photo credit – Iain Robson

Local Nature Recovery Strategy for the North of Tyne

North East Combined Authority | Kim McGuinness North East Mayor

Newcastle City Council

North Tyneside Council

Northumberland County Council

Northumberland National Park

NATURAL ENGLAND

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Acknowledgements

We would like to thank everybody who has taken part in helping create this strategy. Local people, volunteers, community groups, experts in your field, farmers, and managers of land and sea – thank you.

The River South Tyne near Eals - Photo credit David Feige

Chapter 1

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Introduction

Nature Recovery

Nature recovery is the name given to actions which protect and enhance our natural environment, particularly through expanding, connecting, and improving the condition of areas of wildlife habitat. Such actions help wildlife to grow, move, thrive, and adapt to a changing climate, and bring a range of additional benefits to society such as improved soil health, improved water quality, and natural flood defence.

King Edwards Bay, Tynemouth – Photo credit North East Combined Authority

What is a Local Nature Recovery Strategy (LNRS)?

England is widely considered to be one of the most nature-depleted countries in the world following historic and ongoing declines. The scale of recent declines was documented in The State of Nature Report published in 2023. Headline figures for these losses contained in the report include:

Wildlife abundance in England has declined by 32% since 1970.

Of the 8,840 species assessed, 13% are threatened with extinction.

The distribution of over half of all plant species has decreased since the 1970s.

Farmland birds have declined by 61%, and woodland birds by 37% since 1970.

The UK Government has made legally binding commitments to end wildlife declines and for nature recovery. To meet these ambitions targeted, co-ordinated and collaborative action will be required.

Local Nature Recovery Strategies (LNRSs) are part of the Government's approach to addressing wildlife declines.

They are a system of spatial strategies for nature and environmental improvement required by law under the Environment Act 2021. Each strategy must:

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

The LNRS for the North of Tyne is one of 48 strategies being developed across England. Together these form a national Nature Recovery Network (NRN).

The main purpose of these strategies is to identify locations to create or improve habitat most likely to provide the greatest benefit for nature and the wider environment. The strategies do not force the owners and managers of the land identified to make any changes. Instead, the Government is encouraging action through, for example, opportunities for funding and investment.

The Environment Act 2021 also establishes two mechanisms to support the delivery of local nature recovery strategies: mandatory biodiversity net gain and a strengthened biodiversity duty on public authorities.

As such, the strategies will identify where action to achieve net gain will have the most impact and encourage action in these locations through the way net gain is calculated. All public authorities will also have to have regard to relevant local nature recovery strategies under the strengthened biodiversity duty. As part of this, local planning authorities will have to have regard to these strategies as part of the local planning process.

Responsible Authorities (RAs)

The Secretary of State for the Environment, Food and Rural Affairs appointed 48 Responsible Authorities (RAs) to lead on preparing a LNRS for their area in 2023. Together these 48 strategy areas cover the whole of England with no gaps or overlaps.

Within North East England, and within the geography covered by the North East Combined Authority (North East CA), three strategy areas were established as follows:

- **North of Tyne** – Covering the local authority areas of Newcastle, North Tyneside, and Northumberland. This is the only LNRS of which the North East CA is the RA, with Northumberland County Council commissioned to facilitate and lead the preparation of the LNRS.
- **Durham** – Covering the local authority area of Durham only, with Durham County Council identified as the RA.
- **South of Tyne & Wear** – covering the local authority areas of Gateshead, South Tyneside, and Sunderland, with Gateshead Council identified as the RA.

Whilst the three processes will adopt an approach specific to that locality, every effort will be made to apply consistent approaches to such things as data analysis and mapping, as well as sharing good practice on consultation and engagement. As LNRSs move into delivery phases, the North East CA will support and convene efforts to drive nature recovery across all three LNRS areas.

Responsible Authorities must review and republish their strategies as part of an ongoing cycle which considers what has been achieved and proposes what further work is needed for nature to recover.

The stages in this cycle are:

- **Prepare** - agree priorities, identify 'potential measures' (actions for achieving them) and map suitable locations for carrying them out.
- **Publish** - finalise the strategy and make it available.
- **Take action** - local partners work together with landowners and managers to create and enhance habitat for nature and environment and take other biodiversity-positive actions.
- **Review** - recognise what actions have been delivered, including those not identified in the current strategy.
- **Update** - revisit priorities, potential measures, and suitable locations, to reflect progress and changing circumstances to ensure the strategy remains relevant and ambitious
- **Republish** - finalise the updated strategy and make it available

Responsible Authorities should contribute to the delivery of their strategy as well as leading its preparation. However, they are not solely responsible for delivering the strategy. This should be a shared effort with public, private, and voluntary sector partners all playing a role.

Upland hay meadows - Photo credit Northumberland National Park Authority

Box 1 - Responsible Authorities

How can the LNRS be used?

The LNRS is a tool which can drive collaborative action and investment for nature and help to monitor progress over time. It is intended to be of use by everyone, from individuals through to organisations, community groups and statutory bodies to inform decision making and identify actions which can have the most important impact of natural environment in the North of Tyne area.

It is intended that the LNRS will contribute to national environmental objectives such as the protection of 30% of land and sea for nature and the development of the national Nature Recovery Network ("30 by 30"). At a more local level it can be used by Local Planning Authorities and government organisations to inform other spatial plans such as Local Development Frameworks or the Management Plans for National Parks and National Landscapes. Public Bodies can also use the LNRS to inform their statutory duties for the protection of biodiversity.

Walkers on Hadrian's Wall

Priorities vs Opportunities

Opportunities for nature recovery exist over the whole of the North of Tyne. These opportunities can be large or small and undertaken at a range of scales. As a strategic document, the focus of this LNRS is on opportunities which are the highest immediate **priority** to delivery nature recovery and address current threats to nature. These priorities are reflected in the measures contained in subsequent chapters, and on the map, where possible.

Opportunities outside of these priorities can also be taken. All appropriate nature recovery action is valuable and contributes towards a thriving natural environment. Opportunities outside of priority areas are addressed in Chapters 8 and 10.

Box 2 - Priorities vs Opportunities

The following list outlines examples of how different sectors might use the Local Nature Recovery Strategy.

Public Bodies

Can use the Strategy to:

- Support their delivery of the Biodiversity Duty contained in the Environment Act 2021
- As a guide to opportunities for habitat creation and enhancement on public estates (e.g. schools, hospitals, highways)
- To inform work with authorities, landowners, and communities to support joined-up delivery and share expertise
- Target grants and budgets to measures identified in LNRS
- Inform the development of their own plans, strategies or management plans.

Local Authorities

Can use the Strategy to:

- Inform the evidence base for Local Development Plans and documents
- Inform planning, land management, and infrastructure decisions
- Integrate environmental benefits into spatial planning
- Direct funding and developer contributions towards delivery of LNRS measures
- Support their delivery of the Biodiversity Duty contained in the Environment Act 2021.

Landowners and land managers, including woodland managers and foresters

Can use the Strategy to:

- Understand how their land might contribute towards nature recovery in the North of Tyne
- Inform decisions they make about their land, for example about habitat creation or restoration options or entering into agri-environment schemes – or planning ahead for these decisions with their family and neighbouring farmers
- Inform and support applications for funding and delivery of projects on their land
- If the land isn't immediately part of the map, consider the "pop up" suggestions on the wider countryside mapping layer for ideas of what sort of actions might be best to consider in that area
- If important habitats or species are missing from the thinking, work with us to remedy that for the next LNRS.

Local people

Can use the Strategy to:

- Gain more information about what the nature recovery priorities are in their local area and in the North of Tyne as a whole
- Understand what they can do to take action that benefits nature
- Get involved in habitat restoration, wildlife surveys, and volunteer activities
- Consider the "pop up" suggestions on the wider countryside mapping layer for ideas of what sort of actions might be best to consider in your area. We all have a role to play to help nature – even gardening for nature or a window box can help.
- If important habitats or species are missing from the thinking, work with us to remedy that for the next LNRS

Community groups

Can use the Strategy to:

- Gain information about how their local natural environment fits within the overall priorities for nature recovery in the North of Tyne
- Prompt discussion about the types of actions they would like to see carried out in their local community
- Support applications for funding and delivery of projects
- Consider the "pop up" suggestions on the wider countryside mapping layer for ideas of what sort of actions might be best to consider in your area. We all have a role to play to help nature – even gardening for nature or a window box can help
- If important habitats or species are missing from the thinking, work with us to remedy that for the next LNRS.

Environmental charities

Can use the Strategy to:

- Target funding and investment towards delivery of priority nature recovery outcomes
- Build collaborative projects and coordinated action
- Inform their priorities and actions
- Work with and engage communities, businesses, local authorities and landowners.

Investors in green initiatives, developers and builders

Can use the Strategy to:

- Use the information to understand where the nature priorities are in the North of Tyne – referring to the written measures as well as the map.
- Be aware of the areas on the map if you are looking for a location to establish a habitat bank for biodiversity net gain
- Send in your habitat surveys and species records to the Environmental Records Information Centre North East (ERIC North East)
- Stay in touch with us as we develop a pipeline of investible projects as we transition to delivery.

Box 3 - Some indications on how different groups might use the LNRS

What is the LNRS not intended to be used for?

The focus of the LNRS is on the recovery of important habitats and species. It is not intended to a be land-use strategy, such as a local development framework or local forestry strategy, or a wider environmental strategy, although it can be used to inform the development of such documents.

The LNRS is not prescriptive. It does not:

- Require land managers or owners to make any changes to land use
- Place new restrictions on development
- Propose new nature reserves or any other kind of legal designation
- Prevent nature conservation work in areas not prioritised by the LNRS

It is important to stress these points. The LNRS process does not mandate protection, nor does it have the power to require any changes in management by landowners or land manager. Any work to create or restore habitat must still following appropriate existing decision-making frameworks, consultation, permissions, permits or licences.

Creeping buttercup flower - Photo credit Iain Robson

The relationship between the LNRS and biodiversity net gain (BNG)

Where habitat creation or enhancement is being undertaken to enable developers to deliver biodiversity net gain (which is a new mandatory requirement for some types of development under the Town and Country Planning Act), the relationship between this work and LNRS priorities is important. It is reflected in the 'Strategic Significance' element of the biodiversity metric.

Habitat creation or enhancement interventions that fall within a proposed measure on the LNRS map and which will help to deliver a measure included in the LNRS to deliver that priority can be recorded in the metric as having a "high strategic significance". The biodiversity metric will then apply a multiplier of 1.15 to the value of that intervention, in recognition of the fact that the action is helping to deliver an LNRS priority. All other interventions are recorded as being of low strategic significance, including those that are within a Strategic Recovery Areas but not a proposed measure.

The 'Suggested opportunities in the wider countryside' on the map are just suggestions and so are not LNRS measures. Consequently, BNG habitat creation or enhancement that accords with those opportunities does not qualify as having high strategic significance.

How the LNRS has been produced

The Department for Environment, Food and Rural Affairs (Defra) have produced statutory guidance and regulations setting out how responsible authorities should go about producing Local Nature Recovery Strategies for their area.

This guidance breaks down the LNRS process into a four main steps:

Map designated sites and irreplaceable habitats;

Describe the area and opportunities for nature;

Identify potential measures;

Map areas that could become important for biodiversity.

Step 1 of the guidance involves mapping "Areas of Particular Importance for Biodiversity", which may also be called APIBs. In our LNRS, we call this map, "Designated sites and irreplaceable habitats", or "stage 1".

The stage 1 mapping can be viewed online:

- StoryMap Designated sites and irreplaceable habitats
- Web Map Experience LNRS stage 1 map: Areas of particular importance for biodiversity (designated sites and irreplaceable habitat)
- Overall StoryMap collection LNRS StoryMap Collection

Step 5 of the guidance involves mapping "Areas that could become of particular importance", or ACIBs. In our LNRS, we call this map "Measures", or "stage 5".

The stage 5 mapping can be viewed online:

- Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity

More information is in Chapter 11: Mapping and in a separate technical appendix.

1 Local nature recovery strategy: what to include - GOV.UK

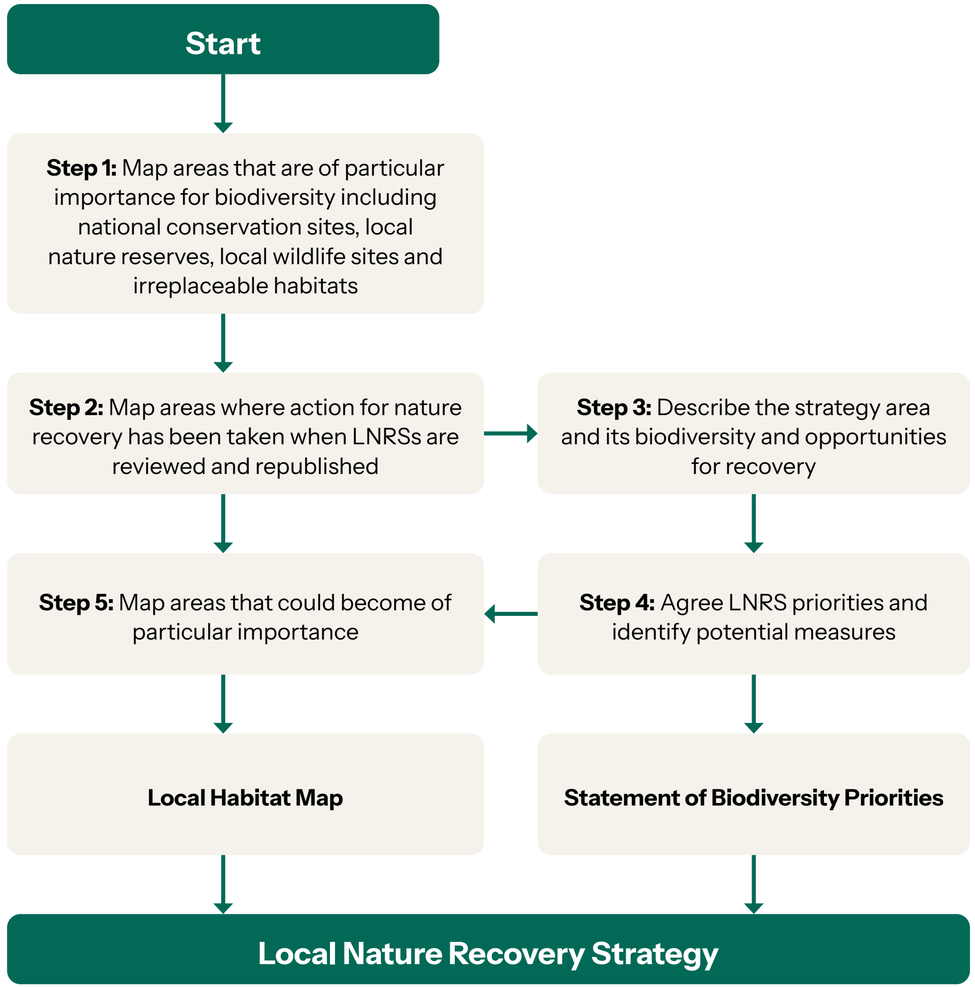


Figure 1 - The key steps in the production of an LNRS, taken from page 8 of the Statutory Guidance published by Defra in March 2023[1]

Who was involved in the production of the LNRS?

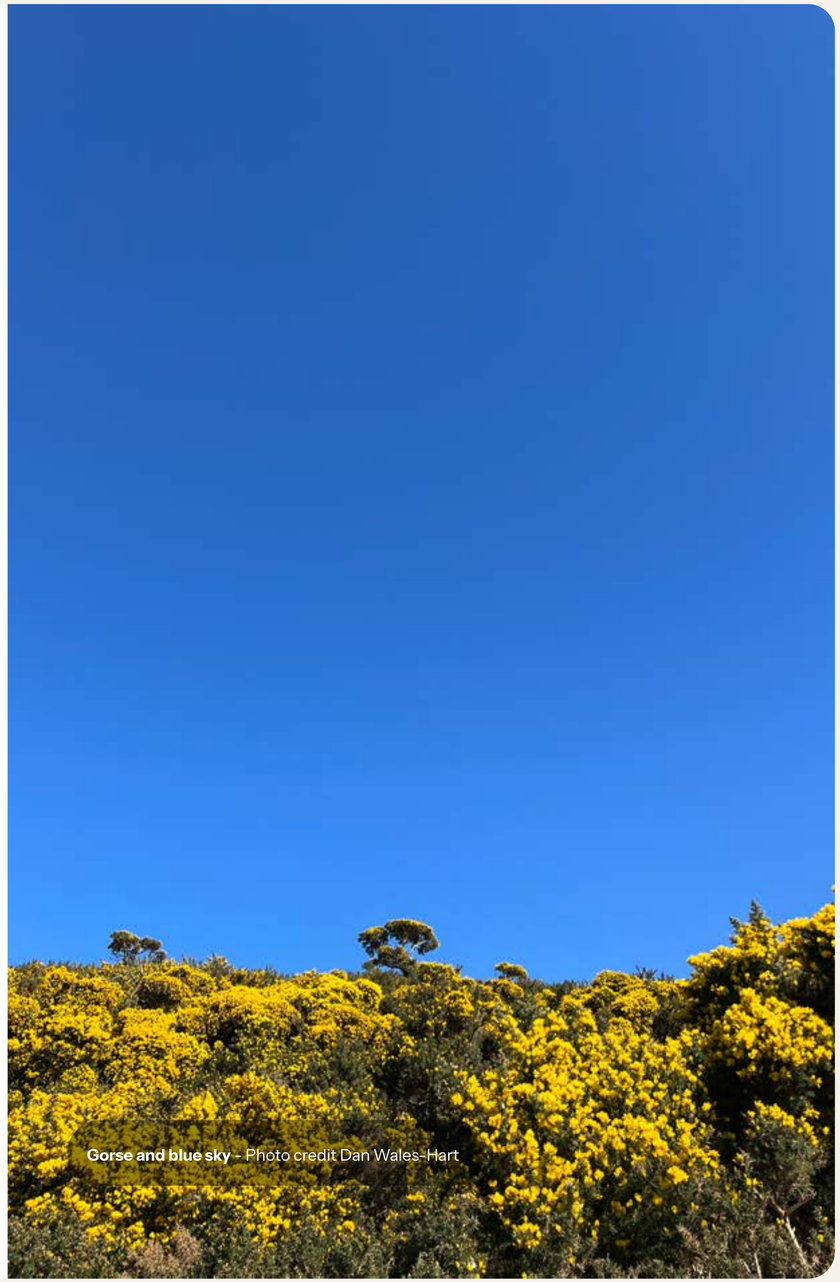
The draft LNRS has been co-produced by a range of organisations. The North East Combined Authority (North East CA) has been designated as the Responsible Authority for the North of Tyne LNRS, with Northumberland County Council delegated to lead on the process on their behalf. The production of the draft LNRS was overseen through the work of a dedicated Steering Group made up of representatives from:

England Coast Path at Bamburgh – Photo credit Iain Robson

- North East Combined Authority
- Northumberland County Council
- North Tyneside Council
- Newcastle City Council
- Northumberland National Park Authority
- North Pennines National Landscape
- Northumberland Coast National Landscape
- Natural England
- Environment Agency
- Forestry Commission
- Northumberland Wildlife Trust
- Environmental Records Information Centre North East
- Berwickshire and Northumberland Marine Nature Partnership

This Steering Group met regularly and where required establish task and finish groups to deliver certain activities.

Additional technical insight from local specialist groups or individuals was sought through the creation of an expert Reference Forum. This forum was engaged to validate the content of the draft Biodiversity Statement, and to take part in five separate habitat-themed workshops to identify priorities and measures.



Gorse and blue sky – Photo credit Dan Wales-Hart

Public engagement: a conversation about nature recovery

We divided the North of Tyne into seven “conversation” areas which collective covered all of our geography:

- North of Tyne Lowlands
- North Northumberland Coast
- Cheviot Fringe
- Mid Northumberland and the Tyne Gap
- North Pennines
- Border Uplands
- Coastal and Marine

A brochure was produced for each conversation area highlighting some of the key features presents and highlighting potential issues and opportunities. The aim of the brochures was to make people aware that the LNRS was being produced and provide contact opportunities to contribute their views about local priorities and potential actions.

Open discussions were facilitated with all those with an interest in the land, the sea, and their local area through a series of local public events branded as “landscape-scale conversations” held to discuss the LNRS process and gather views about local priorities and issues. The brochures were made available at these meetings as conversation prompts. Throughout all the above, the input and co-design was invaluable and much appreciated.

The draft LNRS was also subject to a full public consultation from Friday 14 November 2025 to Friday 9 January 2026. The response to the considerable feedback received prompted several detailed changes to the text of the Strategy to clarify the meaning or improve the accuracy of the document.

Beadnell Bay

Engagement with farmers and land managers

During August and September 2024, we ran a survey for farmers and land managers. A standard questionnaire was used to gather information about their views on nature recovery, current activity, issues and barriers, and priorities. We promoted the surveys / questionnaire, with our partners, at various events, shows, and farmer meetings. Subsequent follow up phone interviews were held with some of the responders to further explore ideas from the survey in greater detail, and to add context and understanding about their perspectives.

During 2025, additional interviews were held with representatives of stakeholder bodies representing farming, land owning, and forestry interests. Many of the useful insights collected during this work, and subsequent consultations, have shaped the LNRS.

Farmer and sheep dog on quad bike - Photo credit Northumberland National Park Authority

Principles for nature recovery

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

Support landowners and managers

Nature recovery activity should support, and work in partnership with landowners and land managers.

The right habitat in the right place

It is important to proposals for habitat creation or restoration do not take place to the detriment of other existing wildlife-rich habitats or species. The most beneficial actions that can be taken in each place should be chosen, favouring habitats and species which are the highest priorities for action. This may require undertaking site-specific assessment for what works best on the land and advice. Pond creation and tree / scrub establishment are two examples that are particularly important to do the right thing in the right place.

Follow good practice, policy, guidance

All delivery must comply with legal requirements and regulatory policy, and should follow standards, guidance, and good practice. Ensure all necessary permits, licences or permissions are in place when creating and restoring habitats.

Know your site

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

Think long term

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

Be ambitious

Work towards achieving good ecological condition and well-functioning habitats that support an abundance of species.

Build resilience

Consider potential future pressures such as climate change, pests and diseases, and human disturbance, and build in resilience to these.

Maximise multiple benefits

Where possible think about how nature recovery actions can be designed to deliver wider benefits, such as improving health and wellbeing, capturing carbon, reducing wildfire risk and flood risk.

Consider access

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

Involve residents and communities

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

Monitor success

Monitoring is critical to understanding the success of nature recovery actions.

Share knowledge

Any species or habitat data collected as part of action for nature recovery should be shared with The Environmental Records Information Centre North East. Sharing any lessons learnt from nature recovery activity through available networks can help others when planning their own work in future.

Box 4 - Principles for Nature Recovery

Chapter 2

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The North of Tyne Area and Our Approach to Nature Recovery

Overview of the North of Tyne

The North of Tyne region, encompassing Northumberland, Newcastle upon Tyne, and North Tyneside, covers an area of 528,242 ha. The landscapes found within the area are incredibly diverse and range from town and city centres in Tyneside, through intertidal mudflats on the north Northumberland coast, to remote upland hills and bogs. This is diversity of landscape and land-use is reflected in the range of habitats, and associated species, dealt with in this LNRS. The area can be is broadly a region of split into two halves: a low-lying coastal plain in the east extending up some of the larger river valleys, and an upland chain of generally rolling hills to the west.

The uplands to the west of the North of Tyne, and the lower lying but still characteristically upland Sandstone Hills are dominated by heathland and peatland habitats as well as swathes of upland acid grassland and forestry plantation. The dales of our upland areas are important locations for traditionally managed hay meadow habitat. The Northumberland National Park and the North Pennines National Landscape can be found in this area. Another significant presence is Kielder Forest, the largest area of planted productive forestry in England. Overall, tree cover in Northumberland is over 18%[2] - although the ecological value of woodland depends on structure, age diversity, edge quality, and integration with neighbouring habitats – not simply on area.

Northumberland's uplands contain some of the UK's best peatland habitat in areas such as the Border Mires. Few lowland peatland sites remain, but highly altered remnants exist at Prestwick Carr and at several locations in north Northumberland.

The valleys in the North Pennines, and those of the North Tyne and Coquet, are important for their remaining species-rich hay meadow habitat. Lowland equivalents are restricted to a few small relicts scattered across the region.

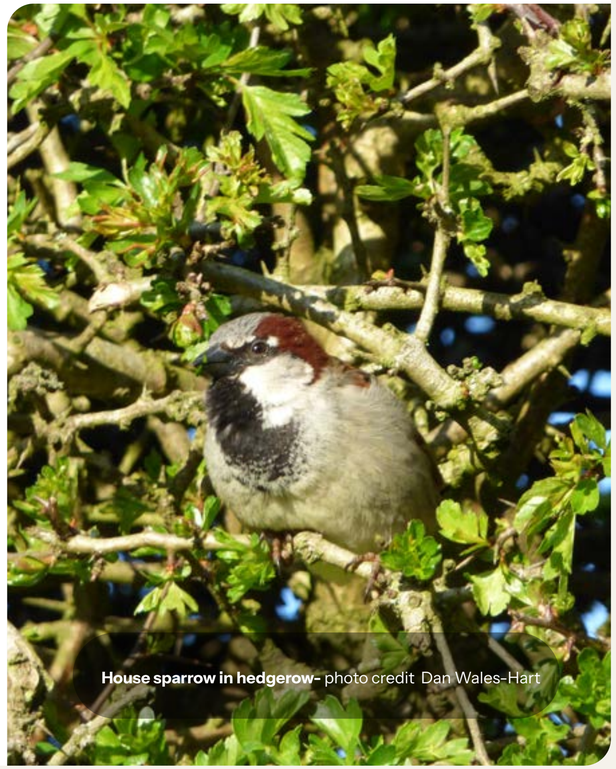
The North of Tyne is transversed by several important river catchments including those of the Tyne, Wansbeck, Blyth, Coquet, Aln, and Tweed. These river valleys support most of our remaining examples of ancient woodland as well as a range of associated wetland and grassland habitats. Upland broadleaved woodland is largely restricted to river valleys and small areas within the forested landscape, including newly planted zones. The river valleys of the Coquet, Wansbeck and Blyth are the main remains of this habitat in more lowland districts. Important fragments also remain in the deep denes leading to the Tyne in Newcastle. Overall, Ancient Woodland accounts for just 1% of the area, while Northumberland contains the largest area of planted productive forestry in England.

An important feature of the natural environment of North of Tyne, spanning both upland and lowland areas, is the Great Whin Sill. This geological feature is a quartz-dolomite extrusion which is runs in a band through the North of Tyne area from Hadrian's Wall and on the north Northumberland coast. As well as shaping some of our most distinctive landscapes, the Whin Sill is also an important wildlife habitat due the distinctive assemblage of plant species which it supports and the sea-cliff habitat it provides when outcropping on the coast.

The lower lying parts of the North of Tyne are largely dominated by arable fields and permanent pasture together with some semi-natural habitats, many of which are relicts of formerly larger areas. Field boundaries are made up of hedgerows (often gappy or fragmented) and post-and-wire fences. Parts of the lowlands, particularly in the south of the area, were formerly subjected to open cast mining. The restoration of these areas has often resulted in simple, relatively featureless agricultural land with strips of broad-leaved or conifer plantation. The impacts of former mining activity can be seen in the ongoing development of pond due to subsidence. These subsidence ponds are an important part of our lowland landscape.

Our urban and urban edge areas retain many important wildlife habitats including examples of peatland, wetland, grassland, ancient woodland and estuaries. Important brownfield sites occur in the southeast of the region, often the result of reclamation and restoration of former colliery sites. These areas can be important for species-rich grassland habitat as well as associated species such as dingy skipper butterfly and bee orchid.

The coast is characterised by areas of rocky shore interspaced with wide sandy bays. Dune complexes, intertidal areas and estuaries provide valuable wildlife habitat. Offshore the Farne Islands and Coquet Island support internationally important seabird breeding colonies which area reliant on healthy marine areas to provide food for themselves and their chicks.



House sparrow in hedgerow- photo credit Dan Wales-Hart

2 National Forest Inventory

The North of Tyne contains 11 specific National Character Areas (NCAs), five of which lie wholly within our area.

These are[3]:

- Border Moors and Forests
- Cheviots
- Cheviot Fringe
- North Northumberland Coastal Plain – part
- Northumberland Sandstone Hills
- Mid Northumberland
- Tyne Gap and Hadrian's Wall – part
- North Pennines – part
- South East Northumberland Coastal Plain
- Tyne and Wear Lowlands – part
- Durham Coalfield Pennine Fringe – part

Each NCA is defined by a combination of landscape, biodiversity, geodiversity, history and cultural and economic characteristics which have shaped the landscape over time.

Significant areas of land within the North of Tyne have statutory designations in place to recognise their importance for wildlife or geology.

Also present are a number of irreplaceable habitats[4] (as defined by the UK Government). For the North of Tyne these are ancient woodland, ancient and veteran trees, blanket bog, limestone pavement, coastal sand dunes, certain types of saltmarsh, and lowland fen.

3 These can be viewed on the National Character Areas map Natural England - National Character Area Profiles - National Character Area Profiles

4 As defined by Irreplaceable habitats and BNG: what you need to know – Environment

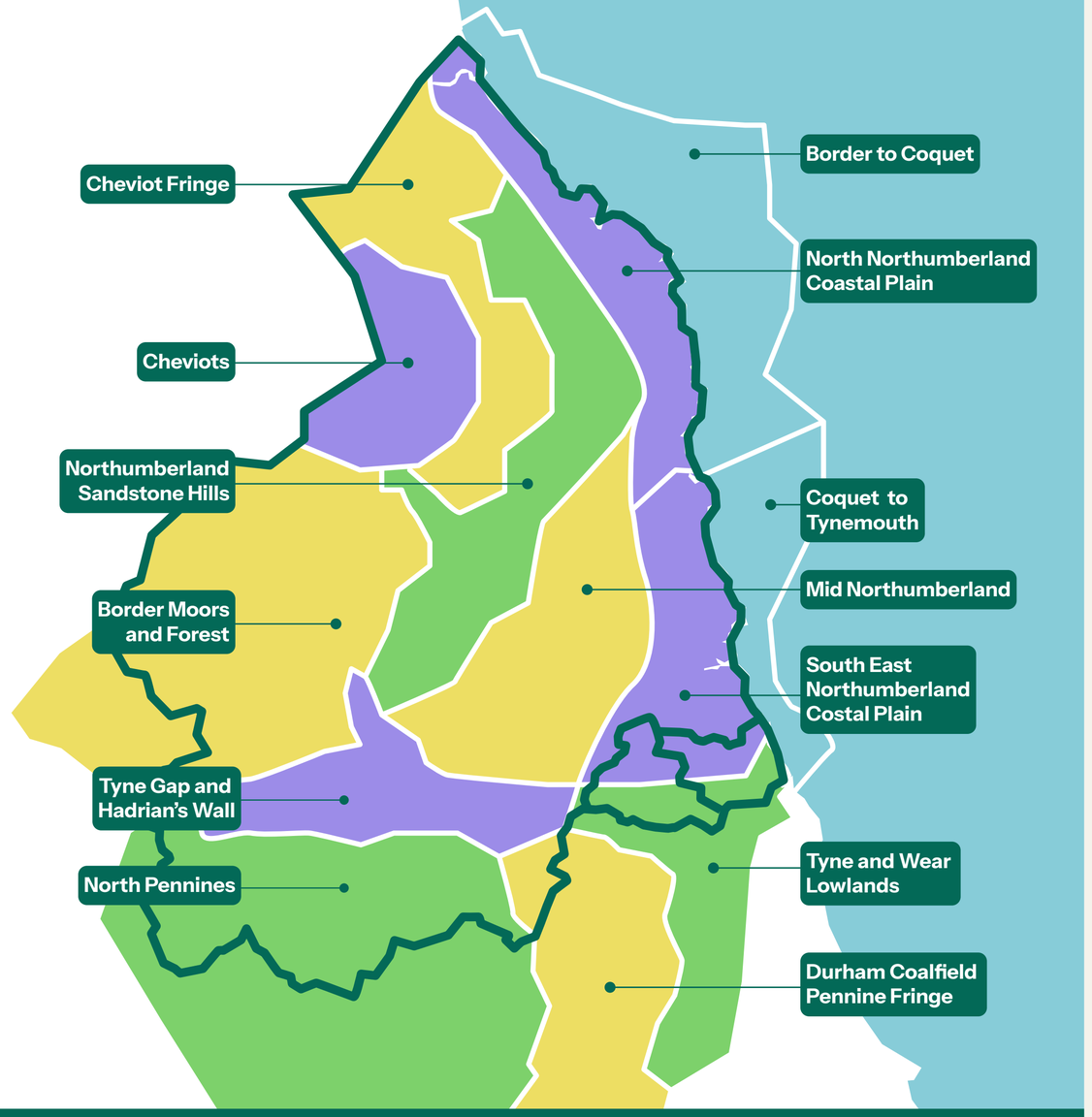


Figure 2 - Map of National Character Areas in the North of Tyne, and the additional marine areas

The North of Tyne contains:

14
Special Areas of Conservation (SAC), ten of which occur entirely within the boundary of the North of Tyne

7
Special Protection Areas (SPA), five of which occur entirely within the boundary of the North of Tyne

4
Ramsar Sites (wetlands of international importance), two of which occur entirely within the boundary of the North of Tyne

119
Sites of Special Scientific Interest (SSSI)

9
National Nature Reserves (NNR)

37
Local Nature Reserves (LNRs)

3
Marine Conservation Zones (MCZs)

263
Local Sites

Primrose, Etal - Dan Wales-Hart

The stage 1 mapping of designated and irreplaceable habitat can be viewed in Map 1 (page 139) or online. The mapping includes options to view the NCA mapping.

- StoryMap Designated sites, irreplaceable and priority habitats
- Web Map Experience LNRS stage 1 map: Areas of particular importance for biodiversity (designated sites and irreplaceable habitat)
- Overall StoryMap collection LNRS StoryMap Collection

Species

Species of particular importance within North of Tyne include:

Roseate Terns nesting on Coquet Island – the only breeding colony in the UK;

Freshwater Pearl Mussels on the Rede and North Tyne;

White-Clawed Crayfish in the Wansbeck – the UK's largest remaining population of the species;

Large Heath Butterfly on peatlands – two thirds of the known English and Welsh sites for the species occur in our area;

One of England's last strongholds for the Red Squirrel, and Pine Marten have colonised the west via the Scottish Borders

Newcastle contains an important nesting site for Black-legged Kittiwake, part of the furthest inland colony in the world, and a notable addition to our urban wildlife

The region is important in the English context for the populations of Coralroot orchid and Lindisfarne helleborine;

Some of the most important populations of breeding waders in England are found on rushy pastures in West Northumberland, including Curlew, Lapwing and Redshank;

Our local rivers are important for species such as Otter and fish species such as Lampreys, Salmon, and Trout.

Species are mentioned in more detail in each habitat chapter. The species long list and North of Tyne area, including marine, can be found on the Environmental Records Information Centre website[5] and on the Northumberland County Council website[6].

There are published criteria for which species we can consider. These are outlined in our "technical consultation" which can be downloaded (from the link in the footnote). In summary, we are restricted to native species which are on the IUCN Red List as Threatened (or there is evidence to show they meet the criteria) or Near-Threatened. Any conservation translocation must align with the Reintroductions Codes for England[7].

Our approach to considering species has been to take a habitat-led approach, and then to consider which species are not covered by that approach.

5 https://ericnortheast.org.uk/lnrs/
6 https://www.northumberland.gov.uk/economy-and-regeneration/projects-and-programmes/rural-growth-and-innovation/local-nature-recovery#technical-consultation
7 Reintroductions and other conservation translocations: code and guidance

Redshank – Photo credit Richard Willis

The benefits of Nature Recovery to the people of the North of Tyne

Nature is important in its own right but also provides important benefits to people in the North of Tyne area. These include:

- Improved water quality
- Reduced levels of pollutants in the air
- Reduced soil erosion
- Healthier soils
- Food production and food security
- Natural flood defence
- Carbon storage
- Improved climate change resilience and adaptation
- Cooling of urban spaces
- Opportunities for green jobs and jobs in land management
- Physical and mental health benefits
- Opportunities for recreation and quiet enjoyment

Pressures on nature

The important habitats and species of the North of Tyne are under a wide range of pressures which have contributed to their decline. These are discussed in greater detail in the individual habitat chapters found later in this document (Chapters 4 to 8) but can be broadly summarised as:

Climate change

Current climate change scenarios predict that by 2100, temperatures could increase by up to 40°C, and sea levels could rise by up to one metre when compared to 1900 baseline data. Likely impacts of this include changes in rainfall patterns and increases in extreme-weather events. These will provide multiple new pressures across a whole range of our habitats and species.

Rising temperatures will increase the vulnerability of species (particularly the species which are adapted to cool conditions), and is likely to lead to changes in the species composition of habitats. Drier, warmer, summers will increase risks of wildfires while wetland and water depended habitats and species will be impacted on by changes in the volume and seasonality of rainfall.

Climate change may also reduce the ability of our natural environment to provide us with benefits such as carbon storage - by reducing the area and sustainability of peat-forming bog systems. Sea-level rises will put additional pressure on coastal habitats particularly the habitats which find themselves squeezed between a rising sea on one side and hard infrastructure on the other.

"I have a sinking feeling that within ten years the environment will have changed so much that a lot of the actions will need to address different issues"

Angus Lunn, in response to consultation

Changing land use

Land-based industries such as agriculture and forestry are an important part of the economic and cultural fabric of the North of Tyne. Many of our most important habitats and species rely on traditional land management practices to keep their ecological condition. For example, many types of grassland rely on grazing or cutting management and low nutrient inputs. Changes to land management practices, such as the loss of grazing systems or intensification of management, can lead to the loss or decline of important wildlife areas. Development is also a potential source of loss or damage to wildlife areas either through direct losses, habitat fragmentation, or indirect impacts on adjacent land.

Human pressures

It is rare for people to intentionally harm wildlife - but unintentional harm to our natural environment is an increasing issue in the North of Tyne. Many of these pressures result from human disturbance to wildlife especially during recreational activity such as dog walking, or through inappropriate access to sensitive locations. Indirect human pressures on wildlife can also arise from pollution to air and water, and through the spread of invasive non-native species. Recent years have seen an increased understanding about the impacts of artificial lighting on wildlife ("light pollution"). Impacts from light pollution can include changes in the feeding, nesting and roosting behaviours of species, which can impact negatively on their populations and distribution. Light pollution can also fragment the habitats which nocturnal species are dependent on for survival. The impacts are not just insects, but also trees, mammals, amphibians, birds, and marine species.[8]

Pathogens and Invasive Non-native Species

Invasive non-native species (INNS) are considered to be one of the greatest threats to biodiversity globally. Within the North of Tyne area, we have seen the impacts they can have on some of our most iconic wildlife, for example through the declines in native Red Squirrel populations through the introduction of the American Grey Squirrel. Invasive species also threaten the condition of some of our most important habitats, including rivers and wetlands and dune grassland. In recent years we have also seen the devastating impacts that the spread of new pathogens can have on nature, for example through the spread of Highly Pathogenic Avian Influenza ("bird flu") among seabird colonies, or the impacts of Ash Dieback on our trees and hedgerows.

8 Light Pollution ~ Impacts Beyond Invertebrates - Buglife

Chapter 3

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Peatlands and Heathlands

What is included in this section and definitions

Heathlands

Definition: Heathlands are found on acidic, impoverished, dry sandy or wet peaty soils. Their vegetation is characterised by the presence of dwarf-shrubs species such as heather, bell-heather and bilberry. Heathlands can be found in upland and lowland locations and in wet or dry conditions.

Bogs

Definition: Bogs are areas of peatland which are fed exclusively by rainwater and where peat depths are greater than 30cm. Characteristic bog species include Sphagnum mosses, cottongrasses, heather, cross-leaved heath and deergrass. Bogs in the North of Tyne area can be found in upland and in lowland locations. This definition includes both bogs which are still actively producing peat and areas of deep peat which are not currently 'active'.

Fens

Definition: Fens are areas of peatland which are fed by both ground water and rainwater. They can occur in several different situations and the vegetation found is strongly influenced by local landform, underlying soils and geology, and on the direction of water movement. The vegetation of some fens can be very similar to that found in true bogs, while other examples of fen habitat may be dominated by tall plants. The definition of fen encompasses a wide variety of different vegetation types. This section of the LNRS deals only with fen habitats which are accumulating peat. Other types of fen are dealt within the Freshwater habitats section of this document.

Blanket Bog – Photo credit North Pennines National Landscape

Waterfall in the Cheviots – Photo credit Dan Wales-Hart

What is not included in this section

The type of swamp and marsh communities called tall-herb fens are not peat-forming and so are dealt with in the Freshwater Habitats section of this Local Nature Recovery Strategy.

Interactions with other habitats

Areas of bog are often found in a mosaic with areas of wet and dry heathlands and acidic or wet grasslands. Areas of marsh or fens can often be found at the margins of bogs where water movement occurs. Peatlands and heathlands usually occur as part of a wider landscape mosaic of bog, heathland, grasslands, flushes, fens, springs, open water and woodland/scrub.

Why Peatlands and Heathlands are Important (including wider environmental benefits)

The UK holds an important proportion of the total global peatland and heathland resource. These habitats support a wide variety of plants and animals including some specialist species who cannot make their home elsewhere. The extent of peatlands and heathlands in England is believed to have declined significantly in extent over the last 200 years with, for example, losses in heathland since the 1940s estimated to be more than 20%. These losses have been accompanied by declines in the quality of the remaining areas.

Peatlands and heathlands are under pressure because of both historic and current management. These include past drainage of peatlands, which has led to degradation and drying, past tree planting on deep peat, and intensification of agricultural or sporting management. These pressures have led to a loss of diversity of vegetation age, structural and plant composition on which many species rely. Some peatlands have suffered from past peat extraction, while lowland heaths have been lost to historic agricultural intensification with those that remain are often threatened by lack of active management. Climate change is also likely to bring significant pressures on these habitats due to changes in rainfall patterns/ hydrology and increased risks of wildfire.

Peatlands and heathlands together form an important cultural landscape that contribute towards the visitor economy and provide land for recreation and agriculture. Peat deposits can also be of great historic importance as they can preserve archaeological information such as pollen records or historic remains, allowing us to interpret past land use.

Peatlands and heathlands help to hold water and provide a natural flood defence function for areas downstream. Much of our drinking water passes through upland peat soils and deep peat can filter and retain atmospheric pollutants. In contrast, eroding peat can release sediment and dissolved carbon into water course and result in large costs to water companies. Peatlands are the largest natural carbon store in the world and globally store more carbon than all other vegetation types combined. Damaged peatlands are a source of anthropogenic CO_2, making peatland under restoration an important tool for reducing greenhouse gas emissions.

Heather in the Cheviots – Photo credit Dan Wales-Hart

Sphagnum moss - photo credit Raul Kozenevsk

Future Resilience

Our examples of bog habitat rely on water from rainfall to maintain their hydrology and to create the conditions needed for continued peat formation. As such they are potentially vulnerable to any future changes in rainfall patterns and to increases in rates of evapotranspiration due to higher temperatures. Areas of bog which have been degraded (for example by drainage, colonisation by trees or scrub, burning or visitor pressure) are thought to be more vulnerable to future climate change pressures.

Future resilience can therefore be increased through measures to increase the condition and quality of these habitats. Areas of heathland are similarly vulnerable to changes in rainfall patterns and to increased temperatures. In addition, there are a wide range of potential indirect impacts from climate change which could place additional pressures on our peatlands and heathlands. These include increased risks from wildfires, increased recreational pressures, and potential changes to the economics of upland agricultural or shooting management resulting in changes to land use management.

The Resource within the North of Tyne Area

The peatlands and heathlands in the North of Tyne area are recognised as being of international importance for the nature they support. They cover extensive tracts of land in our uplands, where they help to define the protected landscapes of the North Pennines National Landscape and the Northumberland National Park, but also form part of the mosaic of natural areas found in our lowlands.

Much of our peatland is made up of upland blanket bog – large extents of peat covering undulating ground – but a wide variety of different bog types are present, including significant raised mires within Kielder Forest and at lowland locations such as Ford Moss and Holburn Moss and at Prestwick Carr on the outskirts of Newcastle. Important areas of fen peat can be found at locations such as Caw Lough on the Roman Wall, Newham Fen on the North Northumberland coastal plain and at Prestwick Carr. Heathlands are found across much of our uplands, although important areas of lowland heath persist at locations such as Longhorsley Moor. In total, the North of Tyne contains over 48,500ha of heathland (around 17% of the English total) and 41,600ha of blanket bog (around 12% of the English total). In addition, the North of Tyne area contains approximately 2,400ha of raised bog in upland and lowland situations.

Examples of Current Activity to Conserve and Enhance these Habitats

The Border Mires

A group of 58 peat bogs in and around Kielder Forest on the Northumberland and Cumbria border. The Border Mires peatland restoration project is one of the earliest and longest-running projects of its kind in the country, having a 50-year history. The large-scale project, which to date has brought some 2,000 hectares of peatlands under restoration across the Border Mires around Kielder Forest, has cleared conifer plantations, blocked thousands of agricultural ditches and created 130 wader pools to help rare birds such as curlew to return to the area. Further work will see some of the mire margins restored including lagg areas and margins with native broadleaves. The effect of these areas on Kielder is to create a patchwork of open and wooded habitats which contribute hugely towards ecosystem structural diversity.

Whitelee Moor National Nature Reserve

Owned by Northumberland Wildlife Trust (NWT), is one of Britain's most important upland nature reserves. It's a site of European conservation importance due to its active blanket bog and heather heaths. A large part of the reserve is rare blanket bog, which is home to a variety of plants including sphagnum mosses, cloudberry, bog asphodel and cotton grasses.

NWT are currently carrying out extensive peat restoration work, reshaping peat cliffs and installing thousands of dams to heal eroding peat channels, whilst providing ideal conditions for countless invertebrates, amphibians and birds. The repairs will hold vast quantities of water on the hill, slowly releasing this water over drier periods, and preventing sediment from entering the river Rede and Catcleugh reservoir.

Benshaw Moor

A large site (258 ha) comprised of blanket bog with recorded peat depths of up to 4.5m, marshy grassland, acid flushes, transition mire and a mosaic of heathland and acid grassland. Self-seeded sitka has been removed, drains have been blocked, and a rewilding approach is being taken across the site, supported by suitable levels of grazing with ponies.

One of the largest peat restoration projects currently happening (486ha) is being delivered by the **Northumberland Peat Partnership** on The Wou. This work includes blocking of grips by peat dams and wave dams, and using mineral dams to rewet paleochannels.

Cinnabar moth on Ragwort – Photo credit Iain Robson

Juniper haircap moss - Photo credit Jonas Buijs

Priorities

PH 1: The size, condition, and quality of healthy functioning peatland is increased

Peatlands cannot be created within any reasonable timescales or with any certainty, and so looking after the existing resource is especially important. Overwhelmingly that means reversing the drainage that people historically carried out with the original aim of improving the quality of grazing. The scale of this task in the North of Tyne area is daunting, but the processes for doing this are well understood, and the Northumberland Peat Partnership (operating north of the A69) and the North Pennines National Landscape Peat Partnership (operating south of the A69) have teams that are surveying peatland sites and planning the restoration work[9] required. The North Pennines National Landscape Partnership has been undertaking his work for some time and at impressive scale.

Forestry England and the wider Border Mires Partnership have also been restoring peatlands within the southern part of Kielder Forest. This complex of peatlands called the Border Mires is one of the most important peatland systems in England, because of the range of types of peatland contained within a relatively small area, and the quality of many of the sites, including peat depth.

Extensive areas of productive forestry in the North of Tyne area are planted on deep peat. Such planting wouldn't be undertaken today because the importance of peatlands for biodiversity, carbon sequestration and water management is much better understood than it was a few decades ago. To help make appropriate decisions about when such forestry crops should be replanted after harvesting or when peatlands should be restored instead, the Forestry Commission and Natural England have produced a Decision Support Framework for Peatland Protection, **the Establishment of New Woodland and Re-establishment of Existing Woodland on Peatland in England**.[10] The LNRS supports the restoration of peat habitats on low-yield woodlands on deep peat as a general principle.

Fens tend to be much smaller than bogs and often occur in complex mosaics with wet grassland, marsh, open water and wet woodland habitats, and so are easily overlooked. However, they are very important habitats, supporting a range of plant and invertebrate species largely or wholly confined to them. The extent and location of fens in the North of Tyne area is poorly understood, and so it is important that our knowledge of them is improved through survey work and then they are protected and managed appropriately.

The designation of important habitats as Local Wildlife Sites and where possible Sites of Special Scientific Interest is addressed in the section of the LNRS on generic measures. However, it is important to note here that there are extensive areas of high-quality peatlands in the North of Tyne area which have no protective designation. This is especially the case in the Sandstone Hill s are bordering the eastern edge of Northumberland National Park.

PH 2: The linkage between mires and their hydrological units is restored and improved

The area surrounding a peat basin which drains into that basin is described as its hydrological unit, and the management of this land significantly influences the heath of the peatland itself. Accordingly, it is important the management of the hydrological unit as a whole is considered when restoring and managing peatlands, with the blocking of drains and avoidance of tree planting also being important within these areas.

9 Undertaking peatland restoration work doesn't lead to "restored peat", but to peat that is "under restoration". The final desired outcome of a restored, functioning wet peatland habitat is likely to take decades or even centuries to achieve, and may involve more than one cycle of restoration work – as the site is monitored / evaluated / new methods become good practice.

10 July_2023_Decision_support_framework_for_peatland_protection_V4.docx

PH 3: The condition and quality of heathland and heathland mosaic habitats is increased

A clear priority for heathlands - identified through the consultation and habitat workshops process - concerns the complexity of heathland vegetation and its interaction with other habitats, such as scrub and woodland. Extensive areas of upland heathland are managed for grouse, which involves the rotational burning or cutting of the heathland to ensure the plentiful supply of young heather shoots for the grouse to eat, and to control heather beetle, an invertebrate that can defoliate large areas of heather.

However, this results in extensive areas of the uplands in the North of Tyne area comprising a massively simplified plant community dominated by young heather. The lack of older, more open heather and the absence of complex mosaics of heathland, scrub, and woodland significantly diminish the ecological value of upland heathland. There is also the almost total absence of a habitat which is familiar enough further north in Scotland – wooded heathland. This comprises forms a very open canopy of upland tree and scrub species, such as downy birch, rowan, and bird cherry, with an understorey of heather, bilberry, crowberry and other berry species, and heathland grasses. There can also be complex and valuable moss, liverwort, and lichen communities. The formal condition assessment process for upland heathland SSSIs allows for SSSI compartments with up to 20% cover of scattered trees and shrubs to be assessed as being in good condition.

Increasing the amount of vegetation within upland heathlands needs to be considered in terms of potential fire risk. Heather species and purple moor-grass burn easily and fiercely, and so any increase in the amount of vegetation potentially increases the fuel available to a wildfire, making it more intense and harder to control. Conversely, blocking drains on both peatland and heathland increases the amount of time that soils are wet if not saturated, and much of the vegetation comprising that would make up the potentially increased fuel load would comprise include deciduous tree and scrub species that are not flammable when alive because of their high moisture content. However, it is vital that wildfires are planned for, especially given the dry springs and increasing temperatures being experienced during dry spells due to climate change. Wildfire mitigation plans and wildfire response plans should be developed in associate with the Northumberland Wildfire Group, Northumberland Fire and Rescue Service and major landowners.

Non-native gamebirds, such as pheasants and French partridges, are released in large numbers each year for shooting. Large concentrations of these birds have a range of ecological effects. Their predation of reptiles, such as adder, is a concern, and their impact on invertebrate food sources may also be so. The birds themselves, and the food put out for them, support species such as carrion crow, which in turn can be a threat to important breeding wader populations. While the release of gamebirds within 500m of Special Protection Areas (sites of international importance for birds) requires licensing by Natural England, this does not extend to other important wildlife sites, or areas beyond 500m of SPAs.

Coir rolls, Knarsdale - Photo credit North Pennines National Landscape

Therefore, it is important that a voluntary code relating to release numbers and the siting of release pens and feeding areas for non-native game birds is developed. At a minimum this should include following best practice guidance published by the Game and Wildlife Conservation Trust (GWCT), which includes avoiding placing release pens in or close to sensitive locations including those that have notable reptile populations, and which would therefore include heathland and peatland.

Although not widespread, the illegal persecution of birds of prey continues and remains a serious threat, especially to the recovery of hen harrier populations[11]. It is important that landowners and conservation bodies continue to work with Northumbria Police to tackle this issue.

11 Patterns of satellite tagged hen harrier disappearances suggest widespread illegal killing on British grouse moors | Nature Communications

PH 4: The extent and patch size of heathland and heathland mosaic habitats is increased

In areas of the uplands, sheep grazing has been intense enough to cause the degradation of heathland to species-poor acid grassland, dominated by unpalatable species, such as mat-grass. Where possible, such areas should be restored to heathland and mosaics of heathland, scrub, and native woodland.

Curlew – Photo credit Brian Rafferty

PH 5: Ecological connectivity between peatland, heathland and other habitats that have a functional relationship with them is increased

As discussed above, intensive management for grouse can have a range of impacts on heathland and peatland both in terms of the quality of the habitats themselves and their interaction with other upland habitats, especially native woodland and scrub. Where sympathetic management across neighbouring estates allows, the opportunity should be taken to work at the landscape scale to develop the full range of peatland, heathland, scrub, woodland, and wetland habitats. The arc of land within the ownership of Hepple, Rothbury, and Wallington estates included in the Mid Northumberland Strategic Recovery Area, and the land within the Kielderhead Strategic Recovery Area offers very important opportunities for this. More information about Strategic Recovery Areas can be found in Chapter 10.

Green hairstreak, found on heaths and bogs where bilberry is present - Photo credit David Feige

Map

You can see where measures have been chosen for inclusion on our map of areas that could become of particular importance for biodiversity by looking at our map:

- **Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity**

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

Only some of the measures were mappable, and even then, only perhaps in part (e.g. for part of the area or for part of the measure as it is written).

Where measures could be applied widely across large areas, statutory guidance requires that we prioritise what is included on the map according to certain criteria, as set out in the mapping chapter (Chapter 11: Mapping).

It should be remembered that any actions that deliver against the measures as they are written, will count as contributing to the delivery of the LNRS. Written measures – both mapped and unmapped – represent our highest priorities.

Mappable

Measures that have been included in our map are shown with this green icon of a map at the left-hand side. Further explanation of the link between the measures and the map layers is in Chapter 11: Mapping.

Not mappable

Not all measures can be spatially mapped, but all remain strategic priorities. Measures that are not mappable are shown with the grey icon of a map at the left-hand side.

Measures

The measures required to achieve the five priorities identified for peatlands and heathlands are set out below:

Priority PH1: The size, condition and quality of healthy functioning peatland is increased

PH 1.1	Restore and maintain hydrological conditions which enable drained peat to re wet e.g., through grip and gully blocking.
PH 1.2	Restore peat forming vegetation through revegetation with Sphagnum moss, cottongrasses and other appropriate vegetation.
PH 1.3	Stabilise areas of active peat erosion, including those associated with footpaths and tracks.
PH 1.4	Avoid further development of tracks and other man-made structures on peatland other than those essential for management purposes and remove where possible.
PH 1.5	Restore peatland by removing woodland planted on deep peat, guided by the Forestry Commission and Natural England Decision Support Framework[12] concerning the planting establishment of new woodland and the re-establishment of existing woodland on peatland, fieldwork, and discussions with land managers.[13]
PH 1.6	Remove self-seeded conifers and birch scrub from peatland before it reaches seeding/coning age, other than birch on shallow peat where development of wet woodland is appropriate.
PH 1.7	Ensure that appropriate grazing and stock management regimes are in place to maintain or improving the condition and diversity of peatlands.
PH 1.8	Increase the extent of peatland that has management regimes in place that create structural diversity, including vegetation of varying heights and ages.
PH 1.9	Identify and locate all valley mires and fens to protect or reinstate natural hydrology and water quality, including by managing nutrient run-off from adjacent land.
PH 1.10	Implement measures to reduce airborne nutrients from farming and industry which lead to vegetation changes on peatland habitats, including through Ammonia regulations, voluntary codes, education campaigns, enforcement, planning policy, and guidance.

12 Decision support framework for peatland protection, the establishment of new woodland and re-establishment of existing woodland on peatland in England - GOV.UK

13 It has only been possible to map this measure on the public forest estate. Elsewhere, the Forest to Bog tool could apply. The LNRS supports the restoration of peat habitats on low-yield woodlands on deep peat as a general principle.

Priority PH 2: The linkage between mires and their hydrological units is restored and improved

PH 2.1	Restore and maintain suitable hydrological conditions to enable drained peat to rewet e.g., through grip and gully blocking, and water level management in the whole hydrological unit.
PH 2.2	Restructure or remove woodland planted within the hydrological units of important peatlands, guided by the Forestry Commission and Natural England Decision Support Framework concerning the planting of woodland on peatland.

Priority PH 3: The condition and quality of heathland and heathland mosaic habitats is increased

PH 3.1	Ensure that appropriate grazing and stock management regimes are in place to maintain or improving the condition and diversity of upland and lowland heathlands.
PH3.2	Increase the extent of heathland that has management regimes in place that create structural diversity, including vegetation of varying heights and ages with areas of bare ground and retention of wetter areas through the blocking of drainage ditches.
PH 3.3	Manage scrub, bracken, and coarse vegetation to create mosaics with areas of heathland, and increase recognition of the importance of wooded heathland in suitable locations.
PH 3.4	Control invasive non-native species such as Rhododendron, Gaultheria, and pirri-pirri bur, and manage sitka spruce to prevent establishment outside of productive forestry areas.
PH 3.5	Develop wildfire mitigation plans and wildfire response plans in association with Northumberland Wildfire Group, including wildfire ponds in high-risk locations.
PH 3.6	Develop a voluntary code relating to release numbers and siting of release pens and feeding areas for non-native game birds. At minimum this should include following Game and Wildlife Conservation Trust (GWCT) best practice guidance, which includes avoiding placing release pens in or close to sensitive locations such as ancient semi-natural woodland, important adder sites or any biological SSSI.
PH 3.7	Continue to take action to tackle the illegal persecution of birds of prey on grouse moors and identify ways to increase its effectiveness.

Priority PH 4: The extent and patch size of heathland and heathland mosaic habitats is increased

PH 4.1	Identify and restore degraded examples of heathland.
PH 4.2	Restore dwarf-shrub cover on areas of grass moorland that previously supported heathland vegetation through appropriate management, especially in areas adjacent to good quality heathland and peatland habitats.

Priority PH 5: Ecological connectivity between peatland, heathland and other habitats that have a functional relationship with them is increased

PH 5.1	Target habitat creation and restoration to create functional linkages and stepping-stones between habitats with the aim of increasing landscape permeability.
PH 5.2	Work at a landscape-scale to ensure that the species found on heathlands and peatlands have access to the appropriate mosaic of habitats they require to meet their requirements for all life stages and dispersal needs.
PH 5.3	Manage peatlands as part of a wider mosaic of wetlands and related habitats within the landscape, especially in lowland areas.

Associated Species

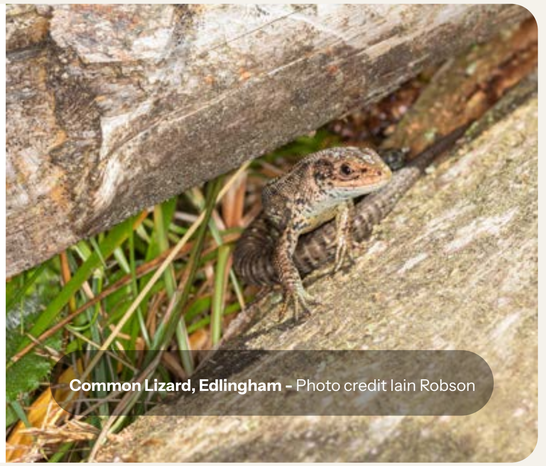
Birds

Several key bird species are strongly associated with the area's peatlands and heathlands. Wading birds such as Curlew and Lapwing will use areas of heathland and peatland as part of the wider habitat mosaic which they utilise throughout the year, while Golden Plover nests in nationally significant numbers on open vegetation on upland peat or heathland. Wading birds rely on many different habitat types (from upland to coastal) throughout the year and their requirements are dealt with in more detail as part of Chapter 5 on important grasslands. Raptors such as Merlin and Hen Harrier use open upland heathland and peatland habitats for nesting and feeding, and Black Grouse relies on a mosaic of upland habitats including heather moorland, grassland, and open woodland or scrub. Individual species of bird often have distinct preferences for requirements for different ages or heights of vegetation. A key aspect of ensuring the conservation of birds is therefor to ensure a diverse habitat structure across the whole landscape. The recovery of birds of peatlands and heathlands will be supported through delivery of measures to increase the size, and improve the condition and quality of peatlands and heathlands (priorities **PH 1, PH 3** and **PH 4**) and by measures to improve the functional connectivity between peatlands and heathlands and other habitats (**PH 5**). Black Grouse will also benefit from measures outlined in Chapter 7 to increase woodland and scrub in upland ghylls.

Black grouse displaying - Photo credit Brain Rafferty

Reptiles

Peatlands and heathlands are the most important habitats for the North of Tyne's adder populations. This is a rapidly declining species in England and is a conservation priority.



Common Lizard, Edlingham - Photo credit Iain Robson

Large heath butterfly, about 70% of the English and Welsh population of this peatland species occurs in Northumberland - Photo credit David Feige

Common cotton grass - Photo credit David Feige

Insects

The Large Heath Butterfly is confined to areas of bog and wet heath containing hare's-tail cotton-grass and cross-leaved heath. Northumberland is believed to hold nearly three-quarters of the known English and Welsh populations of the species. Mountain Bumblebee is a cold-loving species which was once widespread across northern and western Britain but whose numbers have declined nationally in recent years. It is particularly associated with upland moorland, with the flowers of Bilberry forming an important source of nectar. The measures outlined in this Strategy to increase the size and improve the condition and quality of peatlands and heathlands (priorities **PH 1, PH 3** and **PH 4**) will all be of benefit to insects and other invertebrates.

Flowering plants

Some specialist plants are associated with the peatlands and heathlands of the North of Tyne area. The most notable of these is Dwarf Birch, a prostrate shrub associated with blanket bog. The plant is extremely rare in the UK with Northumberland holding three of the five known English sites for the species. Bog Orchid is present on a small number of peatland sites within Northumberland while Bog Rosemary is found on many of the raised bogs which make up the Border Mires and was historically present at Prestwick Carr in the North of Newcastle. These plants, and other peatland species, will benefit from measures to improve the condition and quality of peatlands (priorities **PH 1** and **PH 2**).

Chapter 4

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Important Grasslands and Breeding Waders

What is included in this section and definitions

Unimproved neutral grassland (meadows and pastures)

Definition: This habitat consists of a range of rich-mixture grasses and broad-leaved flowering plants which has developed on soils which are neither strongly acid nor strongly lime-rich. Examples can be found on agricultural land, slopes, woodland edges and road verges amongst other places. They occur in both lowland and upland areas and usually have received little or no inputs from inorganic fertilisers. This definition does not include species-poor neutral grasslands (which typically have less than about ten species per m^2), such as sites dominated by false oat-grass.

Upland hay meadow

Definition: Upland hay meadows are a specific type of neutral grassland. They have formed as a result of traditional, non-intensive, hay meadow management in upland areas typified by high rainfall, cool temperatures and a short growing season. As a result, the mixture of species they contain is more closely related to that found in Scandinavia than lowland Britain. Characteristic plant species of upland hay meadows include wood crane's-bill, lady's mantles, and globeflower. Wetter examples may include marsh marigold. Most remaining areas are still managed as traditional hay meadows, but examples can also be found which are unmanaged or managed by grazing.

Limestone grassland

Definition: Grassland which have developed on lime-rich soils. They contain a diversity of lime-loving plant species such as thyme, quaking grass and hoary plantain.

Whin Grassland and other species-rich acid grasslands, such as sites on Cheviot andesite

Definition: The Great Whin Sill is a geological feature (a quartz-dolerite extrusion) which is runs in a band through the North of Tyne area from Hadrian's Wall and on the north Northumberland coast. Whin grassland is a term used to describe the vegetation which have developed over the thin, drought-prone, alkaline soils on these exposures. These harsh conditions have led to the development of grasslands containing a unique mixture of plant species which includes several local rarities - for example a rare species of lady's mantle. Grasslands on neutral to basic andesite soils can support important grasslands with species such as thyme, rockrose and maiden pink.

Barrowburn Hay Meadow - Photo credit Shaun Hackett

Open mosaic habitat- Photo credit Dan Wales-Hart

Purple moor-grass and rush pasture

Definition: Moist grasslands where vegetation is dominated by purple moor-grass and/or or tall rushes such as sharp-flowered rush. Other common species found in this habitat include marsh thistle and devil's-bit scabious. The definition of purple moor-grass and rush pastures includes species-rich areas of fen meadow as well as relatively species-poor areas of rushy pasture. Our priority within this are examples that are botanically diverse, or which are used by important invertebrates (such as small pearl-bordered fritillary), or which are of importance to wetland birds.

Calaminarian grassland

Definition: Grasslands which have developed over soils contaminated by heavy metals such as Lead, Cadmium and Zinc. These develop a distinct flora, which can include species such as sea thrift, alpine pennycress, spring sandwort, dune helleborine, and mountain pansy, – as well as nationally rare lichens. These plants are metal-tolerant, and some are called metallophytes - they are adapted to the conditions.

Open mosaic habitat (OMH) on previously developed land

Definition: An open mosaic habitat is an area where there is a patchwork (mosaic) of unvegetated, or very sparsely covered, areas interspersed with patches which are more densely vegetated. The vegetation present can include a mixture of grassland, scrub and wetland areas. This mosaic provides areas which are rich in wildlife. To meet the definition of Open Mosaic Habitat on previously developed land this mixture of habitats must occur in locations where there is a known history of disturbance, or where there is evidence that the soil has been removed or modified by previous uses, and must be of at least 0.25ha in size.

Waxcap grasslands

Definition: An area of grassland which supports a high number and/or a high diversity of grassland fungi such as waxcaps, earth tongues, or coral and club fungi. These grasslands typically long established, with a short sward and are low in nutrients. Examples can be found in pastures and meadows on acidic, neutral, or calcareous soils, and may show a low diversity of flowering plants.

Newcastle Helix - Photo credit James Common

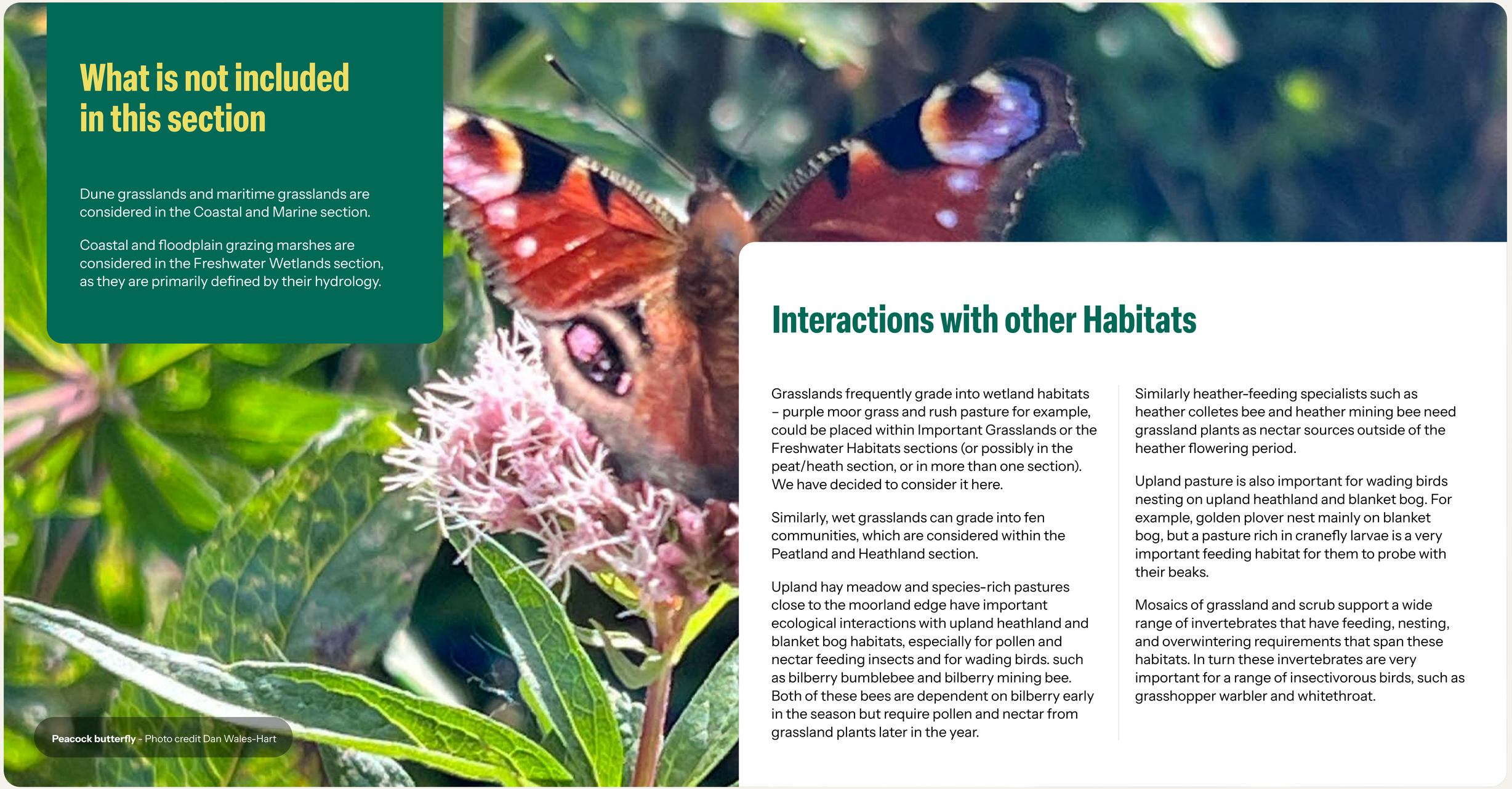
Crimson waxcap - Photo credit Shaun Hackett

Dark Green Fritillary, Druridge Bay - Photo credit Iain Robson

What is not included in this section

Dune grasslands and maritime grasslands are considered in the Coastal and Marine section.

Coastal and floodplain grazing marshes are considered in the Freshwater Wetlands section, as they are primarily defined by their hydrology.



Peacock butterfly - Photo credit Dan Wales-Hart

Interactions with other Habitats

Grasslands frequently grade into wetland habitats – purple moor grass and rush pasture for example, could be placed within Important Grasslands or the Freshwater Habitats sections (or possibly in the peat/heath section, or in more than one section). We have decided to consider it here.

Similarly, wet grasslands can grade into fen communities, which are considered within the Peatland and Heathland section.

Upland hay meadow and species-rich pastures close to the moorland edge have important ecological interactions with upland heathland and blanket bog habitats, especially for pollen and nectar feeding insects and for wading birds. such as bilberry bumblebee and bilberry mining bee. Both of these bees are dependent on bilberry early in the season but require pollen and nectar from grassland plants later in the year.

Similarly heather-feeding specialists such as heather colletes bee and heather mining bee need grassland plants as nectar sources outside of the heather flowering period.

Upland pasture is also important for wading birds nesting on upland heathland and blanket bog. For example, golden plover nest mainly on blanket bog, but a pasture rich in cranefly larvae is a very important feeding habitat for them to probe with their beaks.

Mosaics of grassland and scrub support a wide range of invertebrates that have feeding, nesting, and overwintering requirements that span these habitats. In turn these invertebrates are very important for a range of insectivorous birds, such as grasshopper warbler and whitethroat.

Meadow species - Photo credit Newcastle City Council

Why Grasslands are Important (including wider environmental benefits)

Grasslands support a rich variety of wildlife including pollinating insects, birds, mammals, plants and fungi. Many different types of grassland exist, some of which are extremely rare nationally or globally due to the specific conditions or the special management that they require to exist. In common with the rest of the UK, our grasslands have seen drastic declines in quality and become smaller and more fragmented over the last 80 years.

These declines largely resulted because of changing land management, agricultural intensification, and through losses due to development. Lack of management on some grasslands remains problem, particularly in lowland and in urban areas.

Northumberland's grasslands have a strong cultural importance through their contribution to landscape quality, particularly in areas such as the North Pennines National Landscape and the Northumberland National Park, and the insights they can offer into traditional or historic land-use practices. They remain an important part of agriculture and food production systems but also provide a range of other benefits to people, for example through the large numbers of pollinating insects they can support, their ability to reduce flood risk by slowing the flow of water into rivers and streams, their positive contribution to water quality from filtering out pollutants and contaminants, and their capacity to sequester and store atmospheric carbon.

Alpine penny-cress - a rare plant of calaminarian grassland- Photo credit David Feige

Future resilience

Future climate change impacts are likely to place additional stress on our important grassland types from impacts such as changes in rainfall patterns and increased risks from invasive species such as bracken. Wet grasslands such as purple moor-grass and rush pasture are likely to be the most heavily impacted of our grassland types and will be vulnerable due to reduced soil moisture during summers months and increased flooding during winter periods, leading to changes in species composition. This in turn is likely to impact on important species, such as wading birds, which make use of wet grasslands. Upland hay meadows may also be vulnerable to changes in species composition with some key plants which are associated with colder upland conditions, such as wood cranesbill, becoming less common.

Our most important grasslands are sensitive to changes in management and so may suffer indirect effects if agricultural operations are affected by changing in growing season or accessibility for agricultural equipment. If future economic, societal or climate change impacts reduce the viability of grassland management this could lead to declines in quality or extent. Alternately, a warmer climate may increase pressure for more intensive management of currently marginal grassland sites. On the edge of urban areas, there may be a need to proactively manage the vegetation between grasslands and residential areas, to mitigate the wildfire risk.

The Resource within North of Tyne

The North of Tyne supports a great diversity of grassland types. Flower-rich meadows and pastures can be found on neutral soils throughout our area on agricultural land but also in locations such as roadside verges, parks, recreational grounds and previously developed land. Among the variety of different kinds of grasslands found in the North of Tyne are grassland types for which are internationally significant (such as upland hay meadows) or which are unique to the area (such as Whin grassland).

The total UK extent of the Upland Hay Meadow is believed to be around 1000ha of which there is an estimated 345ha of upland hay meadow in the North of Tyne area. Within our area, the main concentrations of this habitat can be found in Allendale, Tynedale, and Coquetdale with fragments found elsewhere including on roadside verges and riverbanks.

Meadows and pastures also occur across the lowlands of the North of Tyne in both agricultural and non-agricultural settings. Existing sites are often small and fragmented with notable clusters found in South East Northumberland and the fringes of Newcastle and North Tyneside. Our area contains around 935ha of lowland meadows and pastures compared to an estimate total of 8,400 ha for the whole of England.

Purple moor-grass and rush pasture cover many different types of wet grassland. These can range from botanically rich examples supporting a wide range of flowers and insects, through to areas of rush-dominated pasture with a low diversity of plant-species. However, this latter category can be of importance as feeding and nesting habitat for wading birds. There are an estimated 5,900ha of purple moor-grass and rush pasture in the North of Tyne, although botanically rich examples are thought to make up only a fraction of that.

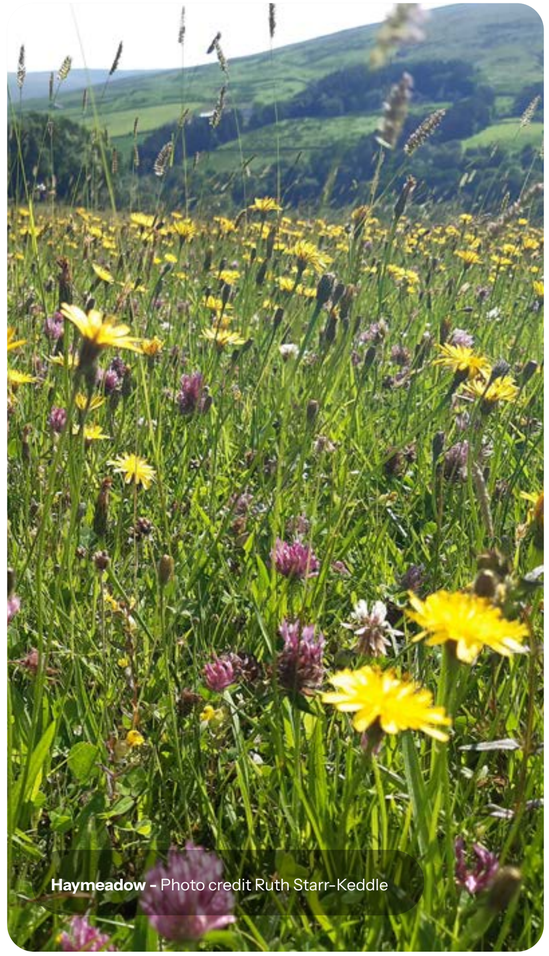
Calcareous grasslands have a limited distribution in the North of Tyne area, but important examples can be found associated with limestone outcrops in the west of Northumberland and in the coastal strip. Our area supports approximately 236ha of calcareous grass compared to around 48,500ha in England as a whole.

A very specialised type of grassland restricted to Northumberland is known as ‘Whin grassland’. This is closely associated with the Great Whin Sill, a quartz-dolerite intrusion, in areas such as Hadrian’s Wall the north Northumberland coast. The thin soils found there are base-rich but nutrient poor and prone to drought, which has led to the development of a species-rich sward with a distinctive flora. There are currently 19 known sites of varied quality which are considered as Whin grassland.

Another distinctive grassland type found in the North of Tyne area is calaminarian grassland This is a scarce and very localised grassland type of high biodiversity value of which, nationally, there is estimated to be only 300ha. Calaminarian grasslands develops on soils contaminated by heavy metal wastes such as lead and zinc and are characterised by plant species which can tolerate toxic metals and low nutrient conditions. Our area has an estimated 42ha of calaminarian grassland of which some of the best examples of which can be found on the river gravels and alluvium of the River Tyne and South Tyne.

Grasslands are an important feature of Open Mosaic Habitat on Previously Developed Land (OMH). Such locations can develop into a mosaic of short grassland, scrub, and bare ground and can be among our most nature-rich sites, capable of supporting a wide range of insects, birds and amphibians. Examples can be found across the North of Tyne but there are concentrations within Newcastle, North Tyneside and South East Northumberland.

Grasslands which have been long established, and which have not received treatment with inorganic fertilisers may support significant communities of fungi such as Waxcaps and Earth-tongues. Such ‘Waxcap Grasslands’ are increasingly rare in the UK, and the North of Tyne is considered to retain some of the most important locations in western Europe. Notable areas for Waxcap Grassland include the Hadrian’s Wall corridor, which has been assessed as being of international significance for grassland fungi.



Haymeadow – Photo credit Ruth Starr-Keddle

Current Activity to Conserve and Enhance these Habitats

A significant amount of activity is already taking place by organisations and by individual land managers to conserve and enhance our important grassland habitats. Here are just a few examples to illustrate the breath of this work:

Grasslands will be restored by Northumberland Wildlife Trust (NWT) at Whitelee Moor National Nature Reserve over the next few years, with a stock free period in summer to allow flowers, especially tall herbs, a longer growing season to flower. Species rich acid grassland, purple moor-grass and rush pasture, and calcareous grassland will be sown with seeds and plug plants added to compliment rarities already found such as pale forget-me-not, a speciality of the border region. The aim is to increase cover of existing plants such as black knapweed, grass-of-Parnassus and wild angelica and introduce plants which would further improve the grassland habitats.

As part of the National Trust's Wilder Wallington project, 15ha of wildflower meadow will be created at Gallows Hill farm.

English Heritage are working with Plantlife to deliver the King's Meadows project, with six meadows being created around their historic monuments at Berwick-upon-Tweed Castle and Ramparts, Dunstanburgh Castle, Etal Castle, Heddon-on-the-Wall – Hadrian's Wall, Norham Castle and Prudhoe Castle.

The Northumberland Coast National Landscape are undertaking restoration of 7ha of whinstone and neutral grassland at Howick Heugh. At Beacon Hill farm 6.5ha of wildflower meadow creation is being carried out together with the establishment of a small pond and wader scrapes.

In North Tyneside management of grassland sites is being undertaken through the planning obligations (known as Section 106 agreements) with developers. These include management for grassland species such as dingy skipper and skylark.

Pyrenean scurvygrass - a rare plant of calaminarian grasslands - Photo credit David Feige

Priorities

IG 1: Important Grasslands are Protected, and their Condition and Quality is Improved

The provision and continuity of suitable management is fundamental to maintaining and improving the condition of important grasslands.

For meadows this comprises a combination of cutting and removing the vegetation to make hay and then grazing it either continuously or at intervals until grazing animals are removed the following spring to allow the hay crop to grow. This aftermath grazing is important, because a combination of grazing and hoofprints prevents a thatch of dead grass building up and breaks open the sward, ensuing that the seed that has fallen before cutting makes contact with the soil. Hooves also create small bare patches where seed can germinate and grow. Pastures in contrast are managed purely by grazing. Although they may not sustain such a high density of wildflowers as a well-managed hay meadow, the fact that they are not cut means that they have a range of important ecological attributes discussed below.

Suitable grazing requires suitable livestock, which for grasslands of high ecological value often means hardy, slow maturing breeds of cattle that will thrive on rougher vegetation, without the need for significant inputs of supplementary feed such as silage through the winter. However, such livestock can be difficult to secure, especially in lowland areas, where faster maturing higher yielding breeds often make more economic sense.

Low nutrient levels are critical to all important grasslands, as high nutrient levels, whether from farmyard manure, inorganic fertiliser or aerial emissions from combustion of fossil fuels, stimulate the growth of fast-growing, robust species of grass and plants such as docks, nettles and thistles, to the detriment of smaller and slower growing species.

There is a concern that extensively managed pasture is undervalued compared to meadow, with most grassland habitat creation schemes comprising hay meadow, with the special qualities of extensively managed pastures being underestimated more generally.

These include:

The higher invertebrate value of grasslands that aren't subject to the sudden and complete removal of so much of the above-ground plant material that results from cutting;

The more varied topography that pastures can support, including the 'lumps and bumps' and patches of bare ground that are so valuable to other creatures, including invertebrates;

The vitally important invertebrate community supported by an ongoing supply of livestock dung (as long as this is free of insecticides such as Ivermectin), and the insectivorous bird, mammal etc. communities supported by dung;

The complex mosaics that can develop with other habitats in the absence of cutting, such as wetlands and scrub;

The important fungal communities that can develop on extensively managed pasture, especially waxcaps.

Continuity of management over long time periods is often an important determinant of the importance of ecological communities, as is recognised in the identification and protection of ancient woodlands.

However, this is true of other habitats too and is likely to be true of many pastures in Northumberland, especially in the uplands and upland fringes. A term such as 'heritage pasture' would be useful in providing recognition for such sites.

Concern was raised during the habitat workshop regarding the loss of species-rich grasslands through their conversion to herbal leys.

Given the context in which open mosaic habitat on previously developed land is found it may not always be possible to protect existing examples.

In such situations it may be appropriate to mitigate losses of open mosaic habitat using landscaping which mimics OMH features such as through the incorporation of mosaics of nutrient-stressed species-rich grasslands, ponds and scrub or through the use of complementary habitat, such as living roofs.

IG 2: There is an Increase in the Abundance and Patch Size of Important Grasslands

Many important grasslands only survive in small and isolated fragments. Sometimes this is an inevitable consequence of the circumstances required for their creation, such as whin grassland on an outcrop of whinstone, but even in such cases, a lack of management and consequent scrub establishment can reduce the patch size still further.

Other types of grassland such as lowland neutral grassland and upland hay meadows used to occur farm more widely but have been lost to agricultural intensification and development. Small patch size and isolation from other areas of similar habitat have significant consequences with a high proportion of the area being affected by:

Adverse edge effects, such as runoff or drift from agricultural fertilisers and pesticides being used on nearby land;

management problems such as not being able to secure suitable grazing on small, isolated fragments;

While isolation prevents recolonisation when populations of particular species are lost due to random events, such as adverse weather or disease outbreaks.

Consequently, increasing patch size where possible is a priority.

It is recognised that there is great potential for the management of amenity grasslands within and around our urban areas to be changed to increase its ecological value. However, such changes tend to receive a mixed reaction from local communities, with a vocal section being implacably opposed to any relaxation of management. As part of its review of greenspace management, Northumberland County Council is co-funding a PhD studentship at Newcastle University to investigate ecological opportunities of changes in the management of amenity grasslands, the financial implications of such changes and the public attitudes to them, to help shape a way forward.

IG 3: Ecological Connectivity between Semi-natural Grasslands is Improved

Sections of rural road verge support important plant communities, and rural verges more generally have great potential to support more diverse communities than they currently do. However, in the absence of the management that such verges once would have received through agricultural activities such as hay cutting and cattle droving, more diverse swards cannot be sustained, unless alternative management is provided in the form of cutting and removing the cut material specifically for ecological reasons.

The removal of the large quantities of material that results from such cuts is hugely expensive; generally, considerably more than the cost of funding sward diversification of a similar area of farmland, and budgets for this sort of work are generally unavailable given the state of local authority financing.

Meadow species of Druridge Bay - Photo credit Mike Perkins

Consequently, improving the management of road verges for nature conservation remains a largely unsolved problem, although some local community groups are doing excellent work on specific sites.

However, the creation of species-rich verges on nutrient poor soils (generally subsoils) when roads are being constructed or verge works undertaken is straightforward and should be a high priority.

Map

You can see where measures have been chosen for inclusion on our map of areas that could become of particular importance for biodiversity by looking at our map:

- **Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity**

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

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Mappable

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Not mappable

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Measures

The measures required to achieve the five priorities identified for important grasslands are set out below:

Priority IG 1: Important grasslands are protected, and their condition and quality are improved

IG 1.1	Secure appropriate management on all sites supporting good examples and the restoration of degraded examples, especially of MG5 neutral grasslands, MG3 mountain upland hay meadows, calaminarian grasslands, Open Mosaic Habitat on previously developed land, whin and other species-rich acid grasslands, limestone grassland and waxcap grasslands.
IG 1.2	Work with land managers to ensure all examples of species-rich grassland habitats are recorded and mapped as either Priority Habitat or as a Local Wildlife Site.
IG 1.3	Modify stocking regimes on currently grazed land where needed, to ensure that grazing density and duration is appropriate to maintain or restore the interest of the grassland site.
IG 1.4	Secure reductions in nutrient levels through nutrient management planning and extensification of management.
IG 1.5	Control negative indicator species - such as nettle, docks, creeping thistle and bracken. It is important that the underlying causes of their spread are addressed - typically excessive nutrient levels for the first three.
IG 1.6	Manage scrub and thin dense stands of self-seeded trees. The retention of scattered scrub or trees and small areas of bare ground is of benefit to invertebrates, and so such mosaics should be encouraged. Management should aim to halt or reverse losses of grassland areas to dense blocks of scrub.
IG 1.7	Promote the importance of pastures that provide important features for invertebrates, waxcap fungi, and birds such as small-scale topographical variations (lumps and bumps), bare ground, livestock dung, nutrient-poor, mossy swards, and mosaics with other habitats such as scrub. Ensure that sites rich in such features are protected. Encourage the adoption of a term such as 'heritage pasture' would be helpful in highlighting the value of such sites, especially those where there is evidence of continuity of management over a long time.
IG 1.8	Reduce use of worming medicines such as Ivermectin through techniques such as faecal egg count monitoring to target treatment, mixed grazing to reduce worm load in pasture, and bioactive forages to protect animals.
IG 1.9	Increase the availability of suitable livestock (especially slow-maturing hardy breeds of cattle) in the lowlands through measures to sustain mixed farming, and through the expansion of conservation initiatives, such as Flexigraze.
IG 1.10	Buffer important but fragmented areas of semi-natural grasslands from negative edge effects, such as nutrients.
IG 1.11	Provide training in the management and restoration of ecologically important grasslands for land managers and advisors.
IG 1.12	Where existing examples of open mosaic habitat are lost, seek to compensate for these through landscaping which mimics Open Mosaic Habitat (OMH) features such as through the incorporation of mosaics of nutrient-stressed species-rich grasslands, ponds and scrub or through the use of complementary habitat, such as living roofs.

Priority IG 2: There is an increase in the abundance and patch size of important grasslands

IG 2.1	Undertake targeted habitat creation and restoration next to existing fragmented patches of grassland of nature conservation value, for example by use of overseeding and green hay spreading, improved grazing or cutting, or by control of scrub and coarse vegetation.
IG 2.2	Create areas of semi-natural grassland on suitable substrates, for example through the restoration of minerals sites and the creation of topsoil-free verges on new road schemes, using natural regeneration where appropriate.
IG 2.3	Introduce appropriate cutting and/or grazing regimes to improve sward diversity and structure of currently unmanaged areas.
IG 2.4	Support farmers to adopt the Maximum Sustainable Output approach to stocking levels, to increase sward diversity.
IG 2.5	Increase the diversity of species-poor swards, for example by use of overseeding, and green hay spreading, using appropriate seed sources. These should ideally be local but at least of UK wild provenance, taking care to avoid agricultural varieties of legume species
IG 2.6	Establish a mechanism to identify suitable donor sites for seed harvesting and green hay, to increase the supply of these and provide an income steam for their owners.

Priority IG 3: Ecological connectivity between semi-natural grasslands is improved

IG 3.1	Work at a landscape-scale to ensure that grassland species have access to the appropriate mosaic of habitats they require to meet their life requirements, and their dispersal needs, including the creation of stepping-stone habitats or non-grassland habitats where needed.
IG 3.2	Target habitat creation and restoration to create functional linkages and stepping-stones between habitats, with the aim of increasing landscape permeability.
IG 3.3	Investigate cost-effective ways to improve management of roadside verges for nature conservation.

Associated Species

Many different species are associated with our grasslands in the North of Tyne. Below we highlight some of the most important:

Birds

Grasslands provide feeding and nesting sites for a range of bird species including species such as skylark and wading birds such as curlew and lapwing. The conservation of breeding waders is a high priority for this Local Nature Recovery Strategy is dealt with in the highlighted box below. They can also provide valuable feeding habitat for birds which nest on adjacent habitats. For example, golden plover nest mainly on blanket bog, but a pasture rich in cranefly larvae is a very important feeding habitat for them to probe with their beaks. The conservation of grassland birds is intrinsically linked to the management delivers high-quality grassland habitat and structurally diversity. Their needs will be met through the measures associated with priorities **IG1, IG2** and **IG3**. See also **Box 5 - Wading Birds** below for details of specific additional priorities and measures for wading birds.

Grassland fungal communities

These include including waxcap fungi communities and soil mycorrhiza. Conservation of waxcap grasslands is identified as a priority within this Strategy and are covered by measures under priority **IG1**.

Blackbird, Holy Island – Photo credit Iain Robson

Insects

Grasslands support a wide range of different invertebrate species, providing them with a home and a place to breed and forage. Several locally important insect species are associated with particular grassland types. For example, the small pearl-bordered fritillary butterfly can breed on purple moor-grass and rush pasture and on other wetland grassland types, while the dingy skipper butterfly is strongly associated with grasslands of open mosaic habitats in urban areas. Increasing the size and condition of grasslands is therefore a central element of conserving grassland invertebrates (priorities **IG1** and **IG2**).

Grasslands are particularly important for pollinating insects such as bees and hoverflies and may play an important role in the life cycle of insects commonly associated with other habitats. For example, upland hay meadow and species-rich pastures close to the moorland edge have important ecological interactions with upland heathland and blanket bog habitats - especially for pollen and nectar feeding insects, such as bilberry bumblebee and bilberry mining bee. Both of these bees are dependent on bilberry early in the season but require pollen and nectar from grassland plants later in the season. Similarly, heather-feeding specialists such as heather colletes bee and heather mining bee need grassland plants as nectar sources outside of the heather flowering period.

Dronefly on Lesser Hawkbit, East Chevington – Photo credit Iain Robson

Moss carder, Red-shanked carder and ruderal bumblebees are similarly important. Mosaics of grassland and scrub support a wide range of invertebrates that have feeding, nesting, and overwintering requirements that span these habitats. In turn these invertebrates are very important for a range of insectivorous birds, such as grasshopper warbler and whitethroat. Maintaining functional linkages between grassland patches and maintaining habitat mosaics at a landscape-scale are therefore both important (**IG 3.1** and **IG 3.2**).

Plant species

Several locally or nationally rare plant species are associated with particular types of grasslands within our area. For example, the UK distribution of Shining Lady's Mantle is currently restricted to five sites in Northumberland, where it is found on species-rich grazed pasture on shallow soil overlying limestone.

Whin grassland supports a characteristic mix of lime-loving and acid-loving plants which can include locally notable species such as wild chives, maiden pink. Likewise, calaminarian grasslands are characterised by the mix of heavy-metal tolerant species that they contain.

Our meadows and pastures also support a range of locally important species including greater butterfly orchid and northern hawk's-beard.

Conservation of these important plant species will be achieved by ensuring that we maintain healthy and diverse grassland habitats with a range of topographies including 'lumps and bumps' and patches of bare ground. Their needs will be met through the measures associated with priorities **IG1, IG2** and **IG3**.

Bee Orchid – Photo credit Newcastle City Council

Curlew, Beal – Photo credit Iain Robson

Wading Birds

The North of Tyne supports nationally and internationally significant populations of wading birds, such as Lapwing, Curlew, Redshank and Snipe. Curlew is a particular concern because the UK holds about a quarter of the global breeding population, but it is rapidly declining throughout its range and is now considered to be a global conservation priority. In the UK it breeds mainly in northern and western uplands, with the North Pennines and western Northumberland having some of the best remaining populations in England. Such species are reliant on multiple habitats or on a mosaic of habitats at different times of the year. For example, during the nesting season a bird such as Curlew requires an open landscape with unobstructed lines of site combined with mosaics of tall vegetation to conceal nests and chicks and shorter vegetation in which chicks and adults can feed. In contrast, during the wintering period Curlew requires large undisturbed coastal areas or inland wet grasslands with abundant soil invertebrates. The successful recovery of such species therefore requires coordinated additional action at a landscape scale and across a range of habitats.

Wherever possible, conservation objectives should be delivered without resorting to the killing of predators (e.g. through good habitat management or appropriate non-lethal means). Any predator control carried out to achieve conservation objectives should be justified through evidence of its need, targeted in its approach and scale, and regularly reviewed. Where evidence shows breeding wader populations to be vulnerable, targeted predator control may be required in order toto ensure that populations remain viable. Such control should be undertaken alongside other measures including habitat management, and the aim should be to facilitate sustainable populations of both wader and predatory species, rather than to maximise the density of wader numbers at the expense of other native species.

Box 5 - Wading Birds

Map

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Measures – Wading Birds

Priority WB 1: Large contiguous areas of habitat (priority zones) remain suitable for breeding Curlew, Lapwing, Redshank, and Snipe.

WB 1.1	Maintain sufficiently large areas of relatively open ground next to rush pasture where wading birds breed. Where scrub encroachment is encouraged, or trees and shrubs are planted, this should consider the landscape in such a way as to avoid conflicts with wading birds.
WB 1.2	Manage rush pasture using cutting and grazing with cattle, and restore hydrology and create scrapes, to ensure wet areas for feeding during spring and summer.
WB 1.3	Protect against and reverse the intensification of management in fields supporting wading birds. This will mean reducing stock numbers, delaying cutting of meadows to later in the season, managing water levels, not undertaking new drainage works, and careful consideration of any tree planting to avoid edge effects.
WB 1.4	Protect important sites for breeding waders from inappropriate land use changes.

Priority WB 2: Coastal and floodplain grazing marsh is managed appropriately, and new areas are created at the coast to provide breeding sites for curlew, lapwing, snipe, and redshank. This will have the additional benefit of providing disturbance-free refuges for wintering waders.

WB 2.1	Secure suitable management of coastal grazing marsh.
WB 2.2	Create new areas of coastal grazing marsh.

Chapter 5

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Rivers and Wetland Habitats

What is included in this section and definitions

Rivers and streams

Definition: Rivers and streams are naturally dynamic habitats with a constant or seasonal flow of water. In their unmodified state rivers are dynamic features, which interact with their floodplains enabling a range of wetland habitats to develop such as grazing marsh, wet woodland and fen habitats including reedbed. Both shingle beds and eroding riverbanks support a range of specialised invertebrates.

Ponds and lakes

Definition: Ponds and lakes are areas of permanent or seasonal standing freshwater. Size is the main factor used to differentiate between the two with area of water of 2ha or greater usually being considered as lakes. This definition includes water bodies which have formed naturally in response to the geology or landform of a location, and waterbodies which are artificial, such as reservoirs, or which result from past human activity such as quarrying or mining.

Marshes and swamps (including reedbeds and tall fen)

Definition: Vegetation which has developed where the water table which is at or above ground level for most of the year. The habitat is often found around the margins of ponds, lakes and slow-moving sections of rivers. Typical plants which might be found in marshes and swamps include reed canary-grass, common spike-rush, sedges, reedmaces and club-rushes, meadowsweet, yellow flag iris and/or wild angelica. Reedbeds are areas of swamp which consist purely of stands of common reed.

Coastal and floodplain grazing marshes

Definition: Grazing marshes are wet grasslands which are periodically inundated with brackish or freshwater because of natural process or human management. They usually occur in low lying coastal areas or within the flood plains of rivers.

Buston Links – Photo credit Abi Mansley

What is not included in this section

By their nature, wetlands grade into many other habitats. Purple moor-grass and rush pasture is considered under 'Important Grasslands', as are wet grasslands of importance for breeding waders. Types of fen which are actively accumulating peat are considered under 'Heathlands and Peatlands'. Wet woodlands are a particularly important wetland type but are considered under 'Woodlands'. Estuaries are considered in the 'Coastal and Marine' section.

Interactions with other habitats

By their nature, there are interactions between wetlands and all the other habitats and land uses within their catchments, and the quality of wetlands inevitably reflects the quality of those terrestrial habitats and environments. This is discussed further under 'Water Quality' below.

The coastal and marine environment is inevitably influenced by the quality of the water that flows into it from rivers, and that influence can be especially strong in enclosed bays subject to limited tidal flushing. This can be seen in the growing problem of filamentous algae growing on mud and sandflats around Holy Island, fuelled by nitrogen pollution from streams and rivers.

Why Rivers and Wetlands are Important (including wider environmental benefits)

A broad range of different types of freshwater habitats can be found within the North of Tyne area, including examples, such as the Roman Wall Loughs or the River Tweed, which are of international importance for their wildlife. Our rivers and wetlands are important places for recreation and tourism, attracting visitors for quite enjoyment and for activities such as water sports, angling, and wildlife watching. Rivers and streams often provide a wildlife corridor link between fragmented habitats in intensively farmed landscapes or in urban areas. Subsidence ponds (ponds formed because of subsidence from old mine workings) are increasingly being recognised for their importance as a link to the industrial history of the area as well as for their considerable wildlife interest.

Riparian and wetland habitats are sensitive to impacts from changing water quality. Diffuse pollution from agricultural or urban sources can increase the nutrient levels in wetlands and rivers and lead to the development of algal blooms or rank vegetation. Point source discharges continue to be an issue in some locations and may arise, for example, from former mine workings. Access to riverbanks by grazing animals can increase bankside erosion and add to silt loads in rivers and streams, which can raise nutrient levels and be detrimental to those aquatic species which rely on high water quality. Our wetlands are also sensitive to water quantity. Water shortages can lead to low river levels and to wetland habitats drying out, which can affect the plants and animals which live there.

Climate change is likely to lead to:

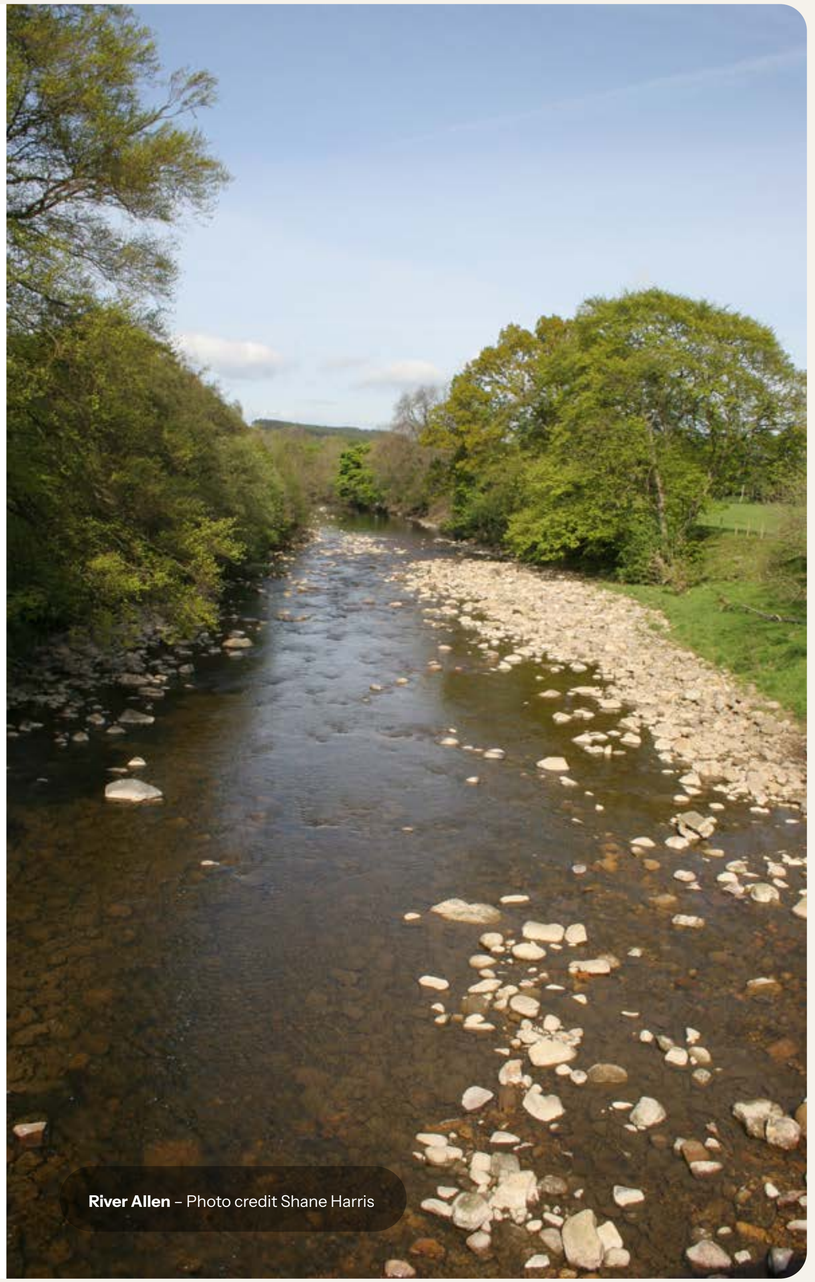
Changes in rainfall patterns which will make water level management of sites more difficult in future;

An increase in water temperature in rivers which will influence what lives there.

Our rivers and streams have suffered past physical modifications such installation of weirs which act as a barrier to fish passage, building of flood banks which disconnect rivers from their natural floodplain, or creation of barrages which prevent natural tidal flushing of estuaries. Non-riparian wetlands such as swamp or grazing marsh may require active management, such as grazing or cutting, to maintain their value for wildlife. In the absence of such management, they can lose their value for wetland species. Invasive non-native species such as signal crayfish and American mink or Himalayan balsam, can lead to the loss of native species in our rivers and wetlands, alter habitat composition, and cause economic harm.

Wetland and riparian habitats are a source of drinking water and wetland vegetation can help to remove pollutants and contaminants and can be used to address issues caused by diffuse or point source pollution.

Wetlands also play a crucial role in flood risk management by storing water or providing natural space for water and slowing the speed and volume at which water moves downstream. Wetlands such as fens and ponds act as important carbon stores, sequestering and storing atmospheric carbon dioxide. In urban areas rivers, ponds and other wetlands can have a localised cooling effect and can assist with future climate change adaptation by helping to reduce the ‘urban heat island effect’.



River Allen – Photo credit Shane Harris

Future resilience

Freshwater habitats are shaped by rainfall patterns and by fluctuations in water availability. As such, they are likely to be sensitive to future climate change. Current predictions suggest that we will see changing changes in the amount, seasonality and intensity of rainfall in the North of Tyne - with drier summers, wetter winters, and an increased occurrence of extreme rainfall at any time of year. Increases in temperatures may also result in greater rates of evaporation and increased drying out of wetland areas. Rivers are likely to be particularly impacted on by increased drought risk and associated issues of low flow, poorer water quality, and reduced habitat availability for important species. There may also be increasing demands for water abstraction from rivers for the irrigation of crops. Many in-river species, such as Freshwater pearl mussel, are adapted to cool water conditions and may suffer if water temperatures rise and warmer water can't hold as much dissolved oxygen. There could be an increased risk, frequency, and severity of wildfires – which will affect water quality – because of bare ground causing increased runoff, and burnt material or releases of mineral soils enter the watercourses. Projected increases in extreme rainfall events could also lead to increased run-off into watercourses, putting additional sediment and nutrients into rivers and streams at peak times. However, wetlands can also play a significant role in future climate change adaptation and in the development of climate-resilient landscapes.

The Resource within North of Tyne

The North of Tyne area contains six main river systems and associated catchments: the Tyne, the Blyth, the Wansbeck, the Coquet, the Aln, and the Tweed, together with many smaller streams and watercourses. Among these smaller watercourses are the 'Northumberland coastal streams' – a series of small streams which flow into the area between Holy Island and the mainland. In the far west of the area a small section of the River Irthing links to the River Eden catchment in Cumbria. These encompass a range of conditions from cold, fast flowing upland streams to meandering lowland rivers. These contain a mosaic of features, such as riffles, pools, exposed shingle, and marginal or bankside vegetation which are used by a range of plants and animals.

Areas of standing open water occur throughout the North of Tyne area and range in size from large natural lakes such as the loughs found along Hadrian's Wall, to man-made reservoirs, through to small ponds which may only be a few square metres in area. Mining subsidence has been responsible for the formation of many of the over one hundred ponds and wetlands in South East Northumberland, Newcastle and North Tyneside, including at localities such as Holywell Pond, Big Waters and Druridge Bay. New ponds are continuing to form in this way. Our ponds support a rich variety of animal and plant life including important species such as great crested newt.

Wet grasslands and grazing marshes can be found on the floodplains of rivers such as the Coquet and the Till, and in coastal location. Approximately 880ha of this habitat is recorded in our area out of an estimated total 200,000ha in England. These sometimes contain a low diversity of plant species but are important breeding sites for wading birds such as curlew and lapwing. Inbye land and allotments in our upland areas can also be important breeding areas for wading birds.

Areas of swamp or marsh vegetation can often be found at the margins of streams, lakes, ponds and other wetlands. These may include reedbed, a particular type of swamp vegetation made up almost entirely of Common Reed. Notable reedbeds can be found at Gosforth Nature Reserve in Newcastle and at East Chevington on Druridge Bay, with a more upland example at Greenlee Lough.

Tyne Helleborine – Photo credit Mike Perkins

Current Activity to Conserve and Enhance these Habitats

A significant amount of activity is already taking place by organisations and by individual land managers and farmers to conserve and enhance our freshwater habitats. Here are just a few examples to illustrate the breath of this work:

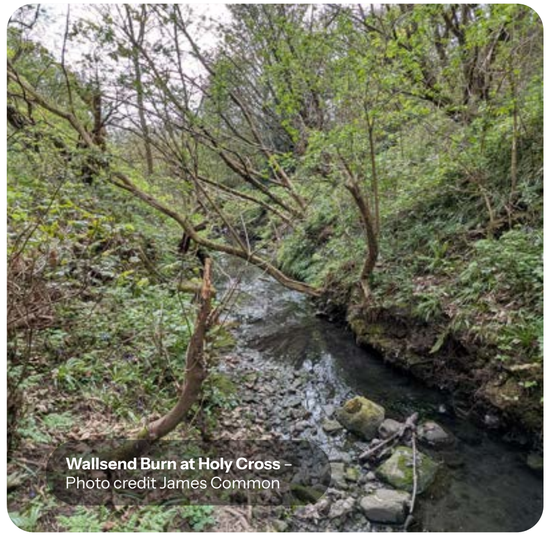
The **Tweed Forum** have since 2002 run the Tweed Invasives Project, one of the largest and most successful invasive non-native plant species control programmes in the UK. The Tweed Forum are also a key partner in the LIFE WADER project and are working with landowners to undertake a range of works inland aimed at reducing nutrient inputs into water courses on the Tweed catchment. This includes trees along river corridors, creating new reed beds and forming new areas of wetland. The Tweed Forum have a UNESCO-recognised catchment management plan[14] and a River Till Restoration Strategy[15]. Each river catchment has a catchment partnership, and a catchment action plan.

Northumberland Rivers Trust work is involved with river restoration projects on the Rivers Blyth and Lyne, along with water quality and habitat restoration on Lindisfarne coastal catchments. They are also establishing ark sites (sites are chosen for their ecological suitability, isolation from invasive species, and ability to support healthy populations) for White-clawed crayfish. The Wallington Estate (National Trust) will have three ark sites for White clawed crayfish.

The **National Trust's Wilder Wallington project** is creating 70ha of priority habitat along the Fallowlees Burn riparian corridor in partnership with Forestry England. 90ha of wetland is being created at Gallows Hill farm.

Northumberland Wildlife Trust are currently delivering the "Biodiversity Boost: A Journey to a Wilder Druridge" project which will restore habitats, enhance biodiversity, and improve access on the reserves at Druridge Bay including Hauxley, West Chevington, and East Chevington. Specific actions include improving reedbeds at its East Chevington reserve, while at the West Chevington site watercourses will be realigned to improve water quality downstream.

The **Tyne Rivers Trust** are working closely with landowners to undertake a variety of activities on the River Rede and its catchment. These include the following habitat projects floodplain reconnection at West Woodburn, woodland creation along the Rede and tributaries, wetland and scrape creation, peatland restoration in Dargues Burn headwaters, fish passage improvement works on Chesterhope Burn. Freshwater pearl mussel is a big focus for habitat improvement works.



Wallsend Burn at Holy Cross – Photo credit James Common

In **North Tyneside the area around St Mary's Point** is an important wetland habitat, owned by North Tyneside Council and managed by a local group of conservation volunteers.

New small-scale wetlands continue to be created as part of **Sustainable Urban Drainage Schemes (SuDS)** associated with new developments.

Northumbrian Water have previously funded and brought together partners around the South Tyne, and at the time of writing, are setting up a similar fine sediment reduction project in the river Rede and North Tyne. They have a vision for coasts and rivers, which includes Bluespaces, targeting the accessible water environment (funding projects that combine elements of biodiversity, access, water quality, and additional benefits).

Farming in Protected Landscapes (FiPL) funds projects that improve 'Nature, People, Climate and Place' in the Northumberland National Park, North Pennines National Landscape and Northumberland Coast National Landscape. Improvements to water quality by reducing diffuse pollution from farming practices have been funded including farmyard water and muck management and watercourse crossing points.

14 Tweed Catchment Management Plan 2023-2028
15 Celebrating 10 years of restoring the River Till – Tweed Forum

Priorities

FH 1: There is an improvement in natural functions and processes in the water environment

Streams and rivers are naturally dynamic environments, with the power of moving water constantly reshaping the channel and interacting with the riparian (bankside) environment and the wider floodplain. Centuries of drainage and canalisation works by people have dramatically reduced these natural functions and processes. While this has enabled more land to be brought into cultivation or to be built on, it has had a devastating effect on a wide range of habitats and species. It has also greatly increased flood risk for riverside settlements downstream, by increasing the rate at which water leaves the land and enters, then flows through, watercourses after rain has fallen.

Enabling watercourses to function more naturally was identified as the top priority for the water environment by our habitat working group. Functionally naturally encompasses a broad range of measures to be undertaken in suitable locations; some within the channel, and others affecting the riparian zone and wider floodplain. Within channel measures include:

- The removal where possible of man-made structures such as weirs and fords, which obstruct fish passage and disrupt natural flow patterns;
- And the introduction of woody debris to watercourses.

Introducing woody debris creates leaky dams that slow the flow in flood events and improve water quality by trapping silt, as well as creating habitats for a wide range of invertebrate and fish. Such features are essentially analogues of beaver dams, and so in due course the need to create such structures will be made redundant by the return of beavers themselves. While recognising that the impact of beaver activity will need to be managed in certain situations, the return of beavers to the North of Tyne area will bring massive ecological benefits, through the habitat that is created by their dam and canal building activities. Preparations for the return of beavers in suitable areas should be started, especially through the planting of streamside willow and aspen trees.

Historically, sections of river were straightened to accelerate the flow of water from and through the catchment. However, it is now recognised that this increases flood risk downstream, and it also causes great ecological harm, removing the pool and riffle sequences that so many riverine species depend on. Fortunately, re-meandering rivers has been shown to be highly effective in enabling these important natural habitats to re-establish, as well as slowing the flow in flood events. Re-meandering canalised sections of river should be undertaken wherever possible.

In recent years awareness has greatly increased of the importance of the relationship between a river and its floodplain and of the need to consider the floodplain as part of the wider river system has greatly increased. Where rivers are able to spread across areas of flood plain during floods, flood risk is reduced downstream and a range of important habitats within the floodplain are sustained. These include temporary ponds, which support a surprisingly wide range of wildlife specially adapted to their fluctuating hydrology, wet woodland, fens and marshes.

A fallen tree – providing important habitat for aquatic invertebrates and fish in the River South Tyne – Photo credit David Feige

FH 2: There is an improvement in the water quality of riverine and freshwater habitats

Water quality is key to the health of wetlands, both in terms of physical characteristics, such as the amount of silt in the water, and chemical characteristics, such as the levels of phosphates, nitrates, and pesticides in the water. Water quality reflects the management of the catchment as a whole, including farming, forestry, and the management of sewage, domestic chemicals, and industrial processes.

Nature friendly farming agricultural practices include important actions, such as:

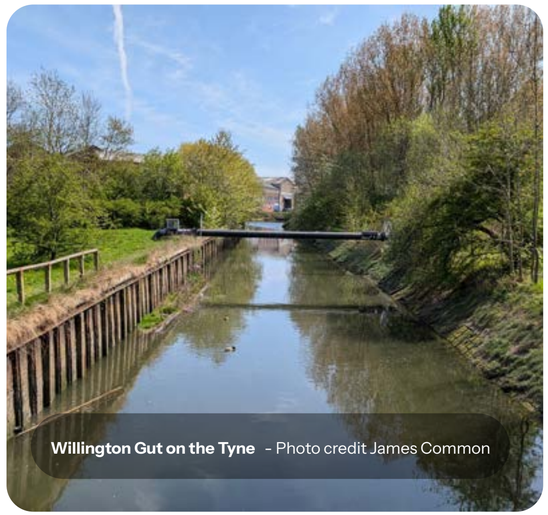
- The incorporation of more trees and hedges into the farmed landscape;
- Low/no-till cultivation;
- Buffer strips adjacent to watercourses;
- Fencing riparian zones to prevent livestock entering the watercourse or causing poaching of marginal vegetation;
- Increasing the proportion of farms that have nutrient management plans and adhere to catchment sensitive farming guidance.

It is essential that farmers and land managers are provided with finance, advice and support to be able to adopt these measures.

Important measures to reduce water quality impacts from sewage treatment include constructed wetlands to improve the quality of discharges from sewage treatment plants, and good management of septic tanks or their replacement with modern package treatment plants.

The legacy of abandoned mine workings continues to adversely affect water quality in parts of the North of Tyne area. The Mining Remediation Authority and the Environment Agency have programmes to address the largest sources of pollution, but many smaller sites lack any remediation.

There is growing evidence of the impact of insecticides used as 'spot-on' flea treatments for dogs on the invertebrate life of wetlands. It is important to rapidly increase awareness of this problem among dog owners, and where possible dogs should be prevented from entering ponds and watercourses to prevent impacts on wildlife. If this is not feasible an alternative would be to create "sacrificial" ponds at some locations to deflect pressure on important wetland areas.



Willington Gut on the Tyne - Photo credit James Common

Woolsington Parish Ponds – Photo credit James Common

FH 3: There is an increase in the abundance and area of stillwaters and vegetated wetlands

It is important to promote understanding about the importance of all wetland types: open water and vegetated, temporary and permanent. Accordingly, when new ponds are being created, it is often much more beneficial to locate them beside a wet area of land rather than within it, so that both open water and wetland vegetation are provided, rather than creating one at the expense of another.

Clean water ponds (sometimes also described as 'offline ponds') are ponds that are not connected to streams or ditches, are well buffered from sources of pollution such as agricultural runoff, road runoff and domestic sources of pollution, and which are not stocked with fish. Creating such ponds is an important measure, where they can be created without damaging other important habitats, created in clusters, with a range of sizes and depths to provide a mixture of permanent, semi-permanent and temporary ponds. Clean water ponds support an extraordinary range of wildlife, especially where they can be provided in clusters with a range of pond types. Mining subsidence has been responsible for the formation of many of the freshwater ponds in South East Northumberland, Newcastle, and North Tyneside. These subsidence ponds range in age from mature ponds with well-established marginal vegetation to the wetland areas which are still growing and in the process of development. Such ponds are an important wildlife resource for the lowlands of the North of Tyne area. The quality and diversity of such ponds should be retained across the landscape.

White clawed crayfish - Photo credit National Trust

FH 4: The condition and quality of riverine and freshwater habitats is improved

Many riverbanks in the North of Tyne area have populations of invasive non-native species, such as Himalayan balsam, giant hogweed and Japanese knotweed. These plants displace native vegetation and, because they die back in winter, leave bare riverbanks that are then vulnerable to soil erosion, contributing silt to the river during heavy rain. As seeds or root fragments are transported along watercourses, effective control requires a catchment-wide approach, beginning in the headwaters and working downstream.

Higher water temperatures resulting from climate change can adversely affect some important species such as Atlantic salmon, partly because warmer water holds less oxygen. Increasing tree and shrub cover along watercourses provides shade that helps to mitigate such effects but needs to take account of any existing habitat or species interest. Tree root clusters extending into the water provide protection from predation for young fish, and valuable habitat for a range of invertebrates, and riverside trees and shrubs provide a source of woody debris, the importance of which is discussed above.

Many vegetated wetlands require active management in the form of grazing, cutting, or the control of water levels to sustain the ecological value, or to restore sites that have been neglected.

Sustainable drainage systems (SuDS) are now common in new developments. Such systems use features such as small wetlands, basins and swales to retain storm water or reduce the speed at which it flows into nearby watercourses. Well-designed SuDS can offer benefits for nature by providing additional habitat for wetland species and by adding to the mosaic of wetland features found within an area. For older systems it may be possible to retrofit new features, or alter management regimes, to align them with current best practice in designing SuDS which are of wildlife value.

FH 5: The ecological connectivity between freshwater habitats is increased

Freshwater life is adapted to dynamic, changing environments where many species require a range of wetland and non-wetland habitats through different stages of their life cycle. Being able to work at the catchment scale rather than on isolated sites is important to ensure that their needs are met, and exemplary schemes such as the Wansbeck catchment project need to be replicated across other catchments in the North of Tyne area. Planned works on river or wetland habitats should be mindful of the risks of enabling the spread of invasive species and ensure that appropriate biosecurity measures are in place.

Map

You can see where measures have been chosen for inclusion on our map of areas that could become of particular importance for biodiversity by looking at our map:

- **Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity**

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

Only some of the measures were mappable, and even then, only perhaps in part (e.g. for part of the area or for part of the measure as it is written).

Where measures could be applied widely across large areas, statutory guidance requires that we prioritise what is included on the map according to certain criteria, as set out in the mapping chapter (Chapter 11: Mapping).

It should be remembered that any actions that deliver against the measures as they are written, will count as contributing to the delivery of the LNRS. Written measures – both mapped and unmapped – represent our highest priorities.

Mappable

Measures that have been included in our map are shown with this green icon of a map at the left-hand side. Further explanation of the link between the measures and the map layers is in Chapter 11: Mapping.

Not mappable

Not all measures can be spatially mapped, but all remain strategic priorities. Measures that are not mappable are shown with the grey icon of a map at the left-hand side.

Measures

The measures required to achieve the five priorities identified for freshwater habitats are set out below:

Priority FH 1: There is an improvement in natural functions and processes in the water environment

FH 1.1	Re-meander straightened channels to enable pool-riffle sequences to be re-established and to slow the flow.
FH 1.2	Remove artificial obstructions to fish passage and to natural flow patterns, such as weirs and fords.
FH 1.3	Introduce and retain woody debris to watercourses to create leaky dams to create riparian wetlands, slow the flow and improve water quality.
FH 1.4	Improve the quality of the riparian zone for beaver in suitable locations, especially through the planting of riparian willow and aspen.
FH 1.5	Reconnect rivers to their floodplains where possible by removing flood banks, bankside deposits, and other obstructions, and facilitate the re-establishment of floodplain wetlands in these areas.

Priority FH 2: There is an improvement in the water quality of riverine and freshwater habitats

FH 2.1	Reduce diffuse and point source pollution from agriculture through management of inputs, slurry and silage pits.
FH 2.2	Increase the proportion of farms that have nutrient management plans and that adhere to catchment sensitive farming guidance, including creating buffer strips (ideally of at least 20m in width) to protect streams and rivers from pesticides, fertilisers, silt and excessive trampling from livestock.
FH 2.3	Promote the fencing of riparian zones to prevent livestock entering watercourses or causing poaching of marginal vegetation
FH 2.4	Reduce diffuse and point source pollution from housing through good management of household septic tanks, with upgrading to modern package treatment plants where possible.
FH 2.5	Establish constructed wetlands to treat discharges from sewage treatment works.
FH 2.6	Continue programmes of mine water treatment at major pollution sources such as abandoned mine workings and use green engineering solutions to trap and hold diffuse pollution from more dispersed sources such as smaller mine spoil heaps.
FH 2.7	Protect watercourses and waterbodies from dogs to avoid pollution by spot-on Ivermectin flea and tick treatments, by restricting access to important sites and providing diversionary dog ponds, and promote alternatives to spot-on treatments.

Priority FH 3: There is an increase in the abundance and area of still waters and vegetated wetlands

FH 3.1	Prioritise the creation of wetlands wherever conditions allow, especially clean water ponds (i.e. those not connected to watercourses or surrounded by intensive land uses), and including marsh and swamp habitats as well as open water.
FH 3.2	Promote the creation of ponds beside rather than within existing wetlands, to protect existing vegetated wetlands and provide a range of vegetated and open water habitats.
FH 3.3	Ensure that a variety of pond sizes and depths exist within a landscape, being created in clusters where possible and including ponds which regularly dry out.
FH 3.4	Maintain the quality and diversity of subsidence ponds (ponds formed as a result of mining subsidence) and their associated wetlands.

Priority FH4: The condition and quality of freshwater habitats is improved

FH 4.1	Control invasive non-native species, such as mink, and Himalayan balsam. When controlling plant species, work systematically from the top of the catchment downstream as much as possible.
FH 4.2	Increase riparian tree and scrub cover in suitable locations where this is not detrimental to existing priority habitats or species - to increase shading, to manage summer water temperatures, and to increase the supply of woody debris to the channel.
FH 4.3	Introduce grazing or cutting where this is an appropriate management intervention to diversify species composition and structure of fens, swamp or grazing marsh.
FH 4.4	Restore areas of wetland habitats lost to succession through management interventions such as regulation of water levels, scrub removal or desilting where appropriate, whilst recognising the value of some later-successional wetland habitats.
FH 4.5	Increase the wildlife value of sustainable drainage systems through improved design and planting.

Priority FH5: The ecological connectivity between freshwater habitats is increased

FH 5.1	Work at a landscape-scale to ensure that wetland species have access to the appropriate mosaic of habitats they require to meet all of their life requirements and dispersal needs. This may include creation of non-wetland habitats such as hibernacula or nectar rich habitats.
FH 5.2	Target habitat creation and restoration to create functional linkages and stepping-stones between habitats with the aim of increasing landscape permeability.
FH 5.3	Ensure that management measures encourage the development of transitional areas between freshwater habitat patches.

The River South Tyne near Eals – Photo credit David Feige

Associated Species

Freshwater pearl mussel

Freshwater pearl mussel is a rare type of mollusc found in clean, fast running, water. The species is endangered globally and is already extinct in some countries. Their UK stronghold is in Scotland, with a small number of locations in Wales and the north of England. In our area, Freshwater pearl mussels can be found on the lower Rede and on the North Tyne.

Populations are currently in decline in both locations although several activities are underway to halt or reverse this. The species is sensitive to water quality and need clean water to survive. It also requires riverbeds with clean sand and gravel as too much silt will suffocate individual animals. The life cycle of Freshwater pearl mussel requires that larvae be carried upstream by hanging onto the gills of salmonoid fish.

Healthy fish populations are therefore necessary to sustain populations of mussels. Measures to improve water quality in rivers and streams (**FH 2.1** and **FH 2.2**) will benefit the species.

Blue mussel bed, Fenham Flats

White-clawed Crayfish

The only species of crayfish native to the UK, white-clawed crayfish is found in clean rivers, streams and lakes. The River Wansbeck holds one the UK's largest remaining population and is regarded as internationally important for the species.

Smaller populations persist in other parts of the North of Tyne area such as the Roman Wall Loughs.

Declines in the species are because of competition and the spread of disease from the non-native American signal crayfish. Control of non-native species (measure **F4.1**) will therefore benefit white-clawed crayfish as will measures to improve the ecological functioning of rivers and stream (**F1**) and to improve water quality (**F2**).

A Northumberland Crayfish Strategy has been produced to guide conservation activity and is being delivered by the Northumberland Crayfish Partnership.

Migratory Fish

The rivers and streams of the North of Tyne area are important fish habitat and are used by migratory species such as Atlantic salmon, brown trout, European eel, sea lamprey and river lamprey.

Such species rely on a range of habitats throughout their life and may have very specific requirements during some stages.

Maintaining diverse and connected freshwater and saltwater habitats with a range of different habitats features is therefore important, as is removing barriers to fish passage.

Measures to diversify river topography (**FH 1.1** and **FH 1.3**), remove barriers to fish passage (**FH 1.2**), improve water quality (**FH 2.1** and **FH 2.2**), improve habitat condition (**FH 4.1** and **FH 4.2**) and to ensure that species have an appropriate mosaic of habitats available to them (**FH 5.1**) will all benefit migratory fish.

Water vole in Kielder Water & Forest Park – Photo credit Katy Barke

River Jelly Lichen

This is an aquatic lichen which grows on submerged rocks in fast flowing upland streams. The species has been declining globally and within the UK is now only know to occur at a small number of sites, with fewer than 15 populations believed remain in England. It is known to occur in the upper reaches of the River Coquet and the Tyne, with older records from the Tweed. River jelly lichen has strict habitat requirements and only occurs in freshwater environments with excellent water quality and minimal silt accumulation. It does not tolerate shading from riparian trees. Conservation of the species will therefore be aided by measures to improve water quality in wetlands (priority **FH 2**).

Water Vole

This was once a common and widespread species which suffered a significant decline during the 20th century, due to habitat loss and then, the most rapid period of decline, was during the 1980s and 1990s due to predation by the introduced American Mink[16]. The species lives along rivers, streams and ditches, around ponds and lakes, and in marshes, reedbeds and areas of wet moorland. And is subject to significant conservation effort. The recovery of Water Vole will be aided by measures to improve river margins and wetlands **FH2.1** and to control invasive non-native species **FH 4.1**.

16 https://ptes.org/get-informed/facts-figures/water-vole

Invasive Non-Native Species (INNS)

The quality and condition of our wetland habitats are affected by several different INNS. The presence of these can have a devastating impact on our native flora and fauna. For example, the severe declines in water vole populations seen in past decades is attributable to predation from the American mink, while the near extinction of White-clawed crayfish seen in the UK is a result of the introduced American signal crayfish. The presence of dense patches of invasive species such as Himalayan balsam, Japanese knotweed or giant hogweed, on riverbanks can shade out native plant species and exacerbate problems with erosion. Aquatic INNS such as New Zealand pigmyweed or water fern can blanket out native species and reduce diversity. New INNS continue to arrive and spread, for example, there are increasing records of Pacific pink salmon in our rivers, and concerns about how these may impact on populations of the native Atlantic salmon. Once established, effective control of INNS can be expensive and difficult. Preventing the introduction or spread of INNS is one of the most effective conservation tools we have. This can be achieved by the adoption of good biosecurity measures such as Check, Clean, Dry of equipment or clothing that has been in the water and by effective monitoring and rapid response protocols where INNS are discovered. Measure **FH 4.1** deals specifically with the management of invasive species.

Himalayan balsam - an invasive non-native species – Photo credit Dan Wales-Hart

Chapter 6

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Woodland, Trees, Scrub and Red Squirrels

What is included in this section and definitions

Native woodlands

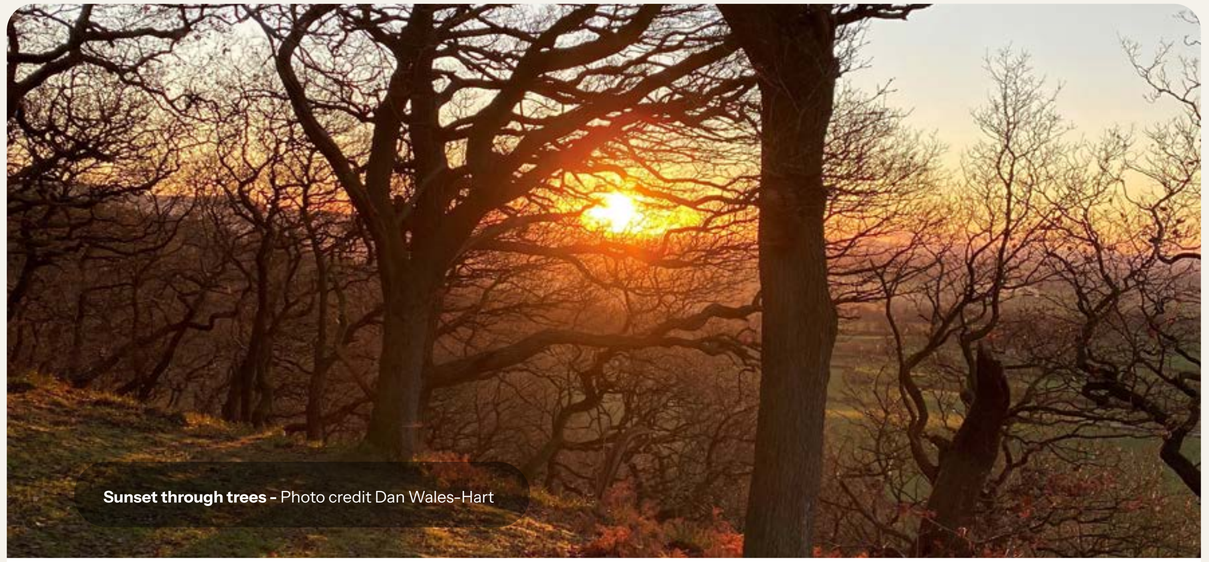
Definition: Areas of woodland dominated by locally native species. This typically comprises woodland communities dominated by pedunculate and sessile oak and ash, or by alder and various willows in wetter situations, with a range of additional species including silver and downy birch, hazel, holly, bird cherry, wych elm, and rowan. In some parts of upland Northumberland, such as William's Cleugh in Kielder, there is evidence that Scots pine may be locally native and was historically present as part of open, low density, woodland.

Native scrub

Definition: Scrub comprises scattered or dense stands of naturally regenerated locally native tree and shrub species, naturally colonising, generally under 5 metres in height. It occurs in a wide range of locations including coast, uplands and lowlands and often is a transitional habitat, for example between grassland areas and woodland, or as part of a habitat mosaic. Typical scrub species of the North of Tyne area include hawthorn, blackthorn, gorse, broom,

Oak leaves - Photo credit Newcastle City Council

and a range of willow species, although rarer and more notable species such as juniper can form important examples of scrub habitat. The value of scrub depends very much on its context. It can form an especially valuable habitat within upland ghylls, around the fringes of woodlands, along rivers and streams and when it forms mosaics with other habitats such as grasslands and wetlands. However, it can be problematic in other contexts, for example where it comes to dominate important grasslands because of a lack of suitable management. This is discussed in the 'Interactions with other habitats' section.



Sunset through trees - Photo credit Dan Wales-Hart

Ancient Woodlands

Ancient woodlands are woodlands where there is evidence of continuous woodland cover since at least 1600AD and are a high priority for nature recovery action. They can be divided into three main categories:

Ancient semi-natural woodland (ASNW) – ancient woodlands where the canopy is made up of native tree and shrub species;

Plantations of ancient woodland sites (PAWS) - where the native woodland has been cleared and replaced by a productive plantation crop;

Ancient wood pasture and parkland (including infilled ancient wood pasture and parkland) – pasture with open grown trees. Has its origins in the traditional practice of managing trees in tandem with grazing – typically with some open grown pollarded veteran trees, old-growth characteristics, and diverse and dynamic open-wooded habitats. *Infilled ancient wood pasture and parkland where the open habitat between open grown or veteran trees in the (above) ancient wood pasture and parkland has infilled – either through planting, or natural regeneration. The result is a closed canopy woodland.*

Box 6 - Ancient Woodlands

Ancient and veteran trees

Definition: Trees are described as ancient when they are mature and include important features for wildlife such as hollows, holes, decay fungus, dead branches or epiphytic plants.

A tree is considered ancient if it is a) in the third or final stage of its life; b) old, relative to other trees of that species; c) interesting for biological, aesthetic, or cultural reasons, because of its age.

The age at which trees are described as ancient depends on the life span of the individual species. For example, a relatively short-lived species such as birch may be regarded as ancient at 150 years old, while longer lived species such as oak may not be considered ancient until they are at least 400 years of age.

A veteran tree can be any age but must show specific physical characteristics which are like those of ancient trees such as cavities and crevices, dead wood, and fungi.

Veteran trees are survivors that have developed some of the features found on ancient trees – but are probably only in their second or mature stage of life.

Ancient wood pasture and parkland

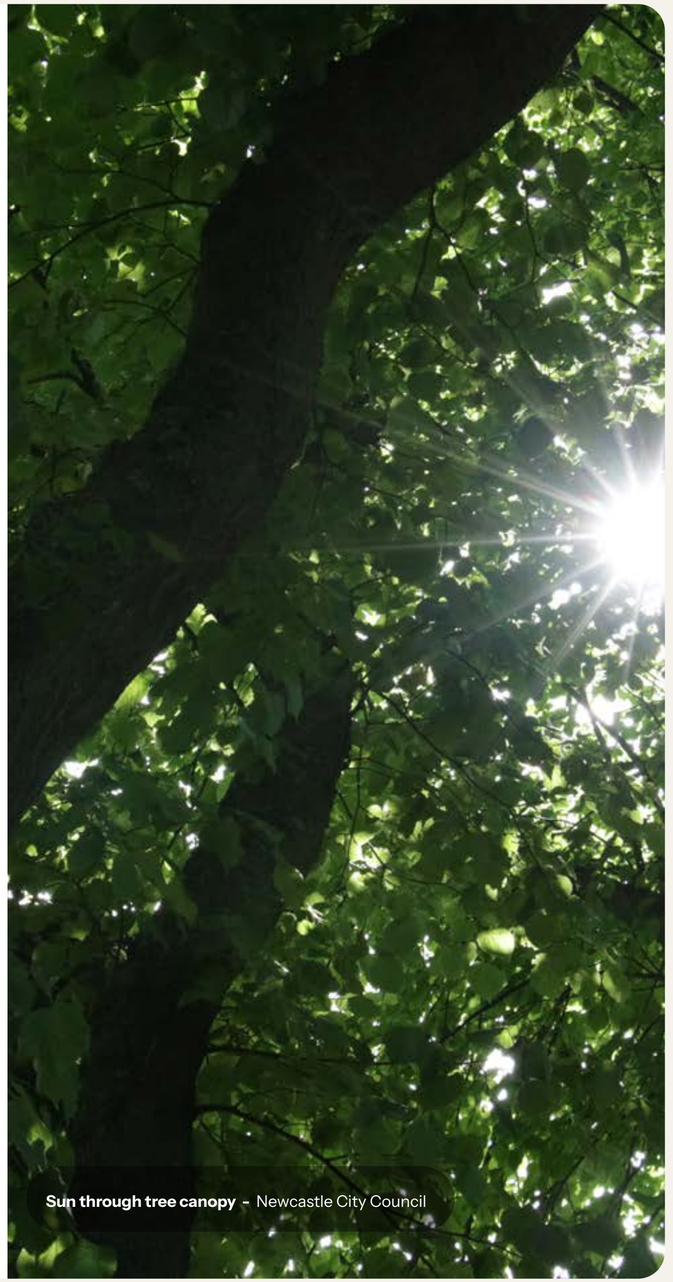
Definition: This habitat is defined by its vegetation structure rather than by the presence of any particular plant species and is usually the result of historic land management practices. Old, open-grown trees set amongst grazed or cultivated grassland or heathland are the defining feature of ancient wood pasture. The trees present are often veteran or ancient. Ancient parkland is wood pasture that is the result of deliberate planting, often with non-native species as part a historic designed landscape. Sometimes closed canopy native woodland may develop on ancient wood pasture or parkland because of management changes and natural succession. Such areas are called infilled ancient woodland or pasture. Maps of ancient wood pasture and infilled ancient wood pasture have been released as part of the updated Ancient Woodland Inventory. They are considered irreplaceable habitat alongside ANSW and PAWS.

Long Established Woodland

Definition: Long-established woodland (LEW) is woodland that has been continuously present since at least 1893, as evidenced by historic mapping. However, it does not meet the earlier cut-off date of 1600 to be classed as ancient woodland. Long-established woodland is ecologically important, because it has existed long enough to develop a complex woodland structure, mature soils, and stable ecological conditions that support high levels of biodiversity. This includes species and habitat features often associated with much older woodlands.

Further definitions are in the Keepers of Time document.[17]

17 https://www.gov.uk/government/publications/keepers-of-time-ancient-and-native-woodland-and-trees-policy-in-england/keepers-of-time-ancient-and-native-woodland-and-trees-policy-in-england#glossary



Sun through tree canopy – Newcastle City Council

What is not included in this section

The focus of this chapter is on native woodland, especially woodland and veteran/ancient trees, which are our highest priorities for woodland nature recovery. Other types of woodland and scrub habitat also play an important role in wider nature recovery, as well as providing a range of wider environmental and societal benefits.

These are dealt with in Chapter 10 of this document which deals with nature recovery opportunities in the wider countryside. Important habitats included in Chapter 10 include:

Mixed woodland and coniferous plantations

Native hedgerows

Dwarf shrubs, such as heather, and "wooded heath" are considered in Chapter 4 (Peatland and Heathland).

Cowparsley over landscape – Photo credit Newcastle City Council

Interactions with other Habitats

Woodland, scrub and Trees outside of Woodlands (TOW) are part of the natural mosaic of habitats found across our landscape. Woodland is generally the end point of a process of ecological succession by which, over a long period of time, one habitat gradually replaces another and can commonly develop in valleys and ghylls, where the land is too steep to be farmed.

Woodland and scrub are often found in transition with other habitats. For example, areas of wetland or riverbank may naturally grade into areas of willow scrub and wet woodland, while areas of scrub may develop on the margins between mature woodland and areas of open habitat, such as grassland or heath. (In the heathland chapter we call this "wooded heath".)

Areas of scattered scrub or trees are common on open habitats and can be a valuable component of them, providing important habitats for birds and insects, and there is increasing recognition of the value of such habitat mosaics.

However, expansion of denser areas of trees and scrub can reduce the extent of other valuable habitats such as species-rich grassland or heathland, or reduce the quality of land as supporting habitat for species such as breeding waders. Where this happens, it is often an indication of management issues on the habitat on to which trees and scrub are expanding, for example lack of grazing.

Depending on local nature recovery priorities, areas of tree and scrub on other priority habitats may need management to reduce their extent or their density.

Unmanaged scrub can lead to less biodiversity, through shading and the loss of open-habitat-species. Scrub expansion in the wrong place can lead to a degraded grassland or heathland habitat. Trees, hedgerows, and scrub need ongoing management to deliver ecological benefits – abandoning them is not the same as nature recovery.

Increasing tree cover without considering "right tree, right place" is not a universal good. Nature recovery depends on maintaining functional habitat mosaics, not maximising woodland extent.

Tree establishment can exist together with farmland – not just as hedgerows and standards. Agroforestry is an example of farming the land alongside trees. For example, stock grazing amongst low-density trees, or shelterbelts, or areas of fruit or nut trees mixed in with arable systems.

Why Woodlands, Trees, and Scrub are important (including wider environmental benefits)

Woodland and scrub are found throughout the North of Tyne area and represent some of our most important areas for wildlife, home to iconic species such the red squirrel. Individual trees are also an important part of our landscapes and townscapes and provide valuable habitat for wildlife. Older trees, such as might be found in parkland and hedgerows, contain holes and crevices that may be important for birds, insects, fungi and for bats. Scrub can also be an important habitat for wildlife, particularly open or scattered scrub. Hedgerows (see Chapter 9) are a particular type of scrub habitat which is of importance for a range of birds, mammals, insects and plants in our farmed landscapes.

Trees, scrub and woodlands play an important role in natural flood defence management by incepting rainwater and slowing surface run off into watercourses and drainage systems. They also have a positive impact on air quality as their leaves can filter atmospheric pollutants such as sulphur dioxide or particulate matter. In urban areas street trees and woodland plantings can play an important role in helping reduce the 'urban heat island effect' as so help with climate change adaptation measures. Riparian tree planting can also have a localised cooling effect on rivers, helping to reduce climate change impacts on fish and other aquatic wildlife. Woodlands also act as important carbon stores, sequestering and storing atmospheric carbon dioxide.

Our woodlands are also important places for recreation and tourism, and can act as valued areas of local greenspace near where people live, for example, community orchards (fruit trees and nut trees) or community woodlands.

Woodlands form an ecosystem, which includes fungi, mosses, liverworts, ferns, lichens, microbiomes in the soil, invertebrates, birds, and mammals (see more in the "associated species" section). The wooded ecosystem operates on long timescales that align with nature recovery.

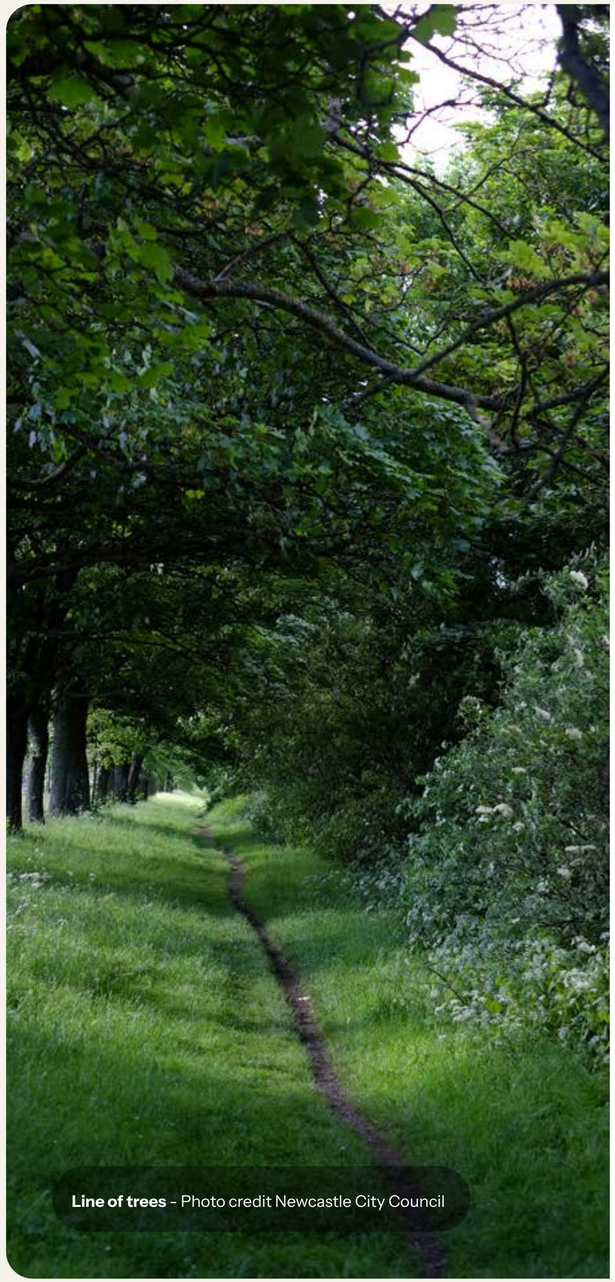
Throckley Dene - Photo credit James Common

Future resilience

Climate change predictions suggest that, in future, the North of Tyne may see hotter, drier summers, wetter and warmer winters, and an increase in extreme weather events such as storms. All these scenarios have the potential to impact on woodlands, trees and scrub. For example, changes in rainfall patterns could affect the composition of species both in the woodland canopy and ground flora and increase drought stress on individual trees. Warmer temperatures can create more favourable conditions for pests, pathogens (such as Ash dieback) and invasive species, while increases in extreme storm events may lead to the loss of mature trees, as was seen with Storm Arwen in 2021. Examples of wetland woodlands (those dominated by species such as Alder, Birch or Willow) are predicted to be especially vulnerable, owing to their reliance on water availability.

Examples of trees and woodland which are in sub-optimal condition or under stress from other causes are more likely to be vulnerable to future climate change impacts. Their future resilience can therefore be improved through improved management, e.g. to control pest species, restore hydrology, or increase woodland size and connectivity. Future "climate-proofing" of woodland management may also require adjustments to the species used in planting.

Woodland, scrub and trees also have a major role to play in building resilience in the wider landscape through their function as carbon stores, but also in the role they play in natural flood defence, improving air quality and localised regulation of temperature.



Line of trees - Photo credit Newcastle City Council

The Resource within the North of Tyne Area

Several distinct types of native woodland can be found in our area, including upland oak woodland, upland ash woodlands, lowland mixed broadleaved woodlands, and wet woodlands. Upland woodland types are typically found in steep-sided valleys with many examples being less than 5ha in size. Wet woodlands can be found on floodplains, on the edges of fens, bogs or open water or along rivers and streams. These different woodland types may be found in mosaics with other habitats or as part of a natural zonation within the same woodland parcel with, for example, wet woodland being found in a valley bottom, oak woodland being found on the valley sides and ash woodland developing on land at the top of the slope.

There is estimated to be more than 13,600 ha[18] of broad-leaved woodland in the North of Tyne area. This is thought to include approximately 2,191 ha of ancient semi-natural woodland. Plantations on ancient woodland sites are thought to cover an area of approximately 4,675 ha. Examples of ancient woodland are found across our area from the high uplands through to urban areas but are often associated with river corridors.

Long-established Woodland (LEW) is an emerging category to describe woodlands.

LEWs are native woodlands that were recorded on the first edition Ordnance Survey (OS) maps in the 1840s and remain on the maps to this day. While they don't have the longevity of ancient woodlands, their continuity of woodland cover is still significant enough to sustain ecological value missing from more recent woodland, and so they are worthy of protection for this reason. Importantly this category also captures woodlands where there isn't the documentary evidence to prove continuity of woodland cover since at least 1600, but which are likely to be ancient woodlands. There are believed to be around 11, 268 ha of such woodlands in the North of Tyne.

At the time of writing, there is no published inventory exists of the full extent of wood pasture and parkland for the UK as a whole. However, we were able to use the reviewed Ancient Woodland Inventory in this area – both in our stage1 mapping (as irreplaceable habitat) and our mapping of measures. This inventory includes "ancient wood pasture and infilled ancient wood pasture". However, there is still a data gap relating to an up to date, agreed and authoritative inventory on parkland.

However, as this habitat is the product of historic land management practices examples are thought to exist on many of the areas' historic estates and designed landscapes. Estimates suggest that there are approximately 120ha of ancient wood pasture and parkland in the North of Tyne.

Records of ancient and of veteran trees exist from across the North of Tyne, with examples found in agricultural and woodland settings, parks and churchyards, on roadsides, and on urban streets in Newcastle and North Tyneside.

Native scrub occurs across our area although no figure for its full extent is available. Scrub can form an important part of habitat mosaics, adding structural diversity to open habitats or forming part of the natural transition between habitat types, although if unmanaged may also threaten the good ecological condition of other important habitats such as grassland or heathland. One particular notable example of this habitat in the North of Tyne is Juniper scrub. Examples of this can be found in the Northumberland National Park, the North Pennines and on the Northumberland Sandstone Hills. The estimated extent of Juniper in our area is 11ha.

18 Figure taken from the Priority Habitat Inventory (PHI)

Current Activity to Conserve and Enhance these Habitats

In the North of Tyne area there is two large-scale initiatives: a Community Forest (covering the Newcastle and North Tyneside area, as well as neighbouring LNRSs) and a Woodland Creation Partnership (the Great Northumberland Forest)[19].

The North East Community Forest (NECF)[20], launched in 2021, is a 30-year, multi-million-pound project that will see tens of thousands of trees planted to benefit the environment, communities, and the economy. The NECF's bespoke grant funding, "Trees for Climate" includes advice, and can fund tree planting in Newcastle and North Tyneside, and up to 10 miles around Newcastle's and North Tyneside's boundary. A forest plan was approved in 2025[21]. Key objectives of the NECF Forest Plan are to:

- Connect trees, woodlands, and hedgerows
- Protect, restore, and sustain the tree woodland and hedgerow ecosystems
- Foster a thriving tree, woodland, and hedgerow culture.

The Great Northumberland Forest (GNF), launched in 2019, is a plan to plant millions of trees, creating more wooded landscapes across Northumberland[22]. It also has an advice service and a bespoke grant funding offer - for trees, hedges, copses, wood pasture / agroforestry – in areas smaller than 1ha. (Above 1ha landowners are encouraged to apply to the England Woodland Creation Offer, or EWCO).

Both the NECF and the GNF go by the principle of, "right tree, right place" (as well as all the regulatory framework around tree planting), and work in partnership with Local Authorities, Natural England, Forestry Commission, to name just a few. Working together, they offer a "one stop shop" to make sure farmers and land managers have the best advice and grant offer. Both initiatives are funded by DEFRA.

Other tree establishment initiatives, as well as the North East Community Forest and the Great Northumberland Forest, active in the North of Tyne area include (not an exhaustive list):

- The Woodland Trust – which offers advice as well as bespoke funding
- The Forestry Commission, Forestry England, and Forest Services
- The different Rivers Trusts across the area – who often focus on riparian tree planting, aiming to improve water quality and the river habitat – and the catchment partnerships
- LIFE WADER partnership project, which aims to improve the water environment for people as well as wildlife and the local economy, again focusing on riparian tree planting
- The Environment Agency, for example past partnership initiatives such as Revitalising Redesdale
- Catchment Sensitive Farming
- Northumberland Wildlife Trust, with initiatives such as the Wildwood Project (and the William's Cleugh pine)[23]
- National Trust, with a lot of tree and hedge planting planned or underway at Wallington in particular
- The Protected Landscapes, with funding through the Farming in Protected Landscapes (FiPL) scheme
- Living Woods[24]

An upcoming initiative will be Wild Kielder[25]. Forestry England has committed to establishing "Forest Wildling Areas" across England, as part of their Biodiversity Plan 2022-2026. The Wild Kielder project will contribute 6,300 ha to this nature recovery initiative, building biodiversity through restoring natural processes. The vision is to create a natural upland ecosystem at scale, with a core of productive and resilient forestry, and a wider landscape mosaic of woodland, scrub, moor, rivers, and crags.

There are other initiatives that aim to manage existing trees, hedges, and woodlands better, and the ecosystem around them. These include the College Valley Estate, and the Wilder Hadrian's Wall initiative, amongst other examples.

There are existing funding opportunities (through Countryside Stewardship) for the management of existing woodland, for restoring PAWS, and for ancient woodlands – amongst other items, such as tree health grants:

- Managing native woodland, including ancient semi-natural woodlands
- Managing and restoring PAWS sites
- PA7: Species management plan
- FY7: Assessing woodland condition

19 www.northumberland.gov.uk/economy-and-regeneration/projects-and-programmes/rural-growth-and-innovation/great-northumberland
20 https://northeastcommunityforest.org.uk/north-east-community-forest
21 Our Forest Plan : 2025 - 2050 | Northeast Community Forest
22 https://storymaps.arcgis.com/stories/e06f03103c364e17b895c6e133e7b03c
23 https://britishandirishbotany.org/index.php/bib/article/view/149
24 Welcome - Living Woods
25 www.forestryengland.uk/kielder-forest/wild-kielder

Priorities

WTS 1: Ancient semi-natural woodlands, ancient and veteran trees and the species which rely on them, are safeguarded through good management and through connection to a landscape richer in trees and scrub

Ensuring that ancient semi-natural woodlands are safeguarded and managed appropriately is the highest priority because of the wide range of plants, fungi and animals that are only or mainly found within such woodland or on ancient or veteran trees. These tend to be species that are very poor colonisers and so can't easily establish themselves on newer woodland sites, or which depend on features such as long-established standing deadwood, and/or fallen deadwood.

Whilst ancient woodland now has relatively strong protection against wholesale removal, a range of pressures are degrading many such woodlands. In the absence of now-extinct native predators such as lynx and wolf, deer numbers have risen to the point that they cause serious problems within many woodlands, as their browsing pressure prevents tree regeneration by preventing a new generation of trees from becoming established, and also reduces or eliminates the shrub layer of lower growing species including bramble and honeysuckle. This leads to an absence of many important woodland habitats, structures and species, and ultimately threatens the existence of the woodland as a whole. Deer numbers are continuing to rise, and so this is a problem demanding urgent action. As deer range widely through the landscape, deer management needs to be coordinated between landowners to be effective. In places livestock have access to woodland, especially sheep in upland woods, where they have similar impacts to deer.

A range of non-native plant and animal species have adverse effects on our most important woodlands. The impact of grey squirrels on red squirrels is set out in a separate section on the red squirrel, but grey squirrels can also severely affect tree regeneration or colonisation, by killing young trees by stripping the bark from them. As with deer, control of grey squirrels requires co-ordination between land managers. Rhododendron can be a significant problem in woods on acid soils. It was often originally planted to provide cover for pheasants, and it forms dense thickets in which nothing else can grow. Himalayan balsam is a particular problem in woodland adjacent to watercourses as its seeds are spread particularly effectively in moving water. It is shade-tolerant and so it forms dense stands in woodland as well as outside of it, that it takes the place of displace native plant communities.

Large numbers of pheasants are reared and then released into woodlands for shooting, with about 40 million birds being released nationally into the British countryside each year. They have a range of ecological impacts including the loss of ground flora around their feeding sites due to trampling, intense predation pressure on woodland invertebrates, and soil enrichment from their droppings (which enables fast-growing species such as nettles to displace less competitive woodland plants). The Game and Wildlife Conservation Trust (GWCT) has produced guidance[26] concerning pheasant releases states that where release pens are placed in sensitive areas such as ancient woodland, the number of birds should not exceed 700 per hectare of pen. However, it goes on to say 'Avoid placing release pens directly onto or close to particularly sensitive locations e.g., patches of woodland that have a notable ground flora, insect fauna or reptile populations.' In practice this is likely to encompass all ancient semi-natural woodland. It is essential that this is followed as a minimum, although it would be better to agree stronger guidance locally, encompassing all relevant habitats (ancient woodland, heathland, and species-rich grasslands).

Many ancient woodlands in the North of Tyne are located within steep-sided denes in South East Northumberland, Newcastle, and North Tyneside. While the National Planning Policy Framework provides strong protection to ancient woodland against removal for new development, the indirect impacts of new development close to such sites can also be significant. Where development is located adjacent to such woodlands, there is inevitably pressure to fell trees on the woodland edge because of safety concerns or shading of gardens, and tree roosts become damaged by building activities. The deposition of garden waste over the fence into the woodland also causes a range of impacts to the ground flora. Consequently, it is essential that adequate buffer zones are provided between the woodland edge and the curtilage of the housing, and that this buffer zone is maintained appropriately forever. For example, it could be planted with native thorny scrub to create an impenetrable barrier. Recreational access to the woodland also needs to be considered, for example by the provision of a path network that directs access away from sensitive areas.

Long-established woodland, whilst not ancient, should also be safeguarded through good management, reflecting their ecological importance.

26 www.gwct.org.uk/advisory/guides/sustainable-gamebird-releasing/

WTS 2: Native woodland is restored on Plantation on Ancient Woodland Sites

Although PAWS have been impacted by the removal of native trees and shrubs and their replacement with a productive timber crop, much of their value persists through the survival of plant seeds and fungi in the soil, and invertebrates and fungi within dead wood. Accordingly, the restoration of native tree and scrub species can lead to a resurgence of the plant, fungi, and invertebrate species particularly associated with ancient woodlands. Successful restoration can require a sensitive approach over time, rather than a simple clear fell and replanting exercise, and the Forestry Commission provides a range of guidance on this.

Where it is not yet appropriate to return PAWS to native species, there are a range of management activities that can help to maintain their ecological value, including the maintenance of open space and of an ongoing supply of standing and fallen dead wood. Again, Forestry Commission guidance[27] and Woodland Trust[28] is available on this. There is also Woodland Condition Assessment[29] guidance to refer to.

WTS 3: Native woodland creation is prioritised in areas where woodland specialist flora and fauna has the best chance of becoming established

Through the selection of appropriate species and planting techniques, new woodlands can be established almost anywhere. However, given how poor many woodland plants, fungi and invertebrates are at colonising new sites, the establishment of new woodland ecosystems is likely to yield quite different results depending on their distance from sources of potential flora and fungi colonists. Consequently, the closer a new woodland is to an ancient woodland, the better the results are likely to be, and so the land immediately adjacent to ancient semi-natural woodland is by far the best place to establish new native woodland. The unique value of such land for this purpose should be recognised, and woodland creation strongly incentivised in such locations.

Planting is not necessarily the best technique for establishing new native woodland, especially where it is located adjacent to existing native woodland. Natural colonisation, possibly enhanced by some ground preparation should be prioritised where possible, as it enables local wild genetic variation to be conserved, and maximises structural diversity as the woodland develops gradually through succession from rough grassland to scrub and then to woodland. It also avoids the risk of importing disease on planting stock produced in large tree nurseries that rely on imported seed. The Forestry Commission has produced guidance on natural colonisation which includes a table of seed characteristics, dispersal considerations, and soil / vegetation types. The Woodland Trust has produced a Woodland Creation Guide which includes all possible methods, including planting, seeding, or natural colonisation, at all scales and settings.

In some situations, e.g. where the likelihood of natural colonisation establishing a resilient woodland edge is relatively low, because of factors such as low species mix or an inappropriate species-mix in the existing woodland, then actively planting an appropriate mix of native species in the adjacent land would ensure the long-term protection and enhancement of ancient and long-established woodland.

WTS 4: The extent of native woodland and scrub is increased in suitable locations within the unenclosed uplands

A range of important open habitats occur in the uplands, in particular bogs, heaths, species-rich grasslands and rushy pastures of importance for breeding waders. However, woodland and scrub are also important upland habitats that are now largely missing from extensive areas of upland in the North of Tyne. Steep-sided ghylls and bracken beds are locations in which upland woodland and scrub can be re-established without damaging other important habitats.

There is also increasing recognition of the importance of complex mosaics of woodland, scrub, heathland, and grasslands maintained primarily by extensive grazing by hardy breeds of cattle and ponies, rather than extensive and uniform areas of single habitats.

WTS 5: There is an increase in native tree and woodland cover in and around our towns and cities, providing wildlife benefits and new greenspace accessible to the public

Trees and woodlands are highly valued as a recreational resource, and so there are various initiatives to increase tree and woodland cover in and around our towns and cities. By choosing appropriate species and planting patterns, the wildlife value of such new woodlands can be maximised alongside their social and recreational functions. Indeed, contact with wildlife is one of the aspects of green space that is most highly valued by people. We recognise the benefits that trees can provide for the character and quality of the built environment, including street trees, parks, community orchards – taking into account the needs of different users of public spaces.

27 Forestry Commission: Managing ancient and native woodland in England (publication FCPG201) and Forest Research https://www.forestresearch.gov.uk/research/lowland-native-woodlands/restoration-of-lowland-plantations-on-ancient-woodland-sites-paws/

28 Practical guidance on Restoring your ancient woodland (Woodland Trust guidance on restoring ancient woodlands))

29 Woodland Condition Assessment (https://woodlandcondition.sylva.org.uk)

Map

You can see where measures have been chosen for inclusion on our map of areas that could become of particular importance for biodiversity by looking at our map:

- **Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity**

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

Only some of the measures were mappable, and even then, only perhaps in part (e.g. for part of the area or for part of the measure as it is written).

Where measures could be applied widely across large areas, statutory guidance requires that we prioritise what is included on the map according to certain criteria, as set out in the mapping chapter (Chapter 11: Mapping).

It should be remembered that any actions that deliver against the measures as they are written, will count as contributing to the delivery of the LNRS. Written measures – both mapped and unmapped – represent our highest priorities.

Mappable

Measures that have been included in our map are shown with this green icon of a map at the left-hand side. Further explanation of the link between the measures and the map layers is in Chapter 11: Mapping.

Not mappable

Not all measures can be spatially mapped, but all remain strategic priorities. Measures that are not mappable are shown with the grey icon of a map at the left-hand side.

Measures

The measures required to achieve the five priorities identified for woodlands, trees and scrub are set out below:

Priority WTS 1: Ancient semi-natural woodlands, ancient wood pasture, ancient and veteran trees, and the species which rely on them, are safeguarded through good management, and through connection to a landscape richer in trees and scrub

WTS 1.1	Manage ancient semi-natural woodland and other broadleaved woodland to ensure structural diversity (well-developed ground flora, shrub layer and canopy) and age diversity (regenerating canopy and shrub species and the presence of standing dead wood or large diameter fallen dead wood), and to promote habitat mosaics with ponded areas and open rides - recognising that non-intervention can be the most appropriate form of management.
WTS 1.2	Manage ancient and veteran trees sensitively, both inside and outside woodland, in accordance with guidance produced by the Ancient Tree Forum[30], aiming to keep trees alive for as long as possible, whilst maintaining the values these trees offer, for example through tree surgery/ reduction rather than removal, and bearing in mind that the best management option may be to do nothing.
WTS 1.3	Increase the effectiveness of deer management across the landscape, to allow for scrub and woodland understorey development, recognising that deer browsing is an increasingly significant and urgent problem.
WTS 1.4	Control invasive non-native species (INNS) in wooded areas (such as rhododendron and Himalayan balsam) to reduce impacts on ground flora, and control grey squirrel (across the North of Tyne area) to reduce impacts on red squirrels and young trees.
WTS 1.5	Identify future ancient and veteran trees and ensure that they are appropriately managed, and their presence recorded on the Woodland Trust's Ancient Tree Inventory[31].
WTS 1.6	Agree and follow a voluntary code relating to release numbers and siting of release pens and feeding areas for non-native game birds. At minimum this should include following Game and Wildlife Conservation Trust (GWCT) best practice guidance, which includes avoiding placing release pens in or close to ancient semi-natural woodland.
WTS 1.7	Exclude livestock where these are impacting on natural regeneration or colonisation.
WTS 1.8	Create buffers of appropriate semi-natural habitat to protect ancient woodland from the indirect impacts of development. Ensure that recreational impacts on ancient woodlands are avoided or managed.

30 Guidance-on-managing-ancient-and-other-veteran-trees.pdf

31 Click here to see the inventory online

Priority WTS 2: Native woodland is restored on Plantation on Ancient Woodland Sites (PAWS)

WTS 2.1	Restore PAWS to native tree species cover, recognising that this may require a gradual transition depending on site and conditions, following guidance in Forestry Commission (FC) Ancient and Native Woodland Practice Guide[32] and any subsequent guidance, and the Woodland Trust's Ancient Woodland Restoration Guide[33].
WTS 2.2	Monitor the condition of restored plantations on ancient woodland sites (PAWS) against success criteria, including species mix, age structure, and regeneration - and address any failures in these
WTS 2.3	Establish collaborative grey squirrel and deer control clusters to help facilitate successful natural regeneration / colonisation, including community volunteers.
WTS 2.4	Where it is not yet appropriate to return them to native tree species, manage plantations on ancient woodland sites (PAWS) sensitively, to provide diversity in age and structure, including creation of open space and retention of standing dead wood or large diameter fallen dead wood as appropriate, in accordance with Forestry Commission and Woodland Trust best practice guidance.
WTS 2.5	Create buffers of appropriate semi-natural habitat to protect ancient woodland from the indirect impacts of development. Ensure that recreational impacts on ancient woodlands are avoided or managed.

Priority WTS 3: Native woodland creation is prioritised in areas where woodland specialist flora and fauna has the best chance of becoming established

WTS 3.1	Expand native woodland cover adjacent to ancient semi-natural woodland, plantations on ancient woodland sites, ancient wood pasture, and isolated SSSI units that are designated for their woodland interest. Natural or assisted colonisation should be prioritised over planting in places where a diverse native seed source is within seeding distance - to conserve local genetic variation, reduce the risk of importing diseases on planting stock, and reduce the use of plastic tree guards.
WTS 3.2	Highlight the unique importance of land adjacent to ancient semi-natural woodland as the best location for tree establishment among land managers, advisors, and the providers of grants and advice.
WTS 3.3	Raise awareness of the new Long Established Woodland dataset, and secure appropriate protection and management for these sites.

32 Managing ancient and native woodland in England
33 Practical guidance on Restoring your ancient woodland

Priority WTS 4: The extent of native woodland and scrub is increased in suitable locations within the unenclosed uplands

WTS 4.1	Establish ghyll trees, scrub, and woodland in suitable locations, using native, locally appropriate species.
WTS 4.2	Outside of ghylls, identify suitable sites for upland woodland, scrub and mosaics with other upland habitats, taking account of other ecological priorities and archaeological sensitivities, and promote establishment work at those sites using native, locally appropriate species.

Priority WTS 5: There is an increase in native tree and woodland cover in and around our towns and cities, providing wildlife benefits and new greenspace accessible to the public

WTS 5.1	In Newcastle and North Tyneside, tree planting should be targeted at areas highlighted in the North East Community Forest (NECF) Plan. Elsewhere, such as in South East Northumberland and the county's market towns, it should be targeted where it will best deliver biodiversity and social benefits, supported by the Great Northumberland Forest and the Northumberland Woodland Creation Partnership.

Holystone landscape - Photo credit Iain Robson

Associated Species

Fungi

Dead wood and woodland soils that have remained undisturbed for long periods of time support important assemblages of fungi, many of which are unable to grow anywhere else. Measures to secure the appropriate management of ancient woodland and ancient and veteran trees, and to restore native woodland species on PAWS sites will contribute to their conservation, especially **WTS 1.1, 1.2, 2.1, 3.1** and **3.2**

Bluebells and wild garlic in an ancient oak woodland - Photo credit David Feige

Plants

Ancient and long-established native woodland supports distinctive plant communities, with 43 species being suggested as being especially indicative of ancient semi-natural woodland in Northumberland[34] including bluebell, wood anemone, wild garlic, moschatel, woodruff, herb Paris, toothwort and sanicle. While none of those species are especially uncommon, they are confined to woodland habitats and generally very slow to colonise new sites, hence the vital importance of ancient and long-established woodland for them, and the value of establishing new woodland adjacent to them, where colonisation is most likely to occur. Similarly, there are a range of lichens, liverworts and mosses associated with them. Measures to secure the appropriate management of ancient woodland and ancient and veteran trees, and to restore native woodland species on PAWS sites will contribute to their conservation, especially **WTS 1.1, 1.2, 2.1, 3.1** and **3.2**

34 "Northumberland" by Angus Lunn (2004) – the Collins New Naturalist Library (95)

Common Blue Damselfly, East Chevington - Photo credit Iain Robson

Invertebrates

As with fungi and plants, ancient and long-established woodlands have distinctive and diverse invertebrate communities, comprising species particularly associated with standing and fallen dead wood, features such as sap runs and specialist fungi and plants. Again, measures to secure the appropriate management of ancient woodland and ancient and veteran trees, and to restore native woodland species on PAWS sites will contribute to their conservation, especially **WTS 1.1, 1.2, 2.1, 3.1** and **3.2**

Fox Cub - Photo credit Kevin Batey

Mammals

Our native woodlands, trees and scrub are important habitat for a range of mammal species, including Red Squirrel (discussed in more detail in Box 7), and bats. Most UK bat species have evolved to live in trees and can be found in and around woodlands. Certain species, such as Noctule or Natterer's Bat are considered to be woodland specialists. Bats use holes, cracks and slits in trees as roosts and will feed in the interior or margins of woodland. Measures to safeguard ancient woodland and veteran trees will contribute towards the conservation of bat species, particularly **WTS 1.3** which deals with management of ancient and veteran trees, **WTS 1.6** which aims to provide woodland buffers, and **WTS 2.4** which aims to provide diversity of tree age structure on PAWS woodlands.

Red Squirrel

The North of Tyne area is a UK stronghold for the Red Squirrel. The species is subject to significant conservation action with landowners, foresters, local communities and environmental organisations all involved in efforts to halt and reverse its decline.

Red squirrel is a woodland specialist. Its preferred habitat is broadleaved woodland but competition with and disease transmission from the introduced Grey Squirrel has led to it increasingly being found in conifer woodlands where Grey Squirrels find it difficult to compete. Conservation efforts for Red Squirrel are therefore not just limited to areas of native woodland. Management of Grey Squirrel is the primary tool available to halt declines in Red Squirrel.

Effective action to conserve Red Squirrel requires coordinated action both locally and regionally. There are a number of red squirrel conservation groups that actively manage grey squirrels.in both rural and urban areas. Coordination of activity across the north of England is provided by Red Squirrels Northern England (RSNE), a partnership operating across Cumbria, Northumberland, Tyne & Wear, County Durham, North Yorkshire, Lancashire & Merseyside. Northern Red Squirrels Northumberland is the umbrella for groups in Northumberland. In 2023, the UK Squirrel Accord published the England Red Squirrel Action Plan (2023-2028) which provides a framework of strategic actions to guide the recovery of Red Squirrel nationally. There are also a number of independent community red squirrel groups undertaking valuable work especially on grey squirrel control.The Government have recently updated the policy statement on grey squirrels[35].

RSNE and the England Action Plan together provide a full picture of priorities for Red Squirrel recovery. The following measures in this Local Nature Recovery Strategy also contribute towards Red Squirrel conservation (relevant sections highlighted in bold):

WTS 1.4 Control invasive non-native species (INNS) in wooded areas (such as rhododendron and Himalayan balsam) to reduce impacts on ground flora, and control grey squirrel (across the North of Tyne area) to reduce impacts on red squirrels and young trees.

See Chapter 9: Opportunities for Nature Recovery within the Wider Countryside and Chapter 10: Overarching issues, opportunities, and priorities for nature recovery in the North of Tyne for further information about the contribution that mixed woodland and coniferous plantations make to Red Squirrel conservation.

35 Grey squirrel policy statement: managing the impact of grey squirrels - GOV.UK

Red Squirrel – Photo credit Laurie Campbell

Box 7 - Red Squirrel

Birds

Woodland, scrub and trees are also an important habitat for birds. Several bird species, such as Pied Flycatcher, Goshawk and Wood Warbler are strongly associated with mature woodland.

Willow Tit is a nationally declining species which has limited mobility across open landscapes and relies on patches of woody vegetation, scrub and young woodland. Such species rely on diverse and healthy woodlands to thrive. The measures identified under **WST 1, WST 2, WST 3** and **WST 4** will all contribute towards having more extensive and better-quality woodland habitat for such birds, as will measures related to woodland contained in Chapter 9 of this document.

Scrub can provide important roosting and feeding areas for migrant birds, especially those arriving on the coast from across the North Sea. Black Grouse rely on a mosaic of upland habitats throughout the year including scrub and woodland.

Black Grouse recovery will be supported by measures to establish ghyll woodland (**WTS 4.1**) and increase the extent of upland woodland and scrub (**WTS 4.2**).

Jay - photo credit Kevin Batey

Chapter 7

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Coastal, Marine and Wintering Waders

The statutory boundary of this Local Nature Recovery Strategy extends down to the lowest part of the tide (known as mean low water). Marine habitats are included within the Strategy where they fall within the intertidal zone (the area covered by the sea for part of the day). In this chapter we also mention habitats and measures for areas that are permanently covered by the sea (subtidal areas). These do not form part of the formal part of the document but are included as we believe their recovery is intrinsically linked to the wider nature recovery priorities for land and intertidal areas set out in the Strategy as a whole. These non-statutory sections are shown in separated boxes with a wave icon such as this one.

Common Mussel shells – Photo credit Iain Robson

What is included in this section and definitions

Coastal Sand Dunes

Definition: Dunes are areas of coastal sand which have been colonised and stabilised by plants. They range from embryonic dunes which are areas of pioneer vegetation which may be dominated by one or two species, such as marram grass, through to fixed dunes, which are mature areas of grassland which may contain many different species of plants.

In long established areas of dune, the underlying soils may have become acidic and dune heath may develop, dominated by dwarf-shrubs such as heather. Also included within this definition are dune slacks, which are wet areas within dune hollows often dominated by sedges and brown mosses.

Coastal slope and cliff

Definition: Areas of sea-cliff and associated slopes on the coast. These include cliffs and slopes found on land and cliffs and slopes found on offshore islands. Exposure to salt-spray often results in this habitat being dominated by salt tolerant plants. Sea-cliffs also provide an important nesting habitat for seabirds.

Rocky reefs (sometimes also described as rocky shores)

Definition: Rocky marine habitats consisting of bed rock, boulders or cobbles. Rocky reefs generally arise from the seabed and show an unbroken transition from seabed into the tidal zone where they are exposed to air at low tide. In several areas sea caves have formed as part of the reef. These range from caves of a few metres in size to extensive sea cave systems in sub-tidal areas.

Mudflats and sandflats

Definition: Areas of sands and muds of the open coast and estuaries which are not covered by the sea at low tide.

Rocky reef at Bamburgh – Photo credit Felix Mulderrig

Tidal sandflats at Budle Bay in Northumberland –
Photo credit Berwickshire and Northumberland Marine Nature Partnership

Saltmarsh

Definition: Areas of salt-tolerant vegetation, regularly immersed in seawater, which develop naturally on the upper margins of intertidal mudflat. Saltmarsh typically shows a zonation in the types of vegetation present depending on the frequency and duration of salt-water coverage, with pioneer vegetation such as glasswort at the lower levels which are frequently covered by the sea and upper areas which can only tolerate infrequent coverage.

Seagrass beds

Definition: Beds of seagrass (Zostera species) on intertidal mud or sand down to mean low water. Seagrass beds which occur below mean low water are included within the non-statutory section of this document.

Blue mussel beds

Definition: Beds or reefs of blue mussel on intertidal sediments such as sand or mud on the open coast and estuaries. This definition does not include aggregations of blue mussel on rocks or boulders. Blue mussel beds may also occur on sediments below the mean low water mark. These are included within the non-statutory section of this document.

Zostera, Lindisfarne

Mussel bed - Photo credit Northumberland Marine Nature Partnership

Subtidal habitats (habitats which are found below the lowest part of the tide)

The following habitats fall below mean low water and so do not form a statutory part of this Local Nature Recovery Strategy. However, they are an important part of the nature of the North of Tyne area and their health is strongly linked to activity which takes place in terrestrial and intertidal marine areas.)

Subtidal rocky reefs

Definition: Those parts of a rocky reef (described above) which are found below the lowest part of tide.

Kelp beds

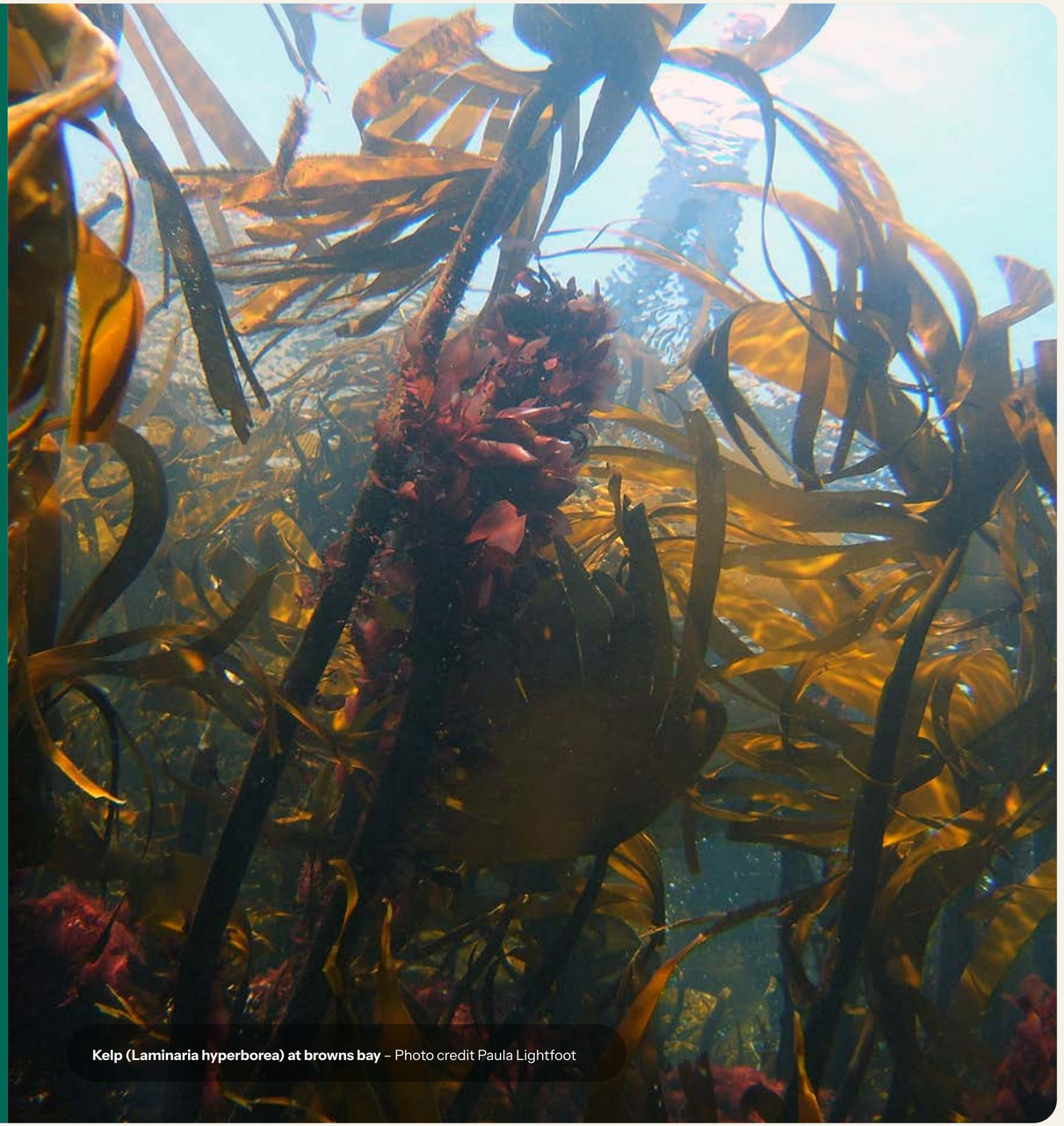
Definition: Dense areas of Kelp (a collective name for several species of large brown seaweed) which develop on bed rock and boulders and form a canopy under which marine creatures and other seaweeds can live.

Sub-tidal biogenic reefs

Definition: Reefs found below the lowest part of the tide which are made from the hard parts of living marine organisms, such as shells or tubes. This habitat includes subtidal examples of blue mussel beds and Sabellaria reefs (reefs constructed out of the tubes of a type of marine worm).

Marine sediments

Definition: These includes habitats of shingle (mobile cobbles and pebbles), gravel, sand and mud or any combination of these which occur below the lowest part of the tide. These, together with reef habitats, make up most of the seabed of the North of Tyne area.



Kelp (Laminaria hyperborea) at browns bay – Photo credit Paula Lightfoot

What is not included in this section

Breeding and wintering waders make extensive use of grasslands, but because of their importance in the North of Tyne area and their particular requirements, they are considered in the grasslands section of the LNRS.

Coastal and floodplain grazing marshes are considered in the Rivers and Wetlands section (Chapter 5), as they are primarily defined by their hydrology.

Habitats which are found below the lowest part of the tide are included within this document because of their importance in the North of Tyne area, but do not form part of the statutory element of this LNRS, which only extends down to mean low water.

Brittlestar Cresswell – Photo credit Iain Robson

Interactions with other habitats

The coastal and marine environment is influenced by the quality of the water that flows into it from rivers, and that influence can be especially strong in enclosed bays subject where there is less tidal flushing. This can be seen in the growing problem of filamentous algae growing on mud and sandflats around Holy Island, fuelled by nitrogen pollution from streams and rivers.

There is a natural transition between different marine and coastal habitats, with one habitat evolving into another as physical factors such as distance from the sea or length of tidal inundation change. This can be seen, for example, in the development of areas of saltmarsh from areas of intertidal mudflat. Estuaries are an important transition zone between marine and freshwater habitats.

Low Newton by the Sea Beach – Photo credit Dan Wales-Hart

Why coastal and marine habitats are important (including wider environmental benefits)

The coast is a distinctive part of the character and landscape of the North of Tyne area. It supports a range of recreational and eco-tourism activity which attractors visitors and supports livelihoods, including the local fishing economy. Habitats such as saltmarsh and seagrass beds act as nursery areas for commercial fish species, while rocky reefs are home for crustacea such as lobster, meaning that a healthy marine environment is crucial to maintaining local fisheries. Coastal and marine habitats are under increasing pressures from changing climate, from increases in recreational uses, from the spread of invasive species, and from changes land-use.

Coastal habitats act as natural coastal defences protecting the land from storm surges, flooding and erosion. There is increasing recognition of the importance of marine habitats as long-term stores of atmospheric carbon dioxide. ‘Blue Carbon’ habitats as they are called include sand dunes, saltmarsh, mudflats, seagrass beds and shellfish beds. Their restoration can help towards the achievement of Net Zero goals.

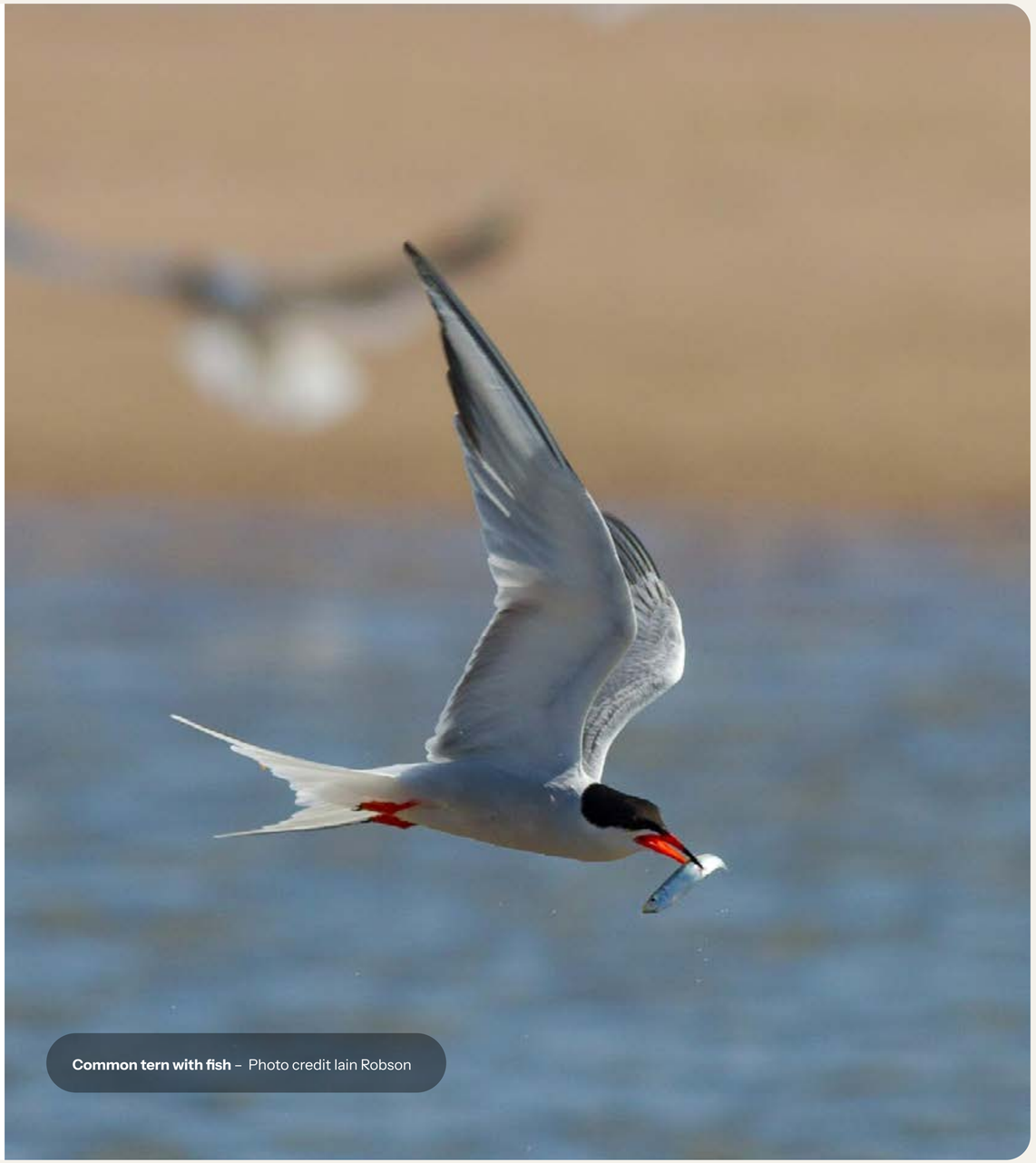
Future resilience

Predicted future changes to climate pose direct and indirect threats to our coastal and marine habitats and to the benefits (such as natural flood defence) which they provide to people. Changes in average temperatures and in patterns of rainfall will affect the composition of species found on many of our habitats. Areas of dune slacks are likely to be particularly vulnerable due to drying out and reductions in the level of water tables. Rises in sea-levels would result in deeper waters and bigger waves causing increased erosion at the seaward edge of saltmarsh, dunes, and coastal cliffs. This could lead to direct losses in extent as well as to additional 'coastal squeeze' in locations were built infrastructure prevents natural roll-back of habitats.

Eider ducks – Richard Willis

There are also potentially wide-ranging impacts on our marine environment from changes in seawater temperature, salinity, sea level, rainfall and weather patterns. Impacts include changes in the distribution of animals as they move to new areas to cope with changing conditions. There is existing evidence of changes to the timing of life events of some marine creatures which can in turn affect the availability of food items used by important populations of marine mammals and or seabirds.

The resilience of our existing coastal and marine habitats can be increased by taking action to reduce some of the other pressures which they face, by creating a more natural shoreline, and by taking action to restore natural coastal processes.



Common tern with fish – Photo credit Iain Robson

The Resource within the North of Tyne Area

The coast in the North of Tyne area is characterised by wide sandy bays backed by dune systems and interspersed with rocky headlands and rock platforms, small river estuaries, and intertidal flats. Our inshore coastal waters are one of the most important marine areas in Europe and supports a range of tidal and sub-tidal habitats and their associated species.

Dune complexes are found along its length from Tynemouth to the Tweed Estuary covering an area of approximately 1,235ha (over 10% of the total English sand-dune resource). There is high concentration of this habitat in north Northumberland where extensive dune systems can be found at Lindisfarne, Ross Sands, Beadnell Bay, Embleton Bay, and Warkworth. Notable dune system can also be found in the south of the area on Druridge Bay and at Blyth South Beach. Areas of embryonic dune have been created at Tynemouth through management interventions.

Intertidal sand and mudflats can be found in the estuaries of all the rivers within the North of Tyne area and cover an area more than 3,200ha. The largest extent of intertidal flats in our area can be found around Lindisfarne. Fenham Flats, Ross Sands, Budle Bay, and the coast adjacent to the north of Holy Island form the most extensive area of intertidal sand and mud in North East England. These support one of the largest intertidal beds of seagrass on the east coast of the UK, covering around 770ha. There is also a diverse collection of animals living within the sediment, including internationally significant populations of wintering birds. Saltmarsh can be found at the upper margins of intertidal mud and sandflats develop. Around 380ha of coastal saltmarsh is present within the North of Tyne area, with notable examples of this can be found around Lindisfarne, on the Long Nanny Burn in Beadnell Bay, on the Aln estuary, and at Warkworth. Smaller areas can also be found on the Blyth, the Seaton Burn, and the Tyne estuary.

River estuaries act as transitional areas between marine and freshwater and can contain important areas of intertidal mudflat and saltmarsh, provide feeding and roosting locations for coastal birds, and act as nursery areas for fish. The North of Tyne contains examples exist of relatively unmodified estuaries, such as those of the Tweed and the Aln, and heavily modified estuaries such as the Tyne and the Wansbeck.

Sea-cliffs and associated maritime slopes are also a common feature across the extent of the North of Tyne coast and can be found on the mainland and on offshore islands. These are home to a variety of salt-tolerant plant species but are especially important as a breeding site for seabirds such as kittiwake, puffin, fulmar and guillemot. There are more than 20km of marine cliff within our area with approximately 150ha of associated maritime grassland.

Rocky shores are a common feature of our coastal landscape and are part of a larger complex of rocky reef features that occur in our marine area. There is more than 20,000ha of rocky reef found in the inshore areas of the North of Tyne with most of this found in the subtidal zone below the low water mark. These areas are among the most diverse habitats in the North Sea and home to an array of marine and coastal wildlife. Associated with our rocky shores and cliffs are sea caves varying in size from a few metres across to extensive systems and supporting a rich array of marine life. Areas of biogenic reef (the name given to reefs made from the hard parts of marine organisms) can be found on our coast. The intertidal flats around Holy Island and on the Blyth estuary have previously supported extensive beds of blue mussel reef. These once covered an area of more than 100ha but have shown a steep decline in extent over the last decade.

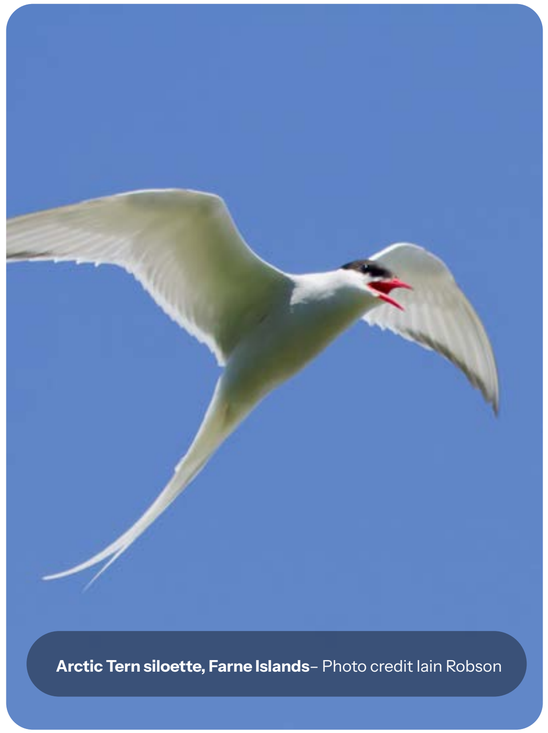
Otter - Photo credit Duncan Hoyle

Subtidal sediments cover more than 13,000ha of our seabed. Together with the associated water column they an important part of the marine ecosystem and support a diversity of life including anemones, crustacea, polychaete worms, bivalves and sea pens. Such areas can be important spawning grounds for fish such as sandeel which in turn form the food resource used by the internationally significant populations of breeding seabirds which use this part of the coast as for marine mammals such as grey seal.

Present within the subtidal seabed are small areas of reef formed by Sabellaria, a type of tube-dwelling marine worm.

Examples of current activity to conserve and enhance these habitats

A significant amount of activity is already taking place by organisations and by individual land managers to conserve and enhance our coastal habitats. Here are just a few examples to illustrate the breath of this work:



Arctic Tern siloette, Farne Islands– Photo credit Iain Robson

Management of coastal habitats by organisations

- Large parts of the coast and shore at Druridge Bay are managed for nature by Northumberland County Council, Northumberland Wildlife Trust, and the National Trust. Northumberland County Council is a significant land manager of the dunes along the bay, which are grazed in part by cattle, and holds much of the beach itself on a long lease.
- The internationally important areas of coastal and intertidal habitat at Lindisfarne National Nature Reserve contains are managed by staff from Natural England. Dune habitat on the reserve is managed for important plant species, such as coralroot orchid - while on intertidal areas, methods of removing mats of macroalgae are being trialled as part of the LIFE WADER project. LIFE WADER is also undertaking a range of works inland aimed at reducing nutrient inputs into coastal waters and intertidal habitats.
- Northumberland Estates and The Northumberland Coast National Landscape is working at Buston Links near Alnmouth on a habitat enhancement scheme which, will create and enhance 8ha of saltmarsh, brackish, and freshwater marsh habitat.

Conservation of important habitats for birds and seals

- Coquet Island near Amble is managed by the RSPB as a Bird Sanctuary. Management includes tern nest boxes and vegetation management to help maintain suitability for ground nesting birds. The National Trust own and manage the Farne Islands National Nature Reserve and undertake visitor management and practical habitat management activities to protect the important populations of breeding seabirds and Grey Seal found there.
- Several projects, groups and organisations are working on the conservation of breeding and wintering shorebirds on mainland areas. These include LIFE WADER/Natural England, the National Trust, Space for Shorebirds and the St Mary's Island Wildlife Conservation Society. Activities include wardening and management of nesting sites of species, such as Ringed Plover and Little Tern, and public outreach and engagement over recreational disturbance to coastal birds.
- In additional to work to protect coastal birds, volunteers from the St Mary's Island Wildlife Conservation Society undertake outreach and wardening activity at Grey Seal haul out areas to reduce the impacts of disturbance from people on Grey Seals at their haul out areas.

Ringed plover – Photo credit Richard Willis

Pirri pirri bur – Photo credit GB Non-native Species Secretariat

Management of Invasive Non- Native Species (INNS)

Control of the invasive non-native plant pirri-pirri bur is undertaken on the Lindisfarne NNR by Natural England staff and on the wider north Northumberland coast by volunteers from the Northumberland Coast National Landscape. Monitoring for the presence of marine INNS and work to engage harbours and marinas over biosecurity planning is undertaken by Newcastle University, with support from the LIFE WADER project and the Berwickshire and Northumberland Marine Partnership.

The Northumberland Inshore Fisheries and Conservation Authority (NIFCA) publish an annual research plan, as well as past environmental and student reports[36].

36 Publications - NIFCA

Priorities

CM 1: The condition and quality of important coastal, estuarine, and marine habitats is maintained and improved

The North of Tyne area is noted for the range and diversity of its coastal and marine habitats. Maintaining the quality and diversity of these habitats is our priority for nature recovery in the coastal zone.

Overgrazing, grazing at the wrong time of year or the absence of grazing can all impact on the botanical diversity of dune grasslands and can impact on wider dune ecosystems and the other species which use habitat. Tailored grazing regimes, with the right types of grazing animals, in the right number at the right time of year can maintain or increase and improve the diversity and quality of dune grasslands. Lack of grazing on dune grasslands can also lead to encouragement by bracken and scrub. Although these can have value for birds and insects as part of a wider habitat mosaic their dominance can cause the loss of important dune habitat and a reduction in overall diversity. In such cases active management may be needed to remove scrub or control bracken to improve habitat condition. The invasive non-native plant pirri-pirri bur is a major threat to dune habitats in many parts of the North of Tyne area. This plant takes over large areas of dune and taking space away space native wildflowers and is easily spread to new areas through its seeds which easily attach to clothes, shoelaces and animal hair. Active removal of the plant is being carried out in several locations but there remains more work to be done.

Invasive non-native species are not just a problem for terrestrial habitats but also pose a threat to the condition of inter-tidal and subtidal marine habitats. The North of Tyne currently has relatively fewer marine invasives recorded from our coast and estuaries than in many other areas of the UK but the risk of accidental introduction through recreation, shipping, aquaculture or coastal development remains high. Once introduced, such species could have a major impact of our marine and intertidal and subtidal marine areas, by altering the species make-up of our marine ecosystems and causing the loss of native species. Marine invasives are difficult and expensive to eradicate once introduced and can cause wider social and economic problems for marine business and sea-users. Awareness raising, good biosecurity measures and good surveillance are all key to preventing or reducing the spread of marine invasive species.

There is also pressure on our coastal and marine habitats through impacts from poor water quality (dealt with in CM2 below) and recreational pressures. Recreational use of both land and sea can result in disturbance to important wildlife, particularly to breeding and wintering birds, and to seals and other marine mammals. Such disturbance can reduce the quality of breeding, feeding or resting areas birds and animals and can cause trampling to sensitive habitats.

Active visitor management is in place at several locations to inform the public about recreational impacts on wildlife and to actively manage access to sensitive areas.

Disturbance from watercraft and from people is also an issue for marine mammals such as seals, whales and dolphins and can reduce the quality of our inshore waters as a habitat which they can use.

Grey Seal Druridge Bay – Photo credit Iain Robson

Blue Mussels - Photo credit Berwickshire and Northumberland Marine Nature Partnership

Extensive beds of blue mussel previously existed on intertidal sediments at Lindisfarne and on the Blyth Estuary. These form an important component of the intertidal mudflats and sandflats as well as providing habitat for other marine creatures to colonise and a food source for other wildlife such as Eider. The beds are monitored annually and have shown catastrophic and ongoing declines in both extent and density over recent years. A similar pattern of loss has been observed at other locations along the East Coast of the UK, but the reasons for these declines is not yet understood, making it difficult to take actions to promote recovery. More research and investigations are needed to determine the cause of mussel loss and to develop conservation actions.

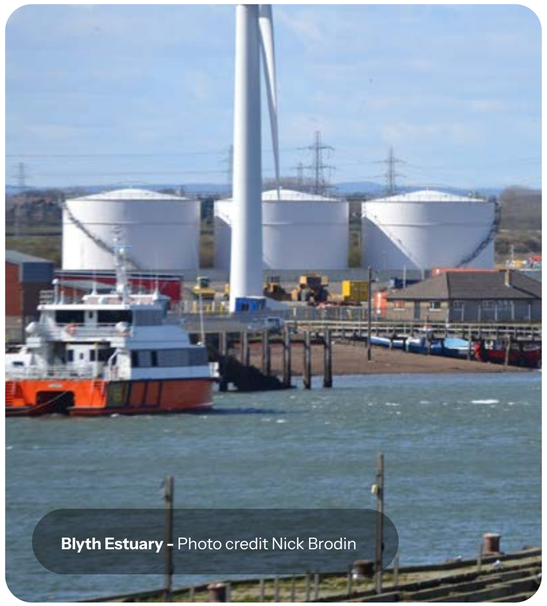
The value of habitats as places for wildlife can be enhanced by management which provides a diversity of habitat structure which different plants and animals can make use of depending on their own requirements. The quality of habitats such as dune grasslands or saltmarsh can be increased by providing vegetation of different heights, ages and successional stages, including small areas of bare ground.

Our coast and estuaries also contain several man-made structures, such as piers, seawalls and slipways. Theses often have limited value for wildlife but in some locations may form areas where marine plants and animals can colonise or important breeding or roosting sites for coastal birds. There is scope to enhance the wildlife value of coastal infrastructure through measures such as creating textured finishes which mimic natural habitats, retrofitting of artificial rockpools or habitat tiles, or creating ledges, fish refugia, or nesting opportunities for birds.

CM 2: The quality of coastal and estuarine waters is improved

Poor water quality can have a big impact on our inshore coastal waters and the habitats found there. For example, excessive amounts of nitrates can promote the growth of dense mats of opportunistic green algae such gutweed. This can smother areas of intertidal mudflats, sandflats and seagrass beds, suffocating underlying habitats and fauna and can preventing the birds which feed on such areas from accessing their food sources. Excessive carpets of green algae are present at several intertidal areas in the North of Tyne area, such as at Budle Bay in North Northumberland. Poor water quality has also been suggested as one of the possible causes of declines in the blue mussel beds at Lindisfarne and on the Blyth Estuary.

The main causes of poor water quality in our inshore coastal waters and estuaries originate on land in the wider catchments which drain into the sea. Water quality reflects the management of the wider river catchments which drain into the sea and is influenced by farming, forestry, urban water management, the management of sewage, domestic chemicals, and industrial processes. Several initiatives are currently underway to assess and address the causes of poor water quality and a number of well-established techniques are available to reduce the amounts of pollutants entering wider river catchments. These include the protection of river margins and the creation of small wetlands.



Blyth Estuary - Photo credit Nick Brodin

Water quality is also a significant pressure on the health of our subtidal marine habitats. Action to improve the quality of coastal waters will aid the natural recovery of marine habitats and associated wildlife.

CM 3: The ecological connectivity between coastal habitats is increased

Many of our most important coastal habitats, such as sand dunes and saltmarsh, show a dynamic transition from area of pioneer vegetation through various succession stages to areas of mature, well-established, vegetation which often grades into other habitats. Maintaining and encouraging these transitions and this dynamism is important to creating diverse and robust areas for nature. Within the coastal zone, there are often very distinct boundaries between areas of semi-natural habitat and areas of agricultural land or developed land and a lack of transition zones between habitat patches. There are opportunities to soften these transitions through creation of buffer zones or through greater use of management approaches which make the wider agricultural or built land more permeable to wildlife.

Some of the biggest challenges facing nature recovery on our coast and sea, such as water quality, can originate many miles inland from activity within wider river catchments. Adopting a 'source to sea' approach and recognising the functional linkages between the land and the sea will be an important principle when considering nature recovery in the coastal zone.

CM 4: There is an increase in the abundance and patch size of important coastal and marine habitats

Opportunities exist for the expansion of coastal and marine habitats, although it is recognised that this should not take place at the expense of existing habitats of high value and that the creation of new areas of coastal habitat is a lower priority than maintaining and increasing the quality of existing habitat patches. Some of these expansion opportunities may come through what is called passive restoration, whereby habitats expand naturally in response to reduced pressures. Active creation of new areas of intertidal and marine habitats requires local access to capacity in the form of materials (such as seeds or plant propagules), appropriate equipment and suitable skills and expertise. Encouraging the natural roll-back of dune systems may offer another opportunity for habitat expansion although the hard infrastructure which backs on to several of our most important dune systems may make this difficult. Some opportunities for active expansion of habitats may be available in some areas, particularly where there is potential for creating new areas of intertidal habitat such as saltmarsh through managed realignment. The Scottish Border to River Tyne Shoreline Management Plan can help to identify potential areas where opportunities for this might exist.

Curled octopus near St Mary's – Photo credit Paula Lightfoot

It is anticipated that most expansion of subtidal marine habitats will be from passive restoration achieved through reducing pressures on our marine environment. Most of these pressures, such as water quality, are shared with intertidal marine habitats.

Map

You can see where measures have been chosen for inclusion on our map of areas that could become of particular importance for biodiversity by looking at our map:

- **Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity**

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

Only some of the measures were mappable, and even then, only perhaps in part (e.g. for part of the area or for part of the measure as it is written).

Where measures could be applied widely across large areas, statutory guidance requires that we prioritise what is included on the map according to certain criteria, as set out in the mapping chapter (Chapter 11: Mapping).

It should be remembered that any actions that deliver against the measures as they are written, will count as contributing to the delivery of the LNRS. Written measures – both mapped and unmapped – represent our highest priorities.

Mappable

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Not mappable

Not all measures can be spatially mapped, but all remain strategic priorities. Measures that are not mappable are shown with the grey icon of a map at the left-hand side.

Measures

CM 1: The condition and quality of important coastal and marine habitats is maintained and improved

CM 1.1	Secure the appropriate management required to restore the condition of degraded dune systems, including the introduction of extensive cattle grazing and scrub or bracken control where necessary is introduced on all dune systems that it is feasible to graze.
CM 1.2	Modify stocking regimes on currently grazed dune systems where needed, to ensure that grazing density and duration is appropriate to maintain or restore the interest of the dune grassland.
CM 1.3	Increase the availability of suitable livestock (especially slow-maturing hardy breeds of cattle) in the lowlands through measures to sustain mixed farming, and through the expansion of conservation initiatives such as Flexigraze.
CM 1.4	Maintain an effective pirri-pirri bur control strategy is maintained, including ensuring that those good quality dunes where it isn't yet widely established rampant can be brought into management and maintained as effectively free of this species.
CM 1.5	Maintain the condition of, and where appropriate expand, areas of early successional dune habitat particularly in coastal locations in urban or urban edge areas.
CM 1.6	Continue work to seek and to implement long-term sustainable management solutions for the impacts from the growth of ephemeral green algae on important areas of intertidal mudflat and sandflat.
CM 1.7	Continue with regular monitoring of the extent of current blue mussel beds at Lindisfarne and in the Blyth estuary. Identify any additional mussel beds present within the plan area.
CM 1.8	Undertake research into the causes of decline of blue mussel populations within the plan area and within the East Coast more generally. Seek to obtain additional funding for research projects and restoration activity, including development of the capacity and infrastructure needed for blue mussel restoration once reasons for current decline are better understood.
CM 1.9	Promote biosecurity messages such as "Check Clean Dry" and "Be Plant Wise", and promote awareness of the threats posed by Invasive Non-Native Species (INNS) with recreational user groups and the public.
CM 1.10	Undertake biosecurity training with ports, harbours and marinas to raise awareness of marine INNS, and work with these to develop site-based biosecurity plans.
CM 1.11	Support site wardening, outreach, and education activity aimed at reducing the impacts of disturbance on important breeding, feeding or resting locations (including man-made structures) used by coastal birds.
CM 1.12	Support site wardening, outreach, and education activity aimed at reducing the impacts of disturbance at important haul out sites for seals.
CM 1.13	Support work by statutory agencies, the police and other stakeholders to raise awareness of the legal protection given to marine mammals and to reduce instances of disturbance to whales and dolphins using our inshore waters.

Beadlet anemone

Squat lobster, near Blyth – Photo credit Paula Lightfoot

CM 2: The quality of coastal and estuarine waters is improved

CM 2.1	Reduce diffuse and point source pollution from agriculture and other land uses through management of inputs, slurry and silage pits. Increase the proportion of farms that have nutrient management plans and that adhere to catchment sensitive farming guidance. Promote nature friendly farming agricultural techniques.
CM 2.2	Create buffer strips (ideally of at least 20m width) to protect streams and rivers from pesticides, fertilisers, and silt.
CM 2.3	Reduce diffuse and point source pollution from housing through good management of household septic tanks, with upgrading to modern package treatment plants where possible.
CM 2.4	Establish constructed wetlands to treat discharges from sewage treatment works.

CM 3: The connectivity between coastal habitats is improved

CM 3.1	Manage coastal areas in a way which enables the creation of transitional areas between different habitat patches and which, where possible, retains the different successional stages found within habitats.
CM 3.2	Work at a landscape-scale to ensure that coastal species have access to the appropriate mosaic of habitats they require to meet their life requirements, and their dispersal needs
CM 3.3	Promote awareness of the linkages between the land and the sea, and how activity within river catchments and urban areas can impact on marine and coastal habitats and species.

Common starfish

CM 4: The is an increase in the abundance and patch size of important coastal and marine habitats

CM 4.1	Facilitate roll-back of dune systems in locations where this is ecologically appropriate and practically possible.
CM 4.2	Create new areas of intertidal habitats, such as saltmarsh and mudflat, in ecologically and logistically appropriate locations, through mechanisms such as managed re-alignment or restoration of tidal regimes and salt-water inundation.
CM 4.3	Identify and implement opportunities to incorporate wildlife-friendly enhancements into new and existing coastal infrastructure where it is ecologically and structurally appropriate to do so. Examples of enhancements could include fitting of artificial rockpools, measures to increase colonisation of hard surfaces by marine organisms, or creation of roosting or breeding sites for coastal birds.
CM 4.4	Identify new potential breeding areas for shorebirds and put management in place to enhance the suitability of locations where it is ecologically appropriate and practical to do so.
CM 4.5	Assess the current capacity available for coastal and marine habitat restoration projects in the North of Tyne area to identify whether access to additional plant materials, equipment or training is required to support local habitat restoration ambitions and protect existing donor sites.
CM 4.6	Work with marine regulators and partners to reduce pressure on the marine environment to promote the passive recovery and natural expansion of marine habitats.

Associated Species

The following are some of the important species are associated with our coastal and marine areas.

Wintering waders and wildfowl

The coastal habitats of the North of Tyne area support nationally and internationally important populations of winter waders and waterfowl. Important wintering species include Purple Sandpiper, Turnstone, Pale-bellied Brent Goose, and Eider. Wintering coastal birds require healthy coastal and marine/intertidal habitats in which to feed and a lack of disturbance in their feeding and roosting areas. Breeding and wintering waders are considered in a separate the grassland section of this Local Nature Recovery Strategy but will benefit from the wider actions identified to maintain and improve habitat condition (**CM 1**), address coastal water quality issues (**CM 2)** and to protect important locations from disturbance (**CM 1.10**). Waterfowl will also benefit from these measures. In addition, eider ducks, whose regular diet includes blue mussel, will benefit from measures to address the local declines in blue mussel beds (**CM 1.7**).

Purple sandpiper – Photo credit Richard Willis

Breeding shorebirds and seabirds

Breeding populations of coastal birds are a distinctive feature of the North of Tyne coast with many species occurring in nationally or internationally significant numbers. Examples include colonial seabirds such as Puffin and Kittiwake, breeding sea ducks such as Eider, nesting Tern species such as Roseate Tern, Arctic Tern and Little Tern, and shore birds such as Ringed Plover. These require a healthy marine environment to provide food for themselves and their chicks and breeding sites which are free from disturbance and predators. The needs of breeding seabirds will be met through measures to maintain and improve habitat condition (**CM 1**), particularly to protect important bird sites from disturbance (**CM 1.10**), through measures to address coastal water quality issues (**CM 2**), to protect important bird locations from disturbance (**CM 1.10**) and to create suitable new breeding sites for shorebirds (**CM 4.4**). In addition, breeding Eider will benefit from measures to address the local declines in blue mussel beds (**CM 1.7**).

Puffins and Guillimot on Inner Farne – Photo credit David Feige

Kittiwake, North Tyneside coast – Photo credit Iain Robson

Tyne Kittiwakes

The breeding populations of Kittiwake found along the estuary of the River Tyne are an important aspect of our local wildlife and are the most inland breeding population of Kittiwake in the world. The species is declining in numbers globally making the Tyne population particularly important. The Tyne birds make their nests on ledges on building or on structures such as the Tyne Bridge. Given the importance of the built environment for the birds, and their interactions with people, we believe that an additional measure for Kittiwake is needed.

Priority TK 1: Maintain sustainable populations of Kittiwake on the Tyne estuary

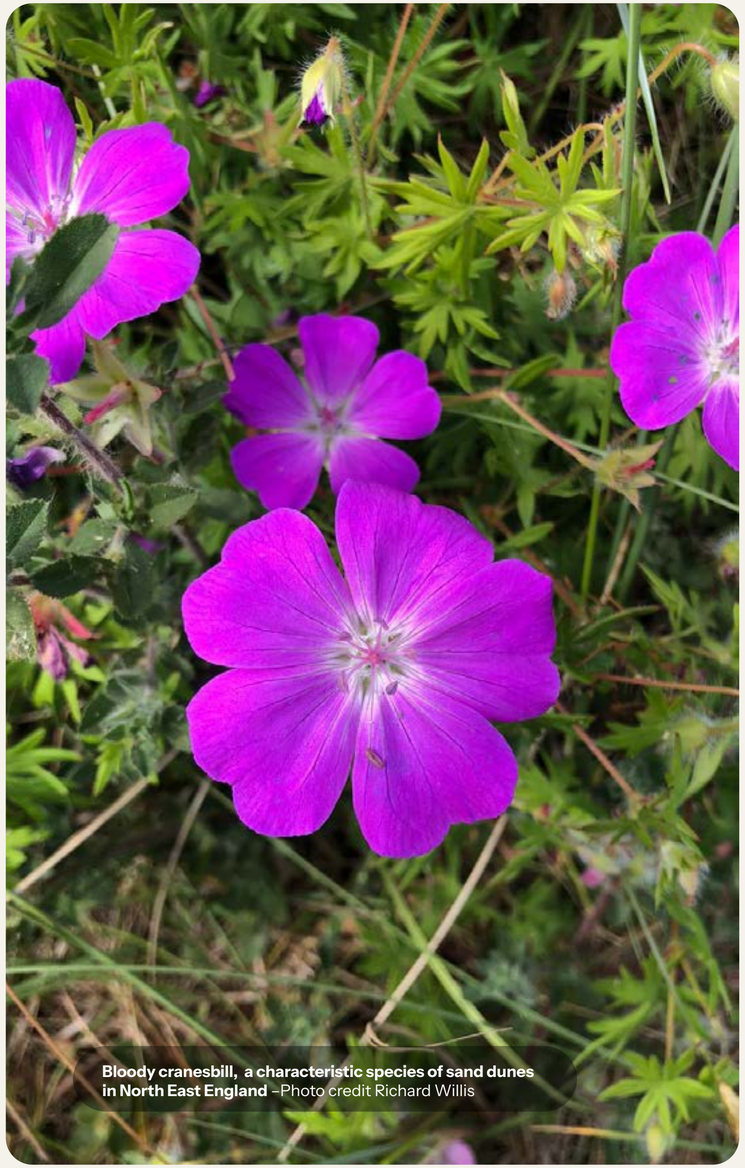
TK 1.1 Engage with the public and businesses over the importance of our urban Kittiwake populations to help to protect existing nesting sites and to identify new, sustainable, nesting opportunities.

Coastal plants

The North of Tyne coast is home to a range of nationally or locally rare plant species. These including Lindisfarne Helleborine, which is endemic to Holy Island, and Purple Milk-Vetch, a red data book list species associated with dune grasslands. The conservation requirements of coastal plants will be met through measures set out under outcome **CM 1** to maintain the condition and quality of coastal habitats.

Petalwort

This rare and declining liverwort is an important feature of some of the dune systems at Lindisfarne and on other parts of the North Northumberland coast. It is a specialist of wet dune slacks with short open grass swards. The requirements of Petalwort will be met by the measures set out for maintaining the condition and quality of dune grassland (**CM 1.1** and **CM 1.2**).



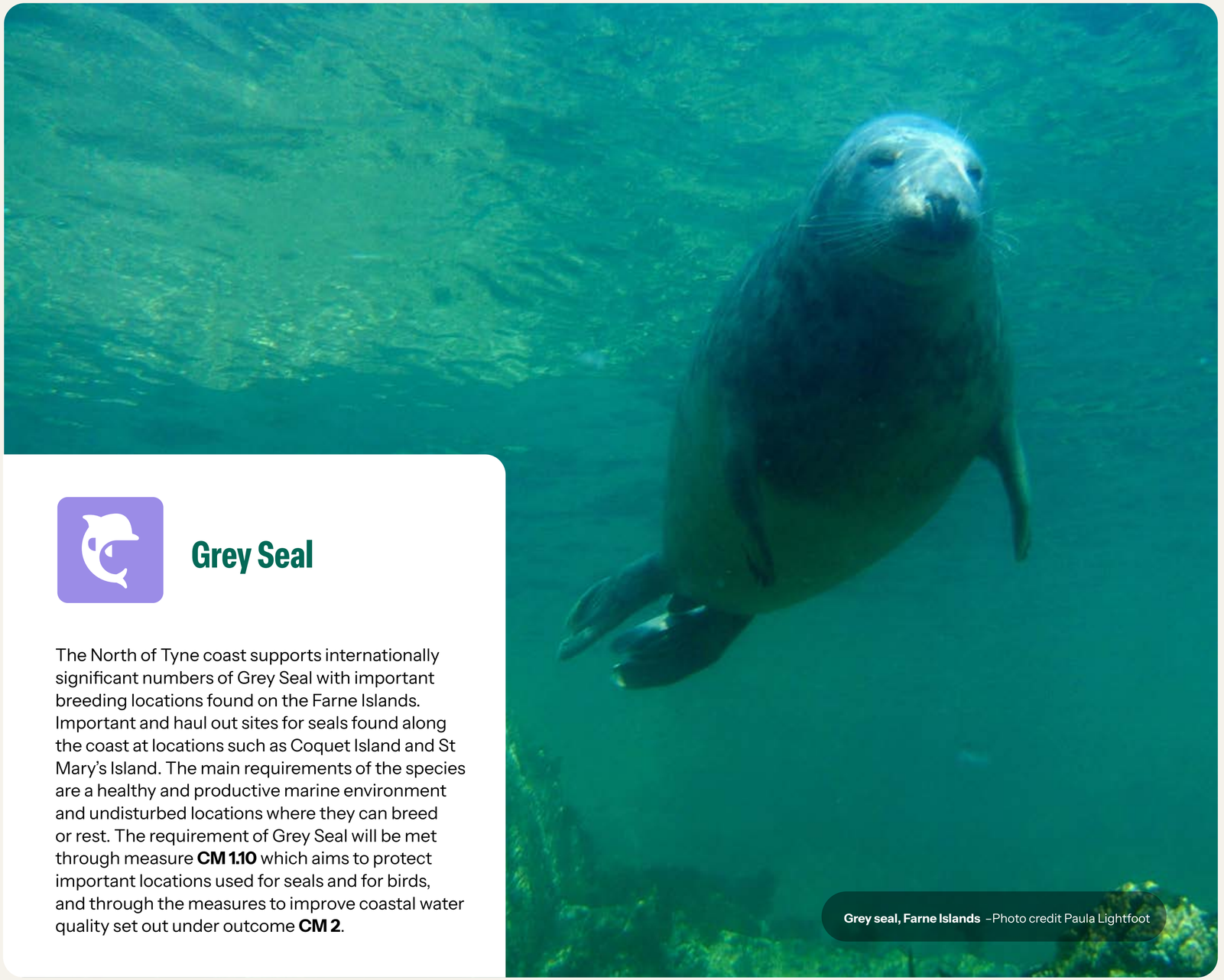
Bloody cranesbill, a characteristic species of sand dunes in North East England –Photo credit Richard Willis

Migratory and Commercial fish

Migratory and Commercial fish present in our area include Atlantic salmon and shellfish such as Brown Crab, European Lobster and Nephrops. These can be found within both intertidal and subtidal areas. Such species rely on healthy and productive marine waters and the overall aims set out in this Strategy will support their conservation.

Cetaceans

Cetaceans such as Bottlenose Dolphin and White-beaked Dolphin make use of our off-shore marine areas for passage and for feeding. There are also increasing records of whale sightings on parts of our coast. The habitat they use is found below mean low water and as such is outside of the statutory element of this Local Nature Recovery Strategy. However, such species rely on healthy and productive marine waters and the overall aims set out in this Strategy will support their conservation, as will measure **CM 1.11** which deals with disturbance to sea mammals.



Grey seal, Farne Islands –Photo credit Paula Lightfoot

Grey Seal

The North of Tyne coast supports internationally significant numbers of Grey Seal with important breeding locations found on the Farne Islands. Important and haul out sites for seals found along the coast at locations such as Coquet Island and St Mary's Island. The main requirements of the species are a healthy and productive marine environment and undisturbed locations where they can breed or rest. The requirement of Grey Seal will be met through measure **CM 1.10** which aims to protect important locations used for seals and for birds, and through the measures to improve coastal water quality set out under outcome **CM 2**.

Chapter 8

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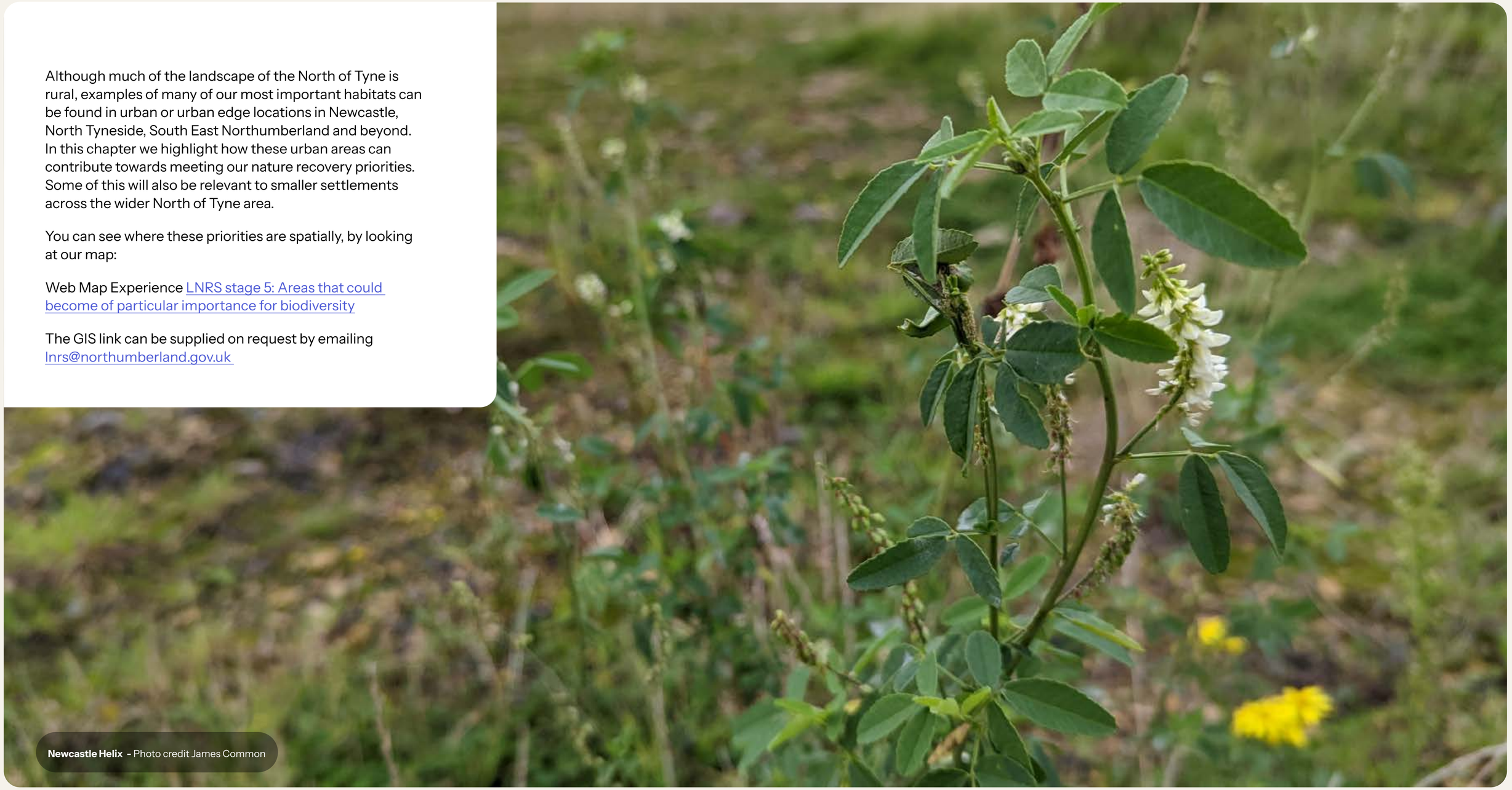
Nature Recovery within the Urban Environment and Urban Edge

Although much of the landscape of the North of Tyne is rural, examples of many of our most important habitats can be found in urban or urban edge locations in Newcastle, North Tyneside, South East Northumberland and beyond. In this chapter we highlight how these urban areas can contribute towards meeting our nature recovery priorities. Some of this will also be relevant to smaller settlements across the wider North of Tyne area.

You can see where these priorities are spatially, by looking at our map:

Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk



Newcastle Helix - Photo credit James Common

Priority habitats within the urban North of Tyne area

Peatlands and Heathlands

The historically important peatland of Prestwick Carr is found in the North of Newcastle. This formerly extensive wetland site was drained and enclosed in the mid-19th century but retains a remnant area of nationally rare lowland raised bog habitat and associated deep peaty soils. The area is a priority for peatland restoration. Fen habitat can also be found as part of the wider peatland complex of Prestwick Carr.

Small areas of lowland heathland are recorded at few locations in Newcastle and in South East Northumberland, usually as a transitional habitat with areas of grassland. Recorded locations include the Havannah Local Nature Reserve and Gosforth Park. A notable area of coastal heath can be found at Newbiggin by the Sea.

Priorities relevant to urban and urban edge areas

Priority PH1: The size, condition and quality of healthy functioning peatland is increased

Priority PH 2: The linkage between mires and their hydrological units is restored and improved

Priority PH 3: The condition and quality of heathland and heathland mosaic habitats is increased

Sacred Heart Fen - Photo credit James Common

Byker Link - Photo credit James Common

Important Grasslands

Within the North of Tyne area, Open Mosaic Habitat (OMH) on previously developed land is largely associated with the urban areas of Tyneside and South East Northumberland. Such locations can develop into a mosaic of short grassland, scrub, and bare ground. This mosaic leads to high levels of structural diversity with many different environmental conditions that different creatures can use. As a results open mosaic habitats can be among our most nature-rich sites, capable of supporting many different types of plants, insects, birds and amphibians. It is a priority to protect the existing good examples of this habitat and improve their management where possible. It may be appropriate to mitigate losses of open mosaic habitat using landscaping which mimics OMH features such as through the incorporation of mosaics of nutrient-stressed species-rich grasslands, ponds and scrub or through the use of complementary habitat, such as living roofs.

Lowland meadows are a scarce resource within the North of Tyne area with many of the remaining examples recorded from Tyneside and South East Northumberland. Pockets of species-rich neutral grassland are present across the urban and urban locations. These have developed or been created in a wide range of situations, with examples found on agricultural land, in nature reserves, parks and greenspaces, golf courses, riverbanks, brownfield land, roadside verges, and transport corridors.

The Waggon Ways of North Tyneside[37] provide a locally important resource of unimproved grassland and together with their mosaic of trees and scrub provide important corridors for wildlife. The mosaics these provide are an important wildlife feature within our urban areas and we believe are significant enough to merit their own measure.

37 https://my.northtyneside.gov.uk/category/244/waggonways-routes

Map

You can see where measures have been chosen for inclusion on our map of areas that could become of particular importance for biodiversity by looking at our map:

- **Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity**

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

Only some of the measures were mappable, and even then, only perhaps in part (e.g. for part of the area or for part of the measure as it is written).

Where measures could be applied widely across large areas, statutory guidance requires that we prioritise what is included on the map according to certain criteria, as set out in the mapping chapter (Chapter 11: Mapping).

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Priorities

Priority U1. Maintain and improve the wildlife value and connectivity of the network of waggonways within North Tyneside and Newcastle.

UH 1.1

Manage waggonways in Newcastle and North Tyneside to maintain a mosaic of grassland and scrub habitats.

Silverlink Waggonway - Photo credit James Common

Many, although not all, of the largest and best of lowland meadows in our urban area are designated as Sites of Special Scientific Interest (SSSIs). Opportunities exist to buffer SSSI grassland sites through the restoration or creation of new areas of species-rich grassland. Opportunities also exist to restore or create new areas of species-rich grassland within our urban areas as part of developments, conservation projects, or changes to greenspace management.

While our urban and urban edge areas are not generally noted for the presence of Waxcap Grassland, some of the long-established grasslands near Plessey Woods have been identified as supporting varied communities of grassland fungi. There are potentially other important areas for grassland fungi which are yet to be identified.

Priorities relevant to urban and urban edge areas

Priority IG 1: Important grasslands are protected, and their condition and quality are improved

Priority IG 2: There is an increase in the abundance and patch size of important grasslands

Priority IG 3: Ecological connectivity between semi-natural grasslands is improved

Riverine and freshwater habitats

Subsidence ponds, formed naturally because of land subsidence as a result of past mining, are a notable feature of the landscape of Tyneside and of the South East Northumberland lowlands and are important areas for wildlife. They include long established examples such as Swallow Pond, Annstead Pond or Big Waters as well as newly forming areas such as Coneygarth Pond near Ashington. In addition, our urban areas include many man-made ponds of various sizes and ages. Examples can be found at numerous locations such as, for example, Gosforth Park Lake, Scotswood Community Nature Garden and St Mary's Island. Recent years have also seen an increasing number of small wetlands and ponds created as part of Sustainable Urban Drainage Systems (SuDS). Areas of marsh, swamp, fen or wet woodland are often found on the margins of such wetlands and can form important habitat and in same locations may be extensive in size, as for example are the reedbeds at Gosforth Nature Reserve.

Rivers and streams are an important nature feature within our urban areas, acting as home for a wide range of plants and animals, supporting semi-natural habitats and providing corridors along which wildlife can move. As well of major rivers such as the Tyne, Blyth and Wansbeck our urban areas are also crossed by smaller tributaries such as the Pont, the Seaton Burn, the Brierdene and the Ouseburn. There are opportunities to improve the natural functions and processes in urban watercourses - for example by modifications to past human modifications or by increasing the extent of riparian habitats - and to improve the quality of streams and rivers for wildlife through actions to improve water quality. The Ouseburn corridor is widely regarded as an area where significant wider action to strengthen nature networks could take place. A number of initiatives are currently underway to deliver water quality, nature recovery and wider environmental benefits in the area. This includes the Ouse Burn Way Vision[38].

Priorities relevant to urban and urban edge areas

Priority FH 1: There is an improvement in natural functions and processes in the water environment

Priority FH 2: There is an improvement in the water quality of freshwater habitats

Priority FH 3: There is an increase in the abundance and area of still waters and vegetated wetlands

Priority FH 4: The condition and quality of freshwater habitats is improved

Priority FH 5: The ecological connectivity between freshwater habitats is increased

38 https://www.theouseburnway.co.uk/

St Mary's Island

Woodland, tree, and scrub

Ancient woodland is found in many of the river valleys within the urban and urban edge area, including important examples at Holywell Dene near Seaton Sluice and Plessey Woods near Bedlington. Within Newcastle notable ancient woodland areas can be found at Jesmond Dene, Sugley Dene, Denton Dene, and Throckley and Walbottle Dene.

Important examples also exist of more recently establish native woodland can be found at locations such as Gosforth Nature Reserve or the Rising Sun Country Park. New areas of native woodland are still being created through initiatives such as the North East Community Forest, and these, together with associated areas of scrub, can form an important part of the interconnected mosaic of habitats present in our urban areas as well as providing additional environmental benefits such as helping to improve urban air quality or mitigate against urban warming.

Within North Tyneside, the network of Waggonways provides value woodland and scrub habitat.aggonways provides value woodland and scrub habitat.

Records of ancient and of veteran trees exist from across urban areas in the North of Tyne. Examples occur in a wide variety of settings, including agricultural land, woodland and parks, churchyards, and roadsides. Examples of ancient or veteran trees may also be found on urban streets in parts of Newcastle and North Tyneside.

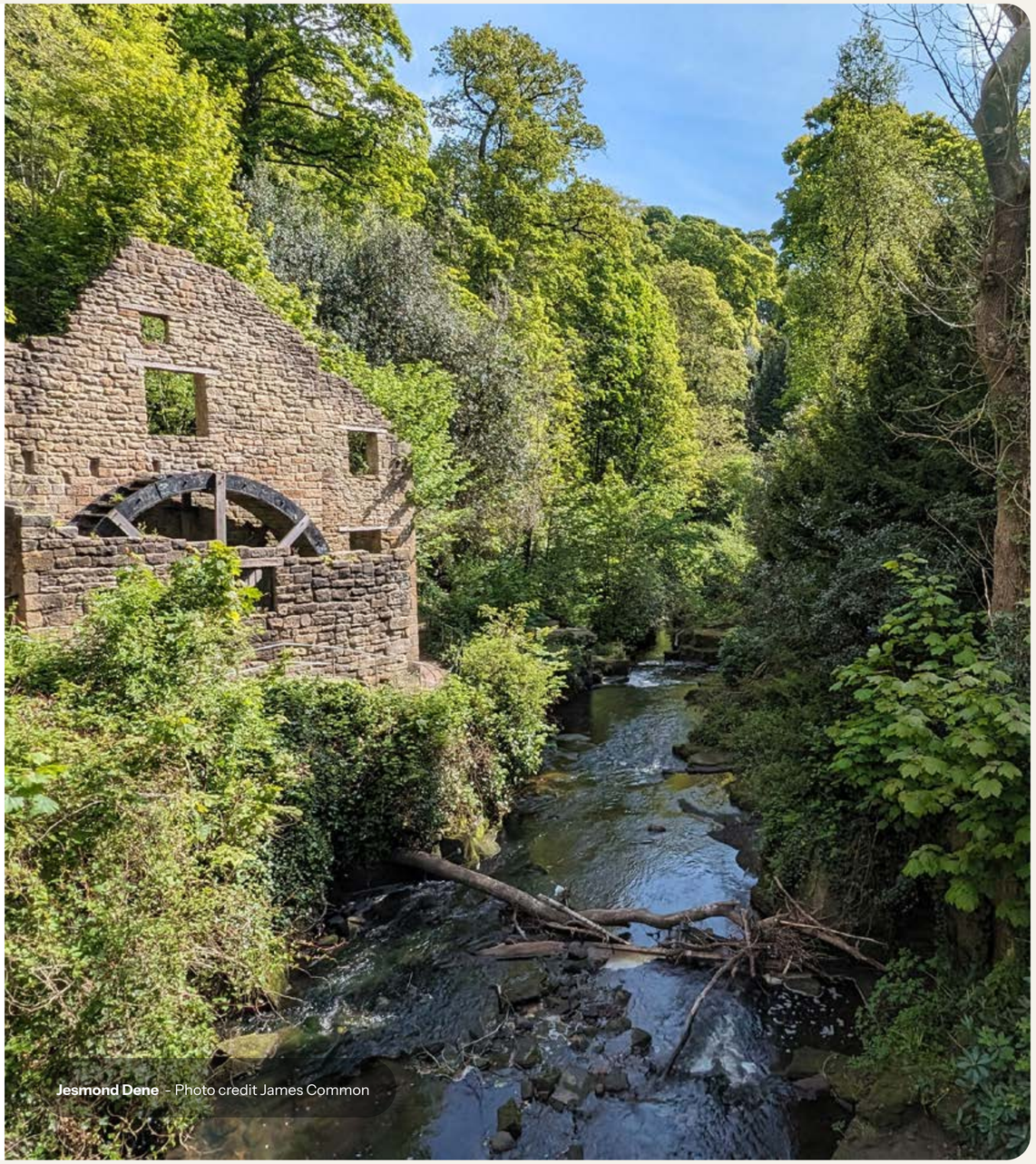
Priorities relevant to urban and urban edge areas

Priority WTS 1: Ancient semi-natural woodlands, ancient and veteran trees and the species which rely on them, are safeguarded through good management, and through connection to a landscape richer in trees and scrub

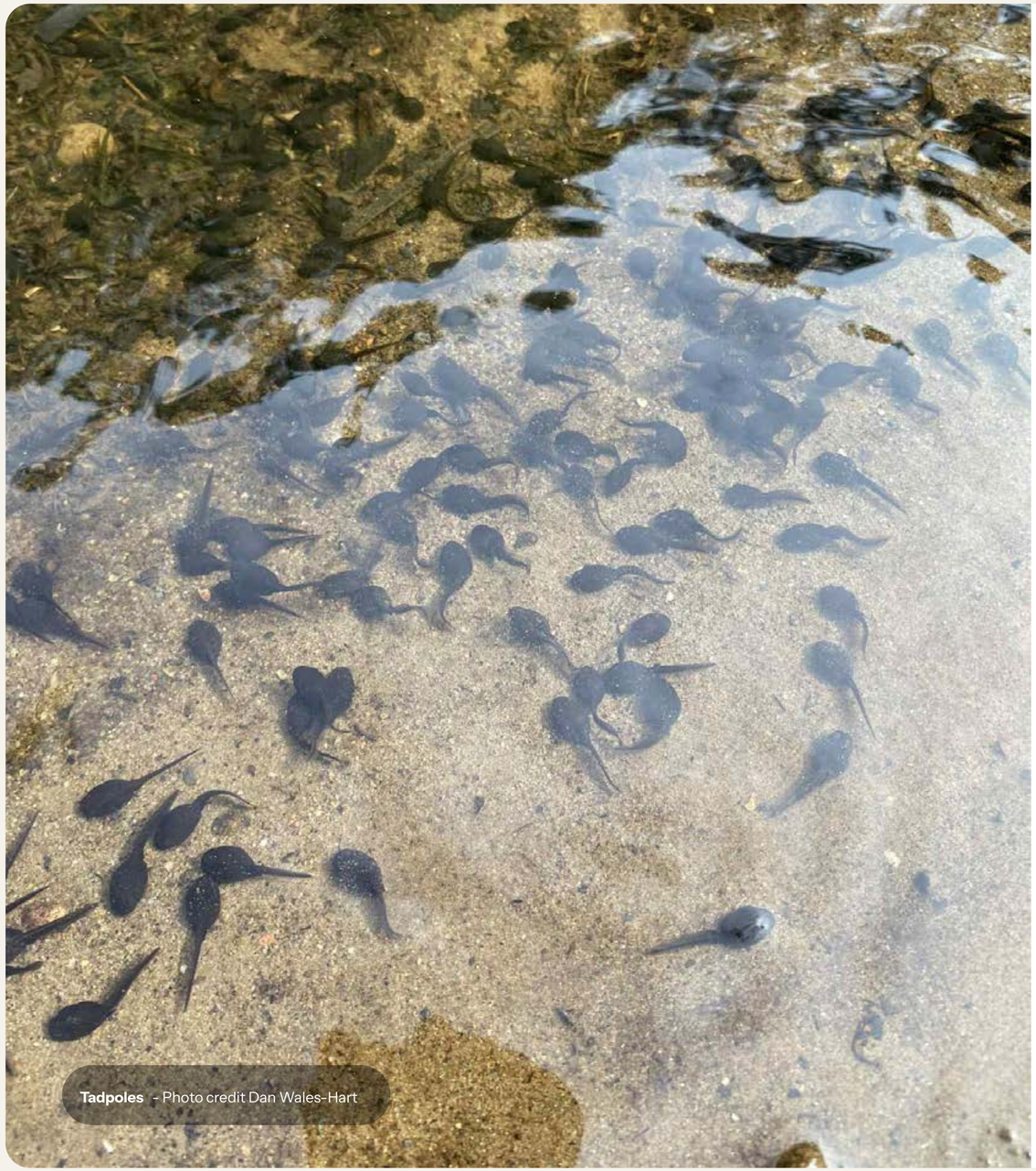
Priority WTS 2: Native woodland is restored on Plantation on Ancient Woodland Sites (PAWS)

Priority WTS 3: Native woodland creation is prioritised in areas where woodland specialist flora and fauna has the best chance of becoming established

Priority WTS 4 : There is an increase in native tree and woodland cover in and around our towns and cities, providing wildlife benefits and new greenspace accessible to the public



Jesmond Dene - Photo credit James Common



Tadpoles - Photo credit Dan Wales-Hart

Coastal and Marine

The urban areas of the North of Tyne contain important areas of coastal and estuarine habitat. Areas of sand dune can be found at locations along the coast of urban South East Northumberland and North Tyneside, for example at Hartley Links near Blyth or at Tynemouth Longsands, where North Tyneside Council has undertaken active restoration activity in the past. Opportunities exist for enhancing the quality of dune grasslands through management and for increasing the extent of embryonic dune vegetation along the coast.

Areas of intertidal rocky reef are found along the coast, interspersed with stretches of sandy bay. These areas are important feeding and roasting habitat for coastal birds and the rocky shore at St Mary's Island at Whitley Bay are now regarded as a regionally important haul out site for Grey Seal.

Estuaries and tidal streams form an important biodiversity asset for the urban locations providing opportunities for nature recovery and creating wildlife corridors along which wildlife can move.

Areas of intertidal muds and sands can be found on the Tyne and Blyth providing feeding areas for wading birds. Land surrounding estuaries may also form import high tide roost sites or refuges for estuarine birds. Areas intertidal saltmarsh vegetation is present at locations such as Leamington Gut, Newburn, and Willington Gut on the Tyne, Sleekburn on the Blyth, and the lower Seaton Burn.

The Blyth estuary an area of intertidal blue mussel bed. This was extensive but in common with other mussel beds in the North of Tyne has decreased dramatically in size over recent years.

Infrastructure such as jetties, seawalls, slip ways and hard coastal defences can be found along our urban estuaries and coast. There are significant opportunities available to enhance the wildlife value of these through retrofitting features, such as artificial rockpools, into these which mimic natural habitats or encourage colonisation by marine creatures.

Priorities relevant to urban and urban edge areas

CM 1: The condition and quality of important coastal, estuarine and marine habitats is maintained and improved

CM 2: The quality of coastal and estuarine waters is improved

CM 3: The connectivity between coastal habitats is improved

CM 4: The is an increase in the abundance and patch size of important coastal and marine habitats

Important species of urban areas

Kittiwake, North Tyneside coast - Photo credit Iain Robson

Kittiwake

The Tyne estuary supports the most inland breeding population of Kittiwake in the world. The species is declining in numbers globally making the Tyne population particularly important. Kittiwakes generally breed on sea cliffs on the open coast and can be found at locations such as the Farne Islands and Coquet Island but on the Tyne make their nests on ledges on building or on structures such as the Tyne Bridge. Adults will travel tens of kilometres from their breeding sites to forage for fish in the open sea. Engagement with the public and businesses over the importance of our urban Kittiwake populations is an important aspect of helping to protect existing nesting sites and to identify new, sustainable, nesting opportunities.

Priorities relevant to urban and urban edge areas

Priority TK 1: Maintain sustainable populations of Kittiwake on the Tyne estuary

Swift

Swift is a summer migrant to the UK and is almost entirely dependent on buildings for their nesting sites, where they make use of cavities and often returning to the same nest site year after year. For this reason, they are strongly associated with towns and urban areas. Swift numbers are declining in the UK. The reason for this is thought to be due to reductions in available insect prey and loss of suitable nesting sites. Actions to maintain and expand semi-natural habitats will help to ensure a healthy population of insects on which Swifts can feed. It is also possible to incorporate Swift nesting sites into new or existing buildings through using specially designed nest boxes, or through features such as Swift Bricks.

Dingy Skipper butterfly

Dingy Skipper butterfly is a species of open grassland and in the North of Tyne area is strongly associated with brownfield sites and with open mosaic habitats where its larval foodplant, bird's-foot trefoil, can be found. Increasing the size and condition of grasslands is a central element of conserving grassland invertebrates. For Dingy Skipper it is important to ensure that suitable examples of open or early-stage grasslands continue to be available within the wider urban landscape.

Additional support for nature recovery in urban and urban edge areas

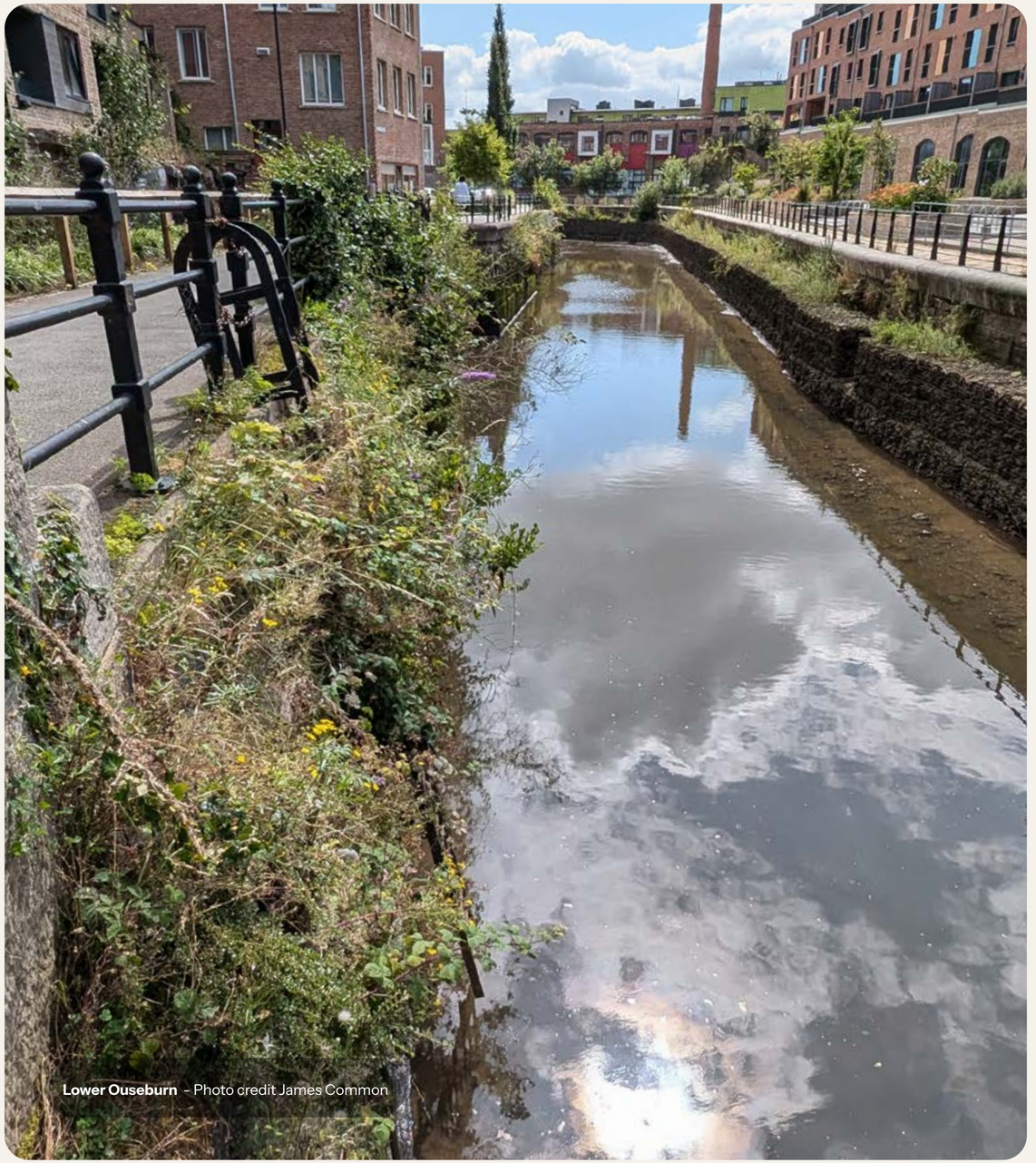
The sections above have reviewed the habitat priorities set out in this Local Nature Recovery Strategy and identified how these priorities are relevant to our urban and urban edge areas. These priorities and the associated measures form the core of the Strategy however outside of these there are many additional actions that individuals, communities and businesses can take which will support wider nature recovery objectives in and around towns and cities.

As well as supporting a range of priority habitats, urban and urban fringe areas contain a wide range of places and features which are of value to wildlife. These include, but are not limited to, private gardens, amenity greenspaces and transport corridors, allotments and community orchards, school grounds, business grounds and churchyards, living roofs, living walls, and street trees and plantation woodlands.

Even small actions can be beneficial to urban wildlife and if carried out at a large enough scale can strengthen urban nature networks and improve the connections between wildlife areas.

Potential wider actions that could be taken to benefit nature recovery include:

- Incorporating wildlife-friendly features into new buildings and their associated landscaping to benefit species such as birds, bats or pollinators;
- Retrofitting wildlife friendly features into existing buildings;
- Undertaking nature-friendly management of public and private land, for example through wildlife gardening, creation of pocket parks, changes to grass cutting regimes on public greenspace or business grounds, meadow creation, wetland creation or management, or through other actions which make space for, or enable, wider ecological processes;
- Supporting and enabling community-led initiatives to maintain, enhance or create local green spaces for biodiversity;
- Education, outreach or interpretation to raise awareness of the value of urban wildlife and to promote nature-positive behaviours;
- Planting of new urban street trees using a diverse range of species. Management of existing street trees to maintain their health and environmental value;
- Planting of new areas of native hedgerow and scrub in appropriate locations and improved management of exiting hedgerows.



Lower Ouseburn - Photo credit James Common

Chapter 9

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Opportunities for Nature Recovery within the Wider Countryside

The previous sections of the LNRS have identified a series of measures which represent our highest priorities for action and form the core of this strategy. However, it is important to recognise that actions to benefit wildlife can and are being undertaken outside of these measures.

Measures – both mapped and unmapped – represent our highest priorities. Such actions, although not an immediate priority in terms of this Strategy, can still represent a meaningful and necessary contribution to nature recovery and to the environment more widely.

The aim of this chapter is to acknowledge some of the important activity that can be, and is being, undertaken in the wider countryside in the North of Tyne area. Our focus is particularly on the farmed and afforested landscapes.

Sea Thrift, Holy Islande – Photo credit Iain Robson

Agricultural Land

Much of the land within the priority areas identified in earlier sections of this LNRS is under agricultural management. This includes important areas of grassland, bog, heath, coastal habitats and wetland. Outside of these immediate priorities there are a wide range of actions that can be taken on agricultural land to facilitate nature recovery. Many of these have the double benefit of supporting wildlife within the areas that are most important for food production and while providing additional environmental benefits such as improving the water quality in the streams, rivers and coastal waters of the catchment within which the farm holding lies.

Upland hay meadows - Photo credit Northumberland National Park Authority

Hedgerows, trees and woodland

Hedgerows, individual trees and small woods within intensively farmed environments support a range of wildlife, facilitate the movement of wildlife through the landscape and improve water quality in streams and rivers by trapping silt and nutrients that would otherwise end up in them. They also have a range of secondary environmental benefits including carbon sequestration and slowing the flow of water during flood events and contributing to the reduction of flood risk further down the catchment. Key actions that can be taken include:

- The creation of native hedgerows;
- Manage existing hedgerows to be wildlife-rich by planting up gaps in hedges with native species such as hawthorn, blackthorn or hazel; maintaining buffer strips either side of hedges; cutting at an appropriate time of year to avoid disturbance to breeding birds;
- Creation of small woodlands and shelterbelts;
- Allowing scrub to develop in field corners;
- Planting of new standard trees in fields, hedges or within farm steadings;
- Managing existing farm trees and farm woods with nature in mind.[39]

Tree establishment can exist together with farmland – not just as hedgerows and standards. Agroforestry is an example of farming the land alongside trees. For example, hedgerows, stock grazing amongst low-density trees, or shelterbelts, or areas of fruit or nut trees mixed in with arable systems.

39 A useful resource to find out which important wildlife could be in or near an existing woodland (based on available distribution data) is Woodland Wildlife Toolkit from the Sylva Foundation – developed in partnership with the Bat Conservation Trust, Butterfly Conservation, the Forestry Commission, Natural England, Plantlife, RSPB, Sylva Foundation, and the Woodland Trust. It can be used to understand the habitats and features that the species in that area might need, and how to provide for these habitats through practical woodland management, including advice on the timing of management.

Streams, ponds and wetlands

- Establish buffer strips to protect watercourses, waterbodies and wetlands from grazing stock, pesticides, fertilisers and silt.
- Create new freshwater ponds or clusters of ponds.

Quaking grass, found widely on unimproved grasslands - Photo credit David Feige

Shelter and nesting habitat for birds and insects

Creating additional feeding, sheltering or nesting opportunities for birds or insects is one simple way in which the benefit of farmland for wildlife can be increased without impacting on farming operations. Potential measures include:

- Leave rough vegetation and scrub to develop at field margins or field corners
- Create beetle banks - permanent, raised, uncut grassy strip across fields which act as a refuge for insects
- Create nesting plots within cereal fields for birds such as skylark or lapwing
- Sowing bird and pollinator friendly seed mixes
- Provide winter food for birds by leaving over-wintered stubbles
- Provide bird boxes for species such as Barn Owl, House Martin, Tree Sparrow or Swift.

Bluebells and wild garlic in an ancient oak woodland – Photo credit David Feige

Woodland and Forestry

The woodland, trees and scrub section of this LNRS focused on those areas of the highest priority for nature conservation but that is not to say that other areas of woodland and forestry do not have ecological value or cannot be managed to develop such value.

The priorities identified in this Strategy for the management or expansion of native woodlands are linked to measures to enhance and protect ancient woodlands. However, actions to better manage or expand native woodland or native tree cover in other appropriate locations can still bring substantial nature benefits, as well as contributing towards many other important environmental outcomes such as carbon capture, natural flood defence, and water quality improvements. Examples of native tree planting that can bring benefits outside of priority areas include increased riparian planting to reduce water temperature, extending scrub and woodland connectivity along upland ghylls, benefits for associated species such as red squirrel, and restoring degraded habitats such as bracken dominated fellsides or grass moorland.

Woodland management plans can also help to improve the ecological value of woodlands, especially where they include actions to increase structural diversity, for example by retaining a different age classes and size of trees, including standing dead wood. Managing our existing woodland / tree / scrub habitats better for nature is an important action in the wider countryside.[40]

Significant areas of native woodland may be found within coniferous plantations due to the UK Forestry Standard, the requirements for which are implemented at each harvesting intervention. This requires, amongst other elements, that no unit is more than 65% single species, and that there are at least 5% native broadleaves or shrubs, 10% other tree species, and 10% open ground. So, this results in at least 15% of the site comprising native broadleaves and open space. Where plantations are large, this 15% or more, amounts to a significant area of open habitats and native woodland, and because forestry works on long timescales, it is secured over long time periods. Overall, bringing productive woodlands into compliance with the UK Forestry Standard and the UK Woodland Assurance Scheme upon harvesting and replanting will over time bring significant nature recovery benefits.

Similarly, there are significant areas of mixed woodland in the North of Tyne, especially within landed estates and the farmed environment. These have a much higher proportion of native broadleaves while still supporting a crop of productive timber. These have a correspondingly higher ecological value, both as habitats in their own right, but also for the important functions, such as natural flood defence, they provide within the farmed environment. Regenerative forestry/woodland management and low impact silvicultural systems (sometimes known as 'continuous cover forestry') are valuable practices for increasing structural diversity and improving resilience within managed woodlands

Extensive tracts of coniferous plantation are currently of vital importance to the survival of the Red Squirrel in Northumberland. Although its preferred habitat is broadleaved woodland competition with, and disease transmission from, the introduced Grey Squirrel has led to it increasingly being found in conifer woodlands where Grey Squirrels find it difficult to compete. The return of the Pine Marten in parts of the UK also appears to help Red Squirrels. Squirrels form part of the Pine Marten's diet, and they prey preferentially on Grey Squirrels when both species are available, which appears to be because they have less effective avoidance behaviour in the presence of this predator. Actions to facilitate the recovery of Pine Marten populations in Northumberland such as the provision of denning boxes, are therefore likely to assist Red Squirrels.

40 See the previous footnote about the Woodland Wildlife Toolkit.

The location of new areas of forestry is a matter of some sensitivity given the range of important ecological resources that could be harmed by the establishment of such plantations. To aid decision making, the Forestry Commission and Natural England have produced a Decision Support Framework in relation to peatlands ,while to avoid conflicts with the conservation of breeding waders they have produced guidance and a map showing likelihood of importance for breeding waders, which can be found on the Forestry Commission's Land Information Search (Forestry Commission Map Browser).

On the LNRS map, (North of Tyne LNRS Mapping), selecting "wider countryside" and then clicking on a specific location will enable a pop-up box to appear. This links to a pdf that provides information about opportunities for nature recovery relevant to that location / area.

Here are all the wider countryside pop ups, hosted on the LNRS web page:

- North Northumberland Coast
- Northumberland Sandstone Hills
- Cheviot Fringe
- Cheviots
- Border Moors and Forests
- North Pennines
- Hadrian's Wall
- Mid Northumberland
- South East Northumberland Coastal Plain
- Durham Coalfield Fringe
- Tyne and Wear Lowlands

Tree planting site at Walkmill – Photo credit Kaleidoscope CFA

Chapter 10

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Overarching Issues, Opportunities and Priorities for Nature Recovery in the North of Tyne

The priorities and measures within this LNRS are focused on specific habitats or within specific areas. However, there are also a small number of priorities and measures apply widely across the whole of the North of Tyne area, and which are critical for supporting and enabling our long-term objectives for nature recovery.

Speckled Wood Butterfly, East Chevington - Photo credit Iain Robson

Lambs at Druridge Bay - Photo credit Iain Robson

Farming, foresters, land managers, and nature

Farming and farmers have a hugely important contribution to make to the management of many of the habitats and species found in the North of Tyne area. This importance is reflected in the measures contained within the subsequent individual habitat themed chapters of this LNRS. In addition to the priorities identified in the habitat chapters, there are also opportunities for farming and forestry to contribute to nature recovery throughout the area.

Threats from Invasive Non-Native Species (INNS)

Invasive Non-Native Species are recognised globally as one of the biggest threats to biodiversity. Not all introduced species are problematic, and many introduced species now form a valued part of our flora and fauna, but within the North of Tyne area we have seen many instances of some introduced species contributing to the loss of other wildlife. Examples of this include the declines in the native Red Squirrel[41] caused by competition and the spread of disease from the introduced Grey Squirrel, declines in White-clawed Crayfish cause by disease spread from the introduced Signal Crayfish, and losses to dune flora caused by the spread of pirri-pirri bur.

In addition, a wide range of other INNS which are not yet present in the North of Tyne are thought to have a high risk of future introduction and could have significant impacts on our terrestrial, freshwater and marine areas. Two examples are the Quagga mussel and the yellow-legged hornet[42]. The North East INNS Strategy includes actions on “horizon scanning”.

Once established, INNS can be difficult and expensive to manage or control. The most effective and least environmentally damaging option for INNS is therefore to prevent their introduction. A clear understanding of potential introduction pathways, good biosecurity, and awareness raising are all important measures in preventing the introduction or spread of INNS. If prevention measures fail, the priority is to identify the presence of new INNS at the earliest opportunity, and take action to eradicate the species or prevent its further establishment or spread if a risk assessment concludes that it is likely to represent a threat. When an INNS is widespread and eradication is not feasible, measures may be needed to contain or control the species, or to mitigate against its impacts.

A significant amount of activity is taking place at a practical and a strategic level within the North of Tyne to deal with Invasive Non-Native Species and their impacts. Some examples of practical management of INNS include the Tweed Forum’s long-established River Till Invasives Project, and work being undertaken by land managers and conservation groups to control Grey Squirrel. At a strategic level, the Invasive Non-Native Species Strategies for the North East of England[43] has been developed by the North East INNS Regional Group. The Strategy aims to prevent the introduction and spread of INNS, improve early detection / horizon scanning and rapid response, and implement effective control and eradication measures. The Berwickshire & Northumberland Marine Nature Partnership have also developed a Marine INNS Strategy[44].

41 More about red squirrel is written in the species section of the Woodland, Trees, and Scrub chapter

42 Species alerts » NNSS

43 https://ericnortheast.org.uk/nenns/ The NE INNS Strategy & Action Plan is being updated in 2026 and will span 2026 - 2030.

44 Marine INNS Strategy for Berwickshire, Northumberland and North Tyneside Coast | Berwickshire & Northumberland Marine Nature Partnership.

Priority OP 3: Halt the spread and reduce the extent of Invasive Non-Native Species (INNS) in the North of Tyne, prevent the arrival of new INNS and, where practically possible, eradicate specific INNS from targeted areas.

OP 3.1	Continue to maintain the Invasive Non-Native Species Strategy for the North East of England, and ensure that it is updated regularly to incorporate new threats and emerging issues, including those from marine INNS.
OP 3.2	Work with land managers and stakeholders to implement and resource the actions contained in the Invasive Non-Native Species Strategies for the North East of England.
OP 3.3	Raise awareness with the public, with land managers and with businesses about the threats posed by INNS and the mechanisms by with INNS can be spread.
OP 3.4	Support and enable continued survey and monitoring for the presence of INNS and work with ERIC North East to grow their existing alert mechanisms for sharing new records of INNS with stakeholders.
OP 3.5	Reduce the risk of the introduction/ spread of INNS, and the diseases they can carry, by encouraging greater implementation of effective biosecurity measures, through education, engagement and support.

Japanese Knotweed close up - Photo credit GB Non-native Species

Maintaining a robust evidence base for nature recovery

Effective planning of nature recovery actions requires access to the best available data on the location, extent and condition of habitats and the location and population size of their associated species. Such datasets are also needed to monitor and report on the success of the actions. We intend our LNRS to be evidence based and driven by robust data.

In an area as large and varied as the North of Tyne, maintaining up-to-date information on the extent and condition of our priority nature areas can pose a significant challenge. The data available to us comes from a wide variety of sources, including from professional ecologists, voluntary biological recorders, and Citizen Science projects, and was collected over many years. The locations of some areas of priority habitats are yet to be identified and mapped and, in some instances, are not captured on national datasets such as the Priority Habitat Inventory (PHI). Up-to-date information on the current condition of existing habitats can be particularly hard to gather, both due to the size and logistical complications of revisiting sites for survey when there is pressure to also visit the unrecorded, but also because of the rapidity at which the condition of some habitats can change.

Local Sites are a high priority area for re-survey. These are non-statutory areas identified at local level for their significant nature conservation value, usually as part of the preparation of local land use planning documents. They therefore receive extra consideration as part of the land use planning process but, unlike statutorily designated sites such as Sites of Special Scientific Interest (SSSIs), they receive no additional legal protection. There are currently 263 Local Sites designated in the North of Tyne area.

Building up the local resource of professionals and volunteers who can carry out surveys of habitats and species and securing resources for additional survey and monitoring of priority habitats and species and of Local Sites will provide an important underpinning to wider nature recovery activity.

Another priority is to ground truth datasets that come via remote sensing or other computer modelling, alongside integrating fine scale datasets, to ensure that community managed sites are incorporated.

The Environmental Records Information Centre (ERIC) North East acts as the main repository of habitat and species data from the North of Tyne and from the wider North East region. It is an invaluable resource in drawing together, checking and analysing information about the local natural environment and in the production of this Local Nature Recovery Strategy. A fully functioning Environmental Records Centre has a key part to play in developing and monitoring future nature recovery actions.

Priority OP 2: Grow the evidence base available on the location, extent and condition of priority habitats and of important associated species to monitor the effectiveness of nature recovery actions and identify future priorities.

OP 2.1 Improve knowledge of the current condition of priority habitats in the North of Tyne.

OP 2.2 Build a robust Local Sites system for the North of Tyne which is supported by a regular programme of survey and monitoring of existing and potential Local Sites.

OP 2.3 Promote and facilitate the addition of new land parcels on to the Priority Habitat Inventory where these have been mapped and meet the criteria for inclusion.

OP 2.4 Continue to support ERIC North East as a key regional resource providing high-quality, biodiversity data which can be used to support local decision-making, monitoring, and nature recovery planning.

OP 2.5 Work with local people, community groups, citizen scientists, and everybody involved in managing the land or water or delivering nature recovery, to record baseline or monitoring data.

We discuss monitoring in greater detail in Chapter 12: LNRS monitoring and reporting.

Recording species - Photo credit Dan Wales-Hart

Local people, community groups, scientists and researchers, farmers, foresters, and land or sea managers, can add records at any time. This is a useful way in helping to achieve the above priority about habitats and species. Even common species are worth recording.

Popular apps such as 'iRecord' and 'iNaturalist' can be used – or for listening to bird sounds, Merlin is a useful app. ERIC North East can also take records, these can be habitat records as well as species records. You can find out how to submit data on ERIC's website[45] (log your sightings by creating a login).

Or, if you come across historic paper records or large dataset, they may be able to work with you to help digitise them.

Members of specialist groups, such as the North East Fungus Study Group or the Northumberland Bird Club, tend to collate their records and send them to their own national organisation. Records can be tagged as sensitive if necessary.

Invasive non-native species can also be recorded in apps, such as iRecord and iNaturalist - some INNS (such as pink salmon) should also be reported to the fisheries management / rivers trust.

45 ERIC North East - Environmental Records Information Centre or eric.ne@northeastmuseums.org

Box 8 - Data

Funding and capacity for nature recovery

The management of habitats and species for nature recovery requires money for delivery and ongoing maintenance and needs people with suitable skills to make it happen. The range of nature recovery ambitions sets out in this Strategy will be more difficult to achieve without access to funding or to people with the appropriate skills and experience.

Funding for nature recovery comes from a wide variety of sources both private and public. Agri-environment schemes are an important mechanism for supporting farmers and foresters to deliver environmental gains. Grant giving organisations, such as the National Lottery Heritage Fund or charitable trusts, also form a major part of the current funding landscape, as does partnership funding from statutory bodies, Non-Governmental Organisations (NGOs) and business.

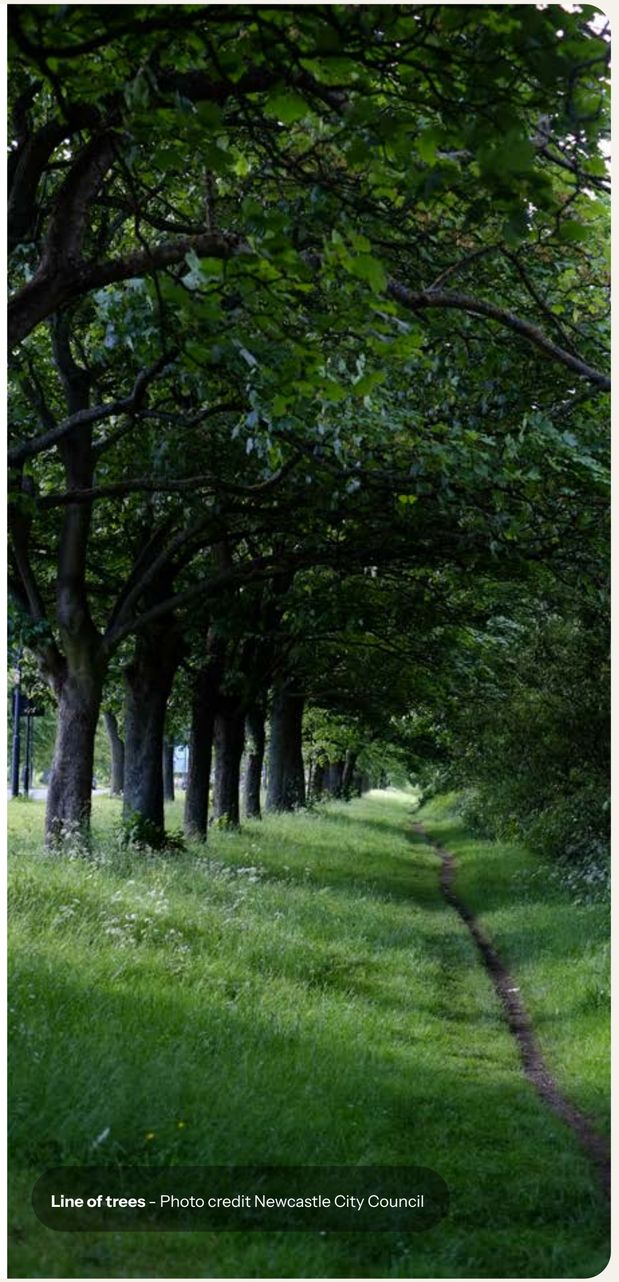
The land use planning process also forms an import mechanism through which nature recovery can be resourced, for example through planning obligations or requirements for Biodiversity Net Gain.

There is increasing interest in novel funding mechanism such as the use of carbon credits, nutrient credits, or the development of green finance opportunities. Funding from non-environmental sources may also be relevant for the delivery of nature recovery, for example funding to support skills training, green jobs or capacity building. With so many potential funding opportunities available it is important that the people involved in nature recovery are kept informed about what opportunities may be available, particularly where relevant funding pots may be available from non-environmental grant schemes. It is also important that potential funders are aware of the priorities for nature recovery in the North of Tyne and how they can best support these.

Resources are needed at all stages of nature recovery planning and delivery, especially if carried out at scale. Funding or capacity is needed to identity important habitats and assess their condition. Development of management proposals, schemes or projects may require additional feasibility work, impact assessment, stakeholder consultation, or the submission of applications for permissions or licences.

Once work on a delivery scheme has been undertaken, there may be the need to monitor the success of actions or to undertake site aftercare. It is not uncommon for funding mechanisms to concentrate on the delivery stage of nature recovery and neglect the development phase or ongoing management and monitoring. This can prove a barrier to the delivery of ambitious nature recovery projects. Another frequent issue is that funding may be offered for direct capital works, but not for the staff time required to oversee and support these, meaning that potential funding sources are not used as effectively as they may be.

A wide range of skills are needed to support the delivery of our objectives for nature recovery in the North of Tyne. These include skills in land management (including agriculture and forestry), ecological survey and data management, public engagement and outreach, fundraising and project management. There is a need to identify gaps in skills, capacity and knowledge and to create more opportunities to build skills and experience through, for example, training, apprenticeships and career opportunities. Networking and knowledge exchange between land managers, foresters, organisations and individuals is also important for the sharing of skills and good practice and encourage new collaborations.



Line of trees - Photo credit Newcastle City Council

Seven-spot ladybird on nettle - Photo credit Iain Robson

Priority OP 1: Increase the capacity, funding and resources available for nature recovery and for enabling activities such as monitoring and survey or skills development and exchange.

OP 1.1	Build local capacity for nature recovery by developing targeted skills and training programmes and by supporting skills sharing and networking.
OP 1.2	Ensure that individuals, businesses, communities and organisations involved in the delivery of nature recovery actions are aware of relevant sources of finance and support.
OP 1.3	Work with funders to make sure they are aware of local nature recovery priorities and how resources can be targeted to deliver the greatest strategic gains.
OP 1.4	Seek to identify or develop novel or non-traditional funding mechanisms for nature recovery.

Strategic Recovery Areas

While developing the LNRS, it became apparent that there are several areas of the North of Tyne where there are exceptional opportunities for achieving nature recovery at scale, and for innovative practice in nature recovery. This is because of the pattern and scale of ownership by public bodies and sympathetic landowners, and because of emerging large-scale projects. Such areas fulfil the following criteria:

There are opportunities to deliver nature recovery at a landscape-scale.

Significant delivery of this is likely to be undertaken or commenced within the next ten years.

The scale and landownership patterns in these areas are such that innovative nature recovery practices can be trialled and developed.

By acting as showcases these areas can lead to the development of similar work more widely, drawing green finance into the North of Tyne area

The actions here wouldn't be just one habitat or broad habitat, but would be a range of actions across the landscape. These areas are multi-themed, linking to the priorities and measures as a whole. They are areas where significant nature recovery gains for a range of habitats and species can be made through collaborative working and many different stakeholders and organisations.

These are places where we may be able to take a deeper approach to nature recovery at a landscape scale, as well as use locations as case-studies and organise inspirational site visits for interested land managers. Another wider benefit maybe the opportunity to engage the public.

The four Strategic Recovery Areas (SRAs) are detailed here and shown in *Figure 3 - overview of the Strategic Recovery Areas*.

Ashington to Amble Strategic Recovery Area

This is an area of exceptional potential for further development of wetlands and wet grassland in particular, as well as a range of extensively managed lowland habitat mosaics. One of its distinctive features is the extent and distribution of landholdings in the ownership of public bodies and environmental bodies. These include:

- Northumberland Wildlife Trust reserves at Linton Lane, Cresswell, Druridge Pools, East Chevington, West Chevington and Hauxley;
- National Trust land at Druridge Links;
- Northumberland County Council's Druridge Bay and Queen Elizabeth Country Parks, Cresswell Dunes Local Nature Reserve, and Ashington Community Woodlands;
- and, Advance Northumberland's Potland Burn Habitat Bank.

Several of these landholdings are well over 100ha in extent, offering opportunities that are hard to achieve on smaller sites, particularly the development of extensive management and the development of habitat mosaics. Overall, this is an assemblage of land being managed for nature conservation unique the North of Tyne lowlands. Work in this area will contribute to the following LNRS priorities:

- Restoration and management of dune grasslands
- Creation of wet grassland and rushy pasture for breeding waders and, at the coast, wintering waders
- Creation, enhancement, and management of species-rich meadows and pasture
- Creation of ponds, especially in clusters of varying size, shape and depth
- Creation of large-scale habitat mosaics incorporating the above habitats.

Druridge Bay - Photo credit Iain Robson

Mid Northumberland Strategic Recovery Area

This area is dominated by estates where sympathetic land ownership over contiguous landholdings offers an opportunity to develop joint working to achieve ecological restoration at a scale that is unique in the North of Tyne area. This work will contribute to the following LNRS priorities:

- Peatland restoration and management;
- Heathland restoration and management, including the extensification of management to produce more complex habitat mosaics
- Ghyll woodland / tree establishment;
- Expansion of native woodland adjacent to ancient semi-natural woodland;
- Wetland restoration and creation, especially within the mapped catchment restoration opportunity areas;
- Creation, enhancement, and management of species-rich meadows and pasture;
- Management of rushy pasture for breeding waders;
- Creation of large-scale habitat mosaics incorporating the above habitats.

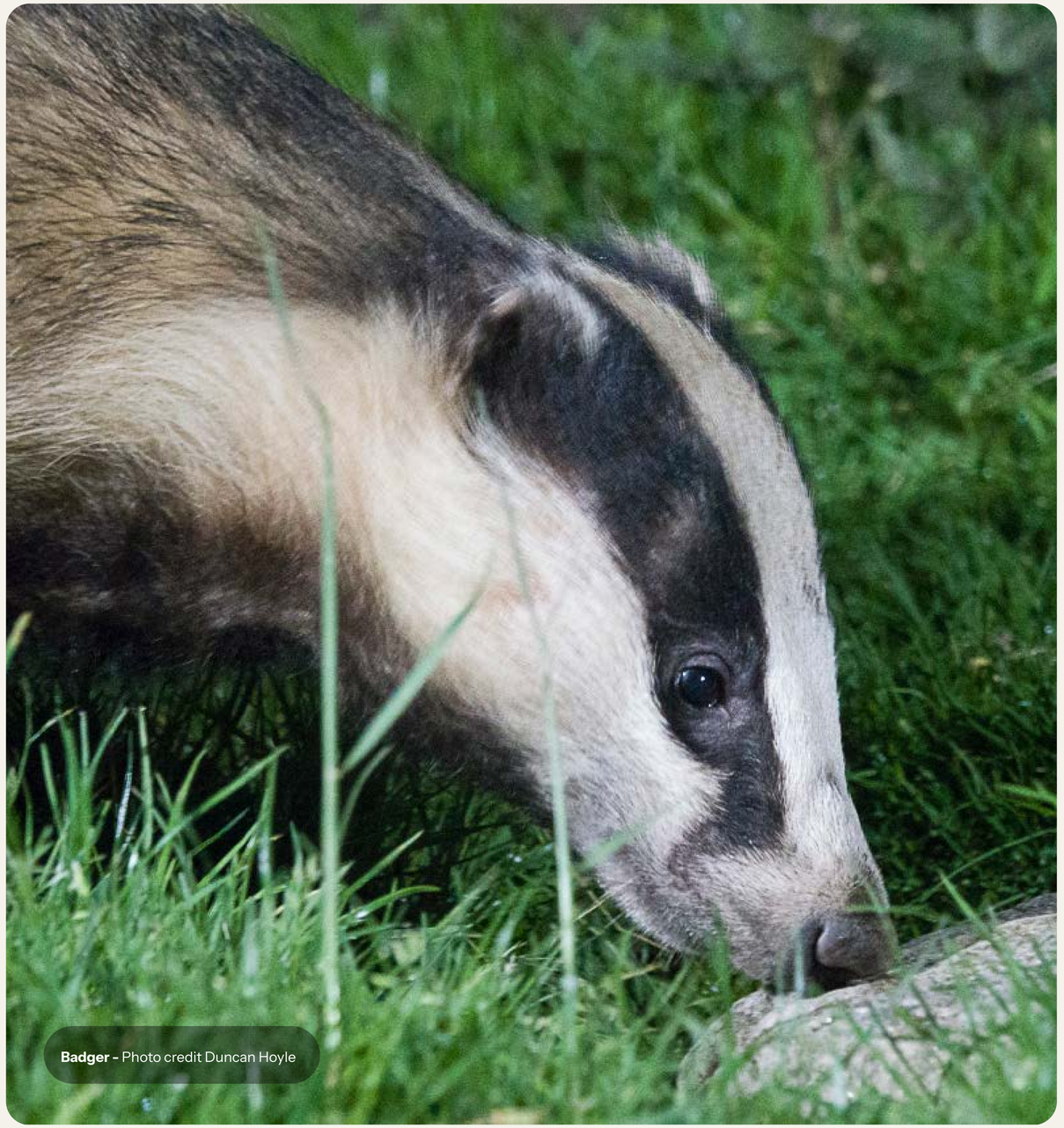
Kielderhead Strategic Recovery Area

This includes

- the 6000ha “Wild Kielder” project area where Forestry England is taking a nature-led approach to restoring fully functioning ecosystems, and
- Northumberland Wildlife Trust’s 1500ha Whitelee Moor Nature Reserve.

This vast upland area has huge potential for the restoration of upland ecosystems. It will contribute to the following LNRS priorities:

- Peatland restoration and management;
- Heathland restoration and management, including the extensification of management to produce more complex habitat mosaics;
- Ghyll woodland / tree establishment;
- Restoration of native woodland cover on plantations on ancient woodland sites;
- Creation, enhancement, and management of species-rich upland meadows and pasture.



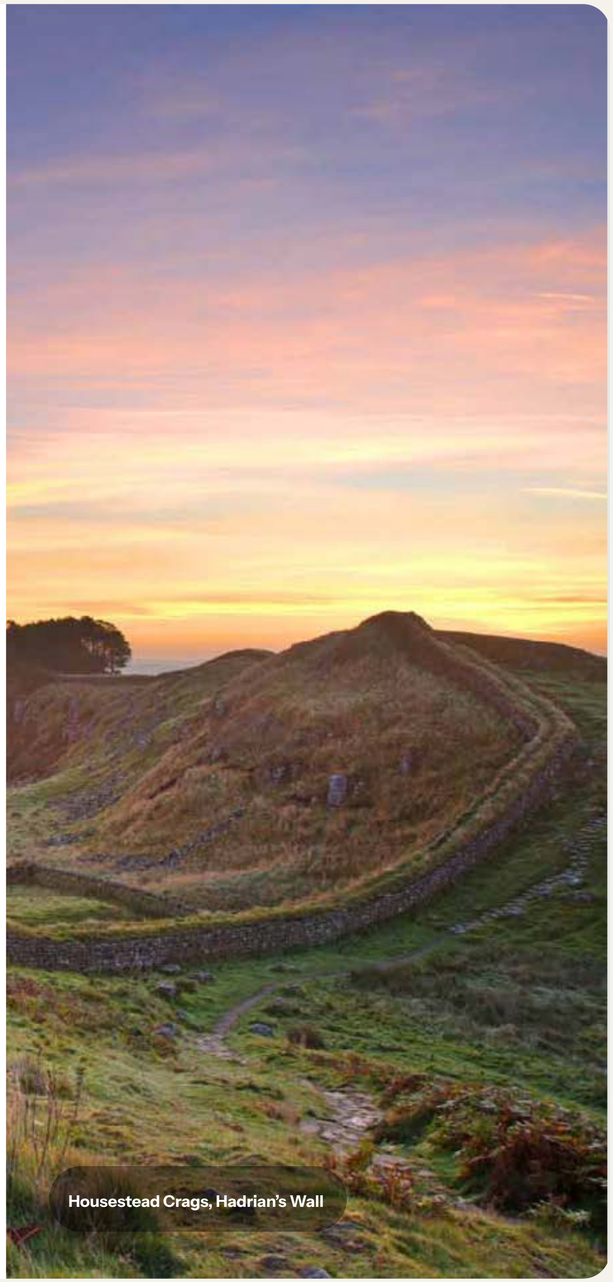
Badger - Photo credit Duncan Hoyle

Hadrian's Wall Strategic Recovery Area

This is a 4400ha area of farmland and forestry near Haltwhistle that includes the Roman Wall loughs and is where a Landscape Recovery Project is currently being developed. This aims to support farmers and landowners to achieve better-connected and better-quality wetlands and to restore related habitats such as peatlands. It will contribute to the following LNRS priorities:

- Peatland restoration and management;
- River and stream naturalisation;
- Wetland creation;
- Management of rushy pasture for breeding waders;
- Ghyll woodland / tree establishment;
- Creation, enhancement, and management of species-rich upland meadows and pasture, and other important grasslands such as waxcap grassland.

When put together with the mapped measures it is also apparent that there is an emerging corridor of opportunity for nature recovery running east to west through the North of Tyne area, from Druridge Bay to the Scottish border, taking in the Wansbeck and Coquet catchments, major landholdings in the Wallington – Rothbury - Elsdon area, Northumberland National Park, and then Forestry England and Northumberland Wildlife Trust landholdings in the west.



Housestead Crags, Hadrian's Wall

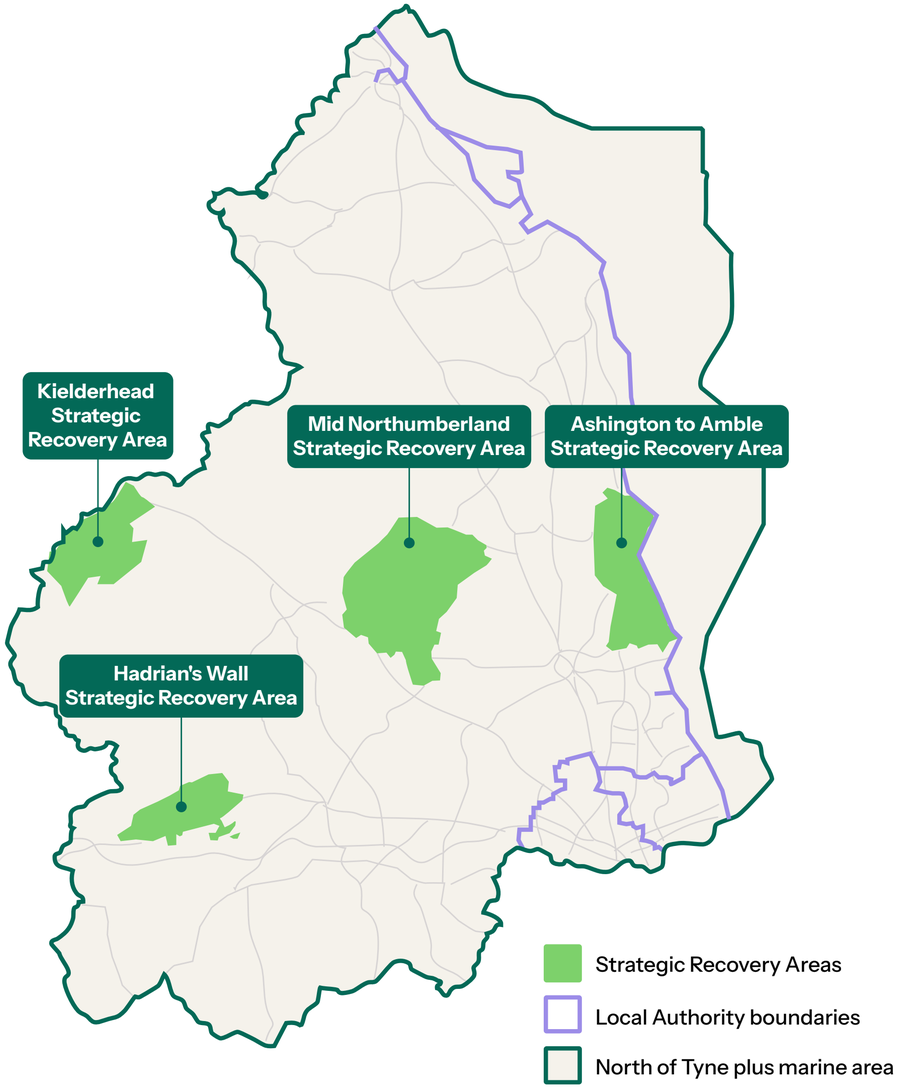


Figure 3 - overview of the Strategic Recovery Areas

Chapter 11

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Mapping

Road verges, Throckley – Photo credit James Common

This chapter outlines the mapping process used to identify priority areas for nature recovery across Northumberland, Newcastle, and North Tyneside, including a voluntarily added marine area.

This chapter explains the two key mapping stages: Stage 1, which includes designated and irreplaceable habitats such as SSSIs, SPAs, SACs, and ancient woodlands; and Stage 5, which maps proposed actions and measures for nature recovery. The maps are not prescriptive, but can be conversation starters with land managers, highlighting areas of ecological potential, while stressing the importance of local knowledge and ground-truthing.

This chapter also details the evolution of mapping for each broad habitat group. Strategic Recovery Areas, such as Ashington to Amble and Hadrian's Wall, are identified for landscape-scale recovery. The document includes mapping for peatlands, grasslands, freshwater systems, woodlands, coastal and marine habitats, urban edges, and wider countryside, with links to online interactive maps. The mapping is intended to support collaborative planning and future updates, rather than serve as a fixed guide for land use decisions.

How to use the maps

The North of Tyne LNRS is made up of Northumberland, Newcastle, and North Tyneside. This area totals 528,242 hectares.

We are voluntarily adding in marine to our project area, which is not statutory. The boundary for this area is made up of three Marine Conservation Zones (MCZ)[46], five Special Protection Area (SPA)[47], and one Special Area of Conservation (SAC)[48] – this shape was then manually adjusted[49].

The LNRS process involves mapping at "stage 1" and "stage 5".

Step 1 of the guidance involves mapping "Areas of Particular Importance for Biodiversity", which may also be called APIBs. In our LNRS, we call this map, "Designated sites and irreplaceable habitats", or "stage 1".

The stage 1 mapping can be viewed at page 132 onwards, or online:

- StoryMap Designated sites and irreplaceable habitats
- Web Map Experience LNRS stage 1 map: Areas of particular importance for biodiversity (designated sites and irreplaceable habitat)
- Overall StoryMap collection LNRS StoryMap Collection

Step 5 of the guidance involves mapping "Areas that Could become of Particular Importance", or ACIBs. In our LNRS, we call this map "Proposed actions and measures", or "stage 5".

The stage 5 mapping can be viewed at page 132 onwards, or online:

- Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

46 The three MCZs we used for the project area are: AIn Estuary, Coquet to St Mary's, Berwick to St Mary's
47 The five SPAs we used for the project area are: Coquet Island, Farne Islands, Lindisfarne, Northumberland Marine, and Northumbria Coast.
48 The SAC we used for the project area is: Berwickshire & North Northumberland Coast – this was adjusted using a marine boundary between England and Scotland.
49 to form a point to the tip of Tynemouth Pier and the centre line of the Tyne estuary, and holes in these designations filled in to make a sensible marine area.

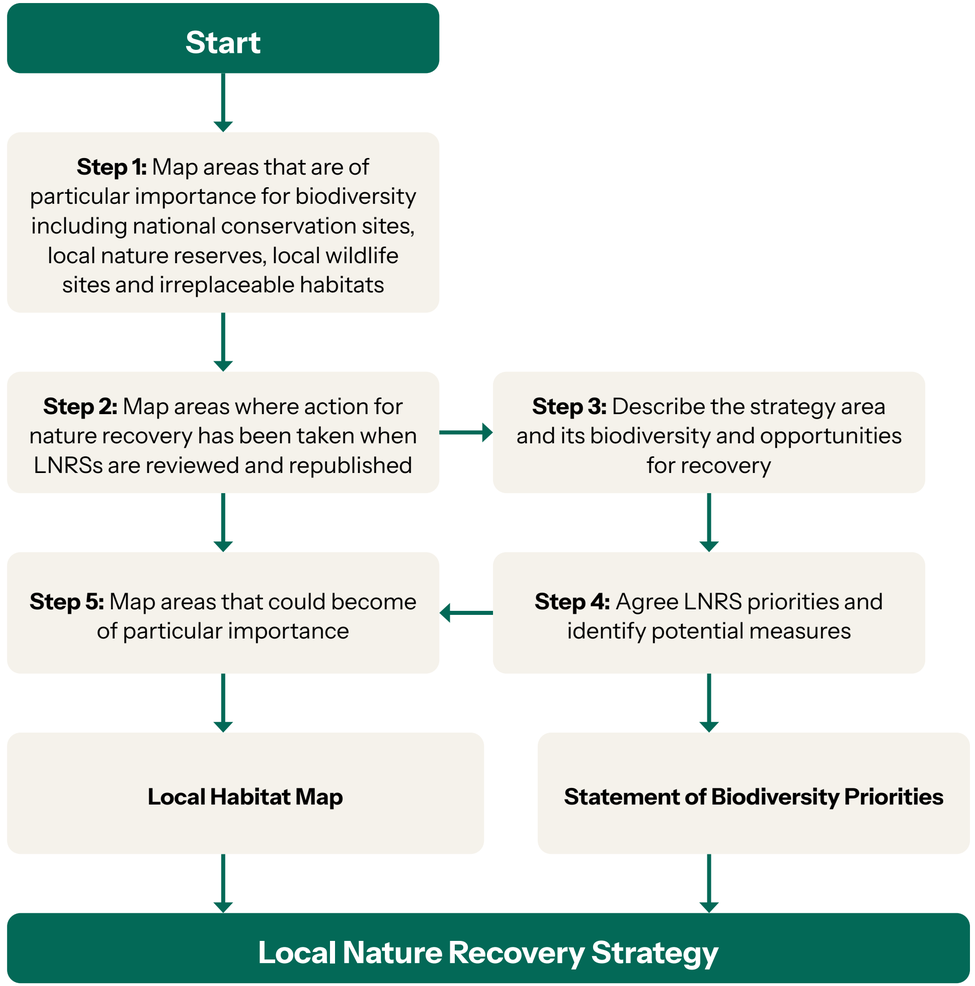


Figure 4 - order of steps to be followed in preparing an LNRS, from the Defra guidance

Stage 1 mapping – designated sites and irreplaceable habitat, or areas that are of particular importance for biodiversity

The stage 1 maps are the core sites already designated for nature. Stage 1, or map of designated sites and irreplaceable habitats, is made up of:

Special Protection Areas (SPA);

Special Areas of Conservation (SAC);

Ramsar sites;

Sites of Special Scientific Interest (SSSI);

National Nature Reserves (NNR);

Local Nature Reserves (LNR);

Marine Conservation Zones (MCZ);

Local Sites (Local Wildlife Sites and Local Geological Sites);[50]

Ancient Woodland (Ancient Semi Natural Woodland and Planted Ancient Woodland Sites);

Blanket Bog;

Limestone Pavement;

Coastal Sand Dunes;

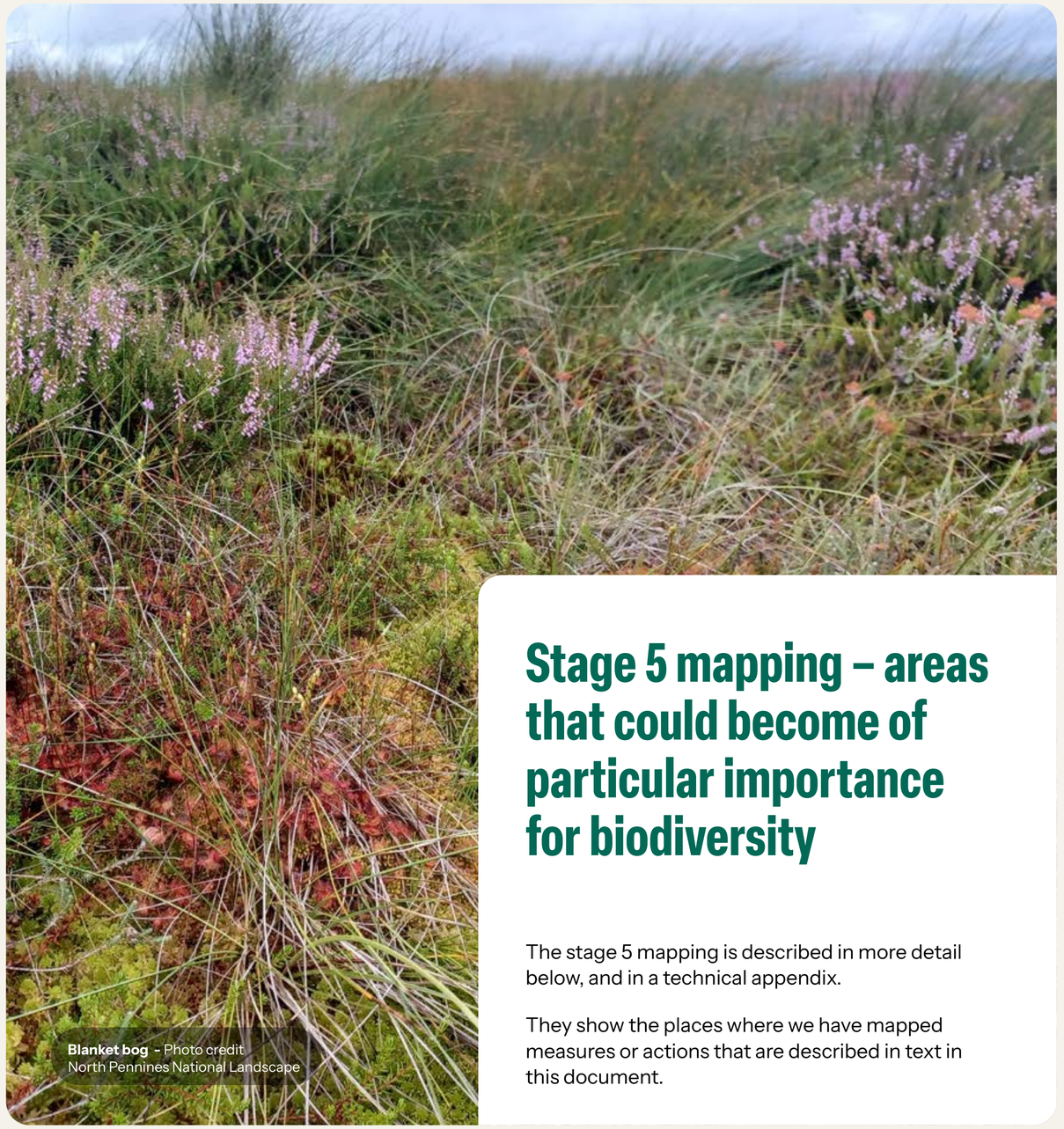
Specific types of Salt Marsh, and;

Lowland Fen.

The stage 1 mapping can be viewed at page 146 onwards, online:

- StoryMap Designated sites and irreplaceable habitats
- Web Map Experience LNRS stage 1 map: Areas of particular importance for biodiversity (designated sites and irreplaceable habitats)
- Overall StoryMap collection LNRS StoryMap Collection

50 Developers or Consultants who need the full database information about each site still need to approach Northumberland Wildlife Trust with their searches.



Blanket bog - Photo credit North Pennines National Landscape

Stage 5 mapping – areas that could become of particular importance for biodiversity

The stage 5 mapping is described in more detail below, and in a technical appendix.

They show the places where we have mapped measures or actions that are described in text in this document.

Map

You can see where measures have been chosen for inclusion on our map of areas that could become of particular importance for biodiversity by looking at our map:

- **Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity**

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

Only some of the measures were mappable, and even then, only perhaps in part (e.g. for part of the area or for part of the measure as it is written).

Where measures could be applied widely across large areas, statutory guidance requires that we prioritise what is included on the map according to certain criteria, as set out in the mapping chapter (Chapter 11: Mapping).

It should be remembered that any actions that deliver against the measures as they are written, will count as contributing to the delivery of the LNRS. Written measures – both mapped and unmapped – represent our highest priorities.

Mappable

Measures that have been included in our map are shown with this green icon of a map at the left-hand side. Further explanation of the link between the measures and the map layers is in Chapter 11: Mapping.

Not mappable

Not all measures can be spatially mapped, but all remain strategic priorities. Measures that are not mappable are shown with the grey icon of a map at the left-hand side.

The statutory guidance published by DEFRA called 'What a Local Nature Recovery Strategy Should Contain'[51] sets out that when mapping areas that could become of particular importance for biodiversity, Responsible Authorities (RA) must avoid the widespread mapping of areas that could become of particular importance.

When considering measures that could feasibly be undertaken in many locations, the RA should choose areas that would benefit nature recovery the most, considering criteria such as which would have the greatest impact on achieving the priorities, and which would maximise connectivity of related habitats across the landscape.

This prioritisation process has proved easier to do for some habitat types and some measures than for others.

The measures included within the Catchment Restoration Opportunities mapping proved especially challenging to prioritise, as these measures are so valuable across all catchments.

The criteria used to select these are set out in the 'Freshwater' section Catchment prioritisation.

The mapped measures cover 164,499ha, or 31%[52] of the North of Tyne area[53]. Measures – both mapped and unmapped – represent our highest priorities.

Actions to benefit wildlife are happening beyond the measures in this LNRS, and they still make a meaningful and necessary contribution to nature recovery and the wider environment. Even if they are not immediate priorities within the LNRS, such efforts matter — nature recovery can happen almost anywhere.

With that in mind, we have written a "wider countryside" chapter, which is focused on the areas that aren't shown on the map, but are still important. We would like it if every land manager had ideas about what they can do for nature. We can all take action, not only farmers / land managers, but also local people and local communities.

It is important at the same time to make sure the right action is done in the right place. For example, pond creation seems to be popular. But if a pond is dug on top of another valuable habitat that isn't the right thing in the right place. It is always worth getting guidance and advice and checking what permissions are needed. Tree planting is another sensitive issue. More about this is written in "Principles for nature recovery" in Chapter 2.

The stage 5 mapping should not be viewed as a guide to what to do where. It would simply be a guide to discussions with the land manager who knows the land best, fieldwork, and investigations.

Only some of the measures were map-able, and even then, only perhaps in part (e.g. for part of the area or for part of the measure as it is written). It should be remembered that any actions that deliver against the measures as they are written, will count as contributing to the delivery of the LNRS. Written measures – both mapped and unmapped – represent our highest priorities.

Accordingly, when considering whether a proposed project will deliver LNRS measures, it is important that funding bodies look at the written measures in the habitat chapters, not just the map of areas that could become of particular importance for biodiversity.

Also, the LNRS is not forcing new designations on land managers. The places mapped won't force new nature reserves onto landowners.

Finally, all the actions mapped below low water mark are not statutory.

The stage 5 mapping can be viewed at page 146 onwards, or online:

- Web Map Experience LNRS stage 5: Areas that could become of particular importance for biodiversity
- Overall StoryMap collection LNRS StoryMap Collection

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

More information is in a separate technical appendix.

51 Local nature recovery strategy statutory guidance

52 The North of Tyne area is 528,242ha. The area of merged potential measures is 164,499ha.

53 This is without cutting out any designated areas or irreplaceable habitat mapped in stage 1.

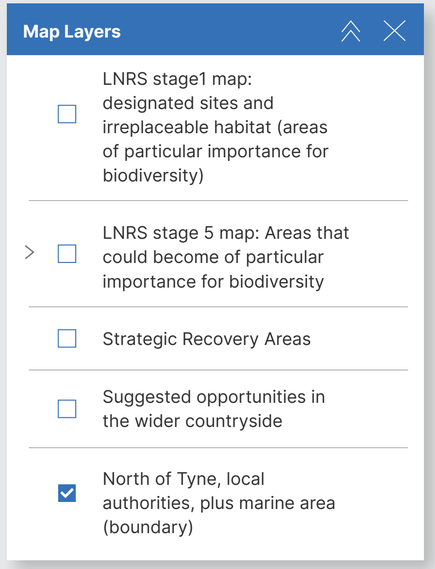
Pop-ups

The layers in the “stage 5” map of measures are grouped by the habitat theme in this LNRS.

The Stage 1 areas of particular importance for biodiversity (designated sites and irreplaceable habitat) mapping is available to active using the very top tick box. All the Stage 5 mapping layers of areas that could become of particular importance for biodiversity are grouped, according to the habitat theme in this draft document, in the second tick box.

Having a layer active, and clicking on one of the polygons, will enable a box to pop-up that explains the measures this mapping links to.

Similarly, when clicking on the wider countryside, a pop-up will appear that links to a page of general suggestions for the wider countryside in that area.



Example map layers control box from the online web map.

Tick the boxes to turn a map layer on.

Expand the arrow to see and switch on the detail grouped underneath

Weasel, Druridge Bay - photo credit Iain Robson

How the maps were produced

More information is in a separate technical appendix.

Stage 1 – Areas of Particular Importance for Biodiversity

Stage 1 mapping identifies designated sites, and irreplaceable habitats. Most datasets come from national, publicly available sources, especially data.gov.uk, with two notable exceptions: locally held irreplaceable habitat data and Local Sites, managed by the Local Sites Partnership for Northumberland, Newcastle, and North Tyneside. Ancient and veteran trees were excluded due to data sharing restrictions.For irreplaceable habitats, locally held information was sourced from the National Trust, Northumberland National Park Authority, Northumberland County Council, Wildlife Trust reserves, and Northumbrian Water. Only habitats meeting the definition of "irreplaceable" were selected, merged, and dissolved for mapping.

The Ancient Woodland Inventory (updated dataset) includes four categories treated as irreplaceable: Ancient Semi Natural Woodland (ASNW), Planted Ancient Woodland Sites (PAWS), Ancient Wood Pasture, and Infilled Ancient Wood Pasture. The Priority Habitat Inventory (2025 update) and Living England datasets were queried for irreplaceable habitats, such as blanket bog, saltmarsh, dunes, limestone pavement, and lowland fens. Saltmarsh mapping used the national Saltmarsh Extent and Zonation dataset, particularly identifying Spartina zones.

Mappable Measures

After the habitat workshops were held in early 2025, we had a set of emerging priorities and measures. Consideration was put into which of these would be possible to map, and this was discussed and agreed with LNRS partners.

It is important to note that not all our proposed measures are possible to map in a meaningful way. Some measures, for example to help the red squirrel, could happen right across the area. That is why our "wider countryside" chapter is important.

We have not done any GIS modelling across the board but have stayed with a relatively intuitive approach. More details on our approach to each habitat and map layer are in a separate technical appendix.

Some of the mapping is based on datasets that may be based on older habitat inputs, or modelled ideas for potential areas to help nature. They haven't always been based on recent fieldwork. We know that local knowledge will always be better, especially working together with a land manager who knows the area well. The maps are just a starting point, for ground truthing and discussions, and aren't a fully designed plan or guide of what to do and where.

At the end of the process of combining and refining map inputs with partners, we had a sense-check, to compare with areas of the most productive farmland, and productive forestry. In the main, many of the areas that we have mapped to go with the text, don't overlap with the best and most valuable agricultural land, and most of the woodland blocks managed for productive forestry.

As part of the LNRS procedures, once the strategy is published, we can't change the map. We might keep a working local copy, but it is only at a future "review" stage, will everything be updated. This applies to both the mapping for the stage 1 of designated sites and irreplaceable habitats, and for the stage 5 of areas that could become of particular importance for biodiversity.

Stage 5 – Areas That Could Become of Particular Importance

Stage 5 maps represent actions and measures that contribute to nature recovery.
More detailed information is in a separate technical appendix.

Not all measures could be spatially mapped, but all remain strategic priorities.

Peatlands and Heathlands: Peat restoration areas were supplied by the Northumberland Peat Partnership, North Pennines Peat Programme, and Forestry England, including hydrologically remapped Border Mires datasets. Potential restoration of Sitka spruce on deep peat within the Public Forest Estate was identified by combining Forestry England sub compartment data with the England Peat Map.

Important Grasslands and Breeding Waders: Wader Recovery Areas were mapped using a combination of moorland line, grass moorland habitat, specific RPA options, and high Curlew score Wader Zonal Mapping. Buffer and expansion zones were created around important lowland and upland grasslands. Un-designated but ecologically significant grasslands (e.g., waxcap sites, whin grassland, rush pasture, calaminarian grassland, OMH) were digitised from long term expert datasets and fieldwork.

Rivers and Wetlands: Catchment restoration opportunities were mapped using the Natural England model combining surface water features, wetland habitats, LIDAR derived connectivity, and overland flow modelling. Subsidence wetlands were digitised through remote sensing and refined through local specialist knowledge.

Woodland, Trees, Scrub and Red Squirrel: Ancient woodland "core" areas were buffered by 100m to identify zones for strengthening and expansion through natural colonisation or improved management. PAWS sites were mapped using the new inventory. Potential ghyll woodland and scrub establishment areas were modelled using slope, topography, and viewshed analysis to avoid key breeding wader habitats.

Coastal, Marine and Wintering Waders: Coastal layers include wet grasslands, wader roosts, mussel beds, seal haul outs, and potential saltmarsh creation. They are based mostly on local knowledge and fieldwork.

Urban Edge and Urban Environment: Urban mapping focused on historic waggonways, OMH, and other habitats from earlier sections.

Online maps

The stage 1 mapping can be viewed at page 132 onwards, or online:

- StoryMap Designated sites and irreplaceable habitats
- Web Map Experience LNRS stage 1 map: Areas of particular importance for biodiversity (designated sites and irreplaceable habitat)
- Overall StoryMap collection LNRS StoryMap Collection

The stage 5 mapping can be viewed at page 132 onwards, or online:

- Web Map Experience
  LNRS stage 5: Areas that could become of particular importance for biodiversity

The GIS link can be supplied on request by emailing lnrs@northumberland.gov.uk

When viewing the maps online, the layers can be ticked on and off using the "map layers" button. The opening view is the North of Tyne with marine area boundary, and the local authorities.

The map layers might need expanding to see the contents as they are grouped according to broad habitat grouping, in line with the chapters in this LNRS.

The basemap can be changed using the button along the bottom. To zoom in and out, either scroll with the computer mouse, or use the + and – buttons in the corner.

As this isn't meant to be a design for where to plant trees or dig ponds, or any other nature action - but is intended to be a more generalised starting point for conversations with land managers - some of the mapping layers will disappear when zoomed in to a parcel level.

For farmers and land managers

Farmers and land managers can use the mapping as a guide to where the partners who work in nature conservation in the North of Tyne area feel the top mappable priorities are. It is not known how the maps will interact with stewardship schemes in the future, or other ways of funding – such as biodiversity net gain (BNG) or other green finance investment.

If at first there seems to be nothing mapped on your land, there could still opportunities here – probably unmappable ones. The chapter about "wider countryside" will be useful.

Only some of the measures were mappable, and even then, only perhaps in part (e.g. for part of the area or for part of the measure as it is written). Where measures could be applied widely across large areas, statutory guidance requires that we prioritise what is included on the map according to certain criteria. It should be remembered that any actions that deliver against the measures as they are written, will count as contributing to the delivery of the LNRS. Written measures – both mapped and unmapped – represent our highest priorities.

If you believe there is an important habitat, species, or potential habitat missing from the thinking, we would welcome knowing about that. It is based on the best information we have in 2025 – no doubt as the LNRS progresses through subsequent years, improvements can be made, for a reviewed LNRS.

At the end of our draft mapping, we reviewed how it overlapped with the best and most valuable land. Most of our mapped measures are away from the most productive food-producing parts of the North of Tyne area. Our "wider countryside" chapter and map pop-ups suggest actions in this area.

Tree replanting site after Storm Arwen damage – Photo credit Great Northumberland Forest

For woodland managers and foresters

The LNRS is not intended to be a woodland creation plan or a tree planting plan. Partners, such as the North East Community Forest (NECF) and the Great Northumberland Forest (GNF) have worked up their own plans and strategies. Forestry England are updating the area's Forest Management Plans.Our top mappable priority for the habitat of trees, woodland, and scrub – is to concentrate on the areas around ancient woodland, to make those more resilient. Perhaps by natural colonisation. At the same time, the Planted Ancient Woodland Sites are on the map, as potential for restoration to a native species selection. This first LNRS is only 5-10 years, so at the same time, it isn't an ancient woodland strategy – the timescale is too short, for example. We have also mapped ghylls / sikes in the uplands where there could be potential, working the land managers, for low density tree establishment that would not impact on breeding wader habitat.

At the end of our draft mapping, we reviewed how it overlapped with the most productive forests. Most of our mapped measures are away from these parts of the North of Tyne area. Our "wider countryside" chapter and map pop-ups suggest actions in this area.

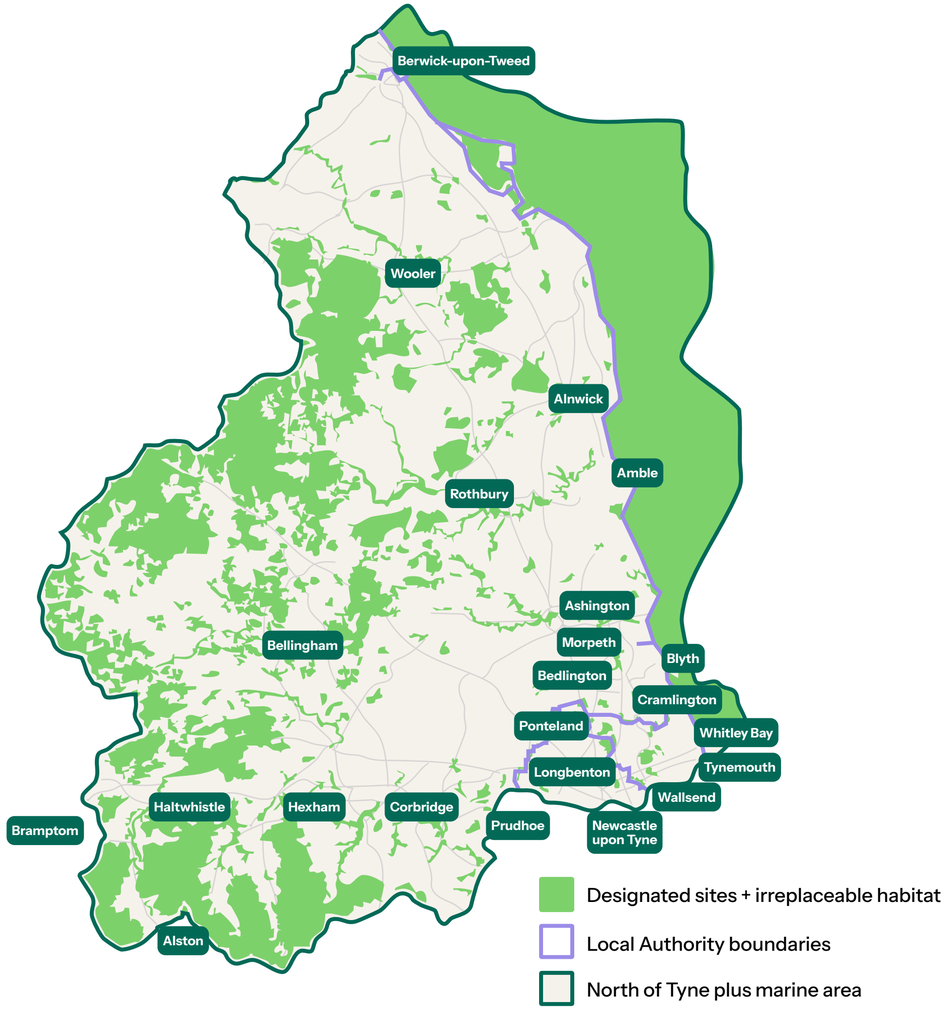
For residents and communities

It is good to see on the map where the nature priorities are in the North of Tyne. Perhaps there is an existing designated site near you, or some irreplaceable habitat. Perhaps one of the mapped priorities is in your community. If at first there seems to be nothing mapped nearby, there could still be opportunities here - probably unmappable ones. The chapter about "wider countryside" will be useful. We all have a role to play to help nature – even gardening for nature or a window box can help.

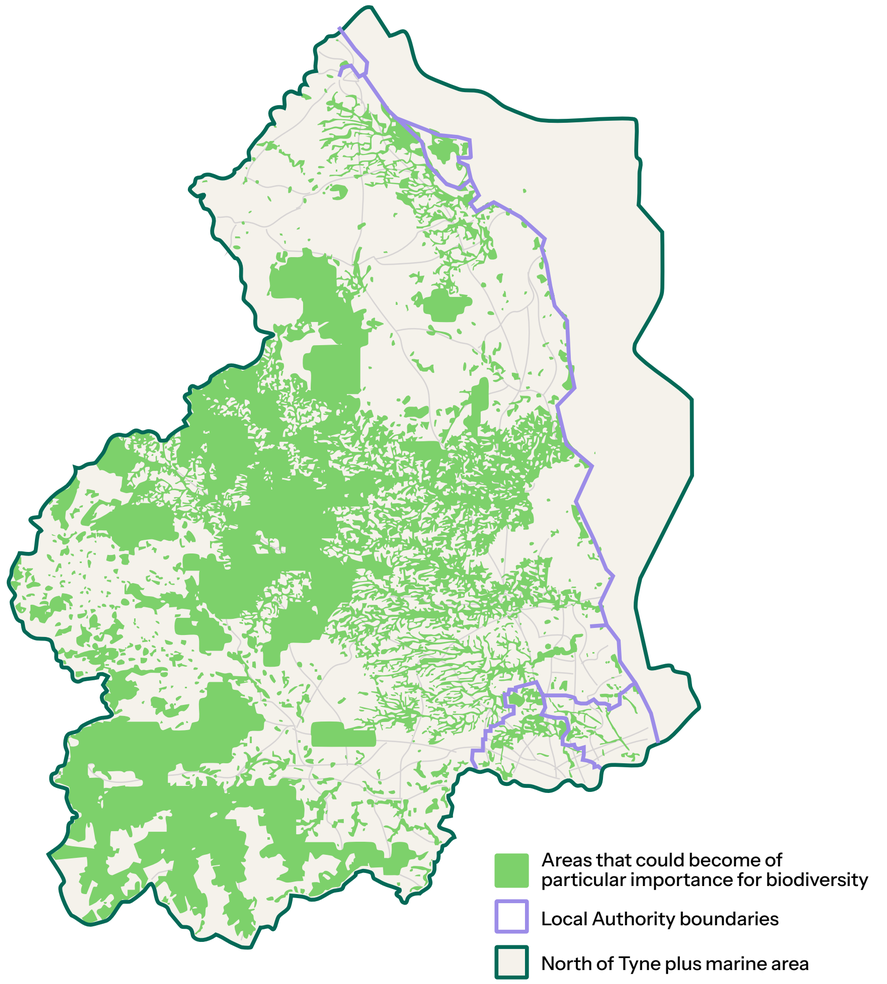
Red-tailed Bumblebee on Common Knapweed - Photo credit Iain Robson

Map inserts

Below are the maps which can also be viewed online. To request these in an alternative colour palette, email lnrs@northumberland.gov.uk



Map 1 - all designated sites, irreplaceable and priority habitat (stage 1) – November 2025



Map 2 - All mappable measures (stage 5) A4 page – 31% of the North of Tyne area – November 2025

Measure by measure (action by action)

In this section, we have linked each map element back to text of priorities and measures.

In a separate technical appendix, we include more information about how each layer was produced.

Some measures can be in more than one habitat group – for instance, coastal and urban edge. We have tried to put them in one group, but some of the information in the tables is duplicated.

Buttercup and ox-eye daisy - Newcastle City Council

Peatland and Heathland

Map layer name	Links to which measures in the LNRS text
Priority Peatland restoration areas	PH 1.1 PH 1.2 PH 1.3 PH 1.6
Border Mires restoration and management areas	PH 1.1 PH 1.6 PH 2.1
Restore to bog - low yield Sitka on deep peat in Public Forest Estate	PH 1.5 PH 2.2

There are two Peat Partnerships covering the North of Tyne area: the Northumberland Peat Partnership (for the area north of the A69) and the North Pennines National Landscape Peat Programme. Both initiatives supplied us with area boundaries for the sites they have surveyed and ready to implement over the next five years. These areas are the top locations for peat work.

The Border Mires is a complex of many peat bogs and raised mires on the Northumberland and Cumbria border, nationally and internationally important ecosystems. They have recently been remapped for their hydrological boundaries. These new mapping boundaries are shown on the map.

Restore to bog - These are locations where we believe that work to restore hydrology and peat restoration should be prioritised, on a site-by-site basis. This is mapping to visualise the "Decision support framework for peatland protection, the establishment of new woodland and re-establishment of existing woodland on peatland in England July 2023"[54] . Decisions need to be made following fieldwork and discussions with land managers; the mapping is a guide.

54 July_2023_Decision_support_framework_for_peatland_protection_V4.pdf.

"Local Nature Recovery Strategies, once they are published, will establish priorities and map proposals for specific actions to drive nature's recovery and provide wider environmental benefits and are managed by local authorities. In the interim a mapping tool (the Forest to Bog tool) produced by Forest Research is available for woodland owners and managers to use to view maps indicating suitability of wooded peatlands for restoration"

Quote from the decision support framework, page 20

We believe the publication of the North of Tyne LNRS supersedes the Forest to Bog tool mentioned in the 2023 decision support framework. The LNRS supports the restoration of peat habitats on low-yield woodlands on deep peat as a general principle.It has only been possible to map this measure on the public forest estate. Elsewhere, the Forest to Bog tool could apply. This can be revisited at the review of the LNRS.

Important Grassland (and breeding waders)

Map layer name	Links to which measures in the LNRS text
Breeding Wader priority recovery areas As per the guidance[55] relating to afforestation on or near upland breeding wader areas, we are identifying these as wader recovery areas.	WB 1.1 WB 1.2 WB 1.3 WB 1.4
Buffer and expansion zones around important grasslands	IG 1.10 IG 2.1
Important undesignated grasslands - sites for protection, restoration, and management ▪ Upland meadows without designation ▪ Waxcap sites ▪ Whin grassland ▪ Species Rich Rush Pasture ▪ Calaminarian Grassland ▪ Open Mosaic Habitat on previously developed land ▪ Newburn Haughs	IG 1.1 IG 1.2

The mapping for the breeding wader priority recovery areas in particular may look “blocky” – but for a mobile species it would not be possible, at a strategy level, to map to parcel level all the fields used by breeding and feeding waders. It is to be the starting point for actions for breeding waders.

55 www.gov.uk/government/publications/guidance-for-afforestation-proposed-on-or-near-nationally-important-upland-breeding-wader-areas

Wood crane’s-bill – a characteristic species of upland hay meadows - Photo credit David Feige

Freshwater – Rivers - Wetlands

Map layer name	Links to which measures in the LNRS text
Catchment restoration opportunities in the Lindisfarne Streams, Coquet, Wansbeck, Pont-and-Upper-Blyth, and Ouseburn catchments – within and fringing wetlands	FH 1.1 FH 1.2 FH 1.3 FH 1.4 FH 1.5 FH 4.1
Catchment restoration opportunities in the Lindisfarne Streams, Coquet, Wansbeck, Pont-and-Upper-Blyth, and Ouseburn catchments – adjacent habitat and wetland restoration potential	FH 3.1 FH 3.2 FH 3.3 FH 4.3 FH 4.4 FH 5.1 FH 5.2
Subsidence wetlands	FH 3.4

The model behind the "Catchment restoration opportunities" prioritises the catchment into two zones; the "within and fringing wetlands" zone and the "adjacent habitat with wetland restoration potential" zone. The aim of this model is to illustrate a way where people from a range of different organisations can explore the land in a river catchment to meet their different aims and ambitions. The tool isn't intended to identify specific opportunities. So far, no fieldwork with land managers or wider stakeholder engagement took place, which would be the next stage, having identified any project area.

- In the "within" zones, actions might include: restoring or expanding the water habitat itself, removing or addressing physical modifications, enhance water habitat fringes (to allow for natural ecological succession), or considering species reintroductions.
- In the "adjacent water" zone, actions might include: linking with riparian corridors areas of water or water fringes, floodplain restoration, address historical modification (such as drainage) and explore alternative agriculture.

Catchment prioritisation

As discussed above, the catchment restoration mapping could have been undertaken for any and all catchments, but DEFRA statutory guidance has required that we prioritise and only choose some of them. Prioritisation has been undertaken on the following basis:

In prioritising, we need to consider:

The potential for the LNRS to help stimulate/ support new activity

The likelihood of delivery over the next 3-10 years (the lifetime of the first iteration of the LNRS)

The relationship with other LNRS priorities

We are aware that there are a group of watercourses that have been relatively neglected to date in terms of conservation activity, but where activity is now starting to build, and therefore there is a good chance of transformational change being delivered or at least commencing, during the lifespan of this first LNRS. Given that we must prioritise, we chose those as a logical focus for this first iteration of the LNRS, and our hope is that activity on those watercourses will start to catch up with activity on the Tyne and Tweed.

The two largest of these, the Coquet and the Wansbeck, also sit within an area of the North of Tyne where lots of other LNRS priorities are coalescing to form a very strong and striking east to west corridor from Druridge Bay to the Scottish border around Kielderhead, creating a corridor of nature recovery opportunities through mid-Northumberland – again, an area that has historically received less attention than other areas.

Application of these criteria led to the following catchments being chosen for inclusion in the catchment restoration mapping:

The North Northumberland coastal streams

The Coquet

The Wansbeck

The Rede

The Pont and upper Blyth

The Ouseburn

The Wooler Water and its catchment area

Wood, Trees, and Scrub (and red squirrels)

Map layer name	Links to which measures in the LNRS text
Improved management of core - ancient semi natural woodland and selected SSSI woodland units[56]	WTS 1.1 WTS 1.3 WTS 1.4 WTS 1.6
Manage land next to core – to improve quality and increase native tree cover	WTS 1.3 WTS 1.4
Priority woodland expansion – using natural colonisation where possible[57]	WTS 1.3 WTS 1.4 WTS 3.1
Ancient Replanted Woodland (PAWS) sites – to be restored to native woodland cover	WTS 2.1 WTS 2.2 WTS 2.4
Potential sites for ghyll woodland, tree, and scrub establishment	WTS 4.1

Coastal and Marine (and wintering waders)

Map layer name	Links to which measures in the LNRS text
Potential wet grasslands and wader roost sites	WB 2.1 WB 2.2
Blue Mussel restoration and management areas	CM 1.7
Seal haul outs	CM 1.12
Potential Saltmarsh creation	CM 4.2
Urban Dunes	CM 1.5

56 See the Mapping Technical Appendix for a fuller explanation (page 145)
57 For example, Forestry Commission guidance Using natural colonisation for the creation of new woodland

Urban and urban edge

Map layer name	Links to which measures in the LNRS text
Waggonways	UH 1.1
Subsidence Wetlands	FH 3.4
Urban Dunes	CM 1.5
Potential Saltmarsh creation	CM 4.2

Strategic Recovery Areas

Map layer name	Links to which measures in the LNRS text
Ashington to Amble	These areas are multi-themed, linking to the priorities and measures as a whole across the LNRS – see Chapter 10.
Ashington to Amble	
Hadrian's Wall	
Mid Northumberland	
Kielderhead	

Wider Countryside

When viewing the online maps, and clicking on an area, a pop-up will appear that links to a page of general suggestions for the wider countryside in that area. See Chapter 9 for more information, (opportunities within the wider countryside).

- North Northumberland Coast
- Northumberland Sandstone Hills
- Cheviot Fringe
- Cheviots
- Border Moors and Forests
- North Pennines
- Hadrian's Wall
- Mid Northumberland
- South East Northumberland Coastal Plain
- Durham Coalfield Fringe
- Tyne and Wear Lowlands

Overlapping measures

Some areas have more than one suggested action or measure. That is a fair reflection of the fact that often there is no one right answer – and working with nature involves a dialogue with the land managers, farmers, those who know the land the best. The maps are just a guide to where these conversations and fieldwork would start.

The LNRS is a strategy - not a precise plan for where to, for example, dig ponds, plant trees, or any other action.

Chapter 12

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LNRS Monitoring and Reporting

At the time of writing, DEFRA and Natural England are developing their detailed thinking around LNRS monitoring and reporting. The aim is to be able to track nature recovery activities and for the information to flow between local and central government.

Tracking nature recovery and the delivery of LNRS measures will be essential to maintain momentum and inspire future ideas.

When the LNRS is reviewed – which we anticipate could be five years after publication, but it is the Secretary of State who would decide on the timescale – there will be a requirement to report on actions that have been achieved since publication.

Lyme Grass, Druridge Bay – Photo credit Iain Robson

Wildlife-rich habitat restored or created

DEFRA have national environmental targets, as part of the Environment Act, the Environmental Improvement Plan (EIP) and 30 x 30[58]. There are links to the Environmental Indicator Framework – 66 indicators that describe environmental change in relation to the 10 goals of the EIP[59] . Local information will help inform progress towards those. For example, the Environment Act Habitat Target:

"To restore or create more than 500,000 hectares of a range of wildlife-rich habitats outside of protected sites by 31 December 2042"[60]

The publication "Environment Act Habitat Target – Definitions and Descriptions" sets out the definitions for creating and restoring wildlife-rich habitat, on land or water[61] . This metric is reporting on actions that bring about an increased extent of wildlife-rich habitat. It should be noted; this is not an improved condition of existing wildlife-rich habitat. Therefore, actions in habitat that already meet the wildlife-rich definition listed aren't considered 'restoration' or 'creation', and only actions taken outside of protected sites will count towards the national target. The reporting system / data model framework for the target is still in development. DEFRA will be combining information from the Arm's Length Bodies (ALBs) and the Nature for Climate Peatland Grant Scheme. Similarly, the LNRS is not required to collect information on schemes like the Environmental Land Management (ELM scheme), because DEFRA already hold this data, under the Farming and Countryside Programme. Work is underway to expand the data included in the analysis, for example Biodiversity Net Gain.

At the time of writing, 7.7% of the national 500,000ha target is reported on in the 2025 Evidence Report, which is broken down by habitat type, data provider, and LNRS region, with the North of Tyne area contributing 750ha to the total 38,877ha.

Butterfliy - Photo credit Kevin Batey

58 www.gov.uk/government/publications/criteria-for-30by30-on-land-in-england/30by30-on-land-in-england-confirmed-criteria-and-next-steps

59 Environmental Indicator Framework - GOV.UK

60 This is the Evidence Report on the Environment Act Habitat Target for 2025 (publication JP063) https://publications.naturalengland.org.uk/publication/5726258254839808

61 Publication TIN219 https://publications.naturalengland.org.uk/publication/6427187599900672

LNRSs supplementing national reporting

Guidelines are still being developed, but it is expected that RAs will supplement the national recording, to minimise duplication of effort. For example, privately financed locally specific habitat restoration or creation. We will be asked to collect information on:

- Habitat creation and restoration actions
- Habitat management actions
- Habitat protection actions
- Specific actions for threatened species
- Levels of private investment

The requirements are set out in the publication "Habitat Target – data model and standard".[62]

62 (publication TIN223) https://publications.naturalengland.org.uk/publication/5581504720404480

North of Tyne LNRS

In 5-10 years, we will be reviewing this LNRS. We will need to develop indicators or metrics for our priorities and measures in the short term, so that the data review task is achievable at this point. This would include case studies of projects and inspiring sites across our suite of habitat groups, including the non-statutory marine. This would be alongside the requirements from DEFRA that are outlines above. This links to priority **OP 2** in Chapter 9. We will be working closely with the Environmental Records Information Centre (ERIC) and with neighbouring LNRSs on monitoring, recording, and reporting.

Glossary

Entry	Acronym	Text
30 x 30		A global conservation target to protect 30% of the Earth's land and ocean areas by 2030 to safeguard biodiversity and address climate change. It was agreed at the UN Biodiversity Summit (COP15) in 2022. The UK's commitment to this international target was included in the 2023 Environmental Improvement Plan, later revised in 2025 (EIP25). www.gov.uk/government/publications/criteria-for-30by30-on-land-in-england/30by30-on-land-in-england-confirmed-criteria-and-next-steps. The latest report from the Office for Environmental Protection is here: https://assets.publishing.service.gov.uk/media/69660de1183e25d7051e0dbd/Progress_in_improving_the_natural_environment_in_England_2024_to_2025.pdf
3Cs		Championing Coastal Co-ordination: A programme of work led by the Environment Agency, seeking to co-ordinate coastal sustainability.
Agroforestry		Growing trees and crops or grazing animals together, to help nature and farming.
Ancient Semi-Natural Woodland	ASNW	Ancient woodland of mostly native tree species, usually derived from coppice or natural regeneration. ASNW often include old growth characteristics such as ancient and veteran trees and large diameter standing and fallen deadwood. They are dynamic ecosystems that can include many other habitat types such as species rich grassland, heathland, wetland and freshwater systems.
Ancient Tree		A tree which, because of its age, size and condition, is of exceptional biodiversity, cultural or heritage value. They are found in ancient woodlands and as trees outside woods. An ancient tree is a) in the third or final stage of its life (which can go on for decades or centuries); b) old, relative to other trees of that species; c) interesting for biological, aesthetic, or cultural reasons, because if its age.
Ancient Tree Inventory	ATI	An inventory managed by the Woodland Trust of ancient and veteran trees in the UK. This is different to the Ancient Woodland Inventory.

Entry	Acronym	Text
Ancient Woodland		An area that has been wooded continuously since at least 1600 AD (other dates in other parts of the UK). It includes Ancient Semi-Natural Woodland (ASNW) which is woodland comprising native species that does not show evidence of having been clear-felled and replanted to produce a timber crop, and Plantations on Ancient Woodland Sites (PAWS), which are sites where native woodland has been cleared and replaced with a timber crop, typically of mixed or coniferous species
Ancient Woodland Inventory	AWI	An inventory managed by Natural England of areas of ancient woodland in England, including both Ancient Semi-Natural and Plantations on Ancient Woodland Sites
Ancient Wood Pasture and Parkland	AWPP	This is derived from the traditional practice of managing trees in tandem with grazing, characteristically with at least some open grown or pollarded veteran trees or shrubs, old-growth characteristics and diverse and dynamic open and open-wooded habitats. Infilled ancient wood pasture and parkland is where the open habitat between open grown or veteran trees in AWPP has infilled, either through natural regeneration or planting, resulting in closed canopy woodland.
Area of Outstanding Natural Beauty	AONB	Landscapes of national importance designated under the National Parks and Access to the Countryside Act 1949 to conserve and enhance natural beauty, wildlife and cultural heritage, now known as National Landscapes. Together with National Parks, they are collectively known as Protected Landscapes.
Areas of Particular Importance for Biodiversity	APIB	Areas which are recognised as already being of importance for biodiversity through their designation as a Site of Special Scientific Interest, Special Protection Area, Special Area of Conservation, Ramsar Site or Local Wildlife Site, or recognition as irreplaceable or priority habitat. The first stage of mapping for an LNRS is to map all of these sites. These are areas already assumed to have some level of protection and management, through legislation or planning.

Entry	Acronym	Text
Areas that Could Become of Particular Importance for Biodiversity	ACIB	Areas where measures identified in the LNRS could be implemented to achieve maximum benefits for nature recovery and wider environmental benefits. The second stage of mapping for an LNRS is to show all of these areas.
Ark site		A concept used widely in the conservation of White-clawed Crayfish but applicable to other species. Ark sites are locations chosen for their ecological suitability, isolation from invasive species, and ability to support healthy populations.
Biodiversity Action Plan	BAP	Nature recovery plans developed across England in the late 1990s – early 2000s.
Biodiversity Net Gain	BNG	A requirement enshrined in the Town and Country Planning Act that requires new development to deliver measurable improvements in biodiversity.
Biodiversity Statement		This is the part of the LNRS that outlines the current situation across the North of Tyne area.
Biosecurity		Steps taken to stop diseases or pests from spreading. Two example campaigns are “Check, Clean, Dry” and “Be Plant Wise”. The GB NNSS has further resources Biosecurity and pathways » NNSS.
Blanket Bog		Areas of deep peat that form a blanket across flat and gently sloping ground in upland areas subject to high rainfall. Vegetation is dominated by peat forming species such as Sphagnum mosses and cottongrasses, and it is one of our irreplaceable habitats.
Broadleaved		Hardwood trees with wide, flat leaves as opposed to needles. Most are deciduous, meaning they lose their leaves in winter. Holly is an evergreen broadleaved species.
Capturing carbon		Process by which carbon dioxide is pulled out of the atmosphere.
Carbon storage		Stores held in soil and plant material.
Catchment		The area where rainwater collects and flows into rivers or lakes.

Entry	Acronym	Text
Catchment Partnership		A group working together to protect rivers and water in a catchment.
Citizen Science		Scientific research carried out by members of the general public, often in collaboration with or under the direction of professional scientists.
Coastal margin		Access Land created by the establishment of the King Charles III England Coast Path, usually the land between the path and mean low water.
Coastal roll back		Process by which the coastline adjusts naturally to a higher sea level with for example dune grasslands moving inland as the sea claims land.
Conifer		Softwood trees with needle-like leaves. There are three native conifer species: Juniper, Yew, and Scots pine. Scots pine is known in low density woodland setting at the William’s Cleugh site on the Northumberland border. Yew may be relevant to tree establishment in the South East of the area.
Constructed Wetland		A wetland that is constructed and planted with plants that help to clean water and reduce flooding. These can also support a range of wildlife.
CRoW Act (2000)		Countryside and Rights of Way Act 2000, which grants public access to certain types of land in England and Wales and improves rights of way, nature conservation, and wildlife protection.
Designated Sites		Sites that have been designated under particular legislation or policy because they have been demonstrated to meet the criteria for being of international, national or local importance.
England Peat Action Plan		A government plan to protect and restore peatlands in England.
England Peat Map	EPM	A map pf peaty soils in England produced by DEFRA A new peat map for England – Natural England.
Environment Improvement Plan	EIP23 or EIP	Government’s strategy for achieving long-term environmental goals, including clean air, water, biodiversity, and climate resilience. Includes a target of wildlife rich habitat. See monitoring chapter.

Entry	Acronym	Text
Environmental Records Information Centre	ERIC North East	The Environmental Records Centre for North East England: ERIC North East - Environmental Records Information Centre
Environmental Stewardship	ES	A scheme that provides financial support for farmers to take action to support nature.
Farmer group or cluster		A team of farmers working together to improve land and nature.
Ghyll		A small, steep-sided, upland valley with a stream running through it.
Green Infrastructure	GI	A network of natural and semi-natural features (like parks, wetlands, and green roofs) that provide environmental and societal benefits.
Greenhouse gases	GHG	Greenhouse gases are atmospheric gases that trap heat from the sun, helping warm the Earth's surface, such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and water vapour (H_2O).
Habitats of Principle Importance	PHI or HPI	Habitats included in the list of the most important habitats in England that the government is obliged to publish under S.41 of the Natural Environment and Rural Communities Act 2006 as amended.
International Union for Conservation of Nature	IUCN	the International Union for Conservation of Nature. It's a global organisation that focuses on nature conservation and sustainable use of natural resources.
Intertidal		The area between high and low tide where land meets the sea.
Invasive Non-native Species	INNS	Plants or animals that have been introduced by people to areas of the world where they don't naturally occur, and which have gone on to spread in the wild in a way that causes harmful impacts to native biodiversity. Invasive non-native species are one of the top five drivers of global biodiversity loss. They threaten the survival of native wildlife, damage our natural ecosystems, and cost the British economy nearly £2 billion a year. There are many non-native species (which are found outside their normal range), however it is only those that pose a threat are considered invasive. Non-Native Species - ERIC North East www.nonnativespecies.org/
Invasive Non-native Species Strategy	INNS Strategy	A strategy to control invasive non-native species. See the entry for INNS.
Irreplaceable habitat		Habitats which 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. They include ancient woodland, ancient and veteran trees, blanket bog, limestone pavement, sand dunes, salt marsh and lowland fen.
Lawton Principles		The principles established in the report published by the committee chaired by Sir John Lawton in 2010 to review England's wildlife sites and the connection between them called 'Making Space for Nature; a Review of England's Wildlife Sites'. These emphasise the importance of having more areas managed for nature, that these be bigger, better managed and have stronger links between them.
Local Nature Reserve	LNR	A site managed by a local authority and designated as a nature reserve under the National Parks and Access to the Countryside Act 1949.
Local Wildlife Site	LWS	A site that has been designated because it meets published criteria for being of at least county -level importance for wildlife. Together with Local Geological Sites, they form a network known collectively as "Local Sites".
Long Established Woodland	LEW	Woodlands that have been on the Ordnance Survey Epoch 1 Map series since 1893 and have been wooded continuously until today.
Marine Conservation Zone	MCZ	A marine area designated as being of importance for nature under the Marine and Coastal Access Act 2009.
National Character Areas	NCA	National Character Areas (NCAs) in the UK are distinct natural regions defined by their unique landscape, biodiversity, and cultural heritage.

Entry	Acronym	Text
National Flood Risk Assessment		The National Flood Risk Assessment is a comprehensive evaluation of flood hazards and vulnerabilities across a country to inform risk management and planning.
National Landscape		Landscapes of national importance designated under the National Parks and Access to the Countryside Act 1949 to conserve and enhance natural beauty, wildlife and cultural heritage, formerly known as Areas of Outstanding National Importance.
National Nature Reserve	NNR	Areas designated as nature reserves under the under the National Parks and Access to the Countryside Act 1949 and managed by Natural England or organisations approved by Natural England.
National Park		Landscapes of national importance designated under the National Parks and Access to the Countryside Act 1949 to conserve and enhance natural beauty, wildlife and cultural heritage and to promote opportunities for the public understanding and enjoyment of their special qualities.
National Planning Policy Framework	NPPF	The document that sets out the UK government's planning policies to promote sustainable development and guide local planning decisions.
Native species		A species of plant or animal that occurs naturally in a particular area, as opposed to one that has been introduced from elsewhere by people.
Native woodland		Woodland where the trees primarily comprise native species. Notes on Tree Planting and the use of native species in North East England this is our guide.
Natural capital		The world's stocks of natural assets such as geology, soil, air, water, and all living things, which provide ecosystem services.
Natural colonisation		Trees self-seeding on the edge of existing woodland, colonising open ground.
Natural regeneration		Trees growing up within an existing woodland, self-seeding into open ground within the woodland itself.

Entry	Acronym	Text
Nature friendly farming practices		Ways of farming that help wildlife and protect the environment.
Nature Recovery Network	NRN	A single, national network which will benefit people and wildlife by increasing, improving and joining-up wildlife-rich places across England.
Nature-based solutions	NbS	Are defined by the International Union for the Conservation of Nature (IUCN) as, 'actions to protect, sustainably manage, improve and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits'.
Non-native species		A species of plant or animal that is only present in a particular area because it has been introduced from elsewhere in the world by people.
Non-statutory		Not required by law, but still important or useful.
North East Combined Authority	North East CA	The regional authority covering Northumberland, Newcastle upon Tyne, North Tyneside, Gateshead, South Tyneside, Sunderland and Durham, with a range of powers and funding streams developed from central government.
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.
Priorities and Measures		Priorities are the end results the strategy is seeking to achieve. Measures are specific practical actions to achieve the priorities.
Priority Habitat Inventory	PHI	An inventory of habitats included in the list of the most important habitats in England that the government is obliged to publish under S.41 of the Natural Environment and Rural Communities Act 2006 as amended.
Protected Landscapes		This refers to National Parks, and the National Landscapes. National Landscapes is the rebranded name for areas of outstanding natural beauty (AONBs).

Entry	Acronym	Text
Protected Sites		Another term for designated sites.
Ramsar site		Ramsar sites are wetlands of international importance that have been designated under the criteria of the Ramsar Convention on Wetlands of International Importance.
Riparian		The banks of a river / wetlands next to rivers and streams. Vs “riverine” for habitat that is within the river itself.
Riverine		Includes the river itself (river channel) and also the floodplains
Restoration		With the example of peat restoration, projects don’t lead to restored peat, but a peat site that is “under restoration”. The final desired outcome of a restored, functioning peatland habitat, is likely to take decades or more to achieve. Similarly, with restoring a PAWS site, restoration can take time, and may happen incrementally.
Scrape		A shallow dip in the ground that holds water (possibly only for part of the year) and attracts wildlife.
Sequestering carbon		Process by which carbon is locked into the soil.
Shoreline Management Plan	SMP	A plan to manage coastal change at a regional scale.
Site of Special Scientific Interest	SSSI	Nationally important wildlife and geological sites designated under the Wildlife and Countryside Act 1981 as amended.
Special Area of Conservation	SAC	Sites of international importance for habitats and species other than birds designated under the Habitats Directive.
Special Protection Area	SPA	Sites of international importance for birds designated under the Birds Directive.

Entry	Acronym	Text
Strategic Recovery Area	SRA	While developing the North of Tyne LNRS, it became apparent that there are several areas of the North of Tyne where there are exceptional opportunities for achieving nature recovery at scale, and for innovative practice in nature recovery. This is because of the pattern and scale of ownership by public bodies and sympathetic landowners, and because of emerging large-scale projects.
Subsidence wetlands		Wetlands formed when land sinks, usually because of the collapse of historic coal mines. They may be seasonal.
UN Convention on Biodiversity		The UN Convention on Biodiversity is an international treaty aimed at conserving biological diversity, promoting sustainable use of its components, and ensuring fair sharing of benefits from genetic resources.
Veteran Tree		A tree that is not necessarily ancient, but which shares many of the features of ancient trees, such as significant decay features including branch death and hollowing. These features contribute to their biodiversity, cultural and heritage value. Veteran trees are survivors that have developed some of the features found on ancient trees, however they are usually only in their second or mature stage of life. They are also considered irreplaceable habitat.
Wider environmental benefits		Good things nature gives us, like clean air and flood control, in addition to nature itself.
Yield Class		A way to measure how fast trees grow and how much timber they produce.

Local Nature Recovery Strategy for the North of Tyne

For more information on Local Nature Recovery Strategies

Visit the North East Combined Authority website

North East Combined Authority | Kim McGuinness North East Mayor