Cumbria Local Nature Recovery Strategy

Statement of Biodiversity Priorities

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Westmorland & Furness Council

Cumberland Council

Lake District National Park

YORKSHIRE DALES National Park Authority

NATURAL ENGLAND

Foreword

Cumbria's unique natural environment is a vital part of our county's cultural identity, as well as providing habitats for some of England's most threatened species. The environment also delivers wider benefits that our communities and economy rely on, underpinning the wellbeing of local people and supporting the prosperity of the county.

Our vision for nature in Cumbria is:

"Cumbria's natural environment is in landscape scale recovery, with a mosaic of wildlife-rich habitats that are managed sustainably to create a network that is resilient to climate change, helps plants and animals thrive, and provides valuable services to local communities and the economy."

Cumbria's Local Nature Recovery Strategy (LNRS) is a call to action, and a source of inspiration for anyone who wants to play their part in addressing the biodiversity and climate crises. It is a tool to help prioritise nature recovery in the places where it will have the greatest impact for people and nature. Everyone working to address biodiversity loss in Cumbria should feel as if they are contributing to a bigger picture of nature recovery, and that everyone is able to play their part.

The LNRS has been produced collaboratively by those who live in, work in, or visit Cumbria, and will help us all to take informed action to create more places where wildlife and people can thrive. Together we can make a change and create a lasting legacy of nature recovery. The first Cumbria LNRS was produced with contributions from the following organisations:

- Westmorland and Furness Council, as the Responsible Authority
- the following Supporting Authorities:
    - Cumberland Council
    - Lake District National Park Authority
    - Yorkshire Dales National Park Authority
    - Natural England
- Cumbria Local Nature Partnership, who have supported the strategy development throughout
- Cumbria Biodiversity Data Centre, who have collated all spatial data and created the Local Habitat Map
- technical input to help inform this Strategy has been provided by Natural England, Forestry Commission and Environment Agency
- Over 650 organisations and interested parties, who have actively engaged with the LNRS process either through newsletters and updates, attendance at workshops, or membership of technical working groups

We would like to further extend our gratitude to all those who have contributed to the LNRS and who will help bring the strategy to life through its implementation.

Contents

1. Introduction

What is a Local Nature Recovery Strategy?

Cumbria is one of 48 strategy areas in England that are required by the Environment Act (2021)[3] to prepare a Local Nature Recovery Strategy (LNRS) for their area, in line with The Environment (Local Nature Recovery Strategies) (Procedure) Regulations 2023[1] and the Local Nature Recovery Strategy Statutory Guidance[2].

The LNRS has been developed to deliver the Nature Recovery Network launched in the UK Government's 25 Year Environment Plan[3], and which has since been reviewed through the Environmental Improvement Plan (2023)[4]. Once combined, these strategies will create a nature recovery network for the whole of England, made up of enhanced, joined-up, wildlife-rich places, which will benefit people and nature.

The LNRS sets out **priorities** for nature recovery and identifies and maps areas where actions, known as **potential measures**, can have the biggest positive impact. By taking evidence and data, expert opinion and including what is important to people and communities, the LNRS makes it easier to plan and take action at a local level.

There are two elements to the LNRS: this document forms one part of the LNRS (the **Statement of Biodiversity Priorities**), and should be used alongside the **Local Habitat Map**, which will help show the areas where taking action for nature will have the most positive impact. The two parts have been produced so that they work closely together and should be used collectively when informing decision-making.

The LNRS is a strategy for local nature recovery, not a binding delivery plan. It aims to be ambitious yet realistic, setting out priorities to address local environmental pressures and opportunities. **LNRSs do not mandate protection or any change in management, and any action needs to be considered against existing legislation and statutory guidance to ensure that any nature recovery efforts are both effective and compliant**. Although the Cumbria LNRS was developed using the best available data and evidence at the time of writing, site-specific surveys and local decision-making will be required to ground-truth any proposed projects to ensure they are suitable for each location.

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[1] The Environment (Local Nature Recovery Strategies) (Procedure) Regulations (2023) Available at: The Environment (Local Nature Recovery Strategies) (Procedure) Regulations 2023 (legislation.gov.uk) [19.08.2024]

[2] GOV.UK (2023) *Local nature recovery strategy guidance: what a local nature recovery strategy should contain*. Available at: https://www.gov.uk/government/publications/local-nature-recovery-strategy-what-to-include [19.08.2024].

[3] Defra (2018) *A Green Future: Our 25 Year Plan to Improve the Environment.* Available at: https://www.gov.uk/government/publications/25-year-environment-plan. [19.08.2024].

[4] Defra (2023) *Environmental Improvement Plan 2023.* Available at: Environmental Improvement Plan 2023 - GOV.UK (www.gov.uk).

Each LNRS will be reviewed every 3 to 10 years to understand progress made and to refresh any targets so that the strategy responds to changing environmental pressures and takes advantage of emerging data and evidence.

Why do we need a LNRS?

England is widely considered to be one of the most nature-depleted countries in the world[5]. 97% of flower-rich meadows have been lost since the 1950s[6], hedgehogs are now an endangered species[7], and 1 in 6 species in Britain are at risk of extinction. Despite having some wildlife success stories and being a county renowned for its natural assets, biodiversity in Cumbria has declined significantly in line with national trends and is continuing to do so. The State of Nature Report[8] published in 2023 highlights an alarming loss of wildlife in England in recent decades:

- the abundance of freshwater and terrestrial species has fallen by 32% since 1970
- the distributions of invertebrate species have decreased by an average of 18% since 1970
- 64% of flowering plant species have decreased in distribution since 1970
- 13% of species are now classified as threatened with extinction

"Pollinating insects are worth millions of pounds to UK agriculture, and their population declines threaten food production." (The State of Nature, 2023)

What do we mean by nature recovery?

In general, nature recovery means to halt or reverse the decline in the number and range of habitats and species; it often includes restoring natural processes at a landscape scale. This is done primarily by either managing and enhancing existing habitats, or expanding and creating new areas of habitat to support the native species that live there. This could also include specific actions to benefit a particular species, or controlling invasive non-native species to allow others to flourish.

By taking evidence, data, expert opinion, and including what is important to people and communities, the LNRS will not only recognise those habitats that are already of particular

[5] State of Nature Partnership (2023) *State of Nature*. Available at: https://stateofnature.org.uk/ [19.08.2024].
[6] Plantlife (2024) *Restoring Grassland across Britain*. Available at: https://www.plantlife.org.uk/protecting-plants-fungi/grassland/ [26.11.2024]. red
[7] The British Hedgehog Preservation Society (2020) *British hedgehog now officially classified as vulnerable to extinction*. Available at: https://www.britishhedgehogs.org.uk/british-hedgehog-now-officially-classified-as-vulnerable-to-extinction/ [26.11.2024].
[8] State of Nature Partnership (2023) *State of Nature*. Available at: https://stateofnature.org.uk/ [19.08.2024].

importance for biodiversity[9], but also identify areas that 'could become of particular importance for biodiversity'.

This means everyone can make the best decisions for nature where they live and work, and lead to the creation of "nature-recovery networks" – bigger, better, and more connected places that provide a home for wildlife and deliver a healthy environment for people.

By creating more space for nature and connecting habitats in line with the principles outlined by Professor Sir John Lawton in 'the Lawton Report'[10], we can increase the abundance and diversity of wildlife and make it easier for everyone to enjoy nature. Taking action for nature recovery is not new to Cumbria. The Cumbria LNRS aims to identify and celebrate the work that has already been done and further build upon it, to ensure that every action for nature is captured as part of our collective aim.

Urgent action is not just needed for nature, but it matters to people too - friends, families, neighbours, and employees all rely on a healthy natural environment. From the peatlands in the Cumbrian uplands that are helping in the fight against climate change by 'locking away' carbon, to the wetlands that store and slow the flow of water in flood events, nature helps to protect communities.

The quality of drinking and bathing waters, the levels of pollution in the air, food and water security, and even the temperature on the streets of our built-up areas is affected by the condition of the environment. Trees clean the air, reduce soil erosion, help reduce the impacts of flooding, capture carbon, and cool the environment. Healthy grasslands support more insects, important for growing crops and produce, and give healthier soils, which reduces erosion and locks away carbon. To get the most benefits from nature a mosaic of different habitats is needed, right across the landscape, that are healthy and functioning in a natural way.

[9] Department for Environment Food and Rural Affairs (2023) *Local nature recovery strategy statutory guidance: What a local nature recovery strategy should contain*. Available at: https://assets.publishing.service.gov.uk/media/6421a4bdfe97a8001379ecf1/Local_nature_recovery_strategy_statutory_guidance.pdf

[10] Lawton, J. (2010) *Making Space for Nature: A review of England's Wildlife Sites and Ecological Network*. Available at: https://webarchive.nationalarchives.gov.uk/ukgwa/20130402170324mp_/http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf

Figure 1: INDICATIVE IMAGE: Wider co-benefits to nature recovery.

Cumbria's natural landscape

Cumbria is the third largest county in England (6,768sq.km) with a diverse geology, topography and climate, but with only 73 inhabitants per square kilometre it is the least densely populated county in England[11].

The county is home to a rich and varied range of nationally and internationally important habitats and species in a unique landscape. From the summit of England's highest mountain, Scafell Pike, to the coastal and estuarine habitats of the Solway Coast and Morecambe Bay, Cumbria's natural environment includes everything from meadows to limestone pavement, ancient and broadleaved woodlands to moorland and montane habitats, and rivers, lakes and tarns.

The LNRS covers the entire county of Cumbria, defined by the administrative boundaries of Cumberland Council and Westmorland and Furness Council. The **Lake District National Park**, part of the **Yorkshire Dales National Park**, the **Solway Coast National Landscape**, and parts of **Arnside and Silverdale National Landscape** and the **North Pennines National Landscape** are all located within Cumbria, making it a special place that deserves care and protection.

Figure 2 shows the Cumbria LNRS boundary along with the National Parks and National Landscapes.

[11] Cumbria Lord-Lieutenant (N.D.) Cumbria and is history. Available at: https://cumbria-lieutenant.org.uk/cumbria-and-its-history [20.08.2024].

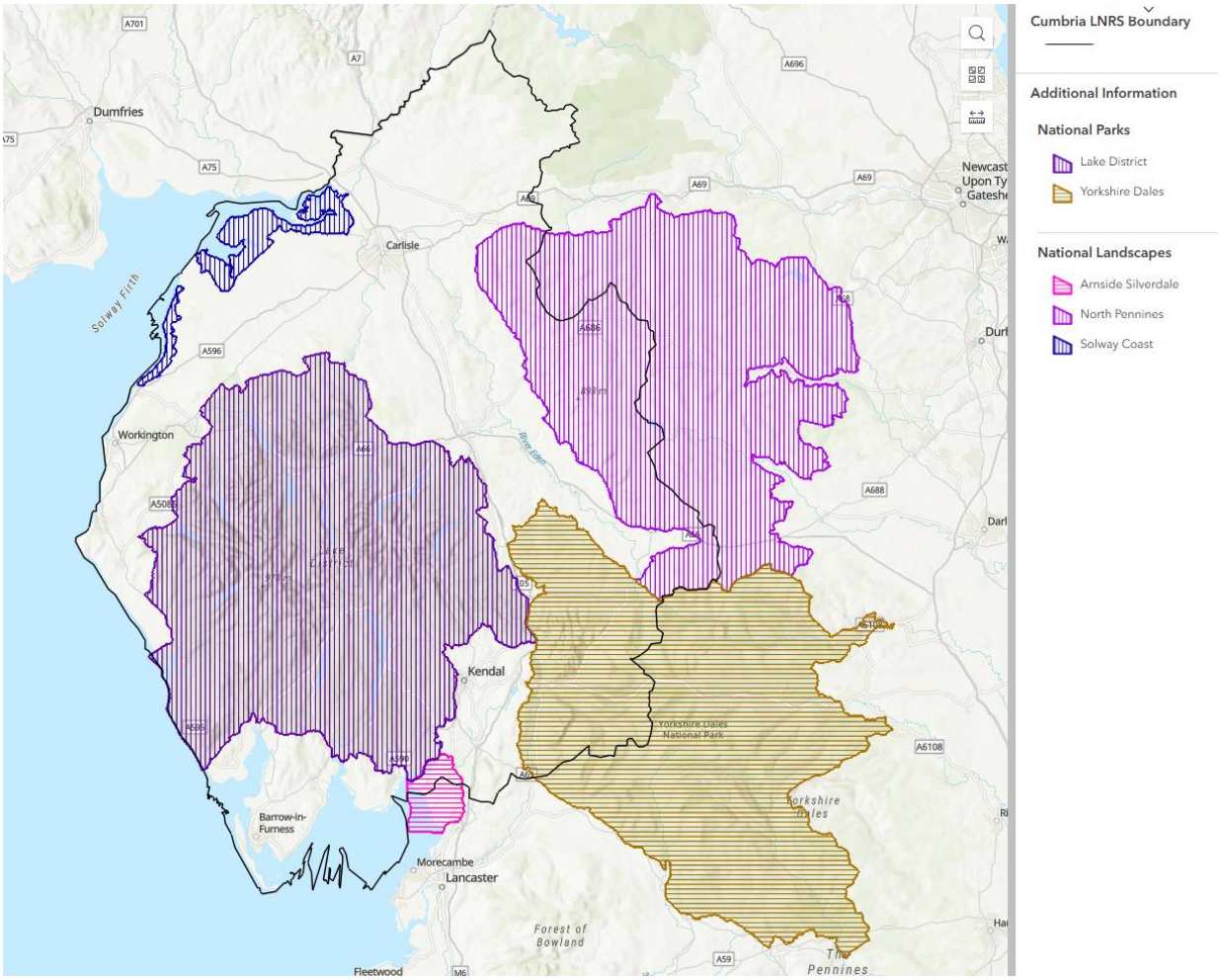

Figure 2: PLACEHOLDER Map showing the locations of Cumbria's LNRS boundary, National Parks and National Landscapes.

Cumbria can also be divided into 12 specific **National Character Areas (NCAs)**, which are each considered to have a unique 'sense of place'. Each area is defined by a unique combination of landscape, biodiversity, geodiversity, history and cultural and economic characteristics. These have, and continue to, shape the landscape over time through both natural and man-made processes and land uses. Summaries of these characteristics, features, key habitats and species, statistics and other data and statements of environmental opportunities in each area are available on the NCA website[12].

Cumbria's Natural Landscape includes:

- *2 National Parks*
  - *Lake District National Park*
  - *Yorkshire Dales National Park*

[12] Natural England (2024) *National Character Area Profiles.* Available at: https://nationalcharacterareas.co.uk/. [26.11.2024].

- *3 National Landscapes*
    - *Solway Coast National Landscape*
    - *Arnside and Silverdale National Landscape*
    - *North Pennines National Landscape*
- *12 National Character Areas (NCAs)*
    - *Border Moors and Forests*
    - *Tyne Gap and Hadrian's Wall*
    - *North Pennines*
    - *Eden Valley*
    - *Solway Basin*
    - *West Cumbria Coastal Plain*
    - *Cumbria High Fells*
    - *South Cumbria Low Fells*
    - *Morecambe Bay Limestones*
    - *Howgill Fells*
    - *Orton Fells*
    - *Yorkshire Dales*
- *2 UNESCO World Heritage Sites*
    - *The Lake District*
    - *Hadrian's Wall*

The county has multiple **designated sites** with special conservation status, which are either subject to legal protection, or are protected through local planning policies. These sites have been designated to reflect the international, national and county importance of the habitats and species that they support. Cumbria also hosts a number of **irreplaceable habitats**[13] including ancient woodland, ancient and veteran trees, blanket bog, limestone pavement, coastal sand dunes, and lowland fen. These designated sites and irreplaceable habitats are classed as '**Areas of Particular Importance for Biodiversity'.**

Cumbria is home to:

- *31 Special Areas of Conservation (SAC)*
- *3 Special Protection Areas (SPA)*
- *5 Ramsar Sites (wetlands of international importance)*
- *288 Sites of Special Scientific Interest (SSSI)*
- *26 National Nature Reserves (NNR)*
- *10 Local Nature Reserves (LNR)*

[13] HM Government (2024) *Irreplaceable habitats: How biodiversity net gain (BNG) applies to irreplaceable habitats*. Available at: https://www.gov.uk/guidance/irreplaceable-habitats

- *1617 County Wildlife Sites (CWS)*
- *1 Marine Conservation Zone (MCZ)*
- *1 Highly Protected Marine Area (HPMA)*

In addition to these land-based designations, Cumbria has one **Marine Conservation Zone** (MCZ), which overlaps with the LNRS area. The Cumbria Coast MCZ stretches for approximately 27 km along the coast of Cumbria, from south of Whitehaven, around the cliffs at St. Bees Head to the mouth of the Ravenglass estuary[14]. MCZs protect typical, rare or declining habitats and species found in our seas. Cumbria is also the location of one of the first **Highly Protected Marine Areas** (HPMAs) to be designated in England in 2023, at Allonby Bay. These are areas of the sea including the shoreline that allow the protection and full recovery of marine ecosystems.

Most of the rural landscape is managed by farmers and private landowners but significant areas are also in the ownership of public bodies, including the Ministry of Defence, United Utilities and the Forestry Commission, as well as conservation bodies such as the National Trust and Cumbria Wildlife Trust. Whilst Cumbria is predominantly rural, there are several urban areas within the county including the city of Carlisle, and the towns of Barrow-in-Furness, Ulverston, Kendal, Keswick, Penrith, Appleby-in-Westmorland, Maryport, Workington and Whitehaven amongst others. Alongside Cumbria's natural land and seascape, the area is also important for engineering and manufacturing, energy, food production, forestry, tourism, and culture and heritage.

It is therefore unsurprising that alongside the 500,000 people who call Cumbria home, many visitors enjoy spending time in Cumbria's natural landscape, with over 42 million people coming to the county in 2023[15] primarily to visit a lake, the countryside or to go walking. A survey conducted while preparing this LNRS to gather views on nature in Cumbria received 786 responses, which exemplified how important Cumbria's natural landscape is to local people and visitors alike. It is widely documented that nature brings wider benefits to people but when asked why people choose to spend time in nature, participants predominately responded that they do so to enjoy natural beauty (81%), to exercise (59%) and to improve mental health (51%). Other responses mentioned farming, volunteering, photography, and for socialising, which show the importance of creating and maintaining sustainable places and spaces for both people and wildlife to appreciate.

[14] GOV.UK (2019) *Marine conservation zones: Cumbria Coast.* Available at: https://www.gov.uk/government/publications/marine-conservation-zone-2013-designation-cumbria-coast [20.08.2024].
[15] Cumbria Tourism (2023) Available at: https://www.cumbriatourism.org/resources/research/ [19.08.2024].

How can the LNRS be used?

The LNRS is designed to be used by everyone, from individuals and community groups to landowners, developers, local authorities, government organisations, businesses, and conservation charities. It aims to drive collaborative action for nature and the investment for this to take place, as well as being a tool to help monitor progress over time.

The LNRS is a key mechanism for planning and mapping local delivery of the Nature Recovery Network, aligning to other national and local strategies and plans and contributing to National Environmental Objectives. Nature recovery efforts at all scales will help contribute towards the Nature Recovery Network and there are many ways in which the Cumbria LNRS can be used.

Local planning authorities and other government organisations

Local planning authorities and other government organisations should use it to inform other spatial plans and statutory duties within the area such as:

- Local Plans, Minerals and Waste Plans and Green Infrastructure Strategies produced by the local planning authorities
- National Park and National Landscape Management Plans
- River Catchment Management Plans, Diffuse Water Pollution Plans and River Restoration Strategies
- Policies, guidance and plans developed by public bodies such as Natural England, Forestry Commission and Environment Agency

Developers

Developers should refer to it when planning habitat creation and/or compensation as part of their development both on and off site, in particular through Biodiversity Net Gain.

Private investors

Private investors looking for biodiversity and nature-based solutions investment opportunities can use the LNRS to identify potentially ecologically suitable sites.

Organisations

Organisations seeking funding for schemes or projects in their area can use this document to support their application by demonstrating delivery of an agreed, county-wide approach to nature recovery.

Landowners

Landowners can use it to identify opportunities for environmental enhancement on their land, and potential revenue opportunities either from Environmental Land Management Schemes, forestry grants, or from private investment looking for biodiversity, carbon, or nutrient offsetting opportunities.

The public, schools, healthcare settings, businesses and community groups

The public, schools, healthcare settings, businesses and community groups can use it to find out what actions can be done to benefit nature in their gardens, workplaces and community spaces.

How is the LNRS structured?

The LNRS has been split into eight habitat or species themed chapters. For each chapter, the **pressures and threats** on that aspect of our biodiversity are summarised, along with the **opportunities** for nature recovery and the wider benefits they would bring. Each chapter then outlines a long-term **vision** for nature recovery, a small number of **priorities** that identify what we want to achieve over the next 3-10 years, and the **potential measures** that could be taken to help achieve our priorities.

The potential measures are listed under each priority that they are relevant to. **Potential measures that are coloured white are also mapped** on our Local Habitat Map. The Local Habitat Map shows the areas that are or could become of importance, with measures mapped where undertaking that particular measure would be particularly strategic and deliver maximum benefit for biodiversity and the wider environment. However, areas outside of these mapped locations may still be suitable for delivering the measure.

Potential measures that are coloured grey are not mapped, either because they don't directly relate to habitat enhancement, restoration or creation, they are considered to be equally beneficial anywhere across the county, or there is insufficient data to know where they should be mapped. Even though a potential measure may not be mapped, it is still considered to be an equally important part of nature recovery.

Some areas of the Local Habitat Map won't fall within a strategic network and will be displayed as 'not allocated'. Whilst not considered to be a strategic location for the delivery of mapped measures, these areas can still be used to deliver mapped potential measures if site surveys determine it to be a suitable location. Areas where no measures are mapped could also be suitable for many of the non-mapped potential measures.

A matrix of all the measures, the priorities they help to deliver, and their wider benefits can be found in Appendix A.

2. Overarching pressures, opportunities, principles and priorities for nature recovery

Pressures on our current biodiversity

The reasons for the decline in biodiversity are often multi-faceted and complex. We have identified four overarching pressures that are causing the decline and fragmentation of species and habitats across Cumbria; or are reducing the ability of ecosystems to maintain their current state.

Climate change

Climate change is the long-term change in temperature and weather patterns, with the UK already experiencing warmer temperatures, sea level rise, longer periods of drought and more intense, heavy rainfall. Scientists predict that by 2100, temperatures could increase by up to 4°C, and sea levels could rise by up to one metre when compared to 1900 baseline data[16]. This will have a significant impact on Cumbria's habitats and the species that live here, many of which are already vulnerable to environmental changes.

The UK Climate projections[17] estimate that:

- *the average UK temperature has increased by 0.8 degrees between 1961 and 1990*
- *by 2050 there could be a 65% chance of a summer as hot as 2018*
- *the UK has seen a 16 cm sea level rise since 1900*
- *summer temperatures could be up to 7.4 °C hotter by 2050, while winter temperatures could be 4.4 °C hotter*
- *by 2010 summer rainfall could decrease by 62%*
- *there could be up to 59% more precipitation in winter by 2050*
- *in 2020 there are 5.2 million homes and businesses at risk of flooding*
- *up to 1.15 m sea level rise by 2100*

Temperature increases could cause changes in distribution of habitats and species, potentially resulting in species migration where certain species may no longer survive in lower altitudes or latitudes. Many of our current species, some of which are iconic and already rare in the UK, may not survive as their habitats are reduced or become inhospitable. This is particularly pertinent to the species that inhabit our mountainous areas, as they are adapted to cooler conditions and already restricted to our highest mountaintops. Warmer temperatures may also introduce new species from further south as they migrate

[16] The Climate Change Committee (2020) *How much more climate change is inevitable for the UK?* Available at: https://www.theccc.org.uk/2020/04/21/how-much-more-climate-change-is-inevitable-for-the-uk/ [22.08.2024].
[17] Met Office (2022) *UK Climate Projections (UKCP18).* Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp [22.08.2024].

northwards, and some of these could be invasive or harmful to our existing wildlife, including pests and diseases.

Sea level rise will cause the loss or deterioration of natural habitats along our coastlines, as many coastal habitats are prevented from migrating inland due to natural or artificial barriers, known as coastal squeeze[18].

More extreme weather will increase the risk of drought, reduce river levels and flows, and put increasing pressure on freshwater wildlife, as well as reducing the amount of water available for communities and industry. Peat bogs across Cumbria could also start to dry out, releasing thousands of tonnes of carbon into the atmosphere and accelerating the effects of climate change. Drought can also cause wildfires, causing damage to Cumbria's important habitats and killing the species that inhabit them. Wildfires can also pose a risk to human health and built infrastructure.

Extreme weather could also bring intense and sudden rainfall, bringing with it a heightened risk of more frequent flooding that persists over a longer period. More frequent and severe flooding can not only destroy or cause damage to habitats and species, but is a huge risk to homes, businesses, and infrastructure. The cost of the flooding caused across Cumbria by Storm Desmond in 2015 was estimated to be £1.3 billion[19].

Land use

Cumbria's land-based industries are a significant part of the local economy and help define the local landscape. Effective connectivity of habitats and the movement of species across the county depends upon sustainable land management and planning practices that meet the variety of needs for those that live and work in or visit Cumbria, as well as our habitats and species. Cumbria's land is increasingly under pressure to meet these needs, resulting in habitat loss and fragmentation, with less space for species to feed, shelter, breed and move:

- new developments are needed to provide local housing, industry and infrastructure, and economic growth
- forestry requires land for timber production
- land is needed for food production to maintain food security
- utility companies need land for renewable electricity generation, water storage, extraction and purification
- recreational users use the landscape for a variety of activities such as walking, running, cycling, climbing, swimming, and boating (which is amplified by the Cumbria's popularity as a tourist destination)

[18] BirdLife International (2024) *Sea level rise poses a major threat to coastal ecosystems and the biota they support.* Available at: https://datazone.birdlife.org/sea-level-rise-poses-a-major-threat-to-coastal-ecosystems-and-the-biota-they-support [22.08.2024].
[19] BBC (2019) Storm Desmond: Study says flood was 'largest in 600 years'. Available at https://www.bbc.co.uk/news/uk-england-cumbria-48351653

Although our land is trying to meet competing priorities, it is still possible for nature recovery to happen in the right place alongside food production, timber production and a thriving local economy, and the owners and managers of Cumbria's land could bring a significant influence and contribution to landscape-scale nature recovery. Where land managers can provide nature recovery, and/or the associated wider benefits, they can receive agri-environment payments for doing so which will financially support their wider business.

Human activity

Human activity has had considerable impact on the natural environment and the wildlife it supports through the way society has developed and how we live our lives. Fortunately, with increased awareness, changes to policy and a range of environmental grants and incentive schemes, there is the opportunity for things to change for the better.

Whilst it is rare for people to intentionally harm our natural environment, unintentional harm to wildlife is an issue across Cumbria where inappropriate human activity is leaving its mark on the landscape and is negatively affecting biodiversity. Often this is due to a lack of awareness or education around the risks and issues and includes recreational disturbance such as off-lead dogs, drones or people walking too closely to wildlife during breeding and nesting seasons[20], and inappropriate / unpermitted recreation such as increased and inappropriate access to areas that contain sensitive species or habitats.

Humans have also introduced over 2,000 non-native species to the UK[21] and although the majority of these are harmless, around 10% have spread and become invasive, impacting the environment, the economy and our health. Cumbria has several invasive non-native species (INNS) that are having a negative impact on habitats and species by outcompeting native species for limited resources or spreading diseases that reduce our native species populations. Key INNS in Cumbria include mink, signal crayfish, grey squirrel, New Zealand pygmyweed, rhododendron, and Himalayan balsam. A full list of key INNS is provided in Appendix B.

Air, water and light pollution can also negatively affect habitats and the species they support. Some habitats and certain plant species are particularly sensitive to air pollution, originating from combustion, vehicle emissions and agriculture; the deposition of nitrogen is particularly an issue in certain low-nutrient habitats such as bogs, heaths and montane habitats, sand dunes and lakes, as it can cause enrichment, reduce plant species diversity and alter their species composition and ecosystem function[22].

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[20] Cumbria Wildlife Trust (2023) *Visitors to South Walney urged not to disturb birds during nesting season*. Available at: https://www.cumbriawildlifetrust.org.uk/news/visitors-south-walney-urged-not-disturb-birds-during-nesting-season [22.08.2024].

[21] Animal and Plant Health Agency (2023) *Invasive species: the silent threat to our ecosystems.* Available at: https://aphascience.blog.gov.uk/2023/05/15/invasive-species-the-silent-threat/ [22.08.2024].

[22] Department of Agriculture, Environment and Rural Affairs (2023) *Effects of air pollution on natural ecosystems.* Available at: https://www.daera-ni.gov.uk/topics/protect-environment/effects-air-pollution-natural-ecosystems [22.08.2024].

Water pollution from chemicals, sediment and high levels of nutrients can negatively affect the condition of aquatic habitats, and poison or suffocate aquatic species. As our freshwater systems run from the highest mountains to the sea and connect all our different habitats, a reduction in their condition ultimately affects the entire food chain. Artificial lighting is often installed in our built environment to improve access and safety for people; however it can have an adverse impact on species because it disturbs the way plants and animals perceive daytime and night-time, disrupting their natural behaviour[23].

Resources and funding

One of the main barriers preventing nature recovery at a landscape scale in Cumbria is the current level of data, funding and resource, and the way it is allocated. Landscape scale nature recovery will only be successful with long-term funding and investment for habitat creation, management, data recording and processing, and monitoring. Investment is also needed to build a skilled and environmentally-aware local workforce across sectors to deliver projects at scale for multiple benefits, which in turn will support the local economy.

Whilst there is already lots of good work happening to aid nature recovery in Cumbria, barriers to data and knowledge sharing means that is not always easy to piece everything together to see the bigger picture. Limited data on the existing condition of our habitats and species means it is difficult to accurately assess the current condition of our natural environment, or meaningfully measure change.

Opportunities for nature recovery and wider benefits

Increasing the amount of space for nature at a landscape-scale, ensuring habitats and species can function as naturally as possible, along with sustainable management, would bring wide reaching benefits to both nature and people. The effective creation, restoration or enhancement of our habitats, increased connectivity and the management or reduction of pressures including recreational disturbance, and the eradication or management of INNS, will make our county more resilient to the impacts of climate change, allowing habitats to be dynamic to changing local conditions and native species to move freely throughout the landscape.

Most species require a range of resources and well-connected habitats in good condition in order to complete their life cycle and maintain sustainable populations. Therefore, managing our landscape as a mosaic of different habitats at a range of scales is critical to enabling native species to thrive[24].

[23] Friends of the Lake District (N.D.) *Dark Skies Cumbria: How light pollution impacts wildlife*. Available at: https://www.friendsofthelakedistrict.org.uk/news/guest-blog-how-light-pollution-impacts-wildlife [22.08.2024].
[24] Natural England (2013) *The Mosaic Approach: Managing Habitats for Species.* Available at: https://publications.naturalengland.org.uk/publication/6415972705501184 [23.08.2024].

The government's Environmental Improvement Plan identifies two key national environmental objectives that relate to the protection, restoration, and creation of wildlife-rich habitat. These are to:

- restore 75% of terrestrial and freshwater protected sites to favourable condition by 2042 (with 50% on track to achieve favourable condition by 2028)
- restore or create more than 500,000 ha of wildlife-rich habitat by 2042 (with an interim target of 140,000 ha by 2028), alongside our international commitment to protect 30% of our land and ocean by 2030

The first step towards nature recovery is ensuring that our Areas of Particular Importance for Biodiversity are protected, enhanced and pressures on them are reduced, as they form the core of our nature recovery network. Our most important sites for biodiversity already provide a range of benefits to people, including:

- **natural flood management** – longer, rougher and deeper-rooted vegetation slows down surface water flow and increases infiltration and evaporation
- **improved water flows**: where more water is retained for longer in the catchment, the supply of water is more consistent during periods of drought
- **improvements to water quality** – natural habitats around watercourses can absorb nutrients and other pollutants, preventing them from entering waterbodies
- **absorption of carbon** – vegetation, trees, and healthy soils and peat absorb carbon, removing it from the atmosphere
- **improvements to air quality** – trees and other vegetation can absorb ammonia and capture particulate matter on their leaves and form a physical barrier between pollution sources and sensitive habitats
- **enhancement of our health and wellbeing** – access to nature is good for us
- **economic benefits** – a healthy environment attracts investment

By expanding and connecting the areas that are already wildlife -rich, we can maximise the benefits for biodiversity whilst balancing the other land use needs on our landscape and maintaining the benefits to people. For example, low-input farming can make farms more sustainable and profitable, improve soil health, and reduce the amount of sediment and nutrients going into our land and water[25]. Investment in nature can support the local economy whilst also improving the condition and extent of habitats in Cumbria.

Involvement in community-based nature recovery projects can bring better physical and mental health and can create a sense of belonging and community spirit[26]; it also gives an opportunity for people to learn about the pressures that the natural environment is facing and feel empowered to play their part in its recovery. Education also brings the opportunity

[25] Upland Farmer Toolkit (2024) *Low-Input Farming.* Available at: https://uplandfarmertoolkit.org.uk/farming/low-input-farming/ [23.08.2024].
[26] Mind (2021) *Nature and Mental Health.* Available at: https://www.mind.org.uk/information-support/tips-for-everyday-living/nature-and-mental-health/how-nature-benefits-mental-health/ [23.08.2024].

for widespread behaviour change to reduce the impact of recreational disturbance, prevent invasive species introductions and spread, pollution and wildfires.

There are also multiple opportunities for financial investment in Cumbria to deliver nature-based solutions, which provide wider benefits as well as nature recovery at a landscape-scale. A nature recovery network across Cumbria would help to provide people with greater access to areas with high nature value, encouraging people to be more physically active and spend time outdoors, which in turn can reduce the health burden on the NHS and local services.

Investment in upskilling people across different sectors to manage, monitor, and care for our habitats and species will help to deliver a joined-up approach to nature recovery. By making the most of our existing resources, pooling them together to deliver maximum benefit in areas which data and evidence suggest could become particularly important for biodiversity, we can provide wider benefits to the people of Cumbria for generations to come.

Principles for nature recovery

There are several common principles that should be followed if the LNRS is to be successful in delivering nature recovery at scale. These principles apply to all priorities and potential measures, across all habitat types.

Follow policy, guidance and good practice

All delivery must comply with legal requirements and regulatory policy, and should follow standards, guidance, and good practice. **The LNRS does not confer permission to create or restore habitat without following appropriate existing decision-making frameworks, consultation, permissions, permits or licenses, or to in any way circumvent standard pre-existing procedures or good practice around habitat creation, restoration or enhancement.** The most common guidance and policy documents will be provided in Appendix C.

A strategy to guide delivery

Whilst the strategy should be used to help guide the delivery of nature recovery, all individual projects will need to be informed by the relevant site-specific field surveys. A detailed delivery plan should be developed for each project, based on what works best for that particular area of land, and the Local Habitat Map interpreted flexibly, so as not to exclude actions where subsequent field data indicates they would be appropriate.

Right habitat, right place

Any habitat restoration or creation measures should occur on suitable sites and not be to the detriment of other existing wildlife-rich habitats or species. The most beneficial actions that can be taken in each place should be chosen, favouring habitats and species

recognised (nationally and locally) as being the highest priorities for action over those that are common and widespread.

Know your site

Prior to undertaking action, obtain information on the existing habitats, species, and unique landscape characteristics present and their requirements, via existing records searches, field surveys, online information such as NCA data, and expert advice.

Think long term

Any action for nature recovery should plan proactively for long term habitat management, maintenance and funding.

Be ambitious

Any action for nature recovery should work towards achieving good condition and well-functioning habitats.

Build resilience

Any action for nature recovery should consider pressures such as climate change, pests and diseases, and human disturbance, and have resilience to these pressures built into their design and management.

Maximise multiple benefits

Action for nature recovery should be designed to deliver wider benefits, such as improving health and wellbeing, capturing carbon, reducing flood risk, or sustaining traditional cultural land management.

Involve communities

Aim to work collaboratively from the outset with local residents, communities, partnerships and businesses.

Consider access

Where it is not detrimental to the target habitats and species, action for nature recovery should support better access to nature for people and communities.

Monitor success

Any action for nature recovery should include monitoring or tracking progress, which is critical to understanding the success of efforts.

Support landowners and managers

Any action for nature recovery should support, and work in partnership with landowners and land managers. The actions in the LNRS are not binding for the landowner or land manager; they do not require the owners and managers of the land identified to make any changes.

Share knowledge

Any data collected as part of action for nature recovery should be shared with Cumbria Biodiversity Data Centre.

Priorities and potential measures for nature recovery

The priorities and measures identified in the LNRS were collectively agreed on by a wide range of stakeholders and have been developed using national environmental objectives, national and local strategies and plans, guidance notes, research papers, data, and local knowledge. The priorities are designed to be Specific, Measurable, Achievable, Relevant, and Time-bound (SMART), and where possible they include a numerical target, timeframe, and a definition of 'what good looks like', so that they can be monitored against, and their success demonstrated in the future.

Where the priorities have a numerical target, a combination of national environmental objectives, local or regional targets in other strategies and plans, local organisational targets, and the Local Habitat Map were used to come up with a target that would be locally relevant, achievable yet ambitious, and align with national targets.

The following enabling priorities and potential measures have been identified as being a critical part of nature recovery, and will be needed to address the local pressures on the natural environment that extend beyond the enhancement, restoration, or creation of habitat. They will be required for all habitats and species if we are to achieve our long-term vision for nature recovery in Cumbria.

Priority 1: Habitat mosaics

More of our environment managed at a landscape scale, providing space for the full range of naturally occurring habitats and species to flourish as part of connected, structurally diverse and dynamic mosaics.

Instead of requiring specific measures, this priority should be achieved by applying the following principles when delivering any aspect of the LNRS:

- any management on a given parcel of land should achieve a well-functioning ecosystem that supports a full range of naturally occurring habitats and species
- all components of habitat mosaics should be enhanced, restored or created as appropriate to the soil and climatic conditions of the location by focusing on restoring natural processes
- any action for nature recovery should plan proactively for long-term management at a range of scales (including livestock grazing, deer, hydrology, invasive species, and recreation)

- the Local Habitat Map should be interpreted with its limitations in mind, so as not to exclude actions where subsequent field data indicates they would be appropriate, and to avoid undertaking actions that site surveys show would be damaging
- action for nature recovery should focus on restoring natural processes using the 5 pillars of natural function (hydrology, nutrients, soil and sediment processes, vegetation management, species composition)

Priority 2: Invasive non-native species

Halt the spread and reduce the extent of invasive non-native species (INNS) in Cumbria, prevent the arrival of new INNS, and where possible eradicate specific INNS from target catchments / areas.

Table 1: Potential measures that would help to achieve Priority 2

Measure number	Measure description
M1	Work with local landowners and stakeholders to develop and implement coordinated management plans for the strategic reduction/eradication of key INNS[27], which also consider the impacts of climate change on species distribution.
M2	Reduce the risk of the introduction/spread of INNS, and the diseases they can carry, by encouraging greater implementation of effective biosecurity measures, through: • education • engagement • signage • targeted risk reduction • working with event organisers • raising awareness of good practice guidance
M3	Develop a coordinated approach for sharing monitoring/surveillance data on INNS, through the development of emergency action plans, to allow for a rapid response to the spread of existing or introduction of new INNS.

[27] A full list of key INNS is provided in Appendix B.

Priority 3: Data and mapping

Improve Cumbria's data for habitats and species including habitat type, extent, and condition, in order to monitor and support the delivery of the LNRS and other associated nature recovery projects.

Table 2: Potential measures that would help to achieve Priority 3

Measure number	Measure description
M4	Identify, survey, and manage data with an emphasis on updating information on existing and potential County Wildlife Sites including: • habitat type • extent • condition • management status • abundance and diversity of species supported by that habitat
M5	Establish a standardised and consistent data reporting method for wildlife rich habitats and species.
M6	Establish a standardised and consistent approach to long-term monitoring practices to ensure consistency in data collection.
M7	Support the role of Cumbria Biodiversity Data Centre as a central resource, targeting: • improved systems to allow for the gathering, sharing, verifying, and updating of data and GIS records between organisations and citizens • robust data-sharing agreements • maximising the use of existing data sources and local knowledge
M8	Develop guidance and provide training to increase the coverage, quantity and quality of data collected through citizen science projects that: • foster community ownership • contribute meaningfully to species and habitat data collection
M9	Carry out research and development into the feasibility and resilience of proposed projects for nature recovery.

Priority 4: Safeguarding our habitats and species

Safeguard existing 'areas of particular importance for biodiversity', 'areas that could become of particular importance', and LNRS priority species through a range of approaches such as appropriate local planning processes, guidance, and land management incentives.

Table 3: Potential measures that would help to achieve Priority 4

Measure number	Measure description
M10	Safeguard 'areas of particular importance for biodiversity', 'areas that could become of particular importance' and LNRS priority species where possible by incorporating them into: • local plans • supplementary planning guidance • development management
M11	Enable enforcement of protections through effective planning, monitoring and reporting processes.
M12	Survey, monitor, and identify more areas in need of safeguarding through designation such as: • Bathing Waters • Limestone Pavement Orders • County Wildlife Sites
M13	Protect sensitive habitats against the impacts of recreational pressure, through: • partnership working to ensure consistent messaging • funding of wardens and engagement officers • access management including fencing and groundworks • provision of training • footpath improvements • promoting responsible behaviour • consideration of the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites • education on dangers of wildfire

Priority 5: Skills, delivery and funding

Increase investment in funding and resource to enable the long-term delivery of nature recovery, including skills and education, and long-term management and monitoring.

Table 4: Potential measures that would help to achieve Priority 5

Measure number	Measure description
M14	Identify skills and knowledge gaps and create more opportunities to access the sector (building the skill base of future generations), through: • training • apprenticeships • career opportunities
M15	Promote and encourage outdoor and nature-based learning.
M16	Continue to develop opportunities for sharing good practice and lessons learnt, to encourage and support collaboration, by supporting and delivering joint training and knowledge exchange between: • farmers • land managers • foresters • conservation bodies • other organisations • and individuals
M17	Invest in community capacity and skills, and economic/human capital development to support the management and monitoring of habitats and species in line with the LNRS.
M8	Develop guidance and provide training to increase the coverage, quantity and quality of data collected through citizen science projects that: • foster community ownership • contribute meaningfully to species and habitat data collection
M9	Carry out research and development into the feasibility and resilience of proposed projects for nature recovery.

Priority 6: People taking action for nature

More people from all sectors of society taking positive action for wildlife, and engaging with nature through responsible recreation, volunteering, and learning.

Table 5: Potential measures that would help to achieve Priority 6

Measure number	Measure description
M18	Engage, empower and build capacity for a more diverse and wider cross section of society to take action for, enjoy and care for Cumbria's natural environment by raising awareness of: • our heritage • biodiversity • wider benefits • how to protect and enhance it
M19	Create more practical opportunities for people to take action for nature recovery, increasing the range, diversity and scale of volunteering opportunities, and embedding in social prescribing.
M20	Encourage nature-friendly practices in gardens, allotments and public/community spaces, including: • pollinator-friendly planting • reduction in mowing • use of peat-free compost • reduced pesticide use • creating holes in fences that allow wildlife such as hedgehogs to move between different spaces
M21	Raise awareness of issues and actions everyone can take, such as: • "love my beach" • clean water campaigns • reducing water use • reducing impacts of access and recreation • increasing flood and drought resilience • reducing and removing litter • improving biosecurity • correct disposal of items such as wet wipes or cooking fats
M8	Develop guidance and provide training to increase the coverage, quantity and quality of data collected through citizen science projects that: • foster community ownership • contribute meaningfully to species and habitat data collection

Measure number	Measure description
M13	Protect sensitive habitats against the impacts of recreational pressure, through: • partnership working to ensure consistent messaging • funding of wardens and engagement officers • access management including fencing and groundworks • provision of training • footpath improvements • promoting responsible behaviour • consideration of the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites • education on dangers of wildfire
M16	Continue to develop opportunities for sharing good practice and lessons learnt, to encourage and support collaboration, by supporting and delivering joint training and knowledge exchange between: • farmers • land managers • foresters • conservation bodies • other organisations • individuals

Priority 7: Farming and nature

More farmland managed to regenerate soils, incorporate thriving wildlife-rich habitats, and improve water quality, contributing to High Nature Value farming systems that produce food and fibre and sustain rural culture and communities.

Farmers have a hugely important contribution to make to nearly all of the habitats and species in Cumbria, and all of the measures in the habitat themed sections could be suitable on farmed land. The measures outlined below are those that could be applied anywhere within the farmed landscape and could be carried out alongside production. Measures which cover the enhancement, restoration, or creation of specific wildlife-rich habitats within the farmed landscape are listed under the relevant habitat priority.

Table 6: Potential measures that would help to achieve Priority 7

Measure number	Measure description
M22	Protect, maintain and enhance existing farm landscape features which support biodiversity, such as: • traditional hay meadows • low input grassland • ponds • field trees, especially ancient and veteran trees • drystone walls • farm woodland • hedgerows and hedgerow trees • rough margins and scrub
M23	Make more space for nature within the farmed landscape, with habitats created/enhanced to expand and connect with nearby wildlife-rich habitats.
M24	Encourage regenerative farming methods that improve soil health, including: • soil assessments and testing to understand soil structure, soil organisms, organic matter, and nutrient status • production of soil management plans • exploring new grazing regimes • use of legume crops in arable rotations • addition of suitable species swards in species-poor grassland • minimising soil disturbance • robotic weeding
M25	Tackle diffuse pollution and sediment runoff by taking a catchment approach to low input farming methods, through: • education and farmer learning • nutrient management plans • diffuse water pollution plans • land use change • sustainable slurry management improved soil management • grazing and vegetation management • prevention of unnatural erosion.
M26	Create new food, shelter and nesting opportunities on arable land, such as: • nesting plots for birds • beetle banks • sowing bird and pollinator friendly seed mixes • leaving rough margins and scrub
M27	Improve air quality and tackle ammonia losses through interventions such as: • planting shelterbelts next to livestock housing • covering farmyard muck heaps • sustainable slurry management

Measure number	Measure description
M28	Establish wildlife-rich agroforestry, promoting the use of climate change resilient native tree species, including options such as: • in-field trees • wood pasture • wildlife-rich hedgerows and hedgerow trees • shelterbelts • riparian buffers • traditional orchards, including native fruit and nut tree species to benefit farmland species
M29	Explore water management and wetland farming innovations where management of wet areas need to be balanced with food production, including: • rewetting of peaty soils • management of wet grassland for breeding waders (generally with cattle grazing) • management of water levels to protect and enhance raised bogs and other wetlands • low nutrient inputs to protect wetlands • creation of wet woodland as part of farming systems
M39	Create more woodland and tree cover, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework, targeting the following wildlife-rich woodland types: • upland oakwood (also known as 'Atlantic rainforests' in gills, fellsides/moorland edges, and where bracken is dominant) • wet woodland (targeting floodplains, riparian zones and plateaus) • lowland yew on limestone and upland ashwood • future wood pasture and parkland and ancient/veteran trees • traditional orchards • mixed and broadleaved woodland in good condition
M50	Manage existing hedgerows to be wildlife-rich by: • maintaining them in a variety of heights, conditions and widths (including tall and wide hedges, those that include standard trees, and those that are able to flower and fruit abundantly) • maintaining buffer strips either side • planting up gaps in hedges with a mix of native species of local or appropriate more southerly provenance including hazel, blackthorn, bramble and honeysuckle (honeysuckle being particularly important where dormice could be present) • cutting at an appropriate time of year to avoid disturbance to breeding birds, and if likely to be present, dormice
M51	Plant species rich native hedgerows (including standard trees) and shelterbelts to create a connected and diverse network, with an emphasis on restoring historical field boundaries and maintaining enclosures and field patterns with historical value.

Measure number	Measure description
M85	Establish wide riparian buffer strips of wildlife-rich habitats where livestock can be excluded, in suitable areas, to minimise nutrient and sediment input into watercourses, waterbodies and wetlands.

3. Woodlands, trees and scrub

Habitats

The habitat group of ‘woodlands, trees and scrub’ is made up of the following wildlife-rich habitats:

- broadleaved woodland (lowland mixed deciduous woodland, lowland beech and yew woodland, upland oakwood, upland mixed ashwoods, upland birchwoods, wet woodland, wildlife-rich native broadleaved woodland, and wildlife-rich mixed woodland)
- traditional orchards
- wood pasture and parkland
- hedgerows
- wildlife rich scrub

This habitat group also considers bracken, coniferous woodland, and trees outside woodlands.

There is approximately 90,000 ha of woodland and trees in Cumbria, covering just over 13% of the county. Of this, around 62 % is broadleaved woodland, 27% is coniferous woodland, and 11% is trees outside woodlands such as wood pasture and parkland, and traditional orchards.

Broadleaved woodland

Broadleaved woodland is typically characterised by trees that do not have needles. Their leaves are generally broad and varied in shape, and most lose their leaves in the autumn for them to redevelop each spring. The highest densities of semi-natural broadleaved woodland are located in the south and west of the county, with the majority of Cumbria’s broadleaved woodland found within the NCAs of the Cumbria High Fells and the South Cumbria Low Fells.

Approximately 35% (16,000 ha) of the semi-natural broadleaved woodland in Cumbria is classed as ancient woodland, which is considered to be one of our most valuable woodland habitat types. Ancient woodland is designated as an irreplaceable habitat, so should be maintained, enhanced and protected for centuries to come. Much of Cumbria's ancient woodland lies within an oceanic climate, making it some of England's only Atlantic rainforest outside of Devon and Cornwall.

Traditional orchards

Traditional orchards are areas of trees and shrubs that are planted to produce food. They are found throughout the county but are largely absent from the central Lake District and parts of the west coast, with the main concentration in the south of the county.

Wood pasture and parkland

Wood pasture and parkland are open areas of trees that occur within land that has been managed through grazing. Wood pasture is an under-recorded habitat, but its value is being increasingly recognised. Wood pasture is generally found within the Lake District and Yorkshire Dales National Parks. Parkland is generally associated with large country houses and estates.

Hedgerows

Hedgerows are rows of trees or shrubs that are planted as boundary lines around parcels of land such as fields or gardens. They have intrinsic biodiversity value as they provide movement and feeding corridors for wildlife, and are found throughout Cumbria, from the flat plains of the Solway Basin to the tracks and byways of the Cumbria Low Fells. They also occur on a wide range of rock and soil types, giving a great deal of regional variation in hedgerow composition and form. The percentage of ancient wildlife-rich hedgerows is not known and there are currently no designated sites for hedgerows in Cumbria, but some will include hedgerows as part of the field system.

Scrub and bracken

Scrub is dominated by bushes or shrubs and is a dynamic successional habitat that occurs on the edge of woodlands and grasslands. Scrub is important for biodiversity, particularly in supporting insects and breeding birds. Remnant areas of scrub can be found throughout Cumbria, particularly on upland fringes often in the form of old hawthorn trees with little young growth to replace them, however areas where dynamic succession can occur are very rare.

Bracken covers many of our open areas of hillside due to its ability to rapidly outcompete other plants, but it can be a useful indicator of areas where woodland would once have existed, and which would likely be suitable for the creation of new woodland or scrub.

Other woodland and trees

Of the county's woodland, approximately 19,000 ha is classed as coniferous. Just under half of this is part of the National Forest Estate and includes forests such as Whinlatter, Grizedale, and Ennerdale. These areas are used for timber production, recreation and also support wildlife; along with other forests such as Whinfell and Thirlmere, they are strongholds for red squirrel. Whilst generally less biodiverse than broadleaved woodlands[28], low impact silviculture is diversifying tree species and forest structure to support a wide variety of wildlife, adding to that already found along rides and the other open habitats found within the forest areas.

[28] Woodland Wildlife Toolkit (N.D.) *Mixed and confider woodlands.* Available at: https://woodlandwildlifetoolkit.sylva.org.uk/advice-types-conifer [27.08.2024].

Where to see:

- **Upland oakwood:** Duddon and Borrowdale valleys
- **Ashwood:** on the limestone hills around Morecambe Bay
- **Wet woodland:** along the Rivers Irthing and Lyne and fringing many of our lakes
- **Traditional orchards:** Lyth and Winster valleys, which are noted for their damson orchards
- **Wood pasture:** Gowbarrow Park along Ullswater, Rydal Park, Borrowdale, and Binnie Banks near Geltsdale
- **Parkland:** Lowther Castle, Levens Park, Holker Hall, Hutton-in-the-Forest, Armathwaite Hall, Corby Castle, Naworth Castle and Muncaster Castle. Rickerby Park is a historic urban parkland next to the river Eden

Species

Woodlands, trees and scrub support a vast array of different species, from flowering plants, ferns, mosses, lichens and fungi to a whole range of animals including insects, birds, and mammals such as our iconic red squirrel. Trees and hedgerows are also key to providing wildlife corridors that connect habitats through Cumbria's landscape.

The main species that our woodland, trees and scrub habitat support have been grouped into the following assemblages:

Broadleaved woodland

This includes threatened species which typically inhabit our broadleaved woodlands, including birds such as wood warbler, hawfinch and tree pipit, butterflies and moths such as high brown fritillary, barred tooth-striped moth and duke of burgundy, mammals such as red squirrel, pine marten and several species of bat.

Upland oakwood

This includes threatened species that thrive in our Atlantic rainforests, which are some of our best examples of ancient woodland. Species in this assemblage include redstart, pied flycatcher, and several mosses and lichens including *Hageniella micans.*

Wet woodland

This includes threatened species that thrive in wet woodland habitats, including coralroot orchid, netted carpet moth, willow tit and willow gloves fungus.

Veteran and ancient trees

This assemblage covers a range of lichen species that are found on individual veteran and ancient trees.

LNRS priority species

Red Squirrel - Native red squirrel populations have declined severely due to the impact of the introduced non-native grey squirrel. Coniferous woodland favours the red squirrel,

providing stronghold areas across the county. In the long term we want to see recovered, sustainable populations across the whole county.

Hageniella micans – this moss can be found in the Atlantic rainforests of Cumbria including Johnny's wood in Borrowdale, and Scales Wood near Buttermere – these unique habitats are some of our best examples of ancient woodland.

Ricasolia amplissima – this is a large, foliose lichen that grows on older, more basic-barked trees, usually in open parkland/ wood pasture habitats. It is indicative of good ecological continuity but has been badly affected by pollution over the last century.

Netted carpet moth – this is a medium sized moth that inhabits wet woodland. With the exception of a few sites in Lancashire, Cumbria holds the entire UK population of this species. Their habitat needs some ground for the larval foodplant (touch-me-not balsam) to establish.

Hazel dormouse – this small nocturnal rodent lives in woodlands and hedgerows. With the population reaching critically low levels in Cumbria, small populations have been reintroduced to south Cumbria in recent years. Whilst early indications are looking successful, more action is needed to achieve the recovery of this species.

Willow gloves fungus - this rare fungus is a parasite on an uncommon host fungus, known as 'willow glue', (*Hydnoporia (Hymenochaete) tabacina*) which lives inside the dead twigs and small branches of willow trees and is mostly only found in a fragmented habitat type (wet willow carr), that has suffered large historical losses. It was assessed as being potentially on the brink of extinction in the UK in 2003 and following a feasibility study into reintroducing the species to England in 2022, three sites in Cumbria were chosen for reintroduction of willow gloves fungus in 2024.

Pressures and threats

The key pressures and threats that affect the condition and extent of our woodland, tree and scrub habitats include[29]:

- climate change
- diseases, pests and invasive non-native species
- development
- pollution
- grazing pressure from domestic livestock and deer

Increases in the frequency and severity of storm events due to climate change can have a damaging effect on our woodlands. Mature woodlands take a long time to establish, and woodlands establishing now may not be suitable for our **changing climate**. Many woodland

[29] Woodland Trust (2024). Threats to Woods and Trees. Available at: https://www.woodlandtrust.org.uk/protecting-trees-and-woods/threats-to-woods-and-trees

species are not very mobile, making it harder for long established woodland species to adapt to climate change. Habitat and species under stress also have increased vulnerability to more mobile **pests and diseases** that are increasing or shifting their range as the climate warms. As a result, diseases such as Ash Dieback are becoming more widespread, and invasive non-native species such as grey squirrel can damage young woodland that is not fully established.

The need to balance the needs of nature with the needs of people often puts woodland habitats at risk from **development**. This can impact on woodlands not only through their direct loss and fragmentation to make space for development, but indirectly through increases in **pollution, disturbance**, and the introduction of **non-native plants** from gardens and landscaping schemes.

Many ancient and native woodlands are small in size and have become increasingly isolated from other semi-natural habitats. This **fragmentation** means that if a species disappears from a woodland, there is no longer a nearby source from which it can recolonise. Hedgerows and field trees are common features across Cumbria, but many have been removed over the years as field sizes have increased to accommodate larger machinery and production yields, and fences have offered a cheaper, lower maintenance alternative, adding to the fragmentation of our wooded landscape.

Woodlands are complex habitats which vary hugely in size, age and structural diversity. **Grazing or browsing pressure** can limit the ability for seedlings to develop into young trees. This can reduce structural complexity, as well as reducing the diversity of the woodland understorey, and in the long term can ultimately cause the loss of woodlands. Grazing or browsing can be from domestic livestock or when levels of native deer have become too high.

Opportunities for recovery and wider benefits

Woodlands and trees already store large quantities of carbon and are a key tool for reducing our contribution to climate change. Planting more trees and creating more woodland will further increase the amount of carbon that is absorbed and stored in our woodlands, and their potential as a **carbon storage** solution is huge. When timber is used in construction, we can lock carbon into our buildings for decades. In towns and cities, trees can help people and species adapt to climate change by **providing shade** and helping to keep our built-up areas cool. In rural settings, trees can provide shelter and shade for livestock.

Creating more woodland, wood pasture, hedgerows and scrub and increasing the structural diversity of our existing woodlands can be an effective way of slowing the flow of water downstream after rainfall events, helping to reduce the severity of potential fluvial flooding through what is known as **natural flood management**. Riparian planting can also keep

rivers cool by providing dappled shade and intercept pollution and sediment from adjacent land.

Healthy and plentiful woodlands and trees also **improve air quality** by intercepting sulphur dioxide, nitrogen dioxide and ammonia from the air, and capturing particulate pollution on their leaves. They also form a physical barrier between sensitive habitats, people and sources of pollutants.

Woodlands are also an important resource for people, as woodland creation near built-up areas provides more places for people to engage with nature, **improving physical and mental health and wellbeing** as well as building local assets such as community orchards which contribute to food and nutritional security within communities.

Changes in national environmental and agricultural policy provides multiple support mechanisms to restore and enhance our existing woodland habitats as well as the creation of new woodland. This includes hedgerows, which are relatively simple to re-establish or to modify their management to enhance their biodiversity value.

The government's Environmental Improvement Plan has a national environmental objective to increase tree canopy and woodland cover to 16.5% of total land area by 2050, with an interim target to increase tree canopy and woodland cover by 0.26% of land area (equivalent to 34,000 ha) by 31 January 2028. It also identifies the creation and management of trees and woodlands as a key mechanism for achieving many of the other objectives in the Environmental Improvement Plan, including those on carbon and climate change, air quality, water quality and quantity, nature-based solutions, and sustainable resources.

Priorities and potential measures for nature recovery

Our long-term vision for woodlands, trees and scrub is:

"A landscape rich in trees including well-managed woodland, wood pasture, hedgerows, scrub and individual trees."

The following priorities and potential measures have been identified to help us achieve our long-term vision.

Priority 8: Sustainable forest management

70% (50,000 ha) of existing woodlands to be under sustainable management practices which maintain and enhance biodiversity by 2035.

Table 7: Potential measures that would help to achieve Priority 8

Measure number	Measure description
M30	Manage woodland to be wildlife-rich by increasing structural and species diversity and resilience within the wooded landscape, using established techniques such as: • low impact silviculture, such as continuous cover forestry • promoting the use of climate change resilient native tree species (using natural regeneration, and planting stock from local or appropriate, more southerly provenance) matched to site characteristics and management objectives • conserving standing deadwood and cavities, split trees and boughs, or where not present providing boxes to increase nesting and roosting opportunities for woodland birds and bats • create glades/rides and open areas in appropriate locations within woodland to benefit lichens and woodland butterflies • where rainforest bryophytes and ferns are present maintain shaded and humid conditions • where dormice are present retain standard trees (especially oak), undertake rotational coppicing of hazel to promote a dense shrub layer and structural complexity, and adjust the timing of management work to avoid nesting and hibernation • retain deadwood within woodlands to create a range of microhabitats to benefit invertebrates and fungi • control of INNS such as rhododendron • controlling grazing pressure to enable successful tree and shrub establishment
M31	Manage and restore traditional orchards to be in good condition.
M32	Develop site-specific woodland management plans in accordance with UK Forestry Standard, where all habitats are managed and monitored appropriately to maximise the benefits to biodiversity.
M33	Adopt precautionary tree health measures by undertaking relevant surveillance and subsequent management of diseases and pests to prevent their establishment or spread.
M34	Monitor and control deer as part of a Cumbria wide deer management strategy.

Species specific measures:

Table 8: Species specific potential measures that would help to achieve Priority 8

Measure number	LNRS priority species	Measure description
M35	Red Squirrel	Work towards the removal of grey squirrels from Cumbria through: • coordinated legal control of grey squirrels • cross-border collaborative action with stakeholders in neighbouring counties • development of medium-term and long-term strategies to enable red squirrel recovery • increased public awareness/education on reporting red and grey squirrel sightings, to improve presence/absence monitoring programmes
M36	Red Squirrel	Favour small-seeded tree species (such as blackthorn, bird cherry, pine species, hawthorn and holly) in planting schemes that are in or adjacent to red squirrel strongholds.
M37	Netted carpet moth	Expand populations of netted carpet moth in Cumbria through: • Appropriate ground disturbance through cattle grazing, raking or trampling, to promote the growth of touch-me-not balsam (the food plant for netted carpet moth) • Translocation of touch-me-not balsam to suitably restored sites in consultation with specialists • Focussing management and expansion around existing colonies
M38	Hazel Dormouse	Carry out translocations to bolster and connect existing populations of dormouse and maintain genetic diversity, under specialist advice.
Measure number to be added	Willow gloves fungus	Review the success of the reintroduction methods already trialled for willow gloves fungus and: • if successful repeat translocations at other sites in the same region to build a robust population • if unsuccessful conduct further reintroduction trials using alternative methods

Priority 9: Create and connect woodland

Increase woodland and non-woodland tree cover in Cumbria by 10,000 ha by 2035, targeting the expansion of and improvement of connectivity between the existing woodland network.

Table 9: Potential measures that would help to achieve Priority 9

Measure number	Measure description
M39	Create more woodland and tree cover, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework, targeting the following wildlife-rich woodland types: • upland oakwood (also known as 'Atlantic rainforests' in gills, fellsides/moorland edges, and where bracken is dominant) • wet woodland (targeting floodplains, riparian zones, and plateaus) • lowland ash and yew on limestone and upland ashwood • future wood pasture and parkland and ancient/veteran trees • traditional orchards • mixed and broadleaved woodland in good condition
M40	Target wildlife-rich woodland creation to buffer, expand, and connect ancient woodlands to the wider treescape (so that there is a range of ages of trees such that continuity of mature/ancient trees is assured), using a combination of: • natural colonisation • planting using native tree species that are of local or appropriate more southerly provenance
M41	Favour woodland establishment which maximises genetic diversity, by natural colonisation if possible, or the use of climate change resilient native tree species that are of local or appropriate more southerly provenance if carrying out planting.
M42	Design new woodland to incorporate open space and maximise use of existing habitats both within and adjacent to the woodland creation site.
M43	Design new woodlands and their associated infrastructure to facilitate low-impact silviculture such as continuous cover forestry.
M44	Support and develop the network of plant and tree nurseries specific to Cumbria.
M32	Develop site-specific woodland management plans in accordance with UK Forestry Standard, where all habitats are managed and monitored appropriately to maximise the benefits to biodiversity.

Species specific measures:

Table 10: Species specific potential measures that would help to achieve Priority 9

Measure number	*LNRS priority species*	Measure description
M45	*Hageniella micans* (bryophyte found in upland oak woodland)	Targeted expansion of Atlantic rainforest habitat and appropriate management including sympathetic grazing levels.

Priority 10: Ancient woodlands and ancient and veteran trees

75% (12,250 ha) of ancient woodlands and ancient and veteran trees are under sustainable management and are in or are moving towards good ecological condition by 2035.

Table 11: Potential measures that would help to achieve Priority 10

Measure number	Measure description
M46	Manage existing wood pasture and parkland to ensure it is a fully functional habitat, with large open grown trees of a varied age-range to ensure succession, deadwood, shrubs and rich ground flora by: • an appropriate grazing regime that allows tree regeneration but prevents shading of trees to the detriment of epiphytes • control of deer • retain fallen and standing deadwood • avoiding the use of fertilisers, pesticides and herbicides
M47	Restore plantation on ancient woodland sites (PAWS) to wildlife-rich woodland using established techniques such as: • continuous cover forestry • low impact silviculture • promoting the use of climate change resilient native tree species (using natural regeneration, and planting stock from local or appropriate, more southerly provenance) matched to site characteristics and management objectives • controlling grazing pressure to enable successful tree and shrub establishment • ensuring that any remnant ancient woodland features are protected and managed sensitively while progressing restoration to native woodland

Measure number	Measure description
M48	Safeguard veteran and ancient trees and their associated birds, bats, invertebrates, fungi, lichens and mosses by: • preventing the loss of ancient trees to development or unregulated felling • protecting root zones (that can spread far beyond the canopy) from compaction and damage • maintaining pollarding, where this was established when the tree was young • protecting trees from excessive cutting or pruning, especially when the tree has not been managed by pollarding • protecting the species that live in and on ancient trees by reducing or avoiding the use of pesticides, slurry and fertilizer and other pollutants • maintain a range of tree ages to ensure succession • retaining both standing and fallen deadwood
M40	Target wildlife-rich woodland creation to buffer, expand, and connect ancient woodlands to the wider treescape (so that there is a range of ages of trees such that continuity of mature/ancient trees is assured), using a combination of: • natural colonisation • planting using native tree species that are of local or appropriate more southerly provenance
M33	Adopt precautionary tree health measures by undertaking relevant surveillance and subsequent management of diseases and pests to prevent their establishment or spread.
M34	Monitor and control deer as part of a Cumbria wide deer management strategy.

Species specific measures:

Table 12: Species specific potential measures that would help to achieve Priority 10

Measure number	LNRS priority species	Measure description
M49	*Ricasolia amplissima* (lichen usually found in open parkland/ wood pasture)	Safeguard *Ricasolia amplissima* populations in Cumbria by: • monitoring known sites to make sure host trees aren't cut down, dying or falling down • planning for succession of host trees with suitable bark conditions/ecology • undertaking translocations to other suitable host trees, following specialist advice

Priority 11: Hedgerows and scrub

Create 500 km of species-rich native hedgerows[30] and 5000 ha of high nature conservation value scrub[31] by 2035 and increase the amount of the existing resource that is under favorable management.

Table 13 Potential measures that would help to achieve Priority 11

Measure number	Measure description
M50	Manage existing hedgerows to be wildlife-rich by: • maintaining them in a variety of heights, conditions and widths, including tall and wide hedges, those that include standard trees, and those that are able to flower and fruit abundantly • maintaining buffer strips either side • planting up gaps in hedges with a mix of climate change resilient species that are of local or appropriate more southerly provenance including hazel, blackthorn, bramble and honeysuckle (honeysuckle being particularly important where dormice could be present) • cutting at an appropriate time of year to avoid disturbance to breeding birds, and if likely to be present, dormice
M51	Plant species rich native hedgerows (including standard trees) and shelterbelts to create a connected and diverse network, with an emphasis on restoring historical field boundaries and maintaining enclosures and field patterns with historical value.
M52	Manage scrub as a mosaic of successional habitats, providing blocks of scrub interspersed with sheltered, sunny areas for varied foraging and basking opportunities and hibernation features, to benefit reptiles, invertebrates and scrub nesting birds.
M53	Expand high nature conservation value scrub cover by creating the appropriate conditions for a mix of scrub types to establish (including blackthorn scrub, gorse scrub, hawthorn scrub, hazel scrub, juniper scrub, willow scrub, mixed scrub), using techniques such as: • grazing management • scarification • assisted sowing/planting

Priority 12: Forestry and nature

Productive forests and woodlands are created and managed sustainably to support wildlife-rich habitats, contribute to nature recovery networks and deliver wider benefits while providing timber for a range of goods.

[30] UKHab Ltd (2023). UK Habitat Classification Version 2.0. Available at: https://www.ukhab.org
[31] Natural England (1999). Lowland Grassland Management Handbook, 2nd ed. Available at https://publications.naturalengland.org.uk/publication/35034

Table 14: Potential measures that would help to achieve Priority 12

Measure number	Measure description
M30	Manage woodland to be wildlife-rich by increasing structural and species diversity and resilience within the wooded landscape, using established techniques such as: • low impact silviculture, such as continuous cover forestry • promoting the use of climate change resilient native tree species (using natural regeneration, and planting stock from local or appropriate, more southerly provenance) matched to site characteristics and management objectives • conserving standing deadwood and cavities, split trees and boughs, or where not present providing boxes to increase nesting and roosting opportunities for woodland birds and bats • create glades/rides and open areas in appropriate locations within woodland to benefit lichens and woodland butterflies • where rainforest bryophytes and ferns are present maintain shaded and humid conditions • where dormice are present retain standard trees (especially oak), undertake rotational coppicing of hazel to promote a dense shrub layer and structural complexity, and adjust the timing of management work to avoid nesting and hibernation • retain deadwood within woodlands to create a range of microhabitats to benefit invertebrates and fungi • control of INNS such as rhododendron • controlling grazing pressure to enable successful tree and shrub establishment
M54	Create more multifunctional productive mixed woodlands, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework, that deliver a range of products that can be capitalised upon, including: • timber • biodiversity • carbon • recreation and access
M42	Design new woodland to incorporate open space and maximise use of existing habitats both within and adjacent to the woodland creation site.
M43	Design new woodlands and their associated infrastructure to facilitate low-impact silviculture such as continuous cover forestry.

4. Moorland, heathland and montane

Habitats

The habitat group of ‘moorland, heathland and montane' is made up of the following wildlife-rich habitats:

- blanket bog
- heathland (upland heathland and lowland heathland)
- montane habitats (montane heath and scrub, tall herb, cliffs and screes) mountain heaths and willow scrub and inland rock outcrop and scree)

This habitat group also considers valley mire and fragmented heath.

Our uplands are characterised by their large unenclosed nature, forming a complex mosaic of different habitats across the landscape. As well as blanket bog, valley mire, heathland and montane habitats, our uplands can include flushes, tall herb habitats, upland grasslands, juniper, willow & other scrub, wood pasture and upland woodlands. This section discusses the habitats that are not covered under the ‘wetland and freshwater’, ‘grasslands’, and ‘woodland, trees and scrub’ chapters, but the full range of habitats should be considered as a landscape-scale mosaic when planning action for nature recovery in our uplands.

There is over 60,000 ha of existing wildlife-rich moorland, heathland and montane habitats across Cumbria, predominantly associated with the Cumbria High Fells, North Pennines, Howgill Fells and Yorkshire Dales, however a much larger area of our uplands is not currently wildlife-rich and is considered to be restorable. The national importance of the Cumbrian uplands is recognised through the landscape scale designation of large areas or our uplands, with over 65% of our wildlife-rich moorland, heathland and montane habitats under some level of designation, mostly of national or international importance.

Blanket bog and valley mire

Blanket bog is a wet peatland habitat formed of sphagnum mosses, cotton grasses and dwarf shrubs such as heather and cross-leaved heath. It occurs on peat, which forms when waterlogged conditions prevent decomposition of sphagnum moss and other plants. Blanket bog is rain-fed and very nutrient-poor and typically occurs on peat in excess of 0.4 m deep on flat or gently sloping ground with poor drainage. It can cloak large areas of our upland landscape. In Cumbria, extensive areas of blanket bog are found in the Cumbrian High Fells, North Pennines and within the Border Mires. These make up a significant proportion (just under 20%) of England’s blanket bog, which is largely limited to the northwest of the country. It is considered to be an irreplaceable habitat.

Valley mire is similar to blanket bog but occurs on more sloping ground and is fed by flowing water as well as rainfall. This means that it receives slightly greater amounts of minerals and can therefore support a wider range of species.

Heathland

Heathland is dominated by heather and other dwarf shrubs such as bilberry, cross-leaved heath, bell heather, crowberry and cowberry. Dry heath occurs on acidic soils, which are more freely draining than blanket bog. Wet heath occurs on wet peat soils that are shallower than those that support blanket bog. Upland heathland covers large areas of the North Pennines, Cumbria High Fells, and Orton Fells. Upland heathland can occur on areas of deep peat which would have been blanket bog but have been modified by drainage and/or burning.

Lowland heathland is uncommon in Cumbria, but examples can be found on the sandstone hills in the Eden Valley, and on the limestone hills around Morecambe Bay. There are also some areas of lowland heathland along the coast.

Fragmented heath occurs where other heathland habitats occur in a fragmented form, due to past burning and grazing practices, usually in a mosaic with grass moorland.

Montane habitats

Montane heath is limited to the higher summits of the Lake District and North Pennine hill tops. Rock ledges, outcrops and screes are found throughout the county, and are abundant within the Lake District and, to a lesser extent, the North Pennines. Often high up in the hills and hard to reach, they are havens for some of our rarest wildlife.

These habitats support a number of arctic-alpine plant species which are adapted to low temperatures and short growing seasons. Many of the arctic-alpine plant species found in Cumbria are at the southern limit of their distribution in the UK.

Where to see:

- **Blanket bog:** Moorhouse and Upper Teesdale NNR, Butterburn-Flow in Geltsdale and the Lake District Fells including the Skiddaw fells, Haweswater and Shap fells, and Armboth Fell
- **Upland heath:** Geltsdale, Skiddaw, Buttermere Fells, Barbon Fell and Kirkby Moor
- **Lowland heath:** Wan and Lazonby Fells, Whitbarrow, Scout Scar and Heslington Barrows, Silloth and on Walney Island
- **Montane heath:** Grasmoor, Skiddaw, and the Buttermere and Ennerdale fells; it is also found on the Cross Fell in the Pennines
- **Rock ledges and scree:** many of the central Lake District fells, such as Great Gable, Scafell, Scafell Pike, and Great End

Species

Cumbria’s moorland, heathland and montane habitats support a distinctive assemblage of plants, insects, mammals and breeding birds. The North Pennines in particular are important for species such as golden plover, curlew, dunlin, merlin, peregrine, hen harrier and black grouse, which are qualifying features of the North Pennine Moors SPA.

The main species that our moorland, heathland and montane habitats support have been grouped into the following assemblages.

Upland blanket bog

This assemblage includes threatened species that are most commonly associated with blanket bog, including birds such as dunlin and golden plover, moth species such as red carpet and northern dart, common lizard, and several mosses and liverworts.

Moorland and upland grassland

These threatened species are most commonly associated with heathland and upland grassland, and include birds such as hen harrier and merlin, plants such as shepherd's cress, butterflies such as mountain ringlet, and a range of insects such as the bilberry bumble bee.

Upland habitat mosaics

This assemblage is made up of threatened species that need a mosaic of different habitat structures including woodland, farmland, meadows, heath, grass moorland, scree and scrub. Species in this assemblage include black grouse, juniper, large heath butterfly, bilberry bumble bee, and adder.

Arctic-alpine and montane

This assemblage is made up of the threatened species that occupy the highest parts of our mountains, including plants such as pyramidal bugle, dwarf birch, yellow marsh saxifrage, alpine catchfly, mountain ringlet butterfly, birds such as dotterel and ring ouzel, and several specialist mosses and lichens.

LNRS priority species

Breeding waders (curlew, lapwing, redshank and snipe) – this is a group of wading birds that inhabit wet grasslands, farmland, heath and blanket bog. Sensitive to disturbance, their numbers have declined as a result of land intensification. The North Pennines is one of a few places in England that still supports large numbers of curlew.

Hen harrier - this bird lives on our moorlands most of the year but can be seen in lowland and coastal areas in winter. One of the most intensely persecuted birds of prey in the UK, only a handful of breeding pairs remain in England.

Black grouse – famous for the mating display behaviour shown by males, black grouse are found in the uplands of northern England and Scotland. Locally extinct in the Lake District, breeding pairs are still found in the North Pennines.

Arctic alpine plants – This group of rare plants are limited to our highest mountain tops. Adapted to cool climates with short growing seasons and thin soils, these species are rarely found elsewhere in England, and are particularly vulnerable to climate change and grazing pressure.

Pressures and threats

The key pressures and threats that affect the condition and extent of our moorland, heathland and montane habitats include:

- management regimes
- grazing pressure
- climate change
- air pollution
- recreation

Almost all of our heathland and blanket bog habitats have been degraded through historical **management regimes**, the results of which are still very visible today. These include the digging of drainage grips to lower the water table and increase the agricultural productivity of these habitats, burning to promote fresh heather growth for livestock or grouse, extraction of peat for fuel and compost, and the planting of forestry for timber production. **Heavy grazing** also has a significant impact on these habitats, leading to the dominance of grass species and the conversion of heathland and blanket bog to upland acid grassland and rush pasture[32], limiting the distribution of montane species.

Climate change has the potential to have a significant impact on our heathland, blanket bog and montane habitats; drier hotter summers risk further drying out already degraded peat and increasing the dominance of grass species, whilst wetter winters with increased storm events will increase gullying and erosion of these sensitive habitats. When peatlands are in good condition, they act as an important carbon sink, absorbing and storing carbon from the atmosphere, however, when in poor condition peat releases carbon to the atmosphere, contributing to climate change. Many of our montane species are particularly at threat from climate change as they are at the southern and altitudinal limit of their range; limited to isolated parts of our highest mountains it is difficult for them to respond to the changing climate.

Peat-forming sphagnum mosses are critical for healthy bogs and wet heaths. However, they require wet conditions and are therefore extremely susceptible to drying out from both drainage and burning of peat. They are also very susceptible to trampling by livestock and deer. Sphagnum mosses are sensitive to **air pollution** and historically bogs have been significantly affected by acid rain as a result of sulphur-based air pollution from the industrial areas of the north-west, although this is a much larger issue in the South Pennines[33]. Airborne ammonia deposits can also affect our peatland habitats, which would naturally be very low nutrient environments.

[32] The Wildlife Trusts (2024) Blanket Bog. Available at: https://www.wildlifetrusts.org/habitats/wetlands/blanket-bog

[33] Moors for the Future Partnership (2015) A practitioners Guide to Sphagnum Reintroduction. Available at: https://www.moorsforthefuture.org.uk/__data/assets/pdf_file/0020/92450/Practitioners-guide-to-the-reintroductin-of-sphagnum.pdf

Opportunities for recovery and wider benefits

Peatlands can **store large amounts of carbon** when in good condition; when waterlogged conditions prevent plants from decaying, the carbon in them is stored within the peat, slowly accumulating over thousands of years instead of being released to the atmosphere. Eroding and degraded peatlands can release large amounts of this previously stored carbon into the atmosphere, and so restoring our degraded peatlands (both the deep peat in our blanket bogs and the shallow peat under wet heath and wet species-poor acid grasslands), is a key tool for reducing our contribution to climate change.

Wet peatlands in good condition are also more resilient to the risks associated with climate change such as wildfires. As these risks increase, peatlands are considered a more reliable carbon store than woodlands because their carbon is stored below ground rather than above ground and is retained within the bog for much longer than the lifespan of most trees.

Peatlands can hold large amounts of water, both in the soil and in plants such as sphagnum moss. Because of this they can help regulate water flows, absorbing water during heavy rainfall and then releasing it slowly. By acting like a natural sponge, peatlands can help to reduce the severity of potential flooding through what is known as **natural flood management**.

Damaged peatlands release soil particles and nutrients into nearby rivers reducing water quality. Where these habitats are in good condition, good vegetation cover reduces erosion and sedimentation of watercourses. Therefore, restoring peatlands **improves water quality** and reduces the cost of treatment for drinking water.

Our moorland, heathland and montane habitats form the largest extent of our semi-natural habitat. It is in these extensive areas that we have the greatest opportunity to create fully functioning ecosystems that contain all the naturally occurring wildlife-rich habitat types. Not only do they support some of our rarest species, but they also form a distinctive part of Cumbria's landscape character, underpinning its **cultural heritage, agricultural and tourism industries**. Enhancing and restoring these habitats will not only help the species that inhabit them but improve the relationship that people who spend time in these upland habitats have with our landscape.

Changes in national environmental and agricultural policy provide multiple support mechanisms to restore and enhance our existing moorland, heathland and montane habitats. Peatland restoration is well known as a means of mitigating against climate change, and restoration projects can be registered with accredited carbon offsetting schemes.

The government's Environmental Improvement Plan has identified peatland restoration as a key mechanism for achieving our legally binding target of net zero carbon emissions by

2050, and aims to restore approximately 280,000 hectares of peatland in England by this time.

Priorities and potential measures for nature recovery

Our long-term vision for moorland, heathland and montane is:

"A connected, and dynamic mosaic of the full range of upland habitats, which are under sustainable management with natural processes restored."

Moorland and montane habitats can include, flushes, cliffs & screes, tall herb, grasslands, juniper, willow & other scrub, wood pasture and upland woodlands as well as heath and blanket bog. Priorities and measures for each of these additional habitats are presented in the themes for 'Wetland and Freshwater', 'Grasslands', and 'Woodland, trees and scrub' respectively, and should be implemented across the uplands in combination with those outlined below and in line with the principles presented under 'Priority 1 – Habitat Mosaics'.

The following priorities and potential measures specific to upland bog, heathland and montane habitats have been identified to help us achieve our long-term vision.

Priority 13: Restore upland bog habitats

Restore 10,000 ha of blanket bog and valley mire and maintain under restorative and sensitive management (resulting in good hydrological and biological condition) as part of a dynamic mosaic of upland habitats by 2035.

Table 15: Potential measures that would help to achieve Priority 13

Measure number	Measure description
M55	Restore hydrological function and appropriate robust vegetation cover, and species diversity on drained or actively eroding peatlands using established techniques such as: • grip blocking • bunding • installing dams • coir matting • hag reprofiling • sphagnum inoculation • patch turfing • mulch/brash spreading • seeding and plug planting

Measure number	Measure description
	• tree, scrub, and woodland removal, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework
M56	Manage peatland habitats to be wildlife-rich (enhancing species and structural diversity, ensuring robust vegetation cover, slowing water flow and protecting peat) through: • appropriate grazing regimes and stocking levels • appropriate heather management that does not harm important habitats and hydrological function • reduced input of medication, pesticides and biocides into the environment
M57	Manage habitats other than peatlands to be wildlife-rich, with a variety of dense and more open vegetation cover that protects and restores the hydrological function, nutrient status, and species diversity, through: • restoration of natural hydrology • low nutrient input • appropriate grazing regimes and stocking levels • establishment of native scrub, woodland, and wood pasture in suitable locations such as areas of bracken or species-poor grassland over mineral soil, and as appropriate mosaics within heathland
M58	Manage risks associated with wildfire using appropriate methods that are not harmful to important habitats, soils and hydrological function.
M59	Avoid the construction of new stone vehicle tracks in moorland landscapes wherever possible and particularly in areas currently free from surfaced tracks, with no further stone track building on deep peat.
M13	Protect sensitive habitats against the impacts of recreational pressure, through: • partnership working to ensure consistent messaging • funding of wardens and engagement officers • access management including fencing and groundworks • provision of training • footpath improvements • promoting responsible behaviour • consideration of the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites • education on dangers of wildfire
M27	Improve air quality and tackle ammonia losses through interventions such as: • planting shelterbelts next to livestock housing • covering farmyard muck heaps • sustainable slurry management
M34	Monitor and control deer as part of a Cumbria wide deer management strategy.

Priority 14: Enhance and restore heathland habitats

Re-create 10,000 ha of heathland and have 90% of the existing resource under appropriate management as part of a dynamic mosaic of upland habitats by 2035.

Table 16: Potential measures that would help to achieve Priority 14

Measure number	Measure description
M56	Manage peatland habitats to be wildlife-rich (enhancing species and structural diversity, ensuring robust vegetation cover, slowing water flow and protecting peat) through: • appropriate grazing regimes and stocking levels • appropriate heather management that does not harm important habitats and hydrological function • reduced input of medication and pesticides into the environment
M57	Manage habitats other than peatlands to be wildlife-rich, with a variety of dense and more open vegetation cover that protects and restores hydrological function, nutrient status, and species diversity, through: • restoration of natural hydrology • low nutrient input • appropriate grazing regimes and stocking levels • establishment of native scrub, woodland, and wood pasture in suitable locations such as areas of bracken or species-poor grassland over mineral soil, and as appropriate mosaics within heathland
M60	Restore dwarf-shrub cover to areas which previously supported heathland vegetation, to make them wildlife-rich through: • tree, scrub and woodland removal, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework • restoration of grass moorland to heathland through grazing management • reintroduction of missing plant species through scarification and seeding
M61	Manage lowland heathland to be wildlife-rich, through: • tree, scrub, and woodland removal, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework • appropriate grazing regimes and stocking levels • patches of bare ground to provide invertebrates and reptiles with foraging, refuge and basking opportunities
M58	Manage risks associated with wildfire using appropriate methods that are not harmful to important habitats, soils and hydrological function.

Measure number	Measure description
M13	Protect sensitive habitats against the impacts of recreational pressure, through: • partnership working to ensure consistent messaging • funding of wardens and engagement officers • access management including fencing and groundworks • provision of training • footpath improvements • promoting responsible behaviour • consideration of the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites • education on dangers of wildfire
M34	Monitor and control deer as part of a Cumbria wide deer management strategy.

Species specific measures:

Table 17: Species specific potential measures that would help to achieve Priorities 13 and 14

Measure number	LNRS priority species	Measure description
M62	Breeding waders (curlew, lapwing redshank and snipe)	Safeguard breeding wader populations through: • appropriate and legal predator control • nest protection using electric fencing to prevent disturbance or destruction • ensuring that nests are not disturbed or destroyed by in-field operations or trampled by livestock • ensuring sufficient open-habitat remains in and around important nesting areas • Liaising with farmers and land managers to increase awareness of these species and their needs
M63	Black Grouse	Restore black grouse populations through: • appropriate and legal short term predator control where productivity is proven to be a limiting factor for population status • where present, assess impact of new fencing and remove or mark existing fencing • potential translocations or localised reintroductions where appropriate, using wild-sourced birds, under specialist advice • avoidance of disturbance to sites where breeding displays (leks) take place

Measure number	LNRS priority species	Measure description
M64	Hen Harrier	Restore hen harrier populations through: • collaboration between landowners and conservation organisations to reduce the illegal persecution of hen harriers • continued surveys and population monitoring of nesting and winter roost sites • protection of nests by managing vegetation to ensure sufficient cover for nesting, avoiding recreational disturbance, and avoiding cutting and burning within 100m of nest sites used in the last 5 years • protection of winter roosts by avoiding cutting, mowing/topping, tree planting, wind farm development, and recreational disturbance • managing foraging habitat sympathetically within a 1km radius of nesting sites, to support the availability of key prey resources during breeding season • appropriate and legal predator control at existing nesting sites

Priority 15: Montane habitats

Restore, enhance and create 500 ha of montane habitats as part of a dynamic mosaic of upland habitats that are under appropriate management by 2035.

Table 18: Potential measures that would help to achieve Priority 15

Measure number	Measure description
M65	Manage montane habitats to be wildlife-rich through appropriate grazing pressure and stocking levels, to enable remnants of grazing-sensitive montane habitats such as tall herb vegetation, rare arctic-alpine plants and mountain top moss-heaths and grasslands to expand.
M66	Protect montane habitats from sources of damage by: • continuing to work with the climbing community to ensure they understand how to avoid damage and disturbance to sensitive habitats and species, observe seasonal climbing restrictions and avoid ‘gardening’ new routes • ensure that footpath repairs are designed to avoid damaging sensitive upland habitats • Managing grazing pressure and recreational access to prevent soil erosion and allow sensitive plants to grow and set seed

Measure number	Measure description
M67	Restore habitats that have become extremely fragmented in the English uplands such as: • high-altitude scrub communities that contain species such as juniper, mountain willows and dwarf birch • flower-rich tall herb communities
M27	Improve air quality and tackle ammonia losses through interventions such as: • planting shelterbelts next to livestock housing • covering farmyard muck heaps • sustainable slurry management
M34	Monitor and control deer as part of a Cumbria wide deer management strategy.

Species specific measures:

Table 19: Species specific potential measures that would help to achieve Priority 15

Measure number	LNRS priority species	Measure description
M68	Arctic alpine plants	Carry out life cycle analysis (survey and research to understand distribution, population status and limiting factors on restoration) on Arctic Alpine plants, to understand the needs of each species, and the conservation action required.
M69	Arctic alpine plants	Develop a propagation programme in nurseries to support the translocation of rare and locally extinct plant species that have been lost or have declined, using: • local/appropriate provenance seed (propagules) • specialist direction/advice

5. Grasslands and limestone pavement

Habitats

The habitat group of ‘grasslands and limestone pavement’ is made up of the following wildlife-rich habitats:

- meadows (lowland meadows, upland hay meadows) and wildlife-rich neutral grassland
- calcareous grassland (lowland calcareous grassland, upland calcareous grassland);
- acid grassland (lowland dry acid grassland, wildlife-rich lowland acid grassland, wildlife-rich upland acid grassland)
- coastal and floodplain grazing marsh
- calaminarian grasslands
- limestone pavements

This habitat group also considers other grassland types such as grass moorland, other neutral grassland, and improved grassland. Limestone pavement is considered in this section as their management and protection generally relates to their surrounding habitats which are typically grassland or woodland.

Grasslands cover most of our landscape in Cumbria. They can be found at all altitudes, from the Cumbria High Fells and North Pennines to the lowlands in the Eden Valley and Solway Basin. Our wildlife-rich grasslands range from species-rich meadows to the nationally scarce calaminarian grasslands located in the North Pennines, however most of Cumbria’s grassland is farmland or rough upland grazing. Approximately 12,000 ha of Cumbria’s grasslands is considered to be wildlife-rich.

Meadows

Meadows are wildlife-rich grasslands that need traditional cutting and/or grazing to maintain their species diversity and prevent scrub colonisation. Upland hay meadows (also called Northern Hay Meadows) are extremely rare in the UK (<1,000 ha)[34] and are mainly found in the Yorkshire Dales, Lancashire and the North Pennines. In Cumbria, upland hay meadows are restricted to upland valleys generally above 200 m, with most examples in the Orton Fells, Howgill Fells and Yorkshire Dales. They are also found throughout the Lake District and North Pennines.

Lowland meadows include both dry and seasonally flooded grassland and are most commonly found in the Eden Valley, West Cumbria Coastal Plain and the Cumbria Low Fells. Wildlife-rich grasslands are also found on some roadside verges, churchyards and other public land where appropriate management regimes maintain their wildlife-richness.

[34] https://www.cumbriawildlifetrust.org.uk/habitats/grassland/northern-hay-meadow

Calcareous grassland

Calcareous grassland are wildlife-rich grasslands that typically grow on shallow, lime-rich soils over limestone bedrock with a pH that's generally higher than 7. They occur mainly on the carboniferous limestone around Morecambe Bay, the Orton Fells and on the western flanks of the North Pennines, with smaller fragmented outcrops occurring around the northern Lake District, base-rich outcrops associated with the Borrowdale Volcanic rocks in the Lake District. The most extensive calcareous grassland in Cumbria, a type dominated by Blue Moor-grass, is rare in the UK and is only found on the carboniferous limestone of the Morecambe Bay area, the Craven district of North Yorkshire and the borders of Cumbria, Durham and North Yorkshire.

Lowland dry acid grassland

Lowland dry acid grassland is an uncommon habitat that occurs in areas that may once have been lowland heath and have a pH generally ranging from 4 to 5.5. This wildlife-rich grassland is generally only found as small areas on thin free-draining acidic soils overlying rocks, sand or gravels in the lowlands. It is generally found on the rocky outcrops in the South Cumbria Low Fells, on wind-blown sands on limestones around Morecambe Bay, on sand deposits and sandstones around Penrith, Carlisle, Brampton and Aspatria within the Eden Valley and Solway Basin, and on coastal sand-dunes along the West Cumbria Coastal Plain.

Coastal and floodplain grazing marsh

Coastal and floodplain grazing marsh is found on low-lying coasts and along slow-flowing rivers and estuaries. The best examples of coastal and floodplain grazing marsh are incredibly wildlife-rich, however most have been agriculturally 'improved' and are less diverse. Coastal and floodplain grazing marsh is defined by proximity to water, topography and management rather than the underlying soil or the vegetation. Most grazing marsh has generally been embanked, drained and agriculturally improved, and is used for pasturing cattle with some cutting for hay or silage. Most coastal and floodplain grazing marsh in Cumbria is found around the Solway Basin and Morecambe Bay and is particularly important for the breeding, overwintering and migrating birds that it supports.

Calaminarian grasslands

Calaminarian grasslands support a unique but limited range of plant species on heavy metal-rich soils associated with the lead mining industry or in similar natural situations. In Cumbria, this habitat is almost exclusively confined to the former lead mines in the North Pennines around Alston, Nenthead and the surrounding fells. This is a rare habitat in the UK and in England, is only otherwise found in the Mendips, Derbyshire Dales and Yorkshire Dales. Management of calaminarian grasslands needs careful consideration due to the limited number of species that can survive on these soils, and management needs to be sensitive to sites that have local historical significance.

Limestone pavement

Limestone pavement comprises exposed, flat slabs of limestone rock featuring shallow erosion pans (‘clints’) and scored with deep fissures (‘grykes’). The rock surface supports little if any vegetation, but differences in the shape of pavements provides a lot of variety in environmental conditions, resulting in rich, complex vegetation communities, especially in the moist, sheltered conditions in the grykes. A distinctive assemblage of plants associated with pavements includes colourful flowers like bloody cranesbill, globeflower, lily of the valley and melancholy thistle, many lush ferns and rare species such as soloman’s seal, dark red helleborine and baneberry.

The proportion of tree and scrub cover on limestone pavements is dependent on their management, particularly the level of grazing. Where limestone pavement is ungrazed, it can develop into an open form of upland mixed ashwood, which can also be extremely species-rich, or limestone scrub characterised by juniper and hawthorn. Pavements are also associated with limestone grassland in both upland and lowlands.

Cumbria has more than 30% of the limestone pavement habitat in the UK. It is an irreplaceable habitat and most of the pavements in Cumbria are designated as being of national importance. In Cumbria, limestone pavement is most extensive around Morecambe Bay and the Orton Fells between Shap and Kirkby Stephen. Smaller areas are found on the high western edge of the North Pennines and there are a few isolated areas on the northern edge of the Lake District.

Other Grassland including grass moorland and improved grassland

The majority of Cumbria’s grassland is managed for agricultural purposes. Improved grassland generally exists in the lowland areas of the county where fertilisers are applied to improve their productivity either for grazing, sileage, or hay crop production. A large proportion of Cumbria’s upland grassland is classified as grass moorland, which typically comprises of upland acid grassland that is managed for sheep grazing. Whilst these habitats are valuable for their agricultural function, they provide less value to nature than other wildlife-rich grasslands.

Where to see:

- **Upland hay meadows:** Gowk Bank NNR and Augill Pasture Cumbria Wildlife Trust Reserve
- **Lowland meadow:** Sandybeck Meadow and High Leys nnrs, Lyth and Winster valleys
- **Calcareous grassland:** Arnside Knott, Scout Scar near Kendal and Smardale Gill near Kirkby Stephen
- **Calaminarian grassland:** Whitesike Mine and Flinty Fell SSSI and SAC between Garrigill and Nenthead, at the one remaining tailings dam at Nenthead, and at Moorhouse NNR including along the shingle banks of rivers in this area
- **Limestone pavement:** Hutton Roof Crags Cumbria Wildlife Trust Reserve

Species

Grasslands and limestone pavements support a range of different plant and animal species, including an array of pollinating insects, some of our rarest butterflies and, at high altitudes, populations of rare arctic-alpine plants. The main species that our wildlife-rich grasslands and limestone habitats support have been grouped into the following assemblages.

Wading birds of in-bye and fell edge

These are the threatened birds that occupy the upland pastures, meadows and rough grazing land that occurs between our bog and heath habitats and lowland enclosed farmland. It includes species such as skylark, yellowhammer, snipe, oystercatcher, curlew, redshank and lapwing.

Farmland

This includes a range of threatened birds that predominantly live in and around our farmed landscapes, and include species such as skylark, yellowhammer, kestrel, hawfinch, snipe, curlew and barn owl, as well as mammals and insects such as harvest mouse, bats, and the brown-banded carder bee.

Hay meadows

This includes threatened plant species that are associated with hay meadows, such as lady's mantle, meadow saffron, small white orchid, alongside a range of bird and insect species.

Limestone grassland and pavement

This includes a wide range of species that are associated with limestone habitats, including plants such as Teesdale violet, birds'-eye primrose, autumn Lady's tresses, high brown fritillary, Northern Brown Argus and Duke of Burgundy, moths including barred tooth-striped and white spotted sable, and the wall mason bee.

Wet/marshy grassland

The threatened species associated with wet/marshy grassland include a range of birds, particularly waders, as well as marsh fritillary butterfly and grass of parnassus – which is the county flower of Cumbria.

LNRS priority species

Waxcap fungi -these are types of mushrooms known for their shiny-looking caps. They are often found in areas of long-undisturbed 'unimproved' grassland with short, grazed vegetation. Churchyards form a significant habitat area for waxcap grasslands in Cumbria.

Pressures and threats

The key pressures and threats that affect the condition and extent of our wildlife-rich grasslands include[35]:

- agricultural improvement
- grazing pressure
- undermanagement
- development
- tree planting

Agricultural improvements such as applying herbicides and fertilisers can very quickly degrade wildlife-rich grasslands so that crop species outcompete wildflowers, which dislike soils with high nutrient content. During the mid-20th century, over 90% of wildlife-rich grasslands were lost[36] mainly due to improvements in chemical fertilisers, reseeding with new increased-yield grass varieties, and government incentives. Ploughing for silage or arable crops can also alter the soil structure so it is less able to support diverse plant communities. Inappropriate cutting regimes can remove species before they set seed and add nutrients to the soil that negatively impact some native wildflowers

Heavy grazing by livestock and deer, or grazing at the wrong time of year, is also detrimental to wildlife-rich grasslands as it prevents plants from flowering and setting seed. However, grasslands do require some management such as conservation grazing to create vegetation at different heights and some bare ground, otherwise competitive species can take over.

Wildlife-rich grasslands are often located in areas that are considered suitable for **woodland creation** or **development** (including housing as well as facilities such as play areas and golf courses), putting them at risk of loss through changes to land use as well as agricultural pressures.

Calaminarian grasslands have different pressures to other wildlife-rich grassland types due to their association with heavy metal-rich soils. The main pressures on this grassland type are a decline in the toxicity of the surface soil leading to **successional change**, mine spoil reclamation or re-working, and a cessation of or decline in grazing.

The main pressures on limestone pavements come from **grazing**. The appropriate management of limestone pavements depends on the wider associated habitats within which the limestone pavement sits. Grazing pressure and other land management therefore needs to be assessed on a site-specific basis as some limestone habitats can tolerate more grazing pressure than others. There remains a residual risk of loss of limestone pavement

[35] NatureScot (2020), Species Rich Grasslands Guidance Leaflet. Available at: https://www.nature.scot/doc/species-rich-grasslands-guidance-leaflet
[36] The Wildlife Trusts (2024) Natural Solutions to the Climate Crisis: Glorious Grasslands. Available at: https://www.wildlifetrusts.org/natural-solutions-climate-change/grassland-solutions

to provide stone for agricultural improvement or development, however Limestone Pavement Orders (LPOs) considerably reduce this risk.

Opportunities for recovery and wider benefits

Wildlife-rich grasslands are a key tool for reducing our contribution to climate change as they can **store large amounts of carbon** when managed appropriately. Restoring more grassland to be wildlife-rich can increase the amount of carbon that is absorbed into our soil instead of being released to the atmosphere. As the risks associated with climate change such as wildfires, and pests and disease introductions increase, grasslands are considered a more reliable carbon store than woodlands because approximately 90% of their carbon is stored below ground[37].

Wildlife-rich grasslands can also **improve soil health** due to the relationship between the plants on the surface and the fungi and bacteria within the soil. Wildlife-rich grasslands can also protect soil from erosion, preventing soil and nutrients from running into nearby rivers, **improving water quality**. Wildlife-rich grasslands also require less fertiliser than improved grassland; known as 'low-input farming', this can **reduce the costs to farm businesses**.

Wildlife-rich grasslands and their associated management can reduce soil compaction and create more structural diversity in our grasslands – this is an excellent way of slowing the flow of water downstream after rainfall events, helping to reduce the severity of potential flooding through what is known as **natural flood management**.

Changes in national environmental and agricultural policy provide multiple support mechanisms to restore or create more species rich grassland, although care must be taken to ensure that any new wildlife-rich grassland is located where nutrient input is limited and appropriate management can be conducted.

The government's Environmental Improvement Plan has a national environmental objective to bring at least 40% of England's agricultural soil into sustainable management by 2028 and increase this to 60% by 2030. Farming schemes that promote the management of grasslands to be wildlife-rich will be a key mechanism in meeting these targets.

Priorities and potential measures for nature recovery

Our long-term vision for grassland and limestone pavements is:

"A network of native, species-rich grasslands in good condition with healthy soils, within a mosaic of associated habitats."

[37] PlantLife (2023) *Grasslands as a Carbon Store.* Available at: https://www.plantlife.org.uk/wp-content/uploads/2023/08/Grasslands-as-a-Carbon-Store.pdf [27.08.2024].

The following priorities and potential measures have been identified to help us achieve our long-term vision.

Priority 16: Conserve and enhance existing wildlife-rich grasslands

Maintain and enhance the existing extent of wildlife-rich grassland, with 75% (8,500 ha) under appropriate management and in good condition by 2035.

Table 20: Potential measures that would help to achieve Priority 16

Measure number	Measure description
M70	Manage existing wildlife-rich grasslands to provide a mosaic of structural and species diversity (taking account of geology, hydrology and sensitive species), with an appropriate cutting and/or grazing regime including: • cutting meadows for hay rather than haylage/sileage • timing cutting to benefit plant species biodiversity • variable cutting regimes • low intensity spring / autumn grazing, and removal of livestock in summer months • low nutrient input • reduced input of medication, pesticides and biocides into the environment
M71	Enhance/restore existing grasslands to be wildlife-rich, through: • an appropriate grazing and/or cutting regime • the addition of local provenance green hay • the addition of local provenance brush harvested seed and wildflower plugs • tree, scrub, and woodland removal, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework • removal of nutrient inputs
M72	Re-work gravels/ mine spoil to prevent encroachment of successional vegetation, growth and shading on calaminarian grasslands and mine spoils.
M73	Work with national infrastructure operators and local authorities to manage verges, transport corridors and open green space to be wildlife-rich, and maintain existing wildlife-rich habitats, through: • appropriate timings of cutting • removal of arisings • reintroduction of missing plant species through scarification and seeding
M74	Increase species diversity and reduce nutrient levels in and around wildlife-rich grasslands by: • reducing the use of pesticides and herbicides • reducing the use of artificial inorganic and organic fertilisers

Measure number	Measure description
M75	Create a county wide hay market and register, with potential for shared cut and collect equipment and storage, to enable sourcing and propagation of more locally appropriate seed to be used in restoration and enhancement.
M69	Develop a propagation programme in nurseries to support the translocation of rare and locally extinct plant species that have been lost or have declined, using: • local/appropriate provenance seed (propagules) • specialist direction/advice

Species specific measures:

Table 21: Species specific potential measures that would help to achieve Priority 16

Measure number	LNRS priority species	Measure description
M76	Waxcap fungi	Safeguard waxcap fungi in Cumbria by: • identifying, recording, and better protecting our waxcap fungi grasslands • conducting more thorough surveys for fungi before committing to land use change where important waxcap assemblages are suspected, utilising novel techniques such as eDNA surveys • maintaining short-sward, nutrient-poor grassland where the most important assemblages of waxcap fungi are known to be present • improving our understanding of how waxcaps fit within habitat mosaics such as wood pasture systems

Priority 17: Create and connect wildlife-rich grassland

Create or restore 2,850 ha of grassland to be wildlife-rich by 2035, creating an appropriately managed and connected network that increases the biodiversity of grasslands and soils.

Table 22: Potential measures that would help to achieve Priority 17

Measure number	Measure description
M71	Enhance/restore existing grasslands to be wildlife-rich, through: • an appropriate grazing and/or cutting regime • the addition of local provenance green hay • the addition of local provenance brush harvested seed and wildflower plugs • tree, scrub, and woodland removal, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework • removal of nutrient inputs • soil management, including topsoil stripping and/or short term no till arable cropping, where current nutrient levels are high and need reducing
M77	Create new areas of wildlife-rich grassland targeting non-grassland sites such as previous quarries, ex-industrial land, landfill sites, and built-up areas through: • the addition of local provenance green hay • the addition of local provenance brush harvested seed and wildflower plugs • an appropriate grazing and/or cutting regime • soil management including topsoil stripping and/or short term no till arable cropping to reduce nutrient levels creating/improving suitable habitat for metapopulations of small blue butterfly to form
M78	Restore wildlife-rich floodplain meadows where soil type, hydrology, and existing plant community are appropriate, using established techniques such as: • drain blocking • reseeding/green hay • plug planting • appropriate grazing and cutting • appropriate soil and nutrient management
M69	Develop a propagation programme in nurseries to support the translocation of rare and locally extinct plant species that have been lost or have declined, using: • local/appropriate provenance seed (propagules) • specialist direction/advice
M73	Work with national infrastructure operators and local authorities to manage verges, transport corridors and open green space to be wildlife-rich, and maintain existing wildlife-rich habitats, through: • appropriate timings of cutting • removal of arisings • reintroduction of missing plant species through scarification and seeding

Measure number	Measure description
M74	Increase species diversity and reduce nutrient levels in and around wildlife-rich grasslands by: • reducing the use of pesticides and herbicides • reducing the use of artificial inorganic and organic fertilisers
M75	Create a county wide hay market and register, with potential for shared cut and collect equipment and storage, to enable sourcing and propagation of more locally appropriate seed to be used in restoration and enhancement.

Priority 18: Limestone pavement

Maintain the extent of the existing pavement resource, including open, wooded and fragmented pavement, enhance the condition of 450 ha, and maintain the condition of the rest of the resource.

Table 23: Potential measures that would help to achieve Priority 18

Measure number	Measure description
M79	Manage limestone pavement as a mosaic of associated wildlife-rich habitats to facilitate a diverse vegetation structure with a wide range of microclimates that supports a range of species including key plants and butterflies associated with limestone, including: • coppicing of pavement edge limestone woodlands • scrub management (where appropriate) on rotation to create light sunny areas • control of encroachment of bracken, bramble, and cotoneaster • translocation of key butterfly food plants (of local or appropriate provenance) such as primrose, cowslips, and violets. • appropriate levels of grazing (including targeted no fence grazing) using hardy native breeds
M80	Identify, survey the extent and condition, and map all limestone pavement and associated habitat and species to inform future management.
M81	Set clear objectives for the management of each limestone pavement and associated habitats and species, through the development of limestone pavement management plans.
M69	Develop a propagation programme in nurseries to support the translocation of rare and locally extinct plant species that have been lost or have declined, using: • local/appropriate provenance seed (propagules) • specialist direction/advice

6. Wetland and freshwater

Habitats

The habitat group of ‘wetland and freshwater’ is made up of the following wildlife-rich habitats:

- rivers and streams
- lakes and ponds (oligotrophic and dystrophic lakes, mesotrophic lakes, eutrophic standing waters, ponds, aquifer fed naturally fluctuating water bodies)
- fen, marsh and swamp (upland flushes fens and swamps, purple moor grass and rush pastures, lowland fens, reedbeds, wildlife-rich floodplain wetland mosaics)
- lowland raised bog

This habitat group also considers other modified waterbodies, and other wetland habitats.

Rivers

A river is a natural stream of freshwater flowing downhill in one or more channels from its source to the sea, lake or into another river. Rivers connect the entire county, forming a complex network that flows through all our habitats from the highest mountain summits to the estuaries of the Solway Firth, Irish Sea and Morecambe Bay. There are thousands of kilometres of rivers and streams flowing through Cumbria, and most of our rivers are considered semi-natural, with characteristic bed, channel and bank features alongside a diverse range of adjacent habitats within their floodplains and wider catchments.

The rivers Kent, Leven, Duddon, Crake and Belah drain the south-western Lake District fells into Morecambe Bay; the rivers Derwent, Ehen, Irt, Esk and Ellen flow from the northern and western Lake District fells into the Irish Sea; and the rivers Waver and Wampool flow north from the edge of the Lake District fells to the Solway estuary. The river Eden occupies the large, fertile valley between the Lake District and the North Pennines, flowing northwards from its source above Kirkby Stephen, through Appleby, Penrith, Carlisle and into the Solway Firth. Its main tributaries include the Eamont, Lowther, Petterill, Caldew, Gelt and the Irthing.

The fells of Cumbria also feed the catchments of three other major rivers which extend beyond the county boundaries. The source of the river Lune is in the Howgill Fells which flows south and west into Lancashire. Several small rivers flowing east from the North Pennines form the upper parts of the catchments of the rivers Tees and South Tyne.

Lakes and ponds

Cumbria is well known for its freshwater lakes, which were created through glacial processes thousands of years ago, and from which the Lake District National Park gets its name. Lake Windermere is possibly the most famous as it’s the largest freshwater body in England, is well known by locals and visitors and is arguably the most studied. Smaller lakes, locally known as ‘tarns’, and ponds are found throughout Cumbria. Within the Lake

District, most of the main valleys have large lakes within them, and almost innumerable tarns can be found on the fells. There are thousands of lakes and ponds across Cumbria. Ponds hold water for at least four months of the year and are found throughout the lowland areas in the county.

Marsh, fens, and swamps

Marsh, fens and swamps are wet, waterlogged and muddy habitats with distinct characteristics. A marsh is characterized by mineral soils that are poorly drained, and habitat composed of mainly grass species. A fen is a type of peatland formed when groundwater seeps into a depression on clay soils. Swamps are characterized by waterlogged soils which are interspersed with areas of dry land, and they usually have lots of trees.

Marsh, fens and swamps are found throughout Cumbria, with purple moor-grass and rush pasture, reedbeds, and lowland fens found around Bassenthwaite Lake, Derwent Water and other lakes in the Lake District, basin mire (fen) found in the Eden valley, and upland springs and flushes found throughout the Lake District, Orton Fells and North Pennines. Other wetland habitats such as marginal vegetation occur around many of our lakes, tarns, ponds, canals and reservoirs. These habitats often occur as part of floodplain wetland mosaics, which can include a range of naturally wet habitats including fens, bogs, grasslands, wet woodlands and open water.

Lowland raised bog

Lowland raised bogs are peatlands fed predominantly by rainwater which develop primarily in lowland areas such as the head of estuaries, along river floodplains and in localised depressions. Cumbria is one of the most important areas in England for lowland raised bog, with over 4,000 ha of this habitat recorded within the county. Large areas are found on the coastal plains of the Solway Estuary, the Duddon estuary and around Morecambe Bay. Raised bogs can also be found inland, though usually in more confined, smaller sites.

Other waterbodies

Other waterbodies within Cumbria include modified waterbodies such as canals and reservoirs. There are numerous reservoirs throughout Cumbria, which play a critical role in supplying drinking water to our major northern towns and cities. There are only two short canals in the county – the Lancaster Canal and the Ulverston Canal.

Where to see:

- **Lakes (within the Lake District):** Bassenthwaite Lake, Ullswater, Wast Water, Derwent Water, Blea Water, Devoke Water, Red Tarn, Elterwater, Innominate Tarn and Ennerdale Water.
- **Lakes (outside the Lake District):** Talkin Tarn, Tindale Tarn, Thurstonfield Lough, Sunbiggin Tarn and Urswick Tarn
- **Purple moor-grass and rush pasture, reedbeds, and lowland fens:** Bassenthwaite Lake, Derwent Water and Esthwaite Water

- **Basin mire:** Cliburn and Newton Reigny Mosses
- **Upland springs and flushes:** Torver Commons, Claife, Tarn Hows, Orton Fells and on the Pennine fells around Crossfell and Great Dun Fell
- **Lowland raised bog:** South Solway Mosses NNR, and Drumburgh Moss Cumbria Wildlife Trust reserve, Roudsea Wood and Mosses NNR, the Duddon Mosses NNR, and Foulshaw Moss and Mealthop Moss Cumbria Wildlife Trust reserves, Rusland Moss NNR

Species

Wetland and freshwater habitats support various aquatic species such as Atlantic salmon, sea and brown trout, lamprey species, freshwater pearl mussels, eel, as well as aquatic plants, macrophytes, mammals such as otter and a range of insect and bird species. As a result, a number of lakes and rivers, including the Derwent, Eden, Kent, Ehen, Ennerdale and Wast Water are designated for the importance of their habitats and the species they support. The main species that our wetland and freshwater habitats support have been grouped into the following assemblages.

Rivers

This includes the key threatened species that rely on clean, naturally functioning rivers to survive, and includes species such as the British dipper, Atlantic salmon, European eel, smelt, brown trout and lampreys, white-clawed crayfish, freshwater pearl mussel, river jelly-lichen, water vole and otter.

Lakes

This includes the key threatened species that live in or around our lakes, including schelly, vendace, arctic charr, slender naiad, floating water plantain, and osprey.

Tarns and ponds

This includes key threatened species that rely on our ponds and tarns to survive, including great crested newt, common toad, and medicinal leech.

Wetland, fens and reedbeds

This includes the key threatened species that are associated with these habitats, including curlew, willow tit, marsh fragrant orchid, and milk-parsley.

Lowland raised bogs

This includes the key threatened species that are associated with lowland raised bogs, including birds such as nightjar and marsh tit, plants such as great sundew, large yellow sedge, and a range of mosses including *Sphagnum austinii,* along with invertebrates such as white-faced darter, argent and sable moth, rosy marsh moth, and the large heath butterfly.

LNRS priority species

White faced darter – This is a small, dark dragonfly with a distinctive white head. It inhabits peatlands with deep bog pools and is currently only found in a handful of sites across England. They have recently been reintroduced at Drumburgh Moss NNR.

Rosy marsh moth – This moth inhabits wetlands such as fens, mosses and bogs. Believed to be extinct in England since the 1860's, it was found at Roudsea Wood in Cumbria in 2005.

Arctic charr, vendace and schelly – these fish are relics from the last ice age and exist at their southernmost extent in Cumbria. Associated with our cool, well-oxygenated lakes, they are particularly vulnerable to declines in water quality from pollution and increases in temperature from climate change.

Atlantic salmon – this fish is found in the cleanest rivers, mostly in the north and west of the UK. It spends most of its life at sea but returns each year to the same stretch of river or stream in which it hatched to spawn.

Freshwater pearl mussel – these molluscs can live for more than 100 years and filter around 50 litres of water per day. They depend on cool, clean, fast flowing rivers with coarse sand and gravel beds.

White-clawed crayfish – this is the UK's only native crayfish and is in decline due to the introduction of the North American signal crayfish, reduction in habitat quality and disease. It is associated with small shallow streams with a stony bed.

Water vole – water voles look a bit like large versions of bank voles. They are under threat due to predation by American mink and loss of suitable habitat. They live along rivers, streams, ditches and in areas of marsh or wet moorland.

Window-winged sedge - this endangered day-flying caddis fly lives in damp, tussocky vegetation at only a few lowland raised bogs and heaths in the UK, including one location in south Cumbria. It is at risk from habitat deterioration and needs a mosaic of specific habitat features to support it at different stages of its life cycle.

Pressures and threats

The key pressures and threats that affect the condition and extent of our wetland and freshwater habitats include[38]:

- pollution (nutrient, chemical and sediment)
- air quality and nitrogen deposition
- physical modification

[38] Environment Agency (2022) River Basin Management Plans, updated 2022: Challenges for the Water Environment. Available at: https://www.gov.uk/government/publications/river-basin-management-plans-updated-2022-challenges-for-the-water-environment

- land and water management regimes
- invasive non-native species
- climate change
- recreation

Our rivers, lakes and ponds, and wetlands are all vulnerable to **pollution** from a range of sources including the discharge of wastewater, agricultural runoff (nutrients and sediment), drainage from roads, mining, industrial and urban runoff, as well as the build-up of chemicals and plastics within our water environment. These can all have dramatic impacts on the water quality of our freshwater habitats, and subsequently on the species that they support. Air quality issues such as nitrogen deposition can also impact on water quality, leading to increased growth of nitrogen loving species which outcompete other more sensitive species. Just over half of our waterbodies assessed under the water framework directive achieved 'good ecological status' in 2019, with none meeting good chemical status[39]. The main reasons for not achieving good status were pollution from rural areas and physical modifications.

In order to function as they should, our wetland and freshwater habitats should have good water quality, physical and ecological function, including natural processes such as erosion, deposition, connection to floodplains, natural hydrology and well-developed lakeshore habitat. In Cumbria, many of our rivers and lakes have been modified in some way, either to protect from flooding, increase productive land, enable transport, or to support **abstraction** for drinking water and food production. These **modifications** mean that the majority of our freshwater habitats do not function in the way they should, and therefore cannot support the full range of habitats and species that they would otherwise be able to. In addition, whilst these modifications may protect certain areas from flooding, they can increase flood risk downstream.

Invasive non-native species can be a problem across all habitat types, but they are particularly problematic in freshwater environments as the flow of water can help them spread much further and faster. Invasive non-native species can outcompete other native species, altering riverbanks, increasing erosion, and causing the decline and potential local extinction of native species. They can also be damaging to human and animal health.

Climate change increases the impact of other pressures on our wetland and freshwater habitats. Hotter summers, wetter winters and more extreme weather events have the potential to affect both water quantity and water quality, put increased pressure on threatened species, potentially increase the spread of invasive non-native species, increase pressures on water supplies, increase the impacts of pollution events, increase flood risk, increase water temperature and alter flow regime.

[39] Environment Agency (2024). Catchment Data Explorer. Available at: https://environment.data.gov.uk/catchment-planning

Our freshwater habitats also support a range of recreational activities such as boating, paddleboarding, swimming, gorge scrambling, or just providing a place to spend the day picnicking or taking part in a creative activity such as photography. Whilst our freshwater habitats are a core part of Cumbria's tourism activity, this **recreational pressure** can also contribute to pollution, erosion of lake shores and riverbanks, disturbance of sensitive species, or the spread of invasive non-native species and the introduction of waterborne diseases.

Other management regimes such as the **removal of peat** from lowland raised bogs for horticultural purposes, the **drainage** of wetland areas to improve their suitability for livestock production, and the use of rivers and ponds as a source of drinking water for livestock have also had a negative impact on the condition of our wetland and freshwater habitats.

Opportunities for recovery and wider benefits

Restoring natural processes to our wetlands and freshwater habitats and creating the space for them to function more naturally can slow the flow of water through the catchment, increasing the amount of water stored upstream and reducing the impacts of flooding in our built-up areas, through **natural flood management**. Restoring natural flows can also provide resilience to drought. Nature-based solutions will be an essential part of increasing our resilience to the impacts of climate change.

Naturally functioning wetland and freshwater habitats can also improve water quality, as structurally complex habitats such as wetlands, wet woodland, and lowland raised bogs can act like a natural filter, preventing sediment and nutrients from running into nearby rivers and lakes, **improving water quality** and reducing the cost of treatment for drinking water. Naturally functioning complex habitats also support a wider range of species, which along with improvements in water quality and the removal or adaptation of barriers such as weirs to improve connectivity, can all aid the recovery of freshwater and wetland species.

Wetlands and lowland peatlands can **store large amounts of carbon** when in good condition; when waterlogged conditions prevent plants from decaying, the carbon in them is stored within them, slowly accumulating over thousands of years instead of being released to the atmosphere. Eroding and degraded peatlands can release large amounts of this previously stored carbon into the atmosphere, and so restoring our degraded peatlands is a key tool for reducing our contribution to climate change.

Clean rivers and lakes can also deliver multiple **health and wellbeing benefits** to those who use our freshwater habitats for recreational activities. Enhancing and restoring these habitats will not only help the species that inhabit them, but improve the relationship that people who live, work or visit Cumbria have with our landscape.

Changes in national environmental and agricultural policy provide multiple support mechanisms to restore natural function to and improve the quality of our wetland and freshwater habitats, however a step change in land use change is required to meet the water quality targets in many of our catchments. Research and funding for natural flood management has become more and more established over the last 10 years, as have accredited carbon offsetting schemes.

The government's Environmental Improvement Plan has four national environmental objectives that specifically relate to the condition of our wetland and freshwater habitats. These are to:

- restore 75% of our water bodies to good ecological status.
- reduce nitrogen, phosphorus, and sediment pollution from agriculture into the water environment by at least 40% by 2038, with an interim target of 10% by 2028 (15% for catchments containing protected sites in unfavourable condition due to nutrient pollution).
- reduce phosphorus loadings from treated wastewater by 80% by 2038 (with an interim target of 50% by 2028)
- halve the length of rivers polluted by harmful metals from abandoned mines by 2038

The Environmental Improvement Plan identifies wetland creation as a key mechanism for meeting these national environmental objectives.

Priorities and potential measures for nature recovery

Our long-term vision for wetland and freshwater is:

"Naturally functioning wetland and freshwater habitats, with excellent water quality and ecological condition throughout each catchment."

The following priorities and potential measures have been identified to help us achieve our long-term vision.

Priority 19: Restore natural function / processes

Restore natural processes and hydrology to our wetland and freshwater habitats, with 200 km of rivers restored, connected to their floodplains, and 500 ha of good quality riparian, lake shore, and wetland habitat created by 2035.

Table 24: Potential measures that would help to achieve Priority 19

Measure number	Measure description
M82	Support natural processes and function in river channels, floodplains and lakeshores, to benefit the habitats and species they support, through appropriate river restoration and re-naturalisation techniques, including: • naturalisation of modified channels, particularly in headwaters and tributaries • reconnecting floodplains • allowing accumulation of woody material • natural flow management • natural sediment movement and storage • INNS management (including preventing further introductions and spread of disease through biosecurity measures)
M83	Restore natural species movement where movement is impeded, by: • removing redundant artificial barriers in river channels and lakes • where barrier removal is not possible installing appropriate alternative passage • installing under/over road tunnels/bridges near known habitat severance or breeding sites
M84	Create new, restore existing, and continue to manage a variety of wildlife-rich wetland habitats including ponds, scrapes and wet woodland to: • be naturally water retentive • be varied in depth for a range of species/habitat communities • be fringed with appropriate marginal vegetation • provide predator refuges for water voles and birds such as islands and reedbeds • avoid stocking of fish or wildfowl • be in appropriate locations
M85	Establish wide riparian buffer strips of wildlife-rich habitats where livestock can be excluded, in suitable areas, to minimise nutrient and sediment input into watercourses, waterbodies and wetlands.
M86	Develop and implement a programme of lake management/restoration plans to restore natural function and habitats.
M87	Carry out targeted reintroduction programmes for ecosystem engineers such as beaver.

Measure number	Measure description
M13	Protect sensitive habitats against the impacts of recreational pressure, through: • partnership working to ensure consistent messaging • funding of wardens and engagement officers • access management including fencing and groundworks • provision of training • footpath improvements • promoting responsible behaviour • consideration of the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites • education on dangers of wildfire
M39	Create more woodland and tree cover, if supported following application of open habitats policy, wader guidance, and the peatland decision support framework, targeting the following wildlife-rich woodland types: • wet woodland (targeting floodplains, riparian zones and plateaus)

Species specific measures:

Table 25: Species specific potential measures that would help to achieve Priority 19

Measure number	LNRS priority species	Measure description
M88	Arctic Charr, Vendace and Schelly	Carry out research to monitor populations of Arctic charr, vendace and schelly, and identify their potential conservation requirements, including: • genetic studies into their vulnerability to climate change and water abstraction. • population assessments and spawning site surveys • identifying sites for potential translocations if found necessary • investigation into the control of non-native fish
M89	Arctic Charr, Vendace and Schelly	No stocking of lakes and tarns which contain Arctic charr, vendace and schelly and enforce the ban on live bait fishing for arctic charr.
M90	Atlantic Salmon	Increase populations of Atlantic salmon in Cumbria through: • continued monitoring and study of populations (adults and smolt) particularly with reference to diet • no stocking of salmon in Cumbrian rivers and Solway Firth • continue the mandatory 100% catch and release of salmon until stocks have sufficiently recovered

Measure number	LNRS priority species	Measure description
M91	White-clawed crayfish	Safeguard white-clawed crayfish populations in Cumbria by: • carrying out further research into removal of signal crayfish • preventing further introductions of signal crayfish and the spread of crayfish plague by adopting biosecurity measures. • Focus conservation efforts above natural barriers such as waterfalls. • Identifying potential ark sites and preparing emergency plans for translocation.
M92	Freshwater Pearl Mussel	Carry out further research to monitor populations of freshwater pearl mussel, and identify their potential conservation requirements, including: • research into genetics of local populations • survey of rivers for existing populations using eDNA • captive breeding and suitable translocation programmes
M93	European Water Vole	Safeguard and expand populations of water vole in Cumbria by: • managing bankside vegetation on rotational basis, limiting intensive grazing and trampling where water vole populations are known to be present • carrying out translocations from appropriate water vole colonies to suitable sites where habitat conditions are optimal • carrying out dedicated mink eradication measures at a landscape scale

Priority 20: Enhance and restore wetland habitats

Maintain, restore or enhance 3,250 ha of lowland raised bog, and 2,000 ha of lagg and wetland habitat to be in good condition and under appropriate management by 2035.

Table 26: Potential measures that would help to achieve Priority 20

Measure number	Measure description
M94	Restore hydrological function and species diversity on drained lowland raised bog and fens/degraded peatlands using established techniques such as: • bunding • peat face reprofiling • installing dams • coir matting • mulch spreading • sphagnum inoculation • seeding and plug planting • tree, scrub, and woodland removal, if supported following the application of open habitat policy, wader guidance, and the peatland decision support framework
M95	Create and restore wildlife-rich fringe habitats (such as wet woodland, purple moor grass and rush pasture, reedbeds, and transition mires) around peatland and wetland habitats through: • restoration of hydrology within wider hydrological units, • appropriate management
M96	Manage wetland habitats including basin mires, fens and flushes to be wildlife-rich through: • ecologically appropriate grazing regimes • restoring natural hydrology • scrub management • reduced nutrient input • avoiding soil compaction by carefully planning stocking densities and performing any mechanical works in the dry months of the year
M78	Restore and create wildlife-rich floodplain meadows where soil type, hydrology, and existing plant community are appropriate, using established techniques such as: • drain blocking • reseeding/green hay • plug planting • appropriate grazing and cutting • appropriate soil and nutrient management

Measure number	Measure description
M84	Create new, restore existing, and continue to manage a variety of wildlife-rich wetland habitats including ponds, scrapes and wet woodland to: • be naturally water retentive • be varied in depth for a range of species/habitat communities • be fringed with appropriate marginal vegetation • provide predator refuges for water voles and birds such as islands and reedbeds • avoid stocking of fish or wildfowl • be in appropriate locations
M97	Cease all extraction of peat.

Species specific measures:

Table 27: Species specific potential measures that would help to achieve Priority 20

Measure number	LNRS priority species	Measure description
M98	White-faced darter	Investigate the feasibility of translocation projects to encourage colonisation of rosy marsh moth to new sites.
M99	Rosy marsh moth	Investigate the habitat and foraging needs of the rosy marsh moth and use this to inform site management, along with the feasibility of translocation projects to encourage colonisation of new sites.
M100	Rosy marsh moth	Maintain and where appropriate expand key food species for rosy marsh moth such as bog myrtle and bog rosemary as part of site management.
Measure number to be added	Window-winged sedge	Manage bogs to contain areas of tussocky purple moor grass interspersed with small shallow pools, to benefit window-winged sedge.
Measure number to be added	Window-winged sedge	Safeguard and expand window-winged sedge populations in Cumbria by: • undertaking detailed surveys of the physical features of the habitat at their known site, to increase understanding of their needs • using knowledge from surveys to identify new sites for potential translocation • investigating the feasibility of setting up a captive breeding programme to reinforce the known population aid potential translocations to suitable new sites, under specialist advice

Priority 21: Water quality

Improve water quality in wetland, freshwater, coastal and estuarine habitats, and reduce diffuse and point source water pollution, with 99% of waterbodies and coastal waters in good ecological condition and 25% in good chemical condition by 2035.

Table 28: Potential measures that would help to achieve Priority 21

Measure number	Measure description
M101	Reduce point source pollution from sewage treatment works, combined sewer overflows, package treatment plants and septic tanks through: • improvement programmes • increased maintenance • education
M102	Reduce the impact of road and urban runoff by: • improving existing infrastructure • incorporating high quality SuDS (sustainable urban drainage systems) into new developments and retrofitting them where feasible
M103	Remediate/mitigate against diffuse and point source historical mine discharges.
M104	Develop and fund research projects into using natural processes such as shellfish and reedbeds to improve water quality.
M25	Tackle diffuse pollution and sediment runoff by taking a catchment approach to low input farming methods, through: • education and farmer learning • nutrient management plans • diffuse water pollution plans • land use change • sustainable slurry management • improved soil management • grazing and vegetation management • prevention of unnatural erosion
M85	Establish wide riparian buffer strips of wildlife-rich habitats where livestock can be excluded, in suitable areas, to minimise nutrient and sediment input into watercourses, waterbodies and wetlands.

7. Coastal and estuarine

Habitats

The habitat group of ‘coastal and estuarine’ is made up of the following wildlife-rich habitats:

- supratidal habitats (maritime cliff and slopes, coastal sand dunes, coastal vegetated shingle)
- intertidal habitats (coastal saltmarsh, intertidal mudflats, intertidal underboulder communities, *sabellaria alveolata* reefs, sheltered muddy gravels, peat and clay exposures with piddocks, seagrass beds wildlife-rich coastal saltmarsh and saline reedbeds, wildlife-rich littoral sand, sediment and rock, seagrass beds)
- subtidal habitats (saline lagoons)

All of Cumbria’s coastline is under some form of national statutory designation, either through being part of a MCZ, SAC or SPA, recognising the national and international importance of these habitats and some of the species they support.

Supratidal habitats

Supratidal habitats occur above the spring high tide line but within the ‘splash zone’, where the sea still affects them, but they are not submerged by the sea. Formed by natural coastal processes, supratidal habitats occur along the majority of Cumbria’s coast. Maritime cliffs and slopes made of boulder clay are present along the west Cumbria coast from Maryport south to Silecroft, except at St. Bees Head which is sandstone. Limestone cliffs are more restricted, being most prominent at Humphrey Head, near Grange-over-Sands. Major sand dune systems are to be found at the mouth of the Duddon Estuary, Drigg Estuary and between Silloth and Maryport. Vegetated shingle is a rare habitat, though unvegetated shingle is more widespread.

Intertidal habitats

Intertidal habitats occur between high tide and low tide and so are frequently submerged by the sea, with their form dependent on their coastal location, degree of wave action and substrate. The intertidal area extends all around the coast of Cumbria, but is particularly extensive in the large estuaries of the Solway Firth, Morecambe Bay, and Duddon Estuary and estuaries of the Rivers Esk and Irt. These are almost exclusively soft sediment habitats with extensive mudflats and saltmarshes. Intertidal bedrock is largely restricted to around St Bees Head and north of Whitehaven. Intertidal boulders and cobble scars, formed from eroded glacial drift, are found extensively on the open coast of Cumbria and to a lesser extent within the estuaries. Honeycomb worm *Sabellaria alveolata* reefs are found at various locations along the Cumbrian coast between Walney Island and Silloth. Seagrass is the only flowering plant that lives fully underwater; Seagrass beds are found in the Walney Channel.

Subtidal habitats

Subtidal habitats occur below low tide. Below the tidal limit Cumbria's seabed is almost entirely mud, silt, sand and gravel sediments. Saline lagoons are restricted to a small number of sites found in man-made locations, such as docks, gravel and mine workings. Although the subtidal/marine habitat is outside the scope of the LNRS, the jurisdiction for which ends at mean-low-water, it is important to recognise the inherent connectivity between all terrestrial and marine environments.

Some habitats and species will transition between the coastal and marine environment, and even between these our terrestrial and freshwater habitats. Management practices on land can have a direct impact on our marine environment; for example, the water quality of our inland rivers will directly impact on the quality of our coastal waters. Therefore, our nature recovery priorities delivered through this LNRS will have some impact on the marine environment, particularly through the connectivity between freshwater and marine habitats.

Where to see:

- **Cliffs:** St Bee's Head, Humphrey Head
- **Sand dunes:** Sandscale Haws, North Walney and Haverigg Dunes, Ravenglass and Eskmeals Dunes
- **Coastal vegetated shingle:** Walney and Foulney Islands, the Solway Firth.
- **Mudflats and saltmarsh**: Solway Firth, Morecambe Bay, and Duddon Estuary
- **Saline lagoons:** the gravel pits on Walney Island (SPA and SAC), Hodbarrow Lagoon (SPA and SAC), Cavendish Dock (SPA) and docks at Whitehaven, Workington, Maryport and Silloth

Species

Our coastal habitats support various species of national and international importance, including breeding and wintering birds such as wildfowl, waders and sea birds, as well as a variety of unique plant and animal species, such as natterjack toads. The main species that our coastal habitats support have been grouped into the following assemblages.

Saltmarsh and intertidal

This includes threatened species that occupy our intertidal areas, either permanently, to breed, or to overwinter, including smelt, birds such as redshank, avocet, ringed plover, several species of terns, and gulls, eider duck and plants such as saltmarsh thread-moss and eelgrass.

Dunes and wet slacks

This includes threatened species that live in our dune systems, such as small blue butterfly, natterjack toad, dune helleborine, grass of parnassus, upright forget-me-not, coralroot orchid and heath dog violet.

LNRS priority species

Natterjack Toad – This rare toad lives in shallow pools on sand dunes and sandy heaths. The Cumbrian coast is a stronghold for this species, which is only found in a few other locations in England. The loud call made by mating males can be heard up to a mile away.

St. Bees seed-eater - this rare ground beetle is only found near St Bees, where it is associated with bare and disturbed ground at the base of the sandstone cliffs, where it feeds on the seeds of ruderal plants. The population is potentially vulnerable to coastal dynamics and vegetation succession.

Northern dune tiger beetle - this large, distinctive beetle is red/brown with three light coloured stripes and an iridescent green underside. Although widespread throughout Europe, in Britain there are only two populations at coastal sand dune sites in north-west England, one of which is in Cumbria. It is under pressure from habitat changes resulting in fewer areas of bare sand, including the spread of invasive plant species, reduction in grazing from rabbits and increasing rates of vegetation succession, as well as localised recreational disturbance affecting larval habitat.

Pressures and threats

The key pressures and threats that affect the condition and extent of our coastal habitats are[40]:

- climate change
- recreational disturbance
- pollution

Coastal habitats are relatively narrow strips that are transitional in their nature, often constrained by the presence of engineered sea defences designed to protect property, roads, railways, and farmland from flooding. As sea levels rise due to **climate change**, these coastal habitats will be squeezed even more, being eroded by the sea but with nowhere to move inland. In order for coastal habitats to be resilient to climate change, they will need to have the space to be dynamic and move further inland as sea levels rise.

The coast is easily accessible and a very popular leisure destination for large numbers of people, but **recreational pressure** can have a huge impact on our coastal environment. In particular, large numbers of walkers, dogs and angling can damage fragile habitats and disturb wildlife including breeding birds and seals.

Our coastal habitats are vulnerable to **pollution** from a range of sources including the discharge of wastewater from the water industry, runoff from agriculture, industry and built environment, drainage from roads, litter and plastic pollution, as well as the build-up of chemicals and plastics within our water environment. As all our lakes, rivers and streams

[40] The wildlife trusts (2024). Coastal. Available at: https://www.wildlifetrusts.org/habitats/coastal

eventually flow into the sea, the different sources of pollution are compounded at our coast. This can have a dramatic impact on the water quality around our coast, and subsequently the species that it supports.

Opportunities for recovery and wider benefits

Restoring natural processes to our coastal habitats and creating the space for them to naturally function can help to increase their **resilience to climate change** as well as our own. The impacts of climate change induced sea level rise will be felt most at the coast, and combining hard engineered coastal defences with dynamic coastal habitats and managed coastal retreat will be an essential part of our adaption to our changing climate. Improving the condition of habitats such as saltmarsh and dune systems in suitable locations can absorb the energy of the sea and help to protect the land behind it, complimenting or being an **alternative to traditional hard engineering** such as sea walls or gabions. Some coastal habitats such as seagrass beds can be used to **absorb carbon** in the same way that woodlands and peatbogs do.

Much of Cumbria's permanent population lives within 5 km of the coast, with many of the county's major towns located along the coastline between Bowness on Solway and Barrow-in-Furness. Clean and naturally functioning coastlines can deliver multiple **health and wellbeing benefits** to those who live near them or use them for recreational activity. Enhancing and restoring these habitats will not only help the species that inhabit them, but the communities that live alongside them. Working with communities could also help to reduce recreational pressure on the most sensitive habitats and encourage participation to reduce litter and wildfires.

The government's Environmental Improvement Plan has two national environmental objectives that specifically relate to our coastal and estuarine habitats. These are to:

- Ensure that 70% of designated features in Marine Protected Areas (MPAs) are in favourable condition by 2042 (48% by 2028), with the remainder in recovering condition
- double the number of government funded projects which include nature-based solutions to reduce flooding and coastal erosion

Priorities and potential measures for nature recovery

Our long-term vision for coastal and estuarine is:

"A dynamic coastal environment that supports a well-functioning mosaic of habitats, where a catchment-based approach recognises the importance of connectivity from the uplands though to the coast and marine environment."

The following priorities and potential measures have been identified to help us achieve our long-term vision.

Priority 22: Restore and enhance coastal habitats

Restore 750 ha of coastal habitats by 2035 and maintain or enhance 75% (7,000 ha) to be in good condition and under appropriate management.

Table 29: Potential measures that would help to achieve Priority 22

Measure number	Measure description
M105	Appropriately manage sand dunes, maritime cliffs and slopes, and coastal vegetated shingle to be in good condition, benefitting the species they support, through: • INNS management (e.g. sea buckthorn and Japanese rose) • scrub management • appropriate grazing management • creating and maintaining undisturbed breeding sites and roosting areas that are above the high tide levels • maintaining and restoring ephemeral water bodies free of vegetation for natterjack toads • maintaining large areas of bare sand with sparse vegetation, whilst minimising damage to Northern tiger beetle larval habitat
M106	Enhance and restore saltmarsh and coastal grazing marsh habitats so they are wildlife-rich, benefitting the species they support, using established and emerging techniques such as: • drain blocking • scrape creation • grazing management to provide suitable habitat for key species (E.g. A grazed tussocky vegetation structure for breeding birds such as redshank and skylark, and a short sward where natterjack toad are found)
M107	Minimise pressures on mudflats, sandflats, and rocky shores by: • reducing pollution and nutrient inputs from surrounding habitats • minimising disturbance to wildlife
M108	Restore and expand seagrass beds to be in good condition by using established techniques with a focus on existing mapped areas.

Measure number	Measure description
M109	Maintain a full transition of vegetational stages of intertidal habitat that will support species of varying salinity tolerance and create a diversity of microhabitats including: • ephemeral water bodies • bare ground for foraging, refuge and basking • sand dunes/upper salt marsh with short vegetation • shallow freshwater pools with no vegetation • winter hibernation sites for natterjack toads • food plants for St Bees seed-eater such as sea campion
M13	Protect sensitive habitats against the impacts of recreational pressure, through: • partnership working to ensure consistent messaging • funding of wardens and engagement officers • access management including fencing and groundworks • provision of training • footpath improvements • promoting responsible behaviour • consideration of the use of Suitable Alternative Natural Greenspaces (SANGs) to reduce pressure on sensitive sites • education on dangers of wildfire

Species specific measures:

Table 30: Species specific potential measures that would help to achieve Priority 22

Measure number	LNRS priority species	Measure description
M110	Natterjack Toad	Safeguard natterjack toad populations through: • continued monitoring and study of existing populations • liaison with landowners and land managers to provide site-specific management advice • increased engagement and education to help reduce disturbance and protect habitat • conservation translocations to appropriate former sites using genetically suitable donor populations under specialist advice
Measure number to be added	Northern dune tiger beetle	Investigate the feasibility of translocations of northern dune tiger beetle to other sites and dependent on outcome, trial translocations to suitable new sites under specialist advice.
Measure number to be added	St Bees seed-eater	Survey St. Bees seed eater population at known site and historic sites to confirm continued presence, and assess the extent of suitable habitat to help safeguard and expand population.

Priority 23: Create space for coastal dynamism

Expand the space available to coastal transitional habitats and restore coastal processes, enabling them to be dynamic and move inland in response to natural processes and climate change.

Table 31: Potential measures that would help to achieve Priority 23

Measure number	Measure description
M111	Restore coastal processes to allow coastal habitats to be wildlife-rich by: • increasing the space available to them where these have been lost due to coastal squeeze • managing these habitats using appropriate grazing • scrub management • management of invasive non-native species
M112	Create new areas of saltmarsh in good condition using established and emerging techniques such as managed realignment and coastal retreat.
M113	Develop and implement a strategic approach to potential climate change driven sea level rise, including adaptive coastal management to ensure resilience of coastal habitats.

Priority 21: Water quality (as per wetland and freshwater chapter)

Improve water quality in wetland, freshwater, coastal and estuarine habitats, and reduce diffuse and point source water pollution, with 99% of waterbodies and coastal waters in good ecological condition and 25% in good chemical condition by 2035.

Table 32: Potential measures that would help to achieve Priority 21

Measure number	Measure description
M101	Reduce point source pollution from sewage treatment works, combined sewer overflows, package treatment plants and septic tanks through: • improvement programmes • increased maintenance • education
M103	Remediate/mitigate against diffuse and point source historical mine discharges.
M104	Develop and fund research projects into using natural processes such as shellfish and reedbeds to improve water quality.

Measure number	Measure description
M21	Raise awareness of issues and actions everyone can take, such as: • "love my beach" • clean water campaigns • reducing in water use • reducing impacts of access and recreation • increasing flood and drought resilience • reducing and removing litter • improving biosecurity • correct disposal of items such as wet wipes or cooking fats
M25	Tackle diffuse pollution and sediment runoff by taking a catchment approach to low input farming methods, through: • education and farmer learning • nutrient management plans • diffuse water pollution plans • land use change • sustainable slurry management • improved soil management • grazing and vegetation management • prevention of unnatural erosion

Priority 24: Marine nature recovery

Increase our understanding of the threats and pressures on the marine environment, and the potential actions that may be needed to address these.

Table 33: Potential measures that would help to achieve Priority 24

Measure number	Measure description
M114	Develop a baseline dataset and coordinate with partners to build a marine evidence base.
M115	Use knowledge from the designation process of the Highly Protected Marine Area (HPMA) to identify the main pressures on the marine environment.

8. Built Environment

Habitats

The habitat group of ‘built environment’ is made up of the following wildlife-rich habitat:

- open mosaic habitats on previously developed land

It also includes other developed land such as buildings, gardens, infrastructure, amenity areas, and lower wildlife value brownfield sites and associated green spaces within settlements known collectively as green infrastructure.

City, towns, villages and hamlets

Cumbria contains one city – Carlisle – plus several towns, with the largest (by population size) including Barrow-in-Furness, Kendal, Whitehaven, Workington, Penrith, Maryport, Ulverston and Cockermouth. The majority of these towns and city are located on either coastal plains or within the main river valleys and their floodplains. Whilst our major urban areas generally lie outside our national parks and national landscapes, many designated sites and irreplaceable habitats extend into our urban areas. There are also numerous smaller towns, villages and hamlets throughout Cumbria.

Within Cumbria’s built-up areas, open habitats consist predominantly of parkland including historic parks and gardens, cemeteries, riversides, roadsides, canal corridors, smaller areas of amenity open spaces, allotments and private gardens. Existing buildings can also provide important habitat for a range of species.

Linear routes, including former railway lines, road verges. rivers, canals, and green infrastructure routes provide important wildlife corridors that connect wildlife in urban centres to the surrounding countryside, with river corridors being particularly important in this respect.

Brownfield sites

The industrial heritage of many of the county’s larger towns has left significant areas of previously developed ‘brownfield’ land following the decline of mining, iron and steel production, and heavy industry. This land can support a diverse range of distinct plant and animal species, although it is at risk from national policies promoting redevelopment on brownfield land. Open mosaic habitats can exist on any brownfield site and consequently can be found anywhere in the county, although it is more likely to be in and around larger built-up areas. The former steel works and associated slag banks along the west coast have particularly good examples of this habitat, along with the former industrial land along the west coast at Maryport.

Where to see:

- **Brownfield open mosaics:** Millom Ironworks LNR, the Derwent Howe slag bank in Workington, the slag banks alongside Walney Channel in Barrow-in-Furness, Kingmoor Sidings LNR in Carlisle, Maryport Coast County Wildlife Site

Species

In addition to being the primary 'habitat' that people occupy, our built-up areas also provide important habitat for a range of species, including nesting birds, bats, reptiles, a range of invertebrates including the Small Blue Butterfly, and numerous plants including purple broomrape and pyramidal orchid. The main species that our built-up habitat supports have been grouped into the following assemblages.

Gardens and brownfield sites

This includes threatened species which occupy our parks, gardens and brownfield sites, including several species of bees and butterflies such as the small blue butterfly and moss carder-bee, flowering plants including heath cudweed and yarrow broomrape, and mammals such as hedgehog.

Urban water bodies

This includes species that live in or around these freshwater bodies including amphibians such as great crested newt and common toad, and mammals such as European water vole, otter and a variety of bat species.

Urban built-up areas

This includes species that predominantly occupy our built environment, including several bat species, and bird species such as swift, house sparrow and peregrine falcon.

Mining spoil

This includes a small number of lichens, mosses and liverworts that grow on old mining spoil heaps.

LNRS priority species

Small blue butterfly - the small blue is the smallest of all the UK's butterflies. Populations only exist where kidney vetch also grows, as it is the sole foodplant of their caterpillars. In Cumbria, small blue are limited to brownfield former industrial sites and coastal grassland in West Cumbria.

Common swift – these birds spend most of their lives flying, only ever landing to nest. Swifts spend the winter in Africa but travel to the UK to breed every year in April and May. They like to nest in older buildings in small holes in roof spaces, and will return to the same nest site year after year.

Pressures and threats

The key pressures and threats that affect the biodiversity value of our built environment include:

- development
- reduction of biodiversity in our urban areas
- management such as herbicide use and grass cutting

Cumbria is seeing increasing **development pressure** around the fringes of urban areas; policies promoting redevelopment on brownfield land often result in the loss of the biodiversity value of these sites, and new development may encroach on existing areas of biodiverse habitat. In addition, greenfield sites in more rural locations may be vulnerable to speculative development beyond the allocated sites identified in each of Cumbria's Local Plans, which can lead to further biodiversity loss and habitat fragmentation.

In addition, modern developments tend to be 'neat', with **little allowance for nature** in their design. Where old buildings may have gaps and cracks for nesting birds and roosting bats, such opportunities are minimal in modern developments. Low maintenance options for gardens such as panel fencing, paving slabs, and artificial turf further reduce the value of our built environment for nature. Redevelopment and individual home improvement works can further add to this problem, leading to the loss or damage of important existing habitat within existing buildings and gardens.

More generally, urban areas tend to have lower biodiversity than surrounding rural areas due to the **intensive use of land**, **fragmentation of green spaces** and **pollution** from intense lighting and vehicle emissions which can make it harder for some species to survive.

Opportunities for recovery and wider benefits

Whilst built-up areas may not typically be as rich in nature as surrounding rural areas, they do present opportunities for nature recovery and are a vital part of how most people connect with nature. One of these opportunities is the provision of **green infrastructure** which includes habitat corridors**'** or 'stepping stones', which are strips or areas of land characterised by rich and varied vegetation, designed to connect green spaces in built-up areas that would otherwise remain isolated. They allow species to navigate our built-up areas to find food and breeding or nesting sites, and move between them and the surrounding countryside. In addition, the removal or adaptation of barriers, as well as sensitive lighting design which also ensures public safety can help species move through built environments and connect them to the wider countryside.

These green corridors can also be combined with strategically planned footpaths and cycle ways, including national trails, so that the network is beneficial for both wildlife and humans. Otherwise known as active travel, moving through a built-up area by walking, cycling or

wheeling provides **health and wellbeing benefits** to those making purposeful journeys. There are also multiple studies showing the link between positive mental health and spending time outdoors in nature. **Access to nature** in general is also shown to have wide-reaching benefits to society, including improved brain activity, blood pressure and mental health[41], and that people with nature on their doorstep are typically more active and mentally resilient.

Concentrations of emissions from fossil fuel combustion from vehicles, and in some instances factories, tend to be higher in built up areas, which can deteriorate the air quality within and around where most people live. Efforts to improve nature in built-up areas can **improve air quality** as vegetation and trees can intercept sulphur dioxide, nitrogen dioxide and ammonia from the air, capture particulate pollution on their leaves and also form a physical barrier between people and pollutant sources. Urban trees also provide shade, and can help people and species in towns and cities adapt to climate change by helping to keep our built-up areas cool.

There are also **economic benefits** to nature recovery as nature provides us with water, clean air, and food amongst other goods and services to society that we depend on for our health and prosperity. These natural resources are known as 'natural capital' and they are important to local and national economies, such as manufacturing, energy, farming, fishing, forestry, leisure and tourism, all of which support local employment and skills. Cumbria's landscape attracts millions of visitors each year to the area and tourism alone contributes £4.68bn to the local economy and employs nearly 46,000 people[42].

The government's Environmental Improvement Plan has a national environmental objective that everyone should live within 15 minutes' walk of a green or blue space.

Priorities and potential measures for nature recovery.

Our long-term vision:

"Our city, towns and villages are rich in wildlife with connected, healthy, and diverse habitats that create space for nature to live, move and thrive alongside people."

The following priorities and potential measures have been identified to help us achieve our long-term vision.

[41] Jimenez et al. (2021) Associations between Nature Exposure and Health: A Review of the Evidence. *International Journal of Environmental Research and Public Health*, 18(9), 4790.
[42] Cumbria Tourism (2023) Available at: Research | Cumbria Tourism [03.09.2024].

Priority 25: Manage and enhance our built environment

Manage more homes and gardens, public buildings and spaces, and travel corridors to minimize losses and maximize opportunities for biodiversity, habitat connectivity, and nature recovery, alongside other functions.

Table 34: Potential measures that would help to achieve Priority 25

Measure number	Measure description
M20	Encourage nature-friendly practices in gardens, allotments and public/community spaces, including: • pollinator-friendly planting • reduction in mowing • use of peat-free compost • reduced pesticide use • creating holes in fences that allow wildlife such as hedgehog to move between different spaces
M73	Work with national infrastructure operators and local authorities to manage verges, transport corridors and open green space to be wildlife-rich, and maintain existing wildlife-rich habitats, through: • appropriate timings of cutting • removal of arisings
M83	Restore natural species movement where movement is impeded, by: • removing redundant artificial barriers in river channels and lakes • where barrier removal is not possible installing appropriate alternative passage • installing under/over road tunnels/bridges near known habitat severance or breeding sites
M116	Improve the connectivity of nature corridors by targeting new and existing transport and active travel routes for high quality green and blue infrastructure that delivers for biodiversity.
M117	Design urban planting schemes so that they use pollinator friendly trees, shrubs, grass species, and perennial plants.
M118	Maximise availability of urban growing spaces and allotments to increase nature corridors and stepping stones within the built environment.
M119	Safeguard existing nesting, breeding and roosting sites, and provide mitigation, compensation and enhancement measures wherever possible, by: • increasing awareness of specific buildings that support important colonies of nesting birds or roosting bats and mitigate against their harm • integrating suitable numbers of universal bird bricks, swift bricks, and bat bricks into all new developments (including extensions and alterations that require planning permission)

Measure number	Measure description
M120	Safeguard and value the contribution of wildlife-rich brownfield sites in providing a range of resting, feeding and breeding places for invertebrates, reptiles and birds when considering development by: • identifying and surveying our most valuable brownfield sites • managing these sites to maximise their value for nature • providing mitigation and compensation measures against their loss
M121	Reduce and sensitively design artificial lighting to help bats and other nocturnal wildlife commute and forage.
M122	Engage with and educate businesses, schools, healthcare settings, other organisations, and significant landowners to: • recognise and maximise their assets potential to provide benefits to biodiversity • capitalise on green finance or funding schemes (e.g. Biodiversity Net Gain)
M72	Re-working of gravels/ mine spoil to prevent encroachment of successional vegetation, growth and shading on calaminarian grasslands and mine spoils

Species specific measures:

Table 35: Species specific potential measures that would help to achieve Priority 25

Measure number	LNRS priority species	Measure description
M123	Common Swift	Minimise and mitigate against the destruction of existing swift nest sites by: • requiring planning applicants to check where swift nest sites have been recorded • avoiding carrying out building works on such buildings during the nesting season • Mitigating against the loss of nest sites by putting up suitable Swift bricks or boxes, as close as possible to the entrances to all existing Swift nest sites
M124	Common Swift	Develop appropriate standards for recording data on swift nest sites, and collecting data to make it easier for people to identify if their building supports swift nest sites.
M125	Small Blue Butterfly	Safeguard and expand populations of small blue in Cumbria by: • appropriate management for kidney vetch, and spreading of seed/plants to suitable locations between populations • ensure known sites that support small blue are protected, or loss of these sites is appropriately mitigated • translocations to suitable sites from stable donor populations • ongoing monitoring and research

Priority 26: Create more wildlife-rich habitat within our built environment

Maximize opportunities to retain existing and create new wildlife-rich habitats in building developments in our built-up areas, creating a mosaic of interconnected habitats designed and managed for wildlife.

Table 36: Potential measures that would help to achieve Priority 26

Measure number	Measure description
M126	Implement, manage and maintain more wildlife friendly features in urban and suburban areas through the planning process, such as: • green roofs • walls • ponds and swales • rain gardens • urban trees
M127	Design new urban waterbodies to be wildlife friendly with varied bank profiles and depths to provide a range of habitat conditions to support amphibians, invertebrates and mammals. Avoid stocking new waterbodies intended for wildlife with fish or wildfowl.
M74	Increase species diversity and reduce nutrient levels in and around wildlife-rich grasslands by: • reducing the use of pesticides and herbicides • reducing the use of artificial inorganic and organic fertilisers, particularly in floodplains and fields adjacent to watercourses
M77	Create new areas of wildlife-rich grassland targeting non-grassland sites such as previous quarries, ex-industrial land, landfill sites, and built-up areas through: • the addition of local provenance green hay • the addition of local provenance brush harvested seed and wildflower plugs • an appropriate grazing and/or cutting regime
M102	Reduce the impact of road and urban runoff by: • improving existing infrastructure • incorporating high quality SuDS (sustainable urban drainage systems) into new developments and retrofitting them where feasible
M116	Improve the connectivity of nature corridors by targeting new and existing transport and active travel routes for high quality green and blue infrastructure that delivers for biodiversity.
M121	Reduce and sensitively design artificial lighting to help bats and other nocturnal wildlife commute and forage.

9. Species Recovery

There are over 700 species in Cumbria that are considered to be either threatened, near-threatened, or of local significance, and were therefore considered in the development of the LNRS (Appendix D). The health of these (and more common and widespread) species is primarily linked to the condition, extent and connectivity between the habitats on which they rely, although many are also vulnerable to wider factors such as climate change, persecution, pollution, disturbance, and invasive non-native species.

The government's Environmental Improvement Plan has three national environmental objectives that specifically relate to species. These are to:

- halt the decline in species abundance by 2030, and then increase abundance by at least 10% to exceed 2022 levels by 2042.
- improve the Red List Index for England for species extinction by 2042 compared to 2022 levels
- reduce the number of establishments of invasive non-native species by at least 50% in 2030, compared to levels seen in 2000

Whilst many species will markedly benefit from the potential habitat measures already identified, some species (or groups of species) are particularly at risk locally and need more specific measures beyond the general enhancement and expansion of habitat. Over 390 species were identified as needing more targeted interventions; these have been sorted into **24 habitat-based assemblages**, where the species in each assemblage would benefit from targeted interventions in those habitats. These additional interventions have been embedded into the potential habitat measures so that species recovery is part of wider nature recovery. A full list of the species that make up each assemblage is presented in Appendix B.

The 24 habitat-based assemblages are:

Table 37: Habitat-based assemblages

Habitat-based species assemblage	Habitat theme	Assemblage specific measures
Broadleaved woodland	Woodlands, trees and scrub	M30, M50, M52
Upland oakwood	Woodlands, trees and scrub	M30
Wet woodland	Woodlands, trees and scrub	M30
Veteran and ancient trees	Woodlands, trees and scrub	M46, M48
Upland blanket bog	Moorland, heathland and montane	M55, M56
Moorland and upland grassland	Moorland, heathland and montane	M56
Upland habitat mosaics	Moorland, heathland and montane	M52, M56, M57, M60
Arctic alpine and montane	Moorland, heathland and montane	M65, M66, M67
Wading birds of in-bye and fell edge	Grasslands and limestone pavement	M52, M57

Habitat-based species assemblage	Habitat theme	Assemblage specific measures
Farmland	Grasslands and limestone pavement	M22, M26, M28
Hay meadows	Grasslands and limestone pavement	M69, M70
Limestone grassland and pavement	Grasslands and limestone pavement	M69, M70, M79
Wet/marshy grassland	Grasslands and limestone pavement	M78
Rivers	Wetland and freshwater	M82, M83
Lakes	Wetland and freshwater	M82, M83
Tarns and ponds	Wetland and freshwater	M84
Wetland, fen and reedbeds	Wetland and freshwater	M84, M96
Lowland raised bogs	Wetland and freshwater	M94, M95
Saltmarsh and intertidal	Coastal and estuarine	M106, M107, M109
Dunes and wet slacks	Coastal and estuarine	M105, M109
Gardens and brownfield sites	Built environment	M20, M120
Urban water bodies	Built environment	M121, M127
Built up areas	Built environment	M119, M121
Mining spoil	Built environment	M72

In addition, **24 LNRS priority species** (or species groups) requiring bespoke action have been identified; these are species that are considered to be either particularly at risk, emblematic/ representative of Cumbria and its habitats, or where their Cumbrian populations are nationally significant.

The 24 LNRS Priority species (or species groups) are:

Table 38: LNRS priority species

Common name	Scientific name	Taxon group	Habitat assemblage	Species specific measure
Eurasian red squirrel	*Sciurus vulgaris*	terrestrial mammal	Broadleaved woodland	M35, M36
Ricasolia amplissima	*Ricasolia amplissima*	lichen	Ancient and veteran trees	M49
Hageniella micans	*Hageniella micans*	moss	Upland oakwood	M45
Netted carpet moth	*Eustroma reticulata*	insect - moth	Wet woodland	M37
Hazel dormouse	*Muscardinus avellanarius*	terrestrial mammal	Broadleaved woodland	M30, M38, M50
Willow gloves fungus	*Hypocreopsis lichenoides*	fungus	Wet woodland	MXX

Common name	Scientific name	Taxon group	Habitat assemblage	Species specific measure
Waxcap fungi	*Entoloma bloxamii s. lat. Entoloma prunuloides Gliophorus reginae Gloioxanthomyces vitellinus Neohygrocybe nitrata*	fungus	Waxcap fungi	M76
Breeding waders (curlew, lapwing, redshank and snipe)	*Numenius Arquata Vanellus vanellus Tringa tetanus Gallinago gallinago*	bird	Upland blanket bog In-bye	M62
Black grouse	*Tetrao tetrix*	bird	Upland mosaic	M63
Hen harrier	*Circus cyaneus*	bird	Moorland and upland grassland	M64
Arctic alpine plants	*(see appendix B)*	flowering plant	Arctic alpine / montane	M68, M69
Arctic charr, vendace and schelly	*Salvelinus alpinus Coregonus Albula Coregonus lavaretus*	bony fish	Lakes	M88, M89
Atlantic salmon	*Salmo salar*	bony fish	Rivers	M90
Freshwater pearl mussel	*Margaritifera margaritifera*	mollusc	Rivers	M92
White-clawed crayfish	*Austropotamobius pallipes*	crustacean	Rivers	M91
European water vole	*Arvicola amphibius*	terrestrial mammal	Rivers	M93
White faced darter	*Leucorrhinia dubia*	insect - dragonfly	Lowland raised bog	M98
Rosy marsh moth	*Coenophila subrosea*	insect - moth	Lowland raised bog	M99, M100
Window-winged sedge	*Hagenella clathrata*	insect - caddis fly	Lowland raised bog	MXX
Natterjack toad	*Epidalea calamita*	amphibian	Dunes and wet slacks	M110
Northern dune tiger beetle	*Cicindela hybrida*	insect - beetle	Dunes and wet slacks	MXX

Common name	Scientific name	Taxon group	Habitat assemblage	Species specific measure
St Bees seed-eater	*Harpalus honestus*	insect - beetle	Saltmarsh and intertidal	MXX
Small blue butterfly	*Cupido minimus*	insect - butterfly	Garden and brownfield	M125
Common swift	*Apus apus*	bird	Built up areas	M123, M124

Priorities and potential measures for species recovery

The following priority has been identified to target species recovery across Cumbria:

Priority 27: Species recovery

Maintain, and where possible increase, the population size, extent, and diversity of Cumbria's key native species.

Many of the species-specific measures and assemblage-specific measures to help achieve this priority relate to habitat management. Therefore, the potential species measures are presented within the relevant habitat sections alongside their wider potential habitat measures.

In addition, overarching priority number 2 and its associated potential measures addresses invasive non-native species.

Species reintroductions

This version of the LNRS prioritises the species that are already established in Cumbria and the habitats that support our current species, ensuring that we safeguard and recover what we already have as our main priority. However, there is the potential that our habitats could also support the reintroduction of species that are either no longer found in the county or are absent from significant parts of their former range, particularly as we continue make progress in restoring our habitats to better condition.

If species reintroductions are explored, these should take a rigorous and informed approach, following IUCN species re-introduction guidelines, any licensing requirements, and giving consideration to the anticipated impact of climate change predictions. As with the priorities and potential measures outlined in the LNRS, any species reintroduction project should be informed by detailed site-specific feasibility studies and be in line with the LNRS principles for nature recovery, undertaken with specialist ecological advice.

The following species have reintroduction projects or feasibility studies already underway, and have been identified as having the potential for reintroduction to Cumbria (or

translocation within Cumbria to reintroduce them to other parts of the county) in the short to medium term, and within the lifespan of this LNRS:

Table 39: Species that are considered to be candidates for reintroduction in the short to medium term

Common Name	Taxon Scientific Name	Taxon Group	Habitat Theme
White tailed eagle	*Haliaeetus albicilla*	bird	Woodland, Trees and Scrub
Black grouse	*Tetrao tetrix*	bird	Moorland, Heathland and Montane
Eurasian aspen	*Populus tremula*	flowering plant	Woodland, Trees and Scrub
Eurasian beaver	*Castor fiber*	terrestrial mammal	Wetland and Freshwater
European pine marten	*Martes martes*	terrestrial mammal	Woodland, Trees and Scrub

Based on historical records and specialist ecological input through the LNRS species group, the following species have been identified as having the potential for reintroduction to Cumbria in the longer term. Actions within the lifespan of this LNRS should focus on landscape scale habitat enhancement, restoration and creation, including connecting and expanding existing suitable habitat to help make Cumbria “reintroduction ready” for these species:

Table 40: Species that could be considered for potential reintroduction to Cumbria in the longer term

Common Name	Taxon Scientific Name	Taxon Group	Habitat Theme
Golden eagle	*Aquila chrysaetos*	bird	Moorland, Heathland and Montane
Corncrake	*Crex crex*	bird	Moorland, Heathland and Montane
Crane	*Grus grus*	bird	Wetland and Freshwater
Twite	*Linaria flavirostris*	bird	Moorland, Heathland and Montane
Native oyster	*Ostrea edulis*	mollusc	Coastal and Estuarine

10. Local Habitat Map

The main purpose of the LNRS is to:

- Identify our **priorities** for nature recovery
- Identify our potential **measures** that would help meet these priorities,
- **Map** the locations where delivering these potential measures would make a particular contribution to achieving those priorities and would be most likely to provide the greatest benefit for biodiversity and the wider environment

The Statement of Biodiversity Priorities and the Local Habitat Map are designed to be used together when informing decision-making, identifying the actions and locations where targeting of resources and effort will have the greatest benefit and encourage collaboration.

The Local Habitat Map identifies zones within which opportunities for nature recovery are strategically significant at a landscape scale; it does not operate at a field scale resolution, but it can show how nature recovery on your land fits into the wider landscape.

The Local Habitat Map does not mandate any requirement to implement the identified potential measures; any nature recovery projects should be informed by detailed site-specific feasibility studies and be in line with our principles for nature recovery (section 2).

Nature Recovery Networks

In order to identify where we should be targeting our efforts for nature recovery, we must first understand what habitats we have in Cumbria. The Cumbria Biodiversity Data Centre undertook a review of new and existing habitat data, from both local and national sources, to gather as much information as possible. This information helped create the Cumbria Habitat Base Map. This was then used in the Natural England Habitat Network Model to show where we should improve, restore, or create specific habitats.

The outputs from this model are displayed under three categories:

- enhance
- restore
- create

Enhance

This includes the improvement of **existing wildlife-rich habitats** (e.g. upland hay meadow) to give better condition or distinctiveness of habitat. This is the focus of the network model.

Restore

This applies to **degraded or fragmented habitats that are not currently classed as wildlife-rich.** Associated potential measures would result in improving their condition or distinctiveness to make them wildlife-rich **where the broad habitat type would stay the same** (e.g. modified grassland being transformed into hay meadow).

Create

This is on land that could be suitable for the **creation of wildlife-rich habitat and would result in a broad change in habitat type** (e.g. modified grassland being transformed into broadleaved woodland). This will make our existing wildlife-rich habitats bigger and more joined up.

Nature Recovery Network Levels

There are three levels to the nature recovery networks:

- overall local nature recovery network
- LNRS networks by habitat theme
- habitat specific local nature recovery networks

The Overall Local Nature Recovery Network shows all existing known wildlife-rich habitat (enhancement), along with all opportunities for restoration or creation overlaid with each other.

The LNRS networks by habitat theme show the wildlife-rich habitats for each broad habitat theme (woodlands trees and scrub, grasslands, etc.) along with the opportunities for restoration or creation of these habitat types.

Habitat specific local nature recovery networks show the specific wildlife-rich habitat (e.g. upland hay meadow), and the areas that are suitable for the enhancement or restoration of this specific habitat type.

The maps are available to view online, and the data can also be downloaded as a shapefile to be used in GIS software.

‘Areas of Particular Importance for Biodiversity’ and ‘Areas that Could Become of particular importance’

The Local Habitat Map can be divided into three parts:

- ‘Areas of Particular Importance for Biodiversity’
- ‘Areas that Could Become of particular importance’
- areas that are not allocated for nature recovery

Areas of Particular Importance for Biodiversity

These are made up of sites that are already protected under planning policy for their habitat value and include:

- all statutorily designated conservation sites (SPAs, SACs, Ramsar sites SSSIs, NNRs, LNRs, LPOs and HPMAs)
- County Wildlife Sites
- irreplaceable habitats

Areas that Could Become of Particular Importance

The parts of the nature recovery networks that fall outside of the Areas of Particular Importance for Biodiversity are classified as Areas that Could Become of Particular Importance.

Areas that are not allocated for nature recovery

Some areas of the map won't fall within a strategic network and will be displayed as 'not allocated' on the map. There are still lots of things that can still be done for nature recovery in these areas, with over 70% of potential measures in the strategy unmapped due to them being beneficial almost anywhere. Similarly, just because a measure isn't mapped in a certain area doesn't mean that it isn't suitable, it just means that it isn't the most strategically important location for that measure to take place, or there is insufficient information to be able to map specific locations for the potential measure.

What if there is more than one mapped measure for my area of interest?

Where an area of land is suitable for more than one potential measure, the Local Habitat Map will show multiple overlapping potential measures. **Prioritising which measure should take place over another should be decided on a site-by-site basis, taking into consideration wider benefits, funding, site surveys, and viability.** The following factors, in no particular order, should be considered when prioritising potential measures:

- Does it contribute towards climate change mitigation through **carbon sequestration**?
- Does it contribute towards **climate change adaption and resilience**?
- Does it help to improve **water quality** in our rivers and lakes?
- Is it a particularly strategic location for delivering **natural flood management**?
- Does it mitigate or provide resilience against **coastal erosion**?
- Does it help to improve **air quality** around sensitive receptors?
- Does it enhance or reinforce our **natural and cultural heritage**?
- Is it particularly strategic for increasing people's **access to nature**?
- Does it provide particular benefit to people's **health and wellbeing**?
- Is there a particular opportunity to **engage or educate** people in nature recovery?
- Is there a potential link to green finance or other **economic opportunities**?
- Is there already **funding** in place for a particular measure?
- Is there an **existing project** or interest group that would deliver the measure?
- Is there l**andowner/land manager preference** or particular interest in delivering the measure?
- Is the delivery of the measure limited to **specific localised conditions** or areas, for which the proposed location is particularly viable?

Additional datasets that show where a potential measure may provide a particular contribution to wider benefits have been added to the mapping portal under 'Additional Information'. These can be overlaid with the Local Habitat Map to identify locations where

implementing potential measures could yield wider environmental and societal benefits as well as benefits for nature. While these additional datasets reflect the most up-to-date information available at the time of writing, they are subject to future updates. Therefore, it is crucial to use this overlay functionality with a level of discretion, always complementing it with site-specific surveys and adhering to ground-truthing principles for reliable on-the-ground evaluations to inform decision making.

Review and update

The Local Habitat Map is hosted by Cumbria Biodiversity Centre on behalf of Westmorland and Furness Council and will be reviewed and updated every 3 to 10 years as per the statutory guidance for the LNRS.

The Local Habitat Map is only as good as the data it is made from, and a key limitation identified during the development of this LNRS is the lack of local data for our area. Cumbria Biodiversity Data Centre provides a central hub for storing and sharing any such data with relevant organisations and businesses, as well as using it to further develop the Cumbria biodiversity evidence base, and subsequent versions of the Local Habitat Map. We would encourage anyone who is collecting habitat or species data in Cumbria to share it with Cumbria Biodiversity Data Centre so that it can be added to their database to help to improve our understanding of the state of nature and inform future monitoring of nature recovery action in our county.

11. Conclusion: Realising the Vision

"A walk in the fells is a treat for the senses with skylarks singing overhead, vibrant bog mosses dotted with crimson berries of wild cranberry and bright white stars of Grass-of-Parnassus, and cool areas of woodland shade. Behind the beauty there's important work being done – carbon locked away in deep peat, wetlands storing and slowing the flow of water to communities downstream, trees and hedgerows cleaning the air we breathe, and organic healthy food being produced.

Roadside verges are buzzing with life, miles and miles of wildflowers providing food for bees and butterflies and brightening up everyone's daily journeys. Arriving at your destination you're not just greeted with the office or shops, but welcoming nature-filled spaces with wildflowers, trees, and birdsong.

A sparkling river is a life source. Flowing through towns and countryside, and connecting our precious uplands with the stunning coast. Clean, clear water is teeming with life, and the lucky can catch a glimpse of otter or kingfisher. Importantly the rivers are working, connected to their floodplains and slowing the flow of water through a catchment."

Cumbria's natural environment is vital for countless species and provide invaluable benefits to nature and our communities. However, the creation of this document is merely the first step on a vital journey. The true success of this strategy hinges on our collective commitment to action. It requires the dedication, collaboration, and shared vision of landowners, farmers, conservation organisations, businesses, local authorities, and individual residents across Cumbria. The LNRS is more than just a document; it's a call to action, an invitation to work together to translate these ambitions into tangible results on the ground.

The development of the Cumbria Local Nature Recovery Strategy has been a collaborative effort, and we extend our sincere gratitude to all those who have contributed their time, expertise, and passion to its creation

Thank you for your interest. To learn more or get involved, please visit our website https://cumbrialnrs.org.uk/

or contact us at cumbria.lnrs@westmorlandandfurness.gov.uk

12. Glossary

Agroforestry –The integration of trees into the farming system, while maintaining or enhancing the farm's main agricultural output.

Ancient and Veteran Trees - A tree of considerable age that is of interest biologically, culturally or aesthetically because of its age, size or condition, including the presence of deadwood micro-habitats.

Ancient semi-natural woodland (ASNW) - Ancient woodland composed of mainly locally native trees and shrubs that derive from natural seedfall or coppice rather than from planting. These woodlands are irreplaceable habitats and generally support the greatest level of woodland biodiversity, including rare species of plants, fungi, and insects.

Ancient woodland - An area that has been wooded continuously since at least 1600 AD. It includes ancient semi-natural woodland and plantations on ancient woodland sites (PAWS).

Areas of Particular Importance for Biodiversity (APIB) - Areas that already have significant ecological value. They are made up of sites that are already protected under planning policy for their habitat value. They include:

- all national conservation sites (SPAs, SACs, Ramsar sites SSSIs, NNRs)
- County Wildlife Sites
- irreplaceable habitats

Areas that Could Become of Particular Importance for Biodiversity (ACB) - The areas of the Local Habitat Map that are identified as having particular potential for enhancement, restoration, or creation but that fall outside of the Areas of Particular Importance for Biodiversity

Assemblage - A group of species that coexist within a specific habitat(s) and largely benefit from the same management measures. Considering species in habitat-based assemblages helps us to identify potential measures that are beneficial for as many species as possible.

Authority - An administrative government funded body.

Biodiversity Net Gain (BNG) - An approach to development and land management that aims to leave the natural environment in a measurably better state than it was beforehand. New developments are legally required to provide BNG, unless they are exempt.

Brownfield - A piece of land that has been previously developed (built-on) but is now vacant, derelict, or unused. These sites often have the potential for redevelopment but may be contaminated with pollutants or have other environmental issues. Brownfield sites can support a wide range of species and can be very biodiverse habitats.

Built Environment – A broad habitat theme used in the Cumbria LNRS. It includes:

- open mosaic habitats on previously developed land.

- developed land such as buildings
- gardens
- infrastructure
- amenity areas
- lower wildlife value brownfield sites

Carbon Offsetting - A process of compensating for carbon dioxide emissions by funding projects that remove and equivalent amount of carbon dioxide from the atmosphere. By offsetting their carbon emissions, individuals and organizations can contribute to climate change mitigation efforts and help to reduce their overall carbon footprint.

Coastal and Estuarine – A broad habitat theme used in the Cumbria LNRS. It includes:

- supratidal habitats (maritime cliff and slopes, coastal sand dunes, coastal vegetated shingle)
- intertidal habitats (coastal saltmarsh, intertidal mudflats, intertidal underboulder communities, *sabellaria alveolata* reefs, sheltered muddy gravels, peat and clay exposures with piddocks, seagrass beds wildlife-rich coastal saltmarsh and saline reedbeds, wildlife-rich littoral sand, sediment and rock)
- subtidal habitats (saline lagoons)

Continuous cover forestry - An approach to forest management in which a range of silvicultural systems are used to maintain the forest canopy at one or more levels without clear-felling.

County Wildlife Site (CWS) – An area that are locally important for the conservation of the habitats and species that they support. Their designation is non-statutory, but recognises their significance, with many sites being of county and often regional importance for wildlife. Most County Wildlife Sites are owned by private individuals.

Create – Creating wildlife-rich habitat where none currently exists, resulting in a broad change in habitat type (e.g. modified grassland being transformed into broadleaved woodland). This will make our existing wildlife-rich habitats bigger and more joined up.

Deadwood - All types of wood that are dead, including whole or wind-snapped standing trees, fallen branch wood and stumps, decaying wood habitats on living trees such as rot holes, dead limbs, decay columns in trunks and limbs, and wood below the ground as roots or stumps. Deadwood of native species that exceeds 200 mm diameter and is associated with sites of high ecological value contributes the most to biodiversity.

Drainage grip - A narrow channel dug into the soil to divert surface water and lower the water table, making the land more suitable for growing grasses, which can be grazed by livestock.

Dune slacks - **L**ow-lying areas between dune ridges where freshwater pools can form. Formed by wind erosion or blowouts, dune slacks are characterized by their unique ecology, supporting specialized plant and animal life.

Dynamic succession - The process by which the mix of species and habitats change over time. It can occur after the initial colonisation of a newly created habitat, of after a disturbance events.

Ecosystem - A complex system where living organisms interact with each other and their non-living environment where every part is connected.

Enhance - Improvement the condition or distinctiveness of existing wildlife-rich habitats (e.g. upland hay meadow). This is the focus of the network model.

Epiphyte - A plant that grows on the surface of another plant, but derives its moisture and nutrients from the air, rain, water or from debris accumulating around it, rather than the host plant.

Fluvial - Relating to, or living in, a river or stream. This term if often used in geography and geology to describe processes, landforms, and deposits that are associated with flowing water.

Gabion - A cage, cylinder, or box filled with rocks, concrete, or sometimes sand and soil for use in civil engineering, road building, military applications, and landscaping. Gabions are often used for erosion control, retaining walls, riverbank protection, and decorative features.

Grasslands and Limestone Pavement - A broad habitat theme used in the Cumbria LNRS. It includes:

- meadows (lowland meadows, upland hay meadows) and wildlife-rich neutral grassland
- calcareous grassland (lowland calcareous grassland, upland calcareous grassland)
- acid grassland (lowland dry acid grassland, wildlife-rich lowland acid grassland, wildlife-rich upland acid grassland)
- coastal and floodplain grazing marsh
- calaminarian grasslands
- limestone pavements
- grass moorland
- other neutral grassland
- improved grassland

Greenfield - Refers to undeveloped land that has not been previously built on or used for industrial purposes. It often consists of open fields, forests, or other natural landscapes.

Green Infrastructure - multi-functional green and blue spaces and other natural features, urban and rural, which is capable of delivering a wide range of environmental, economic, health and wellbeing benefits for nature, climate, local and wider communities and prosperity.

Highly Protected Marine Area (HPMA) – a marine area that is protects the seabed and water column (including all habitats and species) from extractive, destructive and

depositional activities such as commercial and recreational fishing, dredging, construction or anchoring. They are designated as Marine Conservation Zones and protected under UK law by the Marine and Coastal Access Act 2009**.**

(Agriculturally) Improved grassland - Grassland that has been modified through human intervention to increase its productivity for agricultural purposes. This typically involves practices such as: seeding of selective grass species, adding fertilizer, drainage, and irrigation.

Intertidal – Coastal habitats occur between high tide and low tide and so are frequently submerged by the sea, with their form dependent on their coastal location, degree of wave action and substrate.

Invasive Non-Native Species - Are plants, animals, or other organisms that have been introduced to an area outside their natural range and cause harm to the environment, economy, or human health.

Irreplaceable Habitat - A type of habitat that is extremely difficult or impossible to restore, recreate, or replace once it has been destroyed. Irreplaceable habitats are determined by Defra and include ancient woodland, ancient and veteran trees, blanket bog, limestone pavements, coastal sand dunes, spartina saltmarsh swards, mediterranean saltmarsh scrub, and lowland fens.

Local Habitat Map – The map that accompanies the Statement of Biodiversity Priorities. It shows the opportunity areas where undertaking a particular measure would be particularly strategic and deliver maximum benefit.

Local Nature Recovery Strategy (LNRS) - A locally led, evidence-based strategy that is a requirement of the Environment Act (2021). LNRSs agree priorities for nature recovery and propose actions in locations where they would make a particular contribution to achieving those priorities. They are made up of a Statement of Biodiversity Priorities, and a Local Habitat Map.

Local Nature Reserve (LNR) - An area that is protected for its local importance for wildlife, geology, education or enjoyment. Local authorities have the power to designate LNRs under Section 21 of the National Parks and Access to the Countryside Act 1949.

Low impact silvicultural system (LISS) - A forest management system, such as continuous cover forestry, that encourages structural and species diversity and evolutionary adaptation by promoting natural regeneration.

Low-input farming - A farming system that aims to minimize the use of off-farm inputs, such as fertilizers, pesticides, and feed, while optimizing the use of on-farm resources, such as grazing land and existing habitats, to make the farm more sustainable and profitable.

Macrophytes - Aquatic plants that grow in or near water.

Marine Conservation Zone (MCZ) – A protected area that supports a range of nationally important, rare or threatened marine habitats and species. They are designated under the Marine and Coastal Access Act 2009.

Moorlands, Heathlands and Montane – A broad habitat theme used in the Cumbria LNRS. It includes:

- blanket bog
- heathland (upland heathland and lowland heathland)
- montane habitats (mountain heaths and willow scrub and inland rock outcrop and scree)
- valley mire
- fragmented heath

Our uplands are characterised by their large unenclosed nature, forming a complex mosaic of different habitats across the landscape. This habitat theme discusses the habitats that are not covered under the 'Wetland and freshwater', 'Grasslands', and 'Woodland, trees and scrub' themes.

National Character Area (NCA) - An area of distinct and recognisable character at the national scale. These areas follow natural boundaries rather than administrative ones, making them a useful tool for understanding and managing the English landscape.

National Conservation Site – A protected area that is designated for its exceptional natural significance. These sites are protected by UK law and managed to preserve their habitats and the species they support.

National Landscape – An area of land recognised for its distinctive character and beauty. The legal designation is 'Area of Outstanding Natural Beauty', and they are protected under the National Parks and Access to the Countryside Act 1949.

National Nature Reserve (NNR) - An area that is protected for its nationally important habitats, species and geology, and to provide 'outdoor laboratories' for research. Natural England has the power to designate NNRs under the Wildlife and Countryside Act 1981. NNRs managed by Natural England are open to the public, and visitors are encouraged to connect with nature.

National Park - A large area of relatively undeveloped and scenic land protected by law for its natural beauty, wildlife, and cultural heritage. National Parks are designated under the National Parks and Access to the Countryside Act 1949 and have more restrictive planning controls than elsewhere.

Native species - Species that have arrived and inhabited an area naturally, without deliberate assistance by humans.

Natural Capital – Natural resources including geology, soils, air, water and all living organisms, that provide value or services to society. This have a market value (such as

timber or water quality), or have non-market value (such as recreation or landscape amenity).

Peat - A largely organic substrate consisting of partly decomposed plant material forming a deposit on acidic, boggy ground.

Peatland Code - A voluntary certification standard for UK peatland restoration projects that want to market the climate benefits of peatland restoration. It provides assurances to voluntary carbon market buyers that the climate benefits being sold are real, quantifiable, additional, and permanent. It is an example of carbon offsetting, and natural capital financing.

Plantation on Ancient Woodland Site (PAWS) - Planted forests of native or non-native tree species that have replaced the original 'natural' woods on sites with a long history of woodland cover (see ancient woodland).

Potential Measure- A specific practical action which if implemented would help to achieve one of more priorities of the LNRS.

Priority – A shorter term (3-10 year) target that is an end result that this version of the LNRS is seeking to achieve.

Priority Habitat – Habitats that are included on the list of 'Habitats and species of principal importance in England'. This list is a legal duty under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Ramsar Site – An area that is protected due to it being a wetland site of international importance. Designated under the Ramsar Convention, they contain representative, rare or unique wetland types, or are international important for conserving biological diversity.

Rank vegetation - Dense, unmanaged vegetation that hasn't been cut or grazed in some time and is dominated by tall, tussocky growth dominated by coarse grass species.

Reintroduction - Human intervention to establish a new population of a plant or animal species that is either no longer found in Cumbria or is absent from significant parts of their former range.

Responsible Authority - A Defra appointed authority, as listed in section 105(2)(a) to (e) of the Environment Act 2021, responsible for preparing, publishing, reviewing, and republishing the LNRS for a specific geographic area. The Responsible Authority for Cumbria is Westmorland and Furness Council.

Restore - Improving the condition or distinctiveness of degraded or fragmented habitats that are not currently classed as wildlife-rich, where the broad habitat type would stay the same (e.g. modified grassland being transformed into hay meadow). Associated potential measures would result in them becoming wildlife-rich.

Riparian - Relating to, or situated adjacent to, a watercourse or water body.

Scrub: A plant community dominated by shrubs and bushes. A successional habitat which is in transition between one habitat and another. It is normally dominated by shrubs and bushes such as hawthorn, gorse, brambles and thickets, and nettles.

Silviculture - The growing and cultivation of trees, including techniques of tending and regenerating forests, and harvesting their physical products.

Site of Special Scientific Interest (SSSI) - An area that is protected for its particular interest to science, due to it being nationally significant for the rare species of fauna or flora, or important geological features it contains. These sites are protected under UK law by the Wildlife and Countryside Act 1981.

Special Area of Conservation (SAC) - an area that is protected for the special habitats and/or species is supports, that are of international significance. They were originally designated under the Habitats Directive (EU legislation) and following 'Brexit' are protected under UK law by the Conservation of Habitats and Species Regulations 2017.

Special Protection Area (SPA) - an area that is protected for birds of international significance. They were originally designated under the Birds Directive (EU legislation) and following 'Brexit' are protected under UK law by the Conservation of Habitats and Species Regulations 2017.

Species of Principal Importance - Species that are included on the list of 'Habitats and species of principal importance in England'. This list is a legal duty under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Statement of Biodiversity Priorities – This written document that forms part of the LNRS, along with the Local Habitat Map.

Structural Diversity - The degree of physical variation in the different elements of a habitat.

Subtidal – Coastal habitats that occur below low tide.

Supporting Authority - A Defra appointed authority that is either Natural England or is listed in section 105(2)(a) to (e) of the Environment Act 2021 and the strategy area wholly or partly includes the area to which the authority relates, but they are not the responsible authority. Supporting Authorities in Cumbria are Natural England, Cumberland Council, Lake District National Park Authority and Yorkshire Dales National Park Authority.

Supratidal – Coastal habitats that occur above the spring high tide line but within the 'splash zone', where the sea still affects them, but they are not submerged by the sea.

Sustainable Management - The stewardship and use of land in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity and vitality, as well as their

potential to fulfil, now and in the future, relevant ecological, economic and social functions at local, national and global levels, and that does not cause damage to other ecosystems.

Translocation – Human intervention to assist individuals from an established plant or animal population to expand their current range within Cumbria by moving individuals to new sites.

Vision - A long-term (20-30 year) shared aspiration or goal for the future of nature recovery that outlines what the natural environment could look like if action for nature recovery is taken.

Wider benefits - Actions which support and draw on nature to provide wider environmental or societal benefits, for example improvements to the water environment, flood risk management, or climate mitigation and adaptation.

Wetland and Freshwater – A broad habitat theme used in the Cumbria LNRS. It includes:

- rivers and streams
- lakes and ponds (oligotrophic and dystrophic lakes, mesotrophic lakes, eutrophic standing waters, ponds, aquifer fed naturally fluctuating water bodies)
- fen, marsh and swamp (upland flushes fens and swamps, purple moor grass and rush pastures, lowland fens, reedbeds, wildlife-rich floodplain wetland mosaics)
- lowland raised bog
- other modified waterbodies
- other wetland habitats

Wildlife-rich Habitat - Habitats that:

a) are included on either:
    - the list of 'Habitats and species of principal importance in England' under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, or
    - Schedule 1 of the Statutory Instrument for The Environmental Targets (Biodiversity) (England) Regulations 2023; and,

b) meet the condition requirements outlined in the Natural England Technical Information Note TIN219: Environment Act Habitat Target – Definitions and Descriptions (2024).

Wood pasture - Areas of historical, cultural and ecological interest, where grazing is managed in combination with a proportion of open tree canopy cover.

Woodland Carbon Code - A voluntary certification standard for UK woodland projects that want to market the climate benefits of woodland creation. It provides assurances to voluntary carbon market buyers that the climate benefits being sold are real, quantifiable, additional, and permanent. It is an example of carbon offsetting, and natural capital financing.

Woodland, Trees and Scrub – A broad habitat theme used in the Cumbria LNRS. It includes:

- broadleaved woodland (lowland mixed deciduous woodland, lowland beech and yew woodland, upland oakwood, upland mixed ashwoods, upland birchwoods, wet woodland, wildlife-rich native broadleaved woodland, and wildlife-rich mixed woodland); ;
- traditional orchards;
- wood pasture and parkland;
- hedgerows,
- wildlife rich scrub
- bracken
- coniferous woodland
- trees outside woodlands

World Heritage Site – Landmarks or areas with legal protection by an international convention administered by the United Nations Educational, Scientific and Cultural Organization (UNESCO). These sites are designated for having cultural, historical, scientific, or other forms of significance.