

# Nature for the Nation: Scotland's National Ecological Network

## Why is a National Ecological Network needed and what is it?

There is widespread recognition that we are facing both a biodiversity and climate emergency and that the wellbeing and prosperity of society is intrinsically linked to the health of our planet. The Scottish Government has set ambitious targets on climate change and a clear commitment to meet international targets on biodiversity, social justice and the Sustainable Development Goals. What is urgently needed now is transformative action on a significant scale to meet these targets - a National Ecological Network has a significant part to play in delivering that.

Lots of good conservation action, undertaken by a wide range of people, is underway across Scotland, but this disconnected approach is not achieving the most for nature or people. A more strategic approach is required to focus our combined efforts where we can make the most difference. We are approaching 2020 and considering the successor to Scotland's Biodiversity Routemap, which identifies the need for a National Ecological Network (NEN). This key tool is required to deliver our biodiversity ambitions, meet our commitments to net zero emissions by 2045 and adapt to a changing climate.

Imagine trying to travel around Scotland without any road or rail network. For much of our wildlife this is the reality - it is confined to fragments of habitat and is unable to move across the countryside as our climate and landscape rapidly changes. 40-70% of species could go extinct if action is not taken to enable species to move through the landscape.

***At its simplest level, an NEN is a national vision to create a rich network of natural habitats across Scotland and a commitment to deliver that. Promoting an overarching ambition for restoring and reconnecting nature and a spatial vision of where and what could be achieved, would give us all a common purpose and show where best to target collective action and investment. Applying strategic planning to our green and blue infrastructure, as we do with built infrastructure, would catalyse the necessary step change in level of action.***

We all have a role to play in tackling the biodiversity and climate crisis, whether in rural or urban Scotland, and whether working at the field, garden, farm, development, city or landscape scale. Promoting a network of opportunities will empower land managers, decision makers, organisations and businesses to take effective action. The scale of need and ambition is challenging, but a National Ecological Network would provide the framework required to help us all contribute.

This paper has been produced by the Landscape Scale Conservation Working Group of the Scottish Biodiversity Strategy to help inform development of Scotland's NEN.



## How would land managers be affected?

The NEN would help us plan and deliver green infrastructure, supporting the Scottish Government's Land Use Strategy. It would facilitate smarter, targeted land management payments and the conservation and enhancement of Scotland's habitats to be considered strategically alongside other land uses, including food production.

The NEN could drive a new culture of land management where delivery of public goods at a landscape scale could be targeted and incentivised. It would be a good way to target preventative spending, for example wetland creation to mitigate the impacts of flooding.

The NEN's strategic aims could provide a common language for advisors, land managers and other sectors. This could facilitate collaborative action between different sectors and land managers, helping to address strategic land management challenges, for example, deer management.

Prioritising a national network of habitat creation and management would place huge importance on the role of those in the farming, forestry and other land management sectors. The NEN would provide confidence and a long-term vision, helping them withstand changes to funding and governance.

## What would an NEN mean for funders and decision makers?

A NEN would be a clear expression of habitat creation and management as a national priority. It would provide a clear steer on how to prioritise funding and effort on habitat creation and management in an area. The result would be to align spend, giving a more consistent and efficient approach and creating confidence among decision makers and funders. This would help focus private funding, for example through CSR or conservation finance, as well as grants. It would also encourage development of synergistic approaches between different funds.

An NEN would help make best use of limited public funding and other resources, for example by encouraging the embedding of biodiversity delivery in all land management payments and targeting them where they can deliver the most public benefit. By expressing the highest habitat priorities in an area, a NEN would be a tool to help inform land-use decisions, underpinning the Land Use Strategy and new agri-environment payments.

## How could this affect our economy and society?

Healthy functioning habitats support many of Scotland's industries from whisky distilling, to soft fruit production to wildlife tourism, which support livelihoods in rural as well as urban areas. A national focus on strengthening this resource will help to sustain these industries in the long term.

Commitment to an NEN that prioritises habitat creation and restoration would give confidence that investments in natural capital will be secure over the long-term and recognise the role for both urban and rural Scotland in biodiversity delivery. It would encourage consideration of habitat networks in decision making and integration of biodiverse green infrastructure in developments.

Creating, managing and accessing nature is known to be a powerful tool to tackle problems of physical and mental health and well-being. Investing in green infrastructure through the NEN will be a way of component of regeneration, tackling environmental and social inequalities by providing opportunities for job creation, training and volunteering.

## What tools could we use to deliver Scotland's NEN?

Central to the concept of an NEN is the fact that its delivery would be achieved through a wide range of mechanisms operating from the national to local or even site scale. Delivery will require embedding in other plans, projects and activities, for example:

### Nationally:

- Existing funding schemes could be targeted with the NEN, such as focusing Peatland Action at those areas prioritised in the NEN for peatland restoration
- other funding schemes could be developed that support other forms of priority habitat creation and land management
- future agri-environment schemes could be designed to target delivery of the NEN, as a spatial expression of Scotland's highest biodiversity priorities
- In the built environment, planning policy and design guidance could support the delivery of NEN priorities by requiring integration of the most appropriate habitat elements in development

### Regionally:

- the NEN would highlight the best places to build habitat restoration measures into River Basin Management Plans and as Natural Flood Measures in Flood Risk Management Strategies and Flood Risk Management Plans
- In urban areas, spend under the City Region Deal and Regional Growth Deal process could be shaped to deliver regeneration and development that includes NEN habitat elements
- Green travel networks could be designed to incorporate planting that creates habitat connectivity within active travel networks, ensuring that transport funding delivers multiple benefits

### Locally:

- Local Authorities could design greenspace strategies that contribute to the NEN priorities for their area
- Considering the NEN when consenting development, would mean including appropriate habitat creation through the process of securing planning gain
- Sustainable Drainage Schemes could be designed to include priority habitat creation as one of the multiple benefits within urban areas and transport corridors
- A network of land management advisors could catalyse collaborative action by land managers and encourage applications to agri-environment grant schemes
- Conservation organisations, community groups and local businesses could use the NEN to plan land management projects and support grant applications to funders

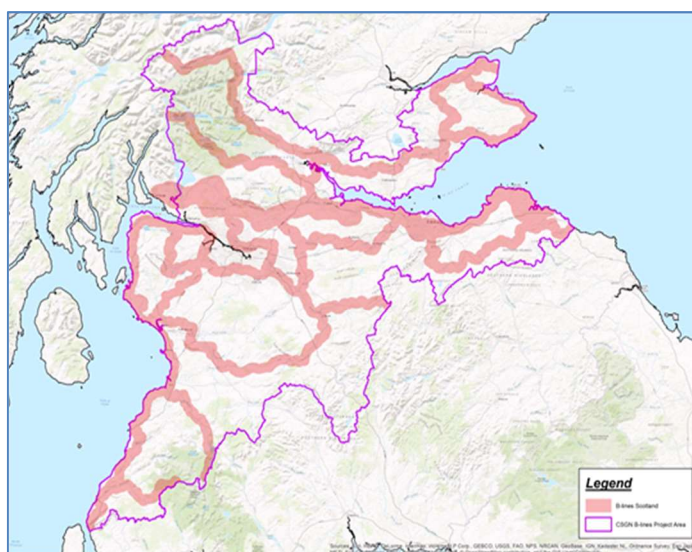
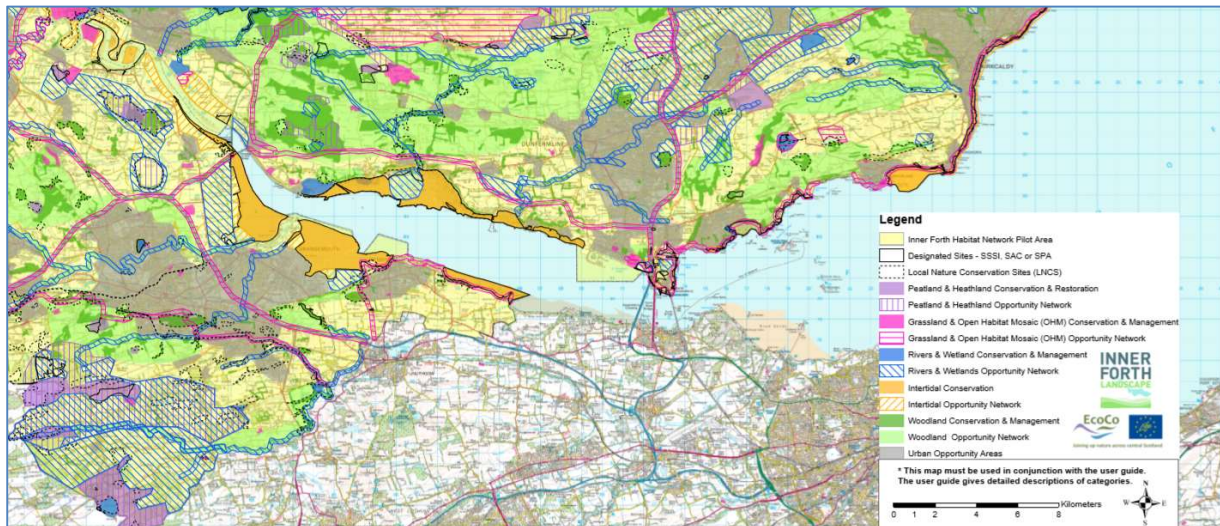
To be successful, the NEN will require cross-departmental buy in within government, an integration of land use decision making at a local authority level and facilitation between different parties at a landscape scale. Delivery will require us all to think about how we can deliver habitat creation and management as part of existing activity or spend.

## How do we decide what to do where?

The NEN is a way to express our vision for a Scotland that is richer in nature. It will describe the highest priorities in different areas but is not a prescriptive map of what must happen at a local level and will not always imply physically joining up habitat patches. It could be about creating stepping stones for nature, creating functional connectivity for species to move across the landscape and understanding the biodiversity priorities in an area and what the opportunities are to enhance them.

## Pilot Projects in Central Scotland

We anticipate that stakeholders working at a regional level would define priorities and potential contributions to an NEN at that scale through mapping a vision for their area. A pilot project to do this as part of the EcoCo Life project in the Inner Forth resulted in stakeholders creating broad habitat network maps showing the opportunities at this regional scale. Using available data and local knowledge, the partnership was able to express a mapped vision for habitat conservation, management, enhancement and creation in the area. The maps and further information on how the pilot worked can be found at [www.innerforthlandscape.co.uk/about/habitat-network-project](http://www.innerforthlandscape.co.uk/about/habitat-network-project).



Following the success of the John Muir Pollinator Way, the EcoCo Life project mapped B-Lines across the Central Scotland Green Network area, identifying where habitat creation and management for pollinators will have greatest benefit to landscape-scale pollinator conservation. Rather than filling the whole area with pollinator habitat, the aim is to create a series of stepping stones, occupying around 10% of the mapped area.

Priority B-Lines linking key and beneficial habitat across the CSGN area. Based upon LCM2007 © NERC (CEH) 2011.



## What the NEN would mean for Scotland's trees and woods

### Benefits for nature

Nearly a fifth (18.5%) of Scotland's land area is covered with woods and trees. These forests are biodiverse stocks of Scotland's natural capital and are home to iconic species. They are important to protect and look after. Internationally important habitats such as Caledonian pine forest and Atlantic woodland currently suffer from under-management and fragmentation.

Promoting appropriate woodland expansion would mean creating more of these biodiverse habitats, and reduced fragmentation of key habitat types. The vision provided by an NEN would guide that expansion, and ensure integration of forestry within a wider landscape, including non-forest habitats, waterways and other green infrastructure. This will help improve integrated thinking on land uses.

More than half of our native woodland sites are in unsatisfactory condition and the issues affecting them, for example invasive non-native species and inappropriate grazing, require coordination of effort across whole landscapes. An NEN would provide a framework to join up the efforts to tackle these issues collaboratively and focus funding and action to enhance nature in an integrated way.

### Benefits for people and our economy

Trees are increasingly seen as a successful part of farm diversification and should be part of sustainable food production systems. An NEN approach could better integrate new non-native plantations into existing land uses and landscapes in a way which maximises the ecological connections of these habitats, and minimises the friction sometimes experienced from existing land uses when new plantations are created. An NEN would bring more people closer to trees and woods in both rural and urban contexts by encouraging collaboration and providing a greater sense of community empowerment and connection to the landscape.

### Climate change and other environmental benefits

Trees are incredibly important in helping to mitigate and reduce the impacts of climate change. They provide many functions such as carbon storage and air purification, playing an important part in improving air quality in urban areas. Trees and woods can reduce the impacts and likelihood of flooding and reducing soil erosion, with benefits for both the terrestrial and water environment. They are part of a natural solution to flood management and can help to improve water quality. However, to maximise these impacts and benefits, woodland expansion would benefit from strategic planning as part of an ecological approach for the whole country. An NEN could contribute to that plan.

### What would this look like in practice?

The NEN would identify and prioritise opportunities for native and non-native woodland expansion. There are several examples where the collaboration of a variety of land managers working collectively to deliver habitat restoration at a landscape scale, is allowing forests to expand, and nature to thrive. The NEN would encourage more of these types of approaches by promoting the benefits of this landscape scale approach and of woodland creation in particular locations.

In urban areas, trees and woods should be part of urban planning and the NEN would help to highlight the green infrastructure needed in these areas. There is already cross-party support to increase tree canopy cover in towns and cities across Scotland by working in partnership with communities, public bodies, the private sector, and individuals, an NEN would focus effort and funding to make it happen.



## What the NEN would mean for Scotland's pollinators

### Benefits for Nature

Bees and other pollinators are essential to healthy ecosystems, their hard work fertilises flowers, creating the seeds and fruits that feed us and other animals and that sustain colour in the countryside. Pollination is therefore an important ecological process that supports healthy plant communities and, in turn, provides food, shelter and other resources for a multitude of species. It is vital in shaping the nature and landscapes that people recognise and enjoy. A NEN would mean that habitat for pollinators is available in the right place, ensuring that they, and the plants they pollinate, can thrive.

The Scottish Government's Pollinator Strategy for Scotland aims to address the causes of decline in populations, diversity and range of our pollinator species, and to help them thrive into the future. A key objective of this strategy is that there will be a strong network of good-quality pollinator habitats in place. The NEN is an opportunity to deliver on this objective.

### Climate change and other environmental benefits

Expanding the extent of, and providing functional connectivity between patches of pollinator friendly habitat will help pollinator populations in Scotland be more resilient and adaptable in the face of climate change. Pollinator habitats also deliver additional benefits in urban areas. Green roofs and street trees regulate heat and water flow, reducing energy use and flooding. A more diverse population of pollinators across the country will help our agriculture sector to adapt to climate change.

### Benefits for people and our economy

It is estimated that 84% of EU crops (valued at £12.6 billion per year) and 80% of wildflowers rely on insect pollination. In Scotland insects are responsible for the pollination of a variety of crops; the most significant is the soft fruit industry, with the raspberry crop in Scotland worth £52 million annually. The blackcurrant crop is valued at £8 million; however, the associated processing industry is worth an additional £200 million. In addition, a healthy population of native pollinating insects avoids the biosecurity risks of importing pollinators. If pollinators continue to decline, we will not have enough wild pollinators for all the crops our growing population requires. It is vital that we create habitats to support pollinators at scale and across Scotland.

Pollinator habitats are attractive and contribute to enhancing landscapes and cityscapes. Managing urban greenspace for pollinators can help reduce ongoing management costs and are also useful for engaging people with nature, creating opportunities for education, local volunteering and tackling environmental justice issue including physical and mental health inequalities.

### What would this look like in practice?

Flower-rich areas are an essential part of the NEN for pollinators. Projects such as the John Muir Pollinator Way are leading the way in demonstrating how pollinator habitat can be created in our towns, cities, and countryside. This project created a 'B-Lines' opportunity map across Scotland identifying where wildflower forage and nesting habitats for pollinators and other wildlife could be created, enhanced and managed on school grounds, golf courses, cemeteries and public parks.



## What the NEN would mean for Scotland's urban areas

### Benefits for Nature

Over recent decades, a compelling body of evidence has emerged that demonstrates the multiple benefits that can be gained from conserving, restoring and enhancing nature in our towns and cities. If we are to reverse global biodiversity declines and sustainably manage natural resources, we need the thoughtful integration of built and natural environment. The NEN would provide a strong spatial framework to achieve this, support decision makers and give nature and green infrastructure the same level of priority as other national infrastructure. A spatial approach would identify wildlife corridors and stepping stones in the right places to reduce habitat fragmentation and create a diversity of habitats for a range of species that depend on them. People that experience nature are more likely to act to save it, so it is crucial that we target effort at maintaining biodiversity in urban areas where most people live, to ensure there is continued public and political support for saving nature.

### Benefits for people and our economy

Studies have revealed the multiple benefits that can be gained from conserving, restoring and enhancing natural environments in urban areas. Preventative spend through nature prescriptions, green gyms and enhancing quality of life shows that for every £1 spent on nature there is a return of £5-12. Access to nature has been shown to reduce social and environmental inequalities but remains patchy and far from universal. An NEN would drive the thoughtful integration of built and natural environments, contributing to social and economic goals across Scotland. Creating better places, strengthening social and cultural bonds, reducing flood risk and providing cleaner air and water, which will ultimately drive inward investment. An NEN can support decision makers to ensure that biodiverse green infrastructure is delivered where it is needed most.

### Climate change and other environmental benefits

We cannot rely on hard infrastructure to engineer our way out of the climate emergency. We need to use nature-based solutions to strengthen our resilience and adaptability to climate related hazards and natural disaster. By supporting the creation of sustainable, natural habitats, the NEN will help identify nature-based solution to the challenges we face with a changing climate. These range from catchment level flood management upstream of settlements, to carbon “in setting”. These need to be planned at a large scale and consider multiple networks. An NEN would give us an increased ability to strategically plan and implement interventions where they are most needed. Considering these challenges at a national scale would lead to a paradigm shift in thinking on how we deliver Sustainable Development Goals for climate action.

### What would this look like in practice?

An NEN would provide a spatial framework for the restoration of ecological function in our towns and cities. It would provide the framework for making crucial decisions on investment in green infrastructure to deliver the biggest benefits. It will provide clear guidance for planners and developers on how they can deliver Scottish Government policies and allow a wide range of stakeholders to co-ordinate activities to achieve a shared goal. Examples of this approach are currently being delivered by the 7 Lochs Wetland Park and Cumbernauld Living Landscape. These approaches have a strong spatial framework for the restoration of ecological networks and have catalysed action from a wide range of partners. This has resulted in co-ordinated action that makes the most of activities that use nature to improve people's health and wellbeing and drive investment.



# What the NEN would mean for Scotland's farmed land

## Benefits for Nature

An NEN would provide a tool to plan biodiversity enhancements, at scale, across nearly 80% of Scotland's land, which is farmed. This would allow us to put in place strategic interventions across large areas and catchments, to reverse major declines in farmland wildlife outside protected areas. This would be of particular benefit to species that rely on traditional and less intensive farming.

Facilitating the creation of habitat at appropriate scales (field, farm and landscape) would create a greater diversity of habitats in the farmed landscape, ensuring that wildlife remains a feature of farmed landscapes across the country.

## Climate change and other environmental benefits

Adopting local or regional opportunity mapping approaches as part of an NEN would allow us to target and coordinate agri-environment spend and other sources of funding and effort in the most effective places to mitigate and adapt to the impacts of climate change. An NEN would help plan and structure interventions at scale, making a genuine difference to water quality, management and security. For example, locating peatland restoration and wetland creation upstream of water stressed areas.

An increase in habitat heterogeneity and extent of natural habitats in farmland would create greater potential for natural pest management helping agriculture become more resilient to climate change and reduce the need for pesticide use, saving significant amounts of money.

## Benefits for people and our economy

Delivery of an NEN could create an interesting, diverse, cleaner, greener agricultural landscape – helping to market Scottish produce around the world and building an attractive “brand Scotland”. A special sense of place could be created by helping bring back species and habitats to our agricultural systems that are missing or now very rare.


An NEN could help link urban and rural areas and breakdown this disconnect. It would encourage collaboration between land managers and create employment and business opportunities for rural communities, for example through the need for new advisory services and new opportunities for diversification. This could help rejuvenate the sector and attract new entrants and young people.

## What would this look like in practice?

Scotland's agricultural land managers are responsible for managing natural assets that they and the rest of society depend on. A NEN would focus funding and support on management of farmland that delivers multiple benefits and is focused on the highest priority habitats and species in that area.

We have good examples that demonstrate effective management of natural assets is possible given strategic targeting of resources and support, and the active engagement of land managers in identifying issues, blockages and solutions. The successful reversal of the massive national decline in the corncrake population was largely underpinned by mainstream agri-environment funding and an effective partnership between crofters, farmers, conservation bodies and the Government agriculture department. However, this was underpinned by spatial planning of habitat management and creation and sound scientific evidence.





## What the NEN would mean for Scotland's peatlands

### Benefits for Nature

Scotland has globally significant peatland habitats, and international responsibilities for their conservation. Around 13% of the world's blanket bog – one particular type of peatland habitat - is in Scotland, with peatlands in Sutherland and Caithness, and the Isle of Lewis, probably the largest remaining contiguous areas globally. An NEN would be a tool to help facilitate the reversal of the historic losses of this key habitat, for which Scotland has international responsibility.

An NEN with a clear spatial approach would highlight the places where restoration and conservation of this habitat is the highest priority, ensuring peatland is protected from other damaging land uses. In turn, this would support rare peatland species, many of which are relatively poor dispersers across other habitats because they need a functioning peatland network, which the NEN would help deliver.

### Climate change and other environmental benefits

Carbon sequestration in soils is an essential climate mitigation action. A recent [review](#) identified peatland conservation and restoration as the number one action for soil carbon sequestration and storage, making protection and restoration of this habitat in Scotland an action of global importance. An NEN would give peatland restoration the priority that should be accorded to this important action.

Peatlands store water as well as carbon and can act like a sponge, slowing the flow of water and providing water attenuation and flood risk management benefits further downstream. They are also an effective way to manage impacts of burning on peatland soils and improve water quality by filtering water before it is extracted for drinking. Strategic targeting of effort using an NEN would help us identify where best to act to deliver these multiple benefits, even if this is at some distance away from the beneficiaries, and potentially across administrative boundaries.

### Benefits for people and our economy

Functioning peatlands help reduce spend on water treatment by reducing colouration and sedimentation in water and help regulate water supply, which is vital for industries including whisky distilling, salmon fishing and agriculture. Their ability to attenuate water flow reduces spend on engineered solutions to flood management and the costs of flood damage. An NEN would help promote these benefits and focus the investment of agencies and private companies in these sustainable long-term management techniques.

### What would this look like in practice?

The Flow Country is a large area of about 200,000 ha in the far north of Scotland characterised by vast areas of peat bogs, fertile straths and a rich cultural heritage. It is the best blanket bog of its type in the world and is important not only for the habitats and the species that live there, but also as a vast carbon store. Flows to the Future is an ambitious partnership project which is restoring areas of blanket bog in the heart of the Flow Country that have been damaged by forestry planting. An NEN would give a national priority to this type of long-term ambition in this area and help focus effort and funding to deliver this agreed habitat restoration and land use.