current incentive scheme i.e. Rural Development Policy (SRDP),** breakdown the silos between different land uses, and encourage creative, bottom-up schemes
- the **simplicity of the message on 'planting trees is a good thing' but it is double edged** some argued. It is beneficial as it garners public support, but problematic when woodland creation in practice is a far more complex
- **woodland creation is complicated;** given interactions with biodiversity and other land land uses, the type of trees grown, and where they are grown, and different stakeholder interests amongst other considerations
- **barriers to woodland creation were recognised** as; the consistency of grants incentives and subsides, fluctuating markets, ability to supply demand in terms of seeds and number of tree nurseries, the risk to pests disease and climate change impacts, and lack of a skilled forestry labour force
- **synergies between climate action and nature conservation were seen as possible** by some, mostly achieved through planting mixed and native woodland creation, including natural regeneration
- **carbon markets were seen as a potential opportunity** to create incentives for woodland creation but also came with associated risks
- the **value of urban woodland** were commonly advocated for, not because they hold the rarest species, but because of what they offer to the public and as green networks
- it was mostly agreed that **communities should have an increasing role in forestry and woodlands in Scotland,** via education and empowerment and with the right mechanisms to promote inclusivity
- the **Regional Land Use Partnerships were seen as 'potentially' crucial for driving collective integrated action;** but needed to avoid becoming a talking shop

The statements provided by the interviewees were neither checked nor refuted by the author. Rather an overview of insights from differing perspectives are provided on the challenges and opportunities for Scotland's woodlands to mutually tackle climate and biodiversity challenges.

Appendix 2: Forest Policy Linkages

This section provides a summary of related policy and strategies directly and indirectly related to Scotland's Forestry Policy (2020), climate change and biodiversity .

Please note this is not a comprehensive list but provides an overview of the key policy documents, statutory bodies, independent advisory groups and local/relevant Plans .

International / EU Commitments and Standards

- Sustainable Development goals (SDGs) – 2016
- Paris agreement - United Nations Framework Convention on Climate Change (UNFCCC)
- Bonn Challenge – restoration (2011)
- Convention on Biological Diversity – Aichi goals
- EU Water Framework Directive – integrated river basin management for Europe
- Special Protection Areas (SPAs)
- Environmental Impact Assessment Directive
- European Landscape Convention

National Performance Framework

The Purpose of the Scottish Government is to focus government and public services on creating a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth.

Nationally selected outcomes:

- attractive place for doing business in Europe
- tackled the significant inequalities in Scottish society
- reduce the local and global environmental impact of our consumption and production
- we live in well-designed sustainable places with access to the amenities and services we need
- we value and enjoy our built and natural environment and protect and enhance it for future generations
- we have strong, resilient and supportive communities where people take responsibility for their own actions and how they affect others

- our public services are high quality, continually improving, efficient and responsive to local people's needs

National Plans and Strategies

- Protecting Scotland's Future: The Government's Programme for Scotland 2019-2020
- Scotland's Economic Strategy (2015)
- Fairer Scotland Action Plan
- Scotland's National Action Plan for Human Rights
- The Environment Strategy for Scotland: vision and outcomes

Forests and Woodlands: National Legislation, Plans and Strategies

- Forestry and Land Management (Scotland) Act 2018
- Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017
- Draft Scottish Forestry corporate plan 2020 -2023
- A Strategic Framework Woodlands in and around towns Programme 2015 – 2020
- Scotland's Forestry Strategy 2006
- Scotland's Forestry Strategy 2019 - 2029
- UK Forestry standard (UKFS)
- UK Woodland carbon code UK Woodland Assurance Standard
- Scotland's Forestry Strategy Implementation Plan 2020 - 2022
- Forestry and land Scotland Corporate action Plan 2019-2022

Climate Change: National Legislation, Plans and Strategies

- Climate Change (Emissions Reduction Targets) (Scotland) Act 2019
- Climate Change Plan (CCP): 3rd report 2018-2032
- Revised CCP report – Due April 2020 (delayed)
- UK Climate Change Risk Assessment (CCRA)
- Climate Ready Scotland: climate change adaptation programme 2019-2024
- UK Climate Change Act 2008

Biodiversity: National Legislation, Plans and Strategies

- Nature Conservation (Scotland) Act 2004
- Wildlife and Natural Environment (Scotland) Act 2011
- 2020 Challenge for Scotland's Biodiversity (2013) Strategy
- Scotland’s Biodiversity: It’s in Your Hands (2004)
- Scotland’s Biodiversity: A Route Map to 2020 (2015)
- Scottish Biodiversity Programme (2020)

Related National Policies

- Common Agricultural Policy (CAP); Scottish Rural Development Policy (SRDP)
- Scotland’s Wild Deer: A National Approach
- Agricultural Holdings (Scotland) Act 2012
- Scottish Outdoor Access Code
- Tourism Development
- Framework for Scotland Land use Strategy (2016 -2021)
- Our Place In Time; The Historic Environment
- Strategy for Scotland (2014)
- Economic Action Plan 2018–2020 (2018)
- National Planning Framework 3
- River Basin Management Plans
- The Scottish Soil Framework
- National Marine Plan
- Scottish Planning Policy (SPP)
- Scotland’s Energy Strategy
- Scottish Land Rights and Responsibilities Statement (2017)

Related Acts, Legislation, and Bills

- Planning (Scotland) Act 2019
- Water Environment and Water Services (Scotland) Act 2003

- National Parks and Access to the Countryside Act 1949
- Agriculture (Retained EU Law and Data) (Scotland) Bill
- National Parks (Scotland) Act 2000
- Land Reform Act (2003)
- Land Reform (Scotland) Act 2016
- Community Empowerment (Scotland) Act 2015
- Countryside Act 2968
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017

Statutory Bodies

- Scottish Land Commission
- National Park Authorities
- Crofting Commission
- Highlands and Islands Enterprise
- Historic Environment Scotland
- Visit Scotland
- Scottish Natural Heritage (now known as NatureScot)

Independent Advisory groups

- Native Woodland Discussion Group
- Woodland and Expansion Advisory Group (WEAG)
- Community Woodlands Association
- Scottish Forest and Timber Technologies Advisory Group
- Forest Policy Group
- Atlantic Woodland Alliance
- Just Transition Commission
- 2050 Climate Group
- Climate Heritage Network

- The Climate Group
- Scottish Environment Link
- Scottish Wildlife Forum
- Habitats and Species Group
- Landscape-scale Conservation Group
- Protected Areas Group
- RSA Food and Farming and Countryside Commission
- The Scottish Tourism Alliance (STA)

Local / Regional Relevant Plans

- Council (local) authority Forest and Woodland Strategies
- Local Biodiversity Action Plans (LBAP)
- Sustainable Energy and Climate Action Plan (SECAP)
- Local Development Plan (LDP)

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