TREES AND WOODS: AT THE HEART OF NATURE RECOVERY IN SCOTLAND

WOODLAND TRUST SCOTLAND

Policy Paper

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"Nature is in trouble in Scotland. We are one of the most nature-depleted countries on Earth with one in nine of our species threatened with extinction. The Scottish Government has a goal to address this crisis by halting further biodiversity loss by 2030 and reversing it with large-scale restoration by 2045. Native woods and trees are vital to making that happen.

This report outlines the significant role that native woods and trees must have in Scotland's nature recovery and makes practical recommendations for the Scottish Government, Local Authorities and landowners. Everyone benefits when our woods and wider landscapes are thriving for people and brimming with wildlife, and this report should inspire us all to act for vital nature recovery."

Alastair Seaman
Director,
Woodland Trust Scotland

1. Overview and recommendations

Scotland is one of the most nature-depleted countries in the world and has experienced significant continued declines in biodiversity in recent decades. Native trees can and must play a significant role in realising the Scottish Government's vision to halt nature loss by 2030 and reverse it with large-scale restoration by 2045.

Our vision is a world where woods and trees thrive for people and nature. Across Scotland's diverse landscape, this vision means:

- **our native and ancient woodlands** are protected, restored, expanded and connected to create resilient, dynamic ecosystems that will form a core component of Scotland's future restored habitat networks. Native woods are some of the most valuable and biodiverse habitats in Scotland, yet many are in poor condition; isolated fragments overgrazed by deer, colonised by non-native plants and susceptible to disease. Expanding out from these restored woods, new native woodland creation is needed at scale to restore much of our land for nature and people
- **extensive new native river woods** are restoring life to our rivers, protecting aquatic life from a warming climate, mitigating flood risk, improving water quality and creating important green corridors through Scotland's landscapes to connect habitats and allow species to migrate
- **through our uplands to the tops of our mountains,** large-scale new native woodland creation is enriching species diversity and abundance, restoring the natural tree line and replacing the mountain woodland habitats that Scotland has lost
- **across our lowland farms,** the intelligent integration of trees and woods into farming systems is enabling nature to move back at scale into our most intensively managed landscapes, while also supporting food production and increasing the resilience of our farms to climate change
- **in our towns and cities,** increased woodland and tree cover is creating more and better spaces for nature and people while helping us adapt our towns to a hotter, wetter and more extreme climate. New planting is carefully designed to create nature corridors through urban areas and to increase tree cover in our most deprived and tree-poor communities.

Kinclaven Bluebell Wood

JULIE HOWDEN/WTML

This vision is profoundly pro-people as well as pro-nature. It improves the health and wellbeing of everyone, including the majority who live in towns and cities. It supports our farming community and our food security, and it respects those in our rural communities whose livelihoods depend on Scotland's important tourism and wildlife management sectors.

This report sets out a list of comprehensive, practical and achievable actions that are needed to make this vision a reality and ensure that thriving native woods and trees contribute powerfully to Scotland's nature recovery. The most significant requirements are to:

- **reduce deer numbers** and maintain populations at sustainable numbers that will allow our woodlands (and many other habitats) to recover and extend naturally
- **incentivise farmers** to integrate native trees, woodlands and hedges into farming systems through the new farm payment systems that are currently being developed
- **develop new options under the Forestry Grant Scheme (FGS)** to incentivise the creation of river woods, urban woodland and mountain woodland, and new native woodlands that will extend and link our most important ancient woodland fragments
- **establish a Rainforest Restoration Fund** to restore this globally significant habitat by addressing key threats including *Rhododendron ponticum*, overgrazing and fragmentation
- **strengthen biosecurity measures** to reduce the risk of importing new pests and diseases that threaten the future health and quality of our native trees and woods.

Our full list of recommendations is summarised below and outlined in detail in the body of the report.

Native woodlands

1. Reduce deer populations to sustainable levels.
2. Focus new native woodland creation on extending and connecting existing ancient woods.
3. Incentivise the restoration and management of ancient woodland.
4. Restore Plantations on Ancient Woodland Sites (PAWS).
5. Control invasive non-native plants.
6. Reduce the risk of importing new pests and diseases.
7. Stop ancient woodland loss to new development and infrastructure.

Rivers

8. Set targets for and incentivise riparian woodland creation.

Uplands and mountains

9. Expand upland native woodland.
10. Manage grouse and deer estates for nature.
11. Support nature positive farming and crofting.
12. Support nature positive timber plantations.

Gleann Shìldeag

PHILIP FORMBY/WTML

13. Ensure renewable energy schemes are nature positive.

14. Explore a Carbon Emissions Land Tax.

Lowland farmland

15. Incentivise agroforestry through farm support mechanisms.

16. Provide agroforestry training for farmers, crofters and advisers.

17. Remove constraints on tenants.

Towns and cities

18. Protect existing urban trees.

19. Increase tree canopy cover and tree equity in towns and cities.

Individual trees

20. Identify and protect ancient and veteran trees.

Cross cutting

21. Reverse recent cuts to the FGS.

22. Improve native tree supply.

23. Invest in tree and woodland skills.

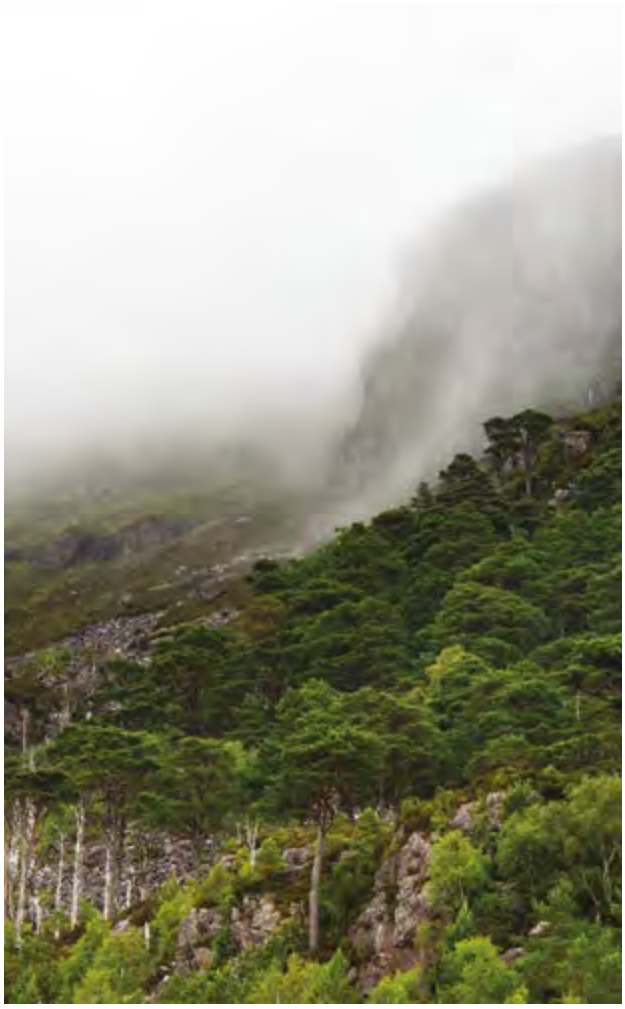
24. Optimise tree-based nature recovery on public landholdings.

25. Support community engagement in tree-based nature recovery.

26. Develop new Natural Capital revenue streams.

27. Ensure effective monitoring.

Gleann Shìldeag



PHILIP FORMBY/WTML

PHILIP FORMBY/WTML

Glen Finglas cattle

2. Introduction

Nuthatch

JOHN BRIDGES/WTML

Scotland faces the same nature crisis that is impacting the rest of the planet. A recent study of 'Biodiversity Intactness' ranked Scotland 212th out of 240 countries[1] on a scale of biodiversity loss. The most recent State of Nature Report for Scotland shows that one in nine species in Scotland is threatened with extinction and that 43% of monitored species have declined strongly in the last decade[2].

Most of the iconic landscapes we see in Scotland are not natural but the result of human management that has often left them in an ecologically degraded condition. The Scottish Government's Biodiversity Strategy concludes that, 'this evidence base points consistently to a natural environment that has been heavily degraded, with continued declines across much of our land and seascapes.'[3] Despite the best efforts of many including from farming, land management and conservation sectors, the situation has deteriorated significantly in recent decades.

The primary drivers of nature decline on land include intensification of farming, unsustainable management of our upland sporting estates, high deer populations, some historically damaging forestry schemes, urbanisation, infrastructure development and a growing range of invasive non-native species that are disrupting our ecosystems[4].

It does not have to be this way. The Scottish Government has an ambition to halt biodiversity loss by 2030 and reverse it with large-scale restoration by 2045, and Scotland's third Land Use Strategy acknowledges the importance of native woodlands for nature recovery[5].

Native woods and trees are vital to life on Earth and to life in Scotland. They can and must play a key role in helping nature to thrive in Scotland again.

The ecological impact of native woods and trees extends beyond their own boundaries in important ways. They are an essential component of large-scale habitat mosaics which sustain viable populations of many mobile species, and they provide important refuges and migration routes that are vital for resilience, particularly in a changing climate. They are important components of other habitats such as wetland and grasslands, and the transition zones between woodland and other habitats are particularly rich in wildlife. A considerable proportion of wildlife species[6], including birds[7], are associated with these interfaces on the edges of woodland, in glades and rides.

Native woods and trees can reduce flooding, protect our soils and help to restore our rivers. They provide shade and shelter which will be increasingly important to people, livestock and wildlife in a changing climate. And they are an important carbon store with the potential to lock up significantly more through expansion and good management.

People are part of nature too and native woods and trees are important for our own wellbeing. They provide us with a diversity of wood products, food for the forager and spaces of joy and discovery to exercise and unwind in. They inspire our art, anchor us to place and provide a sense of continuity that spans generations.

This report outlines practical ways in which native woods and trees can play a significant role in Scotland's nature recovery; beginning with our existing native woods and extending from our river systems to our mountain tops; from towns and cities to our farms and crofts. For each of these major land-use types we'll describe the role that native woods and trees can play, share inspiring examples of what can be achieved, and outline the principles, policies and priorities that are needed to achieve Scotland's 2045 ambitions for nature.

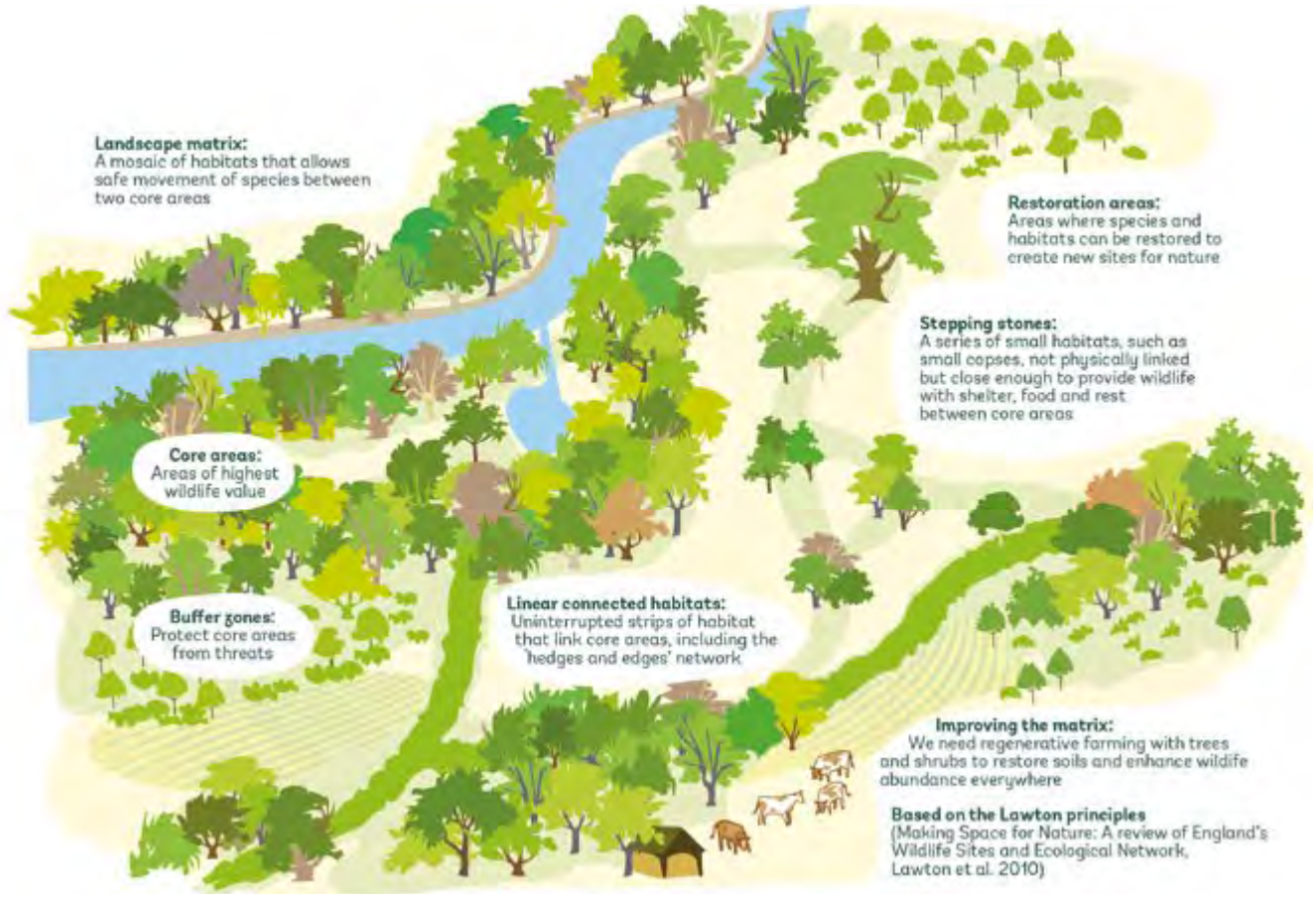
Volunteer surveyors

MICHAEL HEFFERNAN/WTML

Wildcat in pinewood

ARTERRA PICTURE LIBRARY/ALAMY STOCK

3. What is nature recovery?



CAROLINE MIEKINA/WTML

To develop the resilient, complex and dynamic habitats needed to reverse nature decline in Scotland, we need to restore and create more, bigger, better and joined-up natural and semi-natural habitats. These principles were enshrined in the Lawton Report (2010) and form the basis of Scotland's Framework for Nature Networks[8].

In Scotland this means we need to:

- **protect and restore the core areas** of our most important remnants of ancient and native woodland to create structurally complex, dynamic ecosystems
- **buffer and extend** these woodlands to increase their extent and make them more resilient
- **connect** patches of native woodland together and to other important habitats to allow species dispersal and migration
- **create new stepping stones** for nature – through small woods, copses and individual trees scattered across the landscape. These will also be important in creating a seed source for future naturally regenerated trees and woods
- **create new core** native woodland areas at scale to replace past losses and establish new habitats which support diverse and abundant wildlife.

The rest of this report outlines how these principles can be practically implemented in Scotland.

4. Restoring our native woodlands

CAROLINE MIEKINA/WTML

Our native and ancient woodlands are some of the most valuable and biodiverse habitats in Scotland, partly because there is such a diverse range of native woodland types, including riverbank and wetland woods, temperate rainforest, Caledonian pinewoods, gorge woodlands, mountain woodlands, wood pasture and ancient trees that are complex ecosystems in themselves. Much of this woodland contains other important ecosystems: wetland, peatland, watercourses, open water, species-rich grassland and tall herb communities, often combined in rich and diverse mosaics. Collectively, our native woods are home to a remarkable and rich array of plants, mammals, insects and fungi whose complexity and value we are still discovering.

Where are we now?

Many of Scotland's native woods and trees are in poor shape, suffering from a range of threats.

Deer

Wild deer are an integral part of Scotland's wildlife. Our native deer species, red and roe, belong in our landscape and are an important part of our native woodland ecosystems. However, population levels of these and introduced deer species are higher than at any point in the last 1,000 years due to a lack of natural predators and high populations that are actively maintained by some landowners. The Scottish Government recognises that, 'Reducing herbivore impacts is one of the biggest levers we have in Scotland for reducing biodiversity loss and enabling regeneration at scale.'[9]

Deer are woodland animals and naturally browse young seedlings. When deer populations are at naturally low levels there are more than enough young seedlings for some to survive. But over most of Scotland, deer populations are so high that this natural regeneration mechanism of woodlands is broken. The important understorey of many woodland ecosystems is non-existent or significantly denuded and as old trees mature and die, some of our most valuable woodlands are gradually disappearing from the landscape.

Look around Scotland's hills and you'll see many of these 'ghost woods' in their final stage of demise. Compare historic OS maps from the 1800s with what you see on the ground today and you'll find that many of our ancient woodlands have simply disappeared due to overgrazing.

Natural regeneration is an important mechanism to enable trees to adapt to new diseases and climate change. However, excessive grazing prevents this mechanism from working, leaving our woodlands dangerously vulnerable to future changes.

Over the last 40 years, some 12.5% of ancient woodland has been converted to open ground through the grazing activity of herbivores, particularly deer[10].

A recent study of Scotland's Caledonian pinewoods[11], whose ancestry stretches back to the last ice age, found that 23% of these precious habitats are now critically threatened and will be lost without urgent action. High deer populations are the main threat. More than 40% of Scotland's rainforest is grazed and browsed so heavily, mainly by deer, that natural regeneration is unlikely to occur. Even more is being browsed at levels that restrict regeneration of important palatable species like oak[12].

Plantations on Ancient Woodland Sites (PAWS)

Our richest and most diverse woods are our oldest – remnants of ancient woodland that have been present since the last ice age. Thirty nine per cent of our ancient woodland area (around 59,000ha) was planted with non-native timber trees in the last century due to a focus on timber production and lack of appreciation of their value for nature. These fast-growing non-native trees have rapidly shaded out the valuable ground flora and in many cases threaten the survival of the remaining native trees. Across Scotland, oak and pine trees that have stood in ancient woodlands for hundreds of years are now being shaded out and are dying. Fifty per cent of PAWS are owned by the public body Forestry and Land Scotland.

Invasive exotic plants

Some of Scotland's native woods are being steadily colonised by species that are not native to Scotland or the UK. As they spread, these plants displace rare and important native plants and the valuable species that depend on them.

Rhododendron ponticum is a primary threat to Scotland's rainforest, with the Alliance for Scotland's Rainforest estimating that approximately 40% of core rainforest is seriously impacted[13]. In addition to shading out ground flora and globally important lichen and bryophyte communities, dense rhododendron suppresses re-growth of young trees and ultimately causes the demise of the forest itself.

Sitka spruce, one of Scotland's most important commercial conifer species, is increasingly seeding into our ancient and native woodlands, presenting a growing threat to future generations of native woods.

Fence showing impact of deer grazing on vegetation regeneration

JAMES RAINEY/WTML

Pests and diseases

Following the ravaging of our woods by Dutch elm disease over the last 40 years, many of our native woods are now suffering from ash dieback, a fungal disease spread through the air by spores but which was also introduced into the UK by nursery stock imported from Europe. Current evidence suggests that up to 80% of Scotland's 11 million mature ash trees will die over the next two decades, with implications for the 958 species that are associated with ash trees, 44 of which are only found on ash and cannot survive on any other tree species[14]. As global trade and transport continue to increase, the risk of new pests and diseases arriving in Scotland will continue to grow unless we strengthen biosecurity measures.

Climate change

Land managers are already observing increases in the incidence of forest fires, which will become a growing threat in the coming decades. Complex woodland ecological processes are threatened where they depend on the timings of different events to coincide. For example, the emergence of caterpillars on oaks when blue tits hatch is important for chick survival, but highly susceptible to changing climate. Rapid changes in temperature, rainfall and storm frequency are all likely to increase the stress on woodland systems that have developed in a relatively stable climate over millennia.

Inappropriate development

Housing, industrial and infrastructure development have damaged, destroyed and fragmented significant areas of our ancient and native woodland over the last century. Scotland's new National Planning Framework 4 provides more robust protection, stating that, 'Development proposals will not be supported where they will result in any loss of ancient woodlands, ancient and veteran trees, or adverse impact on their ecological condition.'[15] However, compliance with the framework is not guaranteed and inappropriate development remains an ongoing risk.

Gleann Shìldeag

PHIL FORMBY/WTML

Our vision for native woodlands

Scotland's native woodlands are restored to good condition, protected from future threats and expanded in ways that build connectivity and create functional, resilient ecosystems, prioritising our most valuable ancient woods and trees.

Our analysis suggests that Scotland should increase its native tree and woodland cover from around 5% currently to 16% and that this can be done in a way that retains our capacity to grow food and increase softwood timber production.

CRINAN WOOD /NIALL BENVIE WTM

Loch Arkaig Pine Forest

JOHN MACPHERSON/WTML

Case studies

Loch Arkaig Pine Forest, Lochaber

Stretching across more than 1,000ha, Loch Arkaig Pine Forest is an important remnant of ancient Caledonian pinewood located in the heart of Scotland's rainforest. Like many of Scotland's ancient woodlands, it was planted with fast growing non-native conifers in the middle of the last century, which shaded out much of its rare ground flora and killed many of its native trees. Over the last five years, the Woodland Trust has been removing large areas of non-native trees and reducing deer levels to aid the recovery of the woodland, peatland and other natural habitats found on-site. The forest is co-managed with Arkaig Community Forest, with community stalking and a community-owned deer larder ensuring genuine agency and demonstrating how local people can benefit from managing a deer population for environmental objectives. The current period of high intervention will allow natural processes to flourish once again – processes such as natural regeneration of native trees, which was previously prevented through high deer browsing and dense shading of non-native plantation. The forest will be able to extend naturally through expansion into submontane woodland at higher altitudes, increasing resilience to climate change.

Some species have become so locally isolated that they are at risk of extinction before the habitats recover sufficiently to support their revival. The Woodland Trust is intervening with translocations of rare species such as small cow-wheat and two species of wood ants. Tree species that have only survived the past two centuries of high browsing as a few isolated individuals in inaccessible corners of the forest, such as hazel and aspen, support remnants of rare rainforest flora such as Norwegian specklebelly lichen. Natural regeneration of these tree species is being given a helping hand by the community-owned tree nursery, to ensure these trees and their rainforest epiphytes do not disappear before the forest's natural processes recover.

Lower Quoich

NATIONAL TRUST FOR SCOTLAND

Mar Lodge, Cairngorms

Mar Lodge covers 29,000ha in the heart of the Cairngorms National Park and hosts important remnants of ancient woodland. Like much of upland Scotland, these fragments were in decline due primarily to heavy grazing by deer and heather burning, both of which prevented any natural regeneration of trees over much of the estate. Over the last 27 years the National Trust for Scotland has reduced deer numbers significantly and ceased muirburn, initiating a remarkable recovery of the pinewood. 1,900ha of new natural tree regeneration has been established and is expanding every year, with young trees now climbing the slopes and some reaching 900m altitude. The reduction in grazing pressure is allowing the development of rarer plant communities such as tall herbs and is boosting invertebrate and small mammal populations. The success of the restoration work is indicated by the return of species such as hen harrier and white-tailed sea eagle to the estate. For very rare species in need of a helping hand – including twinflower, montane willow and narrow-headed ant - the Trust is undertaking pioneering conservation work to secure healthy, productive populations for the future.

Action needed to restore native woodlands

1. Reduce deer populations across Scotland to sustainable levels

NatureScot, Scottish Forestry and the Scottish Government Directorate of Agriculture and Rural Economy should collaborate on the design of a financial support mechanism to incentivise landscape-scale deer reduction to levels that allow natural regeneration of trees across multiple land ownerships.

The Scottish Government should:

- use land reform legislation to include a requirement for robust deer management plans as part of the proposed public interest test and compulsory management plans
- fund the ongoing work of the The Common Ground Forum, to encourage more positive and collaborative conversations and actions between traditional deer estates and the environmental sector
- direct Forest Research to work with Scottish Forestry and land managers to develop a programme of research, development and innovation in deer management for forest protection
- implement the 99 recommendations of the Scottish Government's Deer Working Group[16].

NatureScot should assess the feasibility of reintroducing lynx as a natural predator for roe deer.

Scottish Forestry should redesign public funding for woodland creation and management to focus on reducing deer numbers to sustainable levels, rather than paying for fencing and plastic tubes.

2. Focus new native woodland creation on extending and connecting existing ancient woods

The Woodland Trust and Trees for Life are collaborating on a survey of around 50 remnants of ancient Caledonian pinewood that have never been mapped or included in the current Caledonian Pinewood Inventory. The survival of these fragments requires their expansion and connection.

Scottish Forestry should incentivise and prioritise the creation of new native woodland in areas that buffer, extend and connect areas of existing ancient woodland and which build connectivity with other important habitats.

Natural colonisation from existing local seed sources should be the preferred method of woodland creation adjacent to existing ancient woodland.

Horse logging at Loch Arkaig Pine Forest

JOHN MACPHERSON/WTML

Volunteers clearing *Rhododendron ponticum*

LYNSEY EWAN/WTML

3. Incentivise the restoration and management of ancient woodland

Scottish Forestry should increase the amount of funding available for ancient woodland restoration under the FGS. Ten per cent of the annual FGS grant budget should be set aside to support management of existing woods for improved nature and public access outcomes.

The Scottish Government should use land reform legislation to require the development and delivery of ancient woodland restoration plans as part of future compulsory management plans.

4. Restore PAWS

The Scottish Government should fund Forestry and Land Scotland to develop and deliver an action plan with clear targets for the restoration of the 50% of PAWS in its ownership. Progress against these targets should be published every three years. Eighty per cent of its PAWS sites should be in active restoration by 2030.

Scottish Forestry should develop a strategy and action plan to restore 50% of PAWS on private land (approximately 15,000ha) by 2045. This should include the development of a PAWS restoration grant that exceeds the grant levels for creating new native woodland.

5. Control invasive non-native plants

Scottish Forestry and NatureScot should develop a strategy for controlling *Rhododendron ponticum* in Scotland's rainforest and controlling regeneration of shade-casting, non-native trees in ancient woodlands. This should focus on the well-established principles of prioritising areas for treatment, catchment-scale action, removal before it becomes well established and long-term maintenance.

Volunteer tree seed collecting

MALCOLM TURNER/WTML

The Scottish Government should:

- deliver on its commitment to create a Rainforest Restoration Fund that would fund the costs of *Rhododendron ponticum* control in the rainforest
- direct Forest Research to develop a programme of research and development focusing on reducing the cost and maximising the impact of invasive non-native plant control, with an initial focus on *Rhododendron ponticum*.

6. Increase the availability of local provenance trees and reduce the risk of importing new pests and diseases

Scottish Forestry should:

- require all grant-aided planting to use trees that are sourced and grown in the UK and Ireland (UKISG[17]) to avoid importing new pests and diseases into Scotland
- invest in supporting Scotland's tree nursery sector, including small and community nurseries, to reduce the risk of importing tree diseases and to support Scottish businesses and jobs.

Landowners should specify UKISG stock in their procurement processes.

7. Stop ancient woodland loss to new development and infrastructure

The Scottish Government should deliver on the Bute House Agreement commitment to create an accurate register of all ancient woodland in Scotland. This is a vital tool to support planners and developers in protecting ancient woodland and is needed to replace the current Ancient Woodland Inventory which contains significant errors and omissions.

Local Authorities should ensure they have the necessary planning and tree skills to understand and implement the new protections for ancient woodland contained in the National Planning Framework 4.

Because energy infrastructure falls outside the Scottish planning system, Scottish Power Energy Networks, Scottish and Southern Electricity Networks and OFGEM should develop and adhere to clear guidance on avoiding damage to ancient woodland.

5. Restoring our rivers

CAROLINE MIEKINA/WTML

A recent comprehensive evidence review confirms that native woods and trees are vital for river health[18]. They play a key role in ensuring clean water, stabilising riverbanks, reducing sediment loads and controlling runoff pollution from fertilisers and pesticides. The shade of river trees plays an important role in keeping our rivers cool as the climate warms. In some Scottish rivers this will be essential to ensure continued spawning of trout and salmon. River trees provide important food inputs to river systems through their associated insects and leaf fall. Deadwood in rivers alters river flow in ways that create more diverse habitats, while helping to slow the flow and reduce flood impacts. Trees in our upper catchments can also play a role in reducing peak flood levels by supporting infiltration and retention of water.

Nature recovery of our rivers requires more and better river woods, and healthy river woods will also play a significant wider role in nature recovery. By creating extensive 'green arteries', they will improve ecological connectivity and enable the movement of species across the country.

Where are we now?

Across Scotland's 125,000km baseline river network, 56% of riparian (riverbank) vegetation is in poor condition without any trees or shrubs[19]. The impacts of this include high levels of nutrient and sediment pollution, overheating rivers, impoverished aquatic ecosystems and fragmented river woodland habitat. Warming rivers present a threat to Scotland's freshwater ecosystems, including the ability of salmon and trout to spawn[20], with some Scottish rivers now experiencing summer temperatures that are close to the lethal limit for juvenile salmon[21] and contributing to the current official 'endangered' status of Atlantic salmon in the UK[22]. Improving climate resilience of rivers – for example, through supporting targeted riparian tree planting and natural regeneration – is identified as a priority action in the Scottish Wild Salmon Strategy[23].

Riparian tree planting is currently supported by Scottish Forestry through the FGS and by the Scottish Government's Agri-Environment Climate Scheme (AECS), but there has been relatively poor uptake of both. This is partly because riparian woodlands can be expensive to create due to their linear nature and the requirement for significant fencing.

Across most of Scotland, unsustainably high levels of deer create technical and economic challenges to establishing new river woods. The growing spread of Scotland's beaver population provides opportunities for improving our river ecosystems, but there is an important interplay with deer populations and the need to ensure that regrowth from trees felled by beavers is not heavily browsed by deer.

The Riverwoods initiative[24] is a collaboration of organisations and landowners who are working together to restore Scotland's rivers and their important bankside habitat.

Our vision for Scotland's rivers

Scotland has a thriving network of riparian woodlands that supports healthy river ecosystems and provides 'green arteries' to connect habitats and enable species migration across the country. One hundred and seventy-five thousand hectares of land along Scotland's river network has been identified as having potential for creating new river woods[25,26].

Case studies

Restoring the Dee catchment

The Woodland Trust is supporting the Dee District Salmon Fisheries Board (DDSFB) and its work with landowners and managers to improve riparian habitat across the River Dee catchment. This has included tree planting and woodland creation along many of the river's tributaries, installation of woody debris into rivers to help create more varied and natural habitat, and removal of dams to aid fish migration. DDSFB has been embedded in the catchment for decades. It uses its local knowledge and strong relationships with landowners and the local angling sector to develop the creative solutions needed to improve the health of the river. The development of riparian woodland from lower stretches up to high catchment headwaters demonstrates the kind of catchment-scale approach that is needed to restore Scotland's river systems.

Rottal Burn restoration

JOHN MACPHERSON/WTML

Renaturalising the Rottal Burn

Rottal Estate in the Angus Glens has restored a stretch of the previously straightened Rottal Burn by returning it to its original meandering channels. This has lengthened the river by 50%, slowed its flow and enabled it to weave its own pathways across the floodplain. By adding windblown Scots pines into the channel and planting native trees along its banks, the estate has restored the river to a more natural and ecologically rich condition. The complexity of the river now allows salmon, at different stages of their life, to access food and shelter, and monitoring by the Esk Rivers & Fisheries Trust has shown that densities of salmon fry are now five times what they were previously.

Action needed to restore rivers

8. Set targets for and incentivise riparian woodland creation

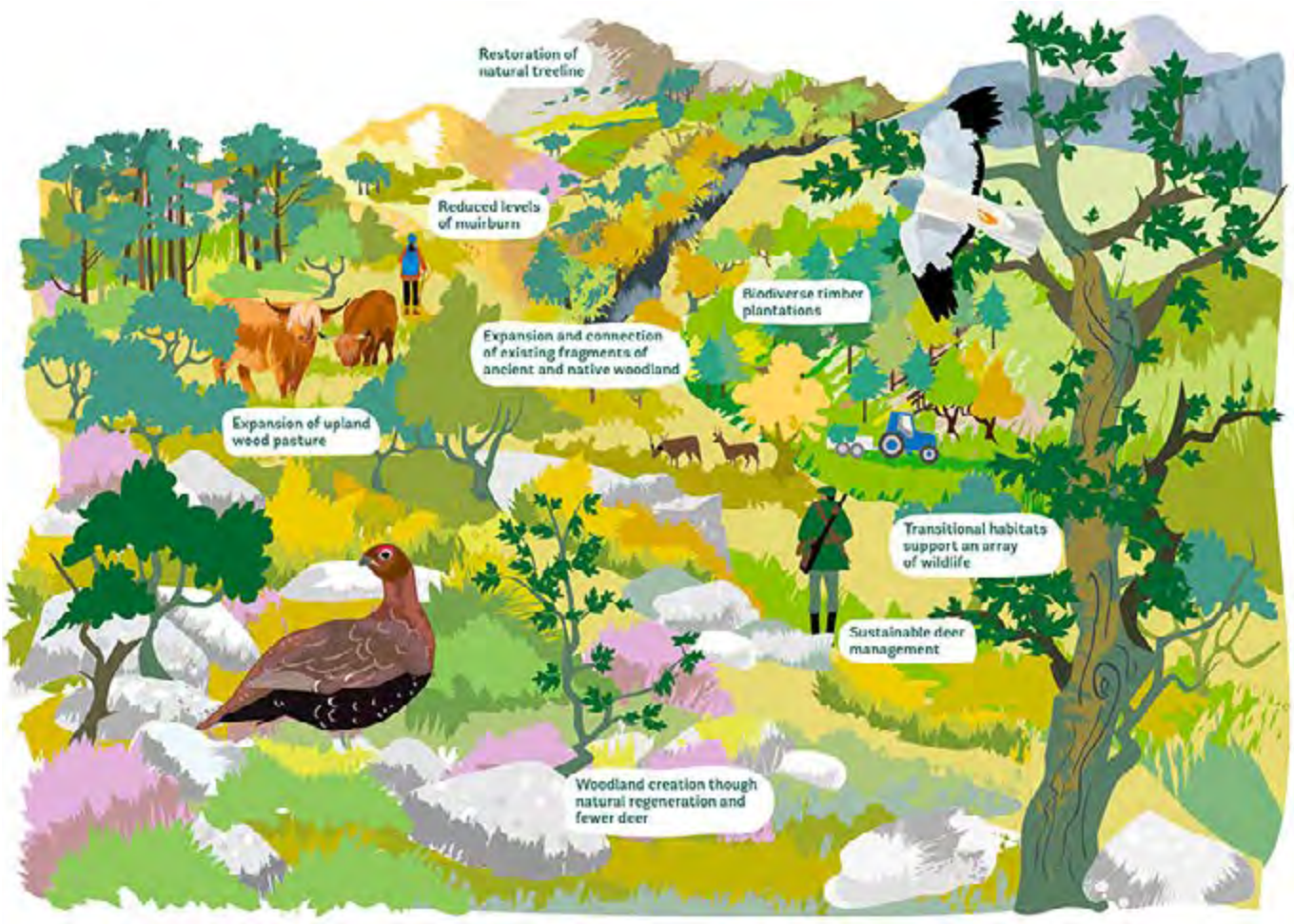
Scottish Forestry should develop an effective riparian woodland creation option under the Forestry Grant Scheme that reflects the technical and financial challenges, and the significant environmental benefits of riparian woodland creation.

The Scottish Government should:

- develop an annual target for new riparian woodland creation as part of the Biodiversity Strategy Implementation Plan
- create attractive options for farmers to fence off watercourses and plant low density native trees along riverbanks as part of the post-CAP farm support systems that are being developed to replace the current Agri-Environment Climate Scheme.

The recommendations in section four of this report pertaining to deer will be important for the restoration of Scotland's rivers and river woodlands.

6. Restoring our uplands and mountains



CAROLINE MIEKINA/WTML

The Scottish uplands are commonly defined as land above the level of agricultural enclosure, which is typically 300-400m above sea level but often lower and down to sea level in parts of the north and west. They cover more than 50% of our land area and comprise a rich range of habitats including mountain, moorland, heathland, species-rich grassland, rough grazing and peatland. Their scale and diversity, along with their relatively minor role in Scotland's food security, mean that uplands can and should play a major role in Scotland's nature recovery.

Where are we now?

While often considered wild and natural, our uplands have been dramatically shaped by human activity over millennia. Livestock grazing has been a significant land use for centuries, with a shift towards large-scale and more intensive sheep farming in the 19th century. The development of sporting estates around the same period means that around two million hectares (approximately 27% of Scotland's land area) is managed primarily for recreational shooting.

In recent decades the development of hydropower, wind farms and plantation conifer forestry have shaped the uplands significantly.

Grazing by sheep and deer and the use of fire to manage grouse moors have modified upland ecosystems in significant ways, including:

- loss of native tree cover. Over the last 40 years, some 12.5% of ancient woodland has been converted to open ground through the grazing activity of herbivores, particularly deer[27]
- prevention of natural regeneration of native woodland which would otherwise cover much of our uplands. The central reservation of the A9 is a good indicator of how much of our uplands would look in the absence of overgrazing and burning
- almost complete loss of mountain woodland habitat and the absence of a natural tree line in most of the uplands
- most native woodlands in the uplands are protected by fences which create stark ecological boundaries, rather than the natural ecotones of transition that are important but missing habitats
- a significant reduction in diversity of ground flora including species-rich grassland and tall herb communities
- damage to peatlands through drainage, heavy grazing and trampling.

This heavily modified vegetation along with lethal control of native birds and mammals on grouse moors results in significantly less bird, mammal, insect and fungal diversity than our uplands are capable of hosting. Scotland's Biodiversity Strategy acknowledges that at least 25% of our uplands are in poor condition.

While the evidence shows that native woodlands provide the most value to wildlife, carefully located non-native timber plantations can also play a positive role in nature recovery. The UK imports around 80% of its timber and there is a need to expand well designed and managed timber-focused plantations.

Timber plantations could provide more benefits for nature by using a greater proportion of native species, creating more open space habitats, retaining deadwood and veteran trees and reducing deer populations to levels that support natural regeneration. It's also important that timber plantations of non-native species are located in areas that avoid seeding non-native species into important native habitats. Improving the ecological condition of productive plantations will not only help wildlife but will also support long-term production by underpinning the resilience of plantations to threats such as tree diseases.

A9 reservation

MATILDA SCHARSACH/WTML

Our vision for Scotland's uplands

Scotland's uplands comprise a nature-rich mosaic of habitats with significantly greater native tree cover, mountain woodland, restored peatland, tall herb communities and species-rich heath, moor and grassland. Traditional upland land uses including farming, stalking and timber production continue to play an important role but transition to more nature-positive models.

Case studies

Nature restoration on an upland farm, Glen Finglas

Luing cattle used for conservation grazing at Glen Finglas

PAUL GLENDELL/WTML

Glen Finglas estate in the Trossachs was acquired by the Woodland Trust in 1996 and demonstrates the multi-purpose role that upland farms can play in nature restoration, food production, public access, catchment management and carbon sequestration. With over half of the estate above 400m, a key interest for the Trust was the extensive areas of upland wood pasture. Unlike many of Scotland's glens there remains a good amount of long-established tree cover, partly due to a history of royal protection as a hunting forest but also due to the usefulness of pollarded tree products to the people living and working on the land.

Nature restoration at Glen Finglas has involved removing the sheep, reducing deer populations and continuing cattle grazing, to improve conditions for tree seedlings to germinate and to maintain the botanical interest of open habitats. We have created significant areas of new native woodland (1,500ha so far) with the aim of eventually opening them up to cattle grazing to maintain a mosaic of woodland and open ground. The new woodlands go high up the hill, allowing a transition from denser tree cover in the bottom of the glens to scattered birch woodland and, ultimately, to open mountain woodland on the hill tops. We are also restoring over 200ha of peat by blocking drainage ditches and repairing eroded hags to prevent the loss of carbon and kickstart the slow process of sequestration again.

Restoring mountain habitat, Ben Lawers

Ben Lawers National Nature Reserve is an area popular with Scotland's hillwalking community. But it is also home to a pioneering National Trust for Scotland project to re-establish mountain woodland, a habitat that would have once covered much of Scotland but which has now almost entirely disappeared as a result of overgrazing. Using active restoration to kick-start the process, over the last 35 years the Trust has successfully established more than 300ha of mountain woodland, creating an open mosaic of trees and shrubs including juniper, rowan, various rare mountain willow species and high-altitude birches. The project demonstrates what a natural tree line could look like in Scotland and points the way to what could be possible across many of our mountains.

Natural regeneration of associated habitats such as tall herbs has been spectacular and invertebrate and bird species have increased. Black grouse are frequently seen within the woodland and beavers have recently moved in. The next phase involves a small herd of hardy cattle that were introduced to the hill in 2023, with the aim of improving the condition of open ground habitats and promoting natural regeneration of woodland and scrub. The use of innovative technology allows managers to control grazing location and intensity, offering the potential of integrated woodland restoration.




SARAH WATTS

Glen Finglas Luing cow

PAUL GLENDELL/WTML

Action needed to restore uplands and mountains

9. Expand upland native woodland

Most of Scotland's new woodlands will continue to be created in the uplands. Scottish Forestry should continue to support significant new native woodland creation in the uplands through its FGS. This should:

- develop a mountain woodland creation option under the FGS that will unlock the creation of mountain woodland at scale and restore a natural tree line to the uplands
- prioritise the expansion and connection of existing fragments of ancient and native woodland and the creation of riparian woodlands as outlined in previous sections
- support woodland creation through deer density reduction rather than deer fencing, as outlined above.

NatureScot and Scottish Forestry should:

- recognise that nature restoration in the uplands will lead to the loss of some existing highly modified habitats and their associated species
- agree a set of principles to guide the transition of upland habitats, which will simplify requirements for surveys and Environmental Impact Assessments and enable landowners and project managers to progress nature restoration projects more rapidly and at lower cost.

10. Manage grouse and deer estates for nature

Traditional Highland grouse and deer estates should transition to nature positive models with lower densities of quarry and greater native tree cover, an approach already being pioneered by a number of estates. Specifically:

- deer estate owners should transition to stalking fewer but larger and healthier deer in regenerating landscapes with greater native tree cover and biodiversity. This should include reducing deer densities to the levels identified by Scottish Government and National Park guidance
- grouse moor owners should transition back to the original model of walked-up shooting through an unburned and more biodiverse habitat with increased native tree cover
- the Scottish Government should use appropriate licencing to reduce levels of muirburn on grouse moors.

The Highland sporting sector should work with Visit Scotland and NatureScot to develop a Scottish sporting market that is focused on, and commands a premium for, the kind of nature-positive sporting described above.

Our recommendations in section four pertaining to deer will be vital for the regeneration of Scotland's uplands.

11. Support nature positive upland farming and crofting

The Scottish Government should:

- support upland farmers and crofters to reduce grazing pressure to levels that significantly increase upland biodiversity as part of the post-CAP farm support systems that are currently being developed. This should also support a move from sheep to more cattle in the uplands
- develop mechanisms to enable crofters to access carbon income through peatland restoration and native woodland projects. Currently, this is much easier for large absentee landowners than for locally resident crofters. The current situation is inconsistent with a Just Transition and hampers the ability to deliver the ambitions for nature outlined in the National Development Plan for crofting[28]
- develop specific mechanisms to support native woodland creation and peatland restoration on common grazings, which will require a different approach from other forms of land tenure.

Scottish Forestry should continue to support the provision of woodland creation advice for crofters.

12. Support nature positive timber plantations

Scottish Forestry should:

- require plantations funded with public money to exceed the minimum standards for native trees, shrubs and open habitats that are required by the UK Forestry Standard (UKFS). Publicly funded schemes should be expected to go beyond the standards required for privately funded schemes. New timber plantations supported with public funding should have a minimum of 30% of their area dedicated to enhancement of biodiversity, including native trees, shrubs and open habitats
- incentivise owners of new and existing timber plantations in the uplands to include a natural mountain woodland treeline where appropriate. This would add significant ecological benefit at little cost without reducing timber production
- develop a grant scheme to support re-structuring of timber plantations to benefit nature in a similar manner to grant support available to farmers. This could include a payment to create ponds, managed open habitats and new areas of native woodland
- review and reform the felling licence system to ensure that it fully enforces the delivery of UKFS biodiversity standards – for example, to ensure that any remaining ancient woodland plants and veteran trees are protected during felling operations within PAWS.

13. Ensure renewable energy schemes are nature positive

NatureScot should ensure that the significant expansion of onshore wind planned under the Scottish Onshore Wind Sector Deal requires all new wind developments to be strongly nature positive. This should include a requirement for sustainable levels of livestock and deer grazing on all future wind farm land. With larger turbine sizes, the creation of open mountain woodland on wind farms should be assessed and implemented where appropriate and feasible in future onshore wind developments.

14. Explore a Carbon Emissions Land Tax

The Scottish Government should explore the feasibility of a Carbon Emissions Land Tax as outlined by the John Muir Trust[29].

Gleann Shìldeag

JOHN MAC PHERSON/WTML

7. Restoring our lowland farmland

CAROLINE MIEKINA/WTML

Around 25% of Scotland's land is used for arable and horticultural production and for improved grassland that supports dairy, sheep and beef. This area generates most of the food grown in Scotland and is generally managed intensively for food production.

The integration of trees into lowland farms can provide significant benefits for nature. For example, higher abundance and species richness of invertebrates was recorded in Scottish pasture with a tree component compared to open grassland[30], with a positive impact on birds that reflected a rich matrix of woodland and grassland birds[31]. Agroforestry has the potential to more than double average farm biodiversity levels and there should be a significant expansion of this approach[32].

PAUL GLENDELL/WTML

There is good evidence that careful integration of a relatively small component of tree cover can also bring significant benefits for food production. For example, trees can support the growth of crops and animals by providing shelter from wind and rain, regulating soil temperatures, supporting pollinators, enhancing water retention, reducing soil erosion and enriching soil fertility[33]. Trees can also produce materials for sale or use on farms, including timber, wood chip bedding, fruit, firewood and fodder.

Where are we now?

The steady intensification of farming in Scotland over the last 40 years has been well documented. Driven by government policy incentives, this transformation has been accompanied by significant globalisation of our food systems, increased yields and reductions in the cost of many food items in supermarkets.

However, many of the farming techniques responsible for this revolution have had negative impacts for nature. Since 1994, Scotland has experienced substantial long-term decreases in farmland bird populations, pollinators, standing water and a 39% reduction in lowland meadows[34]. The last 50 years have witnessed a loss of non-cropped habitat and major loss and fragmentation of all farmland habitats[35].

Increased mechanisation has resulted in larger field sizes and over the course of the 20th century, Scotland lost more than 6,000 miles (around half) of its hedgerows[34], together with a large proportion of its hedgerow trees, parkland, wood pasture and orchards[35]. Despite some notable exceptions and a range of historic financial schemes to support nature on farms, our agricultural lowlands are some of the least biodiverse areas in Scotland.

Recognising this, the Scottish Government's vision for agriculture commits to developing 'a support framework that delivers high quality food production, climate mitigation and adaptation, and nature restoration'[36]. The UK's exit from the EU gives Scotland unprecedented control over support mechanisms for farmers and the next few years will be critical in developing the policy and financial levers required to deliver this vision.

Despite the significant potential for trees and hedges to restore nature and support food production, there has been relatively little tree planting on lowland farms in recent years due to a lack of attractive funding mechanisms and cultural issues arising from a Scottish farmscape that is significantly less wooded than most of Europe. Lack of awareness, education and skills, along with limited availability of good demonstration sites and case studies is a further constraint. The persistent division between trees and farming in education, research and government departments contributes to a lack of policy support, training, guidance and resources for trees on farms.

Our vision

Our lowland farmscapes are rich in native trees and hedges, integrated into farming systems in ways that support nature restoration and quality food production.

This should include:

- 6,000 miles of new hedgerows and hedgerow trees, replacing those that were removed in the last century and supporting a rich range of insects, birds and small mammals
- field trees and wood pasture that will provide the shade necessary for livestock welfare in a warming climate while mimicking the form of open, grazed wildwood that likely prevailed over significant areas of lowland Scotland
- well-designed shelterbelts that protect livestock and crops and provide a home to nature
- small farm woodlands that provide timber for farm use and an additional revenue stream, as well as creating a 'green barn' and access to tree fodder for livestock
- fruit trees in small orchards and alley cropping systems
- tree-lined watercourses and river woods that protect waterbodies from agricultural runoff and help keep our streams and rivers cool in a heating climate.

Parkhill Farm, Newburgh

IAIN MOSS/WTML

Case study
Farming with trees

At Parkhill in Newburgh, Fife, Roger and Rachel Howison have integrated trees creatively into their arable fields. Working with the Woodland Trust, they planted 750 heritage apple trees in rows, spaced to allow farm machinery and arable farming in between. Apples are now being harvested to produce quality cider and apple juice, which is sold directly from the farm.

Andrew and Seonag Barbour run a 540ha livestock farm at Mains of Fincastle, Pitlochry. They established seven hectares of native trees in three blocks using a strip alley system with an objective of growing marketable oak timber. The trees are now accessible to sheep and cattle, providing valuable shade, shelter and tree fodder. Regular thinning produces woodchip for livestock bedding and firewood for home heating.

Action needed to restore lowland farmland

15. Incentivise agroforestry through farm support mechanisms

The Scottish Government should develop financial mechanisms that support significant integration of woods and trees into farming systems through the lower tiers of the new agricultural support scheme that is currently being developed i.e. NOT through the FGS administered by Scottish Forestry. This is because many of the opportunities for integrating trees on farms and crofts are outside the scope of the FGS, for example, hedgerows and hedgerow trees, parkland trees, wood pasture, small copses and scattered trees along watercourses. It is also because options in lower farm support tiers will be much more visible to farmers than the FGS and are therefore more likely to be considered.

Scottish Forestry should monitor uptake of the new agroforestry option under the FGS to assess its effectiveness and adapt as needed to improve the uptake of shelterbelts and farm woodlands.

16. Provide agroforestry training for farmers, crofters and advisers

Scottish Forestry should build on the success of the Integrating Trees Network to strengthen the network of demonstration farms and improve peer to peer learning and knowledge exchange.
Scotland's Rural College (SRUC) and other academic institutions providing tertiary-level education to farmers should ensure an element of tree and agroforestry education in their courses.
The Scottish Government should ensure that the Farm Support Service is equipped with knowledge and funding to advise farmers on the integration of trees and woods on their farms and crofts.

17. Remove constraints on tenants

The Scottish Government should ensure that long term agricultural tenancy agreements reflect the environmental advantages of agroforestry and farm woodlands, and allow tenants to make improvements without recourse to altering tenancy agreements.

Lynbreck Croft

JOHN MACPHERSON/WTML

8. Restoring our towns and cities

CAROLINE MIEKINA/WTML

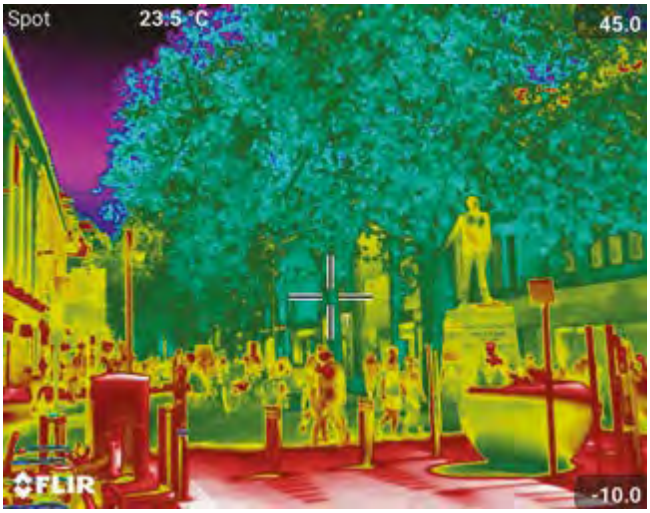
Trees must play a significant role in nature restoration in our towns and cities. Our urban forest includes trees in parks, gardens, schools, street trees, urban woodlands, trees along canals and rivers, and naturally regenerating trees and shrubs that grow in the 'in between places' in our towns and cities.

The urban forest forms a crucial lifeline for nature, giving birds, insects and animals food and shelter and enabling them to move through the urban landscape safely. With the intensification of our lowland agricultural landscapes, towns and cities that contain habitat mosaics have become increasingly important as refugia for biodiversity [37,38]. Urban woods and trees are also an important element of Scotland's climate adaptation, helping to keep people, buildings and streets cool in a warming climate, regulating water and flood management and reducing both energy consumption and carbon emissions[39].

Community tree pack planting with LINKS, Glasgow

GEORGE ANDERSON/WTML

Queen Street, Cardiff, street temperature 44°C but under tree canopy 26°C



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Exposure to nature in our urban environments where 80% of Scotland's people live, has been shown to be an important contributor to people's mental and physical health and quality of life [40,41]. Urban trees and woods can improve air quality[42], reduce noise levels[43] and provide opportunities for outdoor learning and active play that are proven to have a significantly positive role in childhood development [44,45]. They also present one of the most important opportunities for Scotland's largely urban population to regularly experience, enjoy and learn about nature.

Unfortunately, not everyone in our urban areas is able to fully enjoy all the benefits urban trees provide. We believe that all communities in Scotland deserve equitable access to these benefits. This is what we call 'tree equity'.

The 3-30-300 rule increasingly being adopted by cities across Europe has tree equity at its heart and is a simple, evidence-based standard for assessing whether there is sufficient quantity and distribution of urban forest [46,47].

- Every citizen should be able to see at least three mature trees from where they live and work.
- There should be a minimum of 30% tree canopy cover in every neighbourhood.
- No one should be more than 300m from their nearest park or greenspace where they can experience nature.

Where are we now?

All of Scotland's cities (excluding Dunfermline) have carried out tree canopy assessments, though there has been inconsistency in the methodologies used. The data[48] shows that canopy cover ranges from 15% in Glasgow to 22% in Perth. However, trees are not distributed equally across cities and low income and minority communities often have lower tree cover than affluent neighbourhoods.

Working in partnership with American Forests, the Woodland Trust has developed Tree Equity Score UK and created an online map for all urban areas in the UK. This gives Local Authorities an indication of where they should focus urban tree planting to provide maximum benefit for people.

While there are some examples of good practice, overall, the state of urban tree management in Scotland is poor. Trees are often perceived as a liability rather than an asset, resulting in reactive, rather than proactive tree management. Data on urban trees is limited, incomplete and difficult to access. Local Authority tree budgets are stretched, their tree staff are not always appropriately qualified and many feel unsupported[49].

Recognising the importance of trees in our towns and cities, the Woodland Trust has provided free trees for schools and communities since 2011. In that time, 1.3 million trees have been planted through this programme in Scotland.

Vision for Scotland's towns and cities

Scotland's towns and cities are rich in woods and trees; helping nature to thrive, increasing our climate resilience and supporting the health and wellbeing of Scotland's people. The urban forest is given the priority and investment needed to achieve tree equity for everyone and reach the 3-30-300 standard so that everyone benefits from trees, regardless of where they live or their socio-economic status.

Case studies

The Clyde Climate Forest (CCF)

The CCF is a joint initiative of the seven Local Authorities in Greater Glasgow, supported by the Woodland Trust, Scottish Forestry, Green Action Trust and TCV. Its vision is to see up to 1.5 million urban trees planted, 200 woodland habitats connected and 9,000 hectares of new forests and woodland created across some of Scotland's most populous areas. The project has a strong focus on tree equity, prioritising its community work in neighbourhoods with the least tree cover and the greatest vulnerability to climate change.

Million Tree City

This Edinburgh City Council project aims to increase tree cover across the city, with a target of an additional 250,000 trees to be planted by 2030. With support from the Woodland Trust and Edinburgh and Lothians Greenspace Trust, the council is planting urban trees in schools, parks and other green spaces and supporting homeowners to plant trees in their gardens. The project also supports the creation of 'wee forests': tennis-court sized areas of densely planted, fast growing native trees.

Urban trees, Glasgow

NIALL BENVIE/WTML

Action needed to restore nature in our towns and cities

18. Protect existing urban trees

Local Authorities should:

- give greater protection to existing urban trees as part of planning policy
- ensure that tree equity and the 3-30-300 standard is part of all planning applications for new developments.

19. Increase tree canopy cover and tree equity in towns and cities

Scottish Forestry should develop and publish a strategy and implementation plan outlining how they will support Local Authorities to increase canopy cover in our towns and cities, to improve tree equity and ultimately achieve the 3-30-300 standard. This should include funding and investment in staff skills and resources.

Local Authorities should:

- ensure they have adequate budgets and skills to protect, manage and expand the urban forest
- use the new Tree Equity Score map to reduce inequalities in tree cover and access to trees and woods.

Local communities should be engaged in decision making and in planting and maintaining trees, supported by professional tree staff.

9. Tree-scale nature recovery

CAROLINE MIEKINA/WTML

Individual trees and groups of trees outside woods, scattered through the landscape in hedges, fields, churchyards, gardens, parks and housing estates, have a significant yet unsung role in nature recovery.

Scotland has an important array of ancient and veteran trees with more than 10,000 recorded on the Ancient Tree Inventory (ATI) to date, a figure that is only a small fraction of their true number. They are of incredible importance for wildlife, supporting different species to those growing in closed-canopy woodland. Each tree is an ecosystem in its own right, providing a range of specialist habitats for animals, plants and fungi.

In habitats such as wood pasture, many species including fungi, lichens and invertebrates live in mutually beneficial relationships with veteran trees, particularly the decaying wood they contain. These species need a steady supply of trees of a suitable age if they are not to become locally extinct when the host tree dies.

Many of Scotland's ancient trees are not single stemmed maiden ancient trees in wood pasture and parkland settings. Many, particularly in the uplands, are either old coppice stools or phoenix trees that have blown over but continue to grow. They are not always large, physically impressive trees, and they don't always have the same decaying wood habitat as old parkland oaks, but they are genuine ancient trees nonetheless and deserve the same levels of protection.

Action for tree-scale nature recovery

20. Identify and protect ancient and veteran trees

Landowners should:

- ensure that ancient and veteran trees (AVTs) are identified and registered on the ATI, valued, protected and properly managed. This can be achieved by ensuring there is a suitable buffer from damaging activity and by sensitive management. AVTs should be threat-assessed, and action taken where necessary so they are secured for the long-term
- ensure that future AVTs are identified or established. This can be done both in and outside woods to ensure the connectivity and continuity of the micro habitats old trees contain. Time is needed to develop old-growth characteristics and we need to think in 'tree time' to give wildlife a chance to recover and to nurture the ancient trees of the future.

Local Authorities should make full use of Tree Preservation Orders (TPOs) to ensure that significant trees are properly protected.

Dunollie tree seed collecting

MATILDA SCHARSACH/WTML

JIM SMITH-WRIGHT/WTML

Phoenix Birch Tree. Loch Arkaig Pine Forest

WTML

Coppice stool, Loch Ness

Community tree nursery

PHILIP FORMBY/WTML

10. Enabling a tree-based nature recovery

There are a number of cross-cutting areas that need action in order to enable the practical steps outlined above.

21. Reverse recent cuts to the Forestry Grant Scheme

The Scottish Government should reverse the decision of its December 2023 budget to cut Scottish Forestry's budget for grants by 41% from £77m to £45m. This is incompatible with the woodland creation targets that Scotland has set as part of its net zero plan. It is also incompatible with the Scottish Government's vision to reverse nature loss and will make it difficult to deliver many of the recommendations of this report.

22. Improve native tree supply

The Scottish nursery sector is not yet producing the breadth of native tree species of suitable genetic origin that is required for large-scale nature recovery. Tree seed supply for some species and many northern, western and island provenance is poor.

- Scottish Forestry should work with the nursery sector to address important supply chain issues. This should include the establishment of tree seed stands for a range of pioneer tree species (including mountain willow) that are currently unavailable and which could quickly produce seed.

23. Invest in tree and woodland skills

Changes to academic curricula and Brexit, together with an aging work population have led to an acute shortage of tree and woodland skills at technical and managerial level.

- Scottish Forestry should work with the forestry industry, academic providers and training organisations to create flexible learning and training opportunities and workforces skilled in arboriculture and forestry in Scotland.

24. Optimise tree-based nature recovery on public landholdings

The Scottish Government and the Sustainable Scotland Network should ensure that public bodies adequately consider the role that native trees can provide in enabling them to discharge their Biodiversity Duty under the Nature Conservation (Scotland) Act 2004. Public bodies including Scottish Water, Crown Estates, Local Authorities and Health Boards own significant landholdings, some of which have unmet potential for tree-based nature recovery.

25. Support community engagement in tree-based nature recovery

Communities are already playing a significant role in tree-based nature recovery, from community tree planting to increasing ownership and management of land and woodlands. Nature recovery can and must go hand in hand with supporting strong, resilient communities.

- Landowners should ensure meaningful community engagement with significant changes in land use in line with the Scottish Government's Land Rights and Responsibilities statement.
- The Scottish Land Fund should support communities that wish to take on ownership of local land for nature restoration.

26. Develop new natural capital revenue streams

Both public and responsible private investment in Scotland's natural capital will be essential to deliver effective restoration work at the pace and scale needed to deliver on our climate change and biodiversity targets.

The Scottish Government and NatureScot should work with the Scottish Forum on Natural Capital to develop cutting-edge investment and funding models. The overall aim should be to enable corporate bodies and investors with interest and dependencies in tree-based nature recovery to invest through their Environmental Social and Governance commitments, in activities such as rainforest restoration and the creation of riparian and mountain woodlands.

Opportunities for high-integrity private finance should complement and not replace public funding and should be subject to the Interim Principles for Responsible Investment in Natural Capital, ensuring investments deliver social, environmental and economic benefit.

27. Ensure effective monitoring

Monitoring is vital to track progress and to learn and adapt policies and practice.

- The extent and condition of Scotland's native woods should be reported as part of the Scottish Government's regular State of Nature reports.
- Scottish Forestry and NatureScot should collaborate on the development of a more robust metric and method for assessing native woodland condition.
- The Woodland Trust will monitor and report on further loss of ancient woodland in Scotland as a means of assessing the effectiveness of planners in implementing the robust protection given in NPF4.

Community tree planting

GEORGE ANDERSON/WTML

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45 https://www.playscotland.org/resources/print/20220714_Nature-Based-Play_FINAL_compressed.pdf
46 Konijnendijk Cecil 2022 Evidence-based guidelines for greener, healthier, more resilient neighbourhoods: Introducing the 3–30–300 rule
47 https://iucnurbanalliance.org/promoting-health-and-wellbeing-through-urban-forests-introducing-the-3-30-300-rule/
48 Home - Urban Tree Cover
49 Van der Jagt and Lawrence 2015. Trees and Woods in Scottish Towns: The role of Local Authorities. Forest Research

12. Useful resources

Ancient Woodland Inventory (Scotland) Ancient Woodland Inventory (Scotland) - data.gov.uk

State of Scotland's Rainforests https://www.woodlandtrust.org.uk/media/51789/state-of-scotlands-rainforest.pdf

How we restore ancient woodland – The Woodland Trust Ancient Woodland Restoration - Woodland Trust

Ancient and veteran trees: an assessment guide – The Woodland Trust: woodland-trust.org.uk/publications/2022/06/green-recovery-avt-tree-assessment-guide

Woodland creation guide – The Woodland Trust: woodlandtrust.org.uk/plant-trees/woodland-creation-guide

Woodland creation Site assessment handbook – The Woodland Trust woodland-trust.org.uk/publications/2023/04/site-assessment-handbook

Woodland creation Tree species handbook – The Woodland Trust: woodland-trust.org.uk/publications/2022/03/tree-species-handbook

State of the UK's woods and trees 2021 – The Woodland Trust: woodland-trust.org.uk/publications/2021/04/state-of-uk-woods-and-trees-2021

Trees and Woodland Strategy Toolkit – The Tree Council: treecouncil.org.uk/what-we-do/science-and-research/tree-strategies

Tree Equity – Tree Equity Score Tool: Is There Tree Equity Where You Live? - Woodland Trust

Integrating trees and crofts on farms in Scotland; benefits, barriers and opportunities https://www.woodlandtrust.org.uk/media/51158/integrating-trees-on-farms-and-crofts-in-scotland.pdf

The State of Scotland's rainforest https://www.woodlandtrust.org.uk/media/51789/state-of-scotlands-rainforest.pdf

Rhododendron in the rainforest https://www.woodlandtrust.org.uk/publications/2021/10/rhododendron-in-the-rainforest/

Saving Scotland's rainforest; managing the impact of deer https://www.scotlink.org/wp-content/uploads/2023/06/Deer-Report.pdf

And a suite of rainforest coms from https://savingscotlandsrainforest.org.uk/resources-general - particular

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