



NHS Grampian

Biodiversity Strategy

2025 - 2030

Executive summary

The body of evidence that biodiversity is in serious decline - globally, nationally, and regionally - is indisputable, putting our health, wellbeing of communities, and economic stability all in jeopardy. It is imperative that we take accelerated action now to halt further nature loss to establish environmental, social, and economic resilience across NHS Grampian's estate.

This biodiversity strategy acts as a vehicle to deliver an organisation-wide vision for how nature should be viewed and valued in NHS Grampian utilised and managed areas. It also outlines the legal components and requirements of provisioning for biodiversity and an organisational level. Land management practices can have both positive and negative impacts on wider ecological networks. As thus, this document sets out our ambition to tip the balance in favour of environmental integrity and sustainability for years to come.

Our vision for NHS Grampian is, by 2030, to have established:

- A robust, scientific understanding of the biodiversity that our land and water assets hold, as well as how our green estate feeds into wider-reaching habitats and ecology.
- An extensive network of volunteers across our communities to carry out biodiversity restoration and conservation projects on the NHS Grampian estate.
- Estate-wide support for biodiversity enhancement and ensure it becomes integrated throughout NHS Grampian's planning processes, including development, building design, recreation, land management and clinical care. This will maximise holistic functionality of our sites.
- Strong, dynamic partnerships with regional Local Authorities and nature conservation organisations to foster greater awareness, enjoyment, and support for nature by all.
- The resources required to develop and carry out site-specific biodiversity actions that improve nature quality at a landscape scale.

Changes to habitat management and ground maintenance NHS Grampian will prioritise to enhance biodiversity:

While not site-specific, there are some land management practices and approaches NHS Grampian can adopt that will improve biodiversity overall, some of which will also result in reduced labour and supplies costs. These include:

- Increase extent of natural habitats.
- Tree canopy cover.
- Shrubs and scrub.
- Grasslands and wildflowers.
- Increase land area permitted to host leaf litter.
- Reduce mowing frequency for grassland habitat recovery.
- Reduce the application of herbicides.

NHS Grampian's approach to the integration of nature into the built environment:

- Prioritise nature-based solutions over traditional grey infrastructure in all new build development.
- Consider impacts to biodiversity in every aspect of planning, design, construction, procurement, and landscaping.
- Retrofit mitigation efforts to prevent further species loss within current developments.
- Introduce microhabitat solutions to increase desirable or threatened species populations found on the estate.



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Foreword

Biological diversity, or biodiversity, is the variety of all living things on Earth. It is the most valuable and sustaining resource to human survival on earth, providing us food security, potable water, life-saving medicines, oxygen, climate regulation, disease-causing pathogen mitigation, and so much more. The contributions from biodiverse ecosystems also make up our common heritage, cultural identity, economies and livelihoods, and individual purpose.

However, unsustainable land use practices, species exploitation, and human-caused climate change is stretching nature's ability close to breaking point, with the acceleration of species extinctions and wipe out of entire habitats posing grave impacts on people worldwide. Biodiversity is now declining faster than at any time in human history.

To date, nature has been largely seen as a liability when it comes to development, infrastructure functionality and healthcare due to associated maintenance costs without immediate benefits, competing land use demands, and ongoing budgetary constraints. As a result, Scotland, along with the rest of the UK, remains one of the world's most nature-depleted countries, ranking in the bottom 10% globally in biodiversity intactness.

But we are increasingly shown how biodiversity is not only a source of resilience to climate change, but can help meet public health improvement outcomes, while providing significant cost savings and efficiencies.

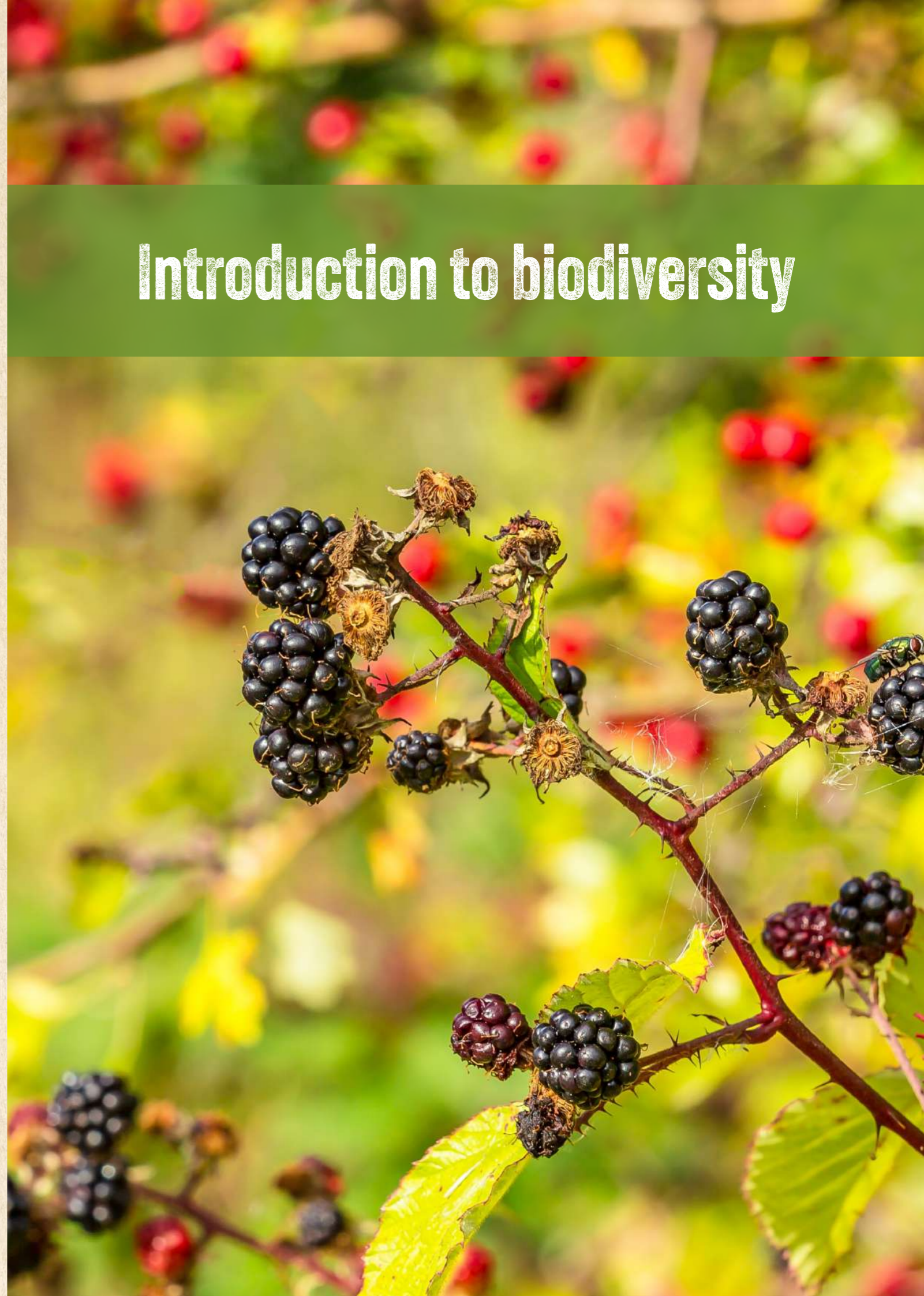
NHS Grampian's Biodiversity Strategy sets out a nature-positive approach to guide the conservation and enhancement of biodiversity across the estate. It sits alongside NHS Grampian's Climate Emergency and Sustainability Strategy and Plan for the Future, adding additional dimension to aid the organisation in delivering a future that is net positive for nature. It marks a crucial step forward in recognising the responsibility NHS Grampian has in halting biodiversity decline, both as a public body and an anchor organisation within the community. The principles embedded within this strategy provide an overarching vision that will guide actions in conservation biodiversity enhancement at local levels across the estate.

Aims of NHS Grampian's Biodiversity Strategy 2025 - 2030

The aims defined in this strategy are high level, designed to steer NHS Grampian's actions, procedures, decisions, and processes towards enhancing the outdoor environment, benefitting all communities of life in the region. The strategy ultimately is about guiding actions at the local level, while acknowledging that site-specific plans will be unique based on local flora, fauna, and environmental factors. Therefore, this document aims to:

- Detail a vision and a set of principles that provide a framework for biodiversity conservation on our estate.
- Identify key actions requiring further investigation to carry out net gain for biodiversity on our estate.
- Emphasise the need for partnership working in biodiversity enhancement, capitalising on the ecological knowledge, skills, expertise, and resources that exists within the wider community.
- Highlight education, community action, and participation as integral to the biodiversity enhancement process.
- Ensure a biodiversity-positive perspective is filtered into future capital project planning and development.

Introduction to biodiversity

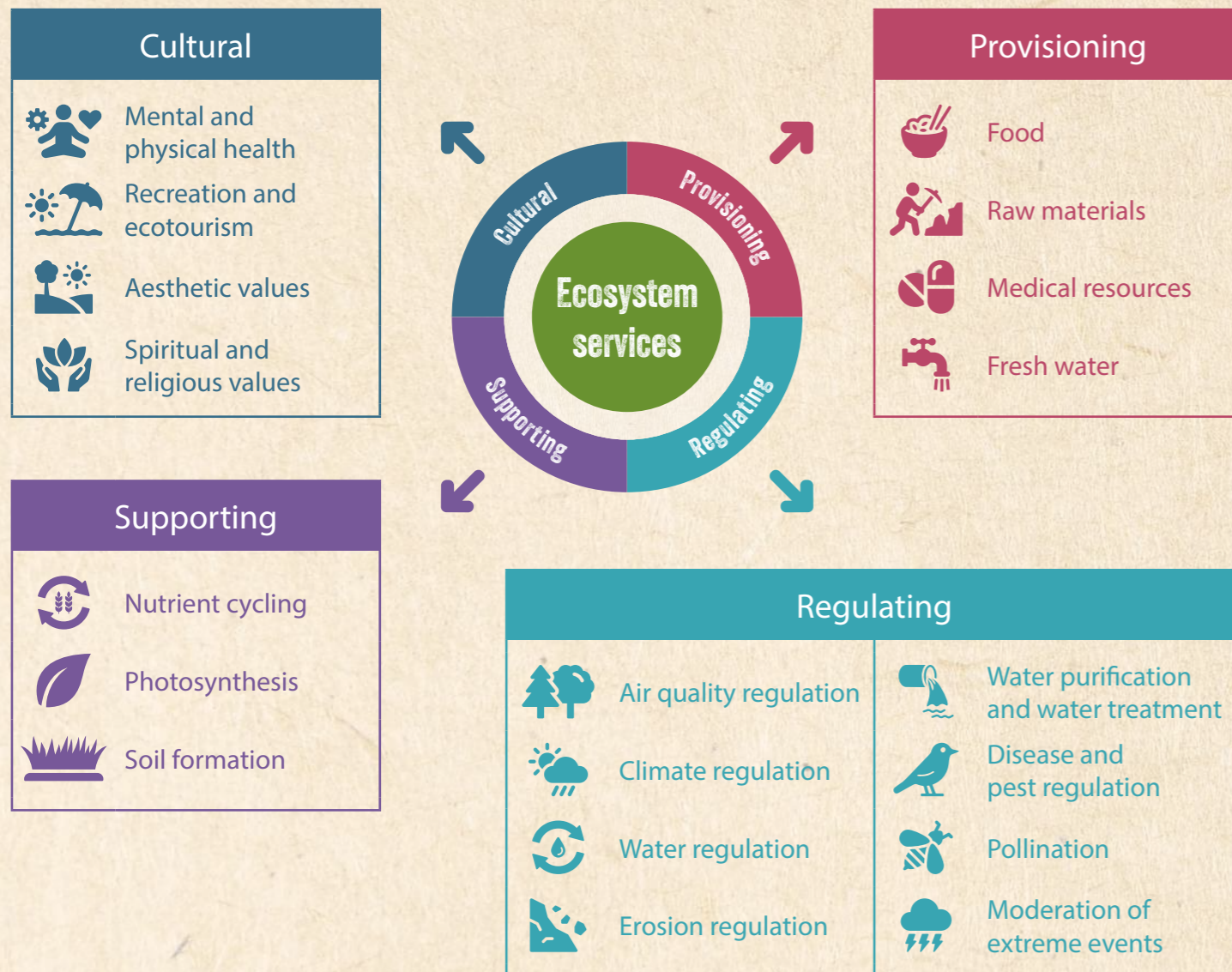


Biodiversity and ecosystem services

“Biodiversity: the variability among all living organisms from all sources and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.”

United Nations Convention on Biological Diversity, 2006.

Biological diversity of wildlife, plants and their communities is vital to maintaining healthy ecosystems. This variety of species, their interactions with each other, and how they interact with their environments benefit people in various ways, both directly and indirectly. These benefits provided by nature’s ecosystems are called ecosystem services and can be broadly broken down as follows:



Provisioning services:

These are the tangible benefits directly provided to humans from ecosystems. Examples include food, water, and raw materials.

Regulating services:

These help to maintain balance within ecosystems and regulation to environmental conditions. Services include treating and purifying wastewater, cleaning our air, and climate regulation.

Supporting services:

These services include nutrient cycling, soil formation, and habitat provision. While supporting services play a more indirect role to humans, they are vital components to health ecosystems.

Cultural services:

These are non-material benefits that contribute to human wellbeing. They encompass recreation, place-making, identity-building, aesthetic enjoyment, and spiritual fulfilment.

The relationship between biodiversity and human health

**“Where you have native species, you have biodiversity,
where you have biodiversity you have health.”**

Diana Beresford-Kroeger (botanist, biochemist, biologist and poet)

Research has repeatedly demonstrated that exposure to green space improves our mental wellbeing and reduces the need to treat mental health conditions, such as depression and anxiety. Short-term and long-term exposure to forests, urban parks, gardens and other semi-natural environments reduces stress and depressive symptoms, restores attention fatigue, increases self-reported positive emotions and improves self-esteem, mood, and perceived mental and physical health¹. Birdsong, plant species-richness, habitat diversity, and butterflies are all found to positively affect mood and lower levels of anxiety². Even when patients are not physically able to go outside, those with visual access to natural or biodiverse outdoor spaces require less pain medication, behave better and heal faster than those where outdoor viewing is absent³. Furthermore, increasing access to natural environments tends to enhance outdoor physical activity, thereby reducing prevalence of conditions associated with obesity, such as diabetes and heart disease. Spending time in nature, even for a short time, produces chemicals in the brain that are linked to reducing stress levels and helps to lower blood pressure⁴.

Trees, plants, and other vegetation also play a significant role in reducing the amount of airborne air pollutants in the air which we breathe. Particulate matter and nitrogen dioxide emitted from vehicle exhaust and fuel combustions can cause and/or exacerbate diseases, like asthma, lung cancer, chronic obstructive pulmonary disease (COPD), and heart disease⁵. Vegetation acts as a natural bioremediation tool, absorbing these harmful pollutants and purifying our air. Poor air quality is now cited as the most serious environmental risk to public health in the UK⁶ and so we need trees and plants more than ever to help prevent respiratory conditions from developing and subsequent health deterioration.



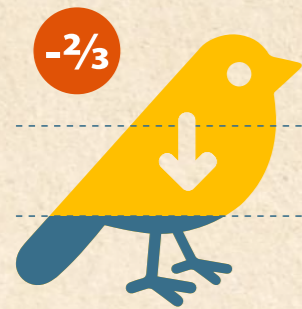
1. [Biodiversity and human health: mechanisms and evidence of the positive health effects of diversity in nature and green spaces.](#)
2. [Species richness is positively related to mental health – A study for Germany.](#)
3. [Touch, feel, heal: The use of hospital green spaces and landscape as sensory-therapeutic gardens: a case study in a university clinic.](#)
4. [A Review of the Benefits of Nature Experiences: More Than Meets the Eye.](#)
5. [Air pollution, air quality, vehicle emissions, and environmental regulations - ScienceDirect.](#)
6. [Health matters: air pollution - GOV.UK \(www.gov.uk\).](#)

Trends in biodiversity

The world is currently undergoing an unprecedented rate of decline in biodiversity, as well as the total number of species becoming critically endangered and extinct. Global populations of mammals, birds, amphibians, reptiles, and fish have collectively plummeted by an average of two-thirds in less than half a century⁷.

Over the last five decades, the human population has doubled, the global economy has expanded almost fourfold, and global trade has increased by a factor of ten. These trends have significantly heightened the demand for energy, materials, and resources. Since 1970, the global utilisation of natural resources has more than tripled, placing immense pressure on natural resources⁸.

Over the last five decades...



The **global populations of mammals, birds, amphibians, reptiles, and fish** have collectively plummeted by an average of two-thirds.



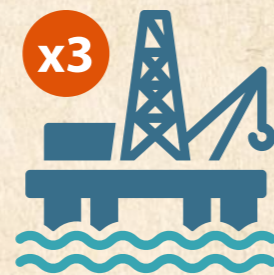
The **human population** has doubled.



The **global economy** has expanded almost fourfold.



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The **global utilisation of natural resources** has more than tripled.

According to the largest biodiversity investigation of its kind, a 2020 UN Convention on Biodiversity report has identified five key drivers of change in nature that are having the greatest global impacts⁹. In order of significance, these are:



1 Changes in land and sea use, leading to habitat destruction and degradation.



2 The direct exploitation of organisms, disrupting natural predator-prey dynamics.



3 Climate change, creating extreme conditions that are too hostile for many species to adapt to.



4 Pollution, including toxic air emissions, noise, light, and plastic waste.



5 Invasive alien species, which outcompete native flora and fauna for resources and introduce diseases to local populations.

The report estimates that approximately 1 million species are at risk of extinction, with this trend growing worse every year.

So far, the global response to these findings has been insufficient. Transformative changes in how we view and manage our land are needed to restore and protect nature, as we inch closer each day towards a point of ecological breakdown that has no return.

7. [69% average decline in wildlife populations since 1970, says new WWF report.](#)
8. [Friends of the Earth: Nature Resources of the Environment.](#)

9. [Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services \(zenodo.org\).](#)

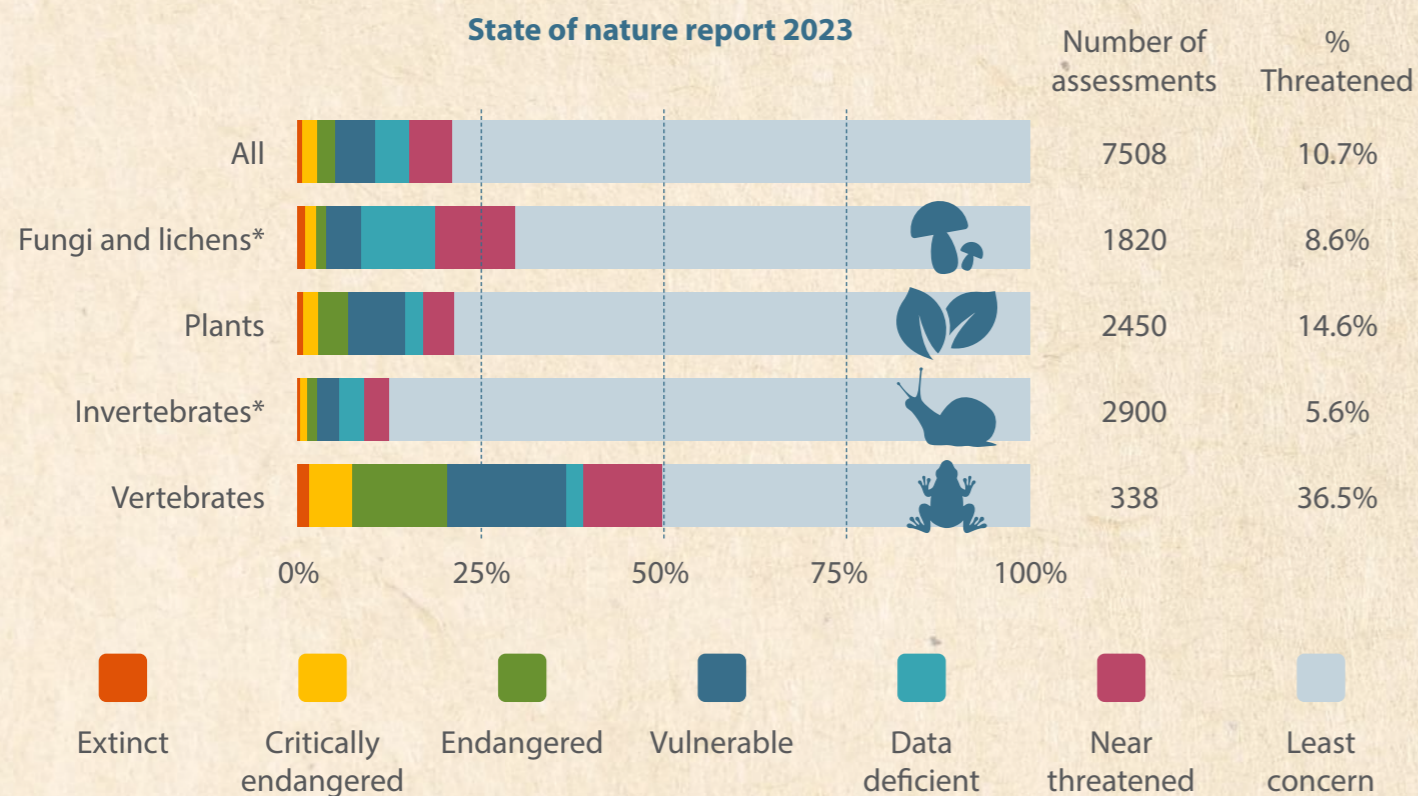
Biodiversity in Scotland

Scotland's biodiversity includes a rich variety of marine and land-based ecosystems, providing home to an estimated 90,000 plant, animal, and microbial species¹⁰. Some of these species are endemic to areas of Scotland, such as Scottish primrose, meaning they are found uniquely and naturally occurring in one part of the world, and that part only. The Northeast of Scotland is a national stronghold for a number of rare and important species, including toothed fungi (*Sarcodon* spp.), stump lichen (*Cladonia botrytis*), as well as rare pinewood specialist plants such as the delicate twinflower. Other species such as *Luzula arcuate* and Issler's clubmoss only exist on exposed, mountainous summit plateaus above 1,250 metres, therefore have very localised distributions.

But like other regions of the UK, Scotland is one of the world's most nature-depleted countries, having experienced historic declines in biodiversity in recent centuries. According to researchers, a figure of 90% is considered the "safe limit" to prevent an ecological collapse. Scotland's biodiversity rate today measures at just 56%.

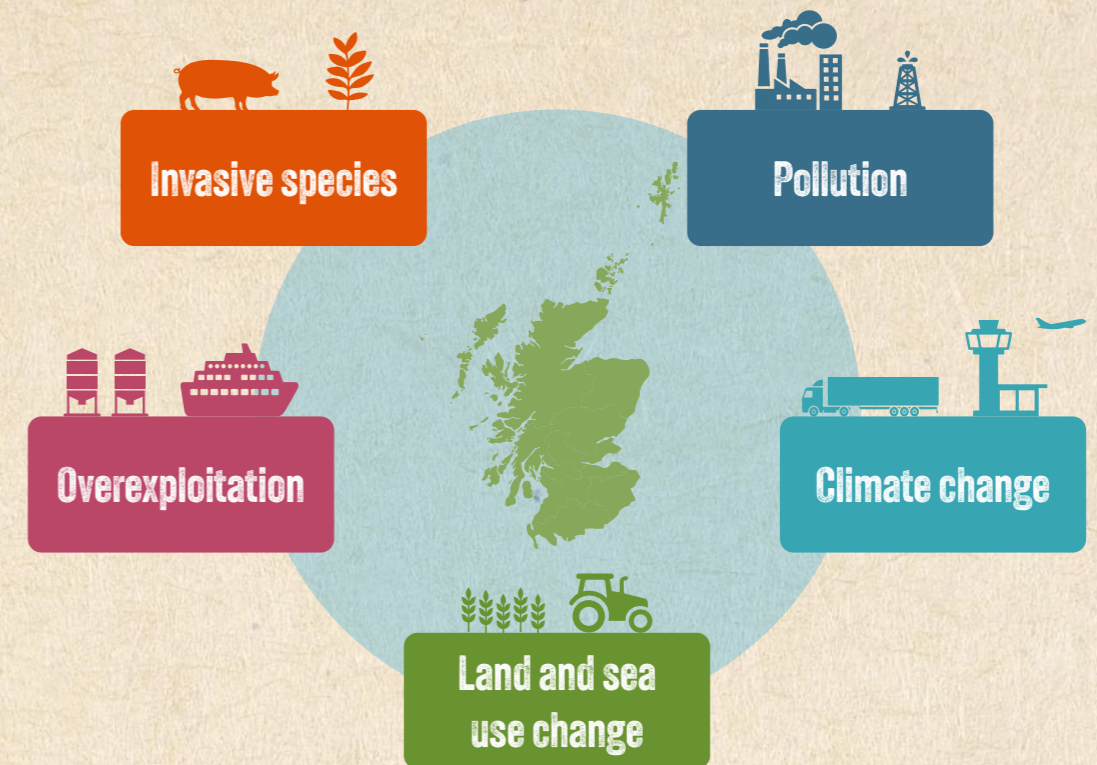
The State of Nature (2023) report for Scotland shows that the number of species and their geographic spread in Scotland has undergone a dramatic decline over the last fifty years. Of the different taxonomic groups, 347 (14.6%) plants, 140 (8.6%) fungi and lichens, 119 (36.5%) vertebrates and 158 (5.6%) invertebrates qualify as threatened.

Of 7,508 species in Scotland that have been assessed using the International Union for Conservation of Nature (IUCN) Red List criteria, 11% have been classified as threatened with extinction from Great Britain.



10. [What is Biodiversity? | NatureScot](#).

Drivers of biodiversity loss in Scotland and their impacts to the environment



Land use change

Habitat fragmentation and destruction

Over the last 100 years, humans have been reshaped ecosystems dramatically through deforestation and land use changes, particularly for agriculture in Scotland. Industrialised ploughing and crop rotation, increased fertiliser use and high livestock numbers have negatively impacted soil and water quality, carbon storage and resulted in increasing greenhouse gas emissions, directly fuelling the acceleration of climate change. Large-scale heavy grazing and browsing pressures have reduced the diversity, complexity and resilience of soils and plant life, leading to further reductions in invertebrates, birds and other animals. Today, over 70% of Scottish land is still being used for agriculture.

Urbanisation

Urbanisation and development, accounting for 2.3% of Scotland's land use continues to expand rapidly, with new infrastructure projects, such as roads or highways, contributing further to the destruction and fragmentation of natural habitats. Urban development breaks up continuous natural habitats into smaller, isolated patches, disrupting wildlife movement and reducing habitat availability. For example, pollinator species like bumblebees require a variety of flowering plants for nectar and pollen. Fragmentation reduces the diversity and abundance of these plants, limiting the food resources necessary to sustain healthy bee populations, causing species decline.



Climate change

There is strong evidence to support that climate change is affecting biodiversity in Scotland, with impacts expected to increase as the magnitude of climate change escalates. Climate experts warn that weather patterns across Scotland have changed substantially since 1960's, with the ten warmest years on record have all occurred since 1997¹¹. Over the last 30 years, average temperature in Scotland has risen by 0.5°C, Scottish winters have become 5% wetter and sea level around the Scottish coast has increased by up to 3cm each decade¹².

Many of Scotland's species are highly adapted to specific climatic conditions, meaning their vulnerability to climate change impacts is severe. For example, warmer weather is reducing snow cover found on mountains, causing important montane habitats such as upland willow scrub and moss-dominated sedge heath to decline. Faunal species like the snow bunting, ptarmigan, and mountain hare all change their colour to white in winter – an evolutionary adaptation to help them camouflage in the snow to evade predation. However, lack of snow cover means these animals become easy targets of prey against a bare backdrop.

Other impacts are indirect, but just as significant. Garden birds, such as blue tits may not hatch at the same time as their prey and flowers might not open up until after pollinators are active.

- Surges in rainstorm prevalence and severity will cause damage to salmon spawning grounds, while summer droughts are expected to reduce survival rates of young mammals, birds, and plants.
- Less predictable effects to wildlife include:
 - Relationship changes between pests/diseases and their hosts.
 - Relationship disruption between predators and prey.
 - Disturbance to the competitive balance between species for resource.

Economically, the disruption of these services carries significant financial implications. In Scotland, pollination services provided by insects like bees, butterflies, moths, beetles, and bats have an estimated value of £43 million per year¹³. The capacity of woodlands to store water and slow down run-off to downstream communities after heavy rain, is worth over £100 million a year¹⁴.

Functioning, robust ecosystems can aid in reducing the impacts brought by climate change. Climate change is a key driver of biodiversity loss and the destruction of ecosystems undermines nature's ability to regulate the environment against diseases, greenhouse gas emissions and extreme weather events.

11. [Scottish Government: A changing climate.](#)

12. [Scotland is not yet climate ready, CCC says.](#)

13. [Scotland Pollinator Strategy 2017 - 2027.](#)

14. [Study puts value on Scotland's trees that prevent flooding.](#)

Invasive non-native species (INNS)

Invasive non-native species (INNS) are a significant cause of species decline and extinctions in Scotland and worldwide. Most introduced species will have little impact on existing habitats, but a small proportion become invasive. These can harm native ecosystems by carrying disease, preying on native species without predators to regulate their populations, crowding out native vegetation and even damaging buildings and infrastructure. Islands are particularly vulnerable to the impacts of INNS.

Once INNS take hold, their control is expensive and eradication is not always possible. INNS cost Scotland an estimated £250 million annually, but this figure is expected to increase. Some of the species are expected to cause further damage in coming years as the warming Scottish climate becomes more hospitable to species such as Nuthatch, XYZ mosquito, and diseases such as ash die-back and phytophthora, all of which pose further threat to our environment, economy, and health.

Pollution

Human-sourced pollution is an important driver of biodiversity loss throughout all ecosystems, but has caused particularly devastating effects in freshwater and marine habitats across Scotland. Fertilisers and increased nutrient input to water ways can cause algal blooms, preventing enough oxygen and light from penetrating water bodies, suffocating the life within. Other pollutants, like broad-spectrum pesticides and herbicides cause soil microbial diversity loss, insect depletion, and toxic effects to freshwater species, each of which causes further ecological loss through bioaccumulation of these substances and direct loss of available prey available for species higher up the food chain. Pollutants from our built environments are often overlooked, but can have strong negative effects on nature, directly or indirectly. These contaminants are more often emitted from urban environments and include excess light, air, and noise pollution, with air and noise pollution negatively affecting human health and welfare too.



Resource extraction and exploitation

Resource extraction, including the harvesting of timber, and the mining of minerals and fossil fuels, has had profound effects on biodiversity. As industrial and urban expansion continues, resource consumption is increasing, leading to a wide range of impacts. These range from the complete removal of ecosystems through surface mining to the over-exploitation of commercial fish species. Additionally, the excessive extraction of fresh water for industrial and human use has significantly affected many river and wetland systems.

Aligning biodiversity policy, strategy, and action

The contributions that nature and landscapes make to health and quality of life has been steadily increasing in recognition by medical professionals and policy makers alike. The Ministerial Task Force on Health Inequalities (2008) recommended that Scottish Government, NHS Boards and other public sector organisations should take steps to encourage the use and enjoyment of green space by all, as a means of improving health. Other published documents, such as Scottish Government's Good Places, Better Health, a key strategy on health and the environment, recognises that the physical environment has a significant impact on the health of Scotland's people and that action is required to create positive physical environments that nurture better health and wellbeing for communities.

The provision of quality green spaces and betterment of biodiversity is not just suggested, but a legal requirement as well. The Nature Conservation (Scotland) Act 2004 places a statutory duty on all public bodies in Scotland to further conservation of biodiversity, while the Wildlife and Natural Environment (Scotland) Act 2011 outlines requirements for public bodies to report on their biodiversity compliance and duty.

The most recent and ambitious iteration yet of Scotland's National Planning Framework (NPF) yet, known as the NPF4 and published in 2023, emphasises the urgency in creating environments that promote biodiversity and human wellbeing and prosperity.

The document calls for public bodies to utilise valuable tools such as open space audits and core path plans to improve the strategic vision of how land owners manage their assets. These may be further complemented by securing grant funding through Nature Scot or other nature bodies to maximise opportunities for wildlife research, public engagement, and overall enhanced utilisation of the green spaces created.

A comprehensive list of the frameworks, legal requirements, and policy levers supporting biodiversity conservation can be found in Appendix A.

Developing a natural health service

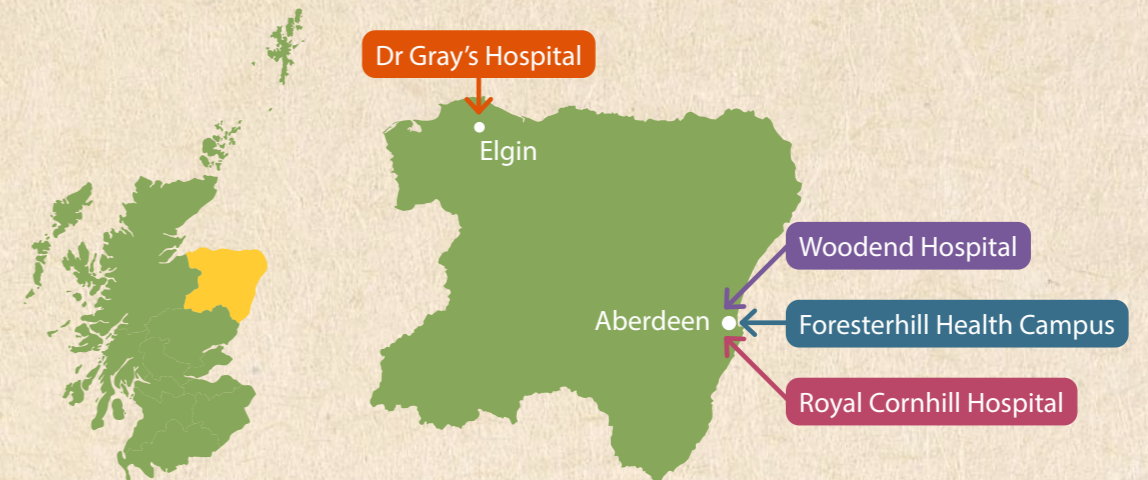
There is considerable scope to promote and develop the use of nature and landscape in healthcare policy, with national programmes such as the Green Exercise Partnership, the NHS Forest Initiative, and social/nature prescribing. At the heart of these initiatives is the priority to maximise green spaces within NHS Scotland estates for health treatment and rehabilitation. Successful activities and site-specific projects completed at other Scottish health boards include volunteer gardening groups, eco-therapy schemes, green gyms, tree planting, path building and development, and bio-blitzes, all of which resulted in increased physical activity, improved mental health, and stronger connections to nature with patients, visitors, and staff.

However, a stronger effort is needed in order to integrate this work into existing and future policy and practice within NHS Grampian. To date, much of the engagement between NHS Grampian communities and the outdoors have been set up by voluntary and community groups, with short-term funding and mixed levels of awareness and commitment from health professionals. By making a stronger effort to embed consideration for the natural environment in long-term planning and clinical health strategies, we can start maximising the green spaces assets we have for human and planetary health.

Biodiversity in NHS Grampian

An overview of the NHS Grampian estate

NHS Grampian is one of fourteen regional health boards of NHS Scotland, serving a population of approximately 565,000 across Aberdeen, Aberdeenshire, and Moray councils. We are responsible for providing health and social care services through a variety of healthcare treatment streams, including acute hospital sites, pharmacies, GP practices, community hospitals, and more. Of all the health boards in Scotland, Grampian has the highest concentration of community hospitals, each of which varies in type and capacity of services offered.



NHS Grampian has four major acute hospital sites across the estate:

- Foresterhill Health Campus, Aberdeen City.
- Woodend Hospital, Aberdeen City.
- Royal Cornhill Hospital, Aberdeen City.
- Dr Gray's Hospital, Elgin.

While the majority of NHS Grampian's green estate is managed for amenity value, subsequently resulting in limited wildlife, this lends significant opportunity to improve ecological conditions. Even areas which otherwise appear derelict, like open waste ground or brownfield sites can be rich in invertebrate diversity, providing footholds for nature in the urban environment, serving as corridor links for species passage across the landscape.

The NHS Grampian Biodiversity Strategy 2025-2030 outlines an organisational commitment to improving land management practices; one that acknowledges the inextricability between environmental health and human resilience. The actions outlined in this document aim to lay down a foundation for developing an outcome-focused biodiversity action plan. By recalibrating our lens to view nature as an asset in planning, place-making, and development, we can deliver nature-positive results to fulfil our duties to both the planet and Grampian communities.

Action for biodiversity: Focal outcome areas

The focal areas for biodiversity action within NHS Grampian are as follows:

- Further our understanding of the existing natural capital within NHS Grampian estate.
- Improve management and maintenance practices to enhance biodiversity.
- Develop site-based and habitat-specific biodiversity plans.
- Identify opportunities for nature-based solutions and green infrastructure in built environments.
- Offer opportunities for community engagement, education, and outreach.

Expanding our knowledge of NHS Grampian's natural environment

Arguably the most important objective is understanding what nature networks, species, and habitats exist within our estate. Gaining a baseline of what the current ecological conditions are is essential in developing a targeted action plan for each site. Key areas of information include:

- Learning what habitats and species can already be found on NHS Grampian's estate.
- Identifying the species and exact location of INNS.
- Understanding which ecological receptors which have the greatest impact to biodiversity enhancement.

Habitats and species found within existing NHS Grampian green spaces

Knowing the habitats and species already found within our outdoor estate means that future site-specific biodiversity action plans will be informed, targeted, and effective in conserving and enhancing biodiversity. Having a baseline against which changes can be measured is essential for monitoring the effectiveness of conservation actions over time, while also lending insight into which species require prioritisation based on their ecological requirements. For instance, if a critical species depends on a certain type of wetland, action plans for where that species was found can include actions to protect and restore that habitat type. Ultimately, expanding the knowledge of our existing biodiversity enables more precise and strategic actions, better resource allocation, and more successful conservation outcomes.



Rhododendron Ponticum



Petasites Albus

Identifying invasive non-native species (INNS)

The actions required to manage invasive species are complex, especially in highly altered and continually disturbed ecosystems. Techniques to manage invasive species tend to be resource intensive, while the distribution and scale of invasive populations are widespread. As such, effective eradication of alien species will require mapped surveys of the affected areas to determine the species, its extent, and the distribution across sites. Understanding the species and locations of where INNS are found within land managed by NHS Grampian, such as Rhododendron ponticum and Petasites albus provide a starting point for controlling them. Prioritisation of INNS eradication may be prioritised based on area's accessibility, removal benefit to local biodiversity, available expertise, labour resources and capacity, as well as the ability to monitor progress. Decisions to actively manage or control invasive species will require an ongoing commitment to a site and must consider a complex set of factors that include the option for adaptive management due to multiple factors at play.

Locating ecological receptors

Ecosystems have the highest integrity when their mixture of living and non-living parts, along with the interactions between them are not disturbed by human activity. Ecological receptors are habitats, species, or communities that can be affected by changes to the environment, such as constructing a new road or straightening a naturally evolved meandering river. With all four of NHS Grampian's acute hospital sites operating in areas of high human activity, vehicle traffic noise, poor air quality, and lack of connectivity are likely to be significant factors in the limited biodiversity found at these sites. Identifying the worst of these point sources will aid our navigation to mitigate them.

Broad changes to land management approach to enhance biodiversity

While not site-specific, there are some land management practices and approaches NHS Grampian can adopt that will improve biodiversity overall, some of which will also result in reduced labour and supplies costs. These include:

- Increase extent of natural habitats:
 - Tree canopy cover.
 - Shrubs and scrub.
 - Grasslands and wildflowers.
- Increase land area permitted to host leaf litter.
- Reduce mowing frequency for grassland habitat recovery.
- Reduce the application of herbicides.

Habitat management objectives

- Increase tree canopy cover.
- Shrubs, scrub, and hedgerows.
- Grasslands and wildflower meadows.



Increase tree canopy cover

About the habitat:

Trees and woodlands provide food and habitat to a wealth of wildlife. The microclimates created by trees along with their provision of seeds, berries, pollen, and cavities sustain countless species across bird, insect, mammal, fungal, and microbiota found in soils. Even after trees die, their cavities and bark create microhabitats, supporting at least 20% of all British fauna at some point in their lifecycle. Trees also aid in climate change mitigation and adaptation efforts, absorbing carbon, and providing shade to cool localised environments.

To enhance woodland habitat and tree cover for biodiversity, Grounds management will prioritise the following techniques:

- Clear invasive *Rhododendron ponticum* and non-native laurel stands within woodland and understorey.
- Encourage native undergrowth through shrub and herb layer establishment.
- Protect existing semi-mature, mature, and veteran tree stock.
- Plant saplings of native tree species in areas of cleared or disturbed ground.
- Where there are lines of single species of trees, additional tree planting using different species to diversify habitat as well as provide a contiguous green canopy corridor. Doing so will aid foraging opportunities and commuting routes for wildlife without increasing their risk of predation.
- Allow 60% of dead wood (standing or piled) to remain on site to create a range of microhabitats.
- Reduce human management of vegetation within 6 metres of treelines.
- Identify opportunities for the enhancement and creation of new tree planting areas.



Shrubs, scrub, and hedgerows

About the habitat:

Scrub is an immensely valuable habitat to wildlife and one which many species depend for their survival. It is a 'successional' or 'ephemeral' habitat, which acts as a transition between one habitat (e.g. open grassland) and another (e.g. woodland).

Many species thrive in areas where two different habitats meet such as woodland/grassland or grassland/water. These transitional zones benefit wildlife more when the change in habitat is gradual, such as, when short vegetation seamlessly morphs to taller vegetation, or when a shrub or scrub area bleeds into a taller or denser woodland. The gradation of habitat allows for the subtle changes in aspect, soil quality, vegetation structure and type, accommodating a greater diversity of species. Scrub can be anything from a few scattered hawthorn or hazel shrubs to a patch of nettles and bramble.

Scrub and hedgerows can also be useful in dampening the anthropogenic noise being inflicted to hospital sites. In appropriate and identified areas, increasing the density and/or height of native vegetation through planting, management, or native succession will reduce the amount of noise able to penetrate the habitat, while also increasing the foraging, nesting, and commuting resources for fauna.

The recommended principles for enhancing biodiversity in this habitat will be trialled by NHS Grampian's Grounds team and include:

- Rotate pruning management to provide a mix of young and mature scrub; this ensures more structural diversity and will appeal to a wider variety of species. Low intensity management at regular intervals will be embedded, as this is generally less disruptive to wildlife than carrying out major works every few years.
- Make sure scrub links up with surrounding habitats to provide connectivity corridors for wildlife to disperse through the landscape.
- Ensure management, is ecologically sensitive to minimise impact on wildlife. Tree or scrub management works should be completed outside of bird nesting season. Species records from each site will be used to influence the management routine conducted respectively to each site.
- Unless scrub is being cleared along a linear feature, such as a fence line, it is not recommended for scrub to be cut in a straight line. Scalloping the edge creates a larger surface area of edge habitat, helping to shield species, such as basking butterflies, from strong winds that may otherwise deter them from the area.
- Replace non-native scrub, shrubs, and hedgerows with native species to improve biodiversity gain.

Grasslands and wildflower meadows

About the habitat:

Much of NHS Grampian's greens spaces are dominated by amenity grassland that provides little value to local biodiversity. Only 1% of UK land now supports species-rich grassland and just 2% of grasslands are species-rich. It is estimated that 97% of wildflowers have been lost over the last 100 years due to the industrialisation of our agricultural systems as well as urbanisation. These human-led actions have contributed significantly to overall biodiversity loss in the Grampian region.

Species-rich grasslands are important components to our ecosystem, but they also provide us with valuable ecosystem services, including carbon storage, nutrient recycling, flood mitigation, and are habitats to pollinating insects.

Improvements to the quality and condition of this habitat, Grounds management will implement the following actions:

- Remove invasive and undesirable species.
- Reduce the mowing management regime to allow for a more varied sward height.
- Avoid the application of herbicide along path edges and signposts to keep vegetation back.
- Retain a closely mown edge to paths, new meadows and tall grass areas. Adopting this aesthetic demonstrates the site or area is still being maintained, but is being better managed for conservation.
- Ensure grass cuttings are removed from site to reduce soil fertility and create more favourable conditions for native wildflowers.
- Establish wildflower species through sowing of locally-sourced wildflower grassland mixes and planting native bulbs. Reseeding the heavily modified grassland will increase the species diversity, aiding the habitat's transition from one of low biodiversity value to a semi-natural habitat with significantly greater benefit to wildlife.

Once established, wildflower meadows and species rich grasslands have minimal maintenance requirements, helping us to minimise labour and associated costs.

Limit pesticide and herbicide application to grounds

Our current grounds maintenance includes the use of glyphosate – a broad-spectrum herbicide - as a means to control grass encroachment to roads and footpaths. NHS Grampian's Grounds staff are diligent in ensuring any application of glyphosate maintains a minimum distance of ten metres from any watercourse, as is in accordance with SEPA's Diffuse Pollution General Binding Rules.

However, applying herbicides to the environment risks harmful chemicals leaching into the soil, harming beneficial soil microbial communities and native plant species as much as its intended target. Furthermore, heavy rains can cause these chemicals to diffuse into unintended areas that are several metres or even kilometres away from the initial spray site. Application of glyphosate can lead to the destruction of the vegetation that serves as a habitat and food sources for wildlife, including key pollinators like bees, butterflies, and moths.

NHS Grampian will explore alternative methods to vegetation which may otherwise pose risks to public safety along paths and roads, and aim to limit glyphosate to the treatment of INNS where no other treatment is possible.

Increase tolerance for natural leaf litter on green spaces

Each autumn, deciduous trees such as oak, birch, and willow shed their leaves, creating a blanket of leaf litter on the ground. Fallen leaves are critical to the ecosystem, supporting a whole range of species who depend on these leaf litter cycles for foraging, habitat, and hibernation. Hedgehogs use leaf litter to build their nests that they go on to spend the winter in hibernation. Other species, like many of our butterfly species use leaf litter year-round, overwintering in their egg, caterpillar, pupal or adult form depending on the species.

NHS Grampian management practices currently see most of these fallen leaves blown and then removed from our sites. Not only is this activity noisy and fuel-intensive, but it reduces available habitat for wildlife.

To increase leaf litter on sites, NHS Grampian will do the following:

- Engage with colleagues to map where the drains are within our sites, to determine whether leaf litter is likely to accumulate around key infrastructure.
- Ensure that leaves are removed before the first frost, reducing impact to wildlife that has already taken refuge.
- Engage with colleagues in infection control to ensure sufficient risk mitigation.
- Relocate leaves to bases of trees and shrubs, as this natural mulch adds nutrients and suppresses weeds in spring.
- Procure signage that we put into the ground to make the public aware that leaving the leaves is an intentional act to improve biodiversity, not neglect of our site.





The built environment

The built environment presents both a challenge and an opportunity for biodiversity. Generally, development means altering the natural landscape and associated ecology in one way or another. In areas that have undergone extensive development, biodiversity has been significantly influenced by impacts from large scale construction, including the deviation of naturally evolved water courses, removing vegetation, altered soil chemistry, non-native garden species being planted ornamentally, and how people behave or interact with their environment.

By taking greater consideration of our outdoor and natural assets, we can:

- Improve design and management of accessible high quality green spaces, close to where people live, work and learn.
- Encourage greater physical activity and contact with nature through informal recreation and play, environmental volunteering and outdoor learning.
- Use the outdoors in programmes for health treatment and rehabilitation, on NHS land and elsewhere.

Nature-based solutions

Modern, responsible and compliant development now requires deployment of nature-based solutions where possible to ensure maximum benefit for people, wildlife, and planetary welfare. Nature-based solutions (NBS) are interventions that use the natural functions of healthy ecosystems to support biodiversity and climate change resilience as well as providing numerous economic and social benefits. Examples of NBS include green infrastructure elements such living roofs and walls, sustainable drainage systems (SuDS) that mimic natural processes of rainwater attenuation, and integrated habitat in building design such as swift bricks and bee hotels.

Compared to industrial-based solutions to climate challenges, nature-based solutions are often more cost-effective, longer lasting, and have multiple synergistic benefits including:

- Reducing net emissions.
- Expanding carbon sinks.
- Providing habitats for biodiversity.
- Benefiting human health and wellbeing.
- Helping our society and economy adapt to climate change.
- Making more resilient and nicer places to live and work.

NBS can aid plans and designs in ensuring a biodiversity net gain is achieved upon development completion. Under policy 3(b) of the NPF4, environmental impact assessments for development will need to achieve significant biodiversity enhancements. The NPF4 places climate and nature at the centre of the planning system and includes a multi-sector approach to improve biodiversity. Significant weight is given to the global and nature crises to ensure they are prioritised and addressed in all plans and decisions going forward. Policies embedded within the framework emphasise the importance of conserving existing biodiversity and natural heritage, while using NBS to aid in reversing biodiversity loss in development and instead deliver net gain for biodiversity.

Infrastructure management decisions therefore must incorporate more robust consideration for the ecological impacts and solutions to ensuring a biodiversity net gain upon project completion. Recognising the integration need of social and ecological systems will help to frame effective design approaches going forward, for new development projects and adaptation measures.

Planning and design

Architectural design in development projects has potential to play a crucial role in biodiversity conservation within NHS Grampian if we making it a consideration throughout every process of development.

It's often too little too late to introduce changes for biodiversity net gain once construction is underway, so addressing ecological impacts from the beginning of the planning stage is essential. Planning therefore has an important role in helping to address our damage to nature. This requires a new approach, one that halts and reverses biodiversity loss and better connects habitats and biodiversity rich areas. Simply minimising damage and replacing lost habitats and species has been routinely proven insufficient to address the decline in Scotland's biodiversity.

Collaborative planning with ecologists and all stakeholders involved in the project is critical for mapping habitats and identifying the correct environmental measures that can be implemented to enhance biodiversity in new developments. This helps to ensure no detriment is posed to water courses and quality, locally-important species are uncompromised, and ultimately that all precautions have been taken to ensure local ecology will not be negatively affected, but rather improved.

Key considerations for architects and designers in the planning stage with regard to biodiversity enhancement:

- Bioregion and landscape character.
- Climate, microclimate, and aspect.
- Sensitivity to water courses and drainage.
- Understanding of the role the site plays in the larger ecological network.
- Habitats and species identified. Species can be very specific in their requirements for food, shelter, and breeding places.

Construction

Impacts that can occur from development works may be either short-term or long-term, and can affect areas beyond the NHS Grampian site where works is occurring. While there is a heightened awareness of protected species when it comes to permission and progress of development, factors such as noise and light disturbance during the construction process may disrupt wider species' natural behaviour patterns that can ultimately lead to population decline later. For example, works are likely to cause disturbance to hedgehogs during their typical period of hibernation between November to March should not take place if habitats such as log piles and dense scrub are required to be removed.

Procurement

Product supply chains unequivocally play their part in biodiversity loss. The methods required to extract and supply the major materials needed for construction, such as timber, sand and gravel disturb or destroy habitats through the removal processes with secondary impacts including noise, air and water pollution. But NHS Grampian's procurement processes have substantial scope in mitigating biodiversity loss by re-evaluating the metrics and standards by which suppliers are contracted to perform services. This may include decisions regarding protection measures needed when undertaking infrastructure or construction projects as well as the sourcing of wood products and sourcing of plants and planting media. Considering biodiversity within the procurement approach would not mean an increase in administrative burden, nor would it narrow competition. Instead, it would set precedent to encourage the procurement of materials to come from sources more locally, and therefore greater transparency of material origins. NHS Grampian can also address its dependency on natural resources by investing in environmentally-friendly technologies and practices. Closed-loop recycling and regenerative approaches can vastly reduce the need to extract natural resources and cut end-of-life waste, thereby decreasing their impact on biodiversity. Purchasing recycled materials, such as wood, reduces impacts on deforestation and loss of biodiversity by reducing the volume of new timber required for development. Additionally, post-consumer recycled fibres reduce the amount of water and energy required during production processes. These actions have also been proven to yield significant financial returns.

Landscaping

Landscaping for new projects should always seek to include native plant species of a local provenance first. This is because using native plants from the same regions helps maintain the genetic diversity of local flora and that the plants are already well-adapted to the local environment, providing essential resources for wildlife. Local plants have evolved to withstand climate, soil, and browsing conditions by wildlife. Thus by using seeds or plants sourced from Northeast Scotland, we can ensure higher rates of successful establishment because the selected species are naturally more resilient to our local climatic conditions or environmental pressures. This also yields to better cost effectiveness and reduced maintenance required.

Plants, shrubs and trees provide food, shelter and homes for many species. New planting at all scales should be designed and managed to enhance biodiversity where possible. This includes structural diversity and species variety, with both elements selected to suit the soil, topography and drainage properties found across the site. To ensure plants remain healthy, pathogen and pest-free, soils should be locally sourced and devoid of peat. Landscape maintenance to these areas must be considered from the outset, with the use of herbicides strongly discouraged from entering the regime as the primary means of managing overgrowth. Buffer strip separating different uses and activities on the site will be created to protect otherwise sensitive areas.

Softscaping of built environments is also recommended where possible. "Softscaping" is a landscape design concept that involves using living plants and organic elements to soften and blend a built environment with its natural surroundings. Incorporating soft edges with a diverse array of native plants helps to seamlessly integrate built and natural environments. These planted edges create additional habitat types, providing more opportunities for animals to find shelter, rest, and feed.



Mitigation of species loss in the built environment

Light pollution and mitigation solutions

Artificial light at night (ALAN) has increased globally by almost 50% in the last 30 years, leading to negative outcomes for nocturnal species, such as bats and moths, while also wasting energy. Bats account for nearly a third of all mammal species in the UK, but have suffered an estimated 70% decline in population in the last century. Artificial lighting at roosts, feeding sites and travel routes excludes bats from suitable habitat. High-intensity, elevated and upward-facing white lights have the strongest effect, and thus should be avoided at all costs. Light sensitivity varies between species, but in general, bats tend to have a higher tolerance for red visual light than white light.

New development projects can reduce negative impacts of lighting on bats by utilising guidance and advice from suitably experienced ecological consultants from the very start of a project. More technical information on best practice and guideline on this subject can be accessed from the Bat Conservation Trust.

Nesting and roosting accommodation

There is a range of cavity-nesting creatures that would benefit from integral nesting or roosting sites including several species of birds, bats and insects. Using a 'one size fits all' policy for nest boxes can accommodate all of the smaller cavity nesting species, simplifying design considerations for ecologists, planners and builders. Nesting boxes have been documented in housing house sparrows, starlings, tree sparrows, blue tits, great tits, and occasionally house martins, amongst other species.

While integrated into building design is best practice, nesting boxes can also be fitted retroactively. It is important to note that there is no conflict between provision of cavities and energy efficiency, as integrated and internal nest and roost sites exist outside the thermal envelope of the building.

Construction materials (bird-safe glass)

Building code amendments can reduce bird collisions with buildings by requiring bird-safe glass. Bird-friendly glass is a type of glass that has a pattern or design on the outermost surface to make it visible to birds and prevent them from colliding with it. This helps protect avian populations in urban environments.

Additional measures to encourage biodiversity

Comparatively small, low-cost features can often achieve important benefits for wildlife, whether making adaptations to existing infrastructure or integrating in new development projects. Creating a mosaic of habitats, such as grasses, wildflowers, and bare ground creates different microclimates for species to rest and shelter. Using simple, low-cost features such as sand banks and log piles can improve diversity to an otherwise dead spot for wildlife.

Hibernacula

Hibernacula are wildlife shelters consisting of wood, stones, leaf litter, or other natural material. They can be used by animals, plants, and fungi during the winter months for refuge, nesting, habitat, and hibernation. Stacked or piled wood, even if it is in decay can support insects, toads, lizards, hedgehogs, and other species.

Insect hotels

An insect or bug hotel is a manmade structure created to provide shelter for solitary bee species, ladybirds, and other pollinators. They can come in a variety of shapes and sizes depending on the specific purpose or specific insect it is catered to. Most consist of several different sections that provide insects with nesting facilities – particularly during winter, offering shelter for hibernation.

Adding insect hotels into an existing habitat can provide valuable shelter for beneficial insects. Impacts can be seen in the form of better soil quality, increased pollination, elevated ecosystem diversity, and reductions in the populations of detrimental insects and pests.



Bird boxes

North East Scotland is an important region for breeding birds, supporting more than 20% of the entire UK population of crested tits, Scottish crossbill, tree sparrow, snow bunting and corn bunting. Installing bird boxes provides additional nesting opportunities to support rare or threatened bird species, especially in urban and suburban areas where natural nesting sites may be limited or scarce due to habitat loss and fragmentation. Wildlife cameras can be installed within these too, garnering community involvement and interest. Installed on north-facing facades or roofs to avoid overheating.

Squirrel boxes

A number of NHS Grampian sites are situated in woodlands, with sightings of red squirrels reported. Scotland supports an estimated 75% of the UK red squirrel population, and despite being one of the most popular mammals of Scotland, they are now one of our most threatened species. Installing squirrel feeders in woodland will increase foraging resources and opportunity, with careful sizing of entry holes will mean invasive grey squirrels can't get in.

Wildlife bridges

Wildlife bridges effectively enable small animals such as squirrels, dormice, and martens, to safely cross busy roadways. These bridges can be low in cost and specifically built to allow wildlife to cross over or under human-made barriers like highways, railways, and even fences. They serve as vital connections, preventing species from becoming isolated and reducing the number of traffic accidents involving animals.

Bat boxes

The deforestation and loss of tree habitat that subsequently occurred over the last century has meant nesting sites for birds and bats has reduced. Putting up nest boxes provides bats with nest sites that offer refuge for cavity-dwelling found in this region, namely Common pipistrelle, Soprano pipistrelle, and Nathusius' pipistrelle. The most frequently used bat boxes are small, with narrow apertures to enter them and are only suitable for crevice-dwelling bat species. Bats use dark tree lines or hedgerows for navigation, so putting boxes near these features will encourage bats to take up residence.

Education, engagement, and outreach

Today the accessibility, diversity and quality of much of Scotland's natural environment is recognised as an important resource for promoting physical and mental health, improving educational outcomes, and supporting community development and regeneration. Increased provision of, and participation in, outdoor or 'green health' activities has the potential to reduce the need for traditional healthcare.

It is therefore imperative we promote and facilitate active engagement between our communities and natural spaces. The general public tends to show affinity for aesthetic animals such as butterflies, hedgehogs and garden birds, whereas many invertebrates are perceived as pests, even when they are not harmful. The crux of these preferences is that we simply cannot have one without the other. Efforts to address the biodiversity crisis have been made more difficult by peoples' lack of knowledge of nature and of the benefits it provides. A 2017 RSPB Birdwatch survey, assessing nature knowledge in parents, found that of 2,000 adults, half were unable to identify a house sparrow, a quarter could not differentiate between a blue tit or a starling, and a fifth were unaware that a red kite was a bird. Access to outdoor spaces has been steadily diminishing for children, with today's generation of children spending more time indoors than any of who came before them. This is partly due to having a limitless assortment of video games, television series, and streaming options at their fingertips, but also discouragement from playing outside by parents in goodwill attempts to keep their children safe. This is often the result of parents themselves having had little childhood experience with biodiversity, who have come to view interaction with nature as dangerous to them and their children's health.

This disconnection from nature is proving to have important consequences for children's cognitive development, directly impacting on independence, social relationships, creativity, and understanding their place in the world. These impacts go on to affect wellbeing into adulthood, too, highlighting the importance of exposure to natural spaces in childhood. Studies show that adults with less exposure to natural spaces during childhood have lower scores on mental health tests than those with higher nature engagement. Additionally, children and young adults who play outdoors are more likely to have positive views of nature, and take action to protect it in adulthood.

Despite the correlation between nature engagement and youth, attitudes of those less sympathetic to nature often become more positive through increased interaction with wild animals and plants. Biodiversity and conservation initiatives within NHS Grampian must therefore place greater emphasis on providing the communities we serve with opportunities for nature engagement. As a public body and anchor organisation in the Northeast region, our approach to increasing wildlife appreciation and education across communities must be dynamic, inclusive, and collaborative between stakeholders and sectors.

Developing partnerships

Having a partnership approach means that workloads can be shared and a wide range of skills and resources utilised. We are fortunate to be surrounded by a wealth of expertise in biodiversity, including regional higher education institutions, conservation charities such as RSPB Scotland, Scottish Wildlife Trust, and Plantlife, Local Authority ranger services, and outdoor volunteer groups. Collaboration with biodiversity experts such as such Nature Scot, and regional ecological networks North East Scotland Biodiversity Records and North East Scotland Biodiversity Partnership will be vital partners in carrying out engagement activities.

Involving the right stakeholders will enable projects to be carried out faster, gain wider influence, and contribute more effectively towards nature restoration at the landscape scale.

NHS Grampian grounds staff

Support from the Grounds team of NHS Grampian will be instrumental in seeing through many of these changes and activities to land management. Our Grounds staff are perhaps more familiar with our green spaces than anyone and essential in maintaining site accessibility and safety. Upskilling Grounds staff with training in conservation techniques can improve land management outcomes while also eliminating the need to outsource jobs to costly external consultants.

Citizen science groups and volunteers

Citizen science activities for biodiversity often involve members of the public or keen volunteers in identifying, collecting, and monitoring flora and fauna species on a particular site and using this data to improve ecological knowledge of the local area.

The knowledge gained in these types of activities often leads to individual behaviour changes outside of their volunteering role, such as decreasing mowing frequency in their gardens at home. They may also benefit from experiencing the social aspects of working towards a shared goal and gaining a stronger pride of place.

Activities and volunteering initiatives

Activities carried out by our local partners might include path building, weeding, tree planting, community-led gardening and allotments, species identification and habitat creation workshops, each giving participants hands-on experience and skills in conservation while contributing to better site quality for people and wildlife. These types of nature engagement also tend to lead to greater physical activity, urban resilience, social integration, and instil a sense of responsibility to protect and restore urban green spaces.

Other opportunities to increase awareness and engagement with nature

Time spent in nature is often experienced the lowest amongst the most disadvantaged in society. More effort is needed to ensure everyone can enjoy the outdoors, regardless of background, health, or age. Therefore, improved access to our green spaces can be achieved by removing derelict and impractical fencing, better signage, interpretation, and way marking, and quality of paths. These efforts will encourage responsible and greater use of NHS Grampian outdoor estate by staff, patients, and local communities.

Appendices

Appendix A

External frameworks, legislation, and policy levers supporting biodiversity action and enhancement in NHS Grampian:

Designation	Name	Scope
International	The UN Sustainable Development Goals (SDGs).	Provides a template comprised of 17 goals to guide decision-making processes across all societal levels that improve equitability for people and planet. NHS Grampian therefore has a responsibility to aid the progress of two key SDGs in relation to biodiversity: SDG 3: Ensure equitable access to quality healthcare services, including those which promote the prevention and treatment to mental and physical wellbeing for all. SDG 15: We must take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.
International	Kunming-Montreal Global Biodiversity Framework.	Composed of four goals and 23 targets to achieve 30% of earth's lands, oceans, coastal areas, and waters by 2030.
International	Edinburgh Declaration and Process.	Seeks to amplify the voices of the subnational constituency in the development of the post-2020 Global Biodiversity Framework and ensure inclusion of all levels of government in the planning, reporting and implementation phases.
European	The Habitats Directive and Regulations.	Provides a legal framework for European species that require strict protection and protects sites that are internationally important for threatened species and habitats.
National Legislation	The Nature Conservation (Scotland) Act 2004.	Makes provision for the conservation of biodiversity and places a statutory duty on all public bodies in Scotland to further the conservation of biodiversity.
National Legislation	The Wildlife and Natural Environment (Scotland) Act 2011.	Sets out the way in which land and environment is managed and outlines the requirement for all public bodies in Scotland to report on their compliance with biodiversity duty.
National Legislation	The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended).	Implements the Habitats Directive in Scotland to provide protection to European protected species, habitats and sites.

Designation	Name	Scope
National Legislation	Wildlife and Countryside Act 1981.	Restricts the release of non-native species into the wild, prohibits actions that may cause harm or disturbance to natural ecosystems and the species within them.
National Strategy	The Scottish Biodiversity Strategy to 2045.	Outlines the commitment to protect a minimum of 30% of our land and sea for nature by 2030. An additional target set out in the 2021 and 2022 Programme for Government committed to the establishment of nature networks. These two targets are commonly referred to as the 30x30 Nature Network. In total, there are 26 actions identified for achieving this goal.
National Strategy	The Pollinator Strategy for Scotland (2017-2027).	Creation of pollinator friendly practices in the NHS estate by halting and reversing the decline in native pollinator populations. Seeks to raise awareness and encourage action across sectors.
National Framework	National Planning Framework 4.	Serves as a long-term guide for national development and planning policy, outlining spatial priorities until 2045. Places the twin crises of climate change and nature loss as key issues to address, with particular emphasis on promoting nature-based solutions to climate change and health improvement.

NHSScotland and NHS Grampian designations

Designation	Name	Scope
NHSS National Policy	DL (2021) 38, A policy for NHSScotland on the Climate Emergency and Sustainable Development.	Requires NHSScotland bodies to establish a culture of stewardship towards nature resource protection, while increasing contributions towards biodiversity restoration.
NHSS National Strategy	The NHSScotland Climate Emergency and Sustainability Strategy.	Sets out the actions NHSScotland health boards to published setting out the actions required to help achieve the NHS's climate and sustainability targets.
NHS National Guidance	Sustainable Design and Construction.	Provides reporting standards, examples of good practice in case studies, and references to leading industry frameworks, methodologies and sustainability targets.
NHSS Report	Grassland Management Strategy and Guidance.	Outlines delivery steps to guide NHS Scotland health boards in implementing improved biodiversity and quality green space enhancement management practices.
NHS Grampian Plan	NHSG Plan for the Future.	Provides an overview approach to reaching sustainability in healthcare over the next ten years.
NHS Grampian Strategy	NHS Grampian's Climate Emergency and Sustainability Strategy 2023 – 2028.	Outlines NHSG's goals and strategic direction for the next five years, focusing on the interdependence between planetary and human health. Key issues addressed are climate change mitigation and adaptation, green space and biodiversity, active travel, and working in partnership.

Appendix B

Key actions for habitats within NHS Grampian, including suggested timeline, delivery partners, and resources.

Grassland management

Key objectives:

- Increase habitat for local pollinators on NHS Grampian estate.
- Contribute to Northeast grassland flora and fauna species monitoring.
- Increase community awareness of pollinator importance.

Action	Timescale	NHS Delivery partners	Additional resources
Create an accurate register of the sites and areas NHSG is responsible for mowing, along with their mowing schedule.	1 - 2 years	<ul style="list-style-type: none"> • NHSG Grounds • NHSG Portering • NHSG Sustainability team 	<ul style="list-style-type: none"> • Mapping capabilities
Identify areas that can tolerate a cessation in cutting regime as well as those with a reduced cutting frequency.	2 - 3 years	<ul style="list-style-type: none"> • NHSG Grounds • NHSG PAD team • NHSG Health and Safety • NHS Assure Biodiversity Officer 	<ul style="list-style-type: none"> • Plantlife
Conduct surveys of the species which appeared after mowing reduction.	2 - 4 years	<ul style="list-style-type: none"> • NHSG Volunteers • NHSG Sustainability team • NHSG Grounds 	<ul style="list-style-type: none"> • Local Rangers and Countryside Officers • NESBReC • NESBiP
Harvest seed from existing wildflowers found on estate as seed source for future wildflower sowing.	2 - 3 years	<ul style="list-style-type: none"> • NHSG Volunteer groups 	<ul style="list-style-type: none"> • NESBReC • NESBiP • Plantlife
If amenity grasses remain too dominant, species diversity should be encouraged by sowing Yellow Rattle (<i>Rhinanthus minor</i>).	3 - 4 years	<ul style="list-style-type: none"> • NHSG Grounds • NHSG Sustainability team 	<ul style="list-style-type: none"> • Scotia Seeds • NESBiP • Aberdeen City Council countryside officers
Cuttings after mowing must be removed so as to reduce soil fertility, creating favourable conditions for native wildflower species.	1 - 3 years	<ul style="list-style-type: none"> • NHSG Grounds 	

Action	Timescale	NHS Delivery partners	Additional resources
Identify areas and opportunities to reduce herbicide application. Herbicides should only to be used where absolutely necessary in managing vegetation encroachment in roads and footpaths, and controlling invasive non-native plant species.	2 - 4 years	<ul style="list-style-type: none"> • NHSG Grounds • NHSG Health and Safety • NHSG Portering • NHSG Sustainability team 	<ul style="list-style-type: none"> • SEPA • Nature Scot
Select sowing or plug planting where necessary could be undertaken over time to increase species diversity.	2 - 5 years	<ul style="list-style-type: none"> • NHSG Sustainability team • NHSG Grounds 	<ul style="list-style-type: none"> • NESBiP • NESBReC
Identify sites for potential expansion of neutral grassland and restoration of wildflower meadows.		<ul style="list-style-type: none"> • NHSG Sustainability team • NHSG Grounds 	<ul style="list-style-type: none"> • NESBiP • Nature Scot
Promote scattered scrub around edges of grassland habitats.	3 - 5 years	<ul style="list-style-type: none"> • NHSG Sustainability team 	<ul style="list-style-type: none"> • NESBiP • NESBReC • Nature Scot
Form cut grass pathways through meadows to allow passage of site users.	2 - 5 years	<ul style="list-style-type: none"> • NHSG Grounds • NHSG Health and Safety • NHSG Logistics 	
Vary the mowing regime and height at the edges of grassland habitat. As a rule, within an area, keep at least 20% of grasses under 7 cm and at least 20% higher than 7 cm at any given time. (Vegetation structural diversity accommodates more species and better biodiversity).	3 - 5 years	<ul style="list-style-type: none"> • NHSG Sustainability team • NHSG Grounds 	<ul style="list-style-type: none"> • NESBiP • NESBReC • Local authority Rangers and Countryside Officers

Action	Timescale	NHS Delivery partners	Additional resources
Convert amenity grasslands to wildflower meadows, planting species that flower at different times of the year to attract a range of pollinators.	2 - 3 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Sustainability team 	<ul style="list-style-type: none"> NESBiP NESBReC
Where possible, scallop the edges of grassland areas instead of leaving them linear.		<ul style="list-style-type: none"> NHSG Grounds 	<ul style="list-style-type: none"> NESBiP NESBReC
Where agreed, reduce the mowing management and frequency to twice a year; one cut in autumn and one cut in spring.	3 - 5 years	<ul style="list-style-type: none"> NHSG Sustainability team NHSG Grounds 	<ul style="list-style-type: none"> NESBiP NESBReC
Identify existing steep gradient amenity grasslands across the outdoor estate and adopt a reduced mowing regime for these areas.	2 - 4 years	<ul style="list-style-type: none"> NHSG Sustainability team NHSG Grounds 	<ul style="list-style-type: none"> Public Health Scotland (topographical mapping access)
Develop protocol to survey areas of diversified grasslands and wildflower meadows for botanical diversity and the invertebrates found within them.	3 years	<ul style="list-style-type: none"> NHSG Sustainability team NHSG Volunteers 	<ul style="list-style-type: none"> NESBiP NESBReC

Outreach, engagement, and communication

Action	Timescale	NHS Delivery partners	Additional resources
No Mow May Campaign.	Annually, in May	<ul style="list-style-type: none"> NHSG Communications team NHSG Sustainability team NHSG Grounds 	<ul style="list-style-type: none"> Buglife Plantlife NESBiP
Procure signage for biodiversity areas under development to inform community of intentions.	1 - 2 years	<ul style="list-style-type: none"> NHSG Communications team NHSG Sustainability team 	<ul style="list-style-type: none"> External consultants

Invasive species management

Key objectives:

Action	Timescale	NHS delivery partners	Additional resources
Using EnviroCentre surveys and local species records, map the locations of INNS found across the NHSG estate. Species previously identified include: <ul style="list-style-type: none"> Rhododendron (Rhododendron ponticum) Japanese honeysuckle (Lonicera japonica) Cotoneaster cultivars (Cotoneaster spp.) American skunk cabbage (Lysichiton americanus) Himalayan balsam (Impatiens glandulifera) Giant hogweed (Heracleum mantegazzianum) Japanese knotweed (Reynoutria japonica) Montbretia (Crocsmia × crocosmiiflora) White butterbur (Petasites albus) Cherry laurel (Prunus laurocerasus) 	1 - 2 years	<ul style="list-style-type: none"> Public Health Scotland NHSG Grounds and Estates 	<ul style="list-style-type: none"> EnviroCentre NESBReC NESBiP
Use risk management methods to identify and prioritise species for eradication.	3 - 5 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Estates NHS Assure Biodiversity 	<ul style="list-style-type: none"> Local authorities NESBReC NESBiP Local action groups
Ensure no INNS are included in planting register of new projects and prioritise native species of local provenance for planting, as appropriate.	6 months	<ul style="list-style-type: none"> NHSG Capital Projects NHSG Projects Team Grounds 	<ul style="list-style-type: none"> Scotia Seeds for seeds of local provenance

Action	Timescale	NHS delivery partners	Additional resources
Work with local groups to report and monitor sightings of American mink and grey squirrel to aid in regional trapping programmes.	2 - 3 years	<ul style="list-style-type: none"> NHSG volunteer groups 	<ul style="list-style-type: none"> NESBiP NESBReC
Cultivate identification skills, capacity, and eradication expertise within NHSG workforce through workshop to allow Grounds staff to carry out these activities themselves.	5+ years	<ul style="list-style-type: none"> NHSG Grounds 	<ul style="list-style-type: none"> NESBReC NESBiP Scottish Wildlife Trust Forestry and Land Scotland Local authorities, rangers, and countryside officers

Trees and woodlands

Key objectives:

Action	Timescale	NHS delivery partners	Additional resources
<p>Create an NHS Grampian Tree Management Policy that sets out clear priorities for woodlands on our estate. This should include:</p> <ul style="list-style-type: none"> Commitment to retaining deadwood. NHSG canopy cover targets. NHSG's legal requirements in terms of woodland management for biodiversity. Health and safety obligations. Mention of tree preservation orders. 	2 - 3 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Portering management NHSG Communications team NHS Assure Green Space Officer 	<ul style="list-style-type: none"> Local authorities Woodland Trust Arboriculture specialist
Digitally map the trees we have registered on acute hospital sites and update appropriately when new trees are planted or maintenance work is carried out.	3 - 5 years	<ul style="list-style-type: none"> Public Health Scotland NHSG Grounds 	<ul style="list-style-type: none"> Mapping software Arboriculture specialist Local authorities
Create a register of the trees being supported with stakes or ties. These trees and their guards should be checked annually to ensure support isn't constricting the tree and subsequently damaging it.	1 year	<ul style="list-style-type: none"> NHSG Grounds NHSG Portering 	<ul style="list-style-type: none"> University of Aberdeen Estates

Action	Timescale	NHS delivery partners	Additional resources
Identify opportunities to plant additional trees that will yield the greatest benefits to: <ul style="list-style-type: none"> Habitat connectivity for wildlife. Rainwater attenuation to reduce surface water flooding. Shade to cool down buildings. Air quality improvement and noise abatement. Carbon sequestration. 	3 - 5 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Sustainability team 	<ul style="list-style-type: none"> Local authorities Tree Equity Tool Trees and Design Action Group (TDAG)
Improve the practical knowledge and skills of NHSG Grounds staff, along with emphasising a common sense approach to tree risk management.	2 - 4 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Sustainability team 	<ul style="list-style-type: none"> Local authorities Woodland Trust
Diversify existing hedgerows and woodlands with native trees species.	2 - 5 years	<ul style="list-style-type: none"> NHSG Grounds 	<ul style="list-style-type: none"> Local authorities (can often provide free trees)
Incorporate new hedgerows along active travel routes. These should include a diversity of native, woody species such as hazel, hawthorn, blackthorn, and field maple.	3 - 5 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Logistics NHSG PAD team 	<ul style="list-style-type: none"> Local authorities (can often provide free trees) NHS Forests
Map and monitor location and condition of ash and Dutch elm trees – these species require close monitoring, as they have grown susceptible to disease.	3 - 5 years	<ul style="list-style-type: none"> NHSG Grounds 	<ul style="list-style-type: none"> Forestry and Land Scotland Nature Scot
Sow shade tolerant seed mixes and bulbs in our mixed woodlands.	3 - 5 years	<ul style="list-style-type: none"> NHSG Grounds 	<ul style="list-style-type: none"> Local authorities Plant Life Scotia Seeds

Action	Timescale	NHS delivery partners	Additional resources
Actively encourage different storeys of woodlands, including diversity in age and species of trees.	2 - 4 years	<ul style="list-style-type: none"> NHSG Grounds 	<ul style="list-style-type: none"> Nature Scot Woodland Trust NHS Forests
Manage semi-mature tree stock and maximise preservation of the existing mature and veteran trees found on sites.	1 - 3 years	<ul style="list-style-type: none"> NHSG Grounds NHSG PAD team/ Planning 	<ul style="list-style-type: none"> Public Health Scotland (mapping capabilities)
Limit leaf blowing activity to reduce fuel consumption, noise pollution, and insect habitat provision.	2 - 4 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Health and Safety 	<ul style="list-style-type: none"> SEPA
Ensure any cutting or trimming of trees and hedgerows occurs outside of bird nesting season (typically running from March - August).	6 months	<ul style="list-style-type: none"> NHSG Grounds NHSG Sustainability team 	<ul style="list-style-type: none"> Nature Scot
Mulch areas surrounding trees to suppress weeds instead of using chemical weed killer.	1 - 2 years	<ul style="list-style-type: none"> NHSG Grounds 	
Retain tree stumps in situ, as they provide re-growth potential and foraging resource for invertebrates.	6 months	<ul style="list-style-type: none"> NHSG Grounds 	

The built environment

Action	Timescale	Delivery partners(s)	Additional resources
Add trellises of native climbing plants (e.g. dog rose, honeysuckle, ivy) to building walls to enhance pollinator habitat.	2 - 5 years	<ul style="list-style-type: none"> NHSG Maintenance NHSG Grounds NHSG Property Asset team NHSG Sustainability team 	<ul style="list-style-type: none"> Nature Scot Local landscape architects Local authority environmental planners
Explore opportunities to install sustainable drainage systems (SuDS) to manage storm and surface water. Solutions may include green infrastructure such as living roofs, detention basins, rain gardens, etc.	1 - 5 years	<ul style="list-style-type: none"> NHSG Capital Projects NHSG Grounds NHSG Sustainability team 	<ul style="list-style-type: none"> Nature Scot
Ensure impacts of environmental pollutions, such as light, air, and noise are appropriately considered and mitigated in new development projects.	1 - 3 years	<ul style="list-style-type: none"> NHS Assure Built Environment team NHSG Capital Projects and Projects team 	<ul style="list-style-type: none"> Ecological consultants NESBReC NESBiP
Ensure all new development projects incorporate biodiversity net gain in planning design.	1 - 5 years	<ul style="list-style-type: none"> NHSG Capital Projects NHSG Sustainability team 	<ul style="list-style-type: none"> SEPA Nature Scot Local Authority Environmental Planning Officers

Additional measurements to enhance biodiversity

Action	Timescale	NHS delivery partners	Additional resources
Install bat and bird boxes to mature trees and installing artificial bat cavities to standing deadwood within the woodlands.	2 - 3 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Charities and Endowments NHSG Communications 	<ul style="list-style-type: none"> Aberdeen City Council Countryside Rangers and Officers NESBiP NESBReC
Installing squirrel feeders in woodlands.	2 - 3 years	<ul style="list-style-type: none"> NHSG 'Friends Of' groups NHSG Charities and Endowments 	<ul style="list-style-type: none"> NESBiP NESBReC
Stacking log piles and piling leaf litter in woodland to provide a nesting and foraging resources for hedgehogs.	1 - 2 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Health and Safety NHSG Volunteers 	<ul style="list-style-type: none"> NESBiP NESBReC Countryside Officers and Rangers Nature Scot
Include hedgehog nest box in grassland areas where appropriate.	2 - 4 years	<ul style="list-style-type: none"> NHSG Grounds NHSG Health and Safety 	<ul style="list-style-type: none"> NESBiP NESBReC Local authority Ranger Services

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