Statement of Priorities

County Durham Local Nature Recovery Strategy

Consultation draft

November 2025

Contents

1 INTRODUCTION TO THE LNRS

1.1 What is the County Durham Local Nature Recovery Strategy?

The County Durham Local Nature Recovery Strategy sets our local priorities for nature recovery and maps where action to support nature will have the greatest impact which in turn will help to better target resources and funding.

The LNRS is a strategy and does not mandate what must be done, rather it says what could be done and where to promote and encourage nature recovery for the benefit of wildlife and people.

The strategy has been prepared by Durham County Council, appointed by the Secretary of State for Environment, Food and Rural Affairs (Defra) as the 'responsible authority' (RA) tasked with leading on the preparation of the LNRS. Natural England as the 'supporting authority' provided support and advice to the council as the strategy was prepared.

The preparation of the LNRS was a collaborative process and could not have been achieved without the expertise and commitment of a wide range of partners and stakeholders including the residents of County Durham, species specialists and organisations from the private, charitable and public sectors.

England is widely considered to be one of the most nature-depleted countries in the world following historic and ongoing declines. Monitoring since the 1970s show that across England the average abundance of species has declined by 32% and 13% are threatened with extinction (Burns et al, 2023). County Durham has not escaped this decline with a report to support the Council's declaration of an Ecological Emergency in 2022 showing similar trends of species and habitat declines (Priestley, 2022).

Government has made legally binding commitments to end these declines and for nature to recover. These commitments acknowledged that such action was required not just for nature's sake but also for all the services that we rely on nature for. Nature is essential for the processes that support all life on Earth, including ourselves. A diversity of animals, plants and microorganisms form robust ecosystems that provide us with the food we eat and the air we breathe. Simply spending time in nature leads to improvements in people's physical and mental health.

Local Nature Recovery Strategies are a statutory requirement introduced in the Environment Act 2021 to help drive nature recovery starting at a local level. There are 48 strategies across England, broadly based at a county level, which will help to deliver for nature recovery at a local scale and when taken together will assist in meeting the Government's England wide targets for nature.

Each Local Nature Recovery Strategy will:

- agree priorities for nature's recovery.
- map the most valuable existing areas for nature.
- map specific proposals for creating or improving habitat for nature and wider environmental goals.

The County Durham LNRS is a way of prioritising nature's needs on a more local and focused level. The strategy is a blueprint for the recovery of nature, showing how and where we should

create, restore and connect habitats across County Durham and provide other environmental benefits, such as carbon sequestration, flood regulation and access to nature-rich spaces.

The intention of the County Durham LNRS is to:

- Direct action and resources to where it is most needed and will have the greatest benefit for nature recovery.
- Influence local planning and the development of local, waste, mineral and neighbourhood plans so we can integrate nature recovery and long-term development proposals for County Durham.
- Support the delivery of ecosystems services (the benefits we receive from nature) and wider national environmental benefits (such as mitigating climate change and mitigating flood risk).

The County Durham LNRS will not:

- Create designations or legal protections.
- Dictate actions, but rather its purpose is to help inform land managers as to the best options for wildlife and to promote nature recovery as a viable alternative to other land uses.
- Prevent development or carry a legal status in the planning system, but it will inform future local plans.
- Prevent nature recovery works in areas not prioritised by the strategy
- Does not give permission to undertake works without regard of due process and consultation with specialists.
- End once it is published. The strategy will be reviewed, revised and republished on a regular basis. This must happen every 3 to 10 years.

1.2 Understanding the components of the County Durham Local Nature Recovery Strategy

The County Durham LNRS is comprised of two components, a Statement of Priorities that describes the strategy area, summarises its current state of nature and sets priorities and measures for nature's recovery. This written component sits alongside a Local Habitat Map showing where potential measures could be delivered.

- The **priorities** are the end results that the strategy is seeking to achieve.
- The **measures** are the specific practical actions to achieve the priorities.

The Local Habitat Map is a map of the strategy area that provides a visual mechanism for organisations or individuals to see where the opportunities for nature recovery are in County Durham and where the measures could be delivered.

The Local Habitat Map includes:

- Areas of particular importance for biodiversity (APIB).
- These are our current most valuable areas for nature and include statutory conservation sites (e.g. Sites of Special Scientific Interest and Special Protection Areas), Local Nature Reserves, Local Wildlife Sites and irreplaceable habitats such as ancient woodland and

veteran trees. The APIB form the baseline for the County Durham LNRS and the springboard for the mapping of the priorities and measures.

- Areas that could become of particular importance for biodiversity (ACB).
- These are the mapped opportunities for nature recovery and other environmental benefits in the County that have been identified as locations where delivering the measures would provide the greatest benefit.

1.3 How can the LNRS be used and delivered?

The LNRS is for everyone across County Durham to use to help drive nature recovery.

From policymakers, developers, farmers and landowners to conservation and nature organisations, community groups and the public, the strategy is intended to provide a focus to our actions to aid recovery of our county's nature, and the wider benefits from nature that we all enjoy and depend upon.

The Environment Act 2021 established two mechanisms to support the delivery of LNRS, these being mandatory Biodiversity Net Gain (BNG) and a strengthened biodiversity duty on public authorities.

Mandatory BNG is a relatively new approach to development that requires new developments, unless exempt, to leave habitat for wildlife in a better state than it was before the work took place. Whether a BNG has been delivered is partly calculated by the 'statutory biodiversity metric', which measures wildlife habitats as 'biodiversity units'. A developer must demonstrate that they have created more biodiversity units than existed before the development either on the site of development or at an off-site location. The LNRS will be key in driving off-site delivery into the best locations for nature recovery.

The LNRS will be used to determine the 'strategic significance' score that is part of the biodiversity metric calculation. The 'strategic significance' score gives additional value to habitat improvements that are in areas highlighted by the LNRS, with a 15% uplift in post development calculations, therefore financially incentivising delivery in these strategically important locations. For the uplift to apply the habitat intervention being proposed must be consistent with the measure that is being proposed in that location by the LNRS.

The strengthened duty on all public authorities to have regard to relevant Local Nature Recovery Strategies means that organisations including Durham County Council, the police, and the National Health Service will need to be cognisant of the LNRS and must consider what they can do to conserve and enhance biodiversity. The council can deliver the duty though managing land they are responsible for in a way that supports nature recovery and integrating the LNRS into the planning system, so that areas of the greatest potential for nature recovery can be better reflected in planning decisions.

The LNRS will have uses for a whole range of stakeholders interested in nature recovery and will help people see where actions for nature recovery would make the greatest impact. Farmers and land managers can use the LNRS to help choose which Countryside Stewardship and Sustainable Farming Incentive options are appropriate for their land and Defra arms-length bodies can use the strategy to inform their advice to farmers, or when choosing locations for nature-based solutions.

The LNRS can also be used to provide evidence supporting the development of species and landscape scale recovery projects and management plans, as well as being used to support funding applications.

Developers can use the strategy to inform the actions they take as part of on-site and off-site BNG, and business will find a use when thinking how to support nature recovery on their land or buildings or how to best invest into natural capital in County Durham.

Residents, County and Parish Councillors could use the strategy at a community level to inspire action to support wildlife and guide local projects.

1.4 Development of the County Durham Local Nature Recovery Strategy

Governance of the LNRS preparation was through the Ecological Emergency Workstream of the Environment and Climate Change Partnership. The Ecological Emergency Board (EEB) was established to have oversight of the LNRS process and agree each of the stages in developing the strategy. The EEB is made up of representatives from the private, public and charitable sectors and is chaired by a representative of the North Pennines National Landscape with a representative of GSC Grays acting as Vice-Chair.

The day-to-day production of the LNRS was the responsibility of Durham County Council and its Ecology team with Natural England providing guidance as the 'supporting authority' and The Environmental Records Information Centre North East (ERIC NE) leading on the technical aspects of the mapping.

Before any development work was undertaken there was engagement with land agents, discussions with the National Farmers Union (NFU) and The Country Land and Business Association (CLA) and an early consultation with residents and other consultees.

Two land agent workshops were organised by GCS Grays with the first being held in December 2023 with a follow up session in January 2024. These workshops and the concurrent conversations with the CLA and NFU were undertaken help understand how the LNRS was perceived and how best to engage with the farming and landowner community and develop an LNRS that met this key user groups requirements.

A countywide resident's consultation in April 2024 helped to start and identify the potential priority habitats and species that were regarded as valuable in a local context. The consultation invited people to 'drop a pin' on locations they felt could be important for nature recovery.

The consultation was undertaken by the Council's Consultation and Engagement Team and promoted on the Council's social media outlets. EEB members and other partners including County Councillors, Parish Councillors, the NFU and CLA promoted the consultation to their local communities and members. Additional information was provided to NFU and CLA members which outlined how the LNRS might be important to their landholding, farm or business. Contact details were also provided for the Council's Ecology team, giving recipients the option to get in touch and discuss the LNRS in more detail.

The consultation was also sent by direct email to a list of nearly 400 identified consultees ranging from private individuals through to local and regional organisations within the public, private and charitable sectors. In each case a covering letter was sent with relevant information on the LNRS alongside contact details for the Councils Ecology team should consultees which to discuss the LNRS in more detail.

During 2024 the Outdoor and Sustainability Education Specialists (OASES) engaged with circa 2000 primary and secondary school pupils to see how children engaged with nature, felt about nature and what aspects of nature they liked best and would like to see more of.

A series of meetings, workshops and conversations were held with a range of interest groups such County Councillors, Parish Councillors, Business Durham, Area Action Partnerships, the Youth Council, social housing providers, quarry operators, conservation groups and local recorders to discuss and get feedback to inform the development of the LNRS and encourage engagement with the process.

Alongside the consultation and other engagement, a series of specialist workshops were held over the spring and summer 2024 to further inform the development of the LNRS, these included:

- Regional LNRS Species Conference held by ERIC NE - March 2024.
- Durham Species Workshop held by Durham County Council - May 2024.
- Landowner and Farmer Workshops held by Durham County Council at four locations across the strategy area - June 2024.

Following on from the consultations and workshops a series of Working Groups were established and tasked with developing the priorities and measures. Durham County Council and partners including Durham Wildlife Trust, Forestry Commission and the Wear Rivers Trust led the Working Groups.

The draft priorities and measures generated by the Working Groups were agreed by the EEB in February 2025 and put out to public consultation via the Councils "Let's Talk" consultation and engagement platform in March of that year. The consultation was also sent out to the individuals and organisations on the consultees list. The consultation was promoted by the NFU and CLA and alongside the draft priorities and measures an on-line mapping tool was included giving farmers and landowners the opportunity to identify parcels of land and the potential nature recovery interventions that could occur at that location.

In the background ERIC NE continued to collate datasets to inform the Local Habitat Map and research techniques to inform the mapping of the LNRS priorities and measures.

ERIC NE had produced the APIB mapping in the summer of 2024. Once the draft priorities and measures were agreed in February 2025 work began in earnest on mapping them and producing a map of the ACB, with the Working Groups feeding into the development of the mapping.

By August 2025 the draft Local Habitat Map was nearing completion, and a meeting was arranged by GSC Grays and Durham County Council to discuss the mapping interface to ensure that it was user-friendly and accessible to its intended audience. Land agents and representatives from the National Farmers Union, Northumbrian Water, Natural England and Environment Agency attended. A further meeting was convened in early October 2025 by GSC Grays to allow land agents to further discuss the LNRS and for the County Council to encourage engagement with their clients.

In October 2025 the LNRS process entered the pre-consultation stage where the consultation draft was shared with supporting authorities and neighbouring responsible authorities. This stage aimed to get early feedback and resolve any significant issues with the draft strategy, before the formal consultation with the wider public.

On the 7 November 2025 the pre-consultation panel review was held. This is an internal review process where the draft LNRS is presented to Natural England and the ALBs before the formal public consultation begins. The panel determined that the draft strategy met the requirements of the statutory guidance and could proceed to public consultation.

1.5 Acknowledgements

Whether you responded to the consultations or attended workshops, working groups or Ecological Emergency Board meetings; many thanks to the organisations and individuals who helped develop the County Durham Local Nature Recovery Strategy.

Logos and named individuals will be added here for the final document.

2 OTHER STRATEGIES AND PROJECTS

Many organisations are already engaged in nature recovery activity in County Durham and the LNRS needs to ensure that it aligns with their objectives, supporting them where possible.

Early work on developing the LNRS identified plans and other strategy documents that would need consideration in its preparation, by engaging with organisations representing these plans and strategies we ensured that due consideration was given to the aims and objective of these stakeholders.

Many of the organisations working on nature recovery either sat on the Ecological Emergency Board or were directly involved with the development of the priorities and measures, this ensured that their interests and strategies formed part of the LNRS process.

Key strategies and plans that were considered during the development of the LNRS are outlined below.

2.1 Local Plan

A local plan is prepared by the local planning authority and sets out planning policies and guides decisions on future development proposals, addressing the needs and opportunities of the area. The plan details policies on a range of subjects from housing allocations, transport infrastructure through to green infrastructure and biodiversity.

Durham County Council is due to start reviewing the Local Plan towards the end of 2025 and the LNRS will be a consideration in its development and form part of the evidence base for the plan.

The Strategy and Delivery Team at Durham County Council is responsible for delivering the Local Plan and has been engaged with the LNRS process from the outset.

2.2 Planning Guidance

The Ministry of Housing, Communities and Local Government published planning practice guidance which provide guidance on the role of LNRSs.

The guidance explains how local planning authorities should interpret their legal duty to “have regard” to LNRSs and how they should be used to help meet existing national planning policy on protecting and enhancing biodiversity.

2.3 The Landscape Strategy (Durham County Council)

The landscape strategy is a non-statutory plan which highlights the issues that affect the landscapes of County Durham and sets objectives for their conservation, restoration and enhancement.

The strategy has three main aims; to conserve and enhance the character and diversity of the Durham Landscape, to make development and land management more sustainable and to support and complement other environmental strategies to help promote co-ordinated action on the environment.

2.4 Durham Strategic Green Infrastructure Framework (Durham County Council)

The purpose of this document was to establish a foundation for more detailed Green Infrastructure work by promoting a coordinated approach and fostering a shared vision across County Durham. The framework identifies strategic GI assets and aims ensure that these assets are recognised for the benefits they bring to wildlife and people.

2.5 North Pennines National Landscape (NPNL) Nature Recovery Plan

The NPNL Nature Recovery Plan forms part of the North Pennines National Landscape Management Plan, which is updated on a five-year cycle.

The NPNL Nature Recovery Plan is currently in development and staff at the NPNL have kept the LNRS team updated on its progress and the mapping techniques used.

2.6 Northumbria River Basin District Management Plan

The Northumbria River Basin District Management Plan is a strategy document published by the Environment Agency to manage and improve the water environment in the Northumbria river basin district, which spans Northumberland, County Durham, and Tyne and Wear. The most recent version was updated in December 2022 and sets out challenges, environmental objectives, and the "programme of measures" needed to achieve them, including reducing pollution and addressing flood risk.

2.7 The Northumbria River District Flood Risk Management Plan

The Northumbria River District Flood Risk Management Plan outlines how flood risk is managed in the north east region. It works in conjunction with other plans, such as River Basin Management Plans (RBMPs) and local strategies, to guide the implementation of flood and coastal erosion risk management schemes.

2.8 The Northumbrian Integrated Drainage Partnership

The NIDP comprises 13 Lead Local Flood Authorities from across the Northumbria River Basin District, the Environment Agency and Northumbrian Water. The Partnership works together to prioritise and fund integrated flood risk studies and collaborative delivery programmes to reduce flooding from sewers, rivers and surface water and to promote sustainable drainage across the region.

2.9 Catchment Management Plans

Catchment Management Plans are in place for both the River Tees and River Wear, the plans are generated by a partnership of organisations that drive practical delivery that results in improvements to water quality, resilience to climate change, biodiversity, flood management and greater engagement of the public with blue spaces. This catchment-based approach has at its core delivering Water Framework Directive (WFD) improvements at a river catchment scale. The WFD is a European Union directive that seeks to protect our rivers and lakes, coastal waters and groundwater, its main aim is to protect and enhance the status of aquatic ecosystems and groundwater and promote sustainable use of water.

2.10 The Water Industry National Environment Programme

This programme is a set of actions and projects required of Northumbrian Water, the aim of which are to protect and enhance the water environment through investments in asset improvements, monitoring, and catchment interventions.

2.11 Thriving Catchments

Thriving Catchments was an approach established between Northumbrian Water and The Rivers Trust as a way to explore and develop catchment solutions at scale, focused on using phosphorus management through Catchment Nutrient Balancing.

A programme of activity through Thriving Catchments was undertaken between 2023 and June 2025. Northumbrian Water is continuing its catchment partnership working.

2.12 North East Invasive Non-native Species Strategy and Action Plan

The strategy was developed by Northumbrian Water, Environment Agency, ERIC NE, and the Tees, Tyne, Wear, and Northumberland Rivers Trusts.

The strategy is concerned with freshwater and riparian species and aims to 'develop and maintain cost-effective strategic approaches to prevent, detect, control and eradicate specified invasive non-native species in North East river catchments through the coordinated action of river catchment partnerships'.

2.13 North East Community Forest

Community Forests are found in and around some of the nation's largest towns and cities. They are a collaboration between councils and other organisations which aim to create and manage woodlands to provide opportunities for leisure and recreation as well as enhancing biodiversity and mitigating the impacts of climate change.

Currently there are 15 Community Forests, of which the North East Community Forest was the second to be announced in 2021. The North East Community Forest supports tree planting across Newcastle, North Tyneside, South Tyneside, Gateshead, Sunderland and the more urban parts of Durham by providing specialist advice and access to the Trees for Climate grant funding.

2.14 Ecological Emergency (Durham County Council)

On 6 April 2022, the council's Cabinet declared a countywide ecological emergency and developed an Ecological Emergency Action Plan (EEAP).

The EEAP proposes council action within the three themes of 'Land Management', 'Polices and Strategies' and 'Education and Awareness'.

2.15 Climate Emergency Response Plan (Durham County Council)

The Climate Emergency Response Plan (CERP) was the response plan to the council declaring a climate emergency in 2019. The CERP was in its third iteration and ran from 2024 to 2027. In July 2025 Durham County Council rescinded the climate emergency declaration, and the CERP ceased to be a live document.

The CERP aimed to achieve net-zero emissions for County Durham by 2045 and for council emissions to be net-zero by 2030 and had the natural environment as one of its themes, encouraging woodland planting and restoration of peatlands to sequester carbon.

The CERP is referred to in this document as mitigating climate change is one of the wider national environmental objectives that the LNRS must seek to contribute to and the CERP informed discussions on the LNRS measures over the summer of 2024. There are plans to replace the CERP and any future document will play a role in informing future iterations of the LNRS.

Outside of the strategies and planning requirements, there are several delivery projects that the LNRS needed to be cognisant of; these projects were picked up within the Working Groups developing the priorities and measures. These projects can be supported by the LNRS and used as springboards for further nature recovery actions, and a selection are described below.

2.16 Great North Fen

The Great North Fen is a project led by the Durham Wildlife Trust aimed at restoring the Durham Carrs, a historically significant wetland area. The project focuses on creating a connected, functioning wetland landscape.

The project builds on the Discover Brightwater Landscape Partnership which began the first phase of the restoration of the Carrs, securing land at Bishop's Fen to the south of Bishop Middleham. Additional land has recently been acquired at Ricknall Carrs, near Newton Aycliffe.

2.17 Coastal Grasslands Reconnected Project

Durham County Council in partnership with the National Trust and Durham Wildlife Trust secured funding from the Government's Species Survival Fund, to restore limestone grasslands and create a mosaic of habitats along the Durham coast from Noses Point to Horden.

The funding is to facilitate the management of habitats through fencing, installation of water sources and ecological surveys. It also includes improvements for a high tide roost area for birds at Blackhall Rocks.

2.18 Durham City Green Corridor

The National Trust and Durham County Council are leading on a green corridor project in Durham city. The Durham City Green Corridor stretches along the River Wear, connecting the city centre of Durham and Crook Hall Gardens with over 1,000 hectares of green and blue space.

The project aims to improve access into the green corridor, create and enhance the biodiversity of the area and deliver ways to connect people and nature.

3 CONTRIBUTION TO THE WIDER BENEFITS FROM NATURE

Nature is essential for human life. Nature provides us with water, clean air and food, and the raw materials for medicines and industry. Our crops rely on insect pollination and the complex biological processes that create and maintain soil health. Spending time outside in parks and nature reserves amongst wildlife improves our health and well-being. We are part of nature and dependant on a healthy planet and its non-human inhabitants for our survival and well-being.

All these benefits that we receive from nature are known as ecosystem services and are dependent on a healthy, diverse environment. Although the focus of the LNRS is on enhancing nature and biodiversity, the priorities and measures will make a positive contribution to these ecosystem services.

There are generally regarded as being four types of ecosystem services:

- Provisioning Services

  Consist of the products obtained from nature, such as food and water, raw materials like timber and other resources such as medicines.

- Regulating Services

  Are categorised as any benefit obtained from the natural processes and functioning of ecosystems. These include flood regulation, pollination and climate regulation.

- Cultural Services

  Cultural services are identified as the benefits people gain from their interactions with nature, they include recreation, spiritual enrichment and benefits to our health and wellbeing.

- Supporting Services

  These are the services that allow for the other ecosystem services to exist. They consist of the underlying natural processes such as the water cycle and photosynthesis that allow the planet to sustain life.

Wider benefits were considered when creating the priorities and measures, and the mapping of the measures was influenced by not only where habitat creation and enhancement would deliver the most benefit for nature but where those same actions could provide ecosystem services.

Climate change and land use change are increasing the risk of flooding and organisations including the Environment Agency, The Rivers Trusts and the Drainage and Coastal Protection Team at Durham County Council work with natural processes to reduce flood risk.

A priority for our rivers is to restore modified and artificial river habitats. This is an example of where a LNRS priority designed to promote nature recovery can also deliver wider benefits, in this case the priority can also help in tackling flooding. The straightening of rivers and their disconnection with the floodplain has reduced their capacity to hold and slow the flow of water.

Although it is not possible to return our rivers to a completely natural state, we can restore some of the features that store and slow water and so reduce the risk of flash flooding. This priority can be targeted to sections of the river upstream of flood risk areas, creating riparian woodlands and wetlands and reconnecting rivers to their floodplains would all reduce the risk of flooding.

How the measures contained within the LNRS can potentially deliver for a range ecosystem services are covered in section '11 The Priorities and Measures' of this document.

4 CONTRIBUTION TO NATIONAL ENVIRONMENTAL OBJECTIVES (NEOs)

In 2018, the government produced its 25 Year Environment Plan which established a series of goals and targets for improving the environment. One of the roles of the LNRS is to contribute to delivery of these national goals.

Guidance from Government detailed the relevant NEOs that the LNRS should seek to deliver against. The guidance drew on the first of the Governments reviews of the 25 Year Environment Plan, the Environmental Improvement Plan (EIP), which sets out specific targets and commitments for the environment.

The apex goal of the EIP is 'thriving plants and wildlife'. Whilst facilitating nature recovery is the primary objective of the LNRS, and so is the focus of the priorities and measures, many of them will also contribute to the other, wider NEOs of the EIP.

The national targets around nature include:

- Restore or create in excess of 500,000 hectares of a range of wildlife-rich habitat outside of protected areas by 2042, compared to 2022 levels.
- Increase total tree and woodland cover from 14.5% of land area now to 16.5% by 2050.
- Reduce nitrogen (N), phosphorus (P) and sediment pollution from agriculture into the water environment by at least 40% by 2038, compared to a 2018 baseline.

The development of the priorities and measures was always 'locally led'. However, the potential contribution that an individual priority or measure could make to one or more of the NEOs was considered and discussed as the priorities were being developed. For example, a priority under woodlands is to increase the area of native woodland as County Durham has relatively low woodland cover, this locally led priority directly relates to one of the NEOs.

How the measures contained within the LNRS can potentially deliver for NEOs is covered in section '11 The Priorities and Measures' of this document.

5 PRESSURES ON NATURE

Human activity over the generations have driven the declines in nature at a global, national and local level. In 2019 the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019) identified five direct drivers of global biodiversity loss and many of these are in play in County Durham.

- Changing use of land and sea
- Pollution
- Invasive non-native species
- Climate Change
- Direct exploitation

Direct exploitation is the least concern in the County Durham LNRS area but is regarded as the leading cause of marine biodiversity loss globally.

5.1 Changing use of land and sea

This is the biggest driver of biodiversity loss, there are multiple demands being made on land ranging from the needs of agriculture, recreational use and residential and employment development. These uses can all have detrimental impacts on nature. Recreation and leisure use can result in direct impacts on habitats through trampling of vegetation and the displacement and disturbance of species. Agricultural intensification and urban expansion lead to the direct loss or degradation of habitats and this in turn leads to the isolation and fragmentation of wildlife habitats. This fragmentation limits wildlife mobility with individuals struggling to move between the patches of habitat, these isolated populations are at a greater risk of extinction.

In Durham these pressures on land are evident by the fact the new standard method to establish a housing requirement has increased our needs by 53% and we now need to deliver 2,011 new dwellings per year. These demands on land, which also include nature recovery and renewable energy, must be managed and balanced to ensure we are efficiently using our land to deliver across the wide range of needs. The LNRS plays a role in this by identifying those areas that could become important for nature recovery and will be an important tool in reviews of the Local Plan. The County Durham Local Plan and its review is an ideal opportunity to embed nature recovery into the development proposals for the county.

5.2 Pollution

Pollution can take many forms and generally relates to air and water pollution where harmful materials negatively impact terrestrial and aquatic ecosystems. Other types of pollution exist and can impact nature; noise pollution can affect a species ability to communicate and forage for food or force them into less suitable habitats whilst light pollution can upset natural behaviour affecting migratory and feeding behaviour.

Atmospheric nitrogen pollutants are of concern within the context of nature recovery, the most common sources of such pollution in England are nitrogen oxides and ammonia. In County Durham the most significant air pollutant is Nitrogen Dioxide, with the primary source being from road vehicle exhaust emissions (Durham County Council, 2024). Ammonia emissions come mainly from farm animals and fertilizers. Nitrogen pollution can degrade soils and in grassland habitats cause nitrogen tolerant species to outcompete more sensitive wild plants

and fungi, recently it was concluded that 63% of nitrogen sensitive habitats in England such as heathlands and acidic grasslands are receiving more nitrogen from the air than they can tolerate (Plantlife, 2017).

Water pollution can arise from several sources, urban and transport run-off can deliver garden pesticides, petrol and oil and litter into our waterbodies, nutrients from agricultural fertilizers or other nutrient rich materials can be washed into rivers and ponds. The Increasing the amount of developed land and loss of urban green spaces contribute to increasing surface water run-off which can overwhelm the drainage system causing flooding and surges within watercourses. During a storm event or heavy rainfall, storm overflows release excess water into our rivers this prevents the sewer system from becoming overwhelmed but can discharge pollutants. Water pollution can harm wildlife in several ways, heavy metals, oils and pesticides can directly harm aquatic life while pollutants like nitrogen and phosphorus can promote excessive algal growth reducing oxygen in the water suffocating wildlife.

Misconnected pipes and drains are a threat to maintaining clean rivers and streams. Misconnections are when wastewater pipes from toilets, sinks, and washing machines are wrongly connected to surface water drains, which carry the wastewater directly to rivers and streams instead of treatment works. This causes water pollution from chemicals, bacteria, and other waste.

Teesdale and Weardale were the principal centres of metal mining in County Durham, and although the mines had closed by the early 1900s it has left a legacy of pollution with over 80km of rivers in Weardale polluted by zinc, cadmium and lead from abandoned metal mines, impacting river wildlife such as fish and river flies.

Recent data indicates that only around 10% of waterbodies in the Wear catchment classed as being in good ecological status, this increases to 15% for the Tees catchment (Environment Agency, 2019). Although water pollution remains a concern in County Durham, there have been notable improvements. Fifty years ago, very few salmon or sea trout were seen in the River Wear but improvements in water quality have reversed this situation. Improvements in fish stocks helped the otter to recolonise the county's river systems after it became virtually extinct in the county by the 1970s after suffering the effects of pesticide pollution. By the 1980's otter was being seen sporadically on the river Tees and then the River Wear. Today they are found across the county and regularly seen on the weirs in Durham city.

The problem of pollution is a complex puzzle to solve and will involve a range of sectors working together to reduce the pollutants entering the environment and impacting nature. Transport, agriculture, the water industry through to the County Council and the public all need to be involved. The LNRS does provide an opportunity to tackle pollution, especially water pollution by encouraging land management practises that reduce diffuse pollution.

5.3 Invasive Non-Native Species

While most of the non-native species that have found a new home in England are benign, there is a proportion that cause significant problems. These invasive non-native species (INNS) threaten native wildlife and the environment, are costly to the economy and can affect humans by damaging our property as is the case with Japanese Knotweed (*Reynoutria japonica*) or by affecting our health; contact with Giant Hogweed (*Heracleum mantegazzianum*) for example which can cause burning and blistering of the skin. These two species alongside Himalayan balsam (*Impatiens glandulifera*) are the main INNS in County Durham's river catchments.

Himalayan balsam was introduced to the UK as a garden plant in 1839 and is now invasive along riverbanks, ditches and other wetland habitats. It grows in dense stands where it outcompetes native plants and when it dies back in the winter it leaves riverbanks bare and exposed to erosion. Within the Wear catchment Giant Hogweed is currently confined to the lowlands with concentrations around Durham city and Chester-Le-Street, whilst the other two species have found their way to the top of the catchment around Rookhope and St John's Chapel.

One of the most recognisable INNS is the Grey Squirrel (*Sciurus carolinensis*) which is widespread across County Durham and frequents our parks and gardens. They were introduced to Britain from America in the late 1800's and is one of the main reasons for the decline in the native Red Squirrel (*Sciurus vulgaris*) and has a damaging effect on native woodlands and timber production. Another introduced mammal is the American mink (*Neogale vision*) which has had a devastating effect on national and local Water Vole (*Arvicola amphibius*) populations.

Ash (*Fraxinus excelsior*) is a common tree in our woodlands and hedgerows, but it is currently under threat from a fungus which originates in Asia but spread through Europe and arrived in the UK in 2012. The fungus is called *Hymenoscyphus fraxineus* and is more commonly known as 'Chalara' or 'ash dieback'. Our Ash trees have no natural defences against the fungus making them highly susceptible. The disease causes leaf loss, crown dieback and ultimately the death of infected trees and is expected to kill up to 80% of Ash trees across the UK (Woodland Trust, n.d.). Losses at this scale will be noticed at a landscape scale, not only is Ash an important woodland tree it is also significant in the wider landscape and can be found along roadsides, in fields, in hedges, and in parks and gardens.

Once established it is extremely difficult and expensive to eradicate INNS across large geographies, but control is needed to reduce the impacts and secure native populations of wildlife. Tackling them effectively requires a coordinated and targeted approach. Locally organisations such as the Rivers Trusts, Durham Wildlife Trust, local volunteers and the local authority strive to tackle the problem and there is a role for the LNRS to support this work.

5.4 Climate Change

Climate change is predicted to result in warmer and wetter winters and hotter and drier summers with more frequent and intense weather extremes such as heatwaves and storms. Some of the impacts arising from these changes in our weather patterns include increased flooding, risk to water supplies during droughts and impacts on farming. The rapid rate at which the climate is changing is unprecedented and means that ecosystems and society struggle to adapt to these changing conditions.

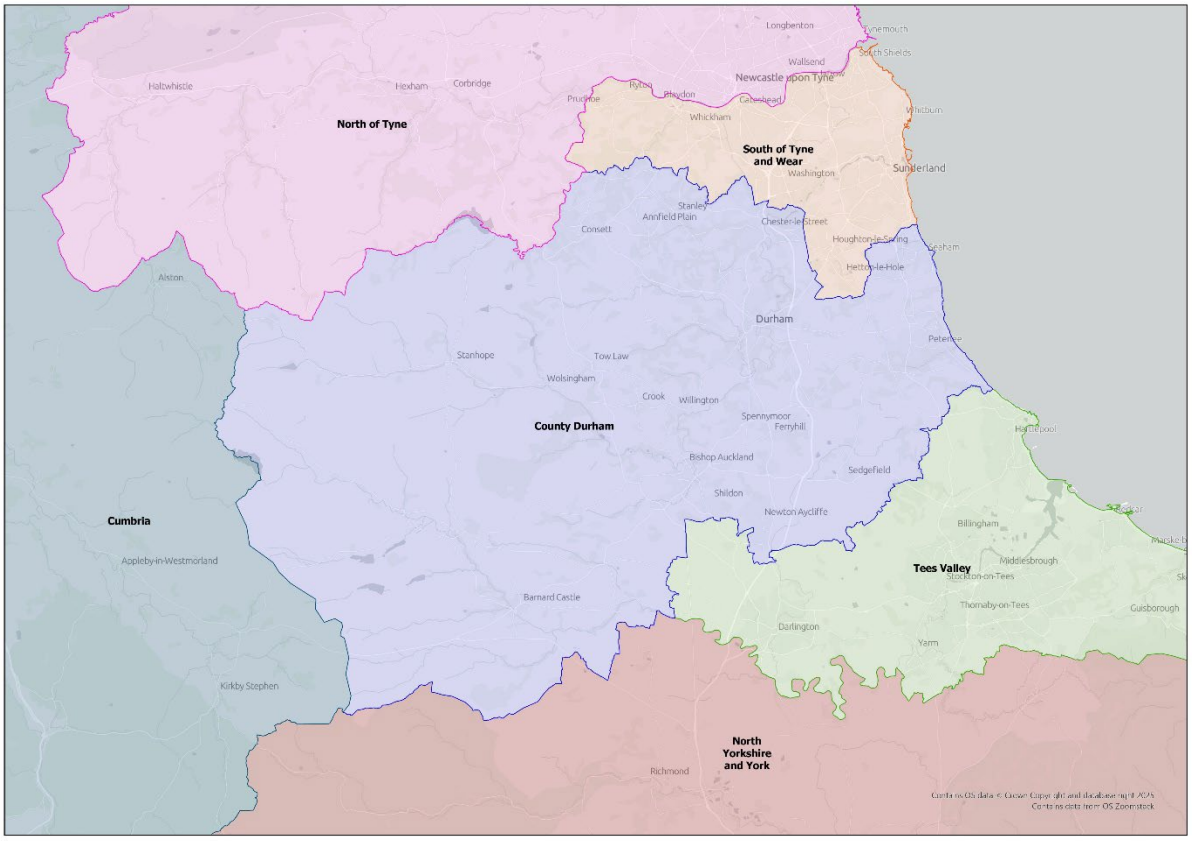
These changes to weather patterns will affect biodiversity in several ways. Habitats can be lost or degraded, seasonal cycles altered so that there is a mismatch between when plants flower and insect pollinators emerge in the spring. Hotter conditions can exceed what species can tolerate, and flooding can damage or destroy valuable wildlife habitats.

Many of our wildlife habitats, such as species rich grasslands, woodlands and peatlands like blanket bog can support our capacity to respond to and manage climate change. The North Pennines holds 27% of England's blanket bog and this resource is not only a diverse wildlife habitat but a significant store of carbon. Nature based solutions can also mitigate the effects of climate change and help us adapt to our changing weather. River restorations can help prevent flooding and urban trees and green spaces can help keep towns and cities cool providing respite from increasingly hot summers.

By encouraging nature recovery, the LNRS is promoting actions that help remove carbon dioxide from the atmosphere as well as helping us to adapt and mitigate the effects of climate change.

6 DESCRIPTION OF THE COUNTY DURHAM LNRS AREA

The County Durham LNRS covers the unitary authority area of County Durham which stretches from the North Sea coast in the east up to the North Pennines in the west where it borders Cumbria. To the north it is separated from Northumberland and Tyne and Wear by the Rivers Tyne and Derwent and to the south it borders North Yorkshire and the Tees Valley.



Plan 1: Location of the County Durham LNRS area

Durham stretches from the magnesian limestone cliffs and grasslands of the North Sea coast through productive farmland and wooded valleys to the carboniferous rocks and high moorland of the North Pennines. This diversity of geology, landscapes, climate and land uses supports a wealth of wildlife.

The magnesian limestone forms a low plateau in the east of the county which slopes down towards the North Sea. This geology provides County Durham with some of its most important habitats. As the magnesian limestone lies in a climatic divide where the warm and dry conditions of the south meet the cool and wet conditions of the north, the grasslands this geology supports contain species at the limit of their southern or northern ranges giving rise to an unusual assemblage of plants.

At the coast the limestone forms deeply incised coastal denes and coastal cliffs. The Durham coast is the only example of vegetated sea cliffs on magnesian limestone in the UK and supports a unique vegetation. On the cliff tops the maritime grasslands are influenced by sea spray so salt tolerant species such as Sea plantain (*Plantago maritima)* and Thrift (*Armeria*

maritima) can be found within the grasslands. Further inland this eastern plateau supports species rich magnesian limestone grasslands. There are four distinct types of magnesian limestone grassland, one of which, the Blue moor grass (*Sesleria albicans)* / Small Scabious (*Scabiosa columbaria*) grassland is found only in County Durham.

These diverse grasslands support a range of species including the Northern brown argus butterfly (*Aricia artaxerxes*), least minor moth (*Photedes captiuncula*), and Glowworms (*Lampyris noctiluca*). The Durham coast is known for its bird populations and is covered by a Special Protection Area, a designation for the conservation of wild birds which in this case protects over wintering populations of wading birds including Purple sandpiper (*Calidris maritima*), and Turnstones **(***Arenaria interpres*) and historically a breeding population of Little turns (*Sternula albifrons)*.

Moving further west the geology changes to carboniferous coal measures with the thin soils of the limestone plateau replaced with heavy, poorly drained gleys derived from glacial boulder clays with pockets of lighter soils associated with glacial sands and gravels. In this central band of County Durham ancient woodlands survive in steep sided valleys and the surrounding agricultural landscape is a mixture of improved pasture and arable cropping with networks of hedges. There are fragmented areas of lowland heath with examples of this rare habitat around Annfield Plain and a significant area at Waldridge Fell Site of Special Scientific Interest (SSSI) which also contains Wanister Bog, a lowland valley mire.

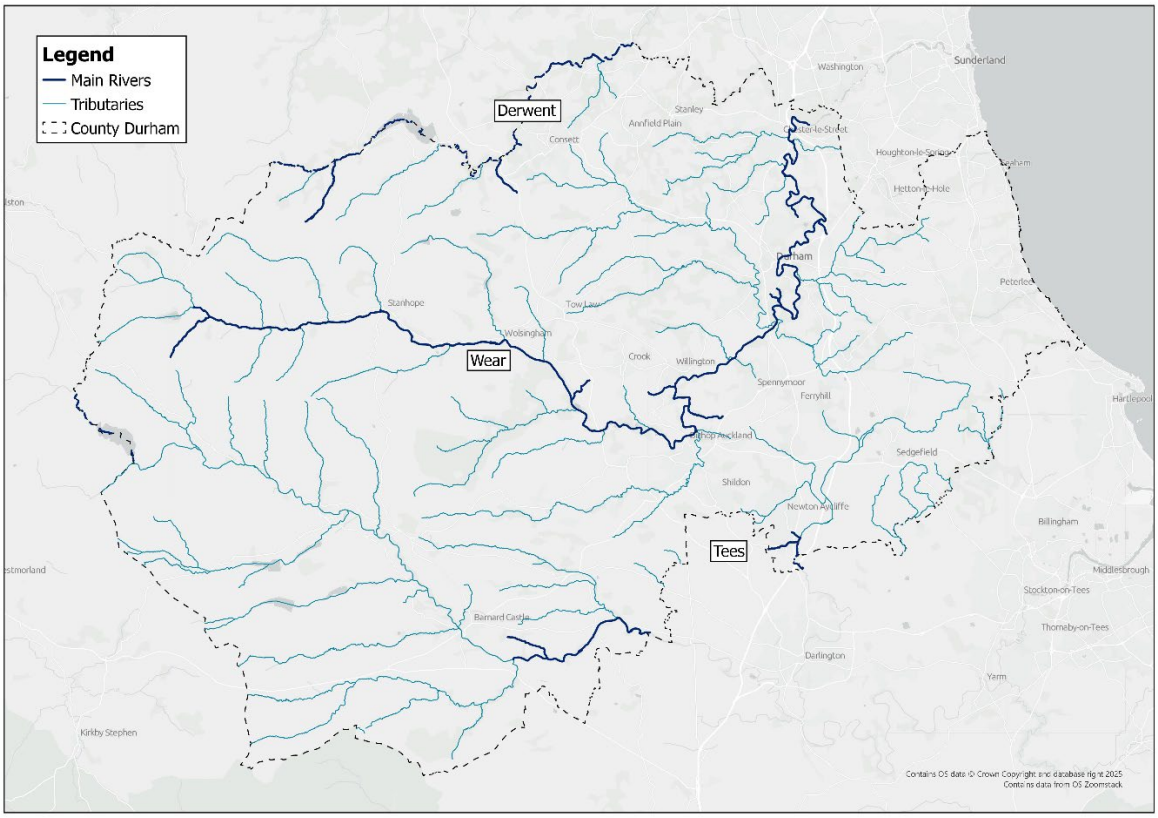
The county is dominated by the uplands, with over half of the county lying above the 150m contour. The greater part of Durham's uplands is included within the North Pennines National Landscape (NPNL) and the geology is defined by the Carboniferous rocks of the Alston Block. This rich geology is recognised in a UNESCO designation as a Global Geopark. The North Pennines have predominantly peaty soils, especially on higher ground which supports extensive blanket bog and moorland vegetation. The mosaics of moorland and grassland habitats across the North Pennines support a diverse wading bird population with Curlew (Numenius arquata), Lapwing (*Vanellus vanellus*), Redshank (*Tringa totanus*) and Golden plover (*Pluvialis apricaria*) being amongst the most prominent.

Much of the area is designated as a Special Protection Area with Golden plover, Hen harrier (*Circus cyaneus*), Merlin (*Falco columbarius*) and Peregrine (*Falco peregrinus*) cited within the designation. Other designations such as SSSI and Special Areas of Conservation cover vast tracts of the North Pennines protecting a suite of habitats including upland heath, blanket bog and notably a rare assemblage of arctic-alpine plants and southern species. This unusual combination of plants is known as the 'Teesdale Assemblage' and is considered to have survived continuously since shortly after the last glaciation some 12,000 years ago. The Spring gentian (*Gentiana verna*) is the iconic plant of the Teesdale Assemblage, first discovered in 1796 this diminutive plant with intense sky-blue flowers is found only in County Durham and the Burren in south western Ireland. Other species in the assemblage are just as rare if not rarer, with Teesdale being the only location in the UK for Teesdale sandwort (*Sabulina stricta*) and the only site worldwide for a subspecies of hoary rock-rose (*Helianthemum oelandicum subsp. levigatum*).

The North Pennines contain around 40% of the UK upland hay meadows, with examples in County Durham being concentrated in Teesdale, Lunedale, Weardale, and Baldersdale. The richest hay meadows can contain over 30 species per square metre and provide important

feeding and nesting sites for Grey partridge (*Perdix perdix*), Curlew and Black grouse (*Lyrurus tetrix*).

The main rivers that pass through County Durham all originate in the uplands of the North Pennines. The most northerly of these rivers is the Derwent which originates near Blanchland before running into the Derwent Reservoir and then beside Allensford and Shotley Bridge before entering the River Tyne. In Durham, the banks of the Derwent feature several excellent examples of ancient woodland and contains the highest concentration of Planted Ancient Woodland sites in the north east. The River Wear rises at the confluence of the Killhope and Burnhope Burns and flows east through Bishop Auckland and heads north through Durham and Chester-le-Street before leaving the county and heading towards Sunderland, where it enters the North Sea. The Wear Catchment covers the majority of the County. The River Tees begins life outside of County Durham at Cross Fell in Cumbria; in Durham the river has formed the UK's largest waterfall, High Force, near the village of Forest-in-Teesdale and then continues eastward through Middleton-in-Teesdale and Barnard Castle before leaving the county and entering the sea between Hartlepool and Redcar.



Plan 2: Main Rivers in County Durham

County Durham has a rich industrial heritage, with coal mining, iron and steel production and the railways being at the forefront. The early 20th century was the highpoint for coal mining and the heavy industries in Durham, the county was a leading coal producing region and at the peak of the industry there were over 200 collieries, the last of these at Easington on the Durham coast closed in 1993. Across County Durham its mineral resource has been exploited, from the coal and lime at the coast, coal mining and iron and steel production in the lowlands and the mineral veins in the uplands worked for lead and other metals.

The legacy of these industries can be seen in the dense settlement pattern of the coalfield, the old railways and waggonways, and restored pit heaps. For nature, the legacy of these heavy industries poses significant challenges even today, ranging from habitat loss and fragmentation to pollution. Conversely former industrial sites such as quarries and pit heaps provide some of the county's most nature rich environments. Abandoned limestone quarries can develop into complex grassland communities and sites such as Bishop Middleham Quarry and Trimdon Grange Quarry are now SSSIs. Former pit heaps have developed into a mosaic of habitats, with scrub, sparse grasslands and wetlands all found with a single site, the variety of mosses, liverworts and flowering plants in turn support a diversity of invertebrates.

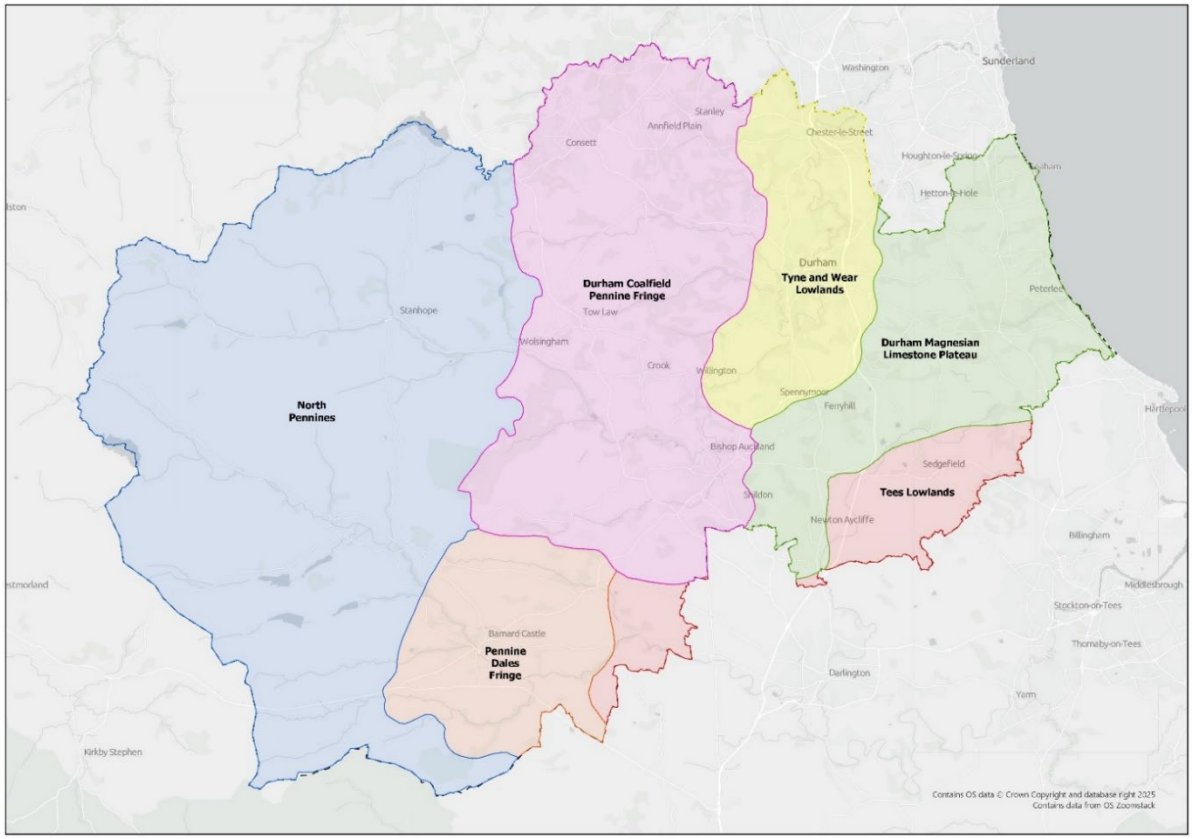
7 NATIONAL CHARACTER AREAS

Early conversations on how to develop the LNRS included using Natural Character Areas (NCAs) as the potential building blocks of the strategy.

A National Character Area is an identified geographical area of England based on a combination of biodiversity, landscape, geodiversity and economic activity which follow natural lines in the landscape rather than administrative boundaries. Each of the 149 NCAs in England contain 'Statements of Environmental Opportunities' and this can make them a useful framework for decision-making on the natural environment.

The County Durham LNRS boundary contains six National Character Areas:

- North Pennines
- Durham Coalfields Pennine Fringe
- Tyne and Wear Lowlands
- Durham Magnesian Limestone Plateau
- Pennines Dale Fringe
- Tees Lowlands



Plan 3: National Character Areas

As the LNRS progressed it became clear that creating priorities and measures across County Durham based on distributions of species and habitats, in the absence of the NCAs, was the more natural approach.

The NCAs were used to 'sense-check' the spatial elements of the strategy as the mapping of the priorities and measures progressed. Mapping was modified in areas if measures would significantly contradict the NCA descriptions and Statements of Environmental Improvements in that area. For example, the Durham Magnesian Limestone Plateau NCA emphasises the need to expand upon the limestone grasslands. In this NCA any promotion of other habitat typologies, such as woodland, would need to be moderated to account for the prominence given to grasslands within the NCA description.

The NCAs are a useful tool for describing the landscapes and habitats in County Durham and the NCAs are briefly described below, more detail can be found at https://nationalcharacterareas.co.uk/

7.1 North Pennines

The North Pennines National Character Area within County Durham is a distinctive upland landscape characterised by moorland plateaux and broad dales. The area is primarily used for sheep grazing and grouse shooting, with livestock also grazing on grass moorland, allotments, and hillside pastures. The dales support cattle and sheep farming on in-bye pastures and meadows. The region borders other NCAs including the Durham Coalfield Pennine Fringe, Pennine Dales Fringe, and Yorkshire Dales. Much of the area is designated as a National Landscape.

The North Pennines is ecologically rich and highly protected, with numerous Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPAs), and Special Areas of Conservation (SACs). The area supports a wide range of habitats such as blanket bog, upland grasslands, heath, flushes, and mires, although tree cover is limited. Traditional farming has preserved upland hay meadows, and calaminarian grasslands have developed on mining-polluted sites.

The Statements of Environmental Opportunities for the North Pennines NCA are:

- SEO1. Protect, manage and enhance the moorlands and moorland fringes of the North Pennines, with their internationally important habitats and wildlife, their sense of wildness and remoteness, and the contribution they make to climate mitigation, water quality and availability, and water flow.
- SEO2. Protect, manage and conserve the distinctive historic and
- geological environment and features of this area, providing access and recreation along with imaginative interpretation, to improve understanding of the landscape and its cultural development
- SE03. Manage and enhance the pastoral character of the broad dales, with their patchworks of pastures and meadows, their strong field patterns defined by drystone walls, and their stone-built field barns, farmsteads and small villages
- SE04. Manage the diverse streams, becks, rivers and reservoirs to maintain their high water quality, enhance their biodiversity interest, and strengthen their contribution to the landscape character and recreational opportunities of the North Pennines, while managing water flows and maintaining water supplies.

7.2 Durham Coalfields Pennine Fringe

The Durham Coalfield Pennine Fringe NCA is a transitional landscape located mainly within County Durham, bridging the upland North Pennines to the west and the lowland Tyne and Wear to the east. The western part of the NCA is more upland in nature, with large, open fields enclosed by drystone walls and used for sheep and cattle grazing. In contrast, the eastern part features more mixed farming, with arable crops grown on richer soils and fields divided by hedgerows. The area is well-wooded in places, with woodland strips along rivers, shelterbelts, and large conifer plantations. Major rivers such as the Wear and Derwent, along with their tributaries, flow through the area, and the A68 road runs north–south across the NCA. The landscape supports a variety of habitats, including upland moorland, hay meadows, lowland heath, native woodland, ponds, and wetlands. These habitats are scattered and often fragmented, particularly in lowland areas due to agricultural development. Ancient oak woods and mixed ash and wet woodlands are found along riverbanks, while coniferous plantations dominate higher ridges and valley sides. Remnants of the mining era, such as disused railways, viaducts, coke works, and restored spoil heaps, are still visible. The agricultural character varies from livestock farming in the west to mixed farming in the east, with hedgerows forming important wildlife corridors throughout.

The Statements of Environmental Opportunities for the Durham Coalfield Pennine Fringe NCA are:

- SEO 1. Protect, manage and enhance the major rivers, including the Wear and Derwent rivers, and their tributaries, to improve water quality, reduce flood risk and enhance their wildlife value and recreational use.
- SEO 2. Protect, expand and connect semi-natural habitats, particularly heathland, and enhance the management of agricultural land to provide a range of benefits to people, wildlife and the wider environment.
- SEO 3. Protect, enhance and connect trees and woodland in the area to improve their wildlife value, climate regulation capacity, biomass production and potential for access and recreation.
- SEO 4. Protect, restore and enhance ex-industrial and brownfield sites, particularly former coal mines, for their historic and wildlife value, and improve access and interpretation in order to celebrate local tradition and culture and increase understanding of the area's industrial history and geodiversity.
- SEO 5. Seek to ensure that where there is new development it retains tranquil areas, is appropriate in a changing climate, provides high-quality green infrastructure and improves quality of life for local residents.

7.3 Tyne and Wear Lowlands

This NCA includes parts of County Durham, notably Durham City, Chester-le-Street, and Spennymoor and lies between the Durham Coalfield Pennine Fringe to the west and the Durham Magnesian Limestone Plateau to the south and east, with the Tyne Valley to the north.

The area is densely populated and heavily influenced by urban development, industry, and transport infrastructure, though it retains stretches of agricultural land, especially in County

Durham. Durham City, a focal point of the NCA, is renowned for its historic castle and cathedral, which form a UNESCO World Heritage Site.

Historically shaped by coal mining, the landscape still bears remnants of its industrial past, including restored spoil heaps and mining sites now converted into agricultural pastures, woodlands and country parks. The NCA is intersected by major transport routes such as the A1 and the East Coast Main Line, with additional links following the Tyne Valley. Designated sites like Waldridge Fell SSSI and Brasside Pond SSSI support rare habitats including lowland heath, fen, reedbed, and species-rich grasslands.

The habitat mosaic includes urban areas, arable land, wooded river valleys, and estate landscapes with mature trees and plantations. While woodland cover is generally low between settlements, river corridors are well-wooded with semi-natural oak and birch woodlands.

The Statements of Environmental Opportunities for the Tyne and Wear Lowlands NCA are:

- SEO 1. Reverse the fragmentation of semi-natural habitats due to the industrial and urban expansion of Tyneside by extending, creating and linking habitats in rural areas, developing or regenerating urban green spaces/urban fringe and protecting brownfield sites with high biodiversity interest.
- SEO 2. Enhance and manage the Tyne and Wear river network and Tyneside coastal area to improve water quality and reduce flood risk, and to mitigate the effects of climate change.
- SEO 3. Conserve and enhance the network of green infrastructure – broadleaved woodlands characteristic of the Tyne and Wear river valleys, country estates in and around urban settlements and restored coal mining sites – to increase biodiversity, improve water and soil quality, provide tranquillity and recreation and enhance landscape character.
- SEO 4. Use an understanding of the unique historic landscape and heritage features of the Tyne and Wear Lowlands NCA to provide opportunities for interpretation, education, wellbeing, recreation and tourism, and to inform good design in new development that respects the setting of heritage assets.

7.4 Durham Magnesian Limestone Plateau

The Durham Magnesian Limestone Plateau NCA is a distinctive open agricultural landscape defined by its steep limestone escarpment to the west and dramatic coastal cliffs, denes, and bays to the east.

The area's industrial past, particularly coal mining and quarrying, has shaped its settlement patterns and left behind features such as reclaimed colliery sites and disused railways.

The Durham coast is ecologically significant, supporting rare plant assemblages due to its unique climate and transitional location. The NCA's habitats include exposed limestone cliffs, flower-rich Magnesian Limestone grasslands, wooded coastal denes, sand dunes, and beaches. Woodland cover is generally sparse, concentrated mainly in the coastal denes. Agriculture dominates the landscape, with productive arable fields and some pasture.

The Durham Coast supports a wide range of wintering and passage coastal birds and reptiles like slowworm and adder are also recorded.

The Statements of Environmental Opportunities for the Durham Magnesian Limestone Plateau NCA are:

- SEO 1. Protect, expand and connect semi-natural habitats, particularly limestone grassland, and enhance management of agricultural land to provide a range of benefits to local people, wildlife and the wider environment.
- SEO 2. Protect and enhance the coast as a place of tranquillity and inspiration that supports wildlife and illustrates the area's industrial past.
- SEO 3. Protect, manage and enhance waterbodies, particularly the River Wear, to improve water quality and enhance their wildlife value.
- SEO 4. Protect and promote the area's rich archaeology and geology to enhance appreciation of its mining heritage, significant role within British industry, and important fossil record and prehistoric sites.
- SEO 5. Seek to ensure that where there is new development it preserves the area's strong sense of place, retains tranquil areas, is appropriate in a changing climate and improves quality of life for local residents.

7.5 Pennines Dale Fringe

The Pennine Dales Fringe NCA lies between the upland Pennines to the west and the Magnesian Limestone ridge and arable lowlands to the east, with only its northern extent falling within County Durham.

The landscape slopes from west to east and is shaped by river valleys, creating a mix of exposed plateaux, enclosed valleys, and broad river corridors. Major rivers such as the Tees and Greta flow through this area, and key transport routes including the A66, A67, and A688, as well as the Teesdale Way walking route, traverse the NCA.

The area is predominantly agricultural, with improved grasslands and leys dominating the landscape, especially in County Durham. Livestock farming is common, and upland heath is present in the northern and western parts, linking to larger heathland areas in adjacent NCAs.

Woodland cover is relatively good, featuring lowland mixed deciduous woodland, wet woodland, and upland ash/oak woodlands, particularly along riverbanks and on country estates like Raby Castle. Hedgerows are widespread, especially around arable fields, and the River Tees and Greta offer important freshwater habitats.

The Statements of Environmental Opportunities for Pennine Dales Fringe NCA are:

- SEO 1. Protect and connect native broadleaved woodland, parkland and veteran trees to maximise their value for wildlife, flood risk alleviation, water quality, climate regulation, recreation, sense of place and sense of history.
- SEO 2. Encourage management of farmland to retain the pastoral and mixed agricultural character and to benefit biodiversity and the wider environment while maximising the value of food production.
- SEO 3. Protect the area's rich historic environment and geodiversity and manage development pressure to preserve tranquillity, sense of place and sense of history, and to enhance recreational opportunities.

- SEO 4. Protect and enhance the area's many major rivers, riparian habitats and wetlands to reduce flood risk, improve water quality and conserve the valuable contribution they make to sense of place, biodiversity, recreation and sense of history

7.6 Tees Lowlands

The Tees Lowlands National Character Area is a broad, low-lying plain with expansive views toward the North Yorkshire Moors and Cleveland Hills. It gently rises in the west toward the Pennine Fringe and merges with the Durham Coalfield Pennine Fringe and Durham Magnesian Limestone Plateau in the north.

Only the far north and northwest parts of the NCA fall within County Durham, where major transport routes like the A1 motorway pass through. Local Wildlife Sites such as Hardwick Hall and Gainford Spa Wood contribute to the ecological value of the area.

Within County Durham, the landscape is in the Tees Lowlands NCA is predominantly agricultural, with fields bordered by hedgerows and scattered remnants of semi-natural woodland.

The Statements of Environmental Opportunities for Tees Lowlands NCA are:

- SEO 1. Protect and enhance the unique landscape of the Tees Estuary (the estuary is outside County Durham) with its mosaic of internationally important intertidal, wetland and brownfield habitats.
- SEO 2. Incorporate semi-natural habitats within the farmed environment and use innovative farming techniques in order to improve the value of food provision alongside biodiversity, flood water storage capacity, and the ability of the landscape to adapt to the impacts of climate change.
- SEO 3. Ensure that there is a well-connected network of high-quality green infrastructure throughout the Tees Lowlands which will enable people to understand and enjoy the natural environment, as well as providing a range of other benefits including biodiversity enhancement, food provision and flood risk mitigation.

8 HABITATS

County Durham is home to a wide and diverse range of landscapes and wildlife, from the blanket bogs and heather of the uplands through to the mixed farmland of the Durham Coalfield with its remnant ancient woodland and hedgerows to the internationally important Magnesian limestone grasslands of the coast.

Many of the habitats found in County Durham are priority habitats as defined by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England).

Irreplaceable habitats such as ancient woodland, ancient trees and veteran trees, blanket bog, coastal sand dunes and lowland fen can be found in County Durham. These habitats are those that are very difficult or take a very long time to restore, create or replace once destroyed.

8.1 Grassland, Heathland and Peatland

As a largely rural county, grasslands are common and can be found virtually everywhere you care to look. However, most of the grasslands we encounter are of little biodiversity value and the species-rich grasslands which support a vast array of flowering plants and an abundance of wildlife are few and far between.

The truly species rich grasslands are 'unimproved' and have not been fertilized or ploughed, and often result from time-honoured, low-intensity management such as traditional grazing and hay making. There has been a significant decline in species-rich grasslands, although there are no figures for the losses in County Durham, at a national level they have been lost at an alarming rate with over 97% disappearing over the last one hundred years primarily due to agricultural intensification.

Most grasslands in County Durham are 'improved' agricultural grasslands, these are low in plant diversity, due to seeding with agricultural species like Perennial ryegrass (*Lolium perenne*), high fertilizer use and intensive grazing.

A wide variety of grassland types are found throughout County Durham, while the bulk of these are agriculturally improved, there are still examples of unimproved species rich grasslands with hay meadows in the North Pennines and magnesian limestone grasslands in the east of the county.

These unimproved grasslands are regarded as UK priority habitats and there are six found in the county; lowland dry acid grassland, lowland meadow, lowland calcareous grassland, upland calcareous grassland, upland hay meadow, and coastal & floodplain grazing marsh. There are a further two UK Priority habitats in the county that can be regarded as grasslands; calaminarian grasslands and open mosaic habitats on previously developed land.

Lowland acid grassland is not necessarily species rich but contains a characteristic suite of species including Heath bedstraw (*Galium saxatile*), Heath woodrush (*Luzula multiflora),* Tormentil (*Potentilla erecta*) and Wavy hair grass (*Deschampsia flexuosa*). Examples of this type of grassland are scarce in the county, but there is a good example at Brasside Pond SSSI to the north of Durham city.

Lowland meadows are far more botanically rich than their acidic counterparts and are found on soils with a neutral pH. Lowland meadows are found in fragmented patches across the

lowlands and fringes of the uplands and like the lowland acidic grasslands, it is a rare and fragmented resource.

The calcareous grasslands are more common, and their distribution is well defined, with this habitat being found mainly on the magnesian limestone outcrops to the east of the county and the carboniferous limestone in the North Pennines. Although all based on limestone the geographical and climatic differences means that the species composition of the grasslands differs. The upland calcareous grasslands are found at moderate to high altitudes in the county and are characterised by Blue moor-grass and Bedstraw *(Galium*) species. Within Upper Teesdale a notable and unique type of upland calcareous grassland forms on 'sugar limestone'. The lime rich geology combined with high rainfall and low temperatures supports an unusual assemblage of specialist plants which includes both northern, arctic-alpine species at the southern edge of their range and southern European species at their northern limits. Windybank Fell and Cronkley Fell support this distinctive local flora known as the 'Teesdale Assemblage'. At lower altitudes in the east of the county calcareous grasslands are confined to the limestone geology of the Durham Magnesian Limestone Plateau NCA. Unimproved magnesian limestone grassland was once more widespread, and most areas now survive as isolated fragments, with good examples at Thirslington National Nature Reserve, which contains the most extensive stand of unimproved magnesian limestone grassland in Britain, and Cassop Vale SSSI.

Upland hay meadows can be found on the higher grounds in the west associated with the North Pennine and Durham Coalfield Fringe NCAs. These grasslands are known as an incredibly diverse habitat with the best examples containing up to 120 plant species across the field. Typical species include Sweet vernal grass (*Anthoxanthum odoratum*), Wood crane's-bill (*Geranium sylvaticum*), Great burnet (*Sanguisorba officinalis*), Pignut (*Conopodium majus*), Rough hawkbit (*Leontodon hispidus*) and Yellow rattle (*Rhinanthus minor*). These grassland habitats are dependent on the persistence of traditional management through hay cutting and aftermath grazing. Probably the best-known example of an upland hay meadow in County Durham is Hannah's Meadow in Baldersdale. The site is named after Hannah Hauxwell, who appeared in several television documentaries which covered the harshness of her farming life. Miss Hauxwell ran the farm for over 50 years and employed traditional farming methods and so the fields have never been reseeded or had artificial fertilizer applied, the result are meadows with a very rich botanical composition with rare species such as Moonwort (*Botrychium lunaria*) and Frog orchid (*Coeloglossum viride*) also present.

Coastal and floodplain grazing marsh is rare in County Durham with only a single location within the south of the county, east of Greta Bridge associated with Hutton Beck being mapped on Natural England's Priority Habitat Map.

Open mosaic habitat on previously developed land (OMH) is found on sites with a history of development. Durham's industrial past means that OMH can be found throughout the County, particularly in areas where land has been subject to mining and industrial activities such as quarry sites and coal workings. Disused railways and urban demolition sites can also develop into OMH. These areas are typically found within the Durham Magnesian Limestone Plateau, Tyne and Wear Lowland and Durham Coalfield Pennine Fringe NCAs with examples of this habitat at sites such as Horden Industrial Estate, North East Industrial Estate and the former Fishburn coking plant and colliery, which closed in the 1980s and where the land has developed into a mosaic of habitats such as scrub, grassland, wetlands and bare ground. This mosaic of habitats means that OMH are often rich in wildlife supporting a wide variety of invertebrates

including solitary bees and butterflies such as Dingy skipper (*Erynnis tages)* and Grayling (*Hipparchia semele)*.

Another habitat that has its roots in industry are the calaminarian grasslands. These grasslands are found on river gravels and spoil heaps where heavy metal pollution from historic mining restricts the plants present to those tolerant to heavy metals. Lichens and heavy metal tolerant plants such as Spring sandwort (*Minuartia verna)*, Mountain pansy (*Viola lutea)* and Alpine pennycress *(Thalspi caerulescens*) make up the sward. Calaminarian grasslands are found in Upper Teesdale and Weardale.

Waxcaps (*Hygrocybe spp*) are bright and colourful fungi that occur in nutrient-poor grasslands such as old pastures, heathlands, and churchyards. They often form the most obvious group of fungi in 'waxcap grasslands', a term used to describe grasslands supporting rich fungal assemblages. Alongside the waxcaps other fungal groups such as fairy clubs (*Clavariaceae*) and earthtongues (*Geoglossaceae*) are also indicative of this habitat. Waxcap grasslands are a local priority, being listed on the Durham Biodiversity Action Plan. Ploughing and applications of fertilizer are highly detrimental to these fungi and so most of the waxcap grasslands are found in the uplands and upland fringes where the impacts of agricultural intensification have been less intensive. Waxcap grasslands require close-grazing or regular mowing to maintain a short grassland sward. This management is evident on the grasslands making up the embankments of Northumbrian Water's reservoirs, and this combined with no fertilizer inputs has led to sites such as Tunstall and Burnhope Reservoirs becoming excellent sites for waxcap grassland.

Heathlands and peatlands are both open habitats dominated by low shrubs like heather (*Calluna vulgaris*). The heathlands occur on well-drained, poor, acidic soils, while the peatlands occur where waterlogging prevents the full decomposition of dead vegetation, forming thick layers of carbon-rich peat. In County Durham there are three priority habitats falling under this category; upland and lowland heathland and blanket bog.

Blanket bog is found in the far west of the county on the high moorland plateaux of the North Pennines NCA set on deep accumulations of peat. Generally speaking, the most extensive areas of unspoilt blanket bog lie in the south-west of the county. High quality blanket bog is notable for the extent of *Sphagnum* mosses with other typical species including Cross-leaved heath (*Erica tetralix*), Deer grass (*Trichophorum cespitosum*) and Cotton grasses (*Eriophorum spp*). Some of the best examples can be found at High Cotherstone Moor in Teesdale. Blanket bog can be degraded through overgrazing and burning, in such areas Sphagnum mosses are lost and heather or Purple moor grass (*Molinia caerulea*) can dominate with typical bog species becoming infrequent.

Lowland blanket bog is incredibly rare in Couty Durham, with an example in the Durham Coalfield Pennine Fringe NCA near Stanley Crook. Stanley Moss is an 18 hectare fragment of what was once a much larger area of bog, which is being restored after being partly drained and planted with conifers.

As rainfall starts to reduce moving eastwards across the North Pennines NCA the blanket bogs gradually turn into dry upland heathlands, the drier conditions become less favourable to peat building mosses and the peat layer thins. Heather is the most characteristic plant of these dry upland heath communities with other dwarf shrubs such as Bilberry (*Vaccinium myrtillus*), Crowberry (*Empetrum nigrum*) and Bell heather (*Erica cinerea*). The Durham climate is

relatively dry as it sits in the lee of the Pennine range, so wet upland heathland is very localised, but it can be found in the transitional areas between dry heath and blanket bog.

While upland heathland is well represented in County Durham its lowland counterpart is rare and fragmented. Lowland heaths are found below around 300m in altitude and isolated fragments can be found around Annfield Plain and further towards the coast at Hesledon Moor West SSSI. The best examples are at Waldridge Fell SSSI near Chester-le-Street and Hedleyhope Fell in the Durham Coalfield Pennine Fringe NCA. Lowland heaths were once more common within the coal measures of central Durham, but opencast coal mining alongside urban development has reduced and fragmented this resource.

8.2 Woodland, Hedgerows, Scrub and Trees

Woodland cover is relatively low in County Durham at around 9% compared to the average for the UK of around 14% and for England of around 10%. This is in part due to woodlands being absent from the upland moors which make up a substantial proportion of the county. Some of the county's lowland and upland fringe landscapes are well wooded and coverage is closer to the national average.

In the North Pennines NCA, tree cover is generally sparse with semi-natural woodlands largely restricted to riverbanks, along watercourses and in minor valleys and gills. Woodland cover is also sparse on the Durham Magnesian Limestone Plateau with broadleaved woodland surviving mainly on steeper uncultivated slopes.

Woodland cover across the rest of the county is greater, although it tends to be patchy. The main river valleys and their tributaries are frequently well-wooded with semi-natural oak or oak–birch woodlands. The Pennine Dales Fringe in County Durham has good woodland cover with semi-natural woodlands found alongside riverbanks and within steep sided valleys with examples found at Brignall Banks SSSI and along the banks of the River Tees and River Greta. Within the Durham Coalfield NCA the tributaries of the Wear and Derwent are notable for their ancient oak woodlands with examples at Derwent Gorge and Horsleyhope Ravine SSSI and the riparian woodlands along the River Wear around Durham city form an important woodland resource in the Tyne and Wear Lowlands NCA.

Most of the county's woodland are coniferous, mixed or deciduous plantations, these are areas which have been intentionally planted with trees to fulfil a variety of purposes such as producing timber, supporting biodiversity or providing recreational and amenity benefits. The largest plantation in County Durham is Hamsterley Forest, a Sitka spruce (*Picea sitchensis*) dominated forest covering just over 2000ha which provides timber, recreational opportunities for visitors as well as supporting a range of wildlife. Large mixed and coniferous woodlands such as Hamsterley Forest can be managed to create opportunities for wildlife; introducing habitat diversity by creating open spaces like rides and glades, retaining and creating deadwood and installing bird and bat boxes are actions that can help support a wider range of species.

Several types of native woodland can be found throughout County Durham including seven UK priority habitat woodland types: wood pasture and parkland, upland oak, upland mixed ash, wet woodland, traditional orchards, upland birch woodland and lowland mixed deciduous woodland. This last category typically encompasses most semi-natural woodlands including Ancient Woodland and Plantation on Ancient Woodland Sites (PAWS).

Ancient woodlands in England are those that have been continuously wooded since at least 1600 AD and include:

- Ancient semi-natural woodland mainly comprised of native trees and shrubs typically arising from natural regeneration.
- Ancient Wood Pasture and Parkland
- PAWS – replanted after felling with conifer or broadleaved trees that retain ancient woodland features such as undisturbed soil, ground flora and fungi.

Ancient woodlands, are by far our most important woodland resource and make up about 20% of our woodlands and most are found on land unsuitable for agriculture, surviving in steep sided valleys.

Individual trees can eventually become ancient or veteran trees and are also considered irreplaceable habitats due to their biodiversity, cultural or heritage value. Different definitions of ancient and veteran trees over the years have caused confusion in categorising them, but as a general rule ancient trees are in an ancient stage of life having passed maturity and moved into senescence, they also have a significant amount of decay features providing opportunities for wildlife. Whilst all ancient trees are veteran trees not all veteran trees are ancient. Veteran trees may not be very old but do have significant decay features such as heart rot and hollowing. The age at which a tree becomes ancient, or veteran will vary by species because each species ages at a different rate.

Whilst most of our ancient and veteran trees are found in woodlands, the rest are found either singly or in small groups in hedgerows, parklands, fields and very occasionally in urban green spaces and roadside verges. Many are found in long established parklands and wood pasture habitat.

County Durham has a number of historic wood pastures and parklands and examples can be found across the county although the majority are found within the Durham Coalfield Pennine Fringe and Pennine Dales Fringe. Raby Castle at Staindrop and Auckland Castle Park at Bishop Auckland are two examples and it is the veteran Sycamores (*Acer pseudoplatanus)* and English oak (*Quercus robur*) at Raby Castle or the ancient and veteran oaks and veteran sweet chestnut (*Castanea sativa*) at Auckland Castle Park that spring to mind when people think of these age-old trees. However, in the west of the county as you move up the dales, smaller, shorter-lived species have reached ancient and veteran status, with ancient Rowan (*Sorbus aucuparia)* at places such as Edmundbyers and Forest-in-Teesdale and ancient Downy Birch (*Betula pubescens*) at Frosterley.

Traditional orchards are sparsely spread throughout County Durham, with the majority in the lowlands. There are few notable orchards in the county, but community orchards have been created, including at Lanchester and Burnhope and the historic orchard at the Old Durham Gardens on the edge of Durham City has been brought back into positive management.

Scrub can be found throughout the entire county either as dense continuous stands or scattered bushes. It provides shelter, food and nesting sites for a wide range of species and forms a valuable transitional zone between different habitats like woodland and grasslands. On the Durham coast scrub provides important roosting and feeding areas for migrant birds particularly as tree cover is sparse. One scrub community of special significance is dominated by juniper *(Juniperus communis)*, whilst not a UK priority habitat, Juniper scrub is listed on the

Durham Biodiversity Action Plan. The majority of this habitat is found in the North Pennines, with the notable exception being a single site on the coast.

The hedgerows in County Durham date from a variety of periods, some survive from the medieval period and possibly earlier, but in general the landscape is dominated by hedgerows established between the 16th and 19th centuries.

Hedgerows are generally characteristic of the lowlands with the dominant field boundary changing to dry-stone walls in the North Pennines NCA. The county's hedgerows are generally species poor, with an estimated 80% being composed of only one or two woody species (Bailey 1978) with hawthorn being the most used species.

The most common hedgerow tree in County Durham is ash (*Fraxinus excelsior*) accounting for 70% of all hedgerow trees, this could amount to 40,000 ash trees within hedgerows (Durham County Council, 2025). Sycamore and oaks are other notable hedgerow trees but are present in much smaller numbers.

Hedgerows came under pressure as changes in agriculture during the 1900's resulted in these features being lost as fields were amalgamated into large more efficient units. Although hedge removal is now much less common, a lack of appropriate management is an issue that still leads to the decline of our hedgerows.

Development has also had an impact, and in County Durham historical opencast mining within the Tyne and Wear Lowlands and Durham Coalfield Fringe NCAs is estimated to have removed 800km of field boundaries (Durham County Council, 2009).

The 1994 Hedgerow Survey found that almost half of the hedges on parish and township boundaries had been lost since 1860 or survived only as relics and in 2006 it was estimated that 21% of the hedgerow resource had been lost since 1979. (Durham County Council, 2006). More recently grants provided through agri-environment schemes and the County Durham Hedgerow Partnership's Field Boundary Restoration Grant Scheme have had some success in supporting farmers and landowners in restoring and renovating existing hedges and the planting of new ones.

8.3 Running Water and Wetlands

The principal rivers in County Durham are the River Wear, which flows through the central and northern parts of the county; the River Tees, which rises in the North Pennines and runs into the North Sea at the Tees estuary; and the River Derwent, which drains the northern part of the county. The strategy area also encompasses several smaller watercourses, most notably the Browney, Gaunless and Skerne, and their numerous tributaries that link a broad expanse of land to the strategy's river network, providing connection to a wide range of habitats and communities throughout the area.

The river systems are a major contributor to the character of the county, rivers and streams act as natural wildlife corridors through the landscape and many of our ancient woodlands flank their steep sided banks. While our rivers support a wide variety of wildlife and provide opportunities for recreation and engagement with the countryside they face challenges from pollution, invasive species, loss of bankside vegetation and obstructions that impact fish migrations.

Wetlands range from open water habitats such as ponds and lakes through to the swamps and fens where emergent vegetation dominates. There are a range of UK priority habitats found in County Durham; ponds, upland flushes, fens and swamps, purple moor grass and rush pastures, lowland fen and reedbeds.

Areas of open water are found across the county, in the west large reservoirs occur at the head of the dales. The largest of these is Cow Green Reservoir in upper Teesdale which is a popular spot for anglers as it supports a large reserve of Brown trout (*Salmo trutta)*. The larger reservoirs can be important for breeding and over-wintering wildfowl such as Wigeon (*Mareca penelope*).

As you move east the large reservoirs become less numerous, and smaller man-made waterbodies begin to appear. Many of these are the result of mineral extraction; sand and gravel working alongside the River Wear created the ponds and wetlands at Durham Wildlife Trust's Low Barns Nature Reserve and clay extraction created Brasside Ponds SSSI close to Durham. More 'natural' open water features are more difficult to find, but there are examples of oxbow lakes and farm ponds across the county, the best of which is arguably Butterby Oxbow SSSI which lies just south of Durham city, which was formed when a meander of the River Wear was cut off in 1811. The site contains not only open water but is notable for the succession series of fen, swamp and fen-carr.

Lowland fens and reedbeds are a rare feature in Durham, with habitat loss to agriculture being the main driver of wetland losses in the county. Whilst the fens can be botanically diverse including reeds, rushes and sedges and a suite of flowering plants, the reedbeds are a virtual monoculture of common reed (*Phragmites australis*). Both these wetland habitats can support a range of wildlife from dragonflies and amphibians to birds such as Sedge warbler (*Acrocephalus schoenobaenus*) and Water rail (*Rallus aquaticus*).

There are still good examples of fens across the county including at Pow Hill SSSI next to Derwent Reservoir, Pike Hill Bog SSSI near Wingate in the east and Fox Holes Dene along the Durham coast. Notable examples of reedbeds can be found at Low Barns Nature Reserve and Ferryhill Carrs.

Upland flushes, fens and swamps can be found in the far west of County Durham associated with the North Pennines NCA. However, these are some of the rarer and more restricted habitats which exist in a mosaic of larger moorland habitats. Examples of this habitat type are mainly found in Teesdale within the areas east and south east of Cow Green Reservoir.

Purple moor grass and rush pastures are a distinctive and botanically diverse type of damp grassland where Purple moor grass (*Molinia caerulea*) and often sharp-flower rush (*Juncus acutiflorus*) are the most abundant plants. This habitat is rare in County Durham with a few examples in the North Pennines NCA, most notably near Harwood and Widdybank Pasture.

8.4 Urban

Gardens, schools, church yards, community orchards and other urban greenspaces provide important habitats for a variety of wildlife in the urban environment whilst also providing accessible nature friendly spaces for people to enjoy.

There are numerous green spaces in the urban and peri-urban environment, often owned and managed by the County Council as well as Parish and Town Councils. The spaces range from larger sites such as Hardwick Park and Chester-le-Street Riverside Park which provide play facilities, cafes, access to nature and attract large numbers of visitors through to small green

spaces such as village greens and smaller parks that generally serve the local community such as Annfield Plain Park and South Moor Memorial Park.

There has been a move towards encouraging wildlife friendly management practises in County Council owned parks and public open spaces. Wildflower seeding and tree planting has been undertaken and there is on-going research by Durham University and the County Council to help to understand how residents feel about their local green spaces and how they should be managed.

Durham City benefits from the River Wear flowing through it and otters can be seen on the weirs in the centre of the city. Badgers can also be seen in the city, with setts in churchyards and next to allotments and CCTV occasionally picks them up walking through the marketplace at night. Durham Cathedral supports a significant colony of pipistrelle bats and peregrine falcons can be seen flying around the towers and have previously nested there. The Cathedral also supports swifts, with nest boxes fitted in the central tower a few years ago to encourage the species to breed.

8.5 Coast

The Durham coastline contains a range of habitats from fens, calcareous grasslands, and ancient woodlands and while many of the habitats can be found elsewhere in the county some are specific to the coast.

Intertidal habitats include sandy beaches, mudflats and rocky shores and lying above the high tide mark are the sand dunes, these ridges and mounds of sand can only be found in one location in County Durham, at Crimdon. Species such as Bloody Crane's-bill (*Geranium sanguineum*) and Sea rocket (*Cakile maritima*) can be found amongst the dunes.

Maritime cliffs characterise much of the Durham coast and boast a unique, species rich community of para-maritime and lime-loving plants. The soft magnesian limestone cliffs are unstable and constantly eroding and this maintains the presence of open bare ground which supports pioneer vegetation alongside nesting sites for burrowing solitary bees and wasps, hunting grounds for predatory ground beetles and basking sites for butterflies.

9 SPECIES

The quality and extent of our species data vary across taxonomic groups. Some groups such as the birds are well recorded with active and enthusiastic individuals providing records to ERIC NE and other recording platforms on a regular basis. Other groups are not as well represented, especially amongst the invertebrates. As a result, the species data varies in its ability to provide robust information on trends and distribution, but where we have extensive datasets, we have a good degree of confidence in the trends exhibited and therefore were able to make informed decisions on a species inclusion within the Durham Local Nature Recovery Strategy.

9.1 Invertebrates

Within the invertebrates the butterflies, moths, dragonflies and damselflies are the most commonly recorded and recently there has been an increased interest in recording the hoverflies, solitary bees and bumblebees.

The butterflies and moths are well recorded in County Durham with natural historians producing accounts since the late 1800's and Dunn and Parrack publishing The Moths and Butterflies of Northumberland and Durham in 1986. The Atlas of the Butterflies of North East England, published in 2014 is the most recent document charting the ups and downs of our butterfly species. More recently, in 2024, a Durham Moths website was created providing up-to-date information on the moths in County Durham. Most moth recording uses light traps, leading to a tendency for records to be clustered around population centres and that species which do not readily come to light may not be as uncommon as the records suggest.

There are over 1400 species of moth currently recorded in County Durham and that number keeps increasing. Since 2015 the county's moth recorders have found an average of 8 new species a year, but it remains to be seen how many species we have lost during the same period.

The majority of new moths recorded in recent years were previously regarded as southern species which have gradually made their way north. Species which would have been almost unthinkable in County Durham 10 years ago such as Beautiful Hook-tip (*Laspeyria flexula*), Beautiful snout (*Hypena crassalis*), Small ranunculus (*Hecatera dysodea*) and Devon carpet (*Lampropteryx otregiata*) are already established here. Other traditionally southern species such as Leopard moth (*Zeuzera pyrina*), Wormwood (*Cucullia absinthii*) and Orange footman (*Eilema sororcula*) are also showing the first signs of colonisation and starting to get a foothold in the south of the county.

Obviously there have been losses too including the spectacular Goat Moth (*Cossus cossus*) which has not been seen in a wild state since the 19th century along with coastal species such as Portland moth (*Actebia praecox*) and Coast dart (*Euxoa cursoria*).

The Durham coast has long been associated with three of the county's iconic and most important day flying moths, Least minor, Cistus forester (*Adscita geryon*) and Chalk carpet (*Scotopteryx bipunctaria*). All three species are associated with limestone grassland and as such are vulnerable to any habitat changes.

It was thought that Least minor had become restricted to a couple of inland sites after not being recorded on the coast since 1986, but it was rediscovered there in 2022. Similarly, a new site for Cistus forester was discovered about 2.5km north of its traditional coastal site in 2016 but

having only been found in just two small regular sites in the last 50 years it remains very vulnerable. Chalk carpet still occurs along the coast at three sites but has only been recorded at a single inland site since the 1950s.

Since recording began the fortunes of our butterflies have ebbed and flowed, species have become extinct in the county, others have vanished and returned, and new species have colonised.

A number of butterflies including Small blue (*Cupido minimus*), Scotch argus (*Erebia aethiops*), Grayling (*Hipparchia semele*) Pearl-bordered fritillary (*Boloria euphrosyne*) and Marsh fritillary (*Euphydryas aurinia*) have never returned after becoming locally extinct. Other species such as the Silver-washed fritillary (*Argynnis paphia*), which was lost to the county in the 1800's, has made a comeback over the last few years with regular records from its old haunts at the Durham coast and good numbers being seen inland especially at Thrislington NNR.

The abundance of many species has varied over the years with historical declines followed by a strong resurgence. The Orange-tip (*Anthocharis cardamines*) was virtually extinct in the county in the late 1800's, had a few stuttering attempts at fully recolonising in the years up to the 1950's and is now commonly seen across Durham. Other species which are now relatively common in the county were once either locally extinct or incredibly rare, these include the Peacock (*Aglais io*) which is now commonly seen in gardens, and the Speckled wood (*Pararge aegeria*) and Comma (*Polygonia c-album*), both of which were locally extinct by the end of the nineteenth century but can now be found across the county in association with woodland.

New species have colonised the county in recent memory, since the 1980's Small skipper (*Thymelicus sylvestris*), White-letter hairstreak (*Satyrium w-album*) and the Brown argus (*Aricia agestis*) have established themselves in the county moving up from the south, probably in a response to climate change.

The Durham Biodiversity Action Plan (DBAP) identified seven butterfly species of conservation concern in County Durham. Five of those species, Dingy skipper (*Erynnis tages*), Small pearl-bordered fritillary (*Boloria selene*), Dark green fritillary (*Speyeria aglaja*), Grayling and the Northern brown argus, are declining or have undergone declines since the DBAP was last updated in 2007.

The Dark Green fritillary is recovering, albeit slowly, and there are hints that Grayling, which was regarded as extinct in the 1980's might be trying to gradually recolonise, but the recent records for this species are questionable. The Small pearl-bordered fritillary has increased its distribution due to introductions and active management, but its range is still limited, and it remains of concern to local recorders. The Dingy skipper is constantly under threat of further declines as its brownfield habitats are under pressure from development and lack of management. The two other species on the DBAP are the White-letter (*Satyrium w-album*) and Green hairstreak (*Callophrys rubi*). The White-letter hairstreak has probably declined since the early 2000s.

All the locally declining species are habitat specialists and the national pattern of declines amongst habitat specialists is therefore echoed in Durham; those species able to thrive in common habitats and under a wide variety of environmental conditions appear to be stable, whilst those with more specific requirements are struggling.

The iconic butterfly of County Durham is probably the Northern brown argus, certainly the species is known locally as the Durham argus, although this stems from a previously held belief that the populations in Durham were a sub-species specific to northern England. This species is a specialist of limestone grasslands and is at risk of becoming increasingly scarce especially on its small isolated inland sites, this is the case for all our habitat specialists as their surviving patches of habitat are gradually lost.

The bumblebees also have a long-recorded history in County Durham dating back to the records of Albany Hancock in 1827 and culminating in the Bumblebees of North East England (Coult et al 2019) published by the Natural History Society of Northumbria. In the years between Hancock's records and the NHSN publication some of our bumblebee species have declined or become locally extinct while new species have colonised the county. Four species have become extinct in County Durham since the early 1800s, the last record for the Shrill carder bee (*Bombus sylvarum*) and Large garden bumblebee (*Bombus ruderatus*) were in 1926 and by the end of the 1970's both the Great yellow bumblebee (*Bombus distinguendus*) and Red-shanked carder bee (*Bombus ruderarius*) were extinct.

Some species have undergone significant reductions in distribution; the Moss carder bee (*Bombus muscorum*) was lost from the lowlands and coast by the 1970's but still survives in upper Teesdale and Weardale. The Broken-belted bumblebee (*Bombus soroeensis*), which has undergone a major national decline, is another species with a redoubt in the Durham uplands. The national and local declines in bumblebees is attributed to habitat loss, especially wildflower meadows, the impacts of pesticides and climate change.

Despite the notable extinctions and declines some species are increasing their distribution in Durham including the Red-tailed cuckoo bee (*Bombus rupestris*). The Tree bumblebee (*Bombus hypnorum*) is a relatively recent addition to our bumblebee fauna, arriving in the county in 2010 and now seen commonly across the county during the summer.

The dragonflies and damselflies have been recorded by individuals and various wildlife groups since the 1800s, albeit inconsistently. There are twenty well-established species occupying a range of wetland habitats from rivers and garden ponds to the upland bogs and mires. Recent publications include the Dragonflies and Damselflies of Northumberland and Durham (Eales 2016) and more recently, since 2021, the County Dragonfly Recorder and the British Dragonfly Society has organised countywide surveys generally focusing on Durham Wildlife Trust sites (Coates 2024). The most common species recorded include Common darter (*Sympetrum striolatum*), Blue tailed damselfly (*Ischnura elegans*), Common blue damselfly (*Enallagma cyathigerum*) and Southern hawker (*Aeshna cyanea*). Two species have arrived in the county over the last few years, Small red-eyed damselfly (*Erythromma viridulum*), and Willow emerald damselfly (*Chalcolestes viridis*). The spread of these two species progressively north through England has been monitored for some time, so it was not a surprise when they were recently observed in the county.

Other invertebrates are less well recorded, there has been increased recording of solitary bees and some of the flies, notably the hoverflies. Despite the recent uptick in recording, the data for many of the invertebrates is not sufficient to understand their status and hence develop priorities and measures within the LNRS.

9.2 Birds

The avifauna of county Durham has been well documented over the last one hundred years with History of the Birds of Durham (Temperley 1951) being an important document for the county at the time and a touchstone for later works. Those later works include A Summer Atlas of the Breeding Birds of County Durham (Westerberg & Bowey 1989) and most recently the Birds of Durham (Newsome & Bowey 2012). Durham Bird Club and Durham Upland Bird Study Group are very active monitoring species and feeding into strategic national surveys for the British Trust for Ornithology (BTO).

Durham's avifauna can be roughly split between two distinctive geographical areas, the uplands and lowlands. The upland community of waders, grouse, birds of prey and several passerines have seen variable population changes over the years. Black grouse is probably the iconic species in the Durham uplands and were once much commoner. Considerable efforts have been made to increase the population with projects such as the North Pennines Black Grouse Recovery Project (1996-2010) successfully encouraging population growth. Continued effort is required to build upon previous work to support a population vulnerable to climate change, land use changes and disturbance.

Breeding wader populations have seen contrasting fortunes across the county with the upland wader assemblage faring much better than those in the lowlands. Grouse moor management, including predator control, across large swathes of the Pennines creates a suitable grassland and heather sward that benefit waders, notably Curlew, Golden plover and Lapwing. This intensive management alongside projects to improve peatland habitats and the retention and restoration of hay meadows allows for a high density of waders including Redshank and Snipe (*Gallinago gallinago*). Lowland populations in contrast are very much limited with only sporadic breeding, the farming practices of autumn and winter sown crops, intensively grazed pasture, sileage production and drainage leaving very little habitat available for waders. Curlew, Redshank and Snipe have seen the most dramatic declines across lowland Durham. Wintering populations favour farmland and inland water bodies. Large winter concentrations of Golden plover and Lapwing can be found across lowland areas with Curlew, Redshank and Snipe in smaller numbers.

Large tracts of lowland County Durham are farmed, and the main species associated with this habitat are Grey partridge, Corn bunting (*Emberiza calandra*), Tree sparrow (*Passer montanus*), Reed bunting (*Emberiza schoeniclus*), Yellowhammer (*Emberiza citrinella*), Linnet (*Carduelis cannabina*), Skylark (*Alauda arvensis*) and Yellow wagtail (*Motacilla flava*). The lowland farmland bird assemblage in the county, as with the rest of the UK has seen dramatic declines, some of these farmland birds have seen declines of up to 90% since the 1950s largely due to changes in agricultural systems with greater silage production, pesticide use and loss of hedgerows. Corn bunting has undergone a catastrophic national decline, in Durham the Corn bunting held out for a while in some numbers around the villages of Bishop Middleham, Mainsforth, Ferryhill, Chilton, the Trimdons and Sedgefield. However, this population has now gone, and the species is close to extinction in County Durham. This area of County Durham contains an unusual mosaic of habitats within lowland Durham, with a mix of meadows, arable crops, grazing land and wetland all present. As a result, this area is the last local stronghold for Yellow wagtail, a species that has declined nationally by over 70% since the 1970's.

The range of habitats across Durham support a diverse range of birds. Although wetlands holding significant numbers of breeding waterfowl are a rarity in County Durham; sites such as

Hurworth Burn and Crookfoot Reservoir are of note alongside the suite of wetlands in the mid-Wear valley.

Deciduous woodlands, especially ancient and mature oak woodlands, support a suite of specialist species including Wood warbler (*Phylloscopus sibilatrix*) and Pied flycatcher (*Ficedula hypoleuca*). The most important areas for the woodland specialist are in the mid to upper sections of the main valleys, the heavily-wooded Derwent valley, the Wear valley around Durham city and the upper Tees are arguably the most important areas. The coastal denes have a lower diversity of woodland birds and Wood warbler and Pied flycatcher are absent along the coast. Nationally the woodland bird index has declined by 27% since the 1970's (Burns et al, 2020) and this decline is reflected in County Durham with the Birds of Durham indicating that many of our woodland species have declined.

Britain's fastest declining resident bird the Willow Tit (*Poecile montanus*) is a woodland specialist and has declined by 90% nationally. County Durham holds approximately 25% of the UK population. Willow Tit is predominantly a lowland species favouring scrub and wet woodland. Most of the records are along the river valleys were most of our woodland resource is held, although there are records from scrubby areas around wetlands such as at Brasside SSSI.

The coast is an important habitat for passage and wintering waders, including Sanderling, Purple sandpiper, Lapwing, Curlew and Turnstone. Sections of the Durham coast are designated for their interest to birds, the designations were put in place largely for the wintering bird populations, but one breeding bird was included, Little turn. The Little tern, one of Britain's rarest sea birds, used to nest on the sand dunes at Crimdon and efficient wardening prevented part or total failure of the colony by minimising human impacts and predation. Unfortunately, it has not bred in County Durham for a number of years and has moved a little further south, outside of the county, to Seaton Carew. The over-wintering coastal waders are regarded as being in decline locally. While in part these declines are probably linked to factors affecting breeding in Greenland and Canada there is evidence that recreational disturbance on the Durham coast is having a negative impact (Whittingham et al, 2019).

9.3 Herptiles

The herptiles comprise the reptiles and amphibians. Historically there were four native reptile species in the county, with two snakes, Grass snake (*Natrix natrix*) and Adder (*Vipera berus*) alongside two lizards, Slow worm (*Anguis fragilis*) and Common lizard (*Zootoca vivipara*). There are five native amphibians in Durham, Common frog (*Rana temporaria*), Common toad (*Bufo bufo*) and the three newt species, Palmate (*Lissotriton helveticus),* Smooth (*Lissotriton vulgaris*) and Great crested newt (*Triturus cristatus*).

The Mammals, Amphibians and Reptiles of the North East of England (2012) provided commentary on the status of our herptiles, with separate atlases updating the distribution data for reptiles and amphibians being produced up until 2016 by the County Recorder.

Of the amphibians, the Common frog is the most widespread and common, being found across the county from moorland pools to garden ponds in urban areas. Although both Common frog and toad have declined, mainly due to loss of wetland habitats, they are still widespread across the county.

The Palmate newt is the most widespread of the three native newts as it is capable of breeding in ponds that are slightly more acidic than the others can tolerate and so extends its range into the acidic ponds of the uplands to a greater extent. The other two native newts have a generally more lowland distribution.

The most famous of the amphibians is the Great crested newt, largely due to its status as a legally protected species. Despite this legal protection the species has declined across County Durham due to loss of wetland habitats and the introduction of fish to their breeding ponds, with the fish heavily predating the young newt larvae. There is some evidence that the Great crested newt population may have stabilised, but not that the declines noted in the 2012 publication have been reversed.

Grass snake was always our rarest reptile with only a smattering of records across the county with a concentration in the Derwent Valley. When Durham County Council declared its Ecological Emergency in 2022 there had been no records of Grass snake for five years and it is almost certainly extinct in County Durham, although tantalisingly, there have been recent unconfirmed reports of grass snake in County Durham this year. Whether these reports are authentic, and the Grass snake has held on for all this time remains to be seen.

One of the best areas for reptiles in County Durham is around Derwent and Tunstall Reservoirs which contains a range of habitats including moorlands, small woodlands, stream valleys and disused quarries and railway lines. The majority of Adder records come from this area, and they are generally absent from lowland areas and the coast. The Adder was regarded as having reduced in distribution by the Mammals, Amphibians and Reptiles of the North East of England, and there is no evidence of a recovery in recent years, and it may still be in decline. The Slow worm can be found in the same upland locations as Adder but also has a presence along the Durham coast, although there are only a handful of coastal records. Like the Adder the Slow worm is regarded as having undergone a reduction in distribution and in 2022 the County Recorder felt that the coastal populations were the most likely future population loss amongst the reptiles. Our final reptile is the Common lizard, and they can often be found in the same places as Adder and Slow worm with populations in the uplands and the coast. Unlike the other two reptiles they have a presence in the lowlands, unfortunately they have declined in the lowlands of the County with the main issue being loss, fragmentation and isolation of suitable habitats.

9.4 Fish

As is commonplace across the UK, fish in County Durham are widely under documented and under recorded. Because of this, knowledge of species and distribution is largely based on survey data collected by the Environment Agency (and to a lesser extent external organisations) and limited evidence from anglers about specific species, such as migratory fish catch returns and anecdotal information.

Atlantic Salmon (*Salmo Salar*) are experiencing a national and international decline, demonstrated by the recent International Union for Conservation of Nature (IUCN) reclassification from 'least concern' to 'endangered' in Great Britain. The Environment Agency's assessment of the River Wear Salmon has deemed them to be 'at risk', with the Tees assessed as 'probably at risk', despite the water quality in both rivers dramatically improving with the cessation of heavy industry and mining activities. Their decline can be attributed to a number of factors including, but not limited to, obstructions to migration, overfishing at sea, poor water

quality, degradation of habitat and effects on rivers related to climate change. Despite these challenges, with the removal of barriers and improvements in water quality Salmon will still return, demonstrated by Salmon parr (juveniles) being found in old Durham beck in 2024 for the first time in Environment Agency surveys.

Sea trout and Brown trout (*Salmo trutta*), the same species but following different life cycles, are widely distributed across the area. Brown trout, remaining resident year-round, are an essential part of the ecosystem of both rivers' catchments, being found in all but the smallest of tributaries and ephemeral streams, with the upper Tees being particularly notable for its large populations of wild brown trout.

The European eel (*anguilla anguilla*) is present in both catchments, however local distribution and population data is limited. The international picture for the European eel is grave, listed as critically endangered on the IUCN Red List, with an estimated 95% decline in population since the 1980s. Whilst a number of the causes, such as unsustainable overfishing and the presence of an introduced parasite, are not within the realms of influence afforded by the LNRS, obstruction to the eels migration, both on its inward journey as an elver and outward journey as an adult silver eel is likely to be a serious limiting factor to its survival and something that can be overcome.

There are three species of lamprey in the UK, Brook lamprey (*Lampetra planeri*), River lamprey (*Lampetra fluviatilis*) and Sea lamprey (*Petromyzon marinus*) and their population declines across the country have been attributed to pollution and physical barriers to migration. The Sea lamprey is regarded has having undergone the most significant decline, they have been making a return to County Durham with a number of spawning sites found on the River Wear near Chester-le-Street in 2009 with further sightings since.

The lamprey is probably the inspiration for a famous piece of local folklore, the Lambton Worm is a tale from County Durham about John Lambton, who skipped church to fish, caught a worm-like creature, and threw it down a well in disgust. Safe in the well the worm grew into a gigantic serpent, terrorizing the local area by eating livestock and children. Fortunately, John Lambton returned from the Crusades and defeated the beast.

9.5 Flowering Plants

Flowering plants occurring in the county have, and continues to be, well recorded. The Flora and Vegetation of County Durham (Graham 1988) and subsequent mapping for the Botanical Society of Britain & Ireland (BSBI) Online Plant Atlas in 2020 have shown the gains and losses of species in the last 20 years.

Nationally, Durham has 4 species that are classed as critically endangered, 17 more that are in the endangered category and no less than 43 that are vulnerable. Two specific areas hold many of these and other locally rare species, the Upper Teesdale area is famous for its "Teesdale assemblage", a unique combination of rare, high altitude, arctic-alpine flora such as Spring gentian, Teesdale sandwort and Teesdale violet (*Viola rupestris*). In the east of the county, we find the magnesian limestone grasslands with Blue moor grass, Birds eye primrose (*Primula farinosa),* Perennial flax (*Linum perenne*) and the best UK populations of Dark red helleborine (*Epipactis atrorubens*). Much of both these areas are generally protected within statutory protected sites and nature reserves and work is continuing to study and protect the species within by several organisations

However, away from these areas there are a number of rare or even very rare species existing at other, much less protected sites, if protected at all. Several species, notably Wood barley (*Hordelymus europaeus*), Heath dog violet (*Viola canina*), Greater butterfly orchid (*Platanthera chlorantha)* and Intermediate wintergreen (*Pyrola media*) are most often found outside of statutory protected sites. Some of these species may be near to, if not already, extinct, though botanists are continuing to record these when still present or are checking old records in the hope of a rediscovery.

County Durham is well known botanically for its Lady's Mantles (*Alchemilla* spp), which are a complex group of rare species with a UK stronghold in the west of County Durham. Nationally *A. acutiloba*, *A. monticola* and to lesser extent *A. glomerulans* and *A. subcrenata* are now very scarce plants. Despite County Durham being renowned for its Lady's Mantles they have declined considerably locally. Surveys in Teesdale and Weardale have revealed localized losses since the 1960s from hay meadows due to agricultural intensification, and from roadside verges due to road widening and inappropriate management. The latter two species have not been seen anywhere in the county since 2009 and 2018 respectively and may be even extinct. One other species within this assemblage is *Alchemilla wichurae,* but this species prefers rocky ledges and cliffs as opposed to pasture and roadside.

Another notable plant associated with the western uplands of Durham is Northern Hawk's-beard (*Crepis mollis*) which can be found in herb-rich upland pastures and hay meadows, wood pasture and on-stream banks and roadsides. The plant can be difficult to find due to the remoteness of its sites, the small size of populations, and lack of flowering, as well as confusion with other yellow-flowered 'Dandelion look-alikes'. The species has been in serious decline throughout its national range and locally it has been recorded at only 7 of its former sites since 1991, and in Weardale is only now recorded from a single site.

Flat sedge (*Blysmus compressus*) is still frequent in Upper Teesdale but has nevertheless declined by 70% in this locality. Even more alarming is the disappearance of Flat sedge in lowland Durham, having declined to just six sites by 1990 the downward trend has continued with the species now only being known from a couple of sites. The Flat sedge is a species of marshes and fens, and sedge-rich, damp grassland and other areas which are subject to flooding; with the loss of so much wetland habitat in the county it is no surprising that the lowland populations have almost gone. Although the Flat sedge is widespread but localized in England and southern Scotland most of the population occurs in Northern England and so the catastrophic declines in County Durham are notable.

One rare County Durham native is somewhat of a botanical enigma, the Ivy-leaved Bellflower (*Wahlenbergia hederacea*) is a species virtually confined to South West England and Wales with a smattering of records from elsewhere in eastern England and Scotland. Despite the geographical constraints it has been found at two sites in County Durham, the first being found in 1926 and then a second location in 1953. The plant can still be found at these locations, both by boggy, acid burns in the Stanhope area of Weardale. The species is classified nationally as Near Threatened.

9.6 Mammals

The status and distribution of County Durham's terrestrial wild mammals is imperfectly understood as many are nocturnal and most avoid humans. For this reason, recording of mammal presence and distribution has been, and is, poor compared to more accessible groups such as birds and butterflies.

Some mammals are limited to specific habitat types, such as woodland, wetland or grassland and most are sensitive to disturbance by humans. The presence, absence and quality of supporting habitats determines the distribution of the county's mammals with increasing habitat loss, fragmentation and human recreational disturbance causing species decline. The weakness of mammal recording makes it difficult to accurately comment on mammal status although some generalisations can be made.

The smaller the mammal the more likely it is to be unnoticed and unrecorded; Moles (*Talpa europaea),* Hedgehogs (*Erinaceus europaeus*), Brown rat (*Rattus norvegicus*), mice, shrews and voles are assumed to be common and widespread in a variety of habitats with the exceptions of Dormouse (*Muscardinus avellanarius*), Harvest mouse (*Micromys minutus*) and Water vole (*Arvicola amphibius*). The former was once resident but recent surveys in suitable specialist habitat (ancient woodland) have failed to find it. Harvest mouse is considered to be in national decline; local increased recorder effort is finding more locations for the species, but it is still only found to be sparsely distributed at low density in the county. The Water vole has suffered a catastrophic national and local decline caused by the degradation of its aquatic habitats and predation by the imported American mink.

Another introduced species, the American Grey squirrel has displaced the native Red squirrel through competition for woodland resources and the spread of disease. Both Water vole and Red squirrel were formally much more widespread locally but by the 1950s surveyors found Red Squirrels to have "declined in recent years" (Temperley 1953) and they appear to have been lost from the east of the county by the early 2000's. By the late 1990s national surveys for Water vole indicated a 94% site loss (Strachan et al 2000) and these losses have been replicated locally and the Water vole is now absent from the Durham lowlands. With both Water vole and Red squirrel restricted to a very few isolated sites in County Durham urgent conservation action is required if they are not to be lost completely.

Four species of deer can be found in County Durham. Red (*Cervus elaphus*) and the introduced Fallow deer (*Dama dama*), with the exception of occasional escapees, are restricted to parks and farms where their population is controlled. By the beginning of the 19th century the native Roe deer (*Capreolus capreolus*) was considered extinct or exceedingly rare in the north-east since then woodland planting, alongside a lack of predators and milder winters, has increased their numbers to the point of them being common and widespread. Within the last twenty-five years, the introduced, Muntjac deer (*Muntiacus reevesi)* has established a limited presence in the county. Although native deer are a natural part of our countryside, their numbers in the UK are now thought to be at their highest levels in 1000 years, these high deer numbers are leading to negative impacts on our native woodlands. Increasing grazing pressure from deer can damage young trees and restrict natural regeneration of trees, shrubs and woodland plants. This leads to a loss of plant diversity and a simplifying of the woodland structure with negative knock-on effects for a range of birds, mammals and invertebrates.

The Greater white toothed shrew (*Crocidura russula*) has recently colonised the county from Europe and is now well established in east Durham. An expanding colonisation of Greater white toothed shrew in Ireland resulted in the displacement of the native Pygmy shrew (*Sorex minutus*), whether this happens in Durham is the subject of ongoing monitoring.

Of the three larger carnivores the Fox (*Vulpes vulpes*) and Badger (*Meles meles*) are found across the county. The Otter (*Lutra lutra*), after a late 20th century decline that left it virtually absent from County Durham, has expanded its range to nearly all the county's watercourses.

The fortunes of the smaller carnivores, Stoat (*Mustela erminea*), Weasel (*Mustela nivalis*), Polecat (*Mustela putorius*), Pine marten (*Martes martes*) and the introduced American mink vary considerably. Stoats and weasels are widespread and common, and the American mink is widespread along the county's watercourses. The pine marten and polecat suffered severe national declines in the 19th century, disappearing from most of England, both have re-established nationally and are close to being present in County Durham. The pine marten is not known to breed in the county but expanding populations in Northumberland and North Yorkshire may eventually colonise the county. The status of the polecat is confused because of its relationship to the domestic ferret. Road-kill polecat/ferret can be difficult to differentiate visually with some animals looking like polecats carrying ferret genes. Recent studies have found a small number of genetically pure polecats in the west of the county.

10 DEVELOPING THE PRIORITIES AND MEASURES

The priorities and measures were informed by the responses from the consultation process and workshops. The information gathered by this engagement was used to help define the scope of the habitats and species that the LNRS should consider and ultimately led to the creation of habitat and species Working Groups that developed the draft priorities and measures over the summer and autumn of 2024.

Further public consultation in early 2025 lead to the priorities and measures being further discussed and refined leading to the versions presented here.

10.1 Species Workshops

ERIC NE produced the species longlist for County Durham; this list was compiled in line with DEFRA guidance and included species that had been assessed as Red List Threatened against IUCN criteria and those species where there was sufficient evidence to indicate that they might be considered for threatened status.

A Regional LNRS Species Conference was held by ERIC NE where they presented the species longlists for all the North East LNRSs. The conference was attended by local recorders and representatives from organisations involved with nature recovery. The aim of the conference was to explain and promote the LNRS and interrogate the longlists and make any appropriate deletions or additions.

The revised version of the longlist was taken to a Durham Species Workshop which aimed to refine the longlist and begin the process of identifying which species the County Durham LNRS could support. The workshop was attended by a range of local recorders alongside members of a local angling club, a quarry operator, consultant ecologists and representatives from nature recovery NGOs.

The workshop ran a 'traffic light' system as the basis for discussions.

Red:

- Species needs a better evidence base
- Species needs action outside England
- Vagrants / occasional visitors

Amber:

- Species needs more / bigger / better-connected habitat

Green:

- Species needs targeted habitat management
- Species needs improvements in environmental quality
- Species needs bespoke conservation action/s

Those species where we had insufficient data to understand a decline or its reasons for declining fell outside of England were regarded as being unsuitable for taking forward within the LNRS process, as appropriate local action could not be identified or would not result in species recovery.

Species which would clearly benefit from targeted local action and improvements in environmental quality were regarded as being suitable for inclusion.

Falling between these two options was the 'amber' category. One of the goals of the LNRS is to create high-quality wildlife habitats that are better connected across the landscape. Species that could potentially recover under those conditions were placed within this category, acknowledging that they were unlikely to become priorities within the LNRS.

The Durham Species Workshop did not define which species were taken up by the LNRS, it did however start to narrow down the options and provided the jumping off point for the work of the species Working Groups.

10.2 Consultation and Farmer / Landowner Workshops Responses

The farmer and landowner workshops highlighted several species. Birds such as Black grouse and the wading birds came up in more than one workshop. Other species mentioned included water vole and red squirrel and the impacts on fish from water pollution and barriers to migration such as culverts.

Woodlands and hedgerows were also a common topic at the workshops with the value of hedgerows as connecting habitats being highlighted. Improving the diversity and connectivity of our woodlands, especially ancient woodlands was raised as a priority. In one of the workshops the impacts of coniferous and mixed woodland planting on reclamation sites was raised, with the potential to thin and replant with native species or clear trees to promote species rich grasslands proposed as actions to aid nature recovery.

Creating a diversity of woodlands including orchards and promoting 'in-field' trees to replace those lost and to maintain continuity of mature single trees in the landscape was also highlighted.

One landowner noted that unauthorised motorbike use was damaging a local ancient woodland, and that management of woodlands could include measures to restrict inappropriate access.

The need to maintain correct grazing pressures to sustain the Teesdale assemblage and limestone grasslands was seen as an issue, with the use of traditional, locally distinctive breeds to deliver grazing management seen as a mechanism to conserve rare breeds.

Concerns were raised at the farmer and landowner workshops that the LNRS would dictate actions on the ground and reduce a farmer's ability to farm the land; one individual with farmland adjacent to an ancient woodland was concerned that they would have to give over land to nature recovery. Although the advisory nature of the LNRS was communicated it remained a concern that the LNRS was a mechanism to dictate land management to farmers. Greater clarity and detail from Defra over how measures would be funded through agri-environment schemes was seen as important with some attendees believing that a lack of communication from Defra could be a barrier to engagement with the LNRS process and its nature recovery objectives.

Locations where there was potential to deliver nature recovery were discussed, with the data logged onto an on-line tool at the end of the sessions and passed onto ERIC NE to assist with the mapping.

The regular meetings held with land agents kept the views of landowners and managers on the radar during the development of the LNRS and were generally positive. Land agents engaged with the process and understood how the LNRS would promote nature recovery and guide local funding and so could be important for their client's landholding, farm or business. They did raise concerns that mapped areas would find it more difficult to gain planning permission or be allocated in the local plan, and this would concern landowners. Land agents asked how requests for land parcels to be removed from the mapping would be addressed. The Regulations and Guidance supporting the development of the LNRS states that if a landowner opposes a potential measure, then alternative, more suitable measures should be investigated. The LNRS will try and accommodate any landowner concerns where this would not erode the function, coherence and ambition of the strategy.

The residents' consultation showed support for nature recovery, with over 80% strongly agreeing that the decline in wildlife was a matter that urgently needs attention. Most people felt that climate adaption was the most important benefit that nature provides, with health and wellbeing and flood alleviation also important.

The consultation asked which habitats should be a priority for County Durham, grasslands and woodlands dominated the responses while heathland and scrub habitats fared less well. The invertebrates topped the list of species groups that the residents felt were important, with this group being favoured in 80% of cases. The birds followed in second place with the mammals also being well represented.

When it came to specific species, Red squirrel and Hedgehog were the most mentioned alongside a range of butterflies and the bees. Bird species such as Lapwing and Curlew were often cited alongside farmland birds such as Yellowhammer and Skylark. Another key group of birds which resonated with the public were the swallows, martins and swifts.

Further details on the residents' consultation can be found in Appendix 1.

The engagement with schools showed support for nature recovery with 94% valuing nature, thinking that it should be preserved. One of the key results from the engagement with primary schools showed there was a definite correlation between where children visited and the habitats that they valued, with most children encountering nature on their doorstep and by visiting nature reserves.

The secondary school pupils felt that woodlands were the most important habitats in the county, with pupils from east Durham also highlighting the coast as important. This again highlighted the relationship between what habitats schoolchildren valued and what they saw in their local environment. As with the residents' consultation the invertebrates were seen as important, although mammals were a slightly more popular choice when asked which types of wildlife they would like to see more of in the county.

A response to the February 2025 consultation on the draft priorities and measures noted a lack of any priority around bryophytes (mosses, liverworts, and hornworts). A number of attempts were made to set up meetings or phone calls with bryophyte specialists to discuss the potential for their inclusion in the County Durham LNRS. The RA has been unable to secure any meetings to date, and so the bryophytes are currently not included in the LNRS. The role of farmers in managing land for nature was noted in the consultation alongside a concern that the purpose of the LNRS was to designate land and require landowners to undertake nature recovery action; this echoed the concerns raised at some of the Landowner and Farmer Workshops. Other

comments noted the absence of a priority around public engagement. The potential for a priority and measures on public engagement was discussed, but it was felt that this work was on-going by partners and that a targeted approach was more appropriate to the LNRS. Measures for engagement have been put forward for specific habitats and species where a need was identified by the working groups and overarching priorities include a focus on engagement with farmers and landowners and encouraging greater biological recording.

10.3 Working Groups

The Working Groups covered various habitats and species groups, and their membership included representatives from private, public and charitable organisations as well as individuals with an interest or specialist knowledge of the subject.

Underpinning the development of the priorities and measures were the Lawton Principles, a set of four guiding concepts - More, Bigger, Better, and Joined up - for enhancing ecological networks and improving wildlife habitats in the UK (Lawton 2010). The LNRS aims to implement these principes at a local level. The Working Groups used the principes to inform development of the priorities and measures with the aim of building a resilient, landscape-scale network that benefits both nature and people.

The responsible authority and Natural England sat on all the Working Groups to ensure that NEOs and wider benefits were considered, and the groups were integrated and opportunities to take a co-ordinated approach to nature recovery were taken.

The results of the consultations, Species Workshops and Farmer & Landowner Workshops were communicated to the Working Groups to held inform the creation of the priorities.

In some cases, the Working Groups developed the priorities and measures for both the Durham and South of Tyne and Wear (SoTW) LNRS.

The table below lists the Working Groups and the lead organisation tasked with co-ordinating the work of the group.

Working Group	Lead Organisation
Grassland, Heathland and Peatland	Durham Wildlife Trust
Woodland, Hedgerows, Scrub & Trees	Forestry Commission
Running Waters and Wetlands	Wear Rivers Trust
Urban	Durham County Council (Ecology & Clean and Green)
Coastal	Durham County Council (Heritage Coast & Ecology)
Species	Durham County Council (Ecology)

10.4 Development of the overarching priorities

During the development of the habitat and species priorities and measures it was noted that some opportunities for nature recovery were potentially being missed and that future iterations of the LNRS would benefit from an increase in ecological data collection. This was the catalyst that led to the development of a series of overarching priorities.

The development of these overarching priorities was undertaken by the responsible authority and Natural England towards the end of 2024 when the habitat and species priorities and measures were starting to come into focus. The Environment Agency, Forestry Commission, ERIC NE, National Farmers Union and Country Land and Business Association were also involved in their creation.

The overarching priorities were designed to further embed the Lawton principles of 'bigger, better and more joined up' nature into the LNRS, support wildlife recording and provide greater support to farmers to encourage the uptake of sustainable, nature-friendly farming practises.

Local Wildlife Sites (LWS) are a network of sites recognised for having substantive wildlife value at a local level and are protected through the planning system, as such they represent some of our most important sites for nature and were mapped as part of the 'Areas of particular importance for biodiversity' in the Local Habitat Map. A significant proportion of our LWS are in poor condition (Priestley 2022) and a measure to bring them into good condition would help secure these valuable assets and provide a springboard for nature recovery. In combination with securing our existing local assets a measure was produced to help facilitate habitat connectivity across the landscape and species ability to migrate across the county. These two measures in combination with the habitat and species measures will assist in delivering the Lawton principles.

Gaps in our ecological data meant that certain taxonomic groups or habitats could not be fully explored as part of the LNRS process, as we had insufficient information to identify meaningful priorities. Measures have been put in place to encourage greater wildlife recording especially of under-represented taxonomic groups. Hopefully these measures will enable more species and habitats to be considered within later iterations of the County Durham LNRS.

Farmers and land managers have a key role to play in nature recovery. Measures have been included to help the farming sector understand how best to access nature recovery funding and develop new business models to support resilient food production. By introducing nature-friendly farming practises such as silvopasture or planting hedgerows and sowing pollinator friendly seed mixes the sector can make a significant, landscape scale contribution to nature recovery within the context of sustainable and productive farming.

10.5 Working Group Development of the Habitat Priorities and Measures

10.5.1 Grassland, Heathland and Peatlands

The Durham Wildlife Trust led this Working Group with representatives from Durham University, North Pennines National Landscape and local recorders feeding into the development of the priorities and measures.

This Working Group ran as a combined effort with South of Tyne and Wear LNRS and so representatives from SoTW and their supporting authorities attended the meetings.

The approach this group took was to generate priorities that restored, conserved, enhanced and connected the UK priority habitats falling under the headings of grasslands, dwarf shrub heath (heathlands) and peatlands. This was a similar approach the Woodland, Hedgerows, Scrub & Trees Working Group took towards ancient woodlands; the most important habitats are identified and used as the building blocks for nature recovery.

The measures the group created centred around ensuring that existing examples of these UK priority habitats were managed to achieve good ecological condition. From this starting point further measures would encourage habitat creation or enhancement to buffer and ultimately being the process of connecting priority habitats across the county. Many of the Statements of Environmental Opportunities for the National Character Areas found in County Durham relate to grassland, heathlands and peatlands measures put forward by the Working Group, including protect, expand and connect semi-natural habitats, particularly heathland within the Durham Coalfield Pennine Fringe and protecting brownfield sites with high biodiversity interest in the Tyne and Wear Lowlands. National Environmental Objectives (NEO) are also delivered by the measures developed by the Working Group including one with the aim of restoring 280,000 hectares of peatland in England.

As the mapping of the measures progressed it was noted that available data showed where grassland species diversity was being improved under agri-environment schemes. The Working Group saw that the LNRS could provide an opportunity for land managers and farmers to build upon the work they were already doing, and existing measures were adapted to incentivise continued enhancement at such locations to priority grasslands where possible.

The group acknowledged that soil conditions are often not conducive to the creation of priority habitats, mainly due to artificially high levels of nutrients. The measures took this into account by promoting less diverse 'other neutral grasslands' and other types of open habitats such as scrub in areas where high nutrient levels or pH make the creation of a priority habitat unrealistic.

10.5.2 Woodland, Hedgerows, Scrub and Trees

This Working Group was led by the Forestry Commission with the Woodland Trust, North East Community Forest, North Pennines National Landscape, Durham Wildlife Trust and tree officers and landscape architects from Durham County Council in regular attendance. Forestry England and Pennine Forestry also attended on occasion.

This Working Group ran as a combined effort with South of Tyne and Wear LNRS and so representatives from SoTW and their supporting authorities attended the meetings.

The Working Group quickly established that conserving, enhancing and connecting our ancient woodlands and ancient and veteran trees should be a priority for the LNRS. Measures were put forward to buffer and connect ancient woodlands alongside measures to encourage the restoration of PAWS, the planting of hedgerow, parkland and in field trees to allow development of future ancient trees.

Ancient woodlands were an obvious starting point given their wildlife and cultural importance, but the group recognised that woodland cover in County Durham is relatively low and that a priority should be to increase woodland cover and connectivity, and that this in turn would

support a range of wildlife including woodland birds. This priority related directly to SEO within the Durham Coalfield Pennine Fringe, Tyne and Wear Lowland and Pennine Dales NCAs which supported increased woodland connectivity as well as NEO around increasing woodland cover from 14.5% to 16.5%.

Discussions on what woodland typologies should be supported by the LNRS when promoting woodland creation spanned several meetings, with whether coniferous, mixed and commercial forestry should be included being the main point of the deliberations. Ultimately it was agreed that only native broadleaved woodland and scrub, including traditional orchards and wood pasture, should be promoted through the LNRS measures. Appropriately managed mixed and coniferous woodlands can support a range of wildlife, and like native woodlands deliver a suite of ecosystem services, however as a rule, native woodlands support far more wildlife because they have evolved alongside local flora and fauna, creating complex, long-established ecosystems. In the context of a nature recovery strategy, it was agreed that incentivising only native woodlands within mapped areas was a sensible approach. It was decided not to be prescriptive and map where all the different types of native woodland, such as wet woodland, birch or oak woodland, should be delivered as this would be dependent on local conditions and landowner preference. Instead, the LNRS would promote the full range of locally native woodlands within the mapping and encourage landowners to select the most appropriate woodland type based on the local ground conditions.

The group noted that there was a general lack of appropriate woodland management across the county, with 40% of the woodlands across Durham unmanaged, and that encouraging appropriate management across all woodland typologies would have benefits for both wildlife and people. Woodland management not only encompasses operations such as coppicing, pollarding, and thinning for timber and firewood, but can also include putting in infrastructure and signage to manage access, such as off-road biking, control of Invasive Non-Native Species and undertaking deer management. It was understood that what defines positive and appropriate management would vary between woodlands; ancient woodlands should be managed primarily to reach good ecological status whilst commercial and plantation woodlands might offer more opportunities for recreation alongside some limited management for biodiversity. Priorities and measures were put in place to encourage management of our woodland resource, recognising the multiple benefits that woodland, in all its guises from native woodlands to commercial plantations, can deliver.

The value of hedgerows as a habitat in their own right, and for their ability to connect habitats led to the creation of new hedgerows and the enhancement of existing hedgerows becoming a priority within the LNRS. The group felt that restoring lost hedgerow connections would also contribute to the character and beauty of the landscape. Care would need to be taken when mapping measures for the creation of new hedgerows as in the North Pennines NCA or areas identified in the lowlands for wader recovery promoting hedgerows would be counterproductive.

10.5.3 Running waters and Wetlands

The Wear Rivers Trust led the Working Group with the Tees Rivers Trust, Environment Agency, Northumbrian Water Ltd and the Durham Wildlife Trust attending the meetings.

The group concluded that water quality was the main issue facing our running waters as good water quality is fundamental to wildlife and aquatic ecosystems. The group felt that diffuse

pollution, arising from a variety of widespread and non-point sources, should be the main focus of the LNRS.

Key pollutants noted during the meetings were nitrogen, phosphorous, pesticides and sediments, which usually arise from diffuse or non-point sources and point source pollutants such as heavy metal pollution in parts of the Wear and Tees catchments which arise from a single identified point. The first priority developed was therefore one to improve water quality by reducing diffuse pollutants entering our rivers and streams by promoting restorative land management practises and supporting actions to tackle the pollution caused by historical metal mining. This priority relates to SEO within all but one of the National Character Areas and an NEO to improve water quality and reduce nitrogen, phosphorus and sediment pollution.

The second priority for running waters was determined to be restoring modified and artificial river habitats. The group felt that reversing or mitigating man-made modifications to running waters would have multiple benefits for nature and people and was therefore an important issue to tackle in the county. Benefits arising from the priority include increasing flood mitigation and improving water quality, reducing barriers to fish migration and supporting the creation or restoration of a wide range of riparian habitats. The measures associated with this priority aim to create riparian habitats, restore natural process and remove or mitigate the impacts of artificial barriers to migration.

Many of the wetland habitats found in County Durham, such as fens and ponds, are UK Priority Habitats, but they can be isolated within the landscape. The group felt that the best way to support these habitats and associated species is to support the creation of ecologically connected clusters of wetland habitats. These clusters or mosaics of wetlands would support a greater range of wildlife than isolated wetland features as well as improving water quality and improving water storage and flood control.

The final priority for the group was a reduction in the abundance of Invasive Non-Native Species. There is a NEO focusing on INNS which aims to reduce their establishment by 50% over the next five years; the measures put forward by the group concentrated on supporting on-going partnership working and development of a countywide strategic approach to the problem of INNS.

10.5.4 Urban

Durham County Council led this Working Group with the North East Community Forest, the County Council's Countryside and Clean and Green sections attending the meetings.

Two main drivers were identified by the Working Group, the first was the need to create permeability for wildlife through the urban environment and the second being the benefits of urban wildlife to people.

The ecosystem services nature can provide to residents such as urban cooling and health and wellbeing benefits are represented by measures to increase the number of urban trees and the creation of community woodlands. The results of the school engagement clearly showed that children engaged with their immediate, local nature and several measures were included to deliver wildlife friendly open spaces with the aim of increasing engagement with, and access to nature. All these measures would increase the opportunities for wildlife in the urban and peri-urban environment as well as providing benefits to local communities. The measures met NEOs around delivering nature recovery in places near to people's homes.

It was noted that the hirundines and swifts were mentioned in the consultation as a group of species of interest to residents and wildlife groups; a measure to promote nest boxes schemes was included. This measure could, in part, be delivered through the planning system with the Local Planning Authority encouraging the use of integrated bird boxes within new developments. Social housing providers were also keen to include this measure as they have an opportunity to retrofit wildlife boxes on their housing stock when undertaking renovations.

10.5.5 Coastal

This Working Group was led by the Heritage Coast team at Durham County Council with the County Council's Ecology and Countryside sections, the Seascapes project, Durham Wildlife Trust and The National Trust also represented. A local interest company that specialises in wildflowers also attended. The Royal Society for the Protection of Birds and Butterfly Conservation received the minutes of the meetings, and Network Rail and The Marine Management Organisation were also involved.

This Working Group ran as a combined effort with South of Tyne and Wear LNRS and so representatives from SoTW and their supporting authorities attended the meetings.

The Durham coast contains a wide range of priority habitats and species, and it was concluded for the LNRS that the priorities and measures under the various habitat and species typologies would be sufficient to cover these interest features at the coast. This view was taken to the other Working Groups and ERIC NE so that the coastal features would be thought through in both the development of priorities and measures and the subsequent mapping.

There was discussion around priorities for intertidal habitats, with Seascapes and the National Trust leading on investigating the opportunities. Ultimately it was determined that there was insufficient data to develop meaningful actions for these habitats, but that more data collection could inform future iterations of the LNRS.

The Coastal Working Group concluded that the focus of their work in Durham should be around addressing the impacts of recreational use of the coast. Disturbance to the assemblage of wintering waders is an issue on the coast, alongside impacts on priority habitats through the use and creation of desire lines. As the coast becomes ever more popular with residents and visitors, a need to sustainably manage the recreational pressure allowing people to experience the coast while preserving and enhancing its natural assets was recognised.

Two measures were put forward to deliver this priority, the first being to develop and implement a specific strategy for the coast that addresses the recreational impacts by engaging with the public and creating a sustainable path network, the second aligned to a degree with priorities in the Urban environment, with a measure to create or enhance accessible green spaces to provide wildlife as an alternative to the coast so reducing recreational pressures.

10.6 Working Group Development of the Species Priorities and Measures

10.6.1 Invertebrates

The invertebrates topped the list of species groups that residents believed should be a priority for the LNRS and discussion at the two species workshops and conversations with specialists identified a suite of butterflies, moths and bumblebees as having potential as priorities for the LNRS. The Durham Species Workshop concluded that species of dragonfly and damselfly did not warrant specific priorities and measures as they could be supported through an increase in

wetland creation and restoration and improvements in riverine habitats delivered through other measures.

The Lepidoptera working group comprised of Butterfly Conservation and local recorders. The group identified several habitat specialist butterflies and moths that were of local and national concern. The group identified fourteen species of that could be included within the strategy, this was too great a number for the LNRS to take forward, however it was noted that some species could be grouped together as they were associated with the same habitat and that a single set of measures would facilitate their recovery.

The first of these groups was the Coastal Day-Flying Moth assemblage of Cistus forester (*Adscita geryon*), Chalk carpet (*Scotopteryx bipunctaria*) and Least minor (*Photedes captiuncula*) all of which can be found on the limestone grasslands along the Durham coast. All the species are mentioned in the Durham BAP, which referenced the declines of Chalk carpet and Least minor and the scarcity of Cistus forester. The Chalk carpet has declined since the publication of Dunn and Parrack's Moths and Butterflies of Northumberland and Durham in 1986 and was once absent from the coast, although it has recolonised it remains a rare moth. The Least minor declined to the point that the Durham BAP noted that there were no recent records and although it has been rediscovered on the coast its abundance is far cry from the description in Dunn and Parrack as a species "still well known in its cliff top haunts from Blackhall Rocks to Beacon Pit in Durham". The Cistus forester follows a similar pattern with it being described as far more common by Dunn and Parrack than the Durham BAP or more modern records indicate.

Two other moths were considered as part of this assemblage or inclusion in the LNRS, Lyme Grass (*Chortodes elymi*) and the micro-moth *Lampronia pubicornis,* but either a lack of data or an inability to reasonably facilitate their recovery led them to be excluded.

The second assemblage brought together habitat specialist lepidoptera associated with brownfield or open mosaic habitats, the species are Dingy skipper, Grayling, Six-belted clearwing (*Bembecia ichneumoniformis),* Small Blue (*Cupido minimus*), Green hairstreak and Wall (*Lasiommata megera*). Both the Grayling and Dingy skipper have declined significantly in County Durham and in the case of Grayling to the point of extinction. There are populations of Grayling to the north and south of Durham in Northumberland, Gateshead and Teesside, and although recent sightings in Durham are debatable, the proximity of established populations means that recolonisation is possible if appropriate habitat can be provided. The Dingy skipper is the classic butterfly of brownfield sites in Durham and survey work in 2004/5 noted that around a third of colonies had been lost and it is still under threat from development and lack of appropriate management. The Small blue and Six-belted clearwing are both species close to colonising Durham with recent records from industrial sites in Teesside and, as with Grayling, colonisation is more likely if appropriate habitat is in place.

For both the assemblages the measures promote the creation and management of habitat with an abundance of the larval food plants, and in the case of the Brownfield assemblage a further Measure was included to promote introductions into appropriate locations, where the larval food plants can be established and maintained.

Three other individual species are included in the LNRS, the Northern brown argus, Small pearl-bordered fritillary and the White-letter hairstreak, all of these species have declined or are declining locally and are habitat specialists. The Small pearl-bordered fritillary underwent

significant declines in the early 1900s and a species that could be found across the County was reduced to four sites in Waskerley, Weardale by the early 2000s. Although introductions and active management have benefited the species its distribution is still limited. The Northern brown argus exists on inland and coastal sites on the Magnesian limestone, some of the inland sites have been lost and others remain at risk. The often small and unmanaged inland sites are difficult to graze, and a lack of management leads to vegetation succession and loss of appropriate habitat. The White-letter hairstreak has declined nationally since the 1970s when Dutch elm disease robbed the countryside of its larval food plant, although it is recovering in some areas nationally, in Durham it is regarded as being in further decline since the early 2000's. There are now disease-resistant varieties of Elm available, and the butterfly has been shown to survive on many of these, providing an opportunity to support the recovery of the species. The priorities and measures for these species concentrate on securing existing populations and expanding their distribution through the creation or enhancement of ecologically connected habitats. For Northern brown argus and Small pearl-bordered fritillary introductions are proposed to help facilitate the expansion of sustainable population networks.

The Bumblebee working group comprised a representative from Buglife and local entomological recorders including a former chairperson of the Bees Wasps and Ants Recording Society. Initially the group had a wider remit than bumblebees and considered the inclusion of Black-headed leafcutter bee (*Megachile circumcincta)* and the beetle *Prasocuris hannoveriana* but ultimately the highly restricted distribution of both species, a lack of data and difficulties in facilitating any expansion of their populations led to them being excluded from the LNRS.

The Moss carder bee is included in the LNRS given its significant local decline, it had declined nationally by the 1970s and in Durham had been lost from the lowlands by the end of the 1980's and is now only found in the west of the county beyond the A68. The Broken-belted bumblebee has been included due to its scarcity, restricted distribution in upper Weardale and Teesdale and the national decline of the species. For both bumblebees the priorities and measures centre around securing the current populations and expanding their distribution through creation of connected foraging and nesting habitats.

Within the existing range of the two bumblebees botanically diverse roadside verges are seen as a valuable foraging resource, as a result a measure was put in place to encourage verge management to promote a diversity of wildflowers. Whilst roadside verges can provide food and refuge for pollinators they can act as an 'ecological trap' attracting insects to a potentially dangerous environment. Research does suggest that bumblebees avoid foraging on roadside verges with significant turbulence from passing traffic (Blomqvist et al 2025). Less busy roads with deeper verges are the preference. Given that the LNRS bumblebees are found in areas with relatively low traffic volumes it was felt that such a measure was appropriate; this would likely not have been the case if measures were being created for more lowland areas with busier roads.

In addition to land management interventions measures to encourage recording and, given that bumblebees are not particularly well-known, to provide information to land managers to help build an interest in bumblebee conservation were also included.

10.6.2 Birds

The Birds Working Group comprised members of Durham Bird Club and the Royal Society for the Protection of Birds.

Several woodland species were considered for inclusion within the LNRS and the idea of an assemblage of woodland specialists was initially proposed. Expansion of our native woodland resource and appropriate management were the key measures identified to support these specialist birds. Given that these actions were to be delivered as part of the habitat measures associated with woodland it was decided not to take a woodland bird assemblage forward within the LNRS.

The exception to this was the Willow Tit, the main driver for its inclusion is that County Durham holds a significant proportion of the UK population. The species also depends on a specific mosaic of wet scrubby woodland, and it was felt that this required targeted measures outside of the habitat measures. There was also a risk that the parameters set for the woodland mapping would not capture the relatively small Willow Tit sites. Aside from measures to expand and connect appropriate habitat, measures to install bird boxes and improve recording were included.

Another individual species, Black Grouse, was also singled out. This species was brought up in the landowner and farmer workshops and organisations such as the Country Land and Business Association and The Game & Wildlife Conservation Trust felt it was an important, iconic species of the uplands. The Black Grouse has been in long-term decline across the UK and the populations in Durham form part of the species northern strongholds, there continues to be an active interest in Black Grouse conservation and this enthusiasm for the species means that the LNRS can build on existing work making a positive outcome more likely. The measures for Black Grouse centred around protecting and enhancing their breeding sites (leks) as well as creating habitat connectivity across the landscape.

The significant declines of wading birds in the lowlands are of concern both nationally and locally, the working group felt that supporting waders in the lowlands and expanding upon the core wader populations in the uplands was important. An assemblage of wading birds was created that includes Lapwing, Common Snipe, Redshank, Golden Plover and Curlew. The measures propose action to create and enhance both breeding and wintering habitats across the county thus supporting wading birds throughout the year.

The farmland birds were another assemblage of species that the working group felt needed attention within the LNRS due to the national and local declines. The farmland bird assemblage included Yellowhammer, Corn Bunting, Gray Partridge, Tree sparrow, Linnet, Reed Bunting, Yellow Wagtail and Skylark. The measures took a similar approach to that taken with the wading birds, with the measures seeking to provide support to farmland birds across the year. Measures such as creating tussocky, wildflower rich grassland margins, beetle banks and headlands would provide a supply of insects in the summer to help feed young birds and the use of wild bird seed mixes would provide a food source over the winter months.

The coastal birds were not included as a priority under the birds. It was concluded that the main local impact is recreational disturbance, and it was agreed that this would be better dealt with by the Coastal Working Group as they had already identified recreational impacts as being of concern and were developing measures to address this problem.

10.6.3 Herptiles

Discussions around the herptiles involved local recorders and representatives from the North Pennines National Landscape (NPNL) and Newcastle University who have been involved with a study of population genetics on Adder in conjunction with the NPNL.

The Durham Species Workshop concluded that the amphibians did not warrant specific priorities and measures as their recovery could be delivered through an increase in wetland creation and restoration. It was noted that mapping of opportunities to create and restore wetland habitats should take account of the distribution of amphibians, especially Great crested newt, and this recommendation was taken forward to ensure that measures for wetland habitats directly benefited our amphibians.

With all the reptiles having declined all three species made it onto the long-list of species for consideration within the LNRS. Given the focused nature of the LNRS it was decided to take forward Adder and Slow worm as priorities, especially as there are established conservation programmes in place that could be built upon and many of the measures for these species would help support Common lizard where their distributions overlapped. It was also felt that habitat recovery, especially for heathland and brownfield habitats in the lowlands would help support Common lizard.

For both reptiles the priorities and measures centre around securing the current populations and expanding their distribution through creation of connected habitats. In addition to land management interventions, encouraging recording and tackling public misconceptions specifically around adders were also included. Building on the study of Adder population genetics and expanding that study out to Slow worm has also been incorporated into the LNRS to help us make more informed decisions about future conservation actions.

10.6.4 Fish

The Fish Working Group comprised members of Bishop Auckland and District Angling Club (BADAC), Wear Rivers Trust, The Angling Trust and the Environment Agency. At the earlier species workshops the BADAC raised the potential for a range of riverine fish species to form an assemblage and this approach was agreed at the working group.

The agreed assemblage included those species most at risk in the county, but also those that were of interest to anglers, with Salmon, Sea Trout, Brown Trout, Eel, River Lamprey, Brook Lamprey and Bullhead all included.

The group decided that the best approach to aid riverine fish populations was to work to improve natural river processes that supported self-sustaining populations. The measures put forward by the group concentrated on improving the habitat for fish by enhancing in-river and riparian habitats and promoting natural river function. This would lead to a diverse range of riverine habitats that provide a range of flow rates, depths and habitat structure that would support the assemblage.

Another key issue identified by the group were barriers to migration that prevented fish from accessing the river system. This problem was also identified at one of the Landowner & Farmer workshops and a specific measure was put in place to remove or mitigate the impacts of artificial barriers and structures.

There was discussion around the potential to include control of fish-eating birds as a measure within the LNRS. Ultimately the decision was taken not to take this measure forward as there is not sufficient data to determine if fish-eating birds are having a significant impact across our catchments, and the numbers and distribution of these birds is unpredictable and driven by prey availability and so any requirements for targeted control could not be identified. The aim of the fish measures was to create a complex, heterogeneous riverine environment and it was felt

that this would help reduce the impacts of fish predation by providing escape routes and cover for fish.

The role of angling clubs in protecting fish stocks was noted by the group, and measures to promote effective catch and release techniques to support natural recruitment as well as encouraging data collection by angling club members to improve decision-making were also included.

10.6.5 Flowering Plants

Discussion at the workshops and conversations with specialists highlighted a significant number of species that are rare and declining in the county. Indeed, a Rare Plant Register has been maintained for many years with an update planned for 2026, so discussion was based on a good understanding of the status of Durham's plants. Many of the species of nature recovery interest are already in statutory protected areas, so those outside of these sites were looked at. The list ultimately reduced to three species and an assemblage so as to be able to manage and target the priorities and measures realistically.

An assemblage of Lady's Mantles (*Alchemilla* spp), where chosen as this assemblage of rare species have their UK stronghold in County Durham and are declining locally. The species within the assemblage are *Alchemilla acutiloba, A. monticola, A. glomerulans, A. subcrenata and A. wichurae*. The measures aim to secure the current populations falling outside of statutory protected sites through appropriate management and introduction when required. Many of the Lady's Mantles are found on roadside verges and engaging the public with the botanical importance of these assets will be key in allowing a reduction in the intensity of grassland management along the roadsides. There is scope for Durham University and local horticulturists to collect seed and provide plug plants for introduction projects, this alongside surveys to identify sites with suitable conditions for establishing new populations of the assemblages will provide the basis for introduction projects to expand the range of the Lady's Mantles.

Flat Sedge was selected due to dramatic local losses across its range and that there is significant potential reverse this decline with active habitat restoration and creation projects providing that opportunity. The restoration of the Durham Carrs through the Discover Brightwater project and currently the Durham Wildlife Trust Great North Fen project has and is creating new habitats which could host former and new populations of Flat Sedge.

Current and former sites should be surveyed to establish what still exists in the way of lowland populations, but the number may be too small to remove plants for translocation. The upland populations which are considerably larger, though still uncommon, relate to a different ecotype so would be unsuitable. However, the species still occurs in lowland eastern Cleveland and these, after investigation, could be a source to create a metapopulation within the Great North Fen Project with Durham University and local horticulturists being engaged to collect seed and grow on plug plants for introduction.

Northern Hawk's-beard was brought into the LNRS as it is a very local and declining species, virtually restricted to Northumberland and to a smaller extent, County Durham.

The last remaining site for this species is a SSSI in Weardale and is well overdue being surveyed. Ideally all its previous sites should be checked and appropriate management introduced to either support the species if present or to set the stage for introductions. Nationally, this

species is rather well-studied so it's preferred habitat of damp, weakly acid or basic soils overlying limestone or intrusive rocks in well-lit places is understood, identifying such sites where conditions are suitable for establishing new populations will be a key measure. Engaging with Durham University and local horticulturists being to collect seed and grow on plug plants for introduction at identified sites would be the next stage in establishing new population of Northern Hawk's-beard.

The final plant species included within the LNRS is the Ivy-leaved Bellflower, the two sites in the county are well isolated from any other population in the country and though discovered mid last century, no other populations have ever been found. It is a difficult plant to locate due to its harsh remote locations, small size, and sprawling habit, so population sizes have never been established. A measure to establish population sizes and introduce appropriate management at its locations is essential in securing the plant in County Durham. Measures to extend the populations into adjacent suitable sites and identify sites suitable for introductions have also been included within the LNRS to promote the creation of a robust population in the county. Again, the potential for Durham University and local horticulturists to collect seed and provide plug plants for introduction projects should be explored.

10.6.6 Mammals

The Mammal Working Group contained members of UK Squirrel Accord and local mammal recorders. The Durham Wildlife Trust and North Pennines National Landscapes were also involved in developing the priorities and measures. The public consultation highlighted Hedgehog and Red squirrel as being important, and the following Durham Species Workshop added Water Vole and Harvest Mouse to the list of species for consideration in the LNRS.

The Hedgehog has declined nationally over the last 30 or so years and is a popular species with the pubic and these factors lead to its consideration. Hedgehogs live in a variety of habitats, in rural areas they prosper in a mosaic of fields, hedges and woodlands and in urban areas can be found in parks and gardens. Ultimately it was decided that the recovery of the hedgehog could be achieved in rural areas through the delivery of priorities for grasslands, hedgerows and woodlands and in the urban environment the measures in the LNRS to manage open space for nature and reducing the use of herbicides would support hedgehogs.

The Harvest Mouse is thought to be in national decline. Despite this, known distribution is expanding in County Durham, although distribution is still patchy and at low density. Whether this is due to a natural increase in species range or an increase in recording effort is unknown. Given the increase in records the Mammal Working Group felt that the species should not be included, and that continued survey work would help clarify the position on harvest mouse for future iterations of the LNRS.

Two other mammal species considered have undergone catastrophic national and local declines. The Water Vole and Red Squirrel are now both absent from the lowlands of County Durham and are restricted to a limited number of sites in uplands areas. Both species are impacted by introductions, the American mink effectively predates the water vole and the Grey squirrel outcompetes our native squirrel and carry a disease, a Parapoxvirus, which is usually fatal to red squirrels. These pressures in combination with habitat loss have led to declines and local extinctions across the country.

It was these significant declines in two of our most iconic mammals that led to both the Water vole and Red Squirrel being included within the LNRS, with measures focusing on tackling the

pressures from the introduced species. Without effective, sustainable control of Mink and Grey squirrel the recovery of our two LNRS mammals is not achievable. The localised nature of Durham's Red squirrel population means that it is possible to target grey control to secure existing populations and support expansion of those populations. The Water vole has been the subject of a recent Durham Wildlife Trust initiative, Naturally Native, which controlled mink and undertook habitat improvements at a landscape scale. The measures for Water vole are informed by the data collected by the Naturally Native Project which allows mink control efforts to be targeted effectively and sets the scene for a regional Water vole recovery project.

11 THE PRIORITIES AND MEASURES

The priorities and measure were developed with National Environmental Objectives (NEOs) and ecosystem services (the wider benefits from nature) in mind.

The NEOs are the UK Government's goals on the environment, with objectives to address biodiversity, climate, and social pressures. Defra provided the RA with a list of NEOs to consider when setting their local priorities. Wider environmental benefits were also a consideration when developing priorities and measures, these benefits range from health and wellbeing through to flood alleviation and climate adaptation.

As part of the presentation of the priorities and measures, how the LNRS can deliver for these objectives and wider benefits is provided.

The following tables list the broad ecosystem services and all the National Environmental Objectives and corresponding codes, these codes are used within the tables showing the priorities and measures.

Ecosystem Service	Benefits	Code
Provisioning Services	Food and drink, renewable and non-renewable energy, medicines, timber.	ES1
Regulating Services	Flood regulation, clean air, carbon storage, pollination erosion control, pest and disease control.	ES2
Cultural Services	Recreation, tourism, sense of place, spiritual enrichment, health and wellbeing, learning and education.	ES3
Supporting Services	Healthy soils, water cycle, nutrient cycling, photosynthesis, space for wildlife.	ES4

Table 2: Ecosystem Services and codes

National Environmental Objective	Code
Biodiversity on land - restore or create in excess of 500,000 hectares of a range of wildlife-rich habitat outside protected sites by 2042, compared to 2022 levels	NEO1
Biodiversity on land - halt the decline of species abundance by 2030. Ensure that species abundance in 2042 is greater than in 2022, and at least 10% greater than 2030	NEO2
Biodiversity on land - reduce the risk of species' extinction by 2042, when compared to the risk of species' extinction in 2022	NEO3
Woodland cover - increase total tree and woodland cover from 14.5% of land now to 16.5% by 2050	NEO4
Improve water quality and availability - reduce nitrogen (N), phosphorus (P) and sediment pollution from agriculture into the water environment by at least 40% by 2038, compared to a 2018 baseline	NEO5
Work to ensure that everyone in England lives within 15 minutes' walk of a green or blue space	NEO6
Restore approximately 280,000 hectares of peatland in England by 2050	NEO7
Restore 75% of our water bodies to good ecological status	NEO8
Protect 30% of land and of sea in the UK for nature's recovery by 2030	NEO9
Support farmers to create or restore 30,000 miles of hedgerows by 2037 and 45,000 miles of hedgerows by 2050	NEO10
Manage our woodlands for biodiversity, climate, and sustainable forestry	NEO11
Restore 75% of Sites of Special Scientific Interest to favourable condition by 2042. By 31 January 2028 50% of SSSIs will have actions on track to achieve favourable condition	NEO12
Ensure delivery and management of actions and policies that contribute towards our 25YEP goals are suitable and adaptive to a changing climate	NEO13
Make sure LNRSs include proposals for Nature-based Solutions which improve flood risk management where appropriate	NEO14
Achieve Good Environmental Status for our seas	NEO15
Reduce emissions of nitrogen oxides by 73% and ammonia by 16% by 2030 relative to 2005 levels	NEO16
Reduce the rates of introduction and establishment of invasive non-native species by at least 50%, by 2030	NEO17

Table 3: National Environmental Objectives and codes

The priorities are split over 13 categories covering overarching priorities and a range of species and broad habitat types as covered by the Working Groups.

Each category has its own prefix, shown in brackets below:

- Overarching Priorities (OA)

- Grassland, Heathland and Peatlands (G)
- Woodland, Hedgerows, Scrub & Trees (W)
- Running Waters and Wetlands (RW)
- Coastal (C)
- Urban (U)

- Butterflies and Moths (BM)
- Bumblebees (BB)
- Birds (BR)
- Reptiles (R)
- Fish (F)
- Flowering Plants (P)
- Mammals (M)

Within each category there are a series of priorities, and these are provided with a unique priority code, which starts with the category prefix followed by a number.

Associated with each priority are the measures, and these are provided with a unique code which starts with the priority code followed by a number.

By way of example, the two priorities under the Bumblebee category have unique codes of BB 1 and BB 2. There are five measures associated with priority BB 1 and so the unique codes for the measures are BB 1-01, BB 1-02 and so on.

Some of the measures will not appear on the Local Habitat Map, these unmapped measures are not location specific but if enacted would still support nature recovery across the county.

The following tables show the County Durham LNRS priorities and measures alongside NEOs and ecosystem services.

11.1 Overarching Priorities (OA)

11.1.1 Priority: OA 1: The Local Wildlife Sites (LWS) network protects the county's valuable habitats and is under positive long-term management

Measures	National Environmental Objective	Ecosystem Services
OA-1-01: The Local Wildlife Sites network is resurveyed on a regular basis and management advice provided to landowners and managers	NEO1, NEO2, NEO9, NEO8, NEO11,	ES2, ES3, ES4
OA-1-02: Local Wildlife Sites are under positive management to maintain or achieve good condition	NEO1, NEO2, NEO9, NEO8, NEO11,	ES2, ES3, ES4
OA-1-03: New sites are brought forward for designation by the Local Wildlife Sites Partnership where criteria are met (not mapped).	NEO1, NEO2, NEO9, NEO8, NEO11,	ES2, ES3, ES4

11.1.2 Priority: OA 2: Enhance habitat connectivity and species' ability to cross the landscape

Measures	National Environmental Objectives	Ecosystem Services
OA-2-01: Reduce fragmentation by the removal or mitigation of ecological barriers to facilitate movement of wildlife and connect habitats, such as providing fish passes, ecopassages, green bridges, underpasses, or appropriate landscape planting (not mapped).	NEO2, NEO3	ES4
OA-2-02: Enhance road, rail and multi-user route infrastructure such as the railway path network to create appropriate green corridors through the landscape (not mapped).	NEO2, NEO3	ES4

11.1.3 Priority: OA 3: Increase the quantity and quality of ecological data being supplied to the Local Environmental Records Centre (ERIC NE)

Measures	National Environmental Objectives	Ecosystem Services
OA-3-01: Promote biological recording by individuals and organisations to increase the quantity and quality of data being provided to ERIC NE and other platforms such as iNaturalistUK and iRecord (not mapped).	NEO1, NEO2, NEO3	ES3
OA-3-02: Offer training on habitat and species recording, with an emphasis on encouraging the recording of under-represented taxonomic groups (e.g. invertebrates) to increase the quantity and quality of data being provided to ERIC NE and other platforms (not mapped).	NEO1, NEO2, NEO3	ES3
OA-3-03: Identify species for targeted survey work, where specialists believe the species might be of conversation concern and a greater understanding of the species distribution and reasons for declines is required for them to be considered in future iterations of the LNRS (not mapped).	NEO2, NEO3	ES3

11.1.4 Priority: OA 4: Encourage the uptake of sustainable, nature-friendly farming practises across the county to support nature recovery and resilient food production and farming.

Measures	National Environmental Objectives	Ecosystem Services
OA-4-01: Ensure farmers and landowners have clear guidance and support to assist them in adopting new or existing business models that support the natural environment and ecosystem services, and access funding from the UK Government and private finance (not mapped).	NEO2, NEO3, NEO4, NEO5,	ES1 ES2, ES4
OA-4-02: Provide farmers and landowners with information and support, encouraging the use of farming practises which improve the environment, soil function as well as supporting productive farming. Examples include no-till farming, silvopasture and cover cropping (not mapped).	NEO2, NEO3, NEO4, NEO5,	ES1, ES2, ES4
OA-4-03: Provide farmers and landowners with information and support, encouraging wildlife friendly practises which support nature recovery as part of productive farming. Examples include maintaining and enhancing existing features across the landholding and creating new features such as ponds and hedgerows that support biodiversity, sowing bird and pollinator friendly seed mixes and installing bird boxes (not mapped).	NEO1, NEO2, NEO3, NEO4, NEO5, NEO8, NEO10, NEO11, NEO12, NEO13,	ES2, ES4

11.2 Grassland, Heathland and Peatlands (G)

11.2.1 Priority: G 1: Priority grasslands are restored, conserved, enhanced, extended and connected.

Measures	**National Environmental Objectives**	**Ecosystem Services**
G 1-01: Priority grasslands managed appropriately to maintain or achieve good ecological condition. Where practical 'lost' priority grasslands are restored and grasslands under agri-environment schemes are uplifted where possible to deliver priority grasslands.	NEO1, NEO2, NEO3, NEO5	ES2. ES4
G 1-02: Buffer and connect priority grasslands through the creation of priority grasslands habitats where soil fertility allows. On high fertility soils provide connections for priority grasslands and their associated species through delivery of agricultural margins, conservation headlands and good condition 'other neutral grassland' at a field scale.	NEO1, NEO2, NEO3, NEO5	ES2. ES4
G 1-03: Identify and catalogue priority grasslands and those that offer potential for enhancement or restoration (not mapped).	NEO1, NEO2, NEO3, NEO5	ES2. ES4
G 1-04: End-use restoration of Magnesian limestone mineral sites to include significant restoration to calcareous grassland communities	NEO1, NEO2, NEO3, NEO5	ES2. ES4

11.2.2 Priority: G 2: Heathlands are restored, conserved, enhanced, extended and connected.

Measures	National Environmental Objectives	Ecosystem Services
G 2-01: Heathlands are managed appropriately to maintain or achieve a structurally diverse habitat in good ecological condition and where practical 'lost' priority heathlands are restored.	NEO1, NEO2, NEO3, NEO5	ES2. ES4
G 2-02: Buffer and connect heathlands through the creation of heathland and appropriate semi-natural habitats.	NEO1, NEO2, NEO3, NEO5	ES2. ES4
G 2-03: Identify and catalogue existing heathlands and historic heathlands identifying those sites that can be targeted for restoration and enhancement (not mapped).	NEO1, NEO2, NEO3, NEO5	ES2. ES4

11.2.3 Priority: G 3: Open Mosaic Habitats are conserved, enhanced, extended and connected.

Measures	National Environmental Outcomes	Ecosystem Services
G 3-01: Open Mosaic Habitats are managed appropriately to achieve good ecological condition and where practical 'lost' priority open mosaic habitats are restored.	NEO1, NEO2, NEO3, NEO5	ES2. ES4
G 3-02: Buffer and connect Open Mosaic Habitats through the creation of OMH or appropriate open semi-natural habitats.	NEO1, NEO2, NEO3, NEO5	ES2. ES4
G 3:03: Identify sites at risk from anti-social behaviour and develop partnerships to tackle misuse and raise awareness of their ecological value (not mapped).	NEO1, NEO2, NEO3, NEO5	ES2. ES4
G 3-04: Identify and catalogue Open Mosaic Habitat and those that offer potential for enhancement (not mapped).	NEO1, NEO2, NEO3, NEO5	ES2. ES4

11.2.4 Priority: G 4: Peatlands are conserved and restored to be in good hydrological and biological condition.

Measures:	National Environmental Outcomes	Ecosystem Services
G 4-01: Peatlands are restored and managed to achieve and maintain good ecological and hydrological condition.	NEO1, NEO2, NEO3, NEO5, NE07	ES2. ES4

11.3 Woodland, Hedgerows, Scrub and Trees (W)

11.3.1 Priority: W 1: Ancient Woodlands and ancient and veteran trees are conserved, enhanced, extended and connected, with Planted Ancient Woodlands (PAWS) actively restored.

Measures	National Environmental Outcomes	Ecosystem Services
W 1-01: Buffer and connect ancient woodland through planting native tree and scrub species and/or through natural colonisation.	NEO1, NEO2, NEO3, NE04	ES2. ES4
W 1-02: Protection of ancient woodland / veteran / ancient trees via Tree Preservation Orders and / or Local Wildlife Site designation and management advice to landowners (not mapped).	NEO2, NEO3	ES2. ES4
W 1-03: Appropriate management of ancient woodland to achieve good ecological condition.	NEO1, NEO2, NEO3, NEO17	ES2. ES4
W 1-04: Restore PAWS, conserving any remaining ancient woodland features, through careful active management.	NEO1, NEO2, NEO3	ES2. ES4
W 1-05: Increase awareness and provide advice to support retention and positive management of ancient and veteran trees among landowners and land managers (not mapped).	NEO2, NEO3	ES2. ES4
W 1-06: Targeted planting of hedgerow, parkland and in field trees and the veteranisation of existing trees.	NEO1, NEO2, NEO3, NE04	ES2. ES4

11.3.2 Priority: W 2: The area of native woodland is increased

Measures	National Environmental Outcomes	Ecosystem Services
W 2-01: Increase the area of native woodland cover through planting and/or natural colonisation, as appropriate, particularly targeting expansion and connecting of existing woodlands and in areas that increasing woodland will contribute to development of robust woodland habitat networks.	NEO1, NEO2, NEO3, NEO4	ES2. ES4

11.3.3 Priority: W 3: All woodland types are managed appropriately to enhance their biodiversity and their wider ecosystem services.

Measures	National Environmental Outcomes	Ecosystem Services
W 3-01: Woodland management is increased in all woodland types, to deliver greater biodiversity benefits and a diverse range of ecosystem services and National Environmental Outcomes. (not mapped).	NEO1, NEO2, NEO3, NEO5, NEO6, NEO11, NEO17	ES1, ES2. ES3, ES4,

11.3.4 Priority: W 4: Native hedgerows are conserved, managed and enhanced, and new species rich native hedgerows with hedgerow trees are created, increasing connectivity and reforming lost connections.

Measures	National Environmental Outcomes	Ecosystem Services
W 4-01: Improve the condition of existing hedgerows through increasing species diversity, planting hedgerow trees and providing buffer strips and headlands (not mapped).	NEO1, NEO2, NEO3, NEO10	ES2. ES4
W 4-02: Plant new species rich native hedgerows with hedgerow trees.	NEO1, NEO2, NEO3, NEO4, NEO10	ES2. ES4

11.4 Running Waters and Wetlands (RW)

11.4.1 Priority: RW 1: Water quality is improved with a reduction in pollutants.

Measures:	National Environmental Outcomes	Ecosystem Services
RW 1-01: Encourage farmers and landowners to reduce diffuse pollution by adopting restorative agricultural techniques such as riparian buffer strips, woodland planting and minimal tillage techniques.	NEO1, NEO2, NEO3, NEO5, NEO8, NEO15	ES2. ES4
RW 1-02: Reduce the water pollution caused by historical metal mining including through continuing and expanding the Water and Abandoned Metal Mines programme across the Wear and Tees catchments.	NEO1, NEO2, NEO3, NEO5, NEO8, NEO15	ES2. ES4
RW 1-03: Awareness raising program to increase public awareness around water pollution to encourage behaviours that support healthy river habitats (not mapped).	NEO1, NEO2, NEO3, NEO5, NEO8, NEO15, NEO17,	ES2. ES4

11.4.2 Priority: RW 2: Modified and artificial river habitats are restored.

Measures:	National Environmental Outcomes	Ecosystem Services
RW 2-01: Work with nature to restore physical complexity and dynamism to the river network by providing the space for our rivers to move and flood, naturalising longitudinal connectivity and improving the lateral connectivity to our floodplains through actions such as re-meandering, grading banks, restoring and creating new floodplain wetlands, backwaters and connecting channels.	NEO1, NEO2, NEO3, NEO5, NEO8, NEO15	ES2. ES4
RW 2-02: Remove culverts, obsolete artificial barriers and structures or mitigate the impacts of such structures.	NEO1, NEO2, NEO3	ES2. ES4

Measures:	National Environmental Outcomes	Ecosystem Services
RW 2-03: Create and restore riparian habitats through creation or natural regeneration of appropriate grassland, wetland and woodland habitats.	NEO1, NEO2, NEO3	ES2. ES4

11.4.3 Priority: RW 3: Ponds, Fens, Swamps are conserved, enhanced, extended and connected.

Measures	National Environmental Outcomes	Ecosystem Services
RW 3-01: Create new wetlands and restore relic wetlands and ghost ponds forming ecologically connected clusters of wetland habitats.	NEO1, NEO2, NEO3, NEO5, NEO8, NEO15	ES2. ES4
RW3-02: Ponds, fens and swamps are managed to maintain or achieve good ecological condition (not mapped).	NEO1, NEO2, NEO3	ES2. ES4
RW 3-02: Undertake desktop analysis and field surveys to identify relic wetlands and ghost ponds that can be targeted for restoration (not mapped).	NEO1, NEO2, NEO3	ES2. ES4

11.4.4 Priority: RW 4: The distribution and abundance of Invasive Non-Native Species (INNS) are sustainably reduced.

Measures	National Environmental Outcomes	Ecosystem Services
RW 4-01 - Encourage landowners to undertake plant INNS control, concentrating on the furthest upstream locations and where INNS are impacting designated sites (not mapped).	NEO1, NEO2, NEO3, NEO8, NEO17	ES4
RW 4-02: Alongside partners develop and deliver a strategic approach to INNS control which aligns with neighbouring LNRS which concentrates on eradication of INNS at the furthest upstream locations (not mapped).	NEO1, NEO2, NEO3, NEO8, NEO17	ES4
RW 4-03: Awareness raising amongst landowners, community groups and the general public to encourage reporting and control of INNS to improve monitoring, increase local control and raise awareness of biosecurity measures to reduce the spread of INNS (not mapped).	NEO1, NEO2, NEO3, NEO8, NEO17	ES4

11.5 Urban (U)

11.5.1 Priority: U 1: There is greater range and abundance of wildlife in the urban environment which is protected, positively managed, and better connected across the urban landscape.

Measures:	National Environmental Outcomes	Ecosystem Services
U 1-01: Creation of community woodlands and other semi-natural habitats in the urban and peri-urban environment, which are easily accessible from urban centres.	NEO1, NEO2, NEO3, NEO4, NEO6	ES2, ES3, ES4
U 1-02: Planting of street trees and individual trees in the urban environment (not mapped).	NEO2, NEO3, NEO4	ES2, ES3, ES4
U 1-03: Where appropriate manage urban green spaces the local authority has responsibly for to promote wildlife and engagement with nature by creating and enhancing semi-natural habitats. Facilitated through the production and delivery of a Strategic Open Space Strategy (not mapped).	NEO2, NEO3, NEO4, NEO6	ES2, ES3, ES4
U 1-04: Encourage residents and landowners to take action, creating habitats for wildlife in urban spaces such as gardens, schools, churchyards and other urban areas, to encourage nature and enhance connectivity and engagement (not mapped).	NEO2, NEO3, NEO4, NEO6	ES2, ES3, ES4
U 1-05: Design and implement targeted nest box schemes for birds, bats and invertebrates (not mapped).	NEO2, NEO3	ES3
U 1-06: Areas of value to wildlife and accessible nature friendly spaces in urban areas to be better protected through appropriate designation such as Local Nature Reserve designation (not mapped).	NEO2, NEO3	ES3

11.6 Coastal (C)

11.6.1 Priority: C 1: Recreational access to the coast is sustainably managed, minimising impacts local wildlife and the environment.

Measures	**National Environmental Outcomes**	**Ecosystem Services**
C 1-01: Develop and implement a specific strategy for the coast that addresses the recreational impacts by, engaging with the public, rationalising and improving the path network, protecting sensitive areas through path rationalisation, fencing and signage and undertaking habitat management to support the designations (not mapped).	NEO1, NEO2, NEO3, NEO6	ES2, ES3, ES4
C 1-02: Create or enhance existing publicly accessible green spaces to provide nature rich environments and reduce recreational pressures on the coasts European Designations (not mapped).	NEO1, NEO2, NEO3, NEO6	ES2, ES3, ES4

11.7 Butterflies and Moths (BM)

11.7.1 Priority: BM 1: Populations of the Coastal Day-Flying Moth Assemblage are secured and their connectivity and distribution increased.

(The Coastal Day-Flying Moth Assemblage contains the following species: Cistus Forester, Chalk Carpet and Least Minor).

Measures	National Environmental Outcomes	Ecosystem Services
BM 1-01: Re-survey of known, historic and potential sites to ensure we have up to date information on the day-flying moth assemblage (not mapped).	N/A	ES3
BM 1-02: Magnesian limestone grasslands are managed to achieve good condition enabling them to support populations of the day flying moth assemblage.	NE01, NEO2, NE03	ES2, ES4
BM 1-03: Quarry restorations prioritise the creation of Magnesian limestone grassland capable of supporting species within the assemblage.	NE01, NEO2, NE03	ES2, ES4
BM 1-04: Coastal grasslands are managed to increase plant diversity and opportunities to create bare ground habitat populated with appropriate foodplants on Magnesian limestone are taken.	NE01, NEO2, NE03	ES2, ES4
BM 1-05: Scope opportunities for species-specific projects and take bespoke practical action where possible (not mapped).	N/A	N/A

11.7.2 Priority: BM 2: Populations of Northern Brown Argus are secured and their connectivity and distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
BM 2 -01: Re-survey of known, historic and potential sites to ensure we have up to date information on Northern Brown Argus (not mapped).	N/A	ES3
BM 2-02: Assessments of habitat quality and management is undertaken at known sites, with this information used to ensure all known sites are brought under appropriate long term management.	NE01, NEO2, NE03	ES2, ES4
BM 2-03: Introductions of Northern Brown Argus onto sites that have (or could have) the capacity to support viable populations once appropriate enhancement and long term management is in place. (not mapped).	NE01, NEO2, NE03	ES2, ES4
BM 2-04: The expansion of Northern Brown Argus and connectivity between known populations is encouraged through habitat creation and appropriate land management.	NE01, NEO2, NE03	ES2, ES4

Measures	National Environmental Outcomes	Ecosystem Services
BM 2-05: Undertake a genetic study to determine the extent of colonisation and distribution of brown argus and the inter-relationships between the two species (not mapped).	NEO2, NEO3	ES2, ES4
BM 2-06: Undertake a research project alongside Durham University and local horticulturalists to assess various methods for the successful introduction of rock rose (not mapped).	NE01, NEO2, NE03	ES2, ES3, ES4

11.7.3 Priority: BM 3: Populations of Small Pearl-Bordered Fritillary are secured and their connectivity and distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
BM 3-01: Assessment of habitat management at known sites, with all known sites being brought into appropriate long term management.	NEO1, NEO2, NEO3	ES2, ES4
BM 3-02: The expansion of Small Pearl-Bordered Fritillary and connectivity between known populations is encouraged through habitat creation and appropriate land management.	NEO1, NEO2, NEO3	ES2, ES4
BM 3-03: Identify clusters of potential reintroduction sites to create additional, sustainable networks outside of the current known distribution (not mapped).	NEO1, NEO2, NEO3	ES2, ES4

11.7.4 Priority: BM 4: Populations of the Brownfield Lepidoptera Assemblage are secured and their connectivity and distribution increased.

(The Brownfield Lepidoptera Assemblage contains the following species: Dingy skipper, Grayling, Six-belted clearwing, Small blue, Green hairstreak and Wall).

Measures	National Environmental Outcomes	Ecosystem Services
BM 4-01: Assessment of habitat management at brownfield sites supporting species within the assemblage, with all sites being brought into appropriate long term management.	NEO1, NEO2, NEO3	ES2, ES4
BM 4-02: Buffer and connect brownfield sites supporting any of the assemblage through the creation of brownfield and appropriate semi-natural habitats.	NEO1, NEO2, NEO3	ES2, ES4
BM 4-03: Re-survey of known, historic and potential sites to ensure we have up to date information on the species within the assemblage	NEO1, NEO2, NEO3	ES2, ES4
BM 4-04: Identify sites for potential introduction of specific species within the assemblage and their foodplants if required and assess the ability of sites to support small blue, especially along the Durham Coast (not mapped).	NEO1, NEO2, NEO3	ES2, ES4

Measures	National Environmental Outcomes	Ecosystem Services
BM 4-05: Scope opportunities for species-specific projects and take bespoke practical action where possible (not mapped).	N/A	N/A

11.7.5 Priority: BM 5: The distribution of White-letter hairstreak is increased across the County.

Measures	National Environmental Outcomes	Ecosystem Services
BM 5-01: Dutch elm disease resistant Elm hybrids are planted as hedgerow and in-field trees.	NEO2, NE03	ES2, ES4

11.8 Bumblebees (BB)

11.8.1 Priority: BB 1: Populations of Moss Carder Bee are secured and their distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
BB 1-01: Species rich grasslands are provided at a field scale.	NEO1, NEO2, NEO3	ES2, ES4
BB 1-02: Permanent flower-rich field margins and headlands are created to support foraging and hibernating bumblebees.	NEO1, NEO2, NEO3	ES2, ES4
BB 1-03: Roadside verges on minor roads are managed to maintain and enhance their value to foraging bumblebees.	NEO2, NEO3	ES2, ES4
BB 1-04: Provide training and encourage further field surveys to establish more accurate distribution mapping (not mapped).	NEO2, NEO3	ES3
BB 1-05: Land management advice and information about moss carder bee is provided to land managers to encourage appropriate management and an affinity with the bee (not mapped).	NEO2, NEO3	ES3

11.8.2 Priority: BB 2: Populations of Broken-Belted Bumblebee are secured and their distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
BB 2-01: Species rich grasslands are created at a field scale with management regimes that allow plants to flower into early October.	NEO1, NEO2, NEO3	ES2, ES4

Measures	National Environmental Outcomes	Ecosystem Services
BB 2-02: Permanent flower-rich field margins and headlands are created that provide nectar sources into early October supporting foraging and hibernating bumblebees.	NEO2, NEO3	ES2, ES4
BB 2-03: Roadside verges on minor roads are managed to maintain and enhance their value to foraging bumblebees.	NEO2, NEO3	ES3
BB 2-04: Encourage further field surveys to establish more accurate distribution mapping (not mapped).	NEO2, NEO3	ES3
BB 2-05: Land management advice and information about broken-belted bumblebee bee is provided to land managers to encourage appropriate management and an affinity with the bee (not mapped).	NEO1, NEO2, NEO3	ES2, ES4

11.9 Birds (BR)

11.9.1 Priority: BR 1: Populations of Willow Tit are secured and their distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
BR 1-01: Known populations are secured through appropriate land management, including veteranising appropriate trees, coppicing, creating scrubby woodland rides, and halting maturation of some woodland in suitable areas.	NEO1, NEO2, NEO3	ES2, ES4
BR 1-02: Buffer, extend and connect known locations with wet woodlands, damp woodlands, hedgerows and scrubby margins to facilitate an increase in distribution and secure known populations.	NEO1, NEO2, NEO3, NEO4	ES2, ES4
BR 1-03: Install species specific 'nestboxes' in suitable areas to encourage expansion of population.	NE02, NE03	ES4
BR 1-04: Encourage further field surveys to establish more accurate distribution mapping and identification of key core areas. (not mapped).	NEO2, NEO3	ES2

11.9.2 Priority: BR 2: Populations of Black Grouse are secured and their distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
BR 2-01: Known populations and lek sites are secured through appropriate land management, maintaining and enhancing a mosaic of structurally diverse heathland, wetlands, grassland, scrubby and open native woodland.	NEO1, NEO2, NEO3	ES2, ES4
BR 2-02: Expand the distribution of black grouse by creating or enhancing a network of suitable habitats including structurally diverse heathland, wetlands, grassland and scrubby and open native woodland.	NEO1, NEO2, NEO3, NEO4	ES2, ES4
BR 2-03: Encourage further field surveys to establish more accurate distribution mapping and population monitoring (not mapped).	NE02, NE03	ES2
BR 2-04: Alongside other Measures, mitigate any significant, demonstrable impacts of predators on the breeding success of Black Grouse through proportionate, responsible and legal predator control, e.g. targeted control of particular species (not mapped).	NEO2, NEO3	ES2

11.9.3 Priority: B R 3: Populations of the Wader Assemblage are secured and their distribution increased.

(The Wader Assemblage contains the following species: Lapwing, Snipe, Redshank, Golden plover and Curlew)

Measures	National Environmental Outcomes	Ecosystem Services
BR 3-01: Improve habitat suitability in core areas for waders by providing the right conditions for breeding and wintering birds through managing water levels throughout the year, promoting the creation of wetland scrapes, spring sown crops and appropriate grassland management to create the right sward conditions.	NEO1, NEO2, NEO3	ES2, ES4
BR 3-02: Expand the distribution of waders by providing the right conditions for breeding and wintering birds through managing water levels throughout the year, promoting the creation of wetland scrapes, spring sown crops and appropriate grassland management to create the right sward conditions for waders outside of their core areas.	NEO1, NEO2, NEO3, NEO4	ES2, ES4
BR 3-03: Encourage further field surveys to establish more accurate distribution mapping and identification of key core areas (not mapped).	NE02, NE03	ES2
BR 3-04: Scope opportunities for species-specific projects and take bespoke practical action where possible (not mapped).	N/A	N/A
BR 3-05: Alongside other Measures, mitigate any significant, demonstrable impacts of predators on the breeding success of waders in the assembledge through proportionate, responsible and legal predator control, e.g. the use of predator exclusion fencing, diversionary feeding, targeted control of particular species (not mapped).	NEO2, NEO3	ES2

11.9.4 Priority: BR 4: Populations of the Lowland Farmland Bird Assemblage are secured and their distribution increased.

(The Lowland Farmand Bird Assemblage contains the following species: Yellowhammer, Corn bunting, Grey partridge, Tree sparrow, Linnet, Reed bunting, Yellow wagtail and Skylark)

Measures	National Environmental Outcomes	Ecosystem Services
BR 4-01: Retain post-harvest stubble fields through the winter and potentially through the spring to mid-summer providing winter food for seed eating birds and spring and summer foraging and nesting opportunities.	NEO2, NEO3	ES2
BR 4-02: Encourage the retention of arable weeds both 'in crop' and at the periphery of fields.	NEO2, NEO3	ES2
BR 4-03: Encourage the use of wild bird seed mixes to provide food for adults and young and overwintering cover.	NEO2, NEO3	ES2
BR 4-04: Increase tussocky, wildflower rich grassland margins, beetle banks and headlands, especially when associated with existing mature hedgerows.	NEO2, NEO3	ES2
BR 4-05: Encourage further field surveys to establish more accurate distribution mapping and identification of key core areas (not mapped).	NE02, NE03	ES2
BR 4-06: Scope opportunities for species-specific projects and take bespoke practical action where possible (not mapped).	N/A	N/A

11.10 Reptiles (R)

11.10.1 Priority: R 1: Populations of Adder are secured and their distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
R 1-01: Land management advice and information about adders is provided to land managers to encourage appropriate management and an affinity with adders (not mapped).	NEO1, NEO2, NEO3,	ES2, ES4
R 1-02: Appropriate land management is in place to secure adder populations and expand increase their distribution.	NEO1, NEO2, NEO3,	ES2, ES4
R 1-03: Projects to tackle public misconceptions about adders are undertaken in order to reduce persecution and encourage engagement with their conservation (not mapped).	NEO2, NEO3	ES4

Measures	National Environmental Outcomes	Ecosystem Services
R 1-04: Undertake a study of population genetics in the North Pennines National Landscape in conjunction with Newcastle University, building on previous work in this area (not mapped).	NEO2, NEO3	ES4
R 1-05: Continue and encourage further field surveys across the county to enable more accurate distribution mapping (not mapped).	NEO2, NEO3	ES4

11.10.2 Priority: R 2: Populations of Slow worm are secured and their distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
R 2-01: Land management advice and information about Slow worm is provided to land managers to encourage appropriate management and an affinity with Slow worm (not mapped).	NEO1, NEO2, NEO3,	ES2, ES4
R 2-02: Appropriate land management is in place to secure Slow worm populations and expand increase their distribution.	NEO1, NEO2, NEO3,	ES2, ES4
R 2-03: Encourage further field surveys across the county, and especially along the Durham coast, to enable more accurate distribution mapping (not mapped).	NEO2, NEO3	ES4
R 2-04: Undertake a population genetics study in the County in conjunction with Newcastle University (not mapped).	NEO2, NEO3	ES4

11.11 Fish (F)

11.11.1 Priority: F 1: An increase in self-sustaining populations of the Wild Fish Assemblage.

(The Wild Fish Assemblage contains the following species: Trout, Eel, River lamprey, Sea lamprey, Brook lamprey, Bullhead and Salmon)

Measures	National Environmental Outcomes	Ecosystem Services
F 1-01: Restore natural river function and physical condition by re-meandering, improving floodplain connectivity and introducing natural flood management measures.	NEO1, NEO2, NEO3, NEO5, NEO8, NEO14, NEO15	ES2, ES4
F 1-02: Remove culverts, obsolete artificial barriers and structures or mitigate the impacts of such structures.	NEO1, NEO2, NEO3	ES2. ES4
F 1-03: Create and restore riparian habitats through planting or natural regeneration of appropriate grassland, wetland and woodland habitats.	NEO1, NEO2, NEO3	ES2. ES4

Measures	National Environmental Outcomes	Ecosystem Services
F 1-04: Encourage effective Catch and Release Techniques across the catchments of County Durham (not mapped).	NEO2, NEO3	ES4
F 1-05: Encourage data collection by angling clubs and anglers to improve collective understanding of the river environment, including the Water Quality Monitoring Network and Riverfly Monitoring Initiative (not mapped).	NEO2, NEO3	ES4
F 1-06: Scope opportunities for species-specific projects and take bespoke practical action where possible (not mapped).	N/A	N/A

11.12 Flowering Plants (P)

11.12.1 Priority: P 1: Populations of the Upland Alchemilla Assemblage are secured and their distribution increased.

(The Upland Alchemilla Assemblage contains the following species: Starry Lady's mantle, Clustered Lady's mantle, Velvet Lady's mantle, Large-toothed Lady's mantle and Rock Lady's mantle)

Measures	National Environmental Outcomes	Ecosystem Services
P 1-01: Enhance the populations at known sites and roadside verges outside of the Special Areas of Conservation and associated component Sites of Special Scientific Interest through appropriate management and introductions if necessary. and expand these populations through appropriate management and introductions where conditions allow.	NEO1, NEO2, NEO3	ES4
P 1-02: Undertake surveys to identify other sites for the Upland Alchemilla Assemblage and locations where conditions are suitable for establishing populations of the assemblage outside of known and legally designated sites (not mapped).	NEO2, NEO3	ES3, ES4
P 1-03: Alongside Durham University and local horticulturists investigate the potential to collect seed and provide plug plants for introduction projects (not mapped).	NEO2, NEO3	ES3, ES4
P 1-04: Engage with and educate the public on the botanical value of roadside verges and the management required to maintain and enhance these assets (not mapped).	NEO2, NEO3	ES3, ES4
P 1-05: Scope opportunities for species-specific projects and take bespoke practical action where possible (not mapped).	N/A	N/A

11.12.2 Priority: P 2: Populations of Flat-sedge are secured and the distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
P 2-01: Enhance the populations at known sites through appropriate management and introductions.	NEO1, NEO2, NEO3	ES4
P 2-02: Undertake surveys at sites that could potentially support flat-sedge to identify any other sites for the species and locations where conditions are suitable for establishing new populations (not mapped).	NEO2, NEO3	ES3, ES4
P 2-03: Alongside Durham University and local horticulturists investigate the potential to collect seed and provide plug plants for introduction projects. A priority would be to establish metapopulation within the Great North Fen project (not mapped).	NEO1, NEO2, NEO3	ES3, ES4

11.12.3 Priority: P 3: Populations of Northern Hawk's-beard are secured and the distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
P 3-01: Enhance the populations at known sites through appropriate management and introductions.	NEO1, NEO2, NEO3	ES4
P 3-02: Undertake surveys at sites that could potentially support northern hawk's-beard to identify any other sites for the species and locations where conditions are suitable for establishing new populations (not mapped).	NEO2, NEO3	ES3, ES4
P 3-03: Alongside Durham University and local horticulturists investigate the potential to collect seed and provide plug plants for introduction projects (not mapped).	NEO1, NEO2, NEO3	ES3, ES4

11.12.4 Priority: P 4: Populations of Ivy-leaved Bellflower are secured and the distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
P 4-01: Undertake a population survey at both known sites and secure the populations through appropriate management and identify opportunities to extend the species into adjacent suitable habitat.	NEO1, NEO2, NEO3	ES4
P 4-02: Undertake surveys at sites that could potentially support ivy-leaved bellflower to identify any other sites for the species and locations where conditions are suitable for establishing new populations (not mapped).	NEO2, NEO3	ES3, ES4
P 4-03: Alongside Durham University and local horticulturists investigate the potential to collect seed and provide plug plants for introduction projects (not mapped).	NEO1, NEO2, NEO3	ES3, ES4

11.13 Mammals (M)

11.13.1 **Priority**: M 1: Populations of water voles are secured and their distribution increased.

Measures	National Environmental Outcomes	Ecosystem Services
M 1-01: Targeted mink control is undertaken along the main migratory routes for mink into County Durham and at other key locations in the county	NEO2, NEO3	ES4
M 1-02: Population monitoring and habitat condition assessments are undertaken at known water vole sites.	NEO2, NEO3	ES4
M 1-03: Known populations are secured through appropriate land management.	NEO1, NEO2, NEO3	ES4
M 1-04: Build on the work of the Naturally Native Project and develop a regional water vole recovery project (not mapped).	NEO1, NEO2, NEO3	ES4

11.13.2 Priority: M 2: Populations of red squirrel are secured and their distribution increased.

Measures:	National Environmental Outcomes	Ecosystem Services
M 2-01: Known populations of red squirrels are secured through appropriate habitat management and grey squirrel control in buffer zones around these populations.	NEO2, NEO3	ES4
M 2-02: Establish and support local red squirrel conservation groups to help protect local populations by improving monitoring of populations and facilitating conservation management and grey squirrel control (not mapped).	NEO2, NEO3	ES3, ES4
M 2-03: Engage with landowners to encourage the local planting of new woodlands and hedgerows around known populations, in conjunction with grey squirrel control, to create habitat connectivity and encourage local dispersal (not mapped).	NEO2, NEO3	ES3, ES4
M 2-04: Encourage formal surveys for red squirrels in areas where anecdotal records are arising for example upper Teesdale, Knitsley, Shotley Bridge and Beamish (not mapped).	NEO2, NEO3	ES3

11.14 Notes on the priorities and measures

11.14.1 Further information on the priorities and measures

The priorities and measures in the tables above are generally short statements; where applicable further information on what delivery of the measures entails and links to further material can be found in Appendix 2.

The information provided in the appendix is only meant to act as an initial guide; many of the measures will require specialist advice to be sought and, in some cases, licences, permits or planning permission will be required.

11.14.2 Biodiversity Net Gain

As part of Biodiversity Net Gain, when delivering habitat creation or enhancement in mapped locations the Statutory Biodiversity Metric provides an uplift in the number of biodiversity units generated. Advice is provided in Appendix 2 regarding what habitat type and condition would be needed to meet the requirements of the measures and gain the uplift. The guidance may not account for all eventualities and in such cases the RA should be contacted and the particulars of the situation discussed.

11.14.3 Right Action, Right Place

The scale of the LNRS has meant that ground truthing has not been possible, and in some cases the measures may not be appropriate for that location. An example would be if a measure promoted woodland creation at a location that was ecologically sensitive, had deep peat or archaeological features.

Although we have factored constraints into the mapping process, including those listed above, this is not a full proof mechanism, and appropriate checks should be undertaken prior to undertaking any works.

The LNRS is not dictating actions, and the mapping should be thought of as series of suggestions and a guide for land managers making decisions as to what is most appropriate based on their local knowledge and requirements.

11.14.4 Multiple Measures

Some locations have more than one measure associated with it, this is deliberate as we wanted to try and provide a range of measures to land managers and farmers so they could more easily choose an incentivised option that suits their landholding and aspirations.

Within the County Durham LNRS there are instances when only a single measure will be mapped at a specific location. Whether a single measure is mapped is dependent on a range of factors:

1) Where there is a clear steer within the National Character Area's Statements of Environmental Improvements towards delivery of a particular habitat type, then only a single habitat measure will be mapped. This is the case in the Durham Magnesian Limestone Plateau where only measures associated with Priority G1 are mapped when there was overlap with other habitat measures.

2) When the NCA guidance above does not apply, priority W1 and measures W1-01, W1-03 and W1-04 would be the only mapped measures when there is overlap with other habitat measures. This is due to W1 being a priority specifically targeted towards ancient woodland, an irreplaceable habitat and determined to be a priority for this iteration of the LNRS.

3) The exception to priority W1 and its measures dominating the mapping is where landscape scale projects have been identified, for example the Durham City Green Corridor. In such cases all appropriate habitat measures are mapped to provide land managers with the greatest range of incentivised options.

4) Habitat measures and species measures can be mapped in the same location; habitat measures should take precedence and be regarded as strategically significant within the Statutory Biodiversity Metric. Where possible habitat design and management should take account for species measures, e.g. where a woodland creation measure overlaps with a measure for Small pearl-bordered fritillary, the LNRS would incentivise woodland creation but ideally that woodland should have glades and management to encourage the butterfly's foodplant.

12 THE LOCAL HABITAT MAP

The Local Habitat Map can be accessed by following the link below:

County Durham LNRS Pre-Consultation Draft Local Habitat Map

The process of mapping measures and creating the Local Habitat Map was led by the Environmental Records Centre North East with support from the Ecology team at Durham County Council and included regular feedback from habitat and species specialists and the Working Groups.

There are two appendices that provide further information on the mapping process. Appendix 3 describes the general approach taken to the mapping and Appendix 4 provides a list of the datasets used.

13 REFERENCES & BIBLIOGRAPHY

- Bailey, AJ (1979). Hedgerows of County Durham: a botanical and historical survey. Durham County Conservation Trust
- Burns, F, Mordue, S, al Fulaij, N, Boersch-Supan, PH, Boswell, J, Boyd, RJ, Bradfer-Lawrence, T, de Ornellas, P, de Palma, A, de Zylva, P, Dennis, EB, Foster, S, Gilbert,
- G, Halliwell, L, Hawkins, K, Haysom, KA, Holland, MM, Hughes, J, Jackson, AC, Mancini, F, Mathews, F, McQuatters-Gollop, A, Noble, DG, O'Brien, D, Pescott, OL, Purvis, A, Simkin, J, Smith, A, Stanbury, AJ, Villemot, J, Walker, KJ, Walton, P, Webb, TJ, Williams, J, Wilson, R, Gregory, RD. (2023). State of Nature 2023, The State of Nature partnership.

  Sofia Blomqvist, Henrik G. Smith, Björn K. Klatt, Lina Herbertsson (2025), Bumblebee workers avoid foraging in road verges along busy roads. Vol 84, pg 133-139, Basic and Applied Ecology.
- Burns, F., Eaton, M.A., Balmer, D.E., Banks, A., Caldow, R., Donelan, J.L., Douse, A., Duigan, C., Foster, S., Frost, T., Grice, P.V., Hall, C., Hanmer, H.J., Harris, S.J., Johnstone, I., Lindley, P., McCulloch, N., Noble, D.G., Risely, K., Robinson, R.A. & Wotton, S. (2020). The State of the UK's Birds 2020. RSPB, BTO, WWT, DAERA, JNCC, NatureScot, NE and NRW

  Butterfly Conservation North East (2014). Butterflies of North East England. Transactions, Vol 77. Natural History Society of Northumberland.
- Environment Agency (2019) Catchment Data Explorer. Available at: https://environment.data.gov.uk/catchment-planning

  Coult T, Hackett S, Hislop L, Port G, Priestley S, Rankin C, Robinson B, Stevens, P, Vinkenoog R (2019). Bumblebees of North East England. Transactions, Vol 87. Natural History Society of Northumberland.
- Coates, M. (2024) Dragonfly Survey 2024, Vice County 66, Durham Wildlife Trust Region. British Dragonfly Society & Durham Wildlife Trust
- Dunn, TC & Parrack JD (1986). The Moths and Butterflies of Northumberland and Durham. Northern Naturalists Union.
- Durham County Council (2006). Durham Hedgerow survey 2006. Durham County Council.
- Durham County Council (2009). County Durham Landscape Guidelines: Hedges. Durham County Council.
- Durham County Council (2024). 2024 Air Quality Annual Status Report. Durham County Council.

- Durham County Council (2025). Ash DieBack Action Plan. Durham County Council.

- Durkin JL. (2016). Reptile Atlas of North East England 2016. Available at https://www.arguk.org/info-advice/survey-and-monitoring/250-reptile-atlas-of-north-east-england-2016/file

- Durkin JL. (2016). Amphibian Atlas of North East England 2016. Available at https://sites.create-cdn.net/sitefiles/28/2/9/282952/North_East_England_Amphibian_Atlas_2016.pdf

- Eales, H. (2016) Dragonflies and Damselflies of Northumberland and Durham. Transactions, Vol 81. Natural History Society of Northumberland.

- IPBES (2019). S. Díaz, J. Settele, E. S. Brondízio, H. T. Ngo, M. Guèze, J. Agard, A. Arneth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razzaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis, and C. N. Zayas (eds.).). Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES secretariat, Bonn, Germany

- Lawton, J.H., Brotherton, P.N.M., Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J.,

- Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.J.,

- Tew, T.E., Varley, J., & Wynne, G.R. (2010) Making Space for Nature: a review of England's

- wildlife sites and ecological network. Report to Defra.

- Newsome, M & Bowey, K (Ed) 2012. The Birds of Durham. Durham Bird Club

- Northumbria Mammal Group (2012). Mammals, Amphibians and Reptiles of the North East. Transactions, Vo 73. Natural History Society of Northumberland.

- Plantlife, Plant Link UK (2017). We need to talk about Nitrogen. Plantlife.

- Priestley, S. (2022). Appendix 2: Consideration of an Ecological Emergency (County Durham). Durham County Council.

- Available at https://democracy.durham.gov.uk/documents/s153924/Appendix%202%20Consideration%20of%20Ecological%20Emergency.pdf

Smith, A. and Chausson. A. (2021) Nature-based Solutions in UK Climate Adaptation Policy. A report prepared by the Nature-based Solutions Initiative at the University of Oxford for WWF-UK and RSPB

- Temperley, G (1951). A History of the Birds of Durham. Natural History Society of Northumberland.
- Temperley, G (1953). The past and present status of squirrels in Northumberland and Durham. Transactions of the Natural History society of Northumbria, 10, 153.
- UK Centre for Ecology and Hydrology (2024). High-tech aerial mapping reveals England's hedgerow landscape. https://www.ceh.ac.uk/press/high-tech-aerial-mapping-reveals-englands-hedgerow-landscape
- Westerberg, S & Bowey, K (Eds) (2000). A Summer Atlas of the Breeding Birds of County Durham. Durham Bird Club

Whittingham, M. J., McKenzie, A. J., Francksen, R. M., Feige, D., Cadwallender, T., Grainger, M., Oughton, E. (2019). Offshore refuges support higher densities and show slower population declines of wintering Ruddy Turnstones *Arenaria interpres*. *Bird Study*, *66*(4), 431–440.

Woodland Trust (n.d.) Ash dieback. https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/tree-pests-and-diseases/key-tree-pests-and-diseases/ash-dieback/ 24th October 2025.

14 APPENDICIES

14.1 Appendix 1: Local Nature Recovery Strategy Residents Survey

Total respondents: 346

(responses and percentages may exceed the 'total responses' and 100% as a respondent had the option to select multiple responses)

Which of the below are you responding as?

Respondent type	Responses	Percent of cases
Community group	20	5.8%
Landowner, farmer or land manager	25	7.3%
Resident	312	90.7%
Parish councillor	10	2.9%
Local business owner	8	2.3%
AAP board member	1	0.3%
Other	31	9.0%
Total	407	118.3%

If other, please specify.

Respondent type	Responses
DCC employee	7
Ecologist/Environmentalist	4
Naturalist/conservationist	4
Former resident	3
Landowner's consultant	2
Local charity	2
Climate Champion	1
Dog walker	1
Historic England	1
Housing developer	1
Local residents' association	1
NGO	1
Non-local resident	1

Respondent type	Responses
Retired business owner	1
Student	1
Visitor	1
Woodland Trust	1
Total	33

Which of the following habitats do you believe should be a priority for the County Durham Local Nature Recovery Strategy?

Habitat priorities	Responses	Percent of cases
Grasslands	222	65.1%
Woodland	213	62.5%
Hedgerows	203	59.5%
Running water	156	45.7%
Open water and marshes	108	31.7%
Heathlands	69	20.2%
Scrub	21	6.2%
Total	992	290.9%

Landowners: Which of the following habitats do you believe should be a priority for the County Durham Local Nature Recovery Strategy?

Habitat priorities	Responses	Percent of cases
Grasslands	18	72.0%
Hedgerows	16	64.0%
Woodland	16	64.0%
Running water	8	32.0%
Open water and marshes	5	20.0%
Heathlands	4	16.0%
Scrub	2	8.0%
Total	69	276.0%

Residents: Which of the following habitats do you believe should be a priority for the County Durham Local Nature Recovery Strategy?

Habitat priorities	Responses	Percent of cases
Grasslands	198	64.5%
Woodland	192	62.5%
Hedgerows	186	60.6%
Running water	139	45.3%
Open water and marshes	95	30.9%
Heathlands	64	20.8%
Scrub	19	6.2%
Total	893	290.9%

Which of the following species groups do you believe should be a priority for the County Durham Local Nature Recovery Strategy?

Species Priorities	Responses	Percent of cases
Invertebrates	275	80.9%
Birds	222	65.3%
Mammals	166	48.8%
Plants	125	36.8%
Amphibians	91	26.8%
Fish	43	12.6%
Reptiles	27	7.9%
Fungi	24	7.1%
Crustacea	11	3.2%
Total	984	289.4%

Nature provides us with many benefits, which of the following do you believe are the most important benefits that nature provides?

Important Benefits	Responses	Percent of cases
Climate adaptation	257	74.5%
Health and wellbeing	222	64.3%
Flood alleviation	214	62.0%
Landscape and views	144	41.7%
Food and fuels	104	30.1%
Recreation and ecotourism	51	14.8%
Art inspiration	15	4.3%
Total	1007	291.9%

How far do you live from the nearest place that you think is good for wildlife?

Distance	Responses	Percent of cases
Less than 300m	152	44.3
300m-1km	109	31.8
1-2km	49	14.3
2-5km	22	6.4
More than 5km	11	3.2
Total	343	100.0

What is your age? * How far do you live from the nearest place that you think is good for wildlife?

Age	Less than 300m	300m-1km	1-2km	2-5km	More than 5km	Total
Under 45	37.6%	30.6%	22.4%	7.1%	2.4%	85
45-54	51.7%	28.6%	10.2%	6.1%	3.4%	147
55+	44.3%	41.4%	8.6%	5.7%	0.0%	70

Are there any species of animal or plant that you remember from earlier in your life that you no longer see in the county, or that you see in much smaller numbers?

Response Options	Responses	Percent of cases
Response	268	77.5%
No response	78	22.5%
Total	346	100.0%

Produced by co-pilot: Here is a summary of the most frequently mentioned animal and plant species, listed in order of prevalence:

1. **Red squirrel** – 15 mentions (including variations like “Red squirrels”)
2. **Hedgehog** – Extremely frequent (mentioned in dozens of entries, often repeatedly)
3. **Butterfly/Butterflies** – Very frequent (including specific types like “Amber butterfly”, “Red Admiral”, “Brimstone”, etc.)
4. **Bee/Bees** – Frequently mentioned, often alongside butterflies
5. **Frog/Frogs** – Frequently noted, often with toads and newts

6. **Newt/Newts** – Commonly cited, including specific types like “Great Crested Newt”, “Palmate Newt”
7. **Birds (general and specific)** – Very frequent, including:
    - Sparrows (House, Tree)
    - Thrushes (Song Thrush, Mistle Thrush)
    - Lapwings
    - Curlews
    - Skylarks
    - Yellowhammers
    - Swifts, Swallows, House Martins
    - Owls, Woodpeckers, Greenfinches, Chaffinches
8. **Bats** – Frequently mentioned
9. **Foxes** – Frequently mentioned
10. **Deer (Roe, Red)** – Frequently mentioned
11. **Badgers** – Frequently mentioned
12. **Moths** – Frequently mentioned
13. **Ladybirds** – Frequently mentioned
14. **Toads** – Frequently mentioned
15. Voles (including Water Voles) – Frequently mentioned
16. **Wildflowers and meadow plants** – Frequently mentioned, including:
    - Bluebells
    - Cowslips
    - Orchids
    - Buttercups
    - Dandelions
    - Foxgloves
    - Primroses
    - Meadow Cranesbill
    - Ragged Robin
17. **Lizards (Common, Smooth)** – Occasionally mentioned
18. **Insects (general)** – Frequently mentioned, especially in reference to decline
19. Fish (e.g., Sticklebacks, Trout, Salmon) – Occasionally mentioned
20. **Hares (Brown Hare)** – Occasionally mentioned

This summary reflects the species most commonly perceived as having declined or disappeared in the county, based on respondents’ recollections.

Do you agree or disagree that the decline in wildlife is a matter that urgently needs addressing?

Agreement levels	Responses	Percent of cases
Strongly agree	276	81.7%
Agree	43	12.7%
Neither agree nor disagree	5	1.5%
Disagree	3	0.9%
Strongly disagree	11	3.3%
Total	338	100.0%

Landowner: Do you agree or disagree that the decline in wildlife is a matter that urgently needs addressing?

Agreement levels	Responses	Percent of cases
Strongly agree	21	87.5%
Agree	3	12.5%
Neither agree nor disagree	0	0.0%
Disagree	0	0.0%
Strongly disagree	0	0.0%
Total	24	100.0%

Resident: Do you agree or disagree that the decline in wildlife is a matter that urgently needs addressing?

Agreement levels	Responses	Percent of cases
Strongly agree	245	80.6%
Agree	42	13.8%
Neither agree nor disagree	5	1.6%
Disagree	3	1.0%
Strongly disagree	9	3.0%
Total	304	100.0%

Age: Do you agree or disagree that the decline in wildlife is a matter that urgently needs addressing?

Age	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
Under 45	75.9%	18.1%	2.4%	1.2%	2.4%	83
45-64	84.7%	9.0%	2.1%	1.4%	2.8%	144
65+	77.1%	18.6%	0.0%	0.0%	4.3%	297

Which one of the following should we prioritise when attempting to reverse declines in wildlife?

Activity Priorities	**Responses**	**Percent of cases**
Education & awareness	60	17.5%
Habitat creation	274	80.1%
Volunteering	8	2.3%
Total	342	100.0%

How do you engage with nature?

Engaging with nature	Responses	Percent of cases
Walking	317	92.2%
Visit nature reserve	255	74.1%
Wildlife gardening	194	56.4%
Photography	118	34.3%
Volunteering	117	34.0%
Other	39	11.3%
Total	1040	302.3%

If other, please specify.

Engaging with nature	**Responses**
Educating	7
Observing wildlife	6
Through employment	5
Habitat restoration	4
Charity/charity support	3

Engaging with nature	Responses
Research	3
Woodland/hedgerow restoration	3
Bird feeders	2
Farmer/farm manager	2
Hunting	2
Monitor wildlife	2
Conservation NGOs	1
Cycling	1
Fishing	1
Foraging	1
Growing food	1
Litter picking	1
Nature activities	1
Nature related membership	1
Networking	1
Providing grants	1
Recycling	1
Wild swimming	1
Total	51

How often do you engage with nature?

Frequency	Responses	Percent of cases
Once a day	181	52.6%
A few times a week	124	36.0%
A few times a month	33	9.6%
Less frequently	4	1.2%
Rarely or never	2	0.6%
Total	344	100.0%

Landowner: How often do you engage with nature?

Frequency	Responses	Percent **of cases**
Once a day	21	84.0%
A few times a week	4	16.0%
A few times a month	0	0.0%
Less frequently	0	0.0%
Rarely or never	0	0.0%
Total	25	100.0%

Resident: How often do you engage with nature?

Frequency	Responses	Percent **of cases**
Once a day	161	51.9%
A few times a week	116	37.4%
A few times a month	28	9.0%
Less frequently	3	1.0%
Rarely or never	2	0.6%
Total	310	100.0%

Age: How often do you engage with nature?

Age	**Once a day**	**A few times a week**	**A few times a month**	**Less frequently**	**Rarely or never**	**Total**
Under 45	43.5%	44.7%	9.4%	1.2%	1.2%	85
45-64	54.7%	33.8%	10.8%	0.0%	0.7%	148
65+	55.7%	35.7%	5.7%	2.9%	0.0%	70

How far reside from nearest place that think is good for wildlife: How often do you engage with nature?

Distance	**Once a day**	**A few times a week**	**A few times a month**	**Less frequently**	**Rarely or never**	**Total**
Less than 300m	64.5%	32.2%	3.3%	0.0%	0.0%	152
300m-1km	56.0%	31.2%	11.9%	0.9%	0.0%	109
1-2km	27.1%	56.3%	10.4%	6.3%	0.0%	48
2-5km	27.3%	50.0%	18.2%	0.0%	4.5%	22
More than 5km	27.3%	27.3%	36.4%	0.0%	9.1%	11

On average how far do you travel to engage with nature?

Distance	Responses	Percent of cases
Less than 300m	110	32.4%
300m-1km	81	23.8%
1-2km	51	15.0%
2-5km	40	11.8%
More than 5km	58	17.1%
Total	340	100.0%

Age: On average how far do you travel to engage with nature?

Age	Less than 300m	300m-1km	1-2km	2-5km	More than 5km	Total
Under 45	27.7%	26.5%	15.7%	12.0%	18.1%	83
45-54	39.0%	24.0%	13.0%	10.3%	13.7%	146
55+	30.0%	20.0%	15.7%	17.1%	17.1%	70

Would you like to share any places that you value for wildlife currently, or where there are opportunities to enhance or create new wildlife spaces?

No of respondents sharing places	Responses	Percent of cases
Yes	163	48.4%
No	174	51.6%
Total	337	100.0%

Number of places

Number of places shared per respondent	Responses	Percent of cases
0	21	12.9%
1	79	48.5%
2	23	14.1%
3	7	4.3%
4	10	6.1%
5	5	3.1%
6	18	11.0%
Total	163	100.0%

What is your gender?

Gender	Responses	Percent of cases
Male	112	37.1%
Female	189	62.6%
A gender	1	0.3%
Total	302	100.0%

What is your age?

Age group	Responses	Percent **of cases**
Under 18	1	0.3%
18-24	14	4.6%
25-34	28	9.2%
35-44	42	13.8%
45-54	68	22.4%
55-64	81	26.6%
65-74	55	18.1%
75+	15	4.9%
Total	304	100.0%

Do you consider yourself to be a disabled person?

Disability	Responses	Percent of cases
Yes	35	11.5%
No	269	88.5%
Total	304	100.0%

What is your ethnicity?

Ethnicity	Responses	Percent of cases
Asian or Asian British	2	0.7%
Black or Black British	1	0.3%
Mixed Race	3	1.0%
Travelling Community	1	0.3%
White British	284	94.7%
White Non-British	9	3.0%
Total	300	100.0%

14.2 Appendix 2: Further details on the priorities and measures.

14.2.1 Grassland, Heathland and Peatlands (G)

Priority:

G 1: Priority grasslands are restored, conserved, enhanced, extended and connected.

Priority grasslands are those defined by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England) and grassland habitats listed on the Durham Biodiversity Action Plan.

Further information on Measures:

G 1- 01: Priority grasslands managed appropriately to maintain or achieve good ecological condition, where practical 'lost' priority grasslands are restored and grasslands under agri-environment schemes are uplifted where possible to deliver priority grasslands.

Before starting work to improve or restore a site, clearly define the management objectives and assess site characteristics and constraints - such as the plant communities and species diversity, soil types, nutrient levels, geomorphology, and the availability of livestock and machinery.

Species rich grasslands should be allowed to flower and set seed and can be managed through the cutting and removal of the sward in late summer or by autumn / winter grazing. If grazing is needed over the summer, then the grassland should only be very lightly grazed, allowing the plants to flower and set seed.

Stock feeding should be avoided, as should the application of chemical fertilizers. Light well-rotted manure is sometimes applied to balance the nutrient removal from hay cuts or grazing, but high rates and routine applications are generally avoided.

Good ecological condition will be defined by the statutory metric condition sheets.

If restoring 'lost' grasslands (i.e. enhancement from a lower distinctiveness habitat, for example other neutral grassland restored back to lowland meadow) then it is likely that wildflower seed will need to be introduced, this can be achieved through natural colonisation or the deliberate introduction of seed. Natural colonisation is a slow process and is dependent on having a nearby species rich grassland. Creating bare ground through scarification on sites near priority grasslands encourages the establishment of genetically local species adapted to site conditions. However, this approach risks colonisation by vigorous, non-target species.

The two most common approaches for introducing seed are spreading green hay from an existing species rich grassland onto a prepared recipient site or by purchasing a (ideally locally sourced) seed mix from a commercial supplier. In both cases the weeds should be reduced at the receptor site to low levels prior to cultivation where 50% bare ground is created (usually through scarification or grazing) before seeds are applied to the site.

Green hay from nearby species-rich grasslands can support restoration by transferring local seed banks. Hay from the donor site should be cut and spread on the recipient site the same day to maintain seed viability. The donor and recipient sites should share similar soil type and pH and be free of injurious weeds. Care must be taken to avoid depleting the donor site. Turf or

plug plants from local donor sites can also be transplanted into bare ground to introduce target species, but this mechanism is generally not suitable for larger sites. When restoring priority grassland habitats, then the target condition for the priority habitat should be moderate, as a minimum, as defined by the metric condition sheets. Moderate condition ensures that the parcel represents a good example of the habitat type.

Agri-environment schemes (AES) can be stacked with BNG, but only if the BNG enhancements are distinct and additional to the original AES. You cannot sell BNG units for habitat creation that was already funded by an AES. However, you can create a further, additional habitat improvement on top of an existing AES agreement to meet BNG requirements, potentially generating two separate income streams from the single piece of land. This measure supports the stacking of AES and BNG when appropriate, supporting management to deliver priority grassland habitats from those of a lower distinctiveness category. As with restoration, a target condition of moderate is required as a minimum.

Further advice can be found at:

Plantlife - How to Manage a Meadow

NPNL - Guide to hay meadow restoration

G 1- 02: Buffer and connect priority grasslands through the creation of priority grasslands habitats where soil fertility allows. On high fertility soils provide connections for priority grasslands and their associated species through delivery of agricultural margins, conservation headlands and good condition 'other neutral grassland' at a field scale.

Whether a priority grassland can be created is dependent on soil conditions, so testing is essential to determine the soil type, pH and nutrient levels as this will determine the type of grassland that can be created.

If soil conditions, especially nutrient levels and pH are suitable then a priority habitat such as lowland meadow should be the target for creation at a field scale. Low levels of soil phosphorus and potassium are a feature of most botanically valuable unimproved grasslands, high levels of nutrients in grasslands generally lead to a decrease in species diversity because nutrient-rich conditions favour fast-growing, dominant plants leading to a community with fewer species.

Where nutrient levels are too high and cannot reasonably be reduced then the target habitat should be a ‘other neutral grassland’ in good condition (condition determined by the statutory metric condition sheets).

Creating priority grasslands usually involves creating around 50% bare ground through scarification or intensive grazing followed by the introduction of seed. The two most common approaches for introducing seed are spreading green hay from an existing species rich grassland onto a prepared recipient site or by purchasing a (ideally locally sourced) seed mix from a commercial supplier.

Green hay from nearby species-rich grasslands can support restoration by transferring local seed banks. Hay from the donor site should be cut and spread on the recipient site the same day to maintain seed viability. The donor and recipient sites should share similar soil type and pH and be free of injurious weeds. The usual ratio is about 1ha of donor hay for every 3 ha of receptor site. Care must be taken to avoid depleting the donor site, so don’t harvest the entire field in any one year. Turf or plug plants from local donor sites can also be transplanted into

bare ground to introduce target species, but this mechanism is generally not suitable for larger sites.

Similar approaches can be taken to creating or enhancing a grassland to other neural grassland or creating agricultural margins and conservation headlands. The long-term management of other neutral grasslands will also be the same as for a species rich lowland meadow (see G1 - 01).

G 1-04: End-use restoration of magnesian limestone mineral sites to include significant restoration to calcareous grassland communities.

Where calcareous grassland habitats are created these should be in good condition as per the Statutory Biodiversity Metric.

Priority:

G 2: Heathlands are restored, conserved, enhanced, extended and connected.

Upland Heathland and Lowland Heathland are priority habitats as defined by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England).

Upland heath occurs where peat soils are shallow such as on the fringes of blanket bog and encompasses vegetation such as heather species, bilberry purple moor grass, deer grass and rush species.

Few areas of lowland heath (generally found below 300m in altitude and out with of the North Pennines) remain in County Durham however, important relics of this habitat survive at Waldridge Fell SSSI. This habitat is typically characterised by dwarf shrubs such as heather and cross-leaved heath.

Further information on Measures:

G 2-01: Heathlands are managed appropriately to maintain or achieve a structurally diverse habitat in good ecological condition and where practical 'lost' priority heathlands are restored.

Heathland management focuses on preventing natural succession (woodland development) through techniques like grazing and mowing/cutting to create a diverse mosaic of vegetation ages and structures, including heather, grasses, shrubs, scattered trees, and bare ground.

Grazing generally produces a greater diversity of habitats than cutting or other management techniques such as burning. Livestock density, timings and duration should be appropriate for the heathland type and size of the area to prevent overgrazing and fragmentation.

Good condition will be defined by the statutory metric condition sheets.

Restoration of 'lost' heathlands can be difficult, especially if agricultural improvements have changed the soil chemistry and increased nutrient levels. In some cases, over grazing will have degraded the heathland to species poor acidic grasslands and reducing grazing pressure will begin the process of restoration. Where invading trees and woodland have resulted in the loss of heathlands then clearing trees and scrub and establishing an appropriate grazing regime would be the starting point for restoration. The ecological value of the woodland would need to

be accounted for in any proposals for heathland restoration. Introducing species such as heather and bilberry through plugs and seed might be required if these species have been completely lost from the site. Conversion of heathland to intensive agriculture can involve significantly changing soil pH and nutrient levels, reversing these changes to allow the recreation of heathland can be intensive and expensive. Applications of sulphur or acidifying organic atter such as pine needles can be used to return to a lower soil pH, alternatively it is possible to mechanically manipulate soil profiles in the search for a more appropriate substrate for heathland. When restoring priority heathland habitats, then the target condition for the priority habitat should be moderate, as a minimum, as defined by the metric condition sheets.

G 2-02: Buffer and connect heathlands through the creation of heathland and appropriate semi-natural habitats.

It will not always be possible to create heathlands and in such cases other open semi-natural habitats can be used to buffer and connect exiting heaths. Diverse grasslands, for example other priority grasslands in moderate condition or good condition other neutral grassland and scrub habitats with clearings, glades and a well-developed edge (scrub criteria D and E in the statutory metric condition sheets) would be suitable alternatives, whereas closed canopy woodland would not be suitable. Rhododendron scrub, ornamental scrub or ruderal/ephemeral habitats would not be suitable habitats given their low distinctiveness and conservation value. Wetlands and open water features are unlikely to act as buffering and connecting habitats given the 'dry' nature of heathlands and the species associated with them.

Priority:

G 3: Open Mosaic Habitats (OMH) are conserved, enhanced, extended and connected.

Further information on Measures:

G 3-01: Open Mosaic Habitats are managed appropriately to achieve good ecological condition and where practical 'lost' priority open mosaic habitats are restored.

When managing OMH the focus should be on maintaining a mosaic of bare ground, short and tall vegetation, wetlands and scrub rather than creating uniformity. The poor nutrient status of the soils at OMH sites mean that annual grazing or cutting is not often required as ecological succession is slowed down and habitats can remain stable over decades.

Interventions will be required at some stage to maintain the mosaic of habitats. Ground disturbance and mechanical removal of vegetation is a useful management tool that creates bare soil which allows pioneer vegetation to colonise as well as providing basking sites for invertebrates. Scrub and woodland encroachment will need to be managed to maintain an open habitat. Rotational cutting and/or grazing can help to maintain a diverse mix of habitats.

Good condition will be defined by the statutory metric condition sheets.

OMH habitats do eventually succeed; where succession has led to more uniform scrub and other neutral grassland habitats the aim of restoration will be recreating a diverse mix of bare ground, grasslands, scrub, and other features that support high biodiversity, particularly for invertebrates and birds. When restoring 'lost' OMH then the target condition should be moderate, as a minimum, as defined by the metric condition sheets. In some cases, OMH succeeds towards other grassland priority habitats such as lowland meadow or lowland heath,

in such cases management should concentrate on promoting the development of the priority habitat. When promoting grassland priority habitats then moderate condition should be targeted as a minimum.

G 3-02: Buffer and connect Open Mosaic Habitats through the creation of OMH or appropriate open semi-natural habitats.

It will not always be possible to create OMH and in such cases other open semi-natural habitats can be used to buffer and connect exiting OMH. Diverse grasslands, for example other priority grasslands or good condition other neural grassland and scrub habitats with clearings, glades and a well-developed edge (scrub criteria D and E in the statutory metric condition sheets) would be suitable alternatives. Wetlands such as reedbeds and fens and ponds could also be considered as buffering and connecting habitats, whereas closed canopy woodland would not be suitable. Woodlands surrounding OMH could be thinned, where appropriate, to create extensive glades and rides where grassland habitats can develop. Rhododendron scrub, ornamental scrub or ruderal/ephemeral habitats would not be suitable habitats given their low distinctiveness and conservation value. Note that *Rhododendron ponticum* and *Rhododendron ponticum x Rhododendron maximum* are on Schedule 9 of the Wildlife and Countryside Act 1981, making it an offence to plant it in the wild or to let it spread in the wild.

G 3-03: Identify sites at risk from anti-social behaviour and develop partnerships to tackle misuse and raise awareness of their ecological value (not mapped). Sites can be damaged by anti-social behaviour including fly-tipping, fires and offroad bike use. Such at risk sites will be identified and partnerships will be developed and may include the County Council, local emergency services, NGOs and community groups. The aim of the partnership would be to both raise awareness about the value of the habitat and the impacts of anti-social behaviour but also put in place access infrastructure where appropriate to restrict anti-social behaviour.

Priority:

G 4: Peatlands are conserved and restored to be in good hydrological and biological condition.

Blanket bog is the priority habitats as defined by Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England).

Peatlands are carbon rich habitats whose waterlogged conditions prevent plant material from completely decomposing. This forms the peat soil which is built up slowly over time.

In County Durham, the higher moorland plateaux of the North Pennines are dominated by blanket bog. Few remanent areas of lowland blanket peat bogs remain in County Durham such as at Stanley Moss.

Further information on Measures:

G 4-01: Peatlands are managed appropriately to achieve good ecological and hydrological condition.

Peatland should be managed to maintain a high-water table and activities such as installing dams or harvesting peat should be avoided. Blanket bogs have a low carrying capacity for stock and are vulnerable to trampling and poaching. Light grazing might be required to prevent the invasion of trees and shrubs or control dominant grasses that may replace bog-specific vegetation

Restoration of peatlands often involves raising the water table by blocking drainage ditches and creating dams. Plants, especially sphagnum mosses can be introduced to degraded sites.

Restoration efforts aim to reduce erosion, increase water storage, and help the bog sequester carbon, contributing to climate change mitigation and biodiversity.

Good condition will be defined by the statutory metric condition sheets.

The North Pennines National Landscapes is at the forefront of peatland restoration and further information can be found at NPNL - Peatland Restoration.

14.2.2 Woodland, Hedgerows, Scrub and Trees (W)

Priority:

W 1: Ancient Woodlands and ancient and veteran trees are conserved, enhanced, extended and connected, with Planted Ancient Woodlands (PAWS) actively restored.

Further information on Measures:

W 1-01: Buffer and connect ancient woodland through planting native tree and scrub species and/or through natural colonisation.

The aim of this measure is to primarily encourage woodland creation at a field scale.

In some cases, natural regeneration would not be an appropriate mechanism. For example, if attempting to create native woodland against coniferous or beech-dominated Planted Ancient Woodlands, natural regeneration is unlikely to succeed given the lack of appropriate seed sources and in such cases planting would be the better option.

For the purposes of this measure native woodland includes scrub habitats such as hawthorn or mixed scrub. The website Durham Landscape provides information on the native woodlands found in County Durham. The creation of wood pasture and parkland would also be supported by this measure; where a landowner has an interest in biodiverse grassland habitats or wishes to maintain some grazing then these open woodland habitats can be a viable option. Coniferous woodlands, Scots pine woodlands and mixed woodlands are excluded from this measure.

Most created woodlands take over 30 years to reach good, or in some cases moderate condition as per the Statutory Biodiversity Metric, the highest possible condition score attainable within a 30 year period should be delivered.

In all cases the woodland type selected should be appropriate to the local conditions, ground conditions may vary across a site and an informed and thoughtful approach to woodland planting design is encouraged. Avoid planting in straight lines, use a low planting density and vary the density across the site balancing denser areas with plenty of open space and opportunities for natural regeneration.

The Forestry Commission documents Using natural colonisation for the creation of new woodland and Guide to planning new woodland in England and the Woodland Trust Woodland Creation Guide provide further information.

W 1-03: Appropriate management of ancient woodland to achieve good ecological condition.

Prior to starting work, undertake an assessment of the woodland so the current conditions are understood, and any constraints and threats are identified.

Management will be site specific but may include a gradual program of thinning to create a diverse woodland structure, protection of veteran and ancient trees and control of invasive or undesirable species.

The Forestry Commission publication Managing ancient and native woodland in England is a starting point for further information.

W 1-04: Restore PAWS, conserving any remaining ancient woodland features, through careful active management.

Restoration of PAWS is usually best achieved by the gradual removal of introduced species, and a phased transition to native woodland, either through natural regeneration or planting. This reduces disturbance to flora and fauna but also landscape and visual impacts. In some woodlands, clear felling by compartment may be the only practical option. Where practical, these compartments should be kept small to minimise disturbance.

Much of the remnant biodiversity in PAWS resides within the soil and ground flora and therefore, it is important to minimise physical disturbance during restoration.

See The Woodland Trust and The Forest Commission websites and guidance links below for more information

Restoration of lowland plantations on ancient woodland sites (PAWS) - Forest Research

How We Restore Ancient Woodland - Woodland Trust

W 1-06: Targeted planting of hedgerow, parkland and in field trees and the veteranisation of existing trees.

Hedgerow guidance documents produced by the Durham Hedgerow Partnership provide information on hedgerow management, hedge laying, hedge planting and hedge trimming.

Tree veteranisation is a technique where younger trees are deliberately damaged to accelerate the creation of microhabitats and decay features typically found on older, veteran trees, such as holes, hollows, and deadwood. These features support a range of species including rare invertebrates, specialised fungi and bats. Veteranisation has often been used as an alternative to felling trees, instead leaving a monolith. Veteranisation is never appropriate for veteran or ancient trees. Further information can be found in a Woodland Trust newsletter; WoodWise.

Priority:

W 2: The area of native woodland is increased

Further information on Measures:

W 2-01: Increase the area of native woodland cover through planting and/or natural colonisation, as appropriate, particularly targeting expansion and connecting of existing woodlands and in areas that increasing woodland will contribute to development of robust woodland habitat networks.

For the purposes of this measure native woodland includes scrub habitats such as hawthorn or mixed scrub.

Native woodlands found in County Durham range from gorse scrub through to lowland oak birch woodland and wet alder carr woodlands. The creation of wood pasture and parkland would also be supported by this measure. Coniferous woodlands, Scots pine woodlands and mixed woodlands are excluded from this measure.

Most created woodlands take over 30 years to reach good, or in some cases moderate condition as per the Statutory Biodiversity Metric, the highest possible condition score attainable within a 30 year period should be delivered.

The purpose of this measure is delivering habitat creation at scale, small areas of scrub or tree planting in the corner or margins of a field are unlikely to be regarded as strategically significant within the Statutory Biodiversity Metric. This view may alter if the planting is part of a wider mosaic of connected semi-natural habitats and a discussion with the RA would be appropriate in such circumstances.

The website Durham Landscape provides further information on the native woodlands found in County Durham.

The measure does not stipulate what type of native woodland should be created; the type of woodland should be commensurate with the ground conditions and geographical location.

Priority:

W 3: All woodland types are managed appropriately to enhance their biodiversity and their wider ecosystem services.

Ground conditions may vary across a site and an informed and thoughtful approach to woodland planting design is encouraged. Avoid planting in straight lines, use a low planting density and vary the density across the site balancing dense areas with plenty of open space and opportunities for natural regeneration.

Further information on Measures:

W 3-01: Woodland management is increased in all woodland types, to deliver greater biodiversity benefits and a diverse range of ecosystem services and National Environmental Outcomes. (not mapped).

Woodland management for biodiversity can be incorporated into existing management plans, this could entail larger thinning operations, introduction of coppicing or smaller interventions such as nest box schemes or creation of monoliths and deadwood. What management for biodiversity is practical will be site specific, and the goals will vary from site to site depending on the opportunities and constraints at that location.

Where a woodland is not under management, a survey to understand the woodland is the starting point, what species and habitats are present and what are the threats, constraints and opportunities. Once the woodland is understood what you can achieve with the woodland can be established and a management plan developed. This management might be biodiversity led, or timber production or recreation might be the drivers. Opportunities to benefit wildlife should be woven into the management plan regardless of the primary goals. Ancient woodlands and priority habitats should be managed primarily to reach good ecological status whilst commercial and plantation woodlands might offer more opportunities for recreation alongside management for biodiversity.

The Woodland Condition Assessment helps landowners to assess woodland condition as the first stage of developing management plans

The Woodland Wildlife Toolkit provides advice on managing woodlands for wildlife.

The Deer Initiative provides information and advice on deer management.

UK Red Squirrel Accord can provide advice on control of Grey squirrels and management to encourage Red squirrels

Ash dieback is a consideration for woodland management with some of the aims being to reduce the spread of the disease, promote any tolerant Ash trees and the planting of alternative species if required. Further information can be found at Forest Research - Ash Dieback Advice.

Any existing wildlife value should not be impacted upon by the proposed management, for example increasing recreational access, especially to an ancient woodland or priority habitat, that results in deterioration of the woodland resource would not be supported by this measure.

Priority:

W 4: Native hedgerows are conserved, managed and enhanced, and new species rich native hedgerows with hedgerow trees are created, increasing connectivity and reforming lost connections.

Further information on Measures:

W 4-01: Improve the condition of existing hedgerows through increasing species diversity, planting hedgerow trees and providing buffer strips and headlands (not mapped).

W 4-02: Plant new species rich native hedgerows with hedgerow trees.

Hedgerow guidance documents produced by the Durham Hedgerow Partnership provide information on hedgerow management, hedge laying, hedge planting and hedge trimming.

Note that alternatives to Ash as hedgerows trees will be required due to the prevalence of Ash dieback. Oak, field maple and disease resistant elm are amongst the potential options depending on the location.

W 4-02 relates to 'species rich-native hedgerows with hedgerow trees' within the Statutory Biodiversity Metric, either associated with a bank or ditch or not.

14.2.3 Running Waters and Wetlands (RW)

Priority:

RW 1: Water quality is improved with a reduction in pollutants.

Further information on Measures:

RW 1-01: Encourage farmers and landowners to reduce diffuse pollution by adopting restorative agricultural techniques such as riparian buffer strips, woodland planting and minimal tillage techniques.

There are a range of general actions that can be taken to reduce diffuse pollution, including alleviating soil compaction through sward lifting and avoiding erosion by cultivating across slopes and placing water troughs away from watercourses. Placing buffer strips at the bottom of sloping fields and next to watercourses is an effective way to reduce diffuse pollution.

For further advice contact the Wear Rivers Trust or Tees Rivers Trust

Where buffer strips or woodland planting blocks are created (not existing features enhanced), then they can be regarded as strategically significant within the Statutory Biodiversity Metric. Where woodland features are being created, they should be native woodland types including scrub habitats such as hawthorn or mixed scrub. Coniferous woodlands, Scots pine woodlands and mixed woodlands are excluded from this measure. Grassland habitats of medium distinctiveness or higher should be used. No condition requirements.

Priority:

RW 2: Modified and artificial river habitats are restored.

Further information on Measures:

RW 2-01: Work with nature to restore physical complexity and dynamism to the river network by providing the space for our rivers to move and flood, naturalising longitudinal connectivity and improving the lateral connectivity to our floodplains through actions such as re-meandering, grading banks, restoring and creating new floodplain wetlands, backwaters and connecting channels.

Restoration techniques that work with natural processes and allow rivers to recover on their own are generally recommended. These approaches tend to create conditions that are more in keeping with the specific characteristics of each part of a river, resulting in habitats appropriate to the locality. Because they rely on natural dynamics, these restored habitats are generally more resilient and sustainable than those created through engineering, especially as climate change continues to affect river systems.

To be successful, restoration efforts should aim to re-establish four key natural processes that support river habitats and biodiversity. These include allowing river channels to move sideways through erosion and sediment deposition, reconnecting rivers with their floodplains to enable the free movement of water, sediment, organic material, and wildlife, ensuring these connections are maintained both upstream and downstream, and supporting natural riverside vegetation and its interaction with the river.

This measure relates to Priority habitat and Other rivers and streams within the Statutory Biodiversity Metric.

There is a potential requirement for activity permits in relation to this measure and the Environment Agency is the primary point of contact regarding such permits.

For further advice and help contact the Wear Rivers Trust or Tees Rivers Trust.

RW 2-02: Remove culverts, obsolete artificial barriers and structures or mitigate the impacts of such structures.

Removing obsolete artificial barriers like culverts can significantly benefit ecosystems and reduce flood risk by restoring natural water flow, enabling fish passage, and preventing sediment buildup. When removal isn't feasible, structures can be modified with features to allow wildlife to pass or allow for natural sediment transport. Fish ladders or bypass channels can be installed to allow fish to migrate freely up rivers, mammal ledges can be used to allow otters dry, safe passage through a culvert during flood conditions and dropping the bed of a culvert invert below the existing natural bed ensures continuity of sediment transport and prevents bed erosion.

Removal of a mapped culvert would be regarded as strategically significant within the Statutory Biodiversity Metric

There is a potential requirement for activity permits in relation to this measure and the Environment Agency is the primary point of contact regarding such permits.

For further advice and help contact the Wear Rivers Trust or Tees Rivers Trust.

14.2.4 Urban (U)

Priority:

U 1: There is greater range and abundance of wildlife in the urban environment which is protected, positively managed, and better connected across the urban landscape.

Further information on Measures:

U 1-01: Creation of community woodlands and other semi-natural habitats in the urban and peri-urban environment, which are easily accessible from urban centres.

By encouraging the creation and/or enhancement of community woodlands and other semi-natural habitats such as grasslands and orchards, we can provide places for local communities to engage with and learn more about nature. These habitats will also provide valuable foraging, commuting and shelter opportunities for a variety of wildlife within the urban environment.

Where woodland features are being created, they should be native woodland types including scrub habitats such as hawthorn or mixed scrub. Coniferous woodlands, Scots pine woodlands and mixed woodlands are excluded from this measure. Grassland habitats of medium distinctiveness or higher should be used. Given the recreational nature of these spaces no condition targets are provided.

The North East Community Forest may be able to provide help and access to funding when creating accessible woodlands.

U 1-02: Planting of street trees and individual trees in the urban environment (not mapped).

Urban environments can be difficult places for trees to survive and thrive, assessing the site conditions is essential. The type of soil, drainage, available space and potential conflicts with underground utilities and building foundations will all need to be considered. Once the environment is known the right type of tree can be selected for planting, native trees may not be the best choice, and non-native trees might be the better option in some situations. Trees provide both ecosystem service and aesthetic benefits, tree choice will affect how the tree benefits the environment, trees with large canopies will provide shade and carbon sequestration while spring flowering trees will provide benefits to pollinators.

Durham County Council's Landscape and Arboriculture team can provide further advice.

U 1-03: Where appropriate manage urban green spaces, the local authority has responsibly for to promote wildlife and engagement with nature by creating and enhancing semi-natural habitats. Facilitated through the production and delivery of a Strategic Open Space Strategy.

A strategic open space strategy will identify those open spaces that can be managed to improve their biodiversity value and provide people with greater engagement with nature. Identification of sites and the interventions proposed will be subject to consultation with local councillors and residents. Interventions might range from relatively small projects such as the installation of bird boxes or the planting of urban trees to the larger scale creation of wildflower grassland or woodland creation. In all cases the aim will be to create wildlife rich environments that residents can use and enjoy.

U 1-05: Design and implement targeted nest box schemes for birds, bats and invertebrates (not mapped).

New developments and refurbishment of existing housing stock provide opportunities for the inclusion of wildlife boxes. Swift boxes are a good option, as they can be used to support these declining birds, but the boxes are also used by other species including sparrows. The Local Planning Authority can encourage the inclusion of built in nesting opportunities for wildlife in new developments and social housing providers could retrofit appropriate boxes when renovating housing stock.

14.2.5 Coastal (C)

Priority:

C 1: Recreational access to the coast is sustainably managed, minimising impacts local wildlife and the environment.

Further information on Measures:

C 1-02: Create or enhance existing publicly accessible green spaces to provide nature rich environments and reduce recreational pressures on the coasts European Designations.

Publicly accessible green spaces such as parks and amenity spaces close to urban communities in coastal towns could be created to provide alternative recreational spaces to the coast itself. These spaces can be created and/or enhanced to provide a mosaic of habitats appropriate to the location of the greenspace such as woodland and/or trees, species rich grassland or scrub that provide not only opportunities for wildlife but an enriching place for people to visit and enjoy.

Where woodland features are being created, they should be native woodland types including scrub habitats such as hawthorn or mixed scrub. Coniferous woodlands, Scots pine woodlands and mixed woodlands are excluded from this measure. Grassland habitats of medium distinctiveness or higher should be used. Given the recreational nature of these spaces no condition targets are provided.

14.2.6 Butterflies and Moths (BM)

Priority:

BM 1: Populations of the Coastal Day-Flying Moth Assemblage are secured and their connectivity and distribution increased.

The species within the assemblage are strongly associated with the Magnesian limestone grasslands of the Durham coast, which contain the larval foodplants. The larvae of Least Minor feed on Glaucous Sedge (*Carex flacca)* and Blue Moor-grass (*Sesler caerulea*), Chalk Carpet requires Common Bird's-foot-trefoil and other trefoils, clovers and vetches while the larval foodplant of Cistus Forester is Common Rock-Rose.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

BM 1-02: Magnesian limestone grasslands are managed to achieve good condition enabling them to support populations of the day flying moth assemblage

Magnesian limestone grasslands are usually managed through low intensity grazing which creates a mosaic of grassland of varying lengths while allowing plants to set seed. All year-round grazing at low stocking densities can be used, or alternatively unproductive sites can be winter grazed, although monitoring for poaching will be required. Some bare ground is beneficial but will need monitoring. Cutting may be appropriate on smaller sites or those on gentle slopes. The foodplants for the moth assemblage should be monitored.

BM 1-03: Quarry restorations prioritise the creation of magnesian limestone grassland capable of supporting species within the assemblage

The restoration of quarries extracting magnesian limestone should include significant areas of Magnesian limestone grassland containing the food plants for the day-flying moth assemblage. The larval foodplants may require introducing either by seed, translocation of turves or plug planting. The grasslands should have a range of sward heights, contain areas of bare soil and include south facing slopes amongst a varied topography.

BM 1-04: Coastal grasslands are managed to increase plant diversity and opportunities to create bare ground habitat populated with appropriate foodplants on magnesian limestone are taken.

Many of the grasslands along the Durham coast are not species diverse, especially those on the cliff tops which were removed from intensive agriculture as part of the Turning the Tide Project, these coastal grasslands should be managed to improve species diversity and so help support populations of the moth assemblage. When increasing the plant diversity of the coastal grasslands the larval foodplants of the day-flying moth assemblage should be introduced either by seed, translocation of turves or plug planting.

The moth species are often associated with bare ground habitat, and such habitat should be created especially where the Magnesian limestone is near the surface or strongly influences the overlying soils. Such exposures will provide localised warm areas and opportunities for larval foodplants to germinate outside of well-established swards where they may struggle to get a foothold, this natural colonisation can be supplemented by plug planting or seeding.

Priority:

BM 2: Populations of Northern Brown Argus are secured and their connectivity and distribution increased.

The Northern Brown Argus is found on calcareous grasslands that support its only larval foodplant Common Rock-rose, the adult can often be found nectaring on wild thyme (*Thymus serpyllum*).

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

BM 2-02: Assessments of habitat quality and management is undertaken at known sites, with this information used to ensure all known sites are brought under appropriate long term management.

This butterfly is found on well drained, lightly grazed or ungrazed unimproved grasslands which have a varied sward height and a large proportion of Common Rock-rose. They prefer sheltered habitats, frequently with light, scattered scrub and patches of bare ground. Grazing is the best mechanism for managing sites, with either autumn or winter grazing being employed or light year-round grazing. Mowing can be used where grazing is impractical with a single annual hay cut in the autumn.

https://butterfly-conservation.org/sites/default/files/northern_brown_argus-psf.pdf

BM 2-03: Introductions of Northern Brown Argus onto sites that have (or could have) the capacity to support viable populations once appropriate enhancement and long term management is in place.

- Any introductions should follow the ICUN Guidelines for Reintroductions and Other Conservation Translocations 2013 and involve Butterfly Conservation from the outset.
- The receptor site should be large enough to support of population of the butterfly, Northern Brown Argus can maintain a population on small habitat patches of less than 1 hectare, but these are less secure and extinctions are more likely on small, isolated sites, and sites of over 1 hectare are encouraged. Both the receptor and donor sites should be under long term positive management ensuring that Common Rock-rose is abundant and habitat structure is suitable thus ensuring that populations remain viable.
- Sites for introductions should not have the ability to be naturally colonised by the butterfly and the reintroduction should be monitored and evaluated over the long term.

- Butterfly Conservation has a Position Statement on Reintroductions and Introductions which provides further information.

BM 2-04: The expansion of Northern Brown Argus and connectivity between known populations is encouraged through habitat creation and appropriate land management.

- Northern Brown Argus has limited colonising ability with migrations of up to several hundred meters being recorded. It is therefore important when created or managing land to support expansion of the species that this is done as close as possible to the known colony. Given that many colonies exist on small patch sizes of less than 1 hectare it is reasonable to provide numerous small areas suitable for the butterfly within close proximity of each other to allow dispersal between populations.
- Habitat patches for the butterfly can be provided on calcareous substrates that can support Common Rock-rose, a degree of shelter will be required alongside a varied sward structure.

Priority:

BM 3: Populations of Small Pearl-Bordered Fritillary are secured and their connectivity and distribution increased.

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- The Small Pearl-Bordered Fritillary is usually found damp grassland, moorland, and open woodland. The most commonly used foodplants are Common Dog-violet (*Viola riviniana*) and Marsh Violet (*Viola palustris*).

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

BM 3-01: Assessment of habitat management at known sites, with all known sites being brought into appropriate long term management.

- Small Pearl-Bordered Fritillary can be found in grassy and bracken habitats or within woodland glades and rides where its larval food plants are available, the most common foodplants are Common Dog-violet and Marsh Violet. Within all the habitat types, management is required to maintain populations of the larval foodplant by creating open, sunlit spaces where the violets can germinate.
- On bracken dominated sites the ideal way to manage the habitat is through grazing, with cattle and ponies trampling the bracken stands during winter and early spring. This breaks up the standing dead vegetation and creates a network of paths running through the bracken, all of which creates germination sites for violets and opens up the bracken canopy to allow in sunlight. Any grazing over the late spring and summer should be at a low density to avoid removing nectar sources used by the butterflies. Alternatives to grazing include cutting, bruising and spraying the bracken.

- Woodland glades can be created through coppicing and connected across the woodland with sunny rides. Glades can be created in succession or maintained through grazing or cutting.
- https://butterfly-conservation.org/sites/default/files/pearl-bordered-fritillary-psf.pdf

BM 3-02: The expansion of Small Pearl-Bordered Fritillary and connectivity between known populations is encouraged through habitat creation and appropriate land management.

- The Small Pearl-Bordered fritillary can move up to 4.5km across the landscape and this provides opportunities to create connectivity at a landscape scale. Creating or managing habitats to support the butterfly can be achieved through the creation of glades and rides within woodlands and introducing appropriate grazing management on grassland and bracken habitats to promote the larval foodplant. The most common foodplants are Common Dog-violet and Marsh Violet, at some locations these plants will need to be introduced with management maintaining open, sunlit spaces for the plant to germinate.
- On bracken and grassland dominated sites the ideal way to manage the habitat is through grazing, with cattle and ponies trampling the bracken stands during winter and early spring. This breaks up the standing dead vegetation and creates a network of paths running through the bracken, all of which creates germination sites for violets and opens up the bracken canopy to allow in sunlight. Any grazing over the late spring and summer should be at a low density to avoid removing nectar sources used by the butterflies. Alternatives to grazing include cutting, bruising and spraying the bracken.
- Woodland glades can be created through coppicing and connected across the woodland with sunny rides. Glades can be created in succession or maintained through grazing or cutting.

  https://butterfly-conservation.org/sites/default/files/pearl-bordered-fritillary-psf.pdf
- BM 3-03: Identify clusters of potential reintroduction sites to create additional, sustainable networks outside of the current known distribution.
- Where natural colonisation of habitat is unlikely given barriers to dispersal or the distances that the butterfly will range then the species should be reintroduced to facilitate an expansion in distribution. Any reintroductions should take place over multiple sites in close proximity of each other so that sustainable networks of locations for the Small Pearl-Bordered fritillary are created.
- Any introductions should follow the ICUN Guidelines for Reintroductions and Other Conservation Translocations 2013 and involve Butterfly Conservation from the outset.
- The receptor site should be large enough to support of population of the butterfly, and both the receptor and donor sites should be under long term positive management ensuring that larval foodplants are present and habitat structure is suitable thus ensuring that populations remain viable.
- Butterfly Conservation has a Position Statement on Reintroductions and Introductions which provides further information.

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

Priority:

BM 4: Populations of the Brownfield Lepidoptera Assemblage are secured and their connectivity and distribution increased.

- The species within the assemblage are strongly associated with species rich brownfield habitats where there larval foodplants can be found and the bare ground component of these habitats provide ideal basking opportunities. Common Bird's-foot-trefoil provides a larval food source for Green hairstreak, Dingy skipper and Six-belted clearwing and is a plant commonly found on brownfield sites. Various grasses provide the larval foodplant for Grayling and Wall, while Kidney vetch (Anthyllis vulneraria) supports the caterpillars of Small blue.

BM 4-01: Assessment of habitat management at brownfield sites supporting species within the assemblage, with all sites being brought into appropriate long term management.

- The best brownfield sites for the assemblage of Lepidoptera are those with an abundance of foodplants and a diversity of flowering plants to act as nectar sources for the adults alongside areas of sparse vegetation with open ground. Positive management usually involves clearing encroaching scrub or woodland and introducing periodic ground disturbance to maintain bare ground and allow foodplants to germinate.

BM 4-02: Buffer and connect brownfield sites supporting any of the assemblage through the creation of brownfield and appropriate semi-natural habitats.

Brownfield habitats can be difficult to create, but grasslands with a diversity of flowering plants including the larval foodplant and ideally areas of bare ground and sparse vegetation can be used to buffer and connect brownfield habitats.

BM 4-03: Re-survey of known, historic and potential sites to ensure we have up to date information on the species within the assemblage.

A butterfly survey usually requires a minimum of three visits, in spring, early and mid-summer to record the species present. These timings would cover most of the species within the assemblage, but a more bespoke approach may be required to cover species such as Grayling which are on the wing from late July through to mid-September. The six-belted clearwing is most effectively searched for using pheromone lures when they are on the wing in late June through to early August.

BM 4-04: Identify sites for potential introduction of specific species within the assemblage and their foodplants if required and assess the ability of sites to support small blue, especially along the Durham Coast.

- Any introductions of Lepidoptera should follow the ICUN Guidelines for Reintroductions and Other Conservation Translocations 2013 and involve Butterfly Conservation from the outset.
- The receptor site should be large enough to support of population of the target species, and both the receptor and donor sites should be under long term positive management ensuring that larval food plants are abundant, and habitat structure is suitable thus ensuring that populations remain viable.
- Any introduction of the foodplants need to take place well in advance of any proposed introduction of Lepidoptera, with a population of the foodplant established.
- Sites for introductions of Lepidoptera should not have the ability to be naturally colonised by the target species and the reintroduction should be monitored and evaluated over the long term.
- Butterfly Conservation has a Position Statement on Reintroductions and Introductions which provides further information.

Priority:

BM 5: The distribution of White-letter hairstreak is increased across the County.

The White-letter Hairstreak can be difficult to spot as it flies high amongst the canopy of trees, especially Elms. The larvae feed on Elms various elm species, including Wych Elm (*Ulmus glabra*) and English Elm (*Ulmus procera),* starting on the developing flowerbuds before moving onto the leaves to feed as they grow larger.

Further information on Measures:

BM 5-01: Dutch elm disease resistant Elm hybrids are planted as hedgerow and in-field trees.

There are several highly Dutch elm disease cultivars commercially available in the UK including 'Lutece', 'Sapporo Autumn Gold' and 'Wingham'. These can be planted as hedgerow trees or in-field trees in proximity to scrub and nectaring sources, care should be taken to avoid planting cultivar Elm on designated sites, ancient woodland or Planted Ancient Woodlands.

14.2.7 Bumblebees (BB)

Priority:

BB 1: Populations of Moss Carder Bee are secured and their distribution increased.

Locally the Moss Carder Bee (Bombus muscorum) has declined since the 1970's and is now only found in the uplands, generally on the moorland fringe in floristically diverse habitats.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

BB 1-01: Species rich grasslands are provided at a field scale.

- The Moss Carder is associated with extensive areas of tall, but open, flower-rich grasslands. During their flight season Moss Carder Bee benefits from flower rich meadows, and although they can forage from a wide range of plants it does show a preference for members of the pea family such as Tufted Vetch (*Viccia cracca*), Red Clover (*Trifolium pratense*), Common Bird's-foot-trefoil (*Lotus corniculatus*) and other species with long corollae, including the dead-nettles *(Lamium*) and yellow-rattle (*Rhinanthus minor*).
-
- The creation or enhancement of species rich grasslands and connecting these habitats at a landscape scale will play a key role in supporting the species, traditional hay meadow management can be used to manage meadows for this species, with the sward being retained over the summer without management.

BB 1-02: Permanent flower-rich field margins and headlands are created to support foraging and hibernating bumblebees.

- Flower rich margins and headlands supporting a diversity of flowering plants, especially those from the pea family, will provide valuable foraging habitat for Moss Carder Bee and 'stepping stones' of suitable habitat that will help the bee move across the landscape. Nests are made above-ground in tall, tussocky vegetation and as one of the carder-bumblebees, they gather moss and dry grass to make the covering of the nest. The provision of suitable nesting sites is essential in supporting the species.

- These habitats can be created or enhanced by sowing areas with a suitable wildflower and grass mix and adapting cutting and grazing regimes to promote wildflower diversity. If providing foraging habitat, cutting on an annual basis with the arisings removed or grazing introduced in the late summer would be appropriate. Cutting or grazing in the autumn every three years, will create a tussocky vegetation that the bees can use for nesting and if robust wildflowers are provided within the sward (e.g. black knapweed, tufted vetch and wild carrot) that can cope with competition from taller vegetation then valuable foraging habitat can also be provided.

BB 1-03: Roadside verges on minor roads are managed to maintain and enhance their value to foraging bumblebees.

Managing Road Verges for Pollinators is an advice sheet published by Buglife that provides guidance on how best to manage roadside verges from the benefit of bumblebees and other pollinators.

Priority:

BB 2: Populations of Broken-Belted Bumblebee are secured and their distribution increased.

The Broken-Belted Bumblebee has declined substantially over England and survives in scattered populations across the country. Locally the bee is found in upland areas and associated with open moorland and open areas of late flowering grassland.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

BB 2-01: Species rich grasslands are created at a field scale with management regimes that allow plants to flower into early October.

The Broken-Belted Bumblebee emerges from hibernation in late May or June and is associated with open sites that have a late season flowering peak with an abundance of plants such as Devil's-bit Scabious (*Succisa pratensis*) and Common Knapweed (*Centaurea nigra*) which flower in the late summer and early autumn.

Light grazing by cattle is recommended to promote late flowering species, this can be achieved through light all year round grazing or late autumn / winter grazing. Sheep are often unsuitable as they can selectively feed on Devil's-bit Scabious reducing or eliminating it from the sward. Cutting can be used, but the late cut required to maintain late flowering species may not suit some land managers, if cutting is used to maintain a species rich grassland, then significant margins and headlands should be left rotationally uncut to allow Devil's-bit Scabious and Common Knapweed to flower and set seed.

BB 2-02: Permanent flower-rich field margins and headlands are created that provide nectar sources into early October supporting foraging and hibernating bumblebees.

Flower rich margins and headlands supporting a diversity of flowering plants will provide valuable foraging habitat for Broken-Belted Bumblebee and 'stepping stones' of suitable habitat that will help the bee move across the landscape. Nests are made below-ground, often in mice or vole nests that have been abandoned their previous occupiers. Tussocky vegetation provides opportunities for small rodents and hence the bumblebee. The provision of suitable nesting sites is essential in supporting the species

These habitats can be created or enhanced by sowing areas with a suitable wildflower and grass mix and adapting cutting and grazing regimes to promote wildflower diversity. If providing foraging habitat, cutting on an annual basis with the arisings removed or grazing introduced in

early autumn would be appropriate. Cutting or grazing in the autumn every three years, will create a tussocky vegetation that the bees can use for nesting and if robust wildflowers are provided within the sward (e.g. black knapweed, tufted vetch and wild carrot) that can cope with competition from taller vegetation then valuable foraging habitat can also be provided.

BB 2-03: Roadside verges on minor roads are managed to maintain and enhance their value to foraging bumblebees.

Managing Road Verges for Pollinators is an advice sheet published by Buglife that provides guidance on how best to manage roadside verges from the benefit of bumblebees and other pollinators.

14.2.8 Birds (BR)

Priority:

BR 1: Populations of Willow Tit are secured and their distribution increased.

Willow tits are the most rapidly declining resident bird in the UK with the population falling by 91% between 1967 and 2010. County Durham is regarded as one of the last strongholds for the species.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

BR 1-01: Known populations are secured through appropriate land management, including veteranising appropriate trees, coppicing, creating scrubby woodland rides, and halting maturation of some woodland in suitable areas.

Willow tits prefer a mosaic of damp habitats with dense scrub of a variable height interspersed with young trees, the species associated with appropriate habitats are birch, willow, hawthorn, elder and alder. They also need rotten standing deadwood in which to excavate their nest holes. Maintaining soil moisture and damp conditions is important, as if a site dries out it will be colonised by less suitable tree species such as oak, features such as leaky dams can help hold water back.

Appropriate management can include removing any grazing to allow scrub regeneration and planting appropriate scrub species. Thinning woodland and creation of rides and glades provides more light that can help scrub develop and rotational coppicing of scrub will regenerate the scrub layer as well as providing mature scrub where rot can develop. Creation of shallow water holding features supports invertebrates which in turn provide a valuable food source for willow tit and the creation of more standing deadwood by killing a tree in-situ provides nesting opportunities.

Further information on management for willow tit can be found in the Willow Tit Conservation Handbook.

BR 1-02: Buffer, extend and connect known locations with wet woodlands, damp woodlands, hedgerows and scrubby margins to facilitate an increase in distribution and secure known populations.

Habitat connectivity is important for willow tits as they find it difficult to cross open landscapes, by providing linear features such as hedgerows or pockets of scrub movement across the landscape can be supported. Allowing damp sites of low conservation value to regenerate to wet woodland and scrub can provide new opportunities for willow tit when connecting or buffering an existing population. Although small pockets of habitat might aid connectivity, breeding willow tits require at least 2ha of suitable habtat and may need up to 7ha and these sizes should act as a guide when looking to create or extend breeding habitat.

Further information on management for willow tit can be found in the Willow Tit Conservation Handbook.

BR 1-03: Install species specific 'nestboxes' in suitable areas to encourage expansion of population.

The priority should be to increase deadwood availability, but when this is not a viable option specialist nest boxes can be installed, alternatively decaying birch or willow logs of 10-20cm in diameter can be attached to sound trees. In both cases the nesting opportunity should be placed about 1.5m from the ground.

Priority:

BR 2: Populations of Black Grouse are secured and their distribution increased.

Black grouse is one of the iconic species of the uplands. It was once common across the UK but has been in long-term decline and it is now restricted to upland areas of Britain, with County Durham holding approximately half the English population.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

BR 2-01: Known populations and lek sites are secured through appropriate land management, maintaining and enhancing a mosaic of structurally diverse heathland, wetlands, grassland, scrubby and open native woodland.

In Britain, black grouse are associated with a variety of moorland and forest fringe habitats. To satisfy their seasonal dietary requirements birds utilise a range of differing habitats throughout the year. Females use diverse moorland and rough grassland habitats which provide protein rich food sources prior to breeding, nesting cover and insect-rich areas in which to raise their chicks.

Appropriate management includes keeping the grassland short in the spring when the lek is active, avoiding tree planting and fencing within 200m of the lek site and managing the wider landscape to create a mosaic of high-quality habitat for the species. Upland hay meadows should be retained, and other grasslands managed to increase botanical diversity and provide a mosaic of short and tall vegetation.

Within the moorland a mosaic of heather ages and structure should be provided with any redundant fences removed and others marked to reduce mortality. Existing areas of boggy vegetation and wet flushes should be retained and enhanced and where possible drains and ditches blocked creating new areas. Native woodland should be enhanced or created, with birch, willow, hawthorn and rowan being appropriate species. Woodland should have uneven edges, and scrub should be encouraged along the edges of woodland or along rides and in larger woodlands open space (≥40%) will be needed.

Further information on management for black grouse can be found at Black Grouse - Game and Wildlife Conservation Trust

BR 2-02: Expand the distribution of black grouse by creating or enhancing a network of suitable habitats including structurally diverse heathland, wetlands, grassland and scrubby and open native woodland.

Maintaining and creating a mosaic of habitats across the landscape is key to supporting Black grouse. Upland hay meadows should be retained, and other grasslands managed to increase botanical diversity and provide a mosaic of short and tall vegetation. Within the moorland a mosaic of heather ages and structure should be provided with any redundant fences removed and others marked to reduce mortality. Existing areas of boggy vegetation and wet flushes should be retained and enhanced and where possible drains and ditches blocked creating new areas. Native woodland should be enhanced or created, with birch, willow, hawthorn and rowan being appropriate species. Woodland should have uneven edges, and scrub should be encouraged along the edges of woodland or along rides and in larger woodlands open space (≥40%) will be needed.

Further information on management for black grouse can be found at Black Grouse - Game and Wildlife Conservation Trust

Priority:

B R 3: Populations of the Wader Assemblage are secured and their distribution increased.

(The Wader Assemblage contains the following species: Lapwing, Snipe, Redshank, Golden plover and Curlew)

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

BR 3-01: Improve habitat suitability in core areas for waders by providing the right conditions for breeding and wintering birds through managing water levels throughout the year, promoting the creation of wetland scrapes, spring sown crops and appropriate grassland management to create the right sward conditions.

Sites suitable for waders will have an open aspect with few trees and tall hedges, have minimal disturbance from humans and livestock and nearby shallow wetland features.

The species in the assemblage do have their own habitat preferences, mostly based on sward height, structure and how wet the soil is. The nature of the habitat provided should be informed by the species of bird that are present in the local area, it is worth remembering that varying conditions across a field can provide opportunities for a range of wader species.

Vegetation should be managed through cutting or grazing to create varied swards of short and tussocky grass alongside wet features such as scrapes, ditches and ponds with gently sloping sides to provide standing water and muddy areas through the spring and summer for feeding. Aviod grazing during the nesting season unless some slight grazing is required to maintain habitat suitability. Once the birds have breed grazing can be introduced so that the desired sward structure is in place by early March the following year.

The RSPB booklet Managing Grassland for Waders provides further information.

BR 3-02: Expand the distribution of waders by providing the right conditions for breeding and wintering birds through managing water levels throughout the year, promoting the creation of wetland scrapes, spring sown crops and appropriate grassland management to create the right sward conditions for waders outside of their core areas.

Same information as for BR 3-01

Priority:

BR 4: Populations of the Lowland Farmland Bird Assemblage are secured and their distribution increased.

(The Lowland Farmand Bird Assemblage contains the following species: Yellowhammer, Corn bunting, Gray partridge, Tree sparrow, Linnet, Reed bunting, Yellow wagtail and Skylark)

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

BR 4-01: Retain post-harvest stubble fields through the winter and potentially through the spring to mid-summer providing winter food for seed eating birds and spring and summer foraging and nesting opportunities.

The change from spring to autumn cereals, resulting in the loss of winter stubbles, has removed a major over wintering foraging habitats for birds. Keeping winter stubbles will be of benefit to a suite of farmland birds. To improve stubbles for birds, leave the stubbles near to other high value habitats such as hedgerows, woodland or scrub. Vary the stubble height by adjusting the combine header to provide different types of cover; skylarks and yellowhammers prefer shorter stubbles, while grey partridges need taller vegetation for shelter. Reducing chemical use will also improve the stubbles for birds; if you can avoid using pre-harvest desiccants, reduce herbicide on the preceding crops and cultivate and spray stubbles as late as possible you can provide a high quality habitat for bords over the winter.

BR 4-02: Encourage the retention of arable weeds both 'in crop' and at the periphery of fields.

Many common arable weeds benefit farmland birds by providing seeds and supporting insect populations vital for chicks. Key species include fat-hen, chickweed, knotgrass, charlock, and annual meadow grass. The presence of desirable arable weeds can help sustain birds like grey partridge, skylark, tree sparrow, linnet, and yellowhammer. Practises such as reducing chemical use across the field and creating non-herbicide and insecticide crop margins can provide opportunities for arable weeds and increase invertebrate populations.

BR 4-03: Encourage the use of wild bird seed mixes to provide food for adults and young and overwintering cover.

These mixes provide several benefits, especially during the winter months when they provide a food source at a time of scarcity. Over the summer month these crops provide nesting habitat and food for both chicks and adults. Different bird species benefit from these crops being grown in different locations so try to have several strips or blocks around the farm if possible. Gray partridge and Yellowhammer benefit from these crops being sown next to features like hedgerows and beetle banks while Corn bunting and Skylark prefer open landscapes so any wild bird seed crops should be sown away from woodland or hedgerows.

BR 4-04: Increase tussocky, wildflower rich grassland margins, beetle banks and headlands, especially when associated with existing mature hedgerows.

All these features work best when part of a wider habitat mosaic, including hedges and ditches, so thinking about habitat connectivity is important when determining their location.

14.2.9 Reptiles (R)

Priority:

R 1: Populations of Adder are secured and their distribution increased.

Further information on Measures:

R 1-01: Land management advice and information about adders is provided to land managers to encourage appropriate management and an affinity with adders (not mapped).

R 1-02: Appropriate land management is in place to secure adder populations and expand increase their distribution.

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

Larger sites generally support more stable Adder populations, and certainly habitat fragmentation is an issue for the species. Adders need open sunny areas for basking and denser areas for cover from predators and protection from extreme temperatures. The focus should be on creating a mosaic of different vegetation structures on sites with a varied

topography or southern aspect, creating habitat edges and transitional zones between vegetation types is important in creating this structural diversity.

Hibernation (or overwintering) sites are important especially as adders are faithful to these sites returning year after year, sometimes sharing them with other adders. Hibernation sites can be disused mammal burrows, log piles, dense vegetation or under tree roots. Damage to hibernaculum can be catastrophic, especially for a small population of adders and so care must be taken to avoid any damage or disturbance to these features.

The Amphibian And Reptiles Groups of the UK have produced and advice note Managing Habitat For Adders, Advice for Land Managers which provides details on managing land for adders.

Priority:

R 2: Populations of Slow worm are secured and their distribution increased.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

R 2-01: Land management advice and information about Slow worm is provided to land managers to encourage appropriate management and an affinity with Slow worm (not mapped)

R 2-02: Appropriate land management is in place to secure Slow worm populations and expand increase their distribution.

Like the Adder, Slow-worms require dense vegetation, especially grasses, alongside sunny areas for them to bask and so can be found in heathland, tussocky grassland, woodland edges and rides. Developing structural diversity is the key to managing Slow-worm habitat.

The Reptile Habitat Management Handbook provides information on managing sites for all the UK reptiles including Slow-worm.

14.2.10 Fish (F)

Priority:

F 1: An increase in self-sustaining populations of the Wild Fish Assemblage.

(The Wild Fish Assemblage contains the following species: Trout, Eel, River lamprey, Sea lamprey, Brook lamprey, Bullhead and Salmon)

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that

where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

See priorities and measures under Running Water and Wetlands

14.2.11 Flowering Plants (P)

Priority:

P 1: Populations of the Upland Alchemilla Assemblage are secured and their distribution increased.

(The Upland Alchemilla Assemblage contains the following species: Starry Lady's mantle, Clustered Lady's mantle, Velvet Lady's mantle, Large-toothed Lady's mantle and Rock Lady's mantle)

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

P 1-01: Enhance the populations at known sites and roadside verges outside of the Special Areas of Conservation and associated component Sites of Special Scientific Interest through appropriate management and introductions if necessary. and expand these populations through appropriate management and introductions where conditions allow.

P 1-02: Undertake surveys to identify other sites for the Upland Alchemilla Assemblage and locations where conditions are suitable for establishing populations of the assemblage outside of known and legally designated sites (not mapped).

The Upland Alchemilla Assemblage are associated with traditional agricultural practises such as hay making and can also be found on roadside verges. With the verge populations it is important to ensure that any cutting regimes are appropriate and not too intensive. Removal of stands of competitive species on verges, such as rosebay willowherb, may also help support the assemblage.

Priority:

P 2: Populations of Flat-sedge are secured and the distribution increased.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

P 2-01: Enhance the populations at known sites through appropriate management and introductions.

P 2-02: Undertake surveys at sites that could potentially support flat-sedge to identify any other sites for the species and locations where conditions are suitable for establishing new populations (not mapped).

Flat-sedge grows in open areas of damp grasslands, fens, marshes, calcareous flushes and along margins of streams and ponds. It relies on low intensity grazing to maintain open conditions and prevent overgrowth of vegetation or development of scrub which would shade it out. The Durham Wildlife Trust's Great North Fen Project provides an opportunities to introduce flat sedge into new wetland habitats and so establish new locations for the species in the county.

Priority:

P 3: Populations of Northern Hawk's-beard are secured and the distribution increased.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

P 3-01: Enhance the populations at known sites through appropriate management and introductions.

P 3-02: Undertake surveys at sites that could potentially support northern hawk's-beard to identify any other sites for the species and locations where conditions are suitable for establishing new populations (not mapped).

Northern Hawks-beard is dependent on traditional agricultural practises such as hay making; increases in grazing pressure, earlier hay cutting dates and use of fertilizers has lead to its decline.

Priority:

P 4: Populations of Ivy-leaved Bellflower are secured and the distribution increased.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

P 4-01: Undertake a population survey at both known sites and secure the populations through appropriate management and identify opportunities to extend the species into adjacent suitable habitat.

P 4-02: Undertake surveys at sites that could potentially support ivy-leaved bellflower to identify any other sites for the species and locations where conditions are suitable for establishing new populations (not mapped).

Ivy-leaved Bellflower is found in damp, wet or marshy grasslands areas over acidic soils. It is a species that prefers light shade. Maintaining open, short vegetation is important, this can be achieved through moderate to light grazing.

14.2.12 Mammals (M)

Priority:

M 1: Populations of water voles are secured and their distribution increased.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

M 1-01: Targeted mink control is undertaken along the main migratory routes for mink into County Durham and at other key locations in the county

Mink control takes the form of live trapping followed by shooting using an airgun. Live trapping avoids the risk of harming non-target animals. The National Water Vole Steering Group advise that mink trapping should not be undertaken when female mink may have dependent young (between mid-April and the end of July).

M 1-02: Population monitoring and habitat condition assessments are undertaken at known water vole sites.

Surveys for water vole are conducted between mid-April to September and outside of direct sightings the survey is looking for field sign including latrines, feeding sign and burrows.

Water vole habitat is assessed for key features such as water depth, bank material, the amount shading from trees and the presence of marginal vegetation.

M 1-03: Known populations are secured through appropriate land management.

Creating or maintaining marginal vegetation is important along watercourses with water voles, maintaining a 2 - 5 m strip of non-woody vegetation provides both food and cover. Limiting grazing on the bank tops of watercourses maintains vegetation over and avoids the risk of burrows being collapsed by livestock. Coppicing trees in densely shaded areas will encourage the growth of grasses and herb, which provide food. Creating new features like ponds, backwaters, or deeper pools close to the watercourse provides refuge during dry periods and increases overall habitat availability. If clearance work is planned, to maintain a watercourse

function, consider undertaking this work in rotation and on one side of the bank only. Having a water vole survey will help to understand the 'core' areas for Water voles on any given watercourse and allows management to be tailored to aviod impacting these areas at sensitive times of year.

M 1-04: Build on the work of the Naturally Native Project and develop a regional water vole recovery project (not mapped).

Any water vole recovery project would likely feature mink control, habitat creation and enhancement and reintroductions.

Priority:

M 2: Populations of red squirrel are secured and their distribution increased.

Further information on Measures:

Where delivery of the mapped measures results in habitat creation or enhancement in line with the Statutory Biodiversity Metric then this can be regarded as strategically significant. Note that where these measures overlap with habitat measures, then the habitat measure and associated advice on the Statutory Biodiversity Metric takes precedence.

M 2-01: Known populations of red squirrels are secured through appropriate habitat management and grey squirrel control in buffer zones around these populations.

The aim of woodland management should be to ensure a healthy supply of food is available all year round. Red squirrels primarily feed on seeds and nuts, and they supplement their diet with fruit, plant shoots and fungi when their preferred food is less readily available. Creating a diverse, mixed age conifer woodland, with species like Scots pine, Norway spruce and Larch present. Red squirrels have adapted to eat both large and small seeds, but they show a competitive advantage in coniferous forests by specializing in smaller, low-calorie conifer seeds, whereas Grey squirrels prefer the larger, high-calorie seeds of broadleaf trees like Oak and Beech.

The timing and location of forestry operations play a crucial role in managing woodlands effectively for red squirrels. For example, it's important to avoid tree felling during periods when young squirrels may still be in their nests (called dreys). Additionally, since red squirrels prefer to travel through continuous tree canopies, maintaining unbroken corridors between seed-bearing trees can help ensure the habitat remains suitable and attractive to them.

Live trapping and shooting are two methods for controlling Grey squirrels. A UK Forestry Standard Technical Note on Controlling Grey Squirrels in Forests and Woodland in the UK provides further information on approved control methods.

M 2-03: Engage with landowners to encourage the local planting of new woodlands and hedgerows around known populations, in conjunction with grey squirrel control, to create habitat connectivity and encourage local dispersal (not mapped).

Ideally new woodlands should be over 200 ha to provide the diversity and resources Red squirrels require. However, smaller woodlands can still be suitable if they are well-connected and consist of favoured tree species. Avoid large seeded broadleaved trees such as Oak and

Sycamore and instead plant species like Scots pine, Norway spruce and Larch alongside native shrubs such as Hawthorn, Holly, Wild cherry and Crab apple.

14.3 Appendix 3: Approach to County Durham LNRS Mapping

14.3.1 Introduction

ERIC NE are the Local Environmental Records Centre for the North East of England, who provide data services to support Environmental Decision making. In 2023 ERIC NE were commissioned by the Responsible Authorities (RA) to provide support for the creation of the four Local Nature Recovery Strategies within the ERIC NE boundary.

This report is provided to ensure transparency and detail on the approaches taken to mapping for the County Durham LNRS.

The report covers the datasets, methods and tools used to produce the outputs that constitute the mapped elements of the LNRS.

During the process ERIC has convened regional working groups to align mapping and approaches where possible.

14.3.2 Data Sources and outputs

The datasets used were gathered from various sources including the responsible and supporting authorities (SA), NGOs, ERIC NE data holdings. Ordnance survey and CEH data were also used as part of the mapping.

The mapping process has adhered to Defra advice on mapping throughout the process.

All mapping was created using tools in either ArcGIS Pro or QGIS.

Metadata for each of the measures, consisting of the layers included and any licensing associated with it for each mapped output are provided in Table 1 below.

14.3.3 Areas of Particular Importance for Biodiversity

As set out by Defra guidance on production of the LNRS, the LNRs requires the mapping of Areas of Particular Importance for Biodiversity (APIB). ERIC NE worked with RAs & SAs to ensure that up to date, and coherent versions of Local Sites datasets were produced primarily by supporting a review of site boundaries and ensuring recent changes were applied. These were then combined with National Datasets, designated sites and irreplaceable habitats to create the layer.

14.3.4 Potential Measures

The outputs from the mapping of potential measures have been achieved through various processes. The RA has implemented a process of engagement with local and national experts to identify priorities, measures and relevant data to map the measures through a series of working groups.

Once measures were agreed and signed off by the Ecological Emergency Board an iterative process for the development of the mapped measures could begin. This involved developing a series of principles, tools and processes.

The approach to mapping potential measure tended to be based in the Lawton principles of bigger, better and more joined-up.

14.3.5 Species measures

Species measures and priorities were determined through a process supported via engagement with local experts and recording community. Initially, a conference was hosted by ERIC NE in March 2024. Delegates were encouraged to comment on species long lists and suggest species that may be considered for shortlisting. The process then was delivered through discussion with experts and specialist groups.

14.3.6 Habitat data for measures

Main habitats for mapping measures were developed from:

- Priority Habitats Inventory
- Ancient Woodland Inventory
- DBAP habitat data
- Local Wildlife Sites Phase 1 Habitat Surveys
- OS MasterMap parcels within Local Wildlife Sites boundaries
- Other important areas identified by LA ecologists.
- Durham County Council Ancient Woodland Inventory

The layers were reviewed by the LA ecologist where required and polygons were retained or deleted based on their suitability for inclusion. This process was completed for:

- Grassland
- Heathland
- Open Mosaic Habitat

Measures that were mapped directly using these layers tended to be around habitat improvements/enhancement. Immediately adjacent measures (in most scenarios, polygons suitable for habitat creation within 50m of target habitat) were usually around expansion of habitat or buffering the effects of surrounding land. Corridors of habitat creation between Core habitat were based on the principle of improving connectivity.

14.3.7 Ecological Connectivity Modelling

Ecological connectivity modelling (ECM)

ERIC NE were involved in the pilot LNRS for Northumberland in 2021 and explored some tools to efficiently apply ecological connectivity. This was introduced to the regional data working group and ERIC were tasked with exploring a suite of ecological connectivity tools. A review completed by Greater Manchester Ecology Unit, Cheshire Wildlife Trust & Lancashire Wildlife Trust compared nine different approaches, three were shortlisted and a preferred option from the three was chosen. We used the information to find a shared approach to ECM and agreed the preferred mapping approach would be Linkage Mapper.

14.3.8 Linkage Mapper

Linkage Mapper uses GIS maps of core habitat areas and resistance values to identify and map ecological linkages between these core areas. Each cell in a resistance map is assigned a value that reflects the energetic “cost” (i.e., difficulty and mortality risk) associated with moving across that cell. These resistance values are typically derived from cell characteristics—such as land cover or housing density—and are informed by species-specific landscape resistance models.

The development of core sites has been previously described, and resistance maps were created using the following datasets:

- Priority Habitats Inventory
- Durham County Council Ancient Woodland Inventory
- National Forestry Inventory
- MasterMap
- UKCEH Land Cover Maps

The tool operates within ArcGIS and utilizes Python scripts to identify adjacent (neighbouring) core areas. It then generates least-cost corridor maps between these areas and mosaics the individual corridors into a single composite corridor map. The resulting output illustrates the relative value of each grid cell in facilitating connectivity between core areas, enabling users to identify routes that encounter more or fewer features that either support or hinder movement.

All datasets used in these workflows underwent several pre-processing steps, including:

- Validation to ensure the most up-to-date information was used
- Projection standardization (all layers were reprojected to British National Grid where necessary)
- General cleaning and polygon refinement to eliminate overlaps and duplication, and to achieve a sufficient level of spatial accuracy

The tool produces a raster output—a digital image composed of a grid of coloured pixels—representing the calculated resistance values for each cell. This raster can be converted into a shapefile format for use in mapping mitigation measures and generating both static PDF maps and interactive web maps. Various documents were used to determine dispersal distances, habitat resistance values and minimum parcel size.

14.3.9 Catchment Restoration Optimisation (CaRO)

After the completion of the Northumberland Pilot Natural England had commissioned environmental consultancy Binnies to develop a tool that could identify opportunities naturally restore catchment function.

The methodology was provided to ERIC NE to implement elements of CaRO approach into LNRS as a potential measure. The process involved combining datasets of ‘within water’ (wet and water habitats directly along the watercourse) and Adjacent (1 vertical metre from the watercourse or in Environment agency Flood Zone 3). The hydrologically modelled parts were produced using Environment Agency Lidar data and a series of tools in ArcGIS pro. Enhanced data that had already had preparatory steps applied were provided by EA Geomatics team.

14.3.10 Urban measures

Urban measures were developed with the RA by using ANGst data and indices of multiple deprivation. Areas were mapped where built up areas that appeared in the top 20% of deprived areas and were outside of 300m of a natural green space.

14.3.11 Constraints on mapped measures

A series of constraints were applied to the mapped measures to reduce conflict between mapped measures and areas considered not suitable for delivery of measures. Constrains include those required by the LNRS process such as nationally designated sites or areas determined not suitable by RAs & SAs such as housing allocations, key employment areas or Built Up Areas. These areas were removed where modelling methodology led to part or whole of the area being mapped.

14.3.12 Areas that Could Become of Particular Importance to Biodiversity

The Areas that Could Become of Particular Importance to Biodiversity (ACBs) are created from the merging of the potential measures minus the APIBs. Potential measures can be mapped on APIBs, but are already considered of importance, so cannot be mapped as ACB

14.3.13 ArcGIS Online Map

To ensure that users of the LNRS can easily navigate the Habitat map, ArcGIS online was used to produce a Webmap that allows interactive interrogation of the APIB Potential Measures and ACB layers.

14.4 Appendix 4: Datasets used for Mapped Measures

14.4.1 Priority: Butterflies and Moths

Measure	Datasets	Methodology	Licensing/attribute
BM1_02	Priority Habitats Inventory, ERIC held species data	Map Coastal calcareous grasslands	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
BM1_03	quarries dataset, Durham Character Areas, ERIC held species data	Quarries in coastal strip	Contains OS data © Crown copyright and database right 2025
BM1_04	PHI, Durham Biodiversity Action Plan, Mastermap	G1-01 + G1-02	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
BM2_02	PHI, DBAP, Mastermap, ERIC held species data	PHI habitat intersecting records (calc sites)	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
BM2_04	PHI, DBAP, Mastermap, ERIC held species data	Directional 1km buffer (mag lime) - calcareous grassland + quarries	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
BM3_01	PHI, DBAP, Mastermap, ERIC held species data	sites intersecting records	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025

Measure	Datasets	Methodology	Licensing/attribute
BM3_02	PHI, Agricultural Land Environmental Risk and Opportunity Tool (ALERT)ponding layer	5km buffer from records	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
BM4_01	PHI, DBAP, Mastermap, North East Open Mosaic Habitat (NE OMH) layer	Butterfly habitat that intersects clusters (>=3) of records	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
BM4_02	PHI, DBAP, Mastermap, NE OMH layer	1km buffer (OMH/open vegetation/grassland)	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
BM5_01	PHI, DBAP, Mastermap, ERIC held species data	500m buffer around records, MM - remove arable and coniferous woodland	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025

14.4.2 Priority: Bumblebees

Measure	Datasets	Methodology	Licensing/attribute
BB1_01	MasterMap, ERIC Species Records, PHI, DBAP, MasterMap, UK Centre for Ecology and Hydrology (CEH)	buffer from clusters of records 5km. Where G1-01 intersects buffer include G1-01 plus immediately adjacent.	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD
BB1_02	MasterMap, ERIC Species Records, PHI, DBAP, MasterMap, CEH	Arable land within 5km from cluster of records	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD
BB1_03	MasterMap, ERIC Species Records, PHI, DBAP, MasterMap, CEH		Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD

Measure	Datasets	Methodology	Licensing/attribute
BB2_01	MasterMap, ERIC Species Records, PHI, DBAP, MasterMap, CEH	Buffer from clusters of records 5km. Where G1-01 intersects buffer include G1-01 plus immediately adjacent.	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD
BB2_02	MasterMap, ERIC Species Records, PHI, DBAP, MasterMap, CEH	Buffer from clusters of records 5km. Where G1-01 intersects buffer include G1-01 plus immediately adjacent.	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD
BB2_03	MasterMap, ERIC Species Records, PHI, DBAP, MasterMap, CEH	Buffer from clusters of records 5km. Where G1-01 intersects buffer include G1-01 plus immediately adjacent.	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD

14.4.3 Priority: Birds

Measure	Datasets	Methodology	Licensing/attribute
BR1_01	ERIC Records, MasterMap	Woodland and scrub that intersect willow tit records	Contains OS data © Crown copyright and database right 2025
BR1_02	ERIC Records, Railway Paths DCC	Heritage railways between willow tit locations/intersect records	Contains OS data © Crown copyright and database right 2025
BR1_03	ERIC Records, MasterMap	Woodland and scrub that intersect willow tit records	Contains OS data © Crown copyright and database right 2025
BR2_01	PHI, Mastermap, Black grouse records	Map intersecting habitat for Black Grouse	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
BR2_02	PHI, Mastermap, Black grouse records, Wader Zonal Map	Suitable habitat adjacent/ within a distance of records	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
BR3_01	Wader Zonal Map, Moorland Line, Environmental Stewardship Scheme Agreements England 2024, PHI, MasterMap	All land within BTO zone 4 and 5 for Curlew and which is either below the moorland line, classified as grass moorland above the moorland line, or land included in RPA moorland and grassland options which could benefit wading birds (UP2, HL7, HL8, GS13, GS9, GS11).	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025

Measure	Datasets	Methodology	Licensing/attribute
BR3_02	Atlas of Living England, Flood Zone 3	Wet grassland Wetland/grassland habitats + flood zone within 6km of BR3-01	Open Government Licence (OGL)
BR4_01	MasterMap	Bishop Middleham, Sherburn, Coxhoe - map arable	Contains OS data © Crown copyright and database right 2025
BR4_02	MasterMap	Bishop Middleham, Sherburn, Coxhoe - map arable	Contains OS data © Crown copyright and database right 2025
BR4_03	MasterMap	Bishop Middleham, Sherburn, Coxhoe - map arable	Contains OS data © Crown copyright and database right 2025
BR4_04	MasterMap	Bishop Middleham, Sherburn, Coxhoe - map arable	Contains OS data © Crown copyright and database right 2025

14.4.4 Priority: Reptiles

Measure	Datasets	Methodology	Licensing/attribute
R1_02	ERIC Records, MasterMap	Combined existing habitat +1km suitable habitat for creation between clusters of records	Contains OS data © Crown copyright and database right 2025
R2_02	ERIC Records, MasterMap	Existing records + 250m of suitable habitat	Contains OS data © Crown copyright and database right 2025

14.4.5 Priority: Fish

Measure	Datasets	Methodology	Licensing/attribute
F1_01	Lidar data, flood zone 3	Catchment restoration optimisation, Browney Gaunless and Skerne	Open Government Licence (OGL)
F1_02	EA river obstacles, OS waterboides	Obstacles 30m/50m clipped to watercourse	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
F1_03	OS waterbodies	25m from watercourse where other measures are not found	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025

14.4.6 Priority: Plants

Measure	Datasets	Methodology	Licensing/attribute
P1_01	Botanical Society of Britain and Ireland (BSBI) Records, PHI, MasterMap Flood Zone 3	Road verges that intersect records	
P2_01	BSBI Records, PHI, MasterMap	Suitable habitat intersecting records	
P3_01	BSBI Records, PHI, MasterMap	Suitable habitat intersecting records	
P4_01	BSBI Records, PHI, MasterMap, Flood Zone 3	Suitable habitat intersecting records	

14.4.7 Priority: Mammals

Measure	Datasets	Methodology	Licensing/attribute
M1_03	ERIC Species Records, OS Surface Water	5m buffer from water bodies within 2km of records in last 20 years	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
M1_02	ERIC Species Records, OS Surface Water	5m buffer from water bodies within 2km of records in last 20 years	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
M2_01	ERIC Species Records, MasterMap	Westgate records, valley between 2 locations - west of Stanhope, Westgate and Killhope	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025

14.4.8 Priority: Grasslands, Heathlands, Peatlands

Measure	Datasets	Methodology	Licensing/attribute
G1_01	PHI, DBAP, MasterMap, CEH	PHI Grass (Extracted) and DBAP (Extracted) grass and snap to MasterMap (Manmade classes removed)	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD
G1_02	PHI, DBAP, MasterMap, CEH	Arable or grazing land parcels from MM intersecting grassland core sites	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD
G1_04	MasterMap, BGS/National Character Areas	Manually select quarries in Maglime maglime NCA	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
G2_01	PHI, DBAP, MasterMap, Durham Wildlife Trust (DWT) data	Map existing heathland from PHI and Durham wildlife trust data	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025

Measure	Datasets	Methodology	Licensing/attribute
G2_02	Shallow Peaty Soils	Shallow peaty soils outside of existing heathland extracted - remove SSSI? - Apply constraints - figure out constraints and clean	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, BGS, Cranfield University (NSRI)
G3_01	OMH Draft, MasterMap	DCC brownfield register (sense check) possibly meeting with SP to make a list - OMH layer same as TV - Compare with Dingy Skipper	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
G3_02	OMH Draft, MasterMap	Buffer from G3-01	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
G4_01	England Peat Map	New peat map for England, outside of SSSIs and more than 10cm	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, BGS, Cranfield University (NSRI)

14.4.9 Priority: Woodlands, Hedgerows, Scrub and Trees

Measure	Datasets	Methodology	Licensing/attribute
W1_01	Ancient Woodland Inventory DCC version (AWI), PHI, DBAP, MasterMap, CEH	MasterMap parcels within 50 m of ASNW and corridors extracted, removed man-made classes and deciduous woodland.	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025
W1_03	Ancient woodland Inventory (DCC version)	Ancient Semi-natural Woodland	Contains OS data © Crown copyright and database right 2025

Measure	Datasets	Methodology	Licensing/attribute
W1_04	Ancient woodland Inventory (DCC version)	Plantation on Ancient Woodland Site	Contains OS data © Crown copyright and database right 2025
W2_01	AWI, PHI, DBAP, MasterMap, CEH	MasterMap parcels within 50 m of PHI Dec extracted, removed man-made classes - extracted where intersects with ecological Connectivity modelling with no Dispersal Distance	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD
W4_02	AWI, PHI, DBAP, MasterMap, CEH, Durham Character Areas	Where W1-01 intersects with Durham character areas	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025, Morton, R. D., Marston, C. G., O'Neil, A. W., & Rowland, C. S. (2024). Land Cover Map 2023 (land parcels, GB) [Data set]. NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/50B344EB-8343-423B-8B2F-0E9800E34BBD

14.4.10 Priority: Urban

Measure	Datasets	Methodology	Licensing/attribute
U1_01	Built up areas, PHI, OS greenspace, Local sites, national sites, National Land Property Gazeteer - Residential Properties, Open Space Needs Assessment layer - Accessible Natural Green Space and Reservoirs filtered out with additional sites added, Deprivation: ID2019	ANGSt outside of 300m where built up area is in to 20% of deprivation	Open Government Licence (OGL) Contains OS data © Crown copyright and database right 2025