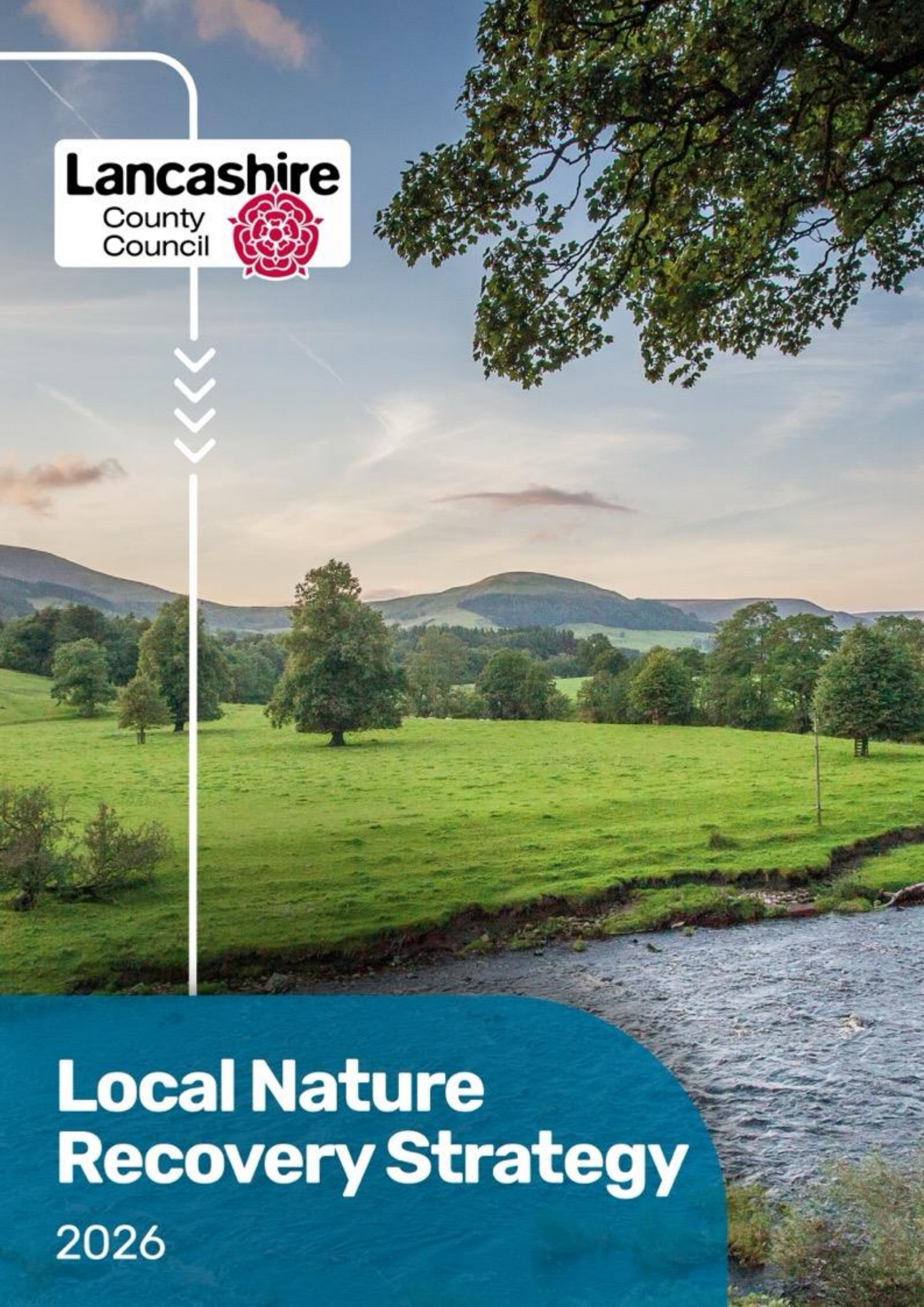

Lancashire County Council

Local Nature Recovery Strategy

2026

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Foreword

We are lucky in Lancashire to have a diverse and spectacular environment and landscape, stretching from the uplands to the coast, including areas designated for their national and international importance for biodiversity. However, reflecting global and national trends, Lancashire's biodiversity has been declining. We want to halt this decline and, in time, reverse biodiversity loss. We want to enhance and protect our best nature rich sites, create new sites where there is opportunity to do so, and provide better access to nature-rich open spaces that everyone can enjoy.

This is the first nature recovery strategy for Lancashire. It recognises the challenges we face in reversing this decline, but also the great opportunities we have for nature recovery and the benefits action can have, not only for our important landscapes, habitats and species, but for the people of Lancashire. Nature can provide many benefits, including greater public enjoyment and health benefits, carbon capture, water and air quality improvements and flood management. A more attractive place to work, visit and do business also encourages local economic growth.

I would like to thank everyone that has provided invaluable input and supported the county council in preparing this strategy for Lancashire, and I look forward to continuing this collaboration in delivering the priorities and opportunities we have collectively identified. By working together, we can build on the good track record we have in Lancashire on improving our environment and use this strategy as a foundation for further action.

County Councillor Joshua Roberts
Cabinet Member for Rural Affairs, Environment and Communities

Wildflower meadow

Acknowledgements

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- Lancaster City Council
- Pendle Borough Council
- Preston City Council
- Ribble Valley Borough Council
- Rossendale Borough Council
- South Ribble Borough Council
- West Lancashire Borough Council
- Wyre Council
- Yorkshire Dales National Park Authority
- Natural England

Consenting Authorities:

- Environment Agency
- Forestry Commission

Habitat Leads:

- Graeme Skelcher Ecology
- Lancashire Wildlife Trust
- Lancashire Peat Partnership
- Lancaster University
- Ribble Rivers Trust
- Suzanne Perry
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The local environmental records centre – LERN (Lancashire Environment Record Network).

Marine Management Organisation

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- Peter Gateley – Dwarf cornel, page 126
- Lancashire Wildlife Trust – Astley Park, Chorley, page 149

Executive Summary

Local Nature Recovery Strategies (LNRS) were introduced by the Environment Act 2021 to drive nature's recovery and provide wider environmental improvements. Their main purpose is to identify locations to create or improve habitat most likely to provide the greatest benefit for nature and the wider environment. The LNRS is a tool to identify opportunities for nature recovery, which can be used to target action and funding. The LNRS is not intended to be a delivery plan.

Lancashire County Council has been appointed as the responsible authority for the preparation of the Lancashire LNRS, which includes Blackburn with Darwen and Blackpool. An inclusive and collaborative approach has been taken to co-produce the Strategy with a broad range of stakeholders.

This Strategy provides a shared vision for collaborative nature recovery action to protect, enhance and connect our rich natural environment and biodiversity to benefit all Lancashire residents and visitors. It aims to:

- Halt and reverse local biodiversity loss and support thriving species populations to move more freely through the landscape.
- Conserve natural resources and build resilience to climate change.
- Provide wider environmental and societal benefits for the people of Lancashire.
- Reinvigorate existing partnerships and establish new ones to deliver nature recovery in the places and spaces that need it most on a landscape-scale.

The Strategy is made up of two main elements, a Statement of Biodiversity Priorities, and a Local Habitat Map.

The **Statement of Biodiversity Priorities,** includes a description of Lancashire and its biodiversity in terms of geomorphology, important habitats, and species, drawing together existing information on the state of nature and the environment in Lancashire. Lancashire's important habitats span the following broad habitat types:

- Aquatic and wetland
- Coastal and estuarine
- Grasslands (including agricultural land)
- Lowland and upland peatland
- Rocky habitats
- Wooded habitats and trees
- Urban habitats (including infrastructure networks)

The existing and likely future pressures faced by each of these habitats have been identified, together with possible opportunities for nature recovery to overcome these pressures. These pressures and opportunities have informed the priorities (the long-term end results that the strategy is seeking to achieve) and the potential measures, or actions, that can be taken to contribute to achieving each agreed priority and deliver wider benefits such as climate resilience, flood risk management, more equitable access to nature-rich open spaces that is safe and sustainable, and improved health outcomes. Measures include, for example, the enhancement, creation, expansion,

connection and maintenance of Lancashire's important habitats as well as other actions to support nature's recovery.

Measures carried out on each specific habitat will benefit a range of Lancashire's most important species. These have been identified alongside the habitat measures. Twenty-four species have also been identified as 'target species'. These are some of Lancashire's most scarce, declining or most important species, requiring bespoke actions beyond the more general habitat creation and enhancement measures to enable their recovery. They are:

Mammals:

- Red squirrel

Fish:

- Atlantic salmon
- European smelt

Birds:

- Hen harrier
- Black-tailed godwit
- Black-headed gull
- Lesser black-backed gull

Plants:

- Yellow Star-of-Bethlehem
- Northern bedstraw
- Wood crane's-bill
- Melancholy thistle
- Lady's slipper orchid
- Petty whin
- Dwarf cornel

Invertebrates:

- Duke of Burgundy butterfly
- High brown fritillary butterfly
- Pearl-bordered fritillary butterfly
- Large heath butterfly
- Belted beauty moth
- Least minor moth
- Wall mason bee
- Tormentil mining bee
- Bilberry bumblebee
- Red wood ant

Additionally, three 'universal' priorities that relate to recurring pressures across all habitats have been identified as:

- Access to nature is provided whilst minimising recreational impacts on sensitive sites, habitats and species populations.
- Nutrient enrichment, sediment deposition and pollution are minimised.
- Biosecurity and control of invasive species.

The measures that could be taken to address these have also been identified. These are unmapped measures i.e. potential actions that could be used widely across the whole strategy area. Mapped measures are those opportunities which can be mapped to a particular area on the **Local Habitat Map** (see below).

Supporting actions that are not specifically linked to delivering actions 'on the ground' but are equally important in achieving the wider goals of nature recovery have been identified as:

- Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
- Engagement, collaboration and support to promote nature recovery.
- Policies that support nature recovery.
- Funding and finance for nature recovery.

The **Local Habitat Map** identifies the existing Areas of Particular Importance for Biodiversity. These include internationally, nationally, and locally designated sites, as well as Lancashire's statutory irreplaceable habitats. The map also identifies the 'Areas that Could Become of Particular Importance' for biodiversity. These are the locations where potential measures including creation or restoration of habitat could deliver the greatest gains in terms of nature's recovery, wider benefits for the environment and people, and the most investible opportunities for private investment in nature's recovery.

The map shows how existing habitats (Areas of Particular Importance for Biodiversity) can be connected to create ecological networks enabling species to move between them and help nature thrive.

This LNRS will be the guiding strategy for nature recovery across Lancashire. It can be used by everyone, including residents, community groups, landowners, businesses, environmental organisations and local authorities to target action and to inform future policies and plans.

1. Introduction

Lancashire is a diverse county with a rich history and culture. The contrasting geography of the area, along with the creativity and friendliness of its people, combines to make Lancashire a great place to live, learn and work. Lancashire is 'polycentric' with a strong network of urban centres set amongst areas of outstanding natural beauty.

There is great natural physical diversity from coast and estuary landscapes to uplands with extensive areas of open countryside and moorland. There is also a great variety in the focus and intensity of the management of land, including areas carefully managed for nature conservation aims, dense urban, commercial, and industrial landscapes.

"Despite being one of the most populous and urbanised shire counties in the UK, much of Lancashire is still predominantly rural. The coastal plain formerly had extensive raised mires (mosses), which have been converted into highly productive agricultural land, and uncultivated mossland only survives as remnants. Some of the vast numbers of wildfowl and wading birds, which feed and roost on the extensive estuaries also use these fields for feeding. Nationally important areas of coastal limestone pavement occur in the north of the county. Semi-natural grasslands are now very rare on the plain but, together with other traditional lowland farmscape elements, are important for farmland birds and plant species which are declining nationally. High field pond densities are locally very characteristic. In the east are two major semi-natural upland areas; of which the Forest of Bowland and outlying Pendle Hill is the most northerly. Heather moorland and blanket bog here are of international importance for breeding birds. The herb-rich hay meadows and clough woodlands are nationally important habitats, but semi-natural grasslands including marshy grasslands which support breeding waders continue to be lost to agricultural improvements. A similar range of habitats occurs in the West and South Pennines, shared with adjacent counties of Greater Manchester and West Yorkshire, and upland reservoirs here add habitat diversity. With the notable exception of the Arnside & Silverdale AONB, Lancashire's woodland cover is low[2]."

Wild about the North West: A biodiversity audit of North West England

The landscape and environment in Lancashire today are the result of millennia of complex interactions between geology, topography, climate, and human activity. It is an ever-changing picture which is not (and cannot) be either static or unmanaged.

Lancashire residents recognise the importance of nature for the natural beauty and cultural heritage it provides and for the benefits it can bring for both physical and mental wellbeing, with many visiting a local park or nature reserve on a weekly basis. However, many are concerned about the state of nature and issues such as the loss of green space and pollution of rivers.

There is limited data on the state of Lancashire's nature, but from what is known, and using the knowledge of local experts, we know Lancashire is experiencing a decline in biodiversity. Key bird populations are declining and bee numbers are falling

dramatically. Woodland cover in Lancashire is below the north-west and national average. Lancashire's habitats and species are experiencing pressure from land-use changes, recreation, pollution, and the changing climate. However, there are great opportunities for nature recovery, building on work already being delivered by many organisations across Lancashire. For example, since January 2022, over £3.7m has been allocated to peatland restoration initiatives in Bowland. Additionally, more than £1m has been secured for tree planting through the Treescapes project and the strong Catchment Partnerships across Lancashire have secured investment to deliver woodland creation and natural flood management schemes. There are many local community engagement and volunteer groups across the county, enabling people to learn new skills and improve health and wellbeing by spending time in nature as well as making improvements to their local green space and making them more accessible for everyone.

The vision for nature recovery

This Strategy provides a shared vision for collaborative nature recovery action to protect, enhance and connect our rich natural environment and biodiversity to benefit all Lancashire residents and visitors. It aims to:

- Halt and reverse local biodiversity loss and support thriving species populations to move more freely through the landscape.
- Conserve natural resources and build resilience to climate change.
- Provide wider environmental and societal benefits for the people of Lancashire.
- Reinvigorate existing partnerships and establish new ones to deliver nature recovery in the places and spaces that need it most on a landscape-scale.

This will be the guiding strategy for nature recovery across Lancashire. It can be used by everyone, including residents, community groups, landowners, businesses, environmental organisations and local authorities to target action and to inform future policies and plans.

Why we need a Local Nature Recovery Strategy

England is widely considered to be one of the most nature-depleted countries in the world following historic and ongoing declines, resulting in the government making legally binding commitments to end these declines and for nature to recover.[3] The 25 Year Environment Plan[4] set out 10 long-term goals for action to help the natural world regain and retain good health. It introduced the concept of creating a "nature recovery network" to complement and connect our best wildlife sites and provide opportunities for species conservation and the reintroduction of native species. Such a network will deliver on the recommendations from Professor Sir John Lawton[5] that recovering wildlife will require more habitat; in better condition; in bigger patches that are more closely connected.

The Environment Act[6] 2021 required the setting of a suite of legally binding targets, including a target to halt the decline in species abundance. This target is set out in the Environmental Improvement Plan 2023[7], the first revision of the 25 Year Environment Plan, along with additional commitments related to nature. A list of relevant national targets and objectives agreed in the Plan is outlined at Appendix One. The Environment Act also introduced the requirement to prepare nature recovery strategies for areas in England to identify opportunities to create and restore habitat to help deliver these commitments. There are 48 local nature recovery strategies covering the whole of England with no gaps or overlaps. Together they will underpin the Nature Recovery Network.

The benefits of nature

Nature plays a vital role in supporting our wellbeing, society, and economy. It provides the air we breathe, the food we eat, the water we drink, and many of the resources crucial for our survival and quality of life. Nature also captures and stores carbon and has a vital role to play in helping us adapt to the impacts of climate change.[8]

Environmental benefits

Habitats and the natural environment are responsible for dynamic systems and natural processes such as soil formation, the water cycle, the carbon cycle, supporting food production and climate regulation, which are all fundamental to sustaining life. These are functions that cannot be substituted with other solutions such as technology. They are irreplaceable.

A healthy water supply depends on natural habitats and processes for filtration, regulation of water flow and reducing sediment and pollution. Habitat creation and enhancement can also reduce erosion and support sustainable management of river catchments with increased resilience to floods and drought. Water supply, healthy soils, pollinators and the control of pests and diseases are fundamental for food production.


Peatland restoration at Pendle Hill

Habitats can store huge amounts of carbon in soil, sediment, and vegetation, helping to reduce carbon emissions. Conversely, habitat degradation results in the release of emissions contributing to climate change. Carbon storage and sequestration by habitat is illustrated in Appendix Four.

Through regulating water flows and temperature, providing flood protection, and reducing erosion, the natural environment is important in helping to build resilience to the impacts of a changing climate.

Benefits to the economy

A healthy environment results in a more attractive area to live, work, visit and enjoy, which encourages local economic growth. The economy is reliant on natural resources for multiple purposes such as food and timber production, raw materials for construction and industry, a healthy water supply and flood alleviation. This is known as 'natural capital' and is important to local and national economies, such as manufacturing, energy, farming, fishing, forestry, leisure, and tourism, all of which depend on local employment and skills and provide potential for the creation of new jobs in low carbon industries, land management and natural science.

Haymaking

Livestock farming

Health and wellbeing benefits

Drinkable water, clean air, nutritious food, and a safe environment are all critical for physical and mental health. Risks to public health from air pollution can be reduced through tree planting and other habitat creation. Targeted planting can have further benefits on air quality through the formation of green barriers, and this can also help to control temperatures in urban areas. Experiences of nature-rich and quiet open spaces in urban and rural environments also have great benefits for both physical and mental health and wellbeing.

Earnsdale Reservoir

Social, cultural, and educational benefits


Avenham Park, Preston

The natural environment has intrinsic value and importance to many people. Nature recovery action can enable active engagement with the natural world, whilst providing social and educational opportunities and benefits to wellbeing, through events, outdoor learning, and volunteer opportunities.

The State of Nature

Globally, it is estimated that over 1 million species are threatened with extinction and that the populations of many vertebrate animals have declined by at least two-thirds since 1970[9]. The UK has experienced a significant loss of biodiversity, with declines over the last 50 years following on from major changes to the UK's nature over previous centuries. As a result, the UK is now one of the most nature-depleted countries[10], the State of Nature Report in England highlights:

- Intensive management of agricultural land since World War II has historically led to significant loss and fragmentation of semi-natural habitats.
- The abundance of terrestrial and freshwater species has on average fallen by 32% across England since 1970.
- The distributions of 4,815 invertebrate species on average decreased by 18% since 1970.
- Since 1970, the distributions of 64% of flowering plant species and 68% of bryophytes (mosses and liverworts) have decreased.
- Of 8,840 species that have been assessed using IUCN Regional Red List criteria[11], 13% have been classified as threatened with extinction from Great Britain.

There is little data available on biodiversity trends for Lancashire, and the absence of sufficient data prevents robust statistical analysis. Survey and research targeted through the LNRS will therefore be essential to aid understanding and ultimately the recovery of Lancashire's habitats and species. The information available indicates:

- Total tree and woodland cover is approximately 10.34% (2022 National Forest Inventory figures[12] and Trees Outside Woodland data published 2023[13]), this is below the North West average for woodland cover (12.57%) and the England average (14.87%).
- Coastal squeeze of inter-tidal habitats is increasing pressure on biodiversity in the important coastal habitats of Lancashire.
- Bird populations can be used as an indicator of the wider state of nature. Mirroring national trends there have been declines in Lancashire's bird species. The data between 1999 and 2011 shows:
    - Important woodland species pied flycatcher and willow tit declining by 10% and 50% respectively with willow tit further declining by 14% between 2011 and 2020.
    - Three key moorland species are in serious decline with ring ouzel declining by 29%, whinchat by 55% and twite by 85% (possibly functionally extinct).
    - Among aquatic and wetland species, breeding curlew, lapwing and snipe are all declining (curlew unknown, lapwing by 7% and snipe by 23%).
    - Among Coastal and Estuarine species, redshank has declined by 22% and ringed plover by 28%.
    - Of grassland and farmland birds, corn crake is functionally extinct but could be considered for reintroduction in future strategies. Grey partridge, yellow wagtail and corn bunting are all in decline (by 37%, 37% and 18% respectively).
    - Among urban species, greenfinch appear to remain stable after recent declines, however others are sadly in decline with starling declining by 1%

(after a much larger decline), swallow by 5%, house martins by 20% and swifts by 35%.

- Key invertebrate groups also show a pattern of decline in most species. Bees have experienced the most dramatic decline.

- We have very little information on mammal trends for Lancashire, but it is believed many follow the national trends showing a long-term decline. Some species like water vole which historically supported much greater populations in Lancashire have severely declined with only small remnant populations remaining.

- The Ribble Rivers Trust utilise a catchment scale fisheries monitoring programme, focused on salmonids (trout and salmon) to provide an indication of catchment health, which allows identification of locations in poor condition requiring further investigation and action to make improvements. This data has shown a concerning decline in populations of both salmon and trout across the catchment. Although salmon populations are significantly dependent on marine conditions, trout are less so and show the same trajectory. Historically, eel populations were well supported in Lancashire, but only small remnant populations now remain.

1. Twite.
2. Snipe.
3.Ringed plover.
4. Grey partridge.
5. Greenfinch.
6. Curlew

Causes of biodiversity decline

Evidence from the last 50 years shows that on land and in freshwater,[10] climate change and land management intensification have had the greatest impacts on our wildlife. Historic pressures on habitats and biodiversity have been linked to increased consumption, reduced resource efficiency[14], and changes to land use and human activity. Many habitats have become fragmented or lost as a result. Absent management is an ongoing pressure on remaining habitat fragments, which may be too small to be managed effectively, particularly species-rich grasslands and wetlands[15]. However, many land managers are working hard together with ecologists and conservationist to reverse these trends.

The government's Environmental Improvement Plan acknowledges the significance of climate change as a pressure on nature. It recognises that we will see more intense and changeable weather and coastal erosion; an increase in risks from pests, pathogens, and invasive species; and knock-on impacts to our ecosystems, habitats, species and agricultural, forestry and marine productivity.

Nature Recovery

Ecological networks have become widely recognised as an effective way to conserve wildlife in environments that have become fragmented by human activities. An ecological network comprises a suite of high-quality sites which collectively contain the diversity and area of habitats needed to support species and which have ecological connections between them enabling species to move between them. The LNRS identifies where the greatest connectivity between similar biodiverse habitats across the landscape can be achieved.

What is a Local Nature Recovery Strategy?

A local nature recovery strategy (LNRS) is a locally led and collaborative strategy for nature recovery. The LNRS identifies priorities agreed between a wide group of stakeholders to drive nature's recovery. In doing so, the LNRS provides wider benefits, such as public access to nature, natural flood risk management and resilience to climate change.

The main purpose of the LNRS is to identify locations to create or improve habitat most likely to provide the greatest benefit for nature and the wider environment. These mapped opportunity areas are intended to guide where the public, private and voluntary sectors can focus their nature recovery efforts to enable the best, most joined-up actions to help improve connectivity and resilience for habitats and species across the strategy area.

The LNRS is a tool to identify opportunities for nature recovery, which can be used to target action and funding. It is not intended to be a delivery plan. Landowners of the areas mapped are not obliged to deliver the opportunities identified. They are simply opportunities within areas that could deliver the greatest gains in terms of nature's recovery, wider benefits for the environment and people, and the most investible opportunities for private investment in nature's recovery.

The LNRS does not add levels of designation to land and therefore does not assign any level of protection or restrictions on land use. It also does not give permission to create habitat without necessary consultation and consents or without following appropriate existing statutory requirements, decision-making frameworks, and pre-existing procedures.

What is in the Local Nature Recovery Strategy?

The Nature Recovery Strategy is made up of two main elements, a statement of biodiversity priorities and a local habitat map, that come together to set out how and where action can be taken to provide the greatest benefits for nature recovery.

The statement of biodiversity priorities draws on existing information on the state of nature and the environment to describe Lancashire and its biodiversity and identify existing areas of particular importance, including internationally designated sites and those designated locally as important for Lancashire.

The existing and likely future pressures on nature such as pollution, climate change, development and other land-use change, and the possible opportunities for nature recovery and enhancement to overcome those pressures are identified. These pressures and opportunities have informed the development of the Strategy priorities and measures for both habitats and species.

Priorities: These are the long-term end results that the strategy is seeking to achieve in terms of habitats and species. The priorities for Lancashire reflect local circumstances, including the most important issues to local people and organisations.

Potential Measures: These are the practical actions that could contribute to achieving each agreed priority and can deliver wider gains for the environment and people of Lancashire.

The Local Habitat Map provides a clear visual way to see the existing areas of particular importance for biodiversity and those that could become of particular importance if the mapped potential measures are implemented. Areas that could become of particular importance have been targeted to join up or expand existing areas of particular importance for biodiversity. This is intended to establish larger, more resilient networks of high-quality habitat across the landscape, and show how spaces can be better connected across Lancashire.

How the strategy was developed

As the designated responsible authority, Lancashire County Council has led on the production of this LNRS. However, an inclusive and collaborative approach has been taken to co-produce the Strategy with a broad range of stakeholders. This includes all local authorities in the strategy area, public bodies (Environment Agency, Forestry Commission and Natural England), habitat and species experts from local environmental organisations and Lancaster University. Land managers (farmers, local authorities, education providers, the NHS, and utilities companies) and members of the public have shared their knowledge, experience and understanding of where nature recovery should be focused, and this information has fed into the production of the LNRS. The Strategy has been developed following the statutory and non-statutory guidance provided by DEFRA and Natural England, taking an evidence-based and locally led approach incorporating data, local expertise, and local opinion.

In preparing this strategy we have:

- Established a Steering Group to provide oversight and direction.
- Delivered a stakeholder mapping workshop to identify key organisations to be involved at various stages of the process.
- Established a mapping, data, and evidence group to develop ecological network models and lead on data management.
- Carried out an online public engagement survey, including an interactive publicly accessible online map, to gather opinion and opportunities for nature recovery across the strategy area.
- Appointed specialist facilitators to engage with landowners, land managers, farmers, and representatives from the sector through workshops, webinars, drop-ins at auction marts and attending existing farmer groups.
- Supported by Natural England, held four 'People and Nature' workshops to engage with the Voluntary Community Faith and Social Enterprise (VCFSE) sector.
- Reviewed over 190 national, regional, and local strategic plans, and documents to identify common pressures, themes, priorities, and measures for each broad habitat type.
- Commissioned local environmental organisations to lead on each of the habitat groups and facilitate input from key interested organisations. They helped to describe the strategy area, its biodiversity and identify the pressures and opportunities for recovery in relation to their habitat to inform the development of priorities and measures.

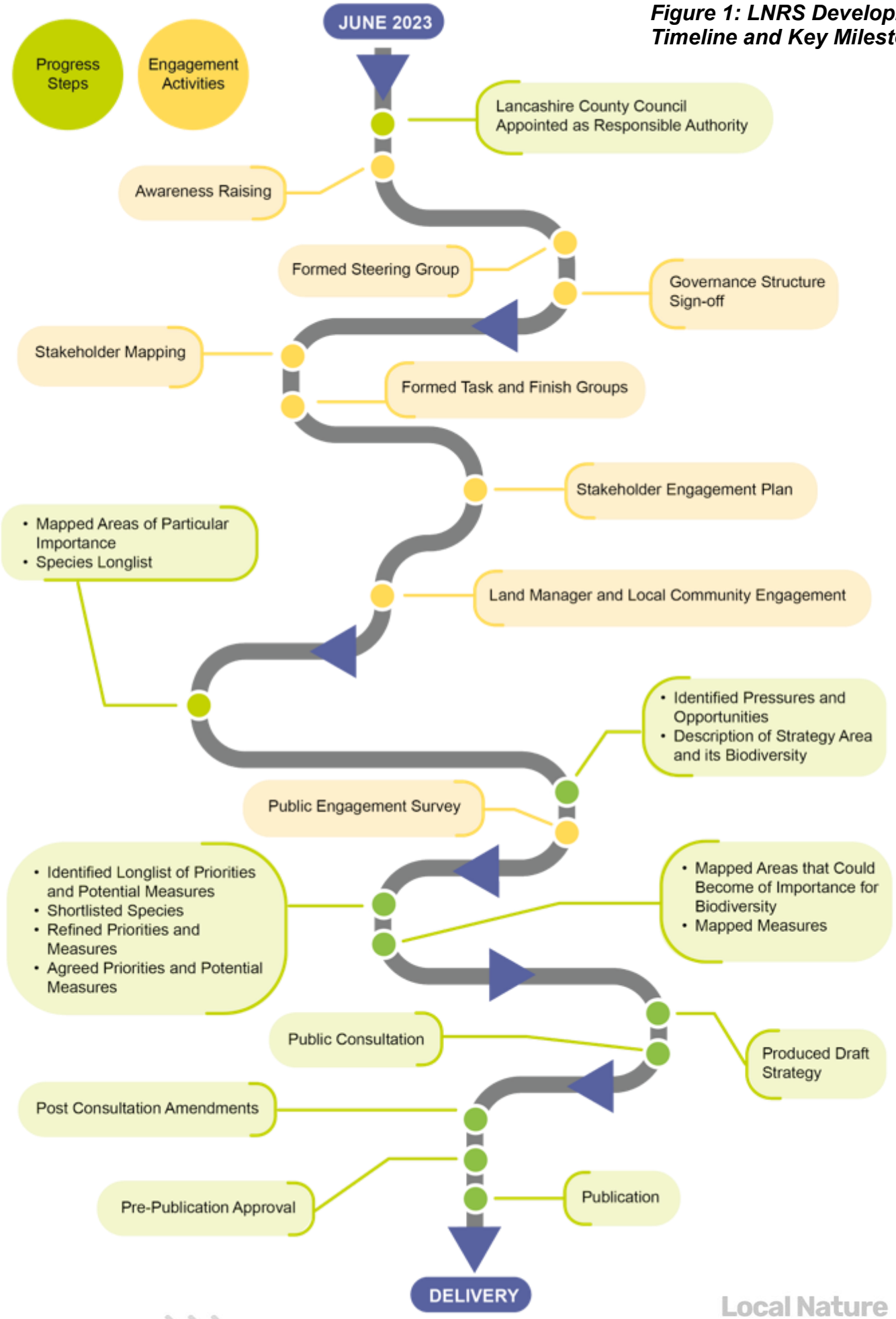
- Engaged species experts to identify Lancashire's most scarce, declining or most important species requiring bespoke actions beyond the more general habitat creation and enhancement measures.

- Undertaken a 6-week public consultation process between June and August 2025. This resulted in a large number of responses from residents and others, demonstrating widespread public support for the strategy and enthusiasm to be involved in the delivery process. Consultation responses also highlighted potential improvements to the strategy.

- Adjusted the Local Habitat Map, the Statement of Biodiversity Priorities and Appendices, as appropriate, to address matters raised through the public consultation.

A timeline of the key milestones is provided in Figure 1. Further details on the LNRS development process, and sources of information and data used to inform the strategy are included in the supplementary *Evidence and Technical Information* document[16].

Figure 1: LNRS Development Timeline and Key Milestones



Who the LNRS is for and how to use it

The LNRS is for the nature and people of Lancashire. Whether you are a land manager, developer, planner, environmental organisation, member of a community group or resident, everyone can act for nature.

The LNRS is not a delivery plan but can be used to understand how and where action could be taken to help nature recover. It identifies the opportunities for nature recovery action in locations likely to provide the greatest benefit. However, this does not preclude nature recovery action in other locations. The LNRS does not impose requirements for land use change, establish statutory designations or place restrictions on land use. All projects delivered to meet LNRS priorities must still comply with relevant legislation, policy, and best practice standards, a summary of some key considerations is provided in Appendix Two.

The Strategy can be used to:

Inform and evidence:

- Policies, plans, and land-use change decisions.
- Land management options, advice, and decisions.
- Appropriate nature recovery opportunities locally and on a landscape scale.
- Understanding of the state of Lancashire's nature and where there is a need for improved information and data.

Target action:

- in the places where it is most likely to have the greatest benefit to species and habitats.
- to take a strategic approach to species recovery, including target species prioritised for bespoke conservation measures.

Deliver multiple benefits:

- Identifies where actions can have multiple benefits, such as reduced flood risk, climate resilience, equitable access to nature, and improved health outcomes.
- Encourage greater involvement in nature recovery by everyone and promote a collaborative approach.

Direct funding and investment:

- Helps to target and prioritise nature recovery funding and investment.
- Identifies strategically significant locations for delivery of Biodiversity Net Gain (BNG).
- Provides evidence and support for funding applications.

Monitor:

- Provides a strategic framework for monitoring biodiversity change.

Different organisations and groups of people will be able to use the LNRS in different ways:

***Local authorities and public bodies*:** Section 40 of The Natural Environment and Rural Communities (NERC) Act 2006 (duty to conserve biodiversity)[17] addresses the duties of public authorities in relation to local nature recovery strategies. Public authorities are required to consider what they can do to conserve and enhance biodiversity and then take action as they consider appropriate. In meeting this requirement, they must have regard to any relevant LNRS.

Section 98 of the Levelling-up and Regeneration Act 2023[18] requires the Contents of a neighbourhood development plan to take account of any LNRS that relates to the neighbourhood area.

The LNRS can support with informing policy, targeting action and provide assurance that biodiversity improvements and nature recovery projects are being targeted in the best locations to achieve the greatest benefit.

***Land managers and landowners*:** Landowners and land managers are integral to supporting nature and achieving better outcomes for biodiversity. The Local Habitat Map shows where the best opportunities to do something significant for nature recovery are located and what the likely best actions could be. Management for nature recovery may provide opportunities for funding, such as through agri-environmental schemes or Biodiversity Net Gain (BNG). The Local Habitat Map also highlights where there are nearby opportunities and where potential landowner clusters could be formed to collaborate on nature recovery initiatives.

***Developers*:** The local habitat map identifies opportunities for developers to deliver mandatory BNG. Development projects that create, enhance, or recover habitat in locations which are mapped in a LNRS can get a higher biodiversity value in the biodiversity metric than they would in other locations.

***Environmental organisations*:** Local environmental organisations are already delivering nature recovery projects across Lancashire and will be important in achieving the strategy priorities. The LNRS provides an opportunity to align approaches and work towards an agreed set of shared goals. The Local Habitat Map shows where the best opportunities to do something significant for nature recovery are located and will help to identify where efforts and funding could be targeted for the greatest benefit.

***Businesses*:** All businesses and organisations can take action to embed nature-friendly practices into their operations and corporate plans and invest in nature's recovery. The Local Habitat Map can help businesses to understand how their activities fit within the local environment and could identify opportunities for collaboration, staff volunteering schemes or opportunities to support a local community group deliver nature recovery initiatives.

***Community groups*:** There are many active community groups tending local sites across Lancashire. The LNRS can help to identify where the best opportunities for

nature recovery are, provide direction on what action to take, and support funding applications. It will also help groups understand how local project support wider nature recovery.

***Residents*:** Residents can use the LNRS to find out what they can do to support nature recovery and achieve co-benefits for health, wellbeing and access to nature. Private gardens, yards, balconies and communal spaces are particularly important for habitat connectivity, helping species move between areas.

What matters to you?

1. Hedgehogs
2. Bees
3. Red squirrels

In March 2024 an online public engagement survey sought residents' views on nature recovery to better understand what is important to our residents with regards to the natural environment, concerns for nature and aspirations for nature recovery. 963 people responded. You told us:

- The main reasons nature is important is for natural beauty, cultural heritage and improvement of mental and physical health.
- Almost half of respondents are concerned about the state of nature in Lancashire. 55% believe that nature in Lancashire is in at least a 'good' state.
- Hedgehogs, bees and red squirrels were the top species identified for nature recovery action.

- Almost 50% of respondents spend time in nature in their own garden daily, 21.4% visit their local park at least once a week with 17.5% visiting a nature reserve / conservation area weekly. However, only 30% strongly agreed that nature is of a high enough standard to want to spend time in.
- Barriers to accessing nature include safety, poor public transport, loss of nature to development, landowner restrictions and bad weather.
- The most important environmental issue of concern was, *'building on green and natural spaces'*, closely followed by *'pollution of rivers, lakes and groundwater'*.

Less than 5% of respondents to the survey were under 30 years old. To further engage with this age group, students at Myerscough College and at the Lancashire Youth Climate Conference 2024 at Blackpool Sixth Form were asked what issues were important to them. They highlighted:

- How nature connects people to places
- Conserving green spaces and nature reserves
- Clean beaches
- Good water quality on the coast

Information gathered from the public engagement survey formed part of the data used to inform the shortlisting of priorities and measures.

Landowners and managers

Independent facilitators experienced in working with farmers and land managers organised several workshops, webinars and drop in events to raise awareness of the LNRS and seek views and feedback that would help shape the priorities for Lancashire.

Participants from this sector displayed a clear pride in, and knowledge of, the wildlife on their land. This results in many taking action to support nature and biodiversity on their land and outside of any support or funding structures, and many examples of this were given. Key themes and opportunities that came out of this engagement were:

- The need for one-to-one advice
- The need for a single, trusted platform for information
- The need for education, training, and upskilling
- More and accessible baseline data
- The LNRS providing an opportunity for joined up thinking.

Some of the barriers and opportunities for nature friendly land management practices were identified as human impacts, accessibility of grants and agri-environment schemes, the pressures on farmers and land managers and in particular education; and the importance of educating children at an early age. The insight and feedback gathered[19] particularly around the enablers and barriers to nature friendly farming and land management practices has informed the potential measures and supporting actions.

Voluntary, Community, Faith, and Social Enterprise (VCFSE) Sector

Four 'People and Nature' workshops were held across Lancashire and were targeted at those working in health and education, the VCFSE sector and local community

groups working on projects to achieve multiple outcomes for people and nature. Areas of good practice and opportunities for nature as well as what could be done better were considered. They identified:

- The creation of high tide roosts for birds and the need for wetland restoration.
- The creation of wildflower meadows in parks and cemeteries and along road verges.
- The control and removal of invasive species.
- Water quality improvements.
- Species recovery.
- Supporting tree planting and peatland restoration projects.
- Numerous urban based projects including 'Green Social Prescribing' (nature-based activities to improve mental and physical health), 'growing' projects and nature-based regeneration and green infrastructure.

The pressure from development was a concern highlighted by all groups; as well as the need for training, pooling of resources and better knowledge sharing through resource hubs. These key findings have been reflected in the potential measures and supporting actions identified.

2. Statement of Biodiversity Priorities for Lancashire

Description of Lancashire and its biodiversity

The area covered by the strategy includes Lancashire's twelve districts, Blackburn with Darwen and Blackpool, covering an area of 3,066 square kilometres, with a population of 1.53 million. The Lancashire LNRS also includes a small part of the Yorkshire Dales National Park.

Figure 2: Boundary of the strategy area

Lancashire is 'polycentric' with a strong network of urban centres set amongst designated National Landscapes. There is great natural physical diversity from coast and estuary landscapes to uplands with extensive areas of open countryside and moorland, as well as dense urban, commercial, and industrial areas.

Natural England's National Character Area (NCA) profiles[20], together with a range of other local information have been used to provide summary descriptions of Lancashire's varied environment and biodiversity. Lancashire is divided into 11 NCAs (see Local Habitat Map). Each NCA represents a distinctly different landscape, following natural lines in the landscape not county or district boundaries. These NCAs comprise:

- Morecambe Bay Limestones
- Morecambe Coast and Lune Estuary
- Bowland Fells
- Lancashire and Amounderness Plain
- Lancashire Valleys
- Bowland Fringe and Pendle Hill
- Southern Pennines
- Lancashire Coal Measures
- Manchester Pennine Fringe
- Sefton Coast
- Yorkshire Dales

Morecambe Bay Limestones


Limestone pavement habitat

This area is found entirely within the district of Lancaster. It is a lowland landscape that surrounds the head of Morecambe Bay, consisting of conspicuous limestone hills with prominent scars, cliffs, screes, and exposed limestone pavements separated by areas of low-lying undulating farmland with limestone drystone walls, and wetland habitats including reedbeds, mudflats, coastal marsh and saltwater lagoons (in particular Leighton Moss). There are significant areas of limestone pavement, often forming a mosaic with other habitats. Lancashire and Cumbria are nationally recognised for the rare and unique wooded limestone hills and the limestone pavements of Arnside & Silverdale National Landscape. Some limestone pavements have been heavily damaged by historic impacts and non-native invasive species. There are also several small caves, limestone outcrops and active and former quarries together with open

mosaic habitats on previously developed land. The underlying limestone blocks form an arc rising steeply from the estuarine landscape at the head of Morecambe Bay with its extensive intertidal flats and saltmarshes.

The retreat of glaciers from the last ice age to the north in Cumbria left several shallow river valleys including the Crake, the Lyth, Bela and Keer whose rivers join the channels of the main rivers, the Leven, and the Kent, as they enter Morecambe Bay and discharge through a vast dynamic estuarine network.

Leighton Moss Special Protection Area (SPA), Ramsar and Site of Special Scientific Interest (SSSI), situated between Warton Crag and Silverdale on the edge of Morecambe Bay, is a site of outstanding importance for birds and wetland habitats. It contains the largest reedbed in north-west England, areas of open water and willow/alder scrub and mixed fen vegetation, supporting nationally important breeding populations of bittern, and bearded tit. The site also supports breeding marsh harrier (a feature of the Ramsar designation). A large population of reed warbler (one of the most northerly colonies in Britain), as well as sedge and grasshopper warblers, water rail and a wide range of waterfowl breed there. The site supports a variety of passage and wintering waterfowl and other birds, including nationally important numbers of teal, shoveler and gadwall. The site is also of value for other fauna including otters and a wide range of butterflies.

Hawes Water (SSSI) is situated in the centre of Arnside & Silverdale National Landscape. It comprises a complex of limestone habitats including a nationally important example of a marl lake. It is the only marl lake in Lancashire and one of only a small number in the north of England.

There are numerous important grasslands found in this area. Lowland calcareous grasslands are most extensive in the Arnside & Silverdale National Landscape and are present on the surface of the underlying limestone bedrock often occurring in intimate mosaics with woodland and limestone pavement habitats. Examples of high-quality calcareous grassland can be found within the SSSIs at Gait Barrows, Warton Crag, Hawes Water, Thrang End and Yealand Hall Allotment, Jack Scout, and Silverdale Golf Course. The international value of the best of these sites has been recognised through designation as part of a suite of smaller sites that comprise the Morecambe Bay Limestones Special Area for Conservation (SAC). Semi-natural species-rich grasslands occur here on the deeper, neutral soils in mosaic with calcareous grasslands on thinner soils.

Important locations for waxcap grasslands in Lancashire include the area of Arnside & Silverdale National Landscape where over 20 species have been recorded. Two sites in Lancashire, Jack Scout, and the Post Office Lots, meet the threshold for SSSI qualification though neither site has been recognised for this interest feature.

Woodland habitats cover 15% of the area. This includes important upland deciduous ash woodlands and coniferous yew woodlands, for which the Morecambe Bay limestones are a stronghold. However, many have been affected by ash dieback, so these woodlands are at risk. Much of the landscape has been reclaimed for agriculture and is otherwise virtually treeless aside from hedgerows alongside ditches on field margins.

Scrub forms part of this landscape including species-rich scrub in high quality semi-natural habitats of national and international importance. There are also orchards that contribute to food provision, genetic diversity, pollination, and biodiversity. The Arnside & Silverdale National Landscape is part of the Lake District Important Invertebrate Area, a significant place for the conservation of invertebrates and the habitats upon which they rely. Hazel dormice are also present in suitable habitat within the Arnside and Silverdale area.

Morecambe Coast and Lune Estuary


Morecambe Coast

Morecambe Coast and Lune Estuary is a relatively small and low-lying NCA bordering Morecambe Bay with a bedrock of sandstones and mudstones of Carboniferous, Permian, and Triassic age, but with a surface mainly shaped by superficial deposits of glacial, fluvial, and coastal origin. There are highly populated areas in the towns of Heysham and Morecambe and the City of Lancaster, but the NCA also encompasses areas of high tranquillity, particularly around the Lune Estuary and westwards along the Pilling Coast. There is a longstanding cultural link to the coastal environment through fisheries, trade, and tourism.

The area is crossed by the rivers Lune and Cocker, both of which enter the NCA from the Bowland Fringe. The rivers that empty into the bay also provide a strong physical connection between the area and the upland NCAs that frame it, particularly through the Lune Catchment, which drains a number of external NCAs including Cumbria High Fells, Howgill Fells and Yorkshire Dales as well as Bowland Fells.

The identity is strongly linked to the coastal environment along its margin with Morecambe Bay, and inland through the estuaries of the rivers Lune and Keer. These are nationally and internationally designated as SSSIs, SAC, SPA and Ramsar sites for their coastal habitats and the wildlife that they support. These include saltmarshes, intertidal reefs, and wader and waterfowl populations.

Coastal and floodplain grazing marsh are associated with the estuaries of the Rivers Lune and Wyre, recognised for their internationally important wildfowl (for example, northern pintail) and wader populations (for example, redshank, ruff and ringed plover) through the Morecambe Bay & Duddon Estuary SPA designation. The proximity of the coastal grazing marshes to these outstanding wildfowl sites is important, as birds regularly commute between the grazing marshes and the mudflats and saltmarshes of the estuaries to forage and roost. The coastal and floodplain grazing marshes are therefore recognised as functionally linked land around the Morecambe Bay & Duddon Estuary SPA.

Away from the coast and urban areas, the landscape is mainly one of pastoral agriculture, including dairy, which varies in character from reclaimed grasslands bounded by wet ditches in the lowest-lying areas to a hedged landscape including frequent boundary trees as the land begins to rise in elevation. Stone walls become prevalent near the adjacent upland NCAs, and where drumlins are present. Very small areas of lowland calcareous grasslands are found here, on old industrial or previously quarried sites.

Bowland Fells

1. Langden Brook, Bowland Fells

2. Long Knots, Forest of Bowland

3. Gisburn Forest

4. Moorlands near Slaidburn

The Bowland Fells form a distinctive upland block on the boundary between north Lancashire and the Yorkshire Dales. Upland areas of Lancaster, Ribble Valley and Wyre districts reside within its boundary. The landscape is wild and windswept, with upland oakwood on the steep slopes and cloughs, steep escarpments, upland meadows and pasture and expansive open moorland.

The NCA is within the Forest of Bowland National Landscape and contains areas of moorland, designated as a SPA due to its international importance for breeding hen harrier, merlin, and lesser black-backed gull. It also provides habitat for other important raptor species, peregrine falcon, and short-eared owl (features of the SSSI), and two breeding bird assemblages (also features of the SSSI) including songbird species such as ring ouzel and whinchat and wader species including curlew, lapwing, snipe and oystercatcher.

An assemblage of interesting and rare plant species is also a feature of the SSSI, some associated with woodland for example, chickweed wintergreen, some with the Millstone Grit crags such as hay-scented buckler-fern and some found in flushes and springs such as broad-leaved cottongrass.

The peat soils of the fells, including the deep columns of peat associated with blanket bog, store significant volumes of carbon and are recognised for their importance through their designation as the Bowland Fells SSSI. Blanket bog habitat is also important for water storage with important peat forming *Sphagnum* mosses acting as sponges and growing in hummocks around dwarf shrubs such as heather and bilberry creating an uneven surface of tall vegetation and hollows essential for keeping water on the tops of the fells. The drainage pattern of this area has cut deep cloughs through the harder sandstone in a radial pattern emanating from the upland moorland plateau.

The remaining uplands are soils from the Belmont series and are typically acid, coarse and loamy. However, there are tracts of underlying limestone that buffer many of the watercourses from the acidity. This land has traditionally been converted, by drainage, fertiliser, and lime application to improved pastures for grazing.

Upland oakwood is also a feature of the Bowland Fells SSSI, it is now fragmented, occurring on the steep slopes and in the cloughs, adding to the diversity of habitats within the site but only a remnant of the previous woodland. Many of the trees are of great age, supporting a variety of lichens, and the shelter they provide allows the growth of carpets of tall ferns. Temperate rainforest or acid oakwood (described by the Joint Nature Conservation Committee as old sessile oak woods with Holly and Hard Fern) is a habitat of European importance, with the best examples designated as SAC. The British Isles once supported large expanses of temperate rainforest across its western fringes including South and West Pennines and the Forest of Bowland, the vast majority of which have been replaced by coniferous plantations and sheep grazed pastures. Temperate rainforest also forms part of the natural range of mammals such as pine marten and red squirrel (now mostly restricted from the area) and provides habitat for migrant birds such as pied flycatcher[21].

The area provides water catchments for many of the surrounding rivers in the adjacent Bowland Fringe and Pendle Hill NCA and beyond. There are also many important waterbodies, such as Stocks reservoir and several upland reservoirs at Barnacre, Barn

Fold and Longridge also important for species such as birds, otter and invertebrates such as stoneflies and mayflies as well as providing water for public consumption within the towns of Blackburn, Burnley and Lancaster.

The northern slopes of the Fells are drained by streams that flow to the rivers Wenning and Hyndburn, tributaries of the Lune, which flows through Lancaster before entering the sea at Morecambe Bay. The western and south-western slopes are drained by the headwaters of the River Wyre and its tributaries, the rivers Calder and Brock, as well as the River Conder, which flows directly to the Irish Sea. The River Wyre enters the sea at Fleetwood. The southern and eastern slopes are drained by streams flowing to the River Ribble and by the headwaters of its tributary, the River Hodder. The Ribble flows through Preston before entering the Irish Sea at Lytham St Anne's.

High-quality species-rich meadows can be found in the limestone areas to the east. Lowland calcareous grasslands are found on old industrial or quarried sites, much the same as in Morecambe Coast and Lune Estuary. In Bowland however, calcareous grassland can sometimes be found above 250m, and similar in composition to the nearby lowland grasslands rather than a distinct upland calcareous grassland vegetation. A few upland hay meadows (nationally scarce flower-rich grasslands rich with eyebrights, pignut and yellow rattle) are found around the margins of the Bowland Fells and small pockets of Lancashire's semi-natural species-rich grasslands persist despite wide-spread agricultural improvements.

Species-rich purple moor-grass and rush pasture are found very patchily within the Bowland Fells. This is one of a few important locations for upland acid grasslands in Lancashire found mostly above 250m or 300m on acid rocks, sands and gravels. Waxcap grasslands are also present with ongoing research suggesting that grassland fungi are likely to be more widespread and diverse and potentially nationally important in Lancashire than is currently recognised.

The Fells are fringed by extensive areas of piecemeal ancient pre-1600 farm enclosures with irregular small to medium sized field parcels defined by a mixture of drystone walls, banks, hedgerows and fragments of ancient woodland. Extensive conifer plantations occur to the south-east and east of the area, with fragmented broadleaved woodland largely in the cloughs.

Gisburn Forest, adjacent to Stocks Reservoir, is one of the largest examples of its kind in Lancashire. It supports small but locally important populations of crossbill, black grouse, nightjar and goshawk. The wider area, including Stocks Reservoir is important for wintering wildfowl and breeding birds such as red breasted merganser, black-headed gull and ringed plover.

There are approximately 2,902ha of woodlands in the Lancashire area of the NCA (9% of the total area of the NCA in Lancashire), of which 415ha is ancient woodland, of which 27ha is plantation on ancient woodland sites.

Lancashire and Amounderness Plain

Lancashire and Amounderness Plain is an area of high-grade agricultural land, bounded by Morecambe Bay in the north and Liverpool City Region to the south. The most populated urban areas include Blackpool, Fleetwood, Leyland, Lytham St. Annes, Preston, Ormskirk and Skelmersdale.

The eastern boundary of the NCA is contained by the Bowland Fringe. The plain is made up of a series of low-lying landscape types: in the east, undulating lowland farmland on the highly productive coastal plain, and in the west, the former moss lands and their remnant sites, and the coastal marshes and dunes. The Ribble Estuary and coastline include intertidal sand flats and mudflats, backed by remnant dunes and some of the largest saltmarshes in the county. About 90% of Lancashire's sand dunes are in the Fylde district. Place names incorporating ‘moss’ and ‘mere’ are numerous today and are associated with an abundance of maintained ditches and drains.

The northern Fylde (or Amounderness) coastal plain contains the estuary and lower reaches of the River Wyre, as well as its tributaries, the rivers Calder and Brock. It is predominantly improved pasture, with isolated arable fields. It is an ordered landscape of medium-sized fields with field ponds, clipped hedgerows and drainage ditches with areas of stubble and grass leys that contribute to significant feeding grounds for internationally important flocks of pink-footed goose and whooper swan. This is a medium to large-scale landscape, where blocks of wind-sculpted mixed woodland punctuate the relatively flat to gently rolling plain.

At the centre of the Lancashire and Amounderness Plain lies the estuary and lower reaches of the River Ribble which has its source in the neighbouring Yorkshire Dales and its tributary, the River Darwen which drains the Southern Pennines. The River Douglas and its tributaries, the rivers Yarrow and Lostock, drain much of the southern half of the NCA, with the River Douglas flowing into the southern side of the Ribble Estuary. The headwaters of these rivers are on Rivington Moor, in the Southern Pennines NCA. South of the Ribble Estuary the plain has a different physiographical history to that of the north, and this is reflected in the land use of the area. It is predominantly highly productive arable land with large fields and is internationally important for wintering wildfowl such as pink-footed geese and whooper swan and wading birds such as golden plover and oystercatcher.

Agricultural drainage systems, including steep-sided ditches with localised reedbeds and steep embankments, are a dominant feature, and are responsible for the area's dramatic transformation from marshland to a rich and ordered landscape of farmed land parcels. This is mainly an area of open, high-quality farmland with large, rectilinear fields bounded by ditches, as well as some pasture for sheep and cattle, with scattered remnant woodlands and wetlands. Coastal inland areas in the south of the NCA fall below sea level, as far inland as the base of Parbold Hill and flooding is a recurring risk. The forecasted impacts of rising sea levels resulting from climate change will make this issue worse, presenting an ongoing challenge to the farming community. This area, which also contains Martin Mere SPA, is key feeding ground for the birds associated with the estuary such as pink-footed geese, teal and pintail.

There are significant pond networks to both the north and south of the Plain, emphasising its importance in providing ecological connectivity between pond habitats.

Small pockets of semi-natural species-rich grasslands remain in southern parts of the Plain. Coastal grazing marshes and floodplain grazing marshes found here are associated with the estuaries of the Rivers Wyre and Ribble and are recognised as functionally linked land around the Morecambe Bay & Duddon Estuary SPA and the Ribble & Alt Estuaries SPA. They are internationally important for the wildfowl and wader populations they support (as above). Relict acid grasslands are also found around Martin Mere in the Rufford area where, despite being inland, they show some affinity with dune grassland as sand sedge is present.

The NCA includes approximately 4,343ha of woodland (6% of the total NCA area), of which 518ha is ancient woodland.

Lancashire Valleys


View of Lancashire Valleys from Barley

The Lancashire Valleys run north-east from Chorley through Blackburn, Accrington, Burnley and Nelson to Colne. The NCA lies mainly in east Lancashire and is bounded to the north-west by the Bowland Fells fringe and Pendle Hill, and to the south by the Southern Pennines. A small proportion of the area (5%) lies in the Forest of Bowland National Landscape.

Lancashire Valleys consists of the wide vale of the rivers Calder and Ribble and their tributaries, running north-east to south-west between Pendle Hill, the Bowland Fells and the Southern Pennines. The landscape here has an intensely urban character. The Millstone Grit outcrop of Pendle Hill, on the northern boundary and the fells of the Southern Pennines to the south create enclosure and serve as a backdrop to the settlements in the valley bottom. The north-west of the NCA contains the middle section of the River Ribble, which has its source in Ribblesdale in the adjacent Yorkshire Dales NCA, as well as the Ribble's confluence with the River Hodder, which drains the southern slopes of the Bowland Fells. In the south, the River Yarrow rises on Rivington Moor in the Southern Pennines before joining the River Douglas in the Lancashire and Amounderness Plain NCA to the west. A number of reservoirs lie on or close to the boundary with adjacent NCAs.

There is approximately 5,463ha of woodland in the Lancashire area of the NCA (8% of that total area). Much of this (91%) is broadleaved and is situated on steep valley

sides. There is also a small amount of conifer plantation. There are approximately 1,462 ha of ancient woodland, of which 107ha is plantation on ancient woodland sites.

Small broadleaved woodlands, often ancient, are scattered throughout the remaining farmland associated with rivers, field boundaries and cloughs. The wooded, steep-sided and narrow cloughs are a characteristic feature of the Lancashire Valleys – for example, Priestly Clough in Accrington, Spurn Clough in Burnley and Lower Darwen Valley which comprises oak, alder and sycamore with areas of grassland flushes and wetland. Wood anemone, Herb-Paris and small-leaved lime are all ancient woodland indicators and typical species in these areas. Wet woodlands dominated by alder occur on the floodplains and riverbanks. There are also small areas of woodland and scrub associated with abandoned or reclaimed industrial land and several small conifer plantations, the largest being Standardise Plantation by Elslack Reservoir to the north-east of Colne.

Small pockets of semi-natural species-rich grassland remain in the valleys that have not been agriculturally improved, while some upland acid grasslands are found in the areas of upland fringe. Floodplain grazing marsh associated with the river valleys is present. Species-rich lowland dry acid grasslands are found on fluvio-glacial sands along the River Darwen. Waxcap grasslands are likely to occur too, although further research is required to identify their locations.

One of the key characteristics is that field boundaries are regular to the west and more irregular to the east. They are formed by hedges with occasional hedgerow trees and by stone walls and post-and-wire fences at higher elevations.

Bowland Fringe and Pendle Hill


Pendle Hill

The Bowland Fringe and Pendle Hill NCA is a transitional landscape that wraps around the dramatic upland core of the Bowland Fells, underpinned by Carboniferous geology. The cultural heritage is an integral part of its character with a range of rich and distinct landscapes, including the substantial extent of semi-natural woodland, tree-fringed rivers, and irregular field patterns defined by well-maintained hedgerows and hedgerow trees. Improved pastureland defined by well-maintained hedgerows is characteristic of the agricultural land in the fringes, which supports both dairy and livestock farming. In contrast to the predominantly rural feel, this NCA includes several relatively urban areas in Clitheroe, Bentham and Longridge.

Over half of this NCA, along with the Bowland Fells, makes up the Forest of Bowland National Landscape. This is a diverse landscape of herb-rich hay meadows, lush pastures, broadleaved woodland, parkland, waterbodies, rivers and streams. The numerous river valleys and associated woodlands are a major component of the area. To the west, this NCA includes part of the Bowland Fells SPA, where the influence of human habitation and activity, and the area's long farming history, contribute significantly to its character. Calf Hill & Cragg Woods SAC to the north of the Forest of Bowland is designated for its old sessile oak woods on the north- and south-facing slopes of a valley on millstone grit. This is one of the most extensive stands of upland oakwood and valley alder woodland in Lancashire[22].

Many of the meadows are nationally or internationally designated, including North Pennine Dales Meadows SAC (which supports globe flower and lady's mantle species). The rivers and streams support nationally and internationally protected species, including Lancashire LNRS Target Species Atlantic salmon and smelt, as well as white-clawed crayfish, otter, water vole, river water-crowfoot, wasp and cranefly species and various species of bat.

Lowland calcareous grassland occurs in association with the scattered limestone knolls such as Long Knots, Great Dunnow Hill, Worsaw Hill; one of the best examples being on the Clitheroe Knoll Reefs SSSI designated for its geological interest.

Unimproved species-rich grassland on neutral soils is a rare habitat in Lancashire due to the influence of agricultural improvement and development. There are however a few upland hay meadows around the margins of Bowland Fringe and Pendle Hill. Floodplain grazing marsh found here is associated with the river valleys of the Lune, Wyre and Ribble. Species-rich purple moor-grass and rush-pastures, valuable for ground nesting waders, including curlew lapwing, redshank and snipe, are found in patches in mosaic with dry grassland and wet woodland.

Species-rich lowland dry acid grasslands are found only very sparsely due to historic heavy stock grazing which has reduced their species-richness. Important locations for upland acid grasslands in Lancashire lie primarily within the Forest of Bowland SPA, in the Bowland Fells and the Bowland Fringe and Pendle Hill NCAs; where they contribute to the important upland vegetation mosaics alongside blanket bog, heath and flush habitats. Waxcap grasslands are also present. The NCA contains 5,060ha of woodland (7% of the total area), including 1,165ha of ancient woodland, almost a quarter of which is plantation on ancient woodland sites.

Southern Pennines


Southern Pennines


Wycoller

Upland areas within the Lancashire districts of Burnley, Chorley, Hyndburn, Pendle, Rossendale as well as Blackburn with Darwen reside within the Southern Pennines NCA. The Southern Pennines are part of the Pennine ridge of hills, lying between the Peak District National Park and the Yorkshire Dales National Park. Major urban areas include Bacup, Darwen, Haslingden and Rawtenstall. The Southern Pennines

are important for recreation due to the extensive open access areas and footpaths, and the sense of escapism they offer, along with the ease of access from large towns. Challenges for the area include managing the land to reduce downstream flooding, halting decline in the upland peat habitats, improving water quality, and managing increased recreational demand.

This is a landscape of large-scale sweeping moorlands, pastures enclosed by drystone walls and gritstone settlements contained within narrow valleys. The moorland plateau is dissected by many small, fast-flowing streams which are tributaries of multiple main rivers; the Aire and the Yorkshire Calder and Colne, draining to the east, the Roch and Irwell which drain to the south-west and the headwaters of the Lancashire Colne and Calder, the Douglas and the Darwen draining to the north and west. Most of the valleys are narrow and steep-sided with woodland on the steepest slopes.

With its high rainfall and impervious rocks, the area is a valuable water catchment area and contains various reservoirs, including Belmont reservoir and Turton and Entwistle Reservoir which support the bird features of the West Pennine Moors SSSI, black-headed gull, heron and Mediterranean gull and supply the water to adjacent conurbations.

The area contains internationally important mosaics of moorland habitats that support nationally rare birds such as merlin, short-eared owl, ring ouzel and twite. Nesting on the unenclosed moorland and foraging elsewhere, including wet grassland and rush pastures in the in-bye fields below the moorland line are wader species like lapwing and curlew.

There are large expanses of internationally important blanket bog and upland heathland within the West Pennine Moors SSSI, often botanically poor and dominated by purple moor grass, with *Sphagnum* mosses being quite rare primarily because of overgrazing, over burning and atmospheric pollution. Upland dry heath, dominated by common heather, occupies the lower slopes of the moors on mineral soils or where the peat is thin. In the wooded cloughs, which transition into the heather moorlands, a greater mosaic of habitats and plants can be found.

The peat soils include blanket bog, a statutory irreplaceable habitat that supports rare and threatened species such as golden plover and dunlin, dwarf shrub species like cranberry and bog-rosemary as well as peat forming *Sphagnum* mosses.

The heathlands and blanket bogs, in mosaic with smaller habitat features such as upland acid flushes are an important component of the blanket mire landscape. They support species such as round-leaved sundew and include lime-rich flushes with carpets of lime-loving bryophytes, fens and areas of bracken and scrub, which support nationally rare bird species.

Upland hay meadow habitat reaches its southern British limit of distribution in Lancashire in the Southern Pennines NCA. Species-rich purple moor-grass and rush-pastures are found very patchily within the Southern Pennines. Stands are sometimes found within the margins and clearings of wet woodland along cloughs, for example at Owshaw Clough in the West Pennine Moors SSSI. In the West Pennine Moors SSSI area of the Southern Pennines NCA, most areas of lowland acidic grassland have

arisen through the degradation of heathland through a combination of fires and overgrazing and latterly affected by environmental nitrification. Historically many of these grassland areas would have supported oak woodland. [23]

Other important grasslands include upland acid grasslands found within the South Pennine Moors SAC/SPA and waxcap grasslands. A survey of upland fringe fields in the West Pennine Moors SSSI found a total of 23 different waxcap species, though individual fields fell just short of qualifying for SSSI notification for this feature[24].

There is approximately 3,026ha of woodland in the Lancashire area of the NCA (8.6% of the total Lancashire area found within) of which 70%, 2,115ha, is broadleaved woodland. Of the woodland resource, 11% (332ha) is ancient woodland.

The West Pennine Moors includes several acid oak woodlands often along steep-sided cloughs and watercourses, some of which are remnants of temperate rainforest for example at Stronstrey Bank, Lead Mine's Clough, Dean Wood, Tiger's Clough, Hall Wood and Longworth Clough.

Woodland habitats include oak woodlands with downy birch, rowan, holly and hazel with ground flora comprising wavy hair-grass, interspersed with ferns, (such as hard-fern and lemon-scented fern), dwarf shrubs (such as bilberry) and woodland flowers (such as wood sorrel). These may be interspersed with wet woodland with species-rich flushes comprising species such as marsh hawk's beard, marsh valerian and many blue-green sedges. The woodlands are also important because they support a diverse assemblage of woodland breeding birds, including scarce and/or rapidly declining species such as pied flycatcher and willow tit. Extensive woodland clearance of higher land during the later Neolithic period and the Bronze Age has formed the open peat landscapes of today.

Lancashire Coal Measures

Ravenhead Brickworks


View from Chisnall Hall

The Lancashire Coal Measures surrounds the towns of St Helens and Wigan and extends from the Mersey Valley in the south to the Lancashire and Amounderness Plain in the north-west. 10% of this NCA lies within the districts of Chorley and West Lancashire. Rocks from the Carboniferous Coal Measures underlie most of the area, giving rise to a varied topography of gentle hills and valleys, with patchy layers of glacial deposits. The area is crossed by various rivers. The River Douglas is the largest of these and drains through West Lancashire alongside the Leeds and Liverpool Canal which eventually connects to the river.

Past industrial activity and mining subsidence have severely altered the drainage and landform of the area, creating a disrupted drainage pattern characterised by low-lying waterbodies, subsidence flashes and peatlands as well as remaining fragments of ancient woodland. This has created the habitat for an array of important species such as the red-eyed damselfly, willow tit, bittern and one of the LNRS target species, the large heath butterfly. This led to the 2022 designation of the Wigan Flashes National Nature Reserve (NNR) in Greater Manchester.

Manchester Pennine Fringe

The Manchester Pennine Fringe occupies the transitional zone between the open moorlands of the Dark Peak and Southern Pennines, and the densely populated urban conurbation of Manchester. Very small areas of Rossendale as well as Blackburn with Darwen lie within this NCA.

Numerous rivers flow through the area, with the Irwell's source in Rossendale district found in the Southern Pennines NCA to the north which drains down through the Southern Pennines towards the lowland Manchester Conurbation and Mersey Valley, ultimately flowing into the Mersey Estuary and the Irish Sea. These rivers are important links between the uplands and lowlands, in terms of ecological connectivity as well as water management.

Sefton Coast

Dune slack on Sefton Coast

This area runs from the mouth of the Ribble Estuary in the north to the edge of Crosby in the south. It is characterised by intertidal sand flats and mudflats, coastal sand dunes, coastal dune heathland and conifer plantations, and is backed by a hinterland of flat farmland. It is a small area of this hinterland that lies within West Lancashire. The landscape is low-lying with complex hydrology, with much of the area at or below sea level. The coastal hinterland is extensively pumped to drain the land for agriculture and to provide flood protection for urban areas.

The River Alt rises in the urban area of Huyton in Merseyside, and flows into the Irish Sea at Hightown, south of Formby. The wide floodplains of the Crossens catchment extend into the Lancashire and Amounderness Plain, with a large network of modified watercourses and a multiple land drainage system discharging into the Ribble Estuary. The sedimentary shoreline experiences a range of physical environments influenced by shallow water and high tidal ranges. This has led to the development of extensive sandy and muddy/sandy beaches along the coast. Dunes of recent wind-blown sand present the dominant landscape feature along much of the coast.

Yorkshire Dales


Yorkshire Dales

A small area of the Yorkshire Dales NCA overlaps with Lancaster district. A number of limestone outcrops within peatland are found within this area together with a small area of limestone pavement, sink holes and a large cave system. This limestone scenery is characterised by the virtual absence of surface drainage and an extensive subterranean drainage network which has resulted in these features[25]. There are also areas of scree and drystone walls. Leck Fell, a limestone fell at 628m, is the highest point in Lancashire. Its slopes support semi-natural species-rich grasslands and grazing is the dominant land use. The landscape of drystone walls and field barns reflects the farming traditions. There are also small areas of irreplaceable habitats, ancient woodland and lowland fen.

Areas of Particular Importance for Biodiversity in Lancashire

Existing areas of particular importance for biodiversity are defined in the LNRS statutory guidance. This is to help establish a nationally consistent baseline of areas whose particular importance has already been recognised.

The Lancashire LNRS ArcGIS StoryMap explains the sites that have been included.

International Conservation Sites

13% of Lancashire (41,586 hectares) is covered by a Special Protection Area (SPA) or Special Area of Conservation (SAC). These include:

- Bowland Fells SPA
- Calf Hill & Cragg Woods SAC
- Leighton Moss SPA
- Martin Mere SPA
- Morecambe Bay & Duddon Estuary SPA
- Morecambe Bay SAC
- Morecambe Bay Pavements SAC
- North Pennine Dales Meadows SAC
- Ribble & Alt Estuaries SPA
- Part of the South Pennine Moors SPA and SAC

Ramsar Sites within Lancashire include Leighton Moss, Martin Mere, Morecambe Bay and the Ribble & Alt Estuaries.

National Conservation Sites

Nationally designated conservation sites in Lancashire Include:

- Two National Nature Reserves (NNR): Gait Barrows and the Ribble Estuary
- Two Marine Conservation Zones (MCZ): Ribble Estuary and Wyre-Lune.
- 70 Sites of Special Scientific Interest (SSSI) covering a total of 49,247 hectares (Appendix Three).

Local Nature Reserves (LNR)

Local Nature Reserves are designated for their natural features, such as habitats, wildlife, or geology, and managed by local authorities for environmental education and the enjoyment of the public. At least part of each LNR should be publicly accessible by anyone where visitors would not damage or disturb wildlife.

Biological Heritage Sites (BHS)

Biological Heritage Site (BHS) is the name given in Lancashire to non-statutory wildlife sites of at least County significance. They are considered to form part of the suite of sites collectively referred to as 'locally designated sites' in the National Planning Policy Framework, and elsewhere as 'Local Wildlife Sites'.

There are currently 1,215 BHSs, covering a total area of 34,298 hectares. Although they do not have statutory protection per se, some are equal in quality to the representative sample of sites that make up the suite of statutory Sites of Special

Scientific Interest (SSSIs). They are identified and designated by a partnership comprising Lancashire County Council, Lancashire Wildlife Trust and Natural England, using a set of published guidelines[26].

District Wildlife Sites

District Wildlife Sites are considered part of the suite of Local Wildlife Sites. These sites are identified by district councils and unitary authorities and have various names locally. They are one 'tier' below BHS and are not identified in all local authorities in Lancashire. They may also have an important role in contributing to the public enjoyment of nature conservation.

Statutory Irreplaceable Habitat

The statutory irreplaceable habitats found in Lancashire, as defined by The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024 are:

- ancient woodland
- ancient and veteran trees
- blanket bog
- coastal sand dunes
- limestone pavements
- lowland fens

Mapped, these core sites, our existing areas of Particular Importance for Biodiversity, help us to identify opportunities to connect and link them up to provide more and higher-quality habitats to allow nature to thrive and species to recover, expand and move across the landscape. This forms the basis of our Local Habitat Map, including Areas that Could Become of Particular Importance across the landscape as a whole and not just in isolated areas. It should be noted that the mapped areas are based on best available information and will be updated when new monitoring data becomes available in future iterations of the LNRS.

Habitat Extent

In the absence of local habitat trend data and a state of nature report for Lancashire, Table 1 provides a summary of habitat extent, extracted from the Local Habitat Map. Information on the data sources used to create the habitat map can be found in the *Evidence and Technical Information* document.

Table 1: Coverage of broad habitat types in Lancashire

(Approximate area and percentage coverage of total county area, with no gaps or overlaps, calculated using the Local Habitat Map[27])

Habitat category	Habitat area ha. (Approx.)	% of total county area (Approx.)
Acid grassland	26,043	8
Arable	31,240	10
Built environment and residential gardens	39,384	12
Calcareous grassland (including limestone grasslands)	597	0.2
Coastal and floodplain grazing marsh	12,291	4
Coniferous woodland	4,392	1
Deciduous woodland (includes temperate rainforest orchards and wood pasture parkland)	18,660	6
Fen, Marsh and swamp	7,053	2
Heath	12,591	4
Improved grassland	90,231	27
Inland rock (including exposed limestone pavement)	851	0.3
Littoral sediment and rock (includes littoral sediment, sand dunes, dune slacks, maritime cliff, mudflats, saltmarsh, saline lagoons, shingle, supralittoral sediment)	22,293	7
Lowland bog (including raised bog, shallow peat (<40cm), deep peat (>40cm), lagg and agricultural peat)	263	0.1
Mixed woodland	955	0.3
Modified grassland (including amenity and tall ruderal)	5,294	2
Neutral grassland	13,592	4
Rivers, streams and drains	9,385	3
Rough grassland	2,650	1
Scrub	474	0.1
Semi-improved grassland	3,906	1
Standing Open Water and Canals	4,891	1

Suburban (including verges)	3,807	1
Upland bog	17,361	5
Total broad habitat	**328,204**	

Table 2: Coverage of irreplaceable and other important habitat types in Lancashire

(Included within broad habitat coverage in Table 1. Approximate area and % coverage calculated using the Local Habitat Map).

Habitat Category	Habitat area ha. (Approx.)	% of total county area (Approx.)
Ancient woodland (ASNW + PAWS)	5,157	2
Blanket bog	16,612	5
Hedgerows	21,877 (km)	
Lowland fens	815	0.2
Lowland raised bog	250	0.1
Limestone pavements	8	0.002
Purple moor-grass and rush pastures	212	0.1
Reedbeds	134	0.04
Sand dunes	374	0.1
Saltmarsh	4,093	1
Temperate rainforest	195	0.1
Upland hay meadows	102	0.03

Species

Due to Lancashire's diversity of habitats, including everything from the upland fells to the coasts and estuaries, as well as farmed and urban landscapes, there are also thousands of species that make Lancashire their home. Considering factors such as their scarcity, decline and whether they are or could be of national importance, 534 species have been identified as the most threatened or locally significant to prioritise for recovery action. The full species list and the methodology followed to shortlist species are included in the *Evidence and Technical Information* supporting document[28]. While trends for many of these species are currently unavailable, a number can be identified as being of national significance, these are detailed in Table Three below.

Table 3: Shortlisted species where the Lancashire population is of national significance

*(LNRS Target Species in **Bold**. Some species appear across more than one habitat group).*

Habitat	Lancashire species with populations of National Significance
Aquatic and wetland	**14 Species:** Birds - Sedge warbler, bittern, curlew, willow tit. Plants - divided sedge, bird's-eye primrose, flat-stalked pondweed, narrow small-reed, thread rush, green-flowered helleborine, floating water-plantain. Fish - **European smelt, Atlantic salmon,** eel**.** Amphibians - Great crested newt. Mammals - Water vole. Invertebrate (Crustacean) - White-clawed crayfish.
Coastal and estuarine	**20 Species**: Birds - **Black-tailed godwit**, curlew, redshank. Fish - plaice, sole, **European smelt, Atlantic salmon,** eel**.** Invertebrates - saltern neb moth, black sober moth, sandhill rustic moth, **belted beauty**, vernal mining bee, margined colletes bee, *Podalonia affinis* (a wasp). Plants - variegated horsetail, Baltic rush and a hybrid *Juncus balticus x J. inflexus,* seaside centaury, dune helleborine, divided sedge and lax-flowered sea-lavender.
Grassland (Including agricultural land)	**19 Species:** Birds – Curlew. Plants - Purple ramping-fumitory, bird's-eye primrose, *Alchemilla monticola* and *Alchemilla subcrenata* (lady's-mantle species). Invertebrates - **least minor**, white-spotted sable, rufous marble, bronze owlet, *Elachista cingillella* and *Anania terrealis* (all moth species), **wall mason bee**, **tormentil mining bee**, moss carder-bee, *Lasius sabularum* (an ant), *Pseudoplatylabus violentus* (a parasitic wasp), **high brown fritillary, pearl-bordered fritillary, Duke of Burgundy** and northern brown argus butterflies.
Peatland	**7 Species:** Birds - **Hen harrier**, curlew. Invertebrates – **Large heath butterfly, bilberry bumblebee**, the northern sallow mining bee. Plants - broad-leaved cottongrass and **dwarf cornel** (for England).
Rocky habitats	**17 Species:** Plants - Dark-red helleborine, Killarney fern, narrow-leaved bittercress, angular Solomon's-seal, fingered sedge, rock whitebeam, Lancastrian whitebeam, baneberry, rare spring-sedge, **lady's-slipper orchid**, mezereon, wall whitlowgrass, blue-moor grass.

	Invertebrates - barred tooth-striped moth, white-spotted sable moth, **least minor** moth and *Scythris fallacella* (a moth).
Wooded habitats and trees	**19 Species:** Birds - Willow tit, Plants - green-flowered helleborine, narrow-leaved bittercress, angular Solomon's-seal, fingered sedge, rock whitebeam, Lancastrian whitebeam, *Rubus accrescens* (a bramble). Invertebrates - **high brown fritillary, pearl-bordered fritillary and Duke of Burgundy b**utterflies, barred tooth-striped and netted carpet moths, **wall mason bee, red wood ant**, shining guest ant, *Passaloecus monilicornis* (a solitary wasp), *Pseudoplatylabus violentus* (a parasitic wasp), and broad margin mining bee.
Urban habitats (including infrastructure networks)	**5 Species:** Birds - Swift, **lesser black-backed gull, black-headed gull**, Invertebrates - European hornet Amphibians - Great crested newt.

24 species have been identified as 'target species', those that require multiple or urgent bespoke actions that could not be delivered through habitat measures. These are:

Mammals:

- Red squirrel

Fish:

- Atlantic salmon
- European smelt

Birds:

- Hen harrier
- Black-tailed godwit
- Black-headed gull
- Lesser black-backed gull

Plants:

- Yellow Star-of-Bethlehem
- Northern bedstraw
- Wood crane's-bill
- Melancholy Thistle
- Lady's-slipper orchid
- Petty whin
- Dwarf cornel

Invertebrates:

- Duke of Burgundy butterfly
- High brown fritillary butterfly
- Pearl-bordered fritillary butterfly
- Large heath butterfly
- Belted beauty moth
- Least minor moth
- Wall mason bee
- Tormentil Mining bee
- Bilberry bumblebee
- Red wood ant

Pressures and Opportunities

In the absence of a state of nature report for Lancashire, stakeholders, including the Lancashire Environment Record Network, local environmental organisations, and other specialists provided information to better understand Lancashire's most important habitats and species, the pressures that are influencing them and the opportunities to aid their recovery.

Pressures on Lancashire's biodiversity

Climate change is acknowledged as a leading pressure across all of Lancashire's broad habitat types. Changing weather patterns with warmer drier summers and warmer, wetter winters with more frequent extreme weather events are likely to become the norm [29]. Flooding and the impacts to both wildlife and communities are a major pressure on watercourses, floodplains, wetlands, and the wider riverine environment. Bowland Fringe and Pendle Hill is a high-risk area within Lancashire. The areas steep topography and narrow floodplains combined with waterlogged moorland soils and high rainfall, produces watercourses that respond rapidly to rainfall, increasing fluvial flood risk. Saltwater flooding is a pressing threat on the coastal and floodplain grazing marsh of the Lune and Wyre River estuaries[30]. These coastal grazing marshes are at additional risk from sea level rise, leading to increased inundation, potential coastal erosion, and coastal squeeze, with freshwater sites adjacent to the coast sensitive to saline intrusion. Climate predictions suggest there will be a significant impact on existing and future wooded habitats. Prolonged periods of drought are likely to lead to reduced ground water and drying out of wet woodland habitats making them more prone to soil erosion and wildfire events. Climate extremes are likely to increase the threat to trees and woodland habitats from new pests and disease. Related impacts on species include, for example, habitat loss, changes to species distribution, physical stress, transmission of disease and disruption to migration, hibernation, reproduction, food chains and ecosystems.

Human activity such as land use changes, urbanisation, recreation, and pollution has impacted the environment and biodiversity. Diffuse water pollution and nutrient enrichment from multiple sources is a particular concern. Some of Lancashire's core sites are particularly impacted by diffuse water pollution and nutrient enrichment, including around Leighton Moss SSSI[31], Martin Mere SSSI[32] and the Lune[33], Ribble[34], and Douglas River[35] catchments. With high rainfall coupled with a growing population and an ageing infrastructure, the Ribble catchment suffers significant point-source pollution from combined sewer overflows[34].

Land is increasingly under pressure from development to meet the variety of needs of those that live and work here, for example the demand for new affordable homes and commercial space, transport, and utilities, to support energy generation, for food growing and recreation, resulting in habitat loss and fragmentation.

Land use practices can also be detrimental to biodiversity, for example a high proportion of species-rich neutral grasslands (especially hay meadows) occur on generally flat topography over deep soils. Consequently, they are readily ‘improved’ in agricultural terms into productive fields. Some national policies, subsidies and incentives have led to land management practices that have contributed to habitat loss

and species decline for example wildflowers and the invertebrates they support in the Forest of Bowland over the last 80 years or so. During the last two centuries, both lowland and upland peatlands in Lancashire were drained to lower the water table, dry the land and make it more productive. Other factors (such as historic peat extraction, overgrazing, inappropriate burning, and recreation) coupled with drainage have contributed to significant loss and degradation of our peatlands over many years.

Tables are given below, summarising pressures and opportunities for recovery for each broad habitat type and the associated species assemblages.

Opportunities for recovery or enhancement

A range of opportunities were identified to overcome the existing pressures and likely future pressures on our most important habitats and species (see pressures and opportunities tables below). Existing successes and potential new initiatives to provide wider benefits by expanding, enhancing, and re-connecting our most important habitats were considered. Opportunities were identified for each of the broad habitats, in many cases building on and expanding existing work being delivered by many organisations across Lancashire, see the 'Pressures and opportunities for recovery' tables for each of the broad habitat types below.

There are excellent opportunities to mitigate the impact of climate change and build resilience for example by building on the collaborative holistic approach to nature recovery through the Catchment Based Approach (CaBA) partnerships. The CaBA is an inclusive, civil society-led initiative that works in partnership with Government, Local Authorities, water companies, businesses and local groups, to maximise the natural value of our environment. These initiatives are a strong platform to launch engagement and educational projects with local communities and land manager networks to highlight the importance of river health.

Climate resilience could also be gained within the Wyre and Lune Estuaries by restoring saltmarsh through rewetting interventions, changes to grazing management and managed realignment through breaches to the seawall reconnecting low-lying farmland to saltmarsh systems.

Reinstating the natural hydrology and revegetating areas of bare peat on blanket bogs could reduce carbon emissions and slow the flow of water off the fells and reduce flooding pressure downstream. Upland peat soils are located in the headwaters of the upper catchments of our major rivers: the Wyre and its tributaries from the Bowland Fringe and Pendle Hill; the Ribble and its tributaries from the Bowland Fells, Bowland Fringe and West Pennines; and the upper Irwell from the Southern Pennines. Combining peatland restoration with sustainable land management will help reverse the decline of this irreplaceable habitat. Public body funding through existing sources such as ELMs and the Nature for Climate grant scheme is available. Stacking this funding with private investment through offers such as the Peatland Carbon Code standard, Woodland Carbon Code or Water Industry National Environment Improvement Programme (WINEP) funding can help realise the potential.

Opportunities in the lowland peatlands vary on location and external factors. In West Lancashire, a move towards a new water level management board on lowland pump drained peat could see valuable natural capital conserved in high grade agricultural

areas. A new water level management strategy following review of the historic and failing pump station infrastructure could enable a range of land use including agriculture, flood defence and conservation within the region. A new Water Level Management Board for the Alt Crossens catchments could incorporate more space for water in the landscape. All of which will build in climate resilience into our catchments.

The way in which trees and woodland are established and managed, both now and in the future will influence the abundance and quality of associated biodiversity as well as building climate resilience, improving water quality and providing places for recreation. Soil carbon is high under areas of woodland, and carbon storage and sequestration are provided by the woodland itself. Active management enhances the carbon storage balance, particularly when managed to supply the wood fuel industry as it offers a low-carbon energy source reducing pressure on fossil-fuel demand while increasing carbon storage in standing biomass. Restoration of Plantation Ancient Woodland (PAWs) is a good opportunity in Lancashire. Planning ahead to consider climate change adaptation by encouraging natural regeneration, and planting of both local provenance and more southerly provenance can increase resilience. Diversifying age and species structure can build resilience to disease, pests and more extreme weather events.

Instilling climate resilience within the connected landscape will benefit our important grassland habitats. Improving conservation land management practice through farming networks and stronger engagement with the land manager community on nature recovery and funding opportunities is key in ensuring that we safeguard our existing important grassland sites. Further work on identifying waxcap grasslands when land use changes are proposed in areas suspected to contain waxcap communities could help prevent the loss of these important ancient grasslands.

There are a range of opportunities to address land use pressures in Lancashire. Recreational impacts could be alleviated on the Morecambe Coast and Lune Estuary, through the collaborative development of a Strategic Recreational Access Management plan. Identifying and creating Suitable Alternative Natural Green Spaces (SANGs) within more localised urban settings and, where appropriate, along active travel routes such as National Trails, public rights of way and canals, to provide access to good quality green space and reduce pressures on important coastal habitats.

Developing or reviewing biodiversity management plans for active and recently closed quarries would be of great value for rocky habitat communities. Quarries have considerable potential for biodiversity and preserving their community composition could maintain and enhance the biodiversity value of these important sites whilst also improving habitat connectivity for species that use the complex mosaic of habitats at some stage in their life cycle. Lancashire and Cumbria are nationally recognised for the rare and unique wooded limestone hills and the pavements of Arnside & Silverdale. There is a need to better understand and then share best practice in the management requirements of these rare habitats to support species recovery.

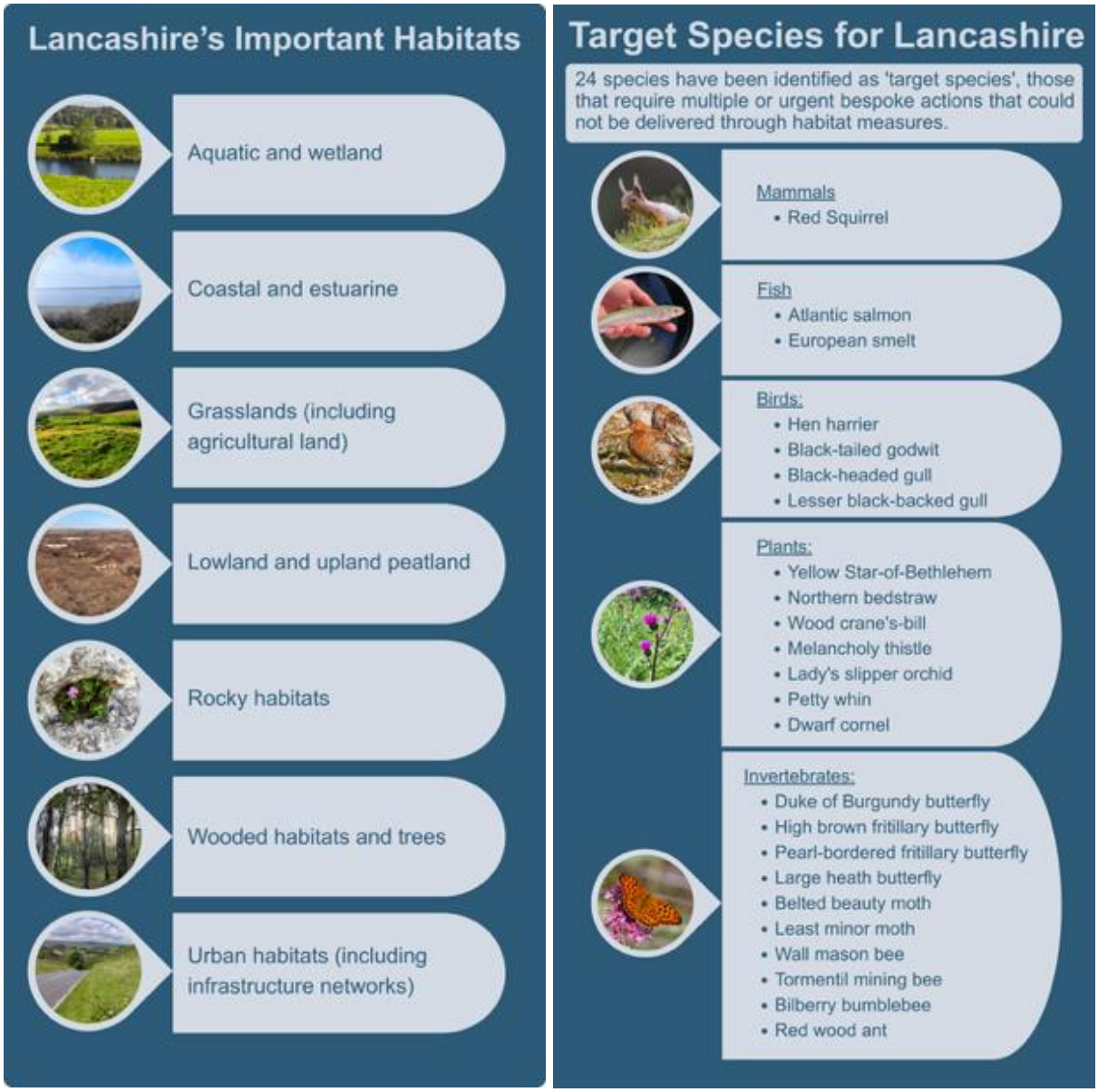
The urban environment is rich in opportunities to enhance and improve existing green space to encourage more wildlife into our built environment. Improving our existing parks and gardens by planting broadleaved native trees and improving the structure of our park woodland can benefit both people and nature. Broadleaved native urban tree

planting to build climate resilience through shading and cooling. Improving existing green urban spaces can also act as a Suitable Alternative Natural Green Space, alleviating recreational impacts. This can provide wider environmental benefits for our local communities improving health and quality of life and providing better access to wildlife rich green space.

Priorities and Potential Measures – what we need to do

Priorities are the long-term end results, and the potential measures are the practical actions that will help to deliver these priorities. These have been informed by the pressures and opportunities identified for habitats and species. For each broad habitat type, these are given in the tables below.

To cover the different types of places and spaces across Lancashire the priorities have been identified by seven broad habitat types and the target species which require their own bespoke set of measures.



Example: Considering the Pressures and Opportunities on Lancashire's Habitats to Establish our Priorities and Potential Measures

Water quantity extremes, a consequence of climate change, such as flooding is a pressure on Lancashire's floodplain meadows and downstream communities that was highlighted by our Aquatic and Wetland group. They then suggested an opportunity to overcome the pressure would be the creation of wetter areas throughout our river systems. This led to the priority, AW4 Catchments resilient to water quantity extremes. The group then worked up a selection of actions or potential measures to achieve the priority which included *AW4.4 Bioengineering* and nature-based solutions* for moderation of water flows, such as reedbed filters, living dams, living revetments, tree and hedge planting and kested* hedgerows*. Suitable locations were then identified in Lancashire on our Local Habitat Map for this measure and, if carried out, would contribute to addressing the pressure. Species such as water vole, various fish species, riverine insects such as cranefly and wasps and white-clawed crayfish would all benefit. Wider benefits for people would include an improved water environment to provide sustainable resources for a growing population, drought resilience and soil loss prevention.

There may be many potential measures that support each priority, and a single measure may help to achieve more than one priority. They are not intended to be detailed instructions, but guidance for what appropriate action can be taken.

Before undertaking any measure, it is important to obtain the permission of the landowner, carry out any necessary surveys/assessments and obtain the required consents and approvals from any relevant public bodies. A summary of some key compliance requirements is provided in Appendix Two.

Some measures have been mapped on the Local Habitat Map. The Map shows where the best opportunities to do something significant for nature recovery and the wider environment have been identified and what the most beneficial measures could be. These measures are highlighted in green in the priority tables.

The habitat priorities will be of huge benefit to many of Lancashire's most important species. The 534 prioritised species have been assigned to groups called "assemblages", which are communities of species that exist in a particular habitat and will therefore be affected by some of the same pressures and share some of the same requirements and management needs. It is anticipated that these species assemblages are likely to benefit from similar habitat recovery measures. For the full list of the 534 species that have been identified as the most threatened or locally significant to prioritise for recovery action, see Appendix Ten of the Evidence and Technical Information document[28].

The measures identified will also deliver wider benefits for the environment and people of Lancashire, as well as help to meet national targets and objectives. These benefits have been summarised to assist those using the LNRS to target action and evidence outcomes from potential projects. The benefits provided by individual potential measures will depend on precisely how, when and where they are carried out.

Aquatic and Wetland

1. Natural Spring at Gisburn
2. Wycoller Beck
3. River Ribble
4. River Ribble at Brockholes
5. Pond
6. Reedbed
7. Lancaster Canal
8. Heron on Lancaster Canal
9. Water vole
10. White clawed crayfish

The condition of Aquatic Habitats across Lancashire varies significantly (as does the number of different ways to assess them). However, broadly speaking, they are not in good condition. 88% of Lancashire's surface water bodies were classified as having 'moderate' water quality and all of our waterbodies failed in the Chemical Status of the Water Framework Directive Water Bodies assessment[36].

In respect of aquatic and wetland species, water voles have undergone one of the most serious declines of any wild mammal in Britain during the 20th century having been lost from 94% of places where they were once widespread[37]. In Lancashire, although oystercatcher have shown an increase of 12%, our breeding curlew, lapwing and snipe are all in decline. The Ribble Rivers Trust use trout and salmon as indicators of catchment health, which allows identification of locations in poor condition. Both species are showing a concerning decline across the catchment.

To ensure continuity and integration of efforts to recover aquatic habitats and species, it is important to collaborate with our neighbouring authorities due to our connections with the Yorkshire Dales, South Cumbria Fells, Merseyside Conurbation and Mersey Valley.

The Lancashire LNRS aims to achieve:

- An enhanced river, stream and watercourse network and associated floodplains.
- Natural river processes restored, with habitats connected along watercourses and between their floodplains.
- A restored and connected healthy freshwater and wetland landscape.
- Catchments resilient to water quantity extremes.

Table 4: Pressures and opportunities for recovery (Aquatic and Wetland Habitats)

Pressures	Example Habitats Affected	Broad Species Assemblages Affected (including example species[28])	Opportunities Identified
• Pollution, sediment deposition and nutrient enrichment • Point source pollution • Climate change • Water quantity extremes such as flood and drought • Invasive species • Recreational impacts • Land management	Canals and ditches Floodplain meadows Grazing marsh Ground water Lowland fens Marsh Standing open water / Ponds Reedbeds Rivers Streams Upland flushes, springs, fens and swamps Wet woodland (also considered under the trees and woodland group).	**<u>Flushes</u>** **(including upland, lowland and wetlands)** 41 shortlisted species including - *Plants:* • Green-flowered helleborine • Ivy-leaved bellflower • *Plagiomnium ellipticum* (Marsh thyme-moss) **<u>Standing open water</u>** **(including ponds, canals and ditches)** 29 shortlisted species including - *Mammals:* • Water vole • Foraging bats *Amphibians:*	Natural flood management solutions to slow the flow of water and attenuate flow Creation of wetter areas throughout our catchments Tree planting in the upper catchments and riparian planting Sustainable Drainage Systems Reduce diffuse and point source pollution entering our watercourses Reinstating our lost pond

detrimental to biodiversity		• Great crested newt *Plants:* • Pondweed and water-crowfoot species **<u>Rivers and streams</u>** **(including riverbanks and riverine sediments)** 27 shortlisted species including - *Mammals:* • Otter *Fish:* • Numerous fish species *Invertebrates:* • Numerous cranefly species • Freshwater pearl mussel • White-clawed crayfish **<u>Marsh</u>** **(including upland, lowland, fen and reedbeds)** 10 shortlisted species including - *Birds:* • Bittern • Sedge warbler • Snipe	landscape in low lying areas Build on the successes of the Catchment Based Approach (CaBA) partnerships Habitat creation and enhancement providing access to nature and Suitable Alternative Natural Green Spaces, where appropriate, along National Trails, public rights of way, canals and other active travel routes.

Table 5: Aquatic and wetland priorities, potential measures, and associated benefits

(N.B. Measures relating to watercourses are not necessarily intended to apply to the canal network and may not be appropriate within canals unless explicitly stated and/or shown on the Local Habitat Map).

AQUATIC AND WETLAND			
PRIORITY	**MEASURES**	**SHORTLIST SPECIES BENEFITED**[28]	**BENEFITS**
AW1. An enhanced river, stream and watercourse network and associated floodplains.	**AW1.1** **-** Support the expansion of eels across the county for example by: • Removing barriers to migration such as dams, • Installing eel and elver passes, • Improving water quality, • Protecting key areas from habitat loss.	*Fish:* • **Atlantic Salmon** • **Smelt** • Brown trout • Lamprey species • Eels	National objectives and targets: 1, 2, 3, 4, 5, 8, 10, 11, 12, 13, 14, 15, 16 Wider benefits: • Improvements in water quality, • Climate adaptation, • Local economy and green jobs, • Water flow regulation, • Reduction in flood risk, • Reduced erosion, • Contribution to delivery of River Basin Management Plans. • Social, cultural and educational. Other linked LNRS Priorities: AW2, AW3, AW4, C1, C2, C3, G1, U1, U2, U4, W2
	AW1.2 - Improve the extent and condition of floodplain habitats including floodplain meadows, damp grassland, grazing marsh, reedbeds, wet woodland and lowland fen.	**Floodplain habitats** *Mammals:* • Otter *Birds:*	

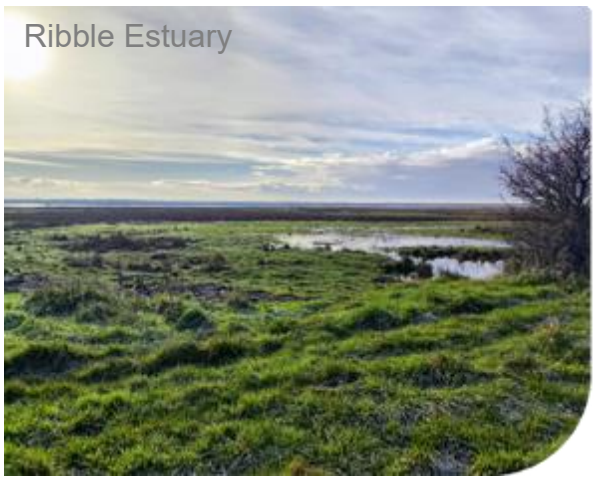
		• Ruff • Redshank *Invertebrates:* • **Belted beauty moth** • Crescent striped moth *Plants:* • Divided sedge • Meadow barley **<u>Reedbeds</u>** *Mammals:* • Harvest mouse *Birds:* • Sedge warbler • Bittern • Lapwing. **<u>Wet woodland</u>** *Birds:* • Willow tit • Sedge warbler *Plants:* • Dark-leaved willow • Bryophytes including *Plagiomnium ellipticum* (marsh thyme-moss).	

	AW1.3 - Sensitive management of ditches and other watercourses for biodiversity for example by: • Reduced livestock grazing along the water's edge to reduce trampling. • Control the extent of trees and scrub along waterways so other native, non-invasive vegetation important for biodiversity is not shaded out. • If bankside cutting is required, cut on a two-year rotation (or longer), leaving one bank uncut each year. • De-silting of ditches on a five-year rotation.	*Mammals:* • Water voles • Harvest mice *Amphibians:* • Common toad *Invertebrates:* • Norfolk hawker dragonfly *Plants:* • Aquatic and marginal vegetation such as water-crowfoot and pond weed species.	
AW2. Natural river processes restored, with habitats connected along watercourses and between their floodplains.	**AW2.1** - Increase the multiplicity and structural diversity of watercourse corridors to include multiple and sinuous channels, the natural supply of sediment, woody material and gravel management. **AW2.2** - Remove or redesign artificial structures impacting natural processes of watercourses including culverts, weirs, revetments, embankments and installation of fish passage solutions. **AW2.3** - Re-meandering of reaches of straightened and artificial modified channels of rivers and streams.	*Mammals:* • Otter • Water voles *Fish:* • Eels • **Atlantic salmon** • Smelt • Brown trout • Lamprey species *Invertebrates:* • Scarce yellow splinter (cranefly) • Norfolk hawker dragonfly • Freshwater pearl mussel • White-clawed crayfish	National objectives and targets: 1, 2, 3, 4, 5, 8, 10, 11, 12, 13, 14, 15, 16 Wider benefits: • Restore natural hydrology and hydro-geomorphic processes including sediment and nutrient deposition • Reduction in flood risk to downstream communities • Reduced erosion, • Contribution to delivery of River Basin Management Plans. • Climate resilience • Local economy and green jobs, • Water attenuation • Improve natural function, • Health and wellbeing • Social, cultural, and educational.

			Other linked LNRS Priorities: AW1, AW3, AW4, C1, C2, C3, G1, G2, P1, P2, P3, P4, P5, P6, W2, U1, U2, U3, U4
AW3. A restored and connected healthy freshwater and wetland landscape.	**AW3.1.1** - Restoration of Lancashire's lost pond landscape **AW3.1.2** – Rotational pond management to preserve marginal, emergent and submerged vegetation. **AW3.2 -** Appropriate canal management to protect and maintain bankside, marginal, emergent and submerged vegetation. **AW3.3 –** Expand and enhance fens, reedbeds, springs, flushes, marshes, marsh fen and ephemeral waterbodies. **AW3.4 -** Restore and reconnect fragmented canal network.	*Mammals:* • Water voles • Foraging bats *Birds:* • Bittern • Sedge warbler • Snipe • Oystercatcher • Curlew *Amphibians:* • Great crested newt • Common toad *Plants:* • Green-flowered Helleborine • Ivy-leaved bellflower • Great fen-sedge • Golden dock • Pondweed and water-crowfoot species • *Plagiomnium ellipticum* (marsh thyme-moss)	National objectives and targets: 1, 2, 3, 5, 8, 11, 12, 13, 14, 16 Wider benefits: • Natural resources, • Health and wellbeing, • Natural processes regulation such as water attenuation, • Improved water quality • Climate resilience, • Local economy and green jobs, • Reduction in flood risk to downstream communities, • Reduced erosion, • Contribution to delivery of River Basin Management Plans, • Improved connectivity, • Social, cultural and educational, • Access to nature, where appropriate, along transport corridors and active travel routes such as National Trails, public rights of way and canal towpaths. Other linked LNRS Priorities: AW1, AW2, AW4, C1, C2, C3, P1, P2, P3, P4, P5, P6, W1, W2, U2, U3, U4

AW4. Catchments resilient to water quantity extremes.	**AW4.1** - Install woody material, including leaky dams to promote natural processes and provide habitat for a range of aquatic species.	*Mammals:* • Water vole *Fish:* • Various species *Invertebrates*: • Riverine invertebrate species such as mayflies, stoneflies and caddisflies • White-clawed crayfish	National objectives and targets: 1, 2, 3, 4, 5, 8, 9, 11, 12, 13, 14, 16 Wider benefits: • Improved water environment to provide sustainable resources to support a growing population, • Reduced erosion, • Drought resilience, • Local economy and green jobs, • Natural flood risk management, • Promote natural processes Other linked LNRS Priorities: AW1, AW2, AW3, C1, C2, C3, G3, P1, P2, P3, P4, P5, P6, W2, U1, U2, U4
	AW4.2 – Create biodiverse sustainable drainage systems incorporating habitats such as swales, ponds, wetlands and reedbeds.	*Amphibians:* • great crested newt • common toad *Invertebrates:* • mayflies, stoneflies and caddisflies *Plants:* • pondweed species • water-crowfoot species	
	AW4.3 - Sustainable abstraction plan for agriculture and horticulture in Lancashire.		
	AW4.4 - Bioengineering and nature-based solutions for moderation of water flows, such as reedbed filters, living dams, living revetments, tree and hedge planting and kested hedgerows.	As above, also: *Birds:* For example, • Sedge warbler (reedbeds) • Corn bunting and tree sparrow (hedgerows)	

Coastal and Estuarine


Ribble Estuary


Morecambe Bay from Jack Scout

The coastal expanse of Lancashire's strategy area spans from Silverdale to Birkdale Sands. This large expanse of coastline has several contributing main estuaries of the Ribble, Wyre, Lune, Keer, Kent and Leven with a myriad of smaller channels and outlets that feed into the coastline[38]. There are extensive areas of river, coastal and estuary SSSIs which predominantly are in favourable condition.

Sand dunes are multiple systems that are vulnerable to increased disturbance and invasive plant species, as well as weather and sea conditions[39]. Over the past 150 years, more than 80% of the sand dunes in Lancashire have been lost[40]. 90% of Lancashire's remaining sand dunes are in Fylde. The presence of three large golf courses on Lancashire's dune land has saved extensive areas of semi-natural vegetation, including the largest remaining areas of dune heath, from built development.[41] However, without sensitive management of routine golf course operations such as drainage, irrigation, tree-planting, mowing, fertilising and re-seeding then their biodiversity value is at risk.

Coastal squeeze of inter-tidal habitats is an increasing pressure on biodiversity in Lancashire.

The Lancashire LNRS aims to achieve:

- Coastal habitats connected with wider ecosystems particularly transitional habitats.
- Naturally functioning coastal systems with dynamic processes forming embryonic and transitional habitats.
- Expanded, enhanced and preserved coastal and estuarine habitat important to Lancashire.

Table 6: Pressures and opportunities for recovery (Coastal and Estuarine Habitats)

Pressures	Example Habitats Affected	Broad Species Assemblages Affected (including example species[28])	Example Opportunities Identified
• Climate change • Sea-level rise and erosion. • Drought and flooding • Land and sea management detrimental to biodiversity • Habitat loss • Development and physical modification • Pollution, sediment	Brackish reedbeds Coastal grasslands Coastal floodplain grazing marsh Coastal hinterland (functionally linked farmland) Coastal saltmarsh Coastal sand dunes Coastal vegetated shingle Coastal woodlands Estuaries Lowland rivers and watercourses Maritime cliffs Mudflats	**Estuaries** 14 shortlisted species including - *Birds:* • Ringed plover • Lapwing *Fish:* • Eel • Lesser sand-eel • River lamprey **Dune slacks** **(including dune slacks/sand dune systems and coastal ditches and canals)**	Restore saltmarsh through rewetting interventions, changes to grazing management and managed realignment. Managed realignment, for tidal exchange. Juvenile fish and spawning habitat restoration in the middle and upper estuaries of the Lancashire and Amounderness Plain, Morecambe Coast and Lune Estuary, and Morecambe Bay Limestones. Promotion of a step change to agricultural management practices.

deposition and nutrient enrichment • Recreational impacts	Non-saline lagoons Saline lagoons Inter-tidal and sub-tidal cobble and boulder skears Open Mosaic Habitat on Previously Developed Land	10 shortlisted species including - *Invertebrates:* • Sand dart moth • tiger cranefly *Amphibians:* • Common toad *Plants:* • Tubular water-dropwort • Early sand-grass **<u>Sand dunes</u>** **(including beach and sand dunes associated with woodland, lowland heath and shingle)** 32 shortlisted species including - *Reptiles:* • Sand lizard • Adder *Invertebrates:* • White colon moth • Black-headed leafcutter bee • Sand runner spider. *Plants:* • Dune helleborine • Seaside centaury • Creeping willow **<u>Saltmarsh</u>** **(including transitional brackish marsh and floodplain grazing marsh** 19 shortlisted species including - *Birds:* • Redshank • **Black-tailed godwit** • Pintail *Invertebrates:*	Wetland and flood storage habitat creation in West Lancashire, Morecambe Coast and Lune Estuary and Lancashire and Amounderness Plain to improve the current water management regime. Alleviate recreational impacts through public engagement for example, through raising awareness and Community wildlife projects and improvements to Suitable Alternative Natural Green Spaces Habitat creation and enhancement, providing access to nature and Suitable Alternative Natural Green Spaces, where appropriate, along National Trails, public rights of way and other active travel routes, for example, King Charles III England Coast Path.

		• Saltern neb moth • **Belted beauty moth** *Plants:* • Sea milkwort • Divided sedge **<u>Coastal rocky / maritime cliffs</u>** 4 shortlisted species including - *Plants:* • Common Scurvygrass • Sea spleenwort (a fern) **<u>Coastal grasslands</u>** 9 shortlisted species including - *Invertebrates:* • White-dusted owlet moth • Vernal Mining bee *Plants:* • Field gentian • Hoary cinquefoil	

Table 7: Coastal and estuarine priorities, potential measures, and associated benefits

COASTAL AND ESTUARINE			
PRIORITIES	**MEASURES**	**SHORTLIST SPECIES BENEFITED**[28]	**BENEFITS**
C1. Coastal habitats connected with wider ecosystems particularly transitional habitats.	**C1.1** - Create and restore coastal habitats (such as sand dunes, dune slacks and saltmarshes) to reverse fragmentation. **C1.2** - Remove barriers, such as small weirs, culverts and other riverbed modifications (or create passages through/around them) to improve connectivity for species dispersal, prioritising barriers within main rivers at, or close to the tidal limit. **C1.3** - Create and enhance habitat corridors and stepping stone habitats to support species migration including connectivity between coastal and freshwater ecosystems e.g. saltmarsh, estuaries, intertidal pools, floodplain grazing marsh.	*Birds:* • Ringed plover • Lapwing • Redshank • **Black-tailed godwit** • Pintail • Ruff *Reptiles:* • Sand lizard • Common toad *Fish:* • Eel • Lesser sand-eel • **Smelt** • **Atlantic salmon** • Brown trout *Invertebrates:* • **Belted beauty moth** • Saltern neb moth • Sand dart moth • White colon moth • Black-headed leafcutter bee	National objectives and targets: 1, 2, 3, 4, 5, 8, 11, 12, 13, 14, 16 Wider benefits: • Natural resources quality, • Reduction in flood risk for coastal communities, • Reduced erosion, • Natural processes regulation, • Climate resilience, • Local economy and green jobs, • Ensure resilient and healthy populations of coastal species, • Improve migration routes, • Health and wellbeing, • Social, cultural, and educational, • Access to nature and Suitable Alternative Natural Green Spaces,

		• Sand runner spider Plants: • Tubular water-dropwort • Early sand-grass • Dune helleborine • Seaside centaury • Creeping willow • Divided sedge	where appropriate, along King Charles III Coastal Path and the associated coastal margin. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, C2, C3, G3, P1, P2, P3
C2. Naturally functioning coastal systems with dynamic processes forming embryonic and transitional habitats.	**C2.1** - Restore natural processes in coastal waters, estuaries, dune slacks, sand dunes and saltmarsh habitats for example by: • Redesigning and realigning coastal flood defences, • Creating naturally functioning saltmarsh creek networks, • Restoring natural hydrology in dune slacks, • Promote the natural growth of sand dunes, • Rewetting of desiccated coastal wetlands and grasslands. **C2.2** - Restore, create and actively manage dune slacks for example through scrape creation, management of frontal woodlands and scrub control. **C2.3** - Allow natural formation of embryonic habitats such as embryonic dunes, saltmarshes (including strand line and pioneer vegetation) and dune slacks. **C2.4** – Manage and enhance sand dune habitats for example through sand patching and vegetation management to maintain a structurally varied habitat. **On sites identified as BHS, also follow Measure B1.1.**	*Amphibians:* • Common toad *Fish (coastal waters and estuaries are a key habitat for juvenile and larvae phase fish):* • Eel • Lesser sand eel • **Smelt** • **Atlantic salmon** • Brown trout • Cod • Plaice *Reptiles:* • Sand lizard	National objectives and targets: 1, 2, 3, 5, 8, 11, 12, 13, 14 Wider benefits: • Natural resources, • Health and wellbeing, • Climate regulation, • Local economy and green jobs, • Reduction in flood risk to coastal communities, • Reduced erosion, • Restoration of coastal habitat dynamism, • Safeguarding natural coastal processes, • Social, cultural and educational. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, C1, C3, P1, P2, P3, U1, U4.

C3. Expanded, enhanced and preserved coastal and estuarine habitat important to Lancashire.	**C3.1** - Create and enhance undisturbed coastal: • High tide feeding and roosting habitat for wildfowl. • Nesting sites and high tide feeding and roosting habitat for wading birds. **C3.2** - Creation of estuarine, and lower river (between tidal limit and 1-2 miles upstream) riffle habitats to support key fish species for example by: • Installing natural features such as large wood or large rocks within the watercourse to alter flow and facilitate sediments to be deposited in desired areas. **C3.3** - Creation and restoration of naturally functioning saltmarsh habitat. **C3.4** - Creation of coastal habitats (such as brackish reedbeds, coastal grasslands and wetlands), to buffer and expand coastal and estuarine habitats, allowing for habitat expansion with sea level rise and reconnection of low-lying reclaimed and frequently flooded agricultural land to coastal and transitional habitats.	*Birds:* • Ringed plover • Lapwing • Redshank • **Black-tailed godwit** • Arctic tern • Common tern *Invertebrates:* • **Belted beauty (moth)** • Dark green fritillary butterfly • Small heath *Fish (particularly riffle habitats):* • **Atlantic salmon** • **Smelt** • Lamprey species *Plants:* • Green-flowered helleborine	National objectives and targets: 1, 2, 3, 5, 8, 11, 12, 13, 14, 16 Wider benefits: • Natural resources, • Natural processes regulation, • Reduction in flood risk to coastal communities, • Habitat adaptation to sea level rise, • Reduced erosion, • Climate regulation, • Local economy and green jobs. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, C1, C2, G1, G2, G3, P2, P3, U1, U4.

Grasslands (Including agricultural land)

1. Wildflower meadow.
2. Hay meadow
3. Grazing pasture at Wycoller
4. Honey waxcap
5. Sunnyhurst meadows
6. Upland neutral grassland

Semi-natural grassland is one of the most threatened habitats in the UK, with a reported 97% loss of semi-natural enclosed grasslands in England and Wales between 1930 and 1984[42].

Between 1960 and 2013, semi-natural grasslands in England declined by 47% overall[43]. Dry acid grassland saw the greatest loss (85%) while the extent of upland calcareous grassland was at 39% loss[44]. The Floodplain Meadows Partnership estimate that about 1,100 hectares (ha) remain of the classic floodplain meadow plant community in England and Wales[45].

Most semi-natural grassland in England has been improved to benefit agricultural production, and the grasslands in Lancashire are no exception. The more natural and species-rich sites that remain are often small and isolated but can still support communities of specialised plant and animal species[46]. The annual value of carbon sequestration by vegetation in grassland is estimated to be approximately £0.2 billion[47]. Figures 1 and 2 in Appendix Four illustrate carbon storage and carbon sequestration by habitat.

Undertaking a range of supporting actions will contribute towards achieving the priorities for grassland and agricultural land. Data and evidence as well as engagement and collaboration actions are of particular interest.

The Lancashire LNRS aims to achieve:

- Ecologically important grasslands preserved and managed for biodiversity.
- A connected network of biodiverse grassland habitats.
- Sustainably managed agricultural land with maximised biodiversity value, generating wider environmental benefits.

Table 8: Pressures and opportunities for recovery (Grassland and Agricultural Habitats)

Pressures	Example Habitats Affected	Broad Species Assemblages Affected (including example species[28])	Example Opportunities Identified
• Climate change • Land management detrimental to biodiversity • Habitat loss and fragmentation • Pollution, sediment deposition and nutrient enrichment • Recreational impacts	Coastal and floodplain grazing marsh Calcareous grassland Lowland dry acid grassland Lowland meadows and pastures Purple moor-grass and rush pastures and other fen Upland acidic grassland Waxcap	**<u>Arable and farmland</u> (including grazed pasture, arable and farmland mosaic /hedgerows)** 11 shortlisted species including - *Birds:* • Corn bunting • Yellow wagtail • Tree sparrow. *Plants:* • 31 arable plant species. **<u>Unimproved grassland</u> (including ancient**	Improve land management practices through farming networks and stronger engagement with the land manager community on nature recovery and agri-environment funding opportunities. Funding reforms to incentivise land managers. Establish collaborative nature recovery programmes like the Farming in Protected Landscapes scheme and promote and support new and existing farming clusters/networks. Create a map and directory of green hay donors and

• Invasive species	(CHEGD) grasslands	**grasslands, dry grasslands and hay meadows)** 14 shortlisted species including - *Invertebrates:* • Wall butterfly • Phantom hoverfly *Plants:* • Dyer's-greenweed • Globeflower *Fungi:* • 50 grassland fungi species. **<u>Calcareous Grasslands</u>** 22 shortlisted species including - *Invertebrates:* • Dingy skipper (Butterfly) • Northern brown argus (Butterfly) • **Least minor (Moth)** • Cistus forester (Moth) *Plants:* • Green-winged orchid • Moonwort • *Rhytidium rugosum* (a feather-moss) • *Didymodon acutus* (a moss) **<u>Open Grassland Mosaics</u> including lowland, coastal, upland, damp, acid, rich flower resource (botanically species-diverse) and verges** 20 shortlisted species including - *Mammals:* • Harvest mouse • Polecat *Invertebrates:* • Small heath butterfly	donor sites that can provide the seed source to support hay meadow recovery projects. Create a directory of contractors who specialise in using smaller tractors and mowers for sites with limited accessibility to maintain low nutrient levels. Reduce verge (and some amenity grasslands) cutting regimes to increase sward diversity. Habitat creation and enhancement providing access to nature and Suitable Alternative Natural Green Spaces, where appropriate, along National Trails, public rights of way, canals and other active travel routes.

		• Tormentil nomad bee • Small flecked mining bee *Plants:* • Autumn crocus • Saw-wort **<u>Flushes /flushed grasslands</u>** 5 shortlisted plant species: • Marsh lousewort • Small water-pepper • Mossy saxifrage • Lesser skullcap • Ivy-leaved bellflower **<u>Marsh</u>** **(including upland and lowland marsh/ fen and wet grassland)** 12 shortlisted species including - *Birds:* • Curlew • Oystercatcher *Plants:* • Heath fragrant-orchid • Corky-fruited water-dropwort • Marsh stitchwort	

Table 9: Grassland priorities, potential measures, and associated benefits

GRASSLAND (INCLUDING AGRICULTURAL LAND)			
PRIORITY	**MEASURE**	**SHORTLIST SPECIES BENEFITED**[28]	**BENEFITS**
G1. Ecologically important grasslands preserved and managed for biodiversity.	**G1.1** - Create and maintain conditions to allow thriving, resilient and dynamic populations of waders important to Lancashire, dependent on key habitats including grasslands, peatland and arable land. **G1.2** - Secure appropriate management of grasslands with high biodiversity value such as ancient permanent grasslands and grasslands rich in plant species, fungi, or invertebrates (for example, conservation grazing, preservation of undisturbed and uncultivated soils and maintenance of low nutrient levels, appropriate sward structure and hydrological conditions). **G1.3 -** Secure appropriate conservation management of known fungi-rich grasslands, including (for example) preserving undisturbed soils with no cultivation, no nutrient inputs, maintaining suitable sward heights to allow fruiting and restricting scrub/tree encroachment. **On sites identified as BHS, also follow Measure B1.1.** **G1.4** – Enhance grasslands by inoculating sites with appropriate plant species from suitable agreed donor sites. **G1.5** - Produce a local directory of resources to aid grassland management, facilitate sharing of equipment and access to appropriate grazing stock and seed donor sites. **G1.6** - Undertake suitability assessments and grassland fungi surveys (fruit body or DNA) on long-established semi-improved and unimproved grasslands (including botanically species poor examples) subject to any proposal or land-use	*Mammals:* • Harvest mouse • Polecat *Birds:* • Curlew • Oystercatcher • Lapwing *Invertebrates:* • **Least minor moth** • Cistus forester moth • **Duke of Burgundy butterfly** • **Pearl-bordered fritillary butterfly** • **High brown fritillary butterfly** • Wall butterfly • Dingy skipper • Northern brown argus butterfly • Small heath butterfly • Tormentil nomad bee • Small flecked mining bee • Phantom hoverfly *Plants:*	National objectives and targets: 1, 2, 3, 5, 8, 11, 12 Wider benefits: • Preservation of natural resources, • Local economy and green jobs, • Social, cultural and educational. Other linked LNRS Priorities: AW1, AW3, C1, C3, G2, G3, P2, P5.

	change which could disturb the soil or increase nutrient levels in the soil (such as tree planting, other habitat creation requiring soil disturbance, change in agricultural use, excavation, ploughing, nutrient enrichment, development etc) and use this information to assess importance and inform decision making, to ensure the conservation of ancient and important grasslands.	• Dyer's greenweed • Globeflower • Green-winged orchid • Moonwort • Autumn crocus • Saw-wort • Lesser skullcap • Ivy-leaved bellflower • Heath fragrant-orchid • Corky-fruited Water-dropwort • Marsh stitchwort • *Rhytidium rugosum* (a feather-moss) • *Didymodon acutus* (a moss) Grassland fungi assemblage (for example, waxcaps and earthtongues): • Jubilee waxcap • Pink waxcap • Glistening waxcap • Brightsky pinkgill • Lilac pinkgill • Violet coral • Dark-purple earthtongue • Rufous earthtongue	

G2. A connected network of biodiverse grassland habitats.	**G2.1** - Enhance habitat, for example, good, semi-improved grasslands to priority habitat, and create biodiverse grasslands buffering and connecting important habitats, through appropriate management including low nutrient inputs, species and sward diversification as well as conservation grazing and mowing regimes.	As above	National objectives and targets: 1, 2, 3, 5, 8, 11, 12, 14, 16 Wider benefits: • Natural resources with improved soil health, • Health and wellbeing, • Crop pollination, • Local economy and green jobs, • Social, cultural and educational, • Access to nature, where appropriate, along transport corridors and active travel routes such as National Trails, public rights of way and canal towpaths. Other linked LNRS Priorities: AW1, AW3, C1, C3, G1, G3, P2, P5, U2, U3, U4.
	G2.2 – Enhance grasslands by inoculating sites with appropriate plant species from suitable agreed donor sites for example where natural re-colonisation is unlikely.		
	G2.3 - Maintain and enhance biodiverse grassland verges such as identified biodiversity verges and wildflower verges which may be particularly valuable in aiding connectivity, including appropriate mowing regimes to enable flowering/seeding and removal of arisings.		
	G2.4 - Create biodiverse grassland verges in suitable locations to enhance habitat connectivity, for example, through species and sward diversification, conservation mowing regimes to enable flowering / seeding and removal of arisings.		

G3. Sustainably managed agricultural land with maximised biodiversity value, generating wider environmental benefits.	**G3.1** - Manage soils for enhanced biodiversity and improved soil health for example by reducing compaction, winter cover crop, crop and grazing rotation, produce a soil management plan.	*Mammals:* • Brown hare • Hedgehogs • Polecat • Roosting and foraging bats (including: Whiskered bat, Serotine, Lesser horseshoe) *Birds:* • Corn bunting • Yellow wagtail • Tree sparrow • Grey partridge • Corncrake • Lapwing • Yellow hammer *Reptiles:* • Grass snake *Amphibians:* • Great crested newt • Common toad *Plants:* (Arable assemblage): • Purple ramping-fumitory • Corn marigold • Prickly poppy • Slender parsley-piert • Corn chamomile	National objectives and targets: 1, 2, 3, 4, 5, 8, 9, 11, 12, 13, 15, 16 Wider benefits: • Improved water quality, • Health and wellbeing, • Crop pollination, • Improved soil health, • Resilience in food production, • Local economy and green jobs, • Local produce, • Reductions in siltation, nutrient run-off, pollution, erosion and flood risk, • Social, cultural and educational. Other linked LNRS Priorities: AW1, C2, C3, G1, G2, P5, U2.
	G3.2 - Appropriately manage for arable species assemblages such as habitat for nesting birds including ground nesting species, buffer strips, beetle banks, conservation headlands, overwintering feeding habitat, overwinter stubble and field corners.		
	G3.3 – Create habitat within arable land and other farmed landscapes such as tree planting in field corners, individual trees, agro-forestry, field ponds, habitats and features to support nesting birds (including ground nesting species) and buffer habitats adjacent to watercourses and aquatic habitats.		
	G3.4 - Reduce the use of herbicide, pesticide and other agricultural chemicals.		
	G3.5 - Support and promote organic farming.		
	G3.6 - Reinstate historic field boundaries such as hedgerows, ditches and drystone walls.		
	G3.7 - Provision of habitat piles, nest and roosting boxes.		

Peatland

1. Lowland raised bog
2. Common cottongrass
3. Round-leaved sundew
4. Butterwort

Lancashire contains approximately 135,000 hectares of peat soils, according to Natural England's Peaty Soils layer. Key upland areas include the Forest of Bowland, West Pennines and Forest of Rossendale, the first two of which are designated as SSSIs in part for the blanket bog habitat, the latter sits outside any such designation but is an important link between the West Pennine Moors and the South Pennines. Land-use in the uplands in the main is water company catchment, agricultural grazing land, grouse moors, common land and windfarms. Key lowland areas include the Alt Crossens and Pilling Moss. Some small areas of these are designated as SSSI but the majority sits outside of designation. Lowland peat areas are generally agricultural crop and grazing land.

Many of our peatlands are in a progressive state of degradation[48]. Only 13% of England's peatlands are in a near natural state and much of our lowland peat is currently used for intensive agriculture[49]. Winmarleigh Moss SSSI is the largest area of lowland raised bog remaining in Lancashire and is the only one that survives in anything like its original condition[50]. White Moss SSSI in Ribble Valley is the best surviving example of an actively growing basin mire in Lancashire. At least 95% of the lowland peat mosses existing in Lancashire in 1948 have been lost.[51] This loss has

mainly been due to reclamation for agriculture, peat extraction, repeated burning or afforestation. National blanket bog losses of 30% between 1930 and 1980 were mainly due to overgrazing, indiscriminate historic moor burning, afforestation and the abandonment of grouse moors.[52] No specific data is available on the condition of Lancashire's upland peat habitats, although it is expected that similar rates of loss will apply to Lancashire's upland peat habitats over the same period.

The Lancashire LNRS aims to achieve:

- Sustainable land use of lowland peat soils, creating a mosaic of peatland habitats that support a variety of species.
- Lowland peatlands connected at a landscape-scale and their supporting habitats restored.
- Active growing lowland peatlands, supporting rich biodiversity.
- Functioning upland peatlands forming peat at a landscape-scale.
- A mosaic of upland peatland, non-peatland and connecting transitional habitats in the uplands, supporting a variety of species.
- Sustainable land use and management of upland peat soils.

Table 10: Pressures and opportunities for recovery (Peatland Habitats)

Pressures	Example Habitats Affected	Broad Species Assemblages Affected (including example species[28])	Opportunities Identified
• Climate change • Land management detrimental to biodiversity • Habitat loss and fragmentation • Pollution, sediment deposition and nutrient enrichment • Hydrological changes • Erosion • Recreational impacts from off-road vehicles and	Blanket bog Hydrologically linked land Lagg fen Lowland heathland Lowland raised bog Mires and quaking bogs Shallow peaty soils Upland heathland	**<u>Bogs</u>** **(including bog pools, blanket, raised and mire)** 21 shortlisted species including - *Birds:* • Dunlin *Invertebrates:* • 5 species of crane-fly • Keeled skimmer and golden-ringed dragonflies *Plants:* • Great sundew • Bog-myrtle • *Sphagnum pulchrum*	To engage sustainable management practices following habitat restoration. To stack public body funding and private investment in nature recovery (such as the Peatland Carbon Code standard or Water Industry National Environment Improvement Programme). Monitoring to evidence improvements following restoration and inform further restoration work. Develop a countywide wildfire strategy. Better engagement across the upland land manager sector, sharing best practice and upskilling contractors and practitioners.

dogs off leads. • Grazing intensity, mainly form sheep		**<u>Scrub-heath and moorland with structural diversity</u>** **Moorland and Woodland Edge, lowland and upland heathland, upland flushes, marsh/fen and purple moor-grass and rush pasture** 53 shortlisted species including - *Birds:* • Short-eared owl • Ring ouzel • Snipe • Curlew *Reptiles:* • Adder *Invertebrates:* • Marsh fritillary butterfly *Plants:* • Mossy saxifrage • Common butterwort • Cloudberry *Lichen:* • Reindeer lichen	Develop a new water level management strategy. Opportunities for a more sustainable management approach to peatland soils through wetter farming.

Table 11: Peatland priorities, potential measures, and associated benefits

LOWLAND PEATLAND			
PRIORITY	**MEASURE**	**SHORTLIST SPECIES BENEFITED**[28]	**BENEFITS**
P1. Sustainable land use of lowland peat soils, creating a mosaic of peatland habitats that support a variety of species.	**P1.1** - Wetter farming - where it leads to peat formation or transition to restoration for example, sustainable *Sphagnum* farming, *Typha* growing and carbon farming. **P1.2** - Productive agriculture on wet or rewetted peaty soils (including short rotation willow coppice) to buffer and enhance habitats adjacent to peatland habitats. **P1.3 -** Create or update sustainable water level management plans to: • Work with local partners and landowners to better manage all forms of flooding in the catchment in the future through promoting collaborative working and sustainable development. • Identify opportunities to improve Water Resource resilience to weather extremes. • Deliver Natural Flood Management / BNG and Water Quality improvements which support nature recovery, peat restoration, long term sustainability and reduction of operational costs. **P1.4 -** Landscape-scale joined up Wildfire Management Plans that cross land boundaries including a fire ranger scheme to educate public and with powers to close areas of high risk. **P1.5** - Work with DEFRA to pilot a north-west traffic light system to manage fire risk.	*Mammals:* • Water vole *Birds:* • Willow tit • Cuckoo • Short-eared owl *Reptiles:* • Adder • Sand lizard *Invertebrates:* • **Large heath butterfly** • Cranefly species • *Macronychia griseola* (a 'flesh' fly) • *Empis prodromus* (a 'dance' fly) *Plants:* • Great sundew • Oblong-leaved sundew • Common butterwort • Bog myrtle • Hare's-tail cottongrass • White beak-sedge • Slender sedge • Small cudweed	National objectives and targets: 1, 2, 3, 5, 7, 8, 11, 12, 13, 14 Wider benefits: • Improved water quality, • Attenuating water flow (water quantity resilience), • Reduced erosion, • Reduction in carbon emissions, • Increase in carbon sequestration, • Climate resilience, • Health and wellbeing, • Reduction in flood risk for local communities, • Local economy through green jobs. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, C1, C2, C3, G1, G2, G3, P2, P3.

		• *Sphagnum pulchrum* • *Campylopus gracilis* (Schwartz's swan-neck moss) *Lichen:* • Reindeer lichen	
P2. Lowland peatlands connected at a landscape-scale and their supporting habitats restored.	**P2.1** Restore and enhance lowland peatland and wetland habitats to improve habitat connectivity, for example lagg, fen and lowland heathland. **P2.2** - Hydrological restoration to support lowland peatland habitat creation and enhancement. **P2.3** - Create corridors and steppingstones of lowland peatland habitats and other wetland habitats in between fragmented lowland raised bog and associated habitats for example wet woodland, reedbeds and wet heath. **P2.4** - Expansion, sensitive management and restoration of lowland heath.	As above	National objectives and targets: 1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14 Wider benefits: • Safeguarding natural resources by restoring peatlands, • Improved water quality, • Attenuating water flow (water quantity resilience), • Reduced erosion, • Reduction in carbon emissions, • Increase in carbon sequestration, • Climate resilience, • Health and wellbeing, • Local economy and green jobs, • Reduction in flood risk for local communities, • Filtration of pollutants (reedbeds). Other linked LNRS Priorities:

			AW1, AW2, AW3, AW4, C1, C2, C3, G2, G3, P1, P3
P3. Active growing lowland peatlands, supporting rich biodiversity.	**P3.1** – Re-establish and restore lowland peatland habitats (such as lowland raised bog) on deep peat and in other locations with the potential to return to active peat-forming bogs. **On sites identified as BHS, also follow Measure B1.1.**	As above	National objectives and targets: 1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 16 Wider benefits: • Safeguarding natural resources by restoring peatlands, • Improved water quality, • Attenuating water flow (water quantity resilience), • Reduced erosion, • Reduction in carbon emissions, • Increase in carbon sequestration, • Climate resilience, • Local economy and green jobs,
	P3.2 - Create transitional buffering habitats adjoining lowland peatlands to support their restoration and hydrology, for example lagg, fen and wet woodland.		
	P3.3 - Inoculate suitable lowland peatland sites for example raised bog, lagg, fen and lowland heathland with appropriate plant species from suitable donor sites.		

			• Health and wellbeing, • Reduction in flood risk for local communities. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, C2, C3, W1, U2.
UPLAND PEATLAND			
PRIORITY	**MEASURE**	**SHORTLIST SPECIES BENEFITED**[28]	**BENEFITS**
P4. Functioning upland peatlands forming peat at a landscape-scale.	**P4.1** - Restore hydrology of upland peat soils such as grip and gully blocking. **P4.2** - Revegetation of key upland peatland plant species in areas of restored hydrology dependent on site specific conditions including seeding, plug planting, encouraging revegetation. **P4.3** - Restore and reconnect appropriate relic areas back to active blanket bog and mire through management changes, practical interventions and encouraging *Sphagnum* growth. **P4.4 –** Re-establish and restore upland peatland habitats (such as blanket bog, wet heath and mire) on deep peat and in other locations with the potential to return to active peat-forming bogs.	*Mammals:* • Water vole *Birds:* • **Hen harrier** • Merlin • Short-eared owl • Ring ouzel • Snipe • Curlew • Dunlin • Whinchat	National objectives and targets: 1, 2, 3, 5, 7, 8, 11, 12, 13, 14, 16 Wider benefits: • Safeguarding natural resources by restoring peatlands, • Improved water quality, • Attenuating water flow (water quantity resilience), • Reduced erosion,

	P4.5 - Maintain and enhance existing blanket bog through appropriate management to achieve good/favourable ecological condition. **On sites identified as BHS, also follow Measure B1.1.**	• Twite *Reptiles:* • Adder *Invertebrates:* • **Large heath** (Butterfly) • **Bilberry bumblebee** • Broken-banded bumblebee • Northern sallow mining bee • Keeled skimmer dragonfly • Golden-ringed dragonfly • Sheet weaver spider *Plants:* • **Dwarf cornel** • **Petty whin** • *Sphagnum pulchrum* • Great sundew • Bog-myrtle • Broad-leaved cottongrass • Mossy saxifrage • Common butterwort • Cloudberry • Juniper Lichen: • Reindeer lichen	• Reduction in carbon emissions, • Increase in carbon sequestration, • Climate resilience, • Local economy and green jobs, • Health and wellbeing, • Reduction in flood risk for local communities, • Contribution to the Great North Bog. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, C1, C2, C3, G1, G2, G3, P1, P2, P3, P5, P6, R1, R2, R4, W1, W2, U1, U2, U3.

P5. A mosaic of upland peatland, non-peatland and connecting transitional habitats in the uplands supporting a variety of species.	**P5.1** - Management to maintain and enhance upland peatland species and habitat diversity through, for example: • Alterations to site hydrology, burning, grazing and nutrient inputs, • Managing encroachment of bracken and other vegetation, • Adjustments to game management and predator control regimes agreed in collaboration with local landowners, managers and shoots. **P5.2 -** Management and restoration of upland heath through sensitive management. **P5.3 -** Management, restoration and expansion of species-rich purple moor-grass and rush pasture and upland flushes.	**Purple moor-grass and rush pasture** *Invertebrates:* • Marsh fritillary butterfly *Plants:* • Bryophyte species such as ribbonwort. **Upland flushes** *Plants:* • Ivy-leaved bellflower • Marsh lousewort • Grass-of-parnassus • *Campylopus gracilis* (Schwarz's swan-neck moss)	National objectives and targets: 1, 2, 3, 5, 7, 8, 11, 12, 13, 14, 16 Wider benefits: • Safeguarding natural resources by restoring peatlands, • Improved water quality, • Attenuating water flow (water quantity resilience), • Reduced erosion, • Reduction in carbon emissions, • Increase in carbon sequestration, • Climate resilience, • Local economy and green jobs, • Health and wellbeing, • Reduction in flood risk for local communities, • Contribution to the Great North Bog. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, C2, G1, G2, G3, P4, P6.
P6. Sustainable land use and	**P6.1** - Work with DEFRA to pilot a north-west traffic light system to manage fire risk.	As above	National objectives and targets:

management of upland peat soils.	**P6.2** - Landscape-scale joined up Wildfire Management Plans that cross land boundaries including a fire ranger scheme to educate the public and with powers to close areas of high risk.		1, 2, 3, 5, 7, 8, 11, 12, 13, 14 Wider benefits: • Safeguarding natural resources by restoring peatlands, • Climate resilience, • Health and wellbeing, • Local economy and green jobs, • Social, cultural and educational, • Contribution to the Great North Bog. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, C2, G1, G2, G3, P1, P2, P3, P4, P5, W1, W2, U4.

Rocky Habitats


Limestone pavement


Angular Solomon's-seal


Bloody crane's-bill


Lady's-slipper orchids

Rocky habitats, some of which are natural and some of which are man-made, are found throughout Lancashire. Lancashire's limestone pavements are nationally rare habitats with 45% of their area having been damaged or destroyed by quarrying activity[53]. In 1990, only 3% of the area left remained undamaged.[54]

Post-industrial sites including former quarries, drained reservoirs, disused railways, and certain types of industrial tips have been colonised naturally by a wide range of plants and animal communities. These sites are valuable for their biodiversity and there is a need to recognise their importance in the context of pressure for development or redevelopment and a need to manage them appropriately to enhance their biodiversity value.

The Lancashire LNRS aims to achieve:

- Limestone pavement habitats with high biodiversity value.
- Rocky outcrops and features with high biodiversity value (including outcrops, cliff faces, ledges, crevices, seepages, scree and boulders).
- Maximised biodiversity value of geological features, rocky habitats and artificial habitats arising from past industry and development.

Table 12: Pressures and opportunities for recovery (Rocky Habitats)

Pressures	Example Habitats Affected	Broad Species Assemblages Affected (including example species[28])	Example Opportunities Identified
• Land management detrimental to biodiversity • Habitat loss • Invasive species • Recreational impacts – from activities such as climbing and caving, mountain biking etc. • Climate Change	Caves and mines Inland rock exposures and scree Limestone pavements Man-made rock features (for example, man-made historic features like barns, sheep folds and dry walls). Open Mosaic Habitats on Previously Developed Land – outside urban areas (≥10,000 residents) Quarries and mineral extraction sites Spoil heaps	**<u>Limestone Habitat Mosaic with structural diversity</u>** 42 shortlisted species including - *Invertebrates:* • Chestnut-coloured carpet moth • Barred tooth-striped moth *Plants:* • Dwarf spurge • Mountain melick • Blue moor-grass • Dark-red helleborine • Baneberry • Juniper • *Tortella densa* (moss) **<u>Limestone pavement/rock</u>** **(often linked with the above)** 9 shortlisted species including - *Invertebrates:* • Grayling (butterfly) • Narrow-mouthed whorl snail *Plants:* • Lily-of-the-valley • **Northern bedstraw** • Limestone fern • *Drepanocladus turgescens* (a feather-moss)	Develop current biodiversity management plans for active and recently closed quarries. Gain a better understanding of suitable biodiversity management of rocky habitats, write guidance and share best practice. Control both native and non-native invasive species to reduce encroachment. Work with Buglife and the Arnside & Silverdale National Landscape to conserve the nationally significant species found within this Important Invertebrate Area.

		<u>Rocky woodland</u> 9 shortlisted species including - *Plants:* • **Lady's-slipper orchid** • Killarney fern • Spring cinquefoil **<u>Exposed Rock (Acidic)</u>** including: • 10 lichen species. **<u>Exposed rock (Basic)</u>** 6 shortlisted species including - *Plants:* • Bloody crane's-bill • Green spleen-wort • *Bryum elegans* (moss) • *Tortella squarrosa /Pleurochaete squarrosa* (moss) **<u>Exposed rock/crags</u> (scrub, heath, moorland)** 8 shortlisted species including- *Birds:* • Peregrine falcon *Plants:* • Hoary whitlowgrass • Hay-scented buckler-fern	

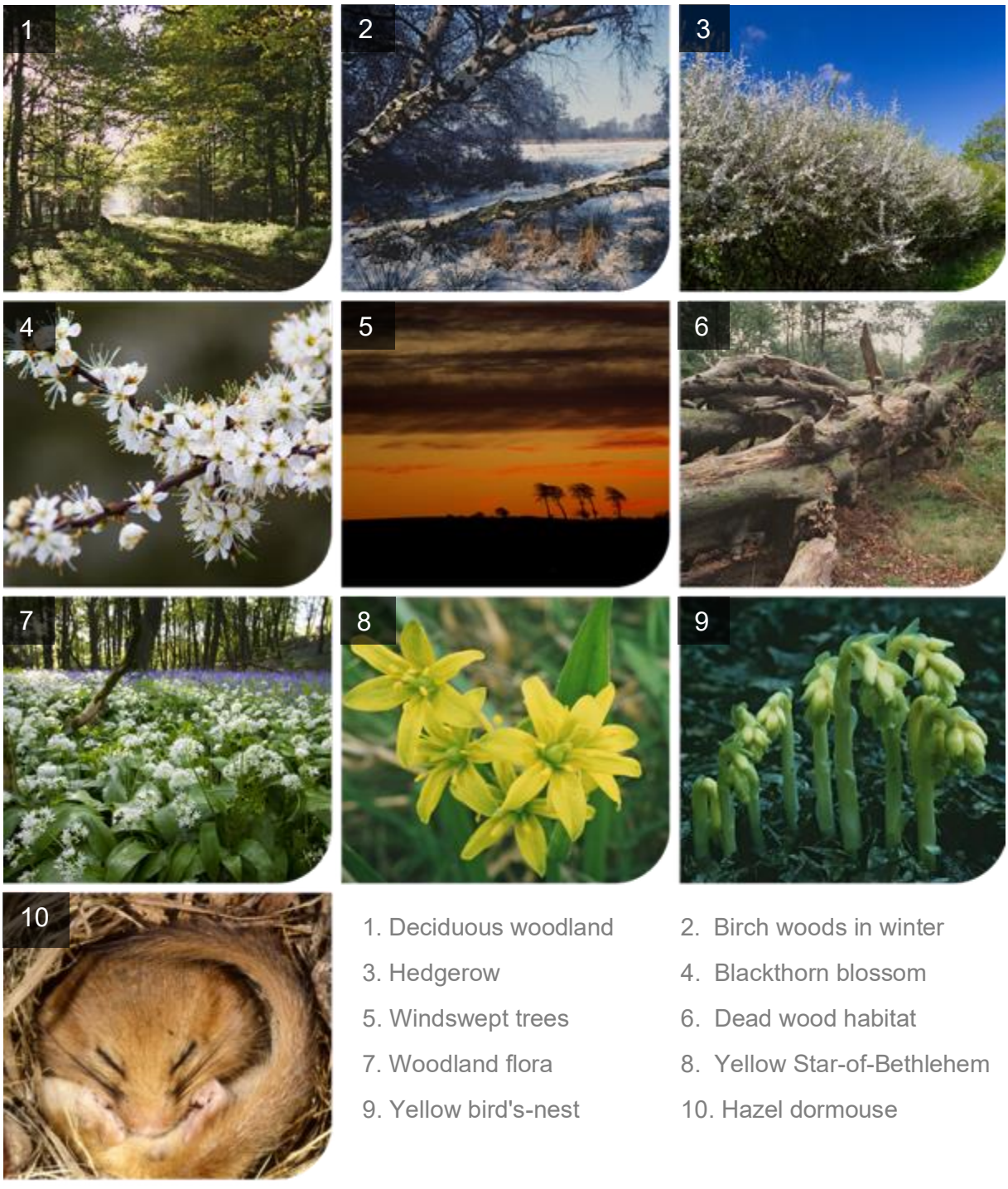
Table 13: Rocky habitats priorities, potential measures, and associated benefits

ROCKY HABITATS			
PRIORITY	**MEASURE**	**SHORTLIST SPECIES BENEFITED**[28]	**BENEFITS**
R1. Limestone pavement habitats with high biodiversity value.	**R1.1** - Suitable management of limestone pavements and associated ecologically valuable habitats e.g. open limestone pavement, limestone grassland, upland mixed ash woods, yew woodland, juniper scrub and bryophyte and lichen communities. **On sites identified as BHS, also follow Measure B1.1.** **R1.2** - Re-establish the naturally occurring gryke communities. **R1.3 -** Write and promote the use of the limestone pavement handbook.	*Mammals:* • *Hazel dormouse* *Invertebrates:* • **Duke of Burgundy** (Butterfly) • **High brown fritillary** (Butterfly) • **Pearl-bordered fritillary** (Butterfly) • Grayling (butterfly) • Chestnut-coloured carpet moth • Barred tooth-striped moth • Narrow-mouthed whorl snail *Plants:* • **Lady's-slipper orchid** • **Northern bedstraw** • Spring cinquefoil • Limestone fern • Dwarf spurge • Mountain melick • Blue-moor grass • Juniper • Lancastrian whitebeam • Baneberry	National objectives and targets: 1, 2, 3, 5, 8, 10, 11, 12, 15, 16 Wider benefits: • Preservation of natural resources, • Local economy and green jobs, • Social, cultural and educational. Other linked LNRS Priorities: G1, G2, G3, R3, W1, SR1.

		• Green spleenwort • Dark-red helleborine • Lily-of-the-valley • *Drepanocladus turgescens* (a feather-moss)	
R2. Rocky outcrops and features with high biodiversity value (including outcrops, cliff faces, ledges, crevices, seepages, scree and boulders).	**R2.1** - Maintain and enhance naturally occurring biodiversity value of rocky outcrops and features, including (for example) maintaining suitable light, shade and moisture levels, grazing, scrub control and limiting disturbance as appropriate to benefit species such as bats, birds, reptiles, invertebrates, ferns, mosses, liverworts, other plants and lichens.	*Mammals:* • Bats *Reptiles* *Birds:* • Peregrine • Ring ouzel *Plants:* • Bloody crane's-bill • Green spleenwort • Hoary whitlowgrass • Hay-scented buckler-fern • *Bryum elegans* (a moss) • *Tortella squarrosa (Pleurochaete squarrosa*, a moss) *Lichens:* • 10 lichen species	National objectives and targets: 1, 2, 8, 11, 16 Wider benefits: • Preservation of natural resources, • Social, cultural, and educational. Other linked LNRS Priorities: C3, G3, SR1.

R3. Maximised biodiversity value of geological features, rocky habitats and artificial habitats arising from past industry and development.	**R3.1 -** Maintain and enhance existing biodiversity value of geological features, rocky habitats and artificial habitats arising from past industry and development, including quarries, mineral extraction sites, disused railways, open mosaic on previously developed land and spoil heaps (hushings) for example, by appropriate management for the habitat type.	As above	National objectives and targets: 1, 2, 3, 8, 11, 16 Wider benefits: • Preservation of natural resources, • Local economy and green jobs, • Social, cultural and educational, • Improve connectivity. Other linked LNRS Priorities: U1, U3, U4, SR1.
	R3.2 - Create and maintain locally appropriate habitats on rock and mineral substrates arising from past industry and development in suitable locations beneficial to habitat connectivity for example by creating new habitat to support shortlisted species.		

Wooded Habitats and Trees



1. Deciduous woodland
2. Birch woods in winter
3. Hedgerow
4. Blackthorn blossom
5. Windswept trees
6. Dead wood habitat
7. Woodland flora
8. Yellow Star-of-Bethlehem
9. Yellow bird's-nest
10. Hazel dormouse

Lancashire is home to a range of habitat types relating to trees and woodland. The thematic habitat of trees and woodland includes the trees, hedgerows, scrub, orchards, woodlands, wood pasture and parkland, wet woodland, and commercial forestry. However, tree and woodland cover is approximately 10.34% (National Forest Inventory[55] figures and Trees Outside Woodland data[56] published 2023), this is below the north-west average for woodland cover (12.57%) and the England average at 14.87%.

The British Isles once supported large expanses of temperate rainforest and associated species, across the western fringes including north-western England. In Lancashire, this included upland oakwood in the Forest of Bowland and South and West Pennines, where important examples still exist. The vast majority, however, have been replaced by coniferous plantations and sheep grazed pastures. Remnant areas are small and fragmented.

Up to 40% of England's ancient woodlands have been cleared and replanted with non-native timber species[57]. The way in which trees and woodland are established and managed will influence their biodiversity and the other benefits they provide[58]. Lack of management of existing woodlands is leading to poor condition and replanting is often required.

Grazing by deer is one of the main pressures on existing temperate rainforests[59]. With deer populations that may be higher than at any other time in the last 1000 years, and invasive grey squirrel populations increasing, strategic management approaches at a landscape scale will be needed to secure our trees, woodlands and the biodiversity they support.

Disease is also a key threat. Ash dieback, *Phytophtora ramorum* and *Phytophora austrocedri* already occur in Lancashire. Planning and managing our woodlands to increase resilience to the spread of disease and to cope with future climate will be needed to keep our trees and woodlands healthy.

Hedgerows are a feature of Lancashire's lowland farmed landscape. They provide stock proof boundaries, link habitats and provide shelter both for wildlife and farm animals. If managed sympathetically they can provide food for a range of species including pollinators and their woody structure can capture carbon, helping to reduce the impacts of climate change. And if planted in the right places, for example contouring across slopes, they can also help to slow surface water flow. However, in detailed surveys undertaken by the Pendle Hill Landscape Partnership[58] in 2018, less than 11% of hedgerows were considered species-rich and most were fragmented and defunct.

A number of community orchards are known to have been planted in recent years, including examples in Blackburn with Darwen, Lancaster, South Ribble and Wyre. However, there does not appear to be a register of either new or pre-existing orchards in Lancashire. Hence, the number, area, composition and condition of orchards in Lancashire is unknown. According to the Arnside & Silverdale National Landscape Management Plan 2019-2024[31], while some orchards are well managed, the condition of others is deteriorating and many require concentrated restoration work.

The Lancashire LNRS aims to achieve:

- Maximised biodiversity value of existing wooded habitats.
- Woodland and wooded habitats expanded and connected with biodiverse woodland creation and tree cover in appropriate locations on a landscape scale.

Table 14: Pressures and opportunities for recovery (Wooded Habitats and Trees)

Pressures	Example Habitats Affected	Broad Species Assemblages Affected (including example species[28])	Opportunities Identified
• Climate change • Pests and diseases • Land management detrimental to biodiversity • Invasive species • Habitat loss and fragmentation • Recreational impacts • Pollution (including air pollution)	Ancient and native woodland Ancient and veteran trees Coniferous woodland Deciduous woodland (incl. lowland mixed deciduous) Hedgerows Mixed woodland Orchards Scrub Temperate rainforest (incl. upland oak/ash wood) Wet woodland Wood pasture and parkland Yew Woodland	**<u>Woodland (Broadleaved)</u> including ancient, damp/wet and calcareous.** 54 shortlisted species including - *Mammals:* • Pine marten • Hazel dormouse • Numerous bat species *Birds:* • Hawfinch • Willow tit • Goshawk • Pied flycatcher *Invertebrates:* • Netted carpet moth *Plants:* • Bird's-nest orchid • Enchanter's nightshade • Dark-leaved willow • Wild service-tree • *Ulota calvescens* (a cushion moss) • *Rhytidiadelphus subpinnatus* (a turf-moss) *Fungi:* • Orange chanterelle • Blackening coral fungi *Lichens* **<u>Calcareous Habitat Mosaic with structural diversity</u>** **(Rocky woodland, limestone, juniper scrub, woodland rides and coppice)** 22 shortlisted species including - *Mammals:* • Hedgehog	Increase tree and woodland cover. Integrate existing community woodlands and country parks into the surrounding landscape. Riparian planting to slow the flow, regulate water quantity and reduce water temperatures. Identify and restore traditional orchards. Establish new orchards in public open space for communities. Restoration of plantation ancient woodland sites. Diversify the structure and composition of productive plantations, including increasing the proportion of semi-natural habitat and native species to benefit biodiversity alongside timber production and other benefits such as recreation. Coppice management for timber production, improve structural diversity and create green jobs. Habitat creation and enhancement providing access to nature and Suitable Alternative Natural Green Spaces, where appropriate, along National Trails, public rights of way, canals and other active travel routes.

		Invertebrates: • 4 LNRS target species (3 butterflies, 1 bee) • White-letter hairstreak butterfly • Painted pill woodlouse *Plants:* • Narrow-leaved bittercress • Yellow bird's-nest • Lancastrian whitebeam **<u>Riparian Woodland</u> (including riverside trees and woodland and shaded banks)** *Plants:* • Black-poplar • **Yellow star-of-Bethlehem** **<u>Scrub mosaics with structural diversity</u>** **(Grassland/Woodland), wood pasture, woodland edge/heath, early succession (Birch Wood) and hedgerows.** 16 shortlisted species including - *Birds:* • Black grouse *Invertebrates:* • Brown hairstreak butterfly • Large red-belted clearwing moth • Broad margin mining bee • Tree snipe fly *Plants:* • Tea-leaved willow **<u>Deadwood and Litter</u>** 9 shortlisted invertebrate species including: • *Trichrysis cyanea* (blue cuckoo wasp) • *Crossocerus binotatus* (a digger wasp) • *Lasius fulginosus* (a jet ant)	

		• Lesser sabre comb-Horn (crane-fly) One lichen species **<u>Mixed and coniferous woodland</u>** 4 shortlisted species: • **Red squirrel** • Nightjar (bird) • **Red wood ant** • Shining guest ant	

Table 15: Wooded habitats and trees priorities, potential measures, and associated benefits

WOODED HABITATS AND TREES			
PRIORITY	**MEASURE**	**SHORTLIST SPECIES BENEFITED**[28]	**BENEFITS**
W1. Maximised biodiversity value of existing wooded habitats.	**W1.1** - Restore natural processes and enhance the biodiversity value of existing wooded habitats, prioritising ancient and long-established woodlands, temperate rainforest, Plantations on Ancient Woodland Sites (PAWS) and wet woodland. Incorporate appropriate habitat enhancements for notable species known to be present or with high potential to colonise (such as feeding and breeding birds, small mammals, invertebrates, ground flora etc), for example: • For dormice, consider retaining standard trees (especially oak), undertaking rotational coppicing of hazel, where appropriate, to promote a dense shrub layer and structural complexity, and adjust the timing of management work to avoid nesting and hibernation. **On sites identified as BHS, also follow Measure B1.1.**	*Mammals:* • Pine marten • Polecat • Hazel dormouse • Hedgehog • Roosting and foraging bat species including (Noctule, brown long-eared, Natterer's) *Birds:* • Hawfinch • Goshawk • Black grouse *Invertebrates:* • **Wall mason bee** • Broad margin mining bee • Large red-belted clearwing moth • White-letter hairstreak butterfly • Painted pill woodlouse Tree snipe fly *Plants:* • Bird's-nest orchid	National objectives and targets: 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16 Wider benefits: • Timber production, • Carbon sequestration, • Improved air quality, • Health and wellbeing, • Climate regulation (building resilience to climate change), • Reduction in flood risk, • Local economy and green jobs, • Social, cultural, and educational. Other linked LNRS Priorities: AW1, AW2, AW4, P2, P3, P4, W2, U2, U3, U4.
	W1.2 – Enhance the biodiversity value of broadleaved, mixed and coniferous plantation woodland, including: • Diversification of structure, age and species composition, • Increasing the proportion of native species, • Retaining permanent areas of broadleaved woodland, • Creation of open habitats such as rides, glades and transitional woodland edge habitats, through selective felling, coppicing and ride management to increase the extent, diversity and connectivity of understory in woodlands and limit over-shading. • Increasing standing and fallen dead wood (where safe to do so). • Inoculating habitats with appropriate native species from suitable agreed donor sites.		

	• Incorporate appropriate habitat enhancements for notable species known to be present or with high potential to colonise (such as feeding and breeding birds, small mammals, invertebrates, ground flora etc), for example: ○ For dormice, consider retaining standard trees (especially oak), undertaking rotational coppicing of hazel, where appropriate, to promote a dense shrub layer and structural complexity, and adjust the timing of management work to avoid nesting and hibernation.	• Enchanter's-nightshade • Narrow-leaved bitter-cress • Yellow bird's-nest • Tea-leaved willow • Wild service-tree • Lancastrian whitebeam • *Plagiomnium ellipticum* (moss) • *Pylaisia polyantha* (moss) *Fungi:* • Orange chanterelle • Blackening coral	
	W1.3 - Introduce low impact woodland management and low impact management practices including sustainably managed Continuous Cover Forestry to diversify age range and structure of woodland.		
	W1.4 - Employ measures to minimise grazing and trampling pressure on woodland ground flora and understorey, including fencing where appropriate.		
	W1.5 - Retention and appropriate maintenance of aged, ancient and veteran trees to maximise their lifespan and biodiversity value, including safe retention of dead and decaying wood and other veteran features as well as maintenance of root protection zones to prevent construction, soil compaction, cultivation/excavation and application of fertilizers and pesticides.		
	W1.6 - Restore, enhance and maintain wood pasture and parkland encouraging a diversity of: • Habitats such as open-grown trees, decaying wood and open pasture, • Tree ages including ancient and veteran trees and multiple younger generations, • Open spaces for future planting or regeneration, • Habitat structure including varied tree spacing and structurally diverse grassland, • Nectar sources,		

	• Species associated with woodlands, decaying wood and open pasture.		
	W1.7 - Restore and expand juniper scrub including encouraging natural regeneration and appropriate planting on suitable soils.		
	W1.8 - Retain and enhance standing and fallen dead wood resources in wooded habitats to maximise biodiversity value (where safe to do so).		
	W1.9 - Retain trees with ash dieback where considered appropriate and safe to do so. Provide adequate replacement planting where retention is not possible.		
	W1.10 - Enhance the biodiversity value of hedgerows for example: • Bring hedgerows into lifecycle management including periodic rejuvenation. • Promote hedgerow management that routinely benefits wildlife such as incremental trimming, longer trimming rotations and other management to benefit species including feeding and breeding birds, small mammals, invertebrates and ground flora. • Lay or coppice hedgerows which have passed their peak maturity to encourage dense base regrowth and ensure another lifecycle.		
W2. Woodland and wooded habitats expanded and connected with biodiverse woodland creation and tree cover in appropriate locations on a landscape scale.	**W2.1** - Establish riparian woodland and trees along watercourses, riparian corridors and floodplains, through appropriate planting or natural colonisation, where biodiversity gains and improved habitat connectivity can be achieved.	As W1 priorities. In particular: *Birds:* • Pied flycatcher • Willow tit *Invertebrates:* • Netted carpet moth *Plants:* • Dark-leaved willow	National objectives and targets: 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16 Wider benefits: • Improved water quality in aquatic environment, • Improved air quality, • Watercourse infiltration,
	W2.2 - Expand and enhance wooded clough habitats, through natural regeneration or appropriate planting if necessary, where biodiversity gains and improved habitat connectivity can be achieved.		
	W2.3 - Creation of new biodiverse woodlands incorporating appropriate native species.		

	W2.4 - Appropriate management of woodland verges which may be particularly valuable in aiding connectivity.	• **Yellow star-of-Bethlehem** • Black-poplar	• Resilience against water quantity extremes, • Supports groundwater recharge, • Agricultural benefits for livestock (shade, shelter, browsing), • Reduced erosion, • Reduction in flood risk to local communities, • Carbon storage, • Timber production, • Climate resilience, • Local economy and green jobs, • Health and wellbeing, • Social, cultural and educational, • Access to nature along transport corridors and active travel routes such as National Trails, public rights of way and canal towpaths where appropriate. Other linked LNRS Priorities: AW1, AW2, AW4, G3, P2, P3, U1, U2, U3, U4.
	W2.5 Wet woodland creation in suitable locations for example: • floodplains, • post-industrial habitats, • willow crop in wetter farming, • transitional habitats between peatland and non-peatland habitats, including natural regeneration, planting of appropriate native species and potentially re-wetting of suitable woodland sites on previously drained land.		
	W2.6 - Create new wood pasture and parkland, establishing a diversity of: • Habitats such as open-grown trees, decaying wood and open pasture, • Tree ages including multiple generations, • Open spaces for future planting or regeneration, • Habitat structure including varied tree spacing and structurally diverse grassland, • Nectar sources, • Species associated with woodlands, decaying wood and open pasture.		
	W2.7 - Create appropriate semi-natural habitats to buffer, expand or connect existing woodland, incorporating natural colonisation wherever possible.		
	W2.8 - Restore and create temperate rainforest on suitable sites along Lancashire's seaboard with precursor vegetation or where indicated by site suitability mapping.		
	W2.9 - Create biodiverse and structurally diverse locally distinctive native hedges, reinstate relic hedgerows and establish boundary trees to connect existing woodland and hedgerow networks.		

Urban Habitats (Including Infrastructure Networks)

1. Unmown lawn
2. Wildflower garden
3. Species-rich verge
4. Wildflower verge
5. Container plants
6. Winckley Square Park, Preston

Throughout Lancashire's long history, changes in agriculture, industry, society and the environment have had a profound and lasting influence over the landscape and urban environment[60]. Our industrial past has left us with many brownfield sites, including open mosaic habitats on previously developed land, which have considerable biodiversity value. Recent increases in housing targets and demand for housing are exerting pressure on brownfield sites for residential development.

The most important habitats in the urban group are the biodiverse open spaces within towns, cities and urban areas and along transport and travel routes. Opportunities for nature recovery in the urban environment include effectively designed nature-rich open spaces. It is therefore essential that nature is at the heart of urban regeneration to create attractive, investable places that are good for people, climate, and the economy[61].

Many of the broad urban habitat types replicate those from the other habitat groups (for example, trees and wooded habitats, aquatic and wetland habitats such as ponds and canals, rocky habitats such as open sandy/stony ground). For simplicity not all of these have been repeated within the tables below. Please see the 'Species shortlisted for recovery in Lancashire' in the *Evidence and Technical Information* supporting document[62] for the full urban species assemblage list.

The Lancashire LNRS aims to achieve:

- Suitable habitats and features created and maintained to support thriving populations of urban species important to Lancashire.
- Maximised biodiversity value of new and existing urban environments and infrastructure networks.
- Increased connectivity of habitats through and between urban landscapes.
- Biodiverse, publicly accessible spaces and routes.

Table 16: Pressures and opportunities for recovery (Urban Habitats including infrastructure networks)

Pressures	Example Habitats Affected	Broad Species Assemblages Affected (including example species[28])	Example Opportunities Identified
• Climate change • Habitat loss and fragmentation, particularly through development • Land management	Farmland enclosed by the urban environment. Open Mosaic Habitat on Previously Developed Land in urban areas (≥10,000 residents).	**<u>Brownfield</u>** **(including Open Mosaic Habitat on Previously Developed Land, disturbed ground, exposed ground, waste ground).** 31 shortlisted plant and moss species including: • Pyramidal orchid	Broadleaved native trees and woodland planting. To improve the structure of park woodland to target urban heat islands in towns and cities. To create urban farms and urban nature reserves for inner city or highly urban communities.

detrimental to biodiversity • Flood risk • Recreational impacts • Invasive species	Rivers and streams, canals and other waterways	• Bee orchid • Basil thyme • Marsh helleborine • Small cudweed **<u>Parkland, parks, gardens, orchards, verges and flower-rich habitat.</u>** 14 shortlisted species including - *Mammals:* • Hedgehog *Invertebrates:* • Moss carder bee • European hornet *Plants:* • Small-flowered buttercup • Bladder campion *Fungi:* • Slate bolete fungi **<u>Open water</u>** **(reservoirs, ditches, ponds, canals and marginal vegetation).** 32 shortlisted species including - *Mammals:* • Water vole • Foraging bat species *Amphibians:* • Common toad *Invertebrates:* • Red-eyed damselfly *Plants:* • Numerous pondweed species • Green figwort (plant) • *Weissia rostellata* (a moss)	To improve engagement with local community groups for example nature focused community projects. Embed nature recovery in education in our primary and secondary schools. Raise awareness of the value of gardens for wildlife. Raise awareness of the value of maintaining a variety of semi-natural habitats and how to incorporate management to benefit biodiversity in parks and other green spaces. Enhance green corridors and active travel routes through urban areas for example, along linear infrastructure and urban watercourses. Habitat creation and enhancement providing access to nature and Suitable Alternative Natural Green Spaces, where appropriate, along National Trails, public rights of way, canals and other active travel routes. Develop/create green spaces within the public and private estates for example, NHS, schools, colleges and universities. Incorporate/create Sustainable Drainage systems

		• *Physcomitrium sphaericum* (a moss) **<u>Manmade structures/buildings</u>, synanthropic** 11 shortlisted species including - *Mammals:* • Numerous roosting bat species including pipistrelles, Daubenton's and whiskered bats. *Birds:* • Swallow • Swift • House martin • Starling • Peregrine falcon	

Table 17: Urban habitats priorities, potential measures, and associated benefits

URBAN HABITATS (INCLUDING INFRASTRUCTURE NETWORKS)			
PRIORITY	**MEASURE**	**SHORTLIST SPECIES BENEFITED**[28]	**BENEFITS**
U1. Suitable habitats and features created and maintained to support thriving populations of urban species important to Lancashire.	**U1.1** – Create insect-rich habitat to support swift breeding populations in Lancashire sites as part of a wider, program of landscape scale habitat restoration to support this often-urban nesting, critically declining species.	• Swifts, • Bats, • Invertebrates, • Other invertebrate predators, • Invertebrate reliant species (e.g. wildflowers/vascular plants).	National objectives and targets: 1, 2, 3, 4, 5, 6, 8, 12, 13, 15, 16 Wider benefits: • Health and wellbeing, • Reduction in heat loss, • Reduction in carbon emissions, • Climate resilience, • Local economy and green jobs, • Attenuate water to reduce flood risk, • Reduced erosion, • Mitigate water quantity extremes, • Social, cultural and educational. • Access to nature and Suitable Alternative Natural Green Spaces, where appropriate, along transport corridors and active travel routes such as National Trails, public rights of way and canal towpaths.
	U1.2 - Create more connected pollinator wildflower-rich habitat in and through urban centres seeking connectivity to the B-Lines[63] approach for example hedgerows, arable margins and headlands, green roofs, and with parks and gardens containing wetland features, wilder areas with native plants including tall ruderals.	*Invertebrates:* • Wool carder bee • *Stelis punctulatissima* (a bee) • *Dolichovespula media* (a wasp)	
	U1.3 - Protect existing swift nesting sites.	• Swifts	
	U1.4 - Retro-fitting nesting and roosting opportunities on existing buildings and infrastructure.	*Bats:* for example: • Common pipistrelle • Soprano pipistrelle • Whiskered • Brandt's bat *Birds:* for example: • Swallow	

		• Swift • House martin • Starling	Other linked LNRS Priorities: AW1, AW2, AW3, AW4, G1, G2, R3, R4, W1, W2, U2, U3, U4.
	U1.5 - Retro-fit green roofs and brown roofs on existing buildings and incorporate green walls, roof gardens and balcony planting into new buildings.	• Bats • Birds • Invertebrates	
U2. Maximised biodiversity value of new and existing urban environments and infrastructure networks.	**U2.1** - Promote the naturalisation of watercourses including the establishment of buffer habitats (such as grasslands, wetlands and reedbeds) in the urban environment.	*Mammals:* • Water vole • Foraging bat species *Amphibians:* • Common toad *Invertebrates:* • Red-eyed damselfly *Plants:* • Green figwort • Numerous pondweed and water-crowfoot species	National objectives and targets: 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16 Wider benefits: • Improve access to green space, • Offer alternative locations to alleviate recreational impacts, • Health and wellbeing, • Local economy and green jobs, • Improve water quality by intercepting diffuse pollution, • Attenuating water to reduce flood risk, • Reduced erosion, • Mitigate water quantity extremes,
	U2.2 - Create and enhance waterbodies, wetlands and other aquatic habitats in urban areas, considering connectivity such as garden ponds, aerial ponds, bioswales, rain gardens and biodiverse sustainable drainage systems.		
	U2.3 - Wooded habitat creation and enhancement in urban area such as orchards, street trees, micro-woods, urban woodland and hedgerows.	*Mammals:* • Hedgehog • Bats *Birds:* • Greenfinch *Invertebrates:* • European hornet	

		• *Brachychaeteuma bagnalli* (a millipede) *Plants:* • Small-flowered buttercup • Pink-flowered bramble *Fungi:* • Slate bolete fungi	• Social, cultural and educational, • Access to nature and Suitable Alternative Natural Green Spaces, where appropriate, along transport corridors and active travel routes such as National Trails, public rights of way and canal towpaths. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, G1, G2, W1, W2, U1, U3, U4.
	U2.4 – Create, enhance and maintain biodiverse grassland habitats in urban areas, appropriate for the location and site conditions, taking account of ongoing land uses (e.g. old established grasslands in cemeteries) and existing ecological interest (e.g. fungi).	*Plants:* • Pyramidal orchid • Common spotted and marsh orchids • Rough hawk's-beard • Lesser hawkbit • Bladder campion • Yellow-wort. *Fungi:* • Grassland fungi such as waxcaps and earthtongues.	
	U2.5 – Maintain and enhance the biodiversity of open mosaic habitat on previously developed land.	*Plants:* • Bee orchid • Basil thyme • Marsh helleborine • Small cudweed • Sand spurrey • Quaking-grass	

	U2.6 - Habitat creation and enhancement through appropriate management within urban parks, public open space, gardens, allotments, historic parks and gardens, burial grounds, cemeteries, churchyards and other religious memorial sites; for example, trees and woodland, hedgerows, grasslands, aquatic and wetland habitats (as appropriate for the location, site conditions, existing ecological interest, land uses and historical importance).	As above *Birds:* • Peregrine falcon *Fungi:* • Grassland fungi such as waxcaps and earthtongues.	
	U2.7 - Habitat creation and enhancement through appropriate management within the public estate for example educational grounds, the NHS estate, the Crown Estate, Ministry of Defence land, complete landfill sites and local authority land; for example, trees and woodland, grasslands, aquatic and wetland habitats appropriate for the location and conditions of the site.	As above	

	U2.8 - Review and adapt existing lighting design in parks and along streets and linear infrastructure to be more wildlife friendly, whilst remaining safe and useable by people.	*Invertebrates.*
		Mammals:
		• Hedgehogs
		• Bats including:
		  ○ Pipistrelle's
		  ○ Daubenton's
		  ○ Natterers
		  ○ Brown long-eared
		  ○ Whiskered
		  ○ Brandt's
		  ○ Serotine	

	U2.9 - Incorporate appropriate native habitats and species into Sustainable Drainage Systems.		
U3. Increased connectivity of habitats through and between	**U3.1** - Create and enhance connected habitats (such as hedgerows, verges etc) along transport and other linear infrastructure corridors for example greener active travel routes, canal network and towpaths through appropriate management.	As above	National objectives and targets: 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 15, 16 Wider benefits:

urban landscapes.	**U3.2** - Enhance connectivity of habitats across transport and other linear infrastructure corridors and reverse the effects of severance, including for example green bridges, removal or widening of culverts, creation of underpasses, 'hop-over' planting.		• Improve access to green space, • Reduction in noise pollution, • Improve air quality, • Health and wellbeing, • Address severance, • Reduction in flood risk, • Reduced erosion, • Local economy and green jobs, • Social, cultural and educational, • Access to nature and Suitable Alternative Natural Green Spaces, where appropriate, along transport corridors and active travel routes such as National Trails, public rights of way and canal towpaths. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, G2, G3, R4, W1, W2, U1, U2, U4.
	U3.3 - Habitat creation and enhancement to connect urban habitats and green spaces to the wider ecological network, including new or enhanced stepping-stone habitats, wildlife corridors and biodiverse open spaces**.**		
	U3.4 - Create and enhance habitats to buffer the canal network for example, trees and woodland, grasslands, aquatic and wetland habitats (as appropriate for the location, site conditions and structural integrity of the canal).		
U4. Biodiverse publicly accessible spaces and routes.	**U4.1** - Habitat creation, enhancement and management within public open space and, where appropriate, along active travel routes (such as National Trails, public rights of way, canals and other routes), for example trees and woodland, grasslands, aquatic and wetland habitats appropriate for the location and conditions of the site.	As above	National objectives and targets: 1, 2, 3, 4, 6, 10, 12, 15, 16 Wider benefits: • Improve air quality,

	U4.2 - Creation of Suitable Alternative Natural Green Spaces comprising wildlife rich woodland, grassland, wetland and aquatic habitats.		• Improve water quality, • Health and wellbeing, • Local economy and green jobs, • Reduction in flood risk, • Improve access to green space, • Social, cultural and educational, • Access to nature along transport corridors and active travel routes such as National Trails, public rights of way and canal towpaths, where appropriate. Other linked LNRS Priorities: AW1, AW2, AW3, AW4, G2, W1, W2, U1, U2, U3.
	U4.3 - Restoration and enhancement of existing Local Nature Reserves, Country Parks and District Wildlife Sites.		

Biological Heritage Sites (BHS)

Beacon Fell

Biological Heritage Sites are the best areas for biodiversity within Lancashire, outside of legally protected sites. They are identified by the BHS partnership. All sites included on the register have been assessed against robust, scientifically determined criteria within the BHS Guidelines for Site Selection. They are some of the core sites for nature recovery in Lancashire on which our Local Habitat Map has been based and are shown

on the map as Areas of Particular Importance for Biodiversity, along with statutory protected sites, district wildlife sites and statutory irreplaceable habitat.

There are currently 1,215 BHSs, covering a total area of 34,298 hectares. However, the BHS system is not static. Independently from the LNRS, the extent of BHSs is regularly reviewed and updated, including the addition of new areas that meet the *BHS Guidelines for Site Selection*. Although LNRS mapping will remain fixed from publication until the next review, new areas of BHS would be included as Areas of Particular Importance for Biodiversity within future iterations of the LNRS. Up to date BHS boundaries can be found here: LERN Environment Information Map

Areas which have been considered and agreed by the BHS Review Panel to warrant inclusion on the BHS register, but which have not yet received higher authorisation, are known as Provisional BHS. The BHS measures have not been applied to Provisional BHS. However, Provisional BHS are likely to be identified as areas of particular importance for biodiversity within future iterations of the LNRS.

Lancashire Environment Record Network holds and provides data, information and site descriptions relating to the BHS system on behalf of the BHS partnership. The BHS Team (on behalf of the BHS Partnership) may also be able to provide additional information on individual sites, as well as advice based on available information and knowledge of sites gained from site assessments, to inform appropriate restoration, enhancement and conservation management. Contact details as follows:

- LERN@lancashire.gov.uk
- BHS@lancashire.gov.uk

Maintaining and enhancing Lancashire's most important non-statutory wildlife sites is central to ongoing and future nature recovery action in Lancashire. The Priority and Measures seek to encourage only those interventions which would restore, enhance and maintain the ecological importance of these sites and are informed by available information and advice.

Pressures and risks

Unlike statutory designated sites, there are no statutory requirements for BHSs to have management plans, and no obligations relating to achieving or maintaining favourable conservation status.

Identified pressures on individual habitats discussed throughout this strategy can equally apply within a BHS. There is also a risk that ill-informed or inappropriate management or interventions that do not take account of qualifying features and other ecological interest of these sites could result in damage or loss of ecological interest of particular importance in a County context.

BHSs can be complex habitat mosaics which can be difficult to map. Individual sites may be important in a County context for a number of different habitats and species with varying requirements. In line with the *BHS Guidelines for Site Selection*, a BHS may also contain important areas (such as Priority Habitat) additional to the guideline for site selection under which the site is listed. All of these factors need to be considered when determining appropriate restoration, enhancement and conservation management.

Although the BHS Partnership hold data and information on BHSs, for many sites this may not be in a suitable format to readily map areas under the most appropriate LNRS habitat measures. Also, the LNRS habitat measures do not always fully align with BHS Guidelines for Site Selection.

Opportunities

Habitat restoration, enhancement and positive conservation management of BHSs and/or appropriate habitat creation, restoration and enhancement adjoining these sites would support nature recovery within Lancashire's most important sites and improve habitat most likely to provide the greatest benefit for nature.

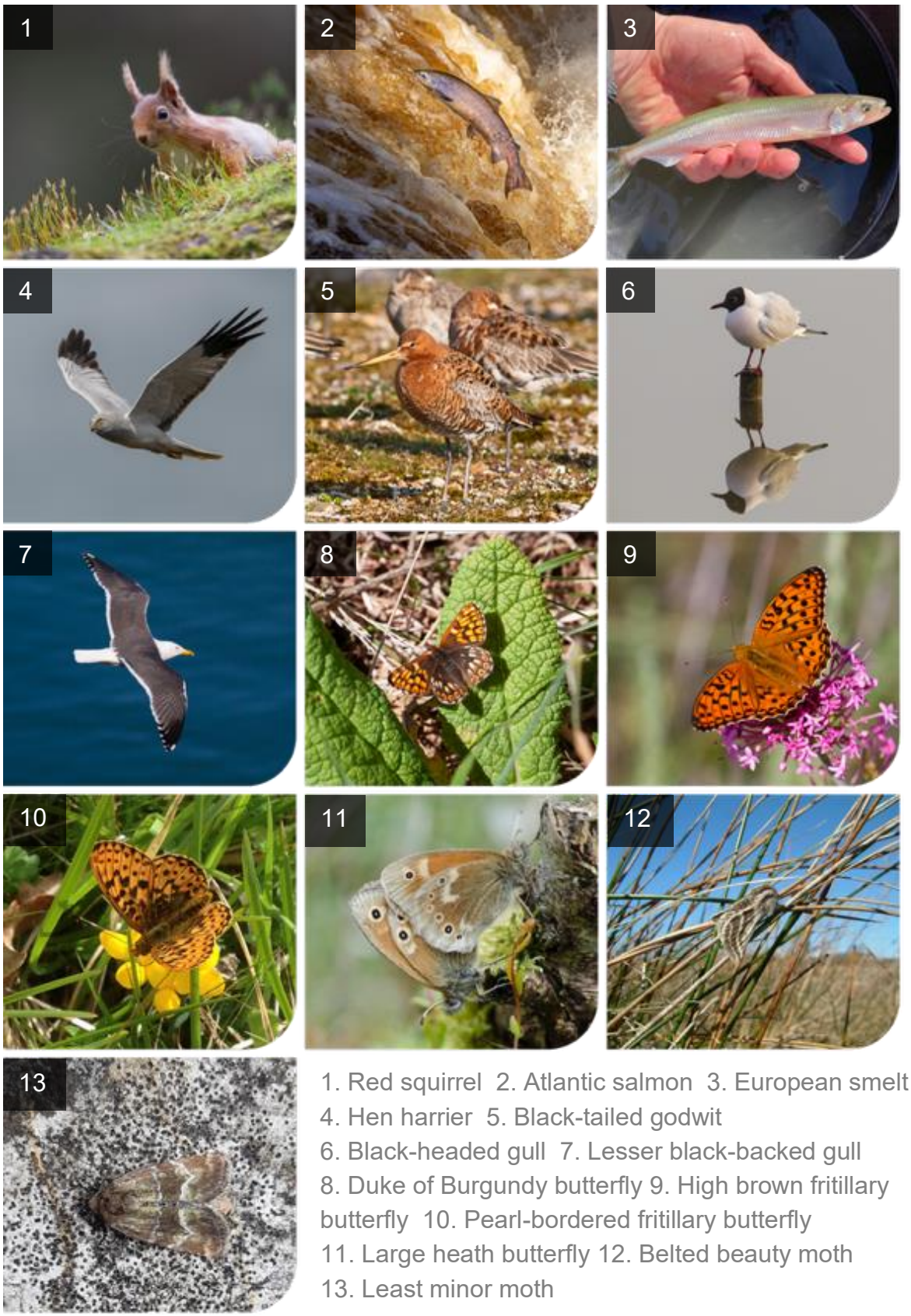
The LNRS aims to enable the maintenance and appropriate enhancement of the ecological interest of Lancashire's Biological Heritage Sites.

Table 18: BHS priorities, potential measures, and associated benefits

BIOLOGICAL HERITAGE SITES (NON-STATUTORY COUNTY WILDLIFE SITES)			
Priorities	**Measures**	**Species Benefits**	**Benefits**
B1 - The ecological interest of Biological Heritage Sites is maintained and appropriately enhanced.	**B1.1 –** Habitat restoration, enhancement and positive conservation management within Biological Heritage Sites, which: • supports the qualifying features of the BHS, • maintains and enhances any irreplaceable habitats present, • supports other existing habitats and species of the site, • increases the ecological value of the site, • is informed by the BHS site description and other information available from the BHS Partnership, and • gives consideration to any available advice from the BHS Partnership.	A wide range of Lancashire species.	As Sites of Particular Importance for Biodiversity, BHS play a significant role in meeting overall national biodiversity targets. To help align action with other potential measures on the land adjoining BHS.

	B1.2 – Habitat creation, restoration and enhancement adjoining Biological Heritage Sites to benefit the ecological value of the BHS, which: • supports the qualifying features and existing ecological interest of the adjoining BHS, • is informed by the BHS site description and other information available from the BHS Partnership. • gives consideration to any available advice from the BHS Partnership.		

Target Species



1. Red squirrel 2. Atlantic salmon 3. European smelt
4. Hen harrier 5. Black-tailed godwit
6. Black-headed gull 7. Lesser black-backed gull
8. Duke of Burgundy butterfly 9. High brown fritillary butterfly 10. Pearl-bordered fritillary butterfly
11. Large heath butterfly 12. Belted beauty moth
13. Least minor moth

14. Wall mason bee 15. Tormentil mining bee 16. Bilberry bumblebee 17. Red wood ant 18. Yellow Star-of-Bethlehem 19. Northern bedstraw 20. Wood crane's-bill 21. Melancholy thistle 22. Lady's-slipper orchid 23. Petty whin 24. Dwarf cornel

The Lancashire LNRS aims to enable the recovery of scarce and declining species and other species considered to be important to Lancashire. Twenty-four 'target species' have been prioritised for bespoke measures beyond the more general habitat creation and enhancement measures. The methods used to shortlist species and to select the list of target species are described within the Lancashire LNRS *Evidence and Technical Information* supporting document[28]. The target species are shown in **Bold** throughout the strategy.

The target species include some of the most scarce, declining, or important species in the County. Bespoke measures for these species often involve multiple coordinated actions to bring about recovery. By enabling the recovery of these species, the LNRS aims to contribute to the following two national environmental targets:

- *Halt the decline of species abundance by 2030. Ensure that species abundance in 2042 is greater than in 2022, and at least 10% greater than 2030.*
- *Reduce the risk of species' extinction by 2042, when compared to the risk of species' extinction in 2022.*

Where these species are a qualifying feature of a SSSI (such as hen harrier in the Bowland Fells), then species recovery measures outside of the relevant SSSI will help bolster the population and aid dispersal. This could also contribute to the relevant key additional commitment of the Environmental Improvement Plan (2023) *'Restore 75% of Sites of Special Scientific Interest to favourable condition by 2042. By 31 January 2028 50% of SSSIs will have actions on track to achieve favourable condition*'.

The Priority ***'SR1: Enable the recovery of scarce and declining species and other species considered to be important to Lancashire, which require bespoke species recovery measures***' and bespoke measures for these species are included in the table below.

Table 19: Target species priority, potential measures, and associated benefits

LNRS TARGET SPECIES and BESPOKE MEASURES			
PRIORITY	**SR1: Enable the recovery of scarce and declining species and other species considered to be important to Lancashire, which require bespoke species recovery measures.**		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**[28]	**BENEFITS**
Red squirrel (RS) National status: • GB Red List, Endangered Local status: • Lancashire Biodiversity Action Plan (LBAP) species. • BHS guideline species • Found in isolated areas which cannot sustain viable populations.	**RS1** - Protect existing red squirrel populations to maintain their current range for example, by prioritising grey squirrel management including actively managing to maintain a buffer between red and grey populations and promoting habitat best practices such as rotational thinning of older conifer trees to maintain cone productivity and creating safe spaces for red squirrels through appropriate planting. **RS2** - Improve and connect existing and suitable areas for red squirrel whilst preventing grey colonisation, for example by: • Defining expansion zones • Promote appropriate habitat management (good practice guidance for woodland and forestry) to landowners and managers in potential red squirrel areas, • Planting of favoured trees to expand existing areas and to optimise the woodland layout to increase food supply. • Avoid establishing new woodland, that would allow grey squirrels to move through the landscape into red squirrel territories.	Mammals including: • Pine marten Birds including: • Nightjar	National objectives and targets: 2 and 3 Implementing recovery measures in Lancashire could benefit and connect any populations in adjacent regions, such as Cumbria, Liverpool City Region as well as North and West Yorkshire. Other linked LNRS Priorities: W1, W2. Universal Priorities: • Biosecurity and control of invasive species

	RS3 - Collaborate with Neighbouring LNRS Authorities (Cumbria, West/North Yorkshire and Liverpool City Region) to align actions that benefit red squirrels and contribute to a joined up and expanded network of red squirrel populations, whilst continuing to develop and implement our measures in line with the developing 'England Red Squirrel Action Plan'.		Supporting Actions: • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
	RS4 - Conduct research into the ecology of squirrels within Lancashire to improve understanding of the dynamics between red and grey squirrels, the changes in distributions of each species and recovery needs of red squirrels within Lancashire. Such research will guide conservation actions for red squirrels at a local scale and identify the need for further action.		
	RS5 - Once appropriate grey squirrel (and squirrel pox transfer) and habitat management is in place, explore appropriate measures to facilitate red squirrel colonisation into expanded and connected sites, either through natural dispersal or reintroduction.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Atlantic salmon (AS) National status: • GB Red List, Endangered Local status: • BHS guideline species	**AS1-** Work with land managers in upper river catchments to reduce the impact of the use of Diazinon (an insecticide used in sheep dip) on nearby watercourses which has a significant impacts on olfactory function in Atlantic salmon, by ensuring sheep do not access or cross watercourses following dipping and by ensuring that they are dipped in an area which drains to tank, rather than surface water drains. This is particularly important as sheep dip tends to be applied between September and November, a time when Atlantic salmon are arriving at their spawning locations in upper river catchments, hugely increasing the risk of impacts from this chemical.	Other fish including: • Eel • Brown trout • Grayling Numerous riverine species including: • Plants • Invertebrates	National objectives and targets: 2 and 3 Other linked LNRS Priorities: AW2, AW4. Universal priorities:

• Lancashire BAP species	**AS2** – River restoration in areas where salmon are known to spawn/have previously spawned to make catchments more resilient to both high and low flows and alleviate pressures caused by water quantity extremes such as the loss of redds (spawning sites) and increased mortality via exposure to extreme temperatures by delivering habitat measures to store water and slow the flow of water during high flows; and store and slowly release water during low flow periods which can also result in a loss in available habitat area for juvenile salmon and an increase in competition for habitat. **AS3** - Work to improve habitat quality in likely spawning areas to help provide a greater area of suitable spawning habitat both within the main stem of rivers and within tributaries for spawning adults for example, natural pool/riffle sequences and refugia (large wood, overhanging trees, complex habitat etc). **AS4** - Create and restore river habitat to support juvenile salmon during their various development phases. For example, by providing suitable habitat via the reintroduction of appropriately sized sediments and the introduction of refugia such as large rocks and large wood at priority sites, especially those in close proximity to known spawning locations. **AS5** - Work to improve habitat complexity for example, via the installation of large wood and boulders and the creation of complex instream habitats within lower reaches of river networks, to provide greater refugia for young salmon during their downstream migrations. This is particularly important where flow regimes are affected by drought conditions, where migration can be held up by low flows increasing the likelihood of predation. **AS6** - Improve connectivity by focussing on the removal of, or mitigation of man-made barriers across the river network (including potential installation of fish passes), a key issue for this species. Barriers include dams, weirs, fords and culverts of any height in the river network and impacts should be considered for both upstream and downstream migration.		• Nutrient enrichment and pollution are minimised. Supporting Actions: • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.

	AS7 - Undertake surveys and monitoring to: • Assess watercourses within spawning range for spawning habitat availability and suitability. • Assess adult populations and population structures within all principal salmon rivers. • Assess spawning activity at known/expected spawning locations. • Assess smolt (a specific salmon life stage) escapement at a catchment scale, helping to further understand migration pathways, triggers and pressures. • Assess the impacts of water transfers on both upstream and downstream migrations (the Lune/Wyre Conjunctive Use Scheme). • Assess catchment scale impacts of barriers on the downstream migration of Atlantic salmon smolts.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Smelt (SM) National status: • UKBAP species • Species of Principal Importance Local status: • Lancashire population is of national significance • Has undergone massive declines in	**SM1 -** Make coastal catchment areas more resilient to both high and low flow through actions designed to slow the flow of water during high flow and store and slowly release during low flow to improve water quality, a key issue for this species. **SM2 -** Habitat improvements in likely spawning areas with suitable tidal regimes to provide a greater area of suitable spawning habitat within the main stem of rivers and within estuarine tributaries (for example, shallow fast flowing riffles) and refugia (for example, large wood, overhanging trees etc) for spawning adults. ***Spawning areas are only semi quantified for the Wyre so this measure is restricted in distribution at the time of writing this report. It is important to consult with specialists for potential in other catchments and useful to consider wider measures (see adjacent column).***	Other fish including: • Eel • Brown trout	National objectives and targets: 2 and 3 Other linked LNRS Priorities: AW2, C1, C3 Supporting Actions: • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.

Lancashire (and the NW). Protected feature of: • Wyre-Lune MCZ • Ribble Estuary MCZ	**SM3 -** Improve connectivity within tributaries where their confluence is adjacent or downstream of the tidal limit for example, by removing, modifying or mitigating the impact of barriers within watercourses, specifically including low head impoundments (small weirs, road culverts and other bed modifications) and that prevent the occurrence of natural tidal regimes such as tidal flaps.		
	SM4 - Population surveys (for example, potential for Citizen Science projects) to: • Assess watercourses within spawning range for spawning habitat availability and suitability. • Assess adult populations and population structures within coastal waters and estuaries. • Assess spawning activity at known/expected spawning locations. Assess juvenile smelt within estuaries using refined techniques based on works undertaken on River Thames.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Hen harrier (HH) National status: • GB Red List, Endangered • UK BAP Species • Species of Principal Importance Local status: • BHS guideline species	**HH1 -** Continued monitoring of breeding attempts and key winter roost sites across the County.	Other birds including: • Merlin • Short-eared owl	National objectives and targets: 2 and 3 Other linked LNRS Priorities: P4, P5, P6 Universal Priorities: • Access to nature is provided whilst minimising recreational impacts on sensitive sites, habitats and species populations.
	HH2 - Protection of recently used nest sites for example, by ensuring deep vegetation cover for nesting is retained and burning or cutting is avoided within a buffer of 100m around nests used in the past 5 years.		
	HH3 - Protection of winter roost sites by, for example: - avoiding cutting, mowing and topping in these areas, - protecting from potentially detrimental land use changes such as tree planting and wind farm developments.		
	HH4 - Consider legal predator control of species that may seek to prey upon eggs and chicks at existing breeding sites.		

• Lancashire BAP species • Lancashire population is of national significance. Designated feature of: • Bowland Fells SSSI (and SPA).	**HH5 -** Manage potential impacts from human activities throughout the year considering both breeding and winter roosting sites for example by, restricting recreational activities and providing information for the public. **HH6 -** Stop any larger scale land management operations in potential nesting areas from March to July to avoid disturbance of prospecting and nesting birds. **HH7 -** Promote diversionary feeding at potential future nesting sites on managed grouse moors to mitigate the potential impact of hen harrier predation on grouse and the associated conflict; and support expansion of the hen harrier population.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Black-tailed godwit (BTG) National status: • GB Red List, Endangered Local status: • Lancashire BAP species • BHS guideline species. • Lancashire population is of national significance. Designated feature of: • Ribble Estuary SSSI	**BTG1 -** Erect predator exclusion fences or implement legal predator control of species that may seek to prey upon eggs and chicks at existing and potential breeding sites. **BTG2 -** Manage potential impacts from human activities during the breeding season (from March when birds are prospecting nest sites to July inclusive) at existing and potential breeding sites for example by, restricting recreational activities such as dog walking, fishing and the use of drones/UAVs and providing information for the public. **BTG3 -** Management and enhancement of wet features at existing and potential breeding sites for example ditch reprofiling and soil spreading to retain reasonable amounts of muddy edge to feed on. **BTG4 -** Creation of a series of wet features at potential breeding sites for example, scrapes and pools where mud is exposed for feeding ground through spring and early summer. These may need to be fed by a constant source of water for example, from a spring or stream to feed wet features in dry springs to ensure wet mud is available throughout the breeding season.	Other ground nesting birds at these sites e.g. • Redshank • Ringed plover • Pintail • Common tern	National objectives and targets: 2 and 3 Universal Priorities: • Access to nature is provided whilst minimising recreational impacts on sensitive sites, habitats and species populations. Supporting Actions: • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.

• Ribble & Alt Estuaries and Morecambe Bay & Duddon Estuary (SPAs).	**BTG5 -** Removal of trees (ensuring appropriate consultation, assessment and compliance to avoid any detrimental impacts on other species or the habitat) at existing and potential breeding sites that may act as perches for avian predators and ensure no tree planting is undertaken in these areas.		
	BTG6 - Once predator fencing and appropriate habitat management is in place, develop project for the release of head-started birds to boost existing population numbers. Further info can be found at Project Godwit – Securing the future of black-tailed godwits in the UK.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Black-headed gull (BHG) National status: • GB Amber List. Local status: • Lancashire BAP species. • Lancashire population is of national significance. Designated feature of: • West Pennine Moors SSSI.	**BHG1** - Erect predator exclusion fences or implement legal predator control of species that may seek to prey upon eggs and chicks at existing and potential breeding sites.	Other ground nesting birds at these sites (coastal and inland) e.g. • Ringed plover • Common tern • Curlew • Dunlin	National objectives and targets: 2 and 3 Universal Priorities: • Access to nature is provided whilst minimising recreational impacts on sensitive sites, habitats and species populations. Supporting Actions: • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
	BHG2 - Manage potential impacts from human activities during the breeding season (from March when birds are prospecting nest sites to July inclusive) at existing and potential breeding sites for example by, restricting recreational activities such as dog walking, fishing, water sports and the use of drones/UAVs and providing information for the public.		
	BHG3 - Habitat management during October – November (to avoid breeding and wintering birds) to remove any growing vegetation from the summer months before the Gull's return in March to ensure an open nesting platform is available at existing and potential breeding sites.		
	BHG4 - Manage water levels at existing breeding sites for example, to avoid flooding of nest sites during high rainfall, and predation during prolonged dry periods where water levels fall allowing predators to cross over to Island nesting sites.		
	BHG5 - Create islands on open areas of water at existing and potential breeding sites either by:		

	1. Installing rafts to provide nesting habitat, or where this is unsuitable (for example, on reservoirs where these may pose a threat to spill ways) – 2. Create islands from stone (depending on the water body depth tipping large amounts of stone can create a safe nesting site for breeding Gull's).		
	BHG6 - Monitor any growth of lesser black-backed gull (and other *Larus* species) populations against any negative impact on black-headed gull colonies.		
	BHG7 - Monitor growth of growing greylag goose populations against disturbance and reduction of the available area for nesting black-headed gull colonies.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Lesser black-backed gull (LBBG) National status: • GB Amber List. Local status: • Lancashire BAP species. • Lancashire population is of national significance. Designated feature of: • Bowland Fells SSSI (and SPA)	**LBBG1** - Erect Predator exclusion fences or implement legal predator control of species that may seek to prey upon eggs and chicks at vulnerable and declining and previously known and potential nesting sites to help encourage gulls back to these locations. **LBBG2** - Manage potential impacts from human activities during the breeding season (from March when birds are prospecting nest sites to July inclusive) at vulnerable and declining and historic/potential natural breeding sites for example by, restricting recreational activities such as dog walking, fishing, and the use of drones/UAVs and providing information for the public. **LBBG3** - Protect existing urban nesting sites from interference for example ensure no netting is erected to avoid entanglement resulting in the loss of existing nesting areas for lesser black-backed gulls.		Cross boundary benefits: • Contribution to North West England Gull Project www.nwgulls.org.uk Universal Priorities: • Access to nature is provided whilst minimising recreational impacts on sensitive sites, habitats and species populations. Supporting Actions: • Data, evidence and strategies to inform nature

• Ribble Estuary SSSI • Ribble & Alt Estuaries and Morecambe Bay & Duddon Estuary (SPAs).	**LBBG4** - Habitat management during the winter to remove any growing vegetation from the summer months before the gull's return in March to ensure an open nesting platform is available at vulnerable and declining and historic/potential natural breeding sites.		recovery actions and the next iteration of the LNRS.
	LBBG5 - Manage potential impacts from the reduction in feeding sites and the resulting increase in foraging in in-bye fields by promoting a change in livestock feeding systems for example, through careful placement of feeders and/or the use of covered feeders to discourage gull's (RSPB, 2022 - Forest of Bowland - Gull Proof Feeder Trial Report).		
	LBBG6 - Continued monitoring of movements of breeding Lesser black-backed gulls between colonies in the north-west of England through the Natural England colour ringing scheme.		
	LBBG7 - Establish a project to identify new potential natural nesting areas for lesser black-backed gulls to alleviate the pressures of existing colonies.		

TARGET SPECIES	MEASURE	SHORTLIST SPECIES BENEFITED	BENEFITS
Duke of Burgundy butterfly (DoB) National status: • GB Red List Vulnerable • UK BAP Species • Species of Principal Importance Local status:	**DoB1** - Work with land managers to establish management practices to enable the key food plant for this species (cowslips and primroses) to increase, suitable conditions for pupation (the transitional stage from larva to adult) to take place and connect habitats by: • late summer and winter grazing (generally recommended) with heavy cattle/ponies to create ground disturbance opportunities for seeding into (consider 'no fence' grazing collars), • appropriate scrub management for shelter and to facilitate connectivity,	Benefits to numerous other limestone grassland and woodland edge species including: • Harvest mouse • Northern brown argus butterfly • Dark-red helleborine • Dwarf spurge	National objectives and targets: 2 and 3 Supporting Actions: • Engagement and collaboration to promote nature recovery. • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.

• BHS guideline species • Lancashire BAP species • Lancashire population is of national significance Designated feature of: • Gait Barrows SSSI • Thrang Wood SSSI.	• cyclical cutting /disturbance of limestone grassland (to avoid a dense thatch of blue moor-grass) where grazing is not possible, • woodland ride, glade and coppice rotation management, • creating breeding habitat through planting larval foodplants (cowslip and primrose spp.), to maintain areas of mosaic habitat of species rich grassland, occasional tussocky limestone grasses (required for pupation), light open scrub, and bracken interspersed with limestone outcrops and connected canopy gaps.		
	DoB2 - Survey local populations to establish trends and conservation successes.		
	DoB3 - At known sites, monitor habitat quality and the needs of the species to further understand their decline and response to climate change to enable effective future action.		
	DoB4 - Support and encourage landowners in targeted landscapes to enter into Countryside Stewardship agreements to support appropriate management for these species.		
	DoB5 - Develop a strategy for a landscape scale habitat patch creation, including stepping-stone patches, across and between areas where multiple historic records exist.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
High brown fritillary butterfly (HBF) National status: • GB Red List, Vulnerable, • UK BAP	**HBF1** - Work with land managers to establish management practices to enable the key food plant for this species (*Viola spp*.) to increase, create suitable conditions in bracken litter vital for larval development and egg laying and connect habitats by: • appropriate summer and winter grazing in bracken	Benefits to other species also requiring violets, such as: • Dark green fritillary • Small pearl-bordered fritillary	National objectives and targets: 2 and 3 Supporting Actions:

• Species of Principal Importance Local status: • BHS guideline species • Lancashire BAP species • Lancashire population is of national significance Designated feature of: • Gait Barrows SSSI • Hawes Water SSSI • Thrang End and Yealand Hall Allotment SSSI • Thrang Wood SSSI • Warton Crag SSSI	• appropriate scrub management for shelter and to facilitate connectivity, • cyclical cutting /disturbance of bracken where grazing is not possible, • woodland ride, glade and coppice rotation management, • potential trials in patch disturbance of ground to produce areas of violet germination and • creating breeding habitat through planting larval foodplants (V*iola spp*.), to maintain areas of mosaic habitat of grassland, scrub and bracken interspersed with limestone outcrops and connected canopy gaps.	Benefits to numerous other limestone grassland and woodland edge species including: • Harvest mouse • Northern brown argus butterfly • Dark-red helleborine • Dwarf spurge	• Engagement and collaboration to promote nature recovery. • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
	HBF2 - Survey local populations to establish trends and conservation successes and verify new abundance and distributions to inform possible re/introductions.		
	HBF3 - Monitor habitat quality at known sites and also at nearby sites where appropriate management for the species has occurred.		
	HBF4 - Support and encourage landowners in targeted landscapes to enter into Countryside Stewardship agreements to support appropriate management for these species.		

TARGET SPECIES	MEASURE	SHORTLIST SPECIES BENEFITED	BENEFITS
Pearl-bordered Fritillary butterfly (PBF) National status: • GB Red List, Vulnerable, • UK BAP • Species of Principal Importance. Local status: • BHS guideline species • Lancashire BAP species • Lancashire population is of national significance Designated feature of: • Gait Barrows SSSI • Hawes Water SSSI • Thrang Wood SSSI	**PBF1 -** Work with land managers to establish management practices to enable the key food plant for this species (*Viola spp*.) to increase, create suitable conditions in bracken litter vital for larval development and egg laying and connect habitats by: • appropriate summer and winter grazing in bracken, • appropriate scrub management for shelter and to facilitate connectivity, • cyclical cutting /disturbance of bracken where grazing is not possible, • woodland ride, glade and coppice rotation management, • potential trials in patch disturbance of ground to produce areas of violet germination and • creating breeding habitat through planting larval foodplants (*Viola spp*.) to maintain areas of mosaic habitat of grassland, scrub and bracken interspersed with limestone outcrops and connected canopy gaps.	Benefits to other species also requiring violets, such as: • Dark green fritillary • Small pearl-bordered fritillary Benefits to numerous other limestone grassland and woodland edge species including: • Harvest mouse • Northern brown argus butterfly • Dark-red helleborine • Dwarf spurge	National objectives and targets: 2 and 3 Supporting Actions: • Engagement and collaboration to promote nature recovery. • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
	PBF2 - Survey local populations to establish trends and conservation successes and verify new abundance and distributions to inform possible re/introductions.		
	PBF3 - Monitor habitat quality at known sites and also at nearby sites where appropriate management for the species has occurred.		
	PBF4 - Support and encourage landowners in targeted landscapes to enter into Countryside Stewardship agreements to support appropriate management for these species.		

TARGET SPECIES	MEASURE	SHORTLIST SPECIES BENEFITED	BENEFITS
Large heath butterfly (LH) National status: • GB Red List, Vulnerable, • UKBAP species • Species of Principal Importance. Local status: • BHS guideline species. • Lancashire BAP species. • Lancashire population is of national significance.	**LH1** - Work with land managers to establish management practices at historical sites and sites with declining populations to restore sward mosaics and promote nectar plants such as crossed leaved heath by: • Appropriate grazing to reduce dominant thatch whilst allowing some dense tussocks for the species to overwinter in the larva form. • Combine with re-wetting techniques to enable the key food plants for this species (hare's-tail cottongrass and crossed-leaved heath) to increase. • Reduce or clear invasive plant species and scrub such as rhododendron, birch and self-set conifers (ensuring appropriate means in sensitive habitats). • Create breeding habitat through planting larval foodplants (hare's-tail cottongrass) and nectar plants (crossed-leaved heath) at degraded sites and new peat restoration project sites.	Umbrella species - Protecting this species indirectly protects many other species, including other species benefitting from peatland restoration and sensitive management, for example: • Curlew • Red-eyed damselfly • Broad-leaved cottongrass	National objectives and targets: 2 and 3 Supporting Actions: • Engagement and collaboration to promote nature recovery. • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
	LH2 - Develop monitoring project to use large heath as a target species to show benefits to wildlife and habitat quality at peat restoration project sites to raise water tables across large landscape areas.		
	LH3 - Survey local populations at known sites and previously recorded sites together with habitat assessments, to establish trends, monitor declines and inform conservation measures.		
	LH4 - At known sites, monitor habitat quality and the needs of the species and create a Rapid Habitat Assessment (RHA). Use this RHA to further understand widespread habitat change, population declines and response to climate change to be able to promote bigger, better and more connected action.		

	LH5 - Building on the mapped measures (LH1 - 4), develop a project building on existing knowledge to model opportunities for re/introduction measures across large areas of recent re-wetted upland Lancashire.		
	LH6 - Support and encourage landowners in targeted landscapes to enter into Countryside Stewardship agreements, to support and promote appropriate management for these species. Share good practice and management options with practitioners.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Belted beauty, macro-moth (BBeau) National status: • Nationally rare. • Species of Principal Importance. Local status: • BHS guideline species. • Lancashire BAP species. • Lancashire population is of national significance **Sole-remaining English site.**	**BBeau1** - Surveys of the existing colony to inform the development of a structured land management plan to include: • Low-intensity cattle grazing of the saltmarsh between spring and autumn. • Establishing temporary exclusion zones to assess the impact of different levels of grazing on the saltmarsh vegetation structure, coupled with larval surveys (also see BBeau2) which could inform which areas provide the best quality habitat for Belted Beauty.		National objectives and targets: 2 and 3 Supporting Actions: • Engagement and collaboration to promote nature recovery. • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
	BBeau2 – Establish a robust monitoring program to advise how long the existing population can survive at low abundances and the impact this might have on genetic diversity; and to help inform any future plans for habitat restoration/creation where there is currently no prospect of habitat expansion or colonisation by: • Increasing the number of transects carried out and increase the area of saltmarsh covered by the transects as the saltmarsh is expanding. • Larval surveys coupled with vegetation monitoring to pinpoint the most-suitable habitat patches and exact habitat		

	preferences, and track abundance changes over time in relation to shifts in vegetation structure.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Least minor, macro-moth (LM) National status: • Nationally rare (GB Red List Pre 94). Local status: • BHS guideline species. • Lancashire BAP species. • Lancashire population is of national significance.	**LM1** - Work with land managers to establish management practices at existing and potential sites to improve open, well-connected habitats and promote the larval food plant blue moor-grass. **LM2** – Establish a robust monitoring program of vegetation, larval, and adult surveys to determine preferred vegetation structure, to establish whether unknown populations are present and whether existing populations are stable by: • Carrying out larval and adult surveys at sites with modern records (larval surveys effective at determining presence), • Survey sites with suitable habitat but without known populations, and • Larval surveys to determine whether glaucous sedge is used as a larval foodplant. **LM3** - Support and encourage landowners in targeted landscapes to enter into Countryside Stewardship agreements to support appropriate management for these species.		National objectives and targets: 2 and 3 Supporting Actions: • Engagement and collaboration to promote nature recovery. • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Wall mason bee (WMB) National status:	**WMB1** - Increase monitoring of key sites with historically plentiful records (Morecambe Bay), where monitoring in the past 10 years has substantially reduced in frequency and quality.	Umbrella species - protecting this species indirectly protects many other species including	National objectives and targets: 2 and 3

• Nationally rare (GB Red List Pre 94), • UKBAP • Species of Principal Importance. Local status: • Lancashire population is of national significance. • Morecambe Bay is a stronghold.	**WMB2 –** Investigate the species composition – including key forage plants and vegetation structure – where populations have remained stable in the last ten years; and compare with non-Lancashire sites where the species is present at higher densities and note any differences. **WMB3 –** Identify key nesting sites, key foraging areas and key "lekking areas (where groups of males display to entice females)" for breeding males. **WMB4 –** Carry out meteorological analysis and atmospheric monitoring at ground level on sites with good populations and sparse populations. To help understand whether climate instability and heat spikes are having localised effects **WMB5 –** Conduct research into the effects of Ash Dieback and whether it has had a significant effect (loss of populations) on sites with previously strong populations.	other species supported by acid grassland and open edge habitats with yellow legumes (such as bird's-foot-trefoil), for example: • welted lesser mason bee.	Supporting Actions: • Engagement and collaboration to promote nature recovery. • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Tormentil Mining bee (TMB) National status: • UKBAP • Species of Principal Importance. Local status: • Lancashire population is of national significance.	**TMB1** - Increase monitoring of upland areas which have never been target surveyed. **TMB2** - Carry out DNA analysis on Lancashire populations in order to be able to compare with remote populations (for example, Cornwall and European populations) to see if there are significant differences.	Umbrella species - protecting this species indirectly protects many other species, including: • Tormentil nomad bee • Black-headed mining bee • Moss carder bee	National objectives and targets: 2 and 3 Supporting Actions: • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS. • Engagement and collaboration to promote nature recovery.

	TMB3 - Carry out pollen analysis to verify that the species is only using tormentil (*Potentilla erecta*) and trailing tormentil (*P. anglica*) in Lancashire (records elsewhere have been noted for other *Potentilla* species).		
	TMB4 - When carrying out restoration of heathland and acid grassland ensure pollen specific plants tormentil and trailing tormentil are included in species mixes; and create bare sandy areas where practical.		
	TMB5 - Work with land managers to establish management practices at historical (lowland) sites and existing (upland sites with declining populations to; restore sward mosaics and promote good farming practices including vastly reduced or avoidance of nitrates; and avoid overgrazing and recreational pressures.		
	TMB6 - Re-survey lowland sites where it has seemingly, recently disappeared (in case of re-colonisation or climate instability that is not as severe a threat to the species as anticipated)		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Bilberry bumblebee (BB) National status: • Not evaluated, • Localised and declining. Local status: • Lancashire population is of national significance.	**BB1** - Survey areas in the uplands (> 400 metres) which have either an absence of records completely or a sharp decline in the last 30 years (where suitable habitat exists).	Other upland and heathland species such as: • Twite • Ring ouzel • Broken-banded bumblebee • Northern sallow mining bee • Cloudberry	National objectives and targets: 2 and 3 Other linked LNRS Priorities: • P4, P5 Supporting Actions: • Engagement and collaboration to promote nature recovery.
	BB2 - When carrying out restoration of heathland and peat-based habitats in the uplands (> 400 metres) ensure nectar plants bilberry, cowberry and cranberry are incorporated into species mixes.		
	BB3 - Work with land managers to establish management practices at historical sites and sites with declining populations to; restore sward mosaics and promote good variation in heath age, retain areas of species-rich grassland and small areas of gorse, especially where these are proximal to ericaceous		

	habitat (for example, areas with bilberry, cowberry and cranberry), avoid the use of pesticides and herbicides.	• Reindeer lichen	• Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
	BB4 - Organise awareness raising events for landowners and land managers with land above 400 metres, to promote the needs of the species, their declining distribution and the management practices that would encourage the growth of their preferred forage plants; and to help to identify any gaps in knowledge of where this species occurs in Lancashire and its nesting requirements (which are poorly known).		
	BB5 - Carry out meteorological analysis and atmospheric monitoring at ground level on sites with good populations and sparse populations to see if climate instability is affecting sites differently.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Red wood ant, *Formica rufa* (RWA) National Status: • Near-threatened (GB Red List Pre 94) • Localised and declining. Local status: • Lancashire population is of national significance.	**RWA1** - Investigate as to whether woodland management practices have changed where populations of this species have declined.	Shining guest ant (lives in nests of *Formica rufa* red wood ant). Improved coniferous woodland management would also benefit species such as: • **red squirrel,** • nightjar.	National objectives and targets: 2 and 3 Universal Priorities: • Biosecurity and control of invasive species. Supporting Actions: • Engagement and collaboration to promote nature recovery. • Data, evidence and strategies to inform nature
	RWA2 - Survey larger existing populations (where nest frequency is more dense and "budding" - which is the establishment of smaller nests as part of an expansion response of a colony to growing original nest size) as part of ongoing research into the species, look to align differences in habitat structure where populations are contracting, dying out or not showing any natural tendency to "bud".		
	RWA3 - Carry out DNA analysis of the Lancashire populations as it has been suggested that they may be of hybrid origin, in which case standalone objectives centred on habitat management may need to be re-considered.		

	RWA4 - Develop and implement red wood ant conservation measures in the vicinity of key populations in collaboration with local landowners, managers and shoots, including: • Habitat enhancement • Pheasant management		recovery actions and the next iteration of the LNRS.
	RWA5 - Carry out meteorological analysis and atmospheric monitoring at ground level on sites with good populations and sparse populations to see if climate instability is affecting sites and populations differently.		
TARGET SPECIES	**MEASURE**	**SHORTLIST SPECIES BENEFITED**	**BENEFITS**
Plants: **Yellow Star-of-Bethlehem (YS)** Local Status: • Rare in Lancashire. • Lancashire BAP Species. • BHS guideline species. **Northern bedstraw (NB)** Local Status: • Rare in Lancashire. • Lancashire BAP Species.	**YS1, NB1, WC1, MT1, LO1, PW1, DC1** Work with landowners at previously known or potential sites to propagate and plant to suitable areas nearby or where populations once existed; taking into account climate resilience (for example where previous or existing sites have become/may become unsuitable and by working with landowners to collect material from existing sites).		National objectives and targets: 2 and 3 Supporting Actions: • Engagement and collaboration to promote nature recovery. • Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS.
	YS2, NB2, WC2, MT2, LO2, PW2, DC2 Maintain existing 'Horticultural reserves' for those species that have otherwise been lost or are at high risk of being lost as a 'cultivation stock' and create additional 'Horticultural reserves' as a fall back whereby propagation attempts can thus be carried out because natural dispersal is known to be failing in the wild (for example, The Barn (LWT) where melancholy thistle is established).		
	YS3, NB3, WC3, MT3, LO3, PW3, DC3 Localised surveys to establish evidence on presence / extent / distribution of local populations, to support recovery.		

Wood crane's-bill (WC) National Status: • GB Red List, Near Threatened. Local Status: • Scarce in Lancashire. **Melancholy thistle (MT)** Local Status: • Scarce in Lancashire. • BHS guideline species. **Lady's-slipper orchid (LO)** National Status: • GB Red List, Critically Endangered. • Nationally Rare. Local Status: • Rare in Lancashire. • Species of Principal Importance. • Lancashire population nationally significant. **Petty whin (PW)**			

National status: • GB Red List, Near Threatened. Local status: • Rare in Lancashire. • Lancashire BAP species. • BHS guideline species. **Dwarf cornel (DC)** National Status: • GB Red List, Near Threatened. Local Status: • Rare in Lancashire. • Lancashire population significant for England.			

Universal Priorities


Astley Park, Chorley

Three 'universal' priorities that relate to recurring pressures across all habitats have been identified as:

- Access to nature is provided whilst minimising recreational impacts on sensitive sites, habitats and species populations.
- Nutrient enrichment, sediment deposition and pollution are minimised.
- Biosecurity (measures aimed at preventing the introduction or spread of harmful organisms) and control of invasive species.

The measures that could be taken to address these pressures have been identified in the table below. Because these are applicable universally across the county, these are not mappable. They are nevertheless important actions that, if taken, will greatly improve the chance of the LNRS priorities being achieved and will generally benefit species and habitats across the board. Where they have a specific benefit for a target species, this has been highlighted and mapped accordingly.

Table 20: Priorities, potential measures and associated benefits – UNIVERSAL PRIORITIES

PRIORITY	MEASURE	BENEFITS
UP1 - Access to nature is provided whilst minimising recreational impacts on sensitive sites, habitats and species populations.	**UP1.1** - Produce and implement recreation management plans for sensitive sites and habitats to minimise detrimental disturbance and other impacts including (for example): • Undisturbed public access exclusion zones around sensitive habitats and species populations, • Seasonal access restrictions to protect breeding birds, important wintering bird populations, hibernating animals and other sensitive species, • Designated access routes, • Interpretation materials, • Visual screens, • Prevention and control of damaging activities, • Requirements for dogs to be on leads, • Public Spaces Protection Orders and bylaws, • Rangers and enforcement officers.	National objectives and targets: • 2, 3, 6, 11 Wider benefits: • Local economy through green jobs • Social, cultural and educational • Health and wellbeing • Safeguarding natural coastal processes • Access to nature along transport corridors and active travel routes such as National Trails, public rights of way and canal towpaths, where appropriate.
	UP1.2 - Enhance existing recreational and public open spaces as well as active travel routes, to improve biodiversity, access and amenity value, to alleviate recreational pressure on sensitive sites and habitats.	
	UP1.3 - Establish new biodiverse multi-functional open spaces accessible to all for public recreation such as: • Sustainable forestry plantations. • Habitat creation, enhancement and new nature-rich open spaces along National Trails, public rights of way, canal towpaths and other active travel routes where appropriate. • Other suitable alternative natural green spaces.	
UP2 - Nutrient enrichment, sediment deposition	**UP2.1** - Establish buffer zones of appropriate semi-natural habitat separating agricultural operations from watercourses, water bodies, wetlands and other habitats sensitive to nutrient enrichment and pollution.	National objectives and targets: • 1, 4, 5, 9, 14, 15 Wider benefits:
	UP2.2 - Establish buffer zones of appropriate semi-natural habitat separating sources of surface water run-off from watercourses, water bodies, wetlands and other habitats sensitive to nutrient enrichment and pollution.	

and pollution are minimised.	**UP2.3** - Establish shelter belts to minimise the impacts of ammonia and nitrogen deposition on sensitive sites and habitats, such as long-established woodlands, lowland raised mire, heathland etc.	• Improvements in water quality, for example by intercepting diffuse pollution/filtration of pollutants. • Local economy through green jobs. • Natural resources with improved soil health • Restore natural hydrology and hydro-geomorphic processes including sediment and nutrient deposition • Reduced erosion, • Social, cultural, and educational • Health and wellbeing
	UP2.4 - Install new and improved infrastructure to: • Minimise the risk of pollution input to rivers and waterbodies from all sources (such as sewage, industrial pollution, surface water run-off, domestic sources etc). • Minimise the risk of nutrient input to watercourses, water bodies, wetlands and other habitats sensitive to nutrient enrichment.	
	UP2.5 - Employ measures to prevent soil erosion and silt run-off during industrial, construction, forestry, agricultural and land management operations.	
	UP2.6 - Reduce or eliminate nutrient inputs as part of landscaping, habitat management, gardening and land management operations.	
	UP2.7 - Employ pollution prevention measures during industrial, construction, forestry, agricultural and land management operations.	
	UP2.8 - Reduce or eliminate use of herbicides, insecticides or other pesticides during landscaping, habitat management, gardening and land management operations.	
	UP2.9 - Where appropriate, employ mowing and grazing regimes as part of habitat management regimes to prevent nutrient build-up.	
	UP2.10 - Remove arisings such as grass cuttings following management operations and seek sustainable uses for the material for example: • Haymaking • Composting • Mulch • Biochar	
	UP2.11 – Litter removal from habitats and open spaces.	
UP3 - Biosecurity and control of invasive species	**UP3.1** - Control and eradication of invasive species within: • Sensitive/important habitats and sites, • Coastal habitats • Catchments, watercourses and floodplains • Transport and infrastructure corridors.	National objectives and targets: • 2, 3, 10, 11, 16 Wider benefits:

	(including consideration of species listed in Schedule 9 of the Wildlife and Countryside Act 1981).	• Local economy through green jobs. • Improvements in water quality. • Social, cultural, and educational. • Improve natural function and processes. • Restoration of coastal habitat dynamism. • Safeguarding natural coastal processes.
	UP3.2 - Management of ancient and long-established woodland to remove invasive and non-native species that are detrimental to the biodiversity of the habitat.	
	UP3.3 - Establish and implement co-ordinated landscape scale plans for management of deer and grey squirrel to facilitate successful woodland establishment and regeneration.	
	UP3.4 - To help achieve biodiversity gains, consider legal predator control of species including mink, and those that may seek to prey upon the eggs and chicks of native natural populations of ground nesting bird species.	
	UP3.5 - Follow guidance and information on controlling disease risk and implement biosecurity measures to prevent introduction and spread of pests and disease including: *Phytophthora ramorum, P.austrocedri, Hymenoscyphus fraxineus* (Chalara ash dieback) and Squirrel Pox Virus Disease (SQPVD)	
	UP3.6 – Avoid the introduction or spread of non-native species during habitat creation and enhancement works (also see compliance).	

Supporting Actions

In addition to the mapped and unmapped measures identified for each habitat type and target species, supporting actions have been identified and agreed by stakeholders that will support and enable delivery of the LNRS priorities. They are grouped under four themes:

- Data and evidence.
- Engagement and collaboration.
- Policies that support nature recovery.
- Funding and finance for nature recovery.

These actions are above and beyond the main purpose of the LNRS (to identify locations to create or improve habitat most likely to provide the greatest benefit for nature and the wider environment). However, they are equally important in achieving our nature recovery priorities and have been informed by feedback gathered from the engagement with land managers, the VCFSE sector and the public survey, particularly around the enablers and barriers to nature friendly farming and land management practices. As with the Universal Priorities, they will generally benefit species and habitats across the board when implemented. Where they have a specific benefit for a target species, this has been highlighted and mapped accordingly.

i) Data, evidence and strategies to inform nature recovery actions and the next iteration of the LNRS

- Maintain and develop the Lancashire Environment Record Network which has been essential in LNRS preparation and will be critical to successful delivery, monitoring and periodic review.
- Research, develop and produce a State of Nature report for Lancashire which will inform future monitoring of habitats and species to assess trends and condition.
- Develop and maintain a Lancashire Habitat Inventory as an accessible repository for historic and up-to-date habitat information to fill current and future data, evidence, and monitoring needs, including (among other things):
    - Agreeing, defining, listing and mapping habitats in Lancashire that are effectively irreplaceable and/or habitats that would be technically very difficult, or take a very significant time to restore, recreate or replace.

- Develop a Species Data Strategy for Lancashire to direct a collaborative and consistent approach to the collection, collation and application of species observation data, supporting and growing biological recording networks to address existing and emerging data, monitoring and evidence needs.
- Maintain the BHS system.
- Develop and implement a programme of measures to identify and safeguard ancient, important and fungi-rich grasslands.

- Develop and implement landscape scale mitigation strategies to minimise recreational and tourist pressure on sensitive habitats, nature conservation sites and species populations.
- Develop and implement landscape scale mitigation strategies to minimise the ecological impacts of nutrient enrichment, sediment deposition and pollution.
- Develop and implement landscape scale mitigation strategies to minimise the ecological impacts of invasive species.
- Develop and implement evidence-based, landscape scale strategies with co-benefits for natural flood-risk management and nature recovery.
- Evidence based forward planning for predicted sea level rise to inform future iterations of the LNRS.
- Identify locations where biodiversity gains and wider environmental benefits can be provided through peatland restoration.
- Contribute to wider research into habitat creation, restoration and management techniques to inform future actions and approaches, focussing on knowledge gaps.
- Gather data and evidence and undertake further research to inform consideration of appropriate wet woodland creation on wasted peat and unrestorable agricultural soils on former peatland sites.
- Undertake further research to develop agreed locally appropriate seeding and planting mixes.
- Identify and agree suitable donor sites for seeds/plants to inoculate habitats as part of habitat restoration.
- Identify strategic nature recovery projects.
- Collect, collate and disseminate data and evidence to inform LNRS delivery plans.
- Monitor and report on delivery of LNRS priorities and measures.
- Analyse monitoring data to identify barriers to successful habitat creation/restoration to inform future actions.
- Gather data and evidence and undertake further research to inform future iterations of the LNRS.
- Gather data and evidence and undertake further research to inform consideration of additional target species within future iterations of the LNRS (taking account of feedback on the first iteration of the LNRS).
- Gather data and evidence and undertake further research to inform consideration of future species reintroduction strategies.

ii) Engagement, collaboration and support to promote nature recovery

- Make the Lancashire LNRS available in multiple accessible formats.
- Direct potential LNRS users to guidance on how to contribute to nature recovery action.
- Develop and implement a strategy to engage the public, residents and communities (including political leaders) in nature recovery action.
- Develop and implement a landowner and land manager engagement strategy for nature recovery.

- Develop and implement a strategy for engagement with charities, non-governmental organisations and research institutions.
- Develop and implement a strategy for engagement with the commercial sector.
- Develop and implement a strategy for engagement and collaboration with Lead Local Flood Authorities.
- Develop and implement a consultation strategy for nature recovery.
- Develop and implement education and training strategies for nature recovery.
- Cross boundary collaboration on nature recovery action.
- Engage with demographic groups under-represented in LNRS development and consultation processes.
- Establish and build upon nature recovery partnerships, including Lancashire's Local Nature Partnership (LNP) and Morecambe Bay LNP to deliver LNRS measures and Supporting Actions.
- Support local partnerships to use the LNRS.
- Facilitate development of strategic nature recovery projects.
- Support the development and preparation of nature recovery delivery plans.
- Support and encourage nature recovery action within and beyond the mapped opportunity areas.

iii) Policies that support nature recovery

- Embed the LNRS into local decision making.
- Establish development plans and policies that support LNRS delivery, giving consideration to the following recommendations:
    - Incorporating identified nature recovery opportunities, priorities and measures into new and emerging local plans.
    - Robust protection for:
        - Areas of particular importance for biodiversity identified on the local habitat map.
        - Lancashire's most important species (see *Evidence and Technical Information* document), in particular the 24 Lancashire LNRS Target Species requiring bespoke measures to support their recovery,
        - Habitats that are difficult or impossible to re-create (including a local list of habitats to be agreed),
        - Habitats with high carbon storage potential such as peatland and wooded habitats,
        - Trees, wooded habitats and associated root protection zones, including aged and veteran trees, ancient and long-established woodlands and temperate rainforest.
    - Restricting development (unless for biodiversity reasons) wherever possible on:
        - Floodplains,
        - Coastal habitats,
        - Upland and lowland peat.

- Support for biodiversity enhancement measures within new developments, above and beyond mandatory and national policy requirements, such as:
    - Nesting and roosting opportunities within buildings and structures (such as swift bricks, bat roosting features, nest boxes etc),
    - Habitat creation on new buildings and structures,
    - Wildlife shelters,
    - Interconnecting habitats,
    - Biodiverse sustainable drainage systems.

- Maximising habitat creation and soft landscaping within new developments, considering restrictions on the use of artificial grass.
- Ecological restoration requirements following mineral extraction.
- Requirements for controlling all sources of pollution, such as air, noise, light, chemical, nutrient enrichment and sediment deposition.
- Control of surface water run-off to avoid impacts on sensitive habitats.
- Appropriate treatment of water prior to discharge.
- Natural flood-risk management incorporating co-benefits for nature recovery.
- Planting and safeguarding street trees and highway trees.
- Management of roadside verges for biodiversity.
- Requirements for safe wildlife crossings and road signs to reduce roadkill.
- Requirements for sensitive lighting.
- New nature-rich open spaces accessible for public recreation.

iv) Funding and finance for nature recovery

- Establish a local strategy for funding and financing:
    - Landscape scale nature recovery projects,
    - Community nature recovery projects.
    - Research and collection of ecological data and evidence.

- Promote private and public investment in:
    - Landscape-scale ecosystem creation and restoration,
    - Community nature recovery projects,
    - Research and collection of ecological data and evidence.

3. The Local Habitat Map

The Local Habitat Map can be accessed here: Lancashire's Local Habitat Map. It shows:

- **Areas of particular importance for biodiversity in Lancashire.**
- **Areas that could become of particular importance in Lancashire** – these are the mapped locations for potential measures that would:
  - make the greatest contribution to achieving the identified priorities.
  - achieve greatest connectivity of similar biodiverse habitats across the landscape.
  - make a particular contribution to other environmental benefits for the people of Lancashire, such as natural flood management or for health and wellbeing.

Connectivity modelling (connecting similar habitats based on the existing areas of particular importance) has identified new ecological networks and has informed where the potential measures have been mapped. Where a potential measure could feasibly be implemented in many locations, areas have been identified that would benefit biodiversity or the environment the most.

Where two or more potential measures could be carried out together, where different potential measures would generate similar levels of benefit, or where the most suitable measure would need to be informed by further survey on the ground, they may be mapped in the same location. Some measures could be applied widely across Lancashire and have therefore not been mapped. This includes, for example, various measures relating to sustainable land management practices and some relating to surveys, research, and monitoring. Further information on the mapping process is provided in the *Evidence and Technical Information* document, along with information on additional steps taken, constraints applied, and datasets used to map measures beyond the described methodology in Appendix Thirteen of the Evidence and Supporting Information document.

When viewing the map please remember:

- The main purpose of the map is to identify locations to create or improve habitat most likely to provide the greatest benefit for nature and the wider environment. This does not preclude nature recovery actions in other locations.
- The habitat map is based on data sets and the best available information available at the time.
- The aim is not to create isolated areas but ecological networks that are bigger, better, and more connected to help nature thrive. If a site doesn't appear it is likely that connectivity opportunities were not identified as a priority in that area.
- It is a tool to identify opportunities for nature recovery and is not intended to be a delivery plan. Landowners of areas mapped are not obliged to deliver opportunities identified.
- Identified potential measures do not preclude other land use changes. It is a 'snapshot' in time and may therefore (for example) include sites that already have planning permission or consent for other land use changes.

- Much of the mapped land is in private ownership.
- Before undertaking any measure, it is important to obtain the permission of the landowner, carry out any necessary surveys/assessments and obtain the required consents and approvals from any relevant public bodies. A summary of some key compliance requirements is provided in Appendix Two.

4. Delivery, Monitoring and Review

Delivery and Monitoring

The LNRS is a tool to identify opportunities for nature recovery, which can be used to target action and funding. The LNRS is not intended to be a delivery plan. However, the LNRS can be used to inform delivery plans for nature recovery. The delivery of the LNRS will be a collaborative exercise involving a wide range of stakeholders. By working with partners, the aim is to strengthen partnerships, particularly with those who manage land and those involved in making regulatory decisions that will be fundamental in delivering the strategy. Delivery of the LNRS will include the following four key functions:

- Building delivery partnerships,
- Embedding the LNRS into local decision making,
- Identifying and facilitating strategic projects,
- Monitoring and reporting on delivery of LNRS priorities.

Review

The Environment Act requires that the LNRS is reviewed and republished every 3 – 10 years. This will enable progress on delivery to be monitored and to reflect on what has been achieved and where more action is needed. The review will consider which measures have and have not been carried out since the previous published strategy, which will inform an open process of adding, removing, or amending potential measures before republishing. Areas where nature recovery action has taken place will be mapped.

LERN will have a critical role in the management of this process, including supporting monitoring responsibilities and decision making as well as developing the next iteration of the strategy. It is predicted that this role will expand with an increasing reliance on data and strategic planning.

A responsible authority may not change a published LNRS without the written agreement of the Secretary of State in accordance with the Regulations.

Glossary

Agri-environment schemes	Agri-environment schemes are Government programmes set up to help farmers manage their land in an environmentally friendly way. Agri-environmental schemes are important for the conservation of farmed environments of high nature value, for improved genetic diversity and for protection of agro-ecosystems.
Ancient tree	An ancient tree is a tree that is exceptionally old for its species and has entered the third and final stage of its life. The age of an ancient tree depends on the species. Some species can live longer than others.
Ancient woodland	Areas of woodland that have been continuously wooded since at least 1600AD.
Belmont series	A type of soil found in the UK, characterized by deep, well-drained residual soils on gently sloping to very steep benches and side slopes.
Biodiversity	The variety of life (abbreviation of biological diversity)
Biodiversity Net Gain (BNG)	BNG is an approach to development, and/or land management, that aims to leave the natural environment in a measurably better state than it was beforehand. It delivers measurable improvements for biodiversity by creating or enhancing habitats in association with development. BNG can be achieved on-site, off-site or through a combination of on-site and off-site measures. Biodiversity net gain - GOV.UK (www.gov.uk)
Biological Heritage Site (BHS)	Non-statutory (not controlled by law) wildlife sites of at least County significance within Lancashire.
Biosecurity	Biosecurity refers to a set of precautions that aim to prevent the introduction and spread of harmful organisms. These include non-native tree pests, such as insects, and disease-causing organisms (called pathogens) such as some bacteria and fungi.
Blue space	Blue space refers to our water environments; natural – such as rivers, lakes, streams and the sea, and built – such as marinas, canals and lidos.
Brownfield sites	Brownfield sites are sites which have been previously developed and are or were occupied by a permanent structure and any fixed surface infrastructure associated with it. It does not include land that is or was occupied for agricultural or forestry purposes. See also, definition of previously developed land within the latest National Planning Policy Framework[64].
Budding nest frequency	Ants reproduce in different ways depending on their colony type and how many queens there are. The most common form of reproduction is called “budding”. Budding is when a queen ant and her devoted workers leave their current nest, travel to a new site, and forms a new colony.

Calcareous grassland	Calcareous grassland is found on shallow, well-drained soils which are rich in bases (principally calcium carbonate) formed by the weathering of limestone or base-rich rock or drift and is characterised by vegetation dominated by grasses and herbs.
Catchment	A natural drainage basin that collects water from various sources and channels them into a low point.
Carboniferous	The Carboniferous Period began approximately 358.9 million years ago and ended 298.9 million years ago. Its duration of approximately 60 million years makes it the longest period of the Paleozoic Era and the second longest period of the Phanerozoic Eon. The rocks that were formed or deposited during the period constitute the Carboniferous System. The name Carboniferous refers to coal-bearing strata that characterise the upper portion of the series throughout the world.
Carbon sequestration	Carbon sequestration is the process of storing carbon in a carbon pool. It plays a crucial role in limiting climate change by reducing the amount of carbon dioxide in the atmosphere.
Catchment Based Approach (CaBA) partnerships	An inclusive, civil society-led initiative that work collaboratively with government, local authorities, water companies, businesses and local groups to maximise the natural value of our aquatic environment.
CHEGD grassland	These are waxcap grasslands. CHEGDs stands for the key fungi groups involved: spindles, club and coral fungi (Clavarioids), the waxcaps *Hygrocybe* genus (although recent DNA investigations have split up the genus), pinkgills (*Entoloma*), earthtongues (*Geoglossum* and relatives), and crazed caps (*Dermoloma* and relatives). Waxcap-grassland fungi are of conservation interest as indicators of semi-natural, mycologically-rich unimproved grasslands. They are a threatened habitat throughout the UK and Europe and the species concerned are strongly associated with unfertilised, unimproved, nutrient-poor grasslands.
Clough	A steep valley or ravine.
Coastal hinterland	The hinterland of a stretch of coast is the area directly in land behind it.
Coastal squeeze	A term that describes the loss or deterioration of natural habitats along the coast due to human activities or structures that prevent them from adapting to rising sea levels.
Co-benefit	Co-benefits are other positive things that the creation or improvement of habitat can also contribute towards such as improvements to peoples' health.
Desiccated	Dried out or dehydrated.
Diffuse pollution	The release of pollutants from a range of activities that individually may have little effect on the water environment, but at a catchment scale can have a significant impact on water quality.

District Wildlife Site	These are sites designated by district councils and unitary authorities and have various names in Lancashire. They include local wildlife sites that have been recognised as having value for wildlife.
Drumlin	An oval or elongated hill believed to have been formed by the streamlined movement of glacial ice sheets across rock debris or till.
Ecology	The science of interrelationships between organisms and their interactions with their environment.
Equitable	Giving consideration to the needs of different population groups, so that everyone has the opportunity to enjoy the same outcome.
Escarpment	A long, steep slope, especially one at the edge of a plateau or separating areas of land at different heights.
Floodplain meadows	Wildflower meadows in a floodplain managed through an annual hay cut and typically grazed afterwards.
Fluvial deposits	These are sediments that are transported and deposited by rivers in a continental environment.
Functionally extinct	Too few individuals remain to enable reproduction.
Functionally linked land	A term used to describe areas of land or sea occurring outside a designated site which is considered to be critical to, or necessary for, the ecological or behavioural functions in a relevant season of a qualifying feature for which a Special Areas of Conservation (SAC)/ Special Protection Area (SPA)/ Ramsar site has been designated. These habitats are frequently used by SPA species and support the functionality and integrity of the designated sites for these features.
Greenspace	• Greenspace is an area of vegetation that is set within a landscape or townscape and may include built environment features. • Greenspace is not necessarily accessible to the public e.g. greenspaces include allotments (that are normally locked and only accessible to key holders), and golf courses (which may require club membership and or payment of a fee to access). Such greenspace has a significant role to play in the overall provision of greenspaces for recreation and enjoyment. • High quality greenspace is designed and managed to deliver its intended functions and to meet defined needs. Greenspace may be urban or rural.
Groundwater recharge	A hydrological process, where water moves downward from surface water to groundwater. Recharge is the primary method through which water enters an aquifer (underground layer of water bearing material).

Habitat	A habitat is an environment inhabited by living organisms. There are a range of systems for classifying habitats into categories. This strategy uses the following broad categories: • Aquatic and wetland • Coastal and estuarine • Grasslands (including agricultural land) • Lowland and upland peatland • Rocky habitats • Wooded habitats and trees • Urban habitats (including infrastructure networks).
Headstarting	Headstarting is a conservation technique for endangered species in which young animals are raised artificially and subsequently released into the wild.
Improved pasture	Improved pasture refers to cultivated or managed areas of land that have been modified to enhance the growth of specific, desirable forage plants for grazing animals.
Irreplaceable habitat	Habitats that would be technically very difficult (or take a very significant time) to restore, recreate or replace once destroyed, taking into account their age, uniqueness, species diversity or rarity. 'The statutory* irreplaceable habitats found in Lancashire (as defined by the Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024) are: • ancient woodland, • ancient and veteran trees, • blanket bog, • limestone pavement, • coastal sand dunes, • lowland fen.
Kested hedgerows	Hedgerows planted on small embankments.
Limestone grassland	Limestone grassland, also known as calcareous grassland, is characterized in Lancashire by its growth on thin, freely draining soils with underlying limestone. These grasslands are typically found in areas with high pH soils and are known for their rich biodiversity supporting many rare and declining plant species.
Limestone pavement	A limestone pavement is a natural karst landform (landform worn away by water) consisting of a flat, incised surface of exposed limestone that resembles an artificial pavement
Long-established woodland	Woodland that has existed since at least 1893.
Lowland peatland	Lowland peatlands comprise of lowland raised bogs and fens. Many lowland peatlands have been drained for cultivation, creating some of the highest grade arable and horticultural land in Lancashire, but simultaneously exposing previously waterlogged

	organic matter to decomposition and compaction, leading to long-term subsidence and sustained CO_2 emissions.
Marine Conservation Zone (MCZ)	Marine Conservation Zones are areas that protect a range of nationally important, rare or threatened habitats and species.
Mitigate	Make something bad less severe.
National Landscape	National Landscapes (designated Areas of Outstanding Natural Beauty) are on par with the UK's National Parks, each is an outstanding landscape whose distinctive character and natural beauty is safeguarded in the national interest.
National Nature Reserves (NNR)	Established to protect some of our most important habitats, species and geology, and to provide 'outdoor laboratories' for research. Most NNRs offer great opportunities for schools, specialist interest groups and the public to experience wildlife at first hand and to learn more about nature conservation.
Natural capital	The parts of nature that provide benefits to people. We depend on it for the air we breathe, the water we drink and the food we eat. It boosts our health and wellbeing. It captures and stores carbon and has a vital role to play in helping us adapt to the impacts of climate change. Natural capital is also an economic concept. It considers nature as a stock of assets, which we must invest in.
Nature-based Solutions (NBS)	Actions which support and draw on nature to provide wider environmental or societal benefits.
Neutral soils	Neutral soil is a type of soil that is neither acid nor alkaline. It has a pH range between 6.6 and 7.3. Most plants have a pH level of between 6.5 and 7, which means they need a neutral soil.
Open Mosaic Habitats on Previously Developed Land	Open Mosaic Habitats on Previously Developed Land (OMH) are found mainly in urban and formerly industrial areas and have high biodiversity value.
Peatland Carbon Code standard	The Peatland Code is a voluntary certification standard for UK peatland projects wishing to market the climate benefits of peatland restoration and provides assurances to voluntary carbon market buyers that the climate benefits being sold are real, quantifiable, additional and permanent.
Plantations on Ancient Woodland Sites (PAWS)	Ancient woodland sites that have been converted to plantations dominated by non-native tree species. These often retain some remnant features characteristic of ASNW such as ground flora along rides or pre-plantation native trees.
Polycentric	Having more than one centre or focus.
Point source pollution	Point source pollution comes from a direct specific source, for example an effluent discharge pipe.

Potential measures (in the LNRS)	Potential measures are specific practical actions to achieve priorities.
Priorities (in the LNRS)	Priorities are the end results that the strategy is seeking to achieve.
Priority Habitat	Habitats of principal importance for the conservation of biodiversity, identified within Section 41 of the Natural Environment and Rural Communities Act 2006 (and within the UK Biodiversity Action Plan).
Protected Species	Species protected by legislation.
Ramsar sites	Wetlands of international importance designated under the Ramsar Convention.
Rectilinear fields	Fields with straight-lined boundaries.
Red List criteria	The IUCN Red List Categories and Criteria are a system for classifying species at high risk of global extinction.
Saline intrusion	Saline intrusion is the movement of saltwater into freshwater aquifers, which can lead to groundwater quality degradation, including drinking water sources and may have other consequences.
Semi-improved grasslands	Semi-improved grassland is a transition category between improved and unimproved grasslands that have undergone some modification through the use of, for example, fertilisers, herbicides and grazing.
Semi-natural species-rich grassland	Defined by a richness score, usually more than 15 and sometimes up to 40 beneficial vascular plant species per square metre, including grasses, graminoids (grass like plants including sedges and rushes) and broadleaf wildflowers.
Silviculture	Silviculture is the care and cultivation of woodlands (as opposed to arboriculture which is the care and cultivation of individual trees).
Sites of Special Scientific Interest (SSSI)	Nationally designated sites of special scientific interest. SSSIs are legally protected under the Wildlife and Countryside Act 1981.
Special Area for Conservation (SAC)	Protect one or more special habitats and/or species listed in the Habitats Directive. They cover both terrestrial and marine habitats and species. Designated under the Conservation of Habitats and Species Regulations 2017.
Special Protection Area (SPA)	Internationally designated areas on land or at sea which protect vulnerable bird species in the UK.

	Designated under the Conservation of Habitats and Species Regulations 2017.
Species	Commonly defined as a group of similar organisms that can successfully breed to produce fertile offspring.
Strategic Significance	BNG Strategic Significance refers to the local significance of a habitat based on its location and habitat type.
Stepping stone habitat	Areas of habitat that will help wildlife to move between isolated fragments of habitat.
Sustainable Drainage Systems (SuDS)	Environmentally friendly techniques designed to help manage and control surface water runoff.
Suitable Alternative Natural Green Space (SANG)	A Suitable Alternative Natural Greenspace (SANG) is a recreational site, created to attract residents of new developments away from designated sites that are protected for their valuable ecology and are sensitive to recreational activities such as dog walking.
Supporting Actions (in the LNRS)	Supporting actions have been identified that will support and enable delivery of the LNRS priorities. They have been grouped under four themes: • Data and evidence • Engagement and collaboration • Policies that support nature recovery • Funding and finance for nature recovery
Synanthropic	An organism that can live near, and could benefit from humans and their environmental modifications.
Temperate rainforest	Temperate rainforests are wet and often have open glades, or rivers cutting through rocky gorges. The trees that grow there typically include sessile oak, birch, rowan, holly, alder, willow, and hazel. The thick cover of ferns, mosses, liverworts, and lichens which cover every surface, from the ground to boulders, crags, and even the trunks and branches. A luscious temperate rainforest once covered vast areas of the British Isles. This woodland is also known as upland oakwood, Atlantic or Celtic rainforest. Wistman's Wood in Dartmoor, Devon is a famous national example of upland oakwood.
Veteran tree	A tree that is of interest biologically, culturally or aesthetically because of its age, size or condition. Characteristic features of veteran trees include (for example) a large girth, cavities/hollowing, crevices, dead wood, fungal growth etc. Such features contribute to their biodiversity, cultural and heritage value. They are considered a statutory irreplaceable habitat. All

	ancient trees are veteran trees, but not all veteran trees are ancient.
Umbrella species	Species whereby protecting these indirectly protects many other species.
Unimproved grassland	Grasslands that have never been ploughed, reseeded or heavily fertilised and tend to be species-rich.
Universal priorities (in the LNRS)	Universal priorities relate to recurring pressures across all habitats. • Access to nature is provided whilst minimising recreational impacts on sensitive sites, habitats and species populations. • Nutrient enrichment, sediment deposition and pollution are minimised. • Biosecurity (measures aimed at preventing the introduction or spread of harmful organisms) and control of invasive species. These priorities are applicable universally across the county and are therefore not mappable. They are nevertheless important actions that, if taken, will greatly improve the chance of the LNRS priorities being achieved and will generally benefit species across the board.
Upland peatland	Upland peatlands occur in areas 200m above sea level, in damp, cool climates that experience high levels of rainfall. They comprise of blanket bog, wet heath and dry heath habitats. Within Lancashire, many have been drained and intensively managed with rotational burning and/or grazing.
Urban heat islands	Urban heat islands are areas within the urban environment that are significantly warmer than the surrounding rural areas. The heat is generated by high concentrations of people and energy use from cars, trains and buses and heat retaining structures such as roads and buildings.
VCFSE	Voluntary, Community, Faith and Social Enterprise sector.
Watercourse	A channel through which water flows, such as rivers and streams.
Waxcap grassland	Waxcap grassland is short-sward, nutrient-poor grassland that supports a rich assemblage of larger fungi, particularly waxcaps, characteristic of such habitats. They are characterised by colourful waxcap fungi but also include other charismatic species like the coral fungi, pinkgills and earthtongues.
Wetlands	Wetlands are areas of land that are either permanently or seasonally inundated with water, supporting species that are adapted to live there. They include a range of habitat types that are important for wildlife and people and play an important role in reducing flood risk and slowing the flow of water.

Wetter farming	Wetter farming is also known as paludiculture or high-water table farming. Wetter farming is the practice of productive agriculture on wet or re-wetted land, often peatland.
Wet woodland	Wet woodland is characterised by trees such as willows, birches and alder that thrive in poorly drained or seasonally flooded soils, such as in fens and bogs, pond and lakesides, riverbanks, and flushed hillsides.
Woodland Carbon Code	A quality assurance standard for UK woodland carbon projects. It empowers landowners, organisations and businesses to address climate change by creating and supporting woodland projects across the UK.
Wood pasture	Wood pasture and parkland is land that has been managed through grazing. It can be ancient, or more recent but will contain trees growing in open pasture-land, often very old and home to many rare and threatened species.

Acronyms

Acronym	Meaning
ASNW	Ancient Semi-Natural Woodland
BNG	Biodiversity Net Gain
BHS	Biological Heritage Site
CaBA	Catchment Based Approach
LNRS	Local Nature Recovery Strategy
MCZ	Marine Conservation Zone
NCA	National Character Area
NNR	National Nature Reserves
NBS	Nature-based Solutions
PAWS	Plantations on Ancient Woodland Sites
SSSI	Site of Special Scientific Interest
SAC	Special Area for Conservation
SPA	Special Protection Area
SuDS	Sustainable Drainage Systems
SANG	Suitable Alternative Natural Green Space
VCFSE	Voluntary, Community, Faith and Social Enterprise sector

Appendix One: National targets and objectives

Table 1 National targets set under the Environment Act 2021

Targets
1) Biodiversity on land - Restore or create in excess of 500,000 hectares of a range of wildlife-rich habitat outside protected sites by 2042, compared to 2022 levels.
2) Biodiversity on land – Halt the decline of species abundance by 2030. Ensure that species abundance in 2042 is greater than in 2022, and at least 10% greater than 2030.
3) Biodiversity on land - reduce the risk of species' extinction by 2042, when compared to the risk of species' extinction in 2022.
4) Woodland cover - Increase total tree and woodland cover from 14.5% of land area now to 16.5% by 2050
5) Improve water quality and availability - Reduce nitrogen (N), phosphorus (P) and sediment pollution from agriculture into the water environment by at least 40% by 2038, compared to a 2018 baseline.

Table 2: Additional relevant commitments from the Environmental Improvement Plan

Objective
6) Work to ensure that everyone in England lives within 15 minutes' walk of a green or blue space
7) Restore approximately 280,000 hectares of peatland in England by 2050
8) Protect 30% of land and of sea in the UK for nature's recovery by 2030
9) Support farmers to create or restore 30,000 miles of hedgerows by 2037 and 45,000 miles of hedgerows by 2050
10) Manage our woodlands for biodiversity, climate and sustainable forestry
11) Restore 75% of Sites of Special Scientific Interest to favourable condition by 2042. By 31 January 2028 50% of SSSIs will have actions on track to achieve favourable condition.
12) Ensure delivery and management of actions and policies that contribute towards our 25YEP goals are suitable and adaptive to a changing climate
13) Make sure LNRSs include proposals for Nature-based Solutions which improve flood risk management where appropriate
14) Achieve Good Environmental Status for our seas
15) Reduce emissions of nitrogen oxides by 73% and ammonia by 16% by 2030 relative to 2005 levels
16) Reducing the rates of introduction and establishment of invasive non-native species by at least 50%, by 2030

Appendix Two: Compliance with current legislation, policy, and best practice standards

N.B. Individuals and organisations are liable for ensuring compliance with all relevant statutory, regulatory, and government guidance and best practice requirements for delivery of the LNRS. Whilst Lancashire County Council, the LNRS Supporting Authorities and consenting authorities may be able to provide guidance and support through the LNRS, they are not responsible or liable for ensuring compliance with these requirements and shall not be held liable where an individual or organisation fails to obtain the necessary consent, permission or licence required and/or fails to comply with any statutory or policy requirements relating to the delivery of the LNRS.

In delivering LNRS priorities and measures, projects must:
Ensure compliance with the requirements of the latest version of relevant legislation, policy and best practice standards.

Ensure compliance with legislation and statutory requirements, including (but not restricted to):

- Avoiding detrimental impacts on statutory designated sites, their qualifying features, associated species populations and functionally linked land.
- Avoiding detrimental impacts on protected species and their habitats.
- Preventing the spread of invasive species, including those listed in:
  - Schedule 9 of the Wildlife and Countryside Act 1981[65] (as amended).
  - The Invasive Alien Species (Enforcement and Permitting) Order 2019[66].
- Implementation of statutory biosecurity measures.
- Completion of all relevant and necessary assessments, such as Habitats Regulations Assessments.
- Prior acquisition of all relevant and necessary permissions, consents, assent, exemptions, permits, licences etc, including those issued by statutory consenting bodies such as Natural England, Environment Agency, Forestry Commission and Local Planning Authorities, for example:
  - Landowner permissions and consents required for site access and proposed works.
  - Planning permission and/or other consents required for change of land use.
  - Protected species mitigation licences,
  - SSSI Assent or Consent,
  - Water abstraction or impounding licences,
  - Fish pass approval,
  - Ordinary Watercourse Consent,
  - Felling licences,
  - Etc.
- Compliance with statutory environmental protection requirements, for example:
  - Environmental Impact Assessments (Agriculture) Regulations[67].
  - Environmental Impact Assessments (Forestry) Regulations[68].
  - Conservation of Habitats and Species Regulations[69].

- Wildlife and Countryside Act[70].
- Environmental Protection Act[71].

- Compliance with statutory health, safety and public protection requirements.
- Compatibility with existing rights, agreements and obligations, including (for example:
  - Planning conditions[72],
  - Town and Country Planning Section 106 agreements[73],
  - Stewardship agreements[74],
  - Access rights,
  - Etc
- Ensure compatibility with relevant national and local policies, local plans and associated land allocations/spatial plans.

Ensure that actions are informed by:

- Ecological data searches including consultation with the local records centre (Lancashire Environment Record Network - Lancashire County Council), as well as open-source data,
- Appropriate baseline ecological assessments (such as Ukhab[75]) of all habitats and species groups that may be affected.
- Soil assessments, peat depth assessments and hydrological assessments where appropriate.
- Other necessary assessments as required, such as hazard assessments, land stability assessments, etc.

Undertake appropriate consultation, giving consideration to consultation and collaboration with:

- Statutory environmental protection and nature conservation bodies (such as Natural England, Environment Agency, Forestry Commission, Marine Management Organisation and Historic England).
- Local Planning Authorities.
- The Local Environmental Records Centre.
- Lancashire Historic Environment Record.
- Ecological advisors.
- Landowners/tenants with an interest in the site or neighbouring land.
- The designating authority/partnership for any designated sites that may be affected, such as the BHS Partnership.
- Public Health.
- Utilities companies responsible for overhead or underground infrastructure within or adjacent to the affected area.
- Authorities/organisations responsible for transport infrastructure, routes and navigation rights that may be affected.
- Other relevant bodies.

Follow current versions of recognised best practice guidance and standards wherever relevant and available, including policies and associated guidance from statutory nature conservation and environmental protection bodies, such as Natural England,

Environment Agency, Forestry Commission, Marine Management Organisation and Historic England, for example:

- Natural England Information Notes,
- UK Forestry Standard[76],
- Decision support framework for peatland protection, the establishment of new woodland and re-establishment of existing woodland on peatland in England, (DEFRA, Forestry Commission and Natural England, July 2023)[77], July 2023 Decision support framework for peatland protection
- Guidance - When to convert woods and forests to open habitat: operations note 68 Updated 15 October 2024[78] When to convert woods and forests to open habitat: operations note 68 - GOV.UK
- National standards for sustainable drainage systems (suds)[79]: https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems/national-standards-for-sustainable-drainage-systems-suds
- Other Government wildlife and habitat conservation guidance.

Deliver overall biodiversity gains, taking existing ecological value and environmental considerations into account, including habitats, features and species populations.

Aim to contribute to habitat targets discussed in Natural England Technical Information Note TIN219[80].

Ensure that habitat creation and enhancement proposals comprise habitats, native species and plant communities appropriate for the location and site conditions taking account of:

- Local climate,
- Geology, soils, and topography,
- Hydrology,
- Existing habitats and land uses on the site and adjacent land,
- Native species distribution,
- Species populations and species associations,
- Competition and species interactions.

Ensure that necessary and appropriate establishment maintenance and long-term management of habitats is secured and provided to achieve the habitat creation/enhancement and species conservation objectives.

Implement monitoring programmes to assess the success of nature recovery projects and to inform the need for remedial measures or adjustments to maintenance and management.

Consider habitat enhancements through adjustments to management including consideration of a non-intervention approach in locations where this would benefit the biodiversity of a site.

Seek to deliver wider environmental benefits, such as recreational and health benefits, reduced flood risk, improved air and water quality, carbon capture, opportunities to reinforce local landscape character, etc.

Ensure that woodland creation proposals do not provide grey squirrels with a pathway to known red squirrel populations.

Avoid detrimental impacts on and provide benefits for:

- Areas of particular importance for biodiversity identified on the local habitat map,
- Irreplaceable habitats,
- Other habitats that are difficult to replace,
- Habitats of principal importance (NERC Act, 2006)[81],
- Species of Principal Importance[82] and their habitats,
- Protected species and their habitats,
- Locally and nationally important species populations,
- Designated sites, their qualifying features and associated species populations,
- Habitats with high carbon storage potential,
- Habitats and species prioritised by the LNRS.

Avoid detrimental impacts on:

- Scheduled Monuments[83],
- Historic designed landscapes,
- Historic landscape character,
- Historically important features,
- Heritage assets and their setting,
- Archaeological remains,
- The historic environment.

Avoid detrimental impacts on infrastructure/other property and its structural integrity.

Avoid increased flood risk, flood events, detrimental erosion, sediment deposition and pollution.

Appendix Three: SSSIs in Lancashire

SSSI Name	SSSI Area (ha)	SSSI completely within Lancashire?	Area Within Lancashire LNRS (ha)
Artle Dale SSSI	25.83	YES	25.83
Barn Gill Meadow SSSI	5.51	YES	5.51
Beeston Brook Pasture SSSI	1.73	YES	1.73
Bell Sykes Meadows SSSI	13.8	YES	13.8
Bowland Fells SSSI	16007.83	YES	16007.83
Burton Wood SSSI	18.5	YES	18.5
Calf Hill and Cragg Woods SSSI	34.36	YES	34.36
Charnock Richard Pasture SSSI	1.18	YES	1.18
Clear Beck Meadow SSSI	0.54	YES	0.54
Clitheroe Knoll Reefs SSSI	117.5	YES	117.5
Cock Wood Gorge SSSI	2.84	YES	2.84
Cockerham Marsh SSSI	9.72	YES	9.72
Coldwell Farm Pasture SSSI	0.82	YES	0.82
Coplow Quarry SSSI	5.23	YES	5.23
Crag Bank SSSI	3.7	YES	3.7
Cringlebarrow and Deepdale SSSI	50.15	YES	50.15
Darwen River Section SSSI	6.35	YES	6.35
Downholland Moss SSSI	21.56	YES	21.56
Eaves Wood SSSI	52.23	YES	52.23
Far Holme Meadow SSSI	1.68	YES	1.68
Field Head Meadow SSSI	3.33	YES	3.33
Gait Barrows SSSI	69.75	YES	69.75
Gale Clough and Shooterslee Wood SSSI	9.37	YES	9.37
Harper Clough and Smalley Delph Quarries SSSI	2.9	YES	2.9
Hawes Water SSSI	89.39	YES	89.39
Heysham Moss SSSI	12.74	YES	12.74
Hodder River Section SSSI	7.01	YES	7.01
Hodge Clough SSSI	2.95	YES	2.95
Jack Scout SSSI	6.74	YES	6.74
Langcliff Cross Meadow SSSI	5.27	YES	5.27
Leck Beck Head Catchment Area SSSI	691.87	NO	424.31
Lee Quarry SSSI	49.13	YES	49.13
Leighton Moss SSSI	131.62	YES	131.62
Light Clough SSSI	0.49	YES	0.49
Little Mearley Clough SSSI	5.87	YES	5.87
Lower Red Lees Pasture SSSI	4.02	YES	4.02
Lune Estuary SSSI	7632.83	YES	7632.83

Lytham Coastal Changes SSSI	24.86	YES	24.86
Lytham St. Anne's Dunes SSSI	24.66	YES	24.66
Martin Mere, Burscough SSSI	119.75	YES	119.75
Marton Mere, Blackpool SSSI	39.51	YES	39.51
Mere Sands Wood SSSI	42.98	YES	42.98
Morecambe Bay SSSI	26042.99	NO	5738.22
Myttons Meadows SSSI	10.09	YES	10.09
New Ing Meadow SSSI	2.1	YES	2.1
Newton Marsh SSSI	66.01	YES	66.01
Ravenhead Brickworks SSSI	22.09	YES	22.09
Red Scar and Tun Brook Woods SSSI	63.62	YES	63.62
Ribble Estuary SSSI	9348.7	NO	6808.09
Robert Hall Moor SSSI	19.73	YES	19.73
Roeburndale Woods SSSI	41.68	YES	41.68
Rough Hey Wood SSSI	6.18	YES	6.18
Salthill and Bellmanpark Quarries SSSI	17.64	YES	17.64
Silverdale Golf Course SSSI	0.64	YES	0.64
South Pennine Moors SSSI	20944.5	NO	2876.45
Standridge Farm Pasture SSSI	4.35	YES	4.35
Tarnbrook Meadows SSSI	11.8	YES	11.8
Thrang End and Yealand Hall Allotment SSSI	51.48	YES	51.48
Thrang Wood SSSI	4.77	YES	4.77
Thwaite House Moss SSSI	7.25	YES	7.25
Trowbarrow Quarry SSSI	7.46	YES	7.46
Warton Crag SSSI	73.01	YES	73.01
West Pennine Moors SSSI	7615.49	NO	6851.22
White Moss SSSI	10.21	YES	10.21
Winmarleigh Moss SSSI	89.57	YES	89.57
Wrightington Bar Pasture SSSI	1.28	YES	1.28
Wyre Estuary SSSI	1481.79	YES	1481.79
Hale Moss Caves	22.3765	NO	0.07
Middlebarrow	18.1154	NO	0.00001
Whernside	3856.134	NO	0.02

Appendix Four: Carbon Storage and Sequestration by Habitat[84]

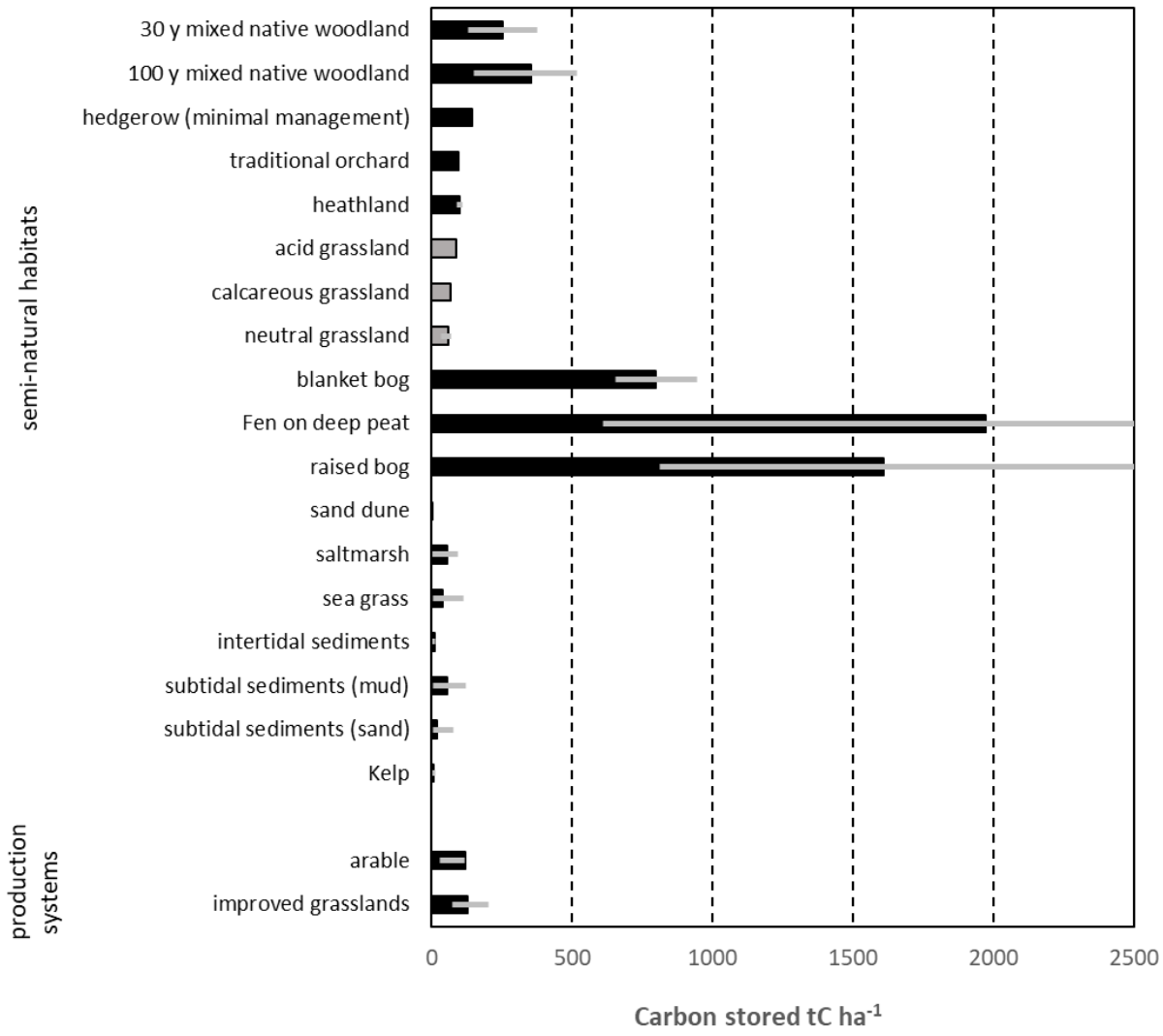


Figure 1: Carbon storage in contrasting habitats and land managements, using the best available data. Note that the semi-natural grasslands data are from the top 15 cm of soil only are shown in grey. Other habitats (shown in black) vary in their depths from 15 cm to 380 cm. Blanket bog carbon stocks are based on catchment scale estimates. Fen data here are restricted to deep semi-natural fens.

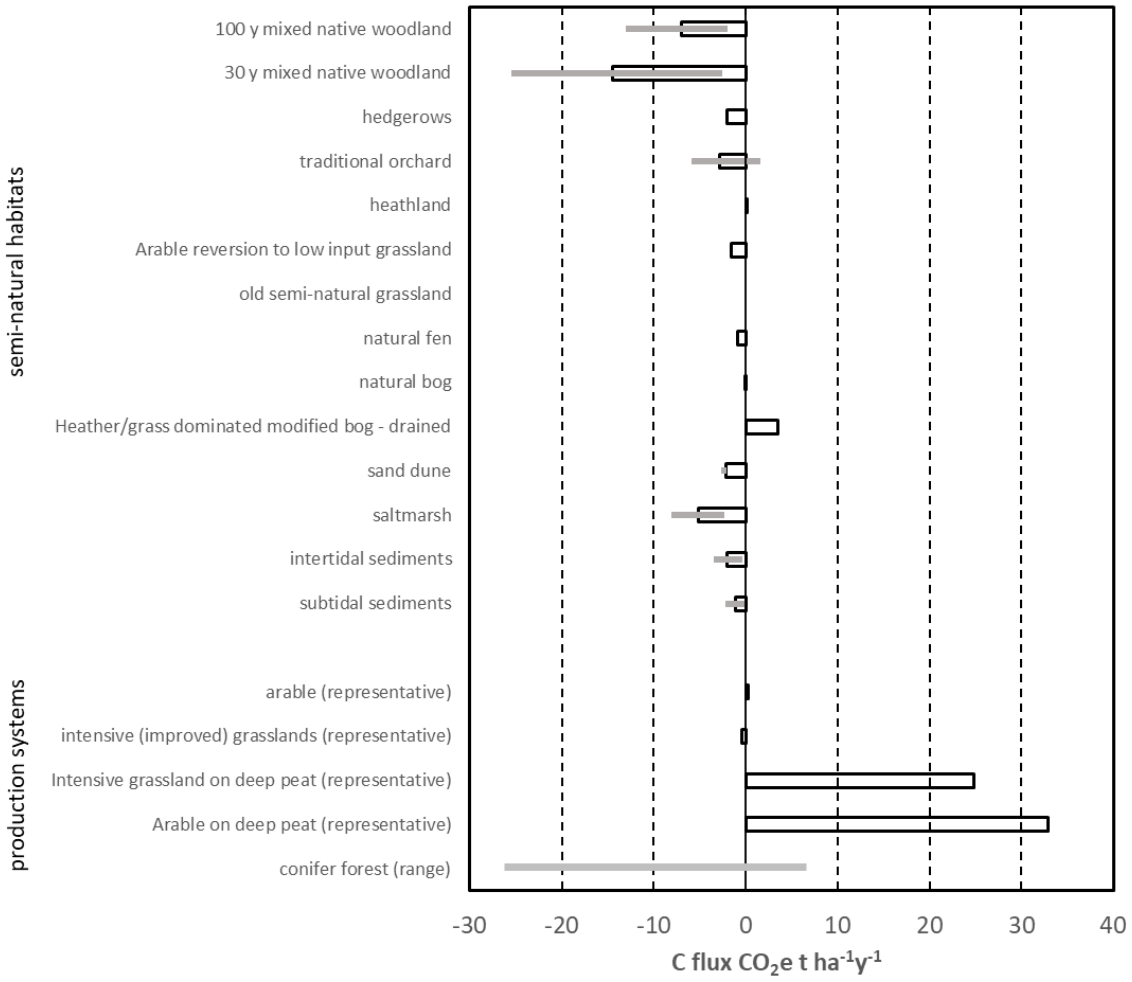


Figure 2: Carbon flux in contrasting habitats and land managements, using representative data. Best available data have been used and includes data from a wide range of different sources, modelled and field data. A negative value indicates sequestration; positive values are emissions. The grey bars indicate the likely range of values across sites where this is available. Habitats with no suitable data are not included.

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