North of Tyne Local Nature Recovery Strategy – Mapping Technical Appendix

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 "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

Stage 1: Areas of particular importance for biodiversity

Almost all the datasets used on the map of designated sites, irreplaceable and priority habitat are national datasets that are already available in the public domain on data.gov.uk, under Open Government Licence.

The two exceptions are:

- locally-held irreplaceable habitat
- the Local Sites

We are not including ancient and veteran trees in our final mapping of irreplaceable habitats – this is because of ownership of this dataset which means we would not be able to onwards share it.

Locally held datasets

Sources of information included National Trust habitat data, Phase 1 habitat survey from Northumberland National Park Authority, Northumberland County Council's phase 1 dataset[1], Habitat data from Wildlife Trust owned reserves, and from Northumbrian Water Ltd. Habitats that met the definition of "irreplaceable" were selected. These were merged and dissolved together before displaying.

[1] This dataset is available on data.gov.uk through INSPIRE

Local Sites

A copy of the Local Sites dataset was taken[2], this dataset is managed by a Local Sites Partnership across the areas for Northumberland, Newcastle, and North Tyneside.

Ancient Woodland Inventory

This dataset is, at the time of writing, has been reviewed, and is in the process of being republished for this area. We are able to use the new inventory dataset. It includes two new elements, relating to wood pasture – but it is not the "long established woodland" dataset[3] (which will be published separately). All four of these classifications are considered to be irreplaceable habitat:

- Ancient and Semi-Natural Woodland (ASNW)
- Ancient Replanted Woodland (PAWS)
- Ancient Wood Pasture
- Infilled Ancient Wood Pasture

The Priority Habitat Inventory

This is an open, national dataset. The October 2025 update of the PHI was queried for certain irreplaceable habitats: where the main habitat included Blanket Bog, Coastal Saltmarsh, Coastal sand dunes, Limestone pavement, and Lowland fens.

Living England

This is an open, national dataset. Living England[4] dataset Primary Habitat was queried for Bog, Coastal Saltmarsh, and Coastal Sand Dunes.

Saltmarsh Extents and Zonation

This is an open, national dataset. This Environment Agency dataset was queried for Spartina (either in its classification or its alternative class).

[2] Version 13
[3] 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
[4] Downloaded October 2024

Stage 5: Areas that could become of particular importance for biodiversity: measures (actions)

For each section, the tables below explain the data source and methodology.

The stage 5 mapping can be viewed 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

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 action that delivers against the measures as they are written, count as working for the LNRS. Measures – both mapped and unmapped – represent our highest priorities.

Peatlands and Heathlands

Map layer name	Data source and methodology
Priority Peatland restoration areas	Parcels were supplied from both the Northumberland Peat Partnership and the North Pennines Peat Programme
Border Mires restoration and management areas	Parcels were supplied by Forestry England (who manage in partnership the Border Mires Committee) – this 2025 dataset has been remapped using hydrological boundaries
Restore to bog - low yield Sitka on deep peat in Public Forest Estate	The Forestry England sub compartment dataset was examined to select parcels where *Sitka spruce* is either the primary, secondary, or tertiary species – with a yield class less than 10. Maps about yield class are not available outside of the Public Forest Estate. This was then unionised with pixels from the new England Peat Map indicating a depth of more than 30cm of peat. New datasets will become available over the next 5 years, for example Tree Species Map England which would enable the identification of predominantly Sitka spruce parcels in the rest of the North of Tyne area. If estimates of yield class can be modelled or mapped, then such dataset developments would enable a revised / future LNRS to map areas where we believe peat restoration should be prioritised for the whole North of Tyne area, not just the Public Forest Estate (woods owned by Forestry England). 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	Data source and methodology
Breeding Wader Recovery Areas (As per the guidance[5] relating to afforestation on or near upland breeding wader areas, we are identifying these as **wader recovery areas**).	In the North Pennines National Landscape, this dataset is: - Land below the moorland line - Plus "grass moorland" from the Priority Habitat Inventory - Plus RPA moorland option parcels GS13, HL7, HL8, and UP2 From this, reservoirs are removed. The final layer is clipped to the Wader Zonal Mapping where the Curlew score is 4 or 5. For the North of Tyne area outside of the North Pennines National Landscape, this dataset needed to be simpler because the above methodology produces too complex a dataset in this wider landscape. Therefore, it is simply selected Wader Zonal Mapping where the Curlew score is 4 or 5. The grid squares were smoothed.
Buffer and expansion zones around important grasslands	In the lowlands, the mapping is based on discussions with specialists from the three Local Authorities, plus with the National Park Authority. These discussions identified the important grasslands that are special for their lowland grassland interest. Surrounding parcels from Ordnance Survey Master Map were selected. In the uplands, the mapping is based on zones around the best upland meadows. These were selected from datasets supplied by NNPA and NPNL. Around these, zones of 1000m and 1500m were drawn, to show the meadows as a network. From this, three inputs were cut out as a way of restricting the networks to the unenclosed uplands: - conifer blocks (using selected parcels from the National Forestry Inventory 2023) - above moorland line, - open access land.
Important undesignated grassland sites - for protection, restoration, and management - Upland meadows without designation - Waxcap sites - Whin grassland	The highest quality meadows were selected from datasets supplied by the Northumberland National Park Authority and the North Pennines National Landscape – based on their years of project work and survey work. Waxcap grasslands are digitised using data for all the CHEGD species records from the North East

[5] www.gov.uk/government/publications/guidance-for-afforestation-proposed-on-or-near-nationally-important-upland-breeding-wader-areas

- Species Rich Rush Pasture - Calaminarian Grassland - Open Mosaic Habitat on previously developed land - Newburn Haughs	Records Centre. These are aggregated and matched to sites – site boundaries either based on OS Master Map / Rural Payments Agency polygons where known, or based on 100m and 200m radiuses. The sites that would meet the Joint Nature Conservation Committee SSSI criteria for non-lichenised fungi are selected. Whin grasslands are digitised based on valuable fieldwork over many years by Janet Simkin at Newcastle University. Species Rich Rush Pasture parcels are digitised based on MSc fieldwork by Meg Bamford, "Characterising the purple moor-grass and rush pasture communities in the North of England" (2022). Grid references were matched to OS Master Map polygons. Calaminarian Grassland dataset is based on a combination of parcels from Janet Simkin at Newcastle University, the North Pennines National Landscape, specialists working on this habitat in the past, Local Sites designation, SAC designations, SSSI designations, and the Priority Habitat Inventory from ~2016. For Open Mosaic Habitat on previously developed land, the starting point was Natural England's GIS of draft Open Mosaic Habitat. This was reviewed site by site, by the North East Records Centre, using aerial maps – checking that the sites may still contain the habitat of interest. This was further reviewed in Northumberland by experienced Ecologists using local knowledge. For Newburn Haughs, parcels of grassland were selected from OS Master Map. These were refined using local knowledge during a telephone call with the Newcastle City Council Ecologist.

Rivers and Wetlands

Map layer name	Data source and methodology
Catchment restoration opportunities in the Lindisfarne Streams, Coquet, Wansbeck, Pont-and-Upper-Blyth, and Ouseburn catchments - Within and fringing wetlands - Adjacent habitat and wetland restoration potential	This model's methodology has been developed by Natural England to apply the water advice to LNRSs. "Within and fringing wetlands" is a combination of two inputs: a) Mapped surface water features - with small streams etc adjusted in the GIS to be 1m wide (found an improvement to the method using ALERT - downloading the "probable overland flow" dataset), and b) Wetland habitats - "bog" and "fen, marsh, swamp" taken from Living England. "Adjacent habitat with wetland restoration potential" uses the GIS to find out which parts of the catchment / land are strongly hydrologically linked to the "within water" zone. This uses LIDAR and digital information about altitude. A vertical distance of <1m indicates good connectivity. The tool isn't intended to identify specific opportunities, but rather a means where practitioners from a range of organisations can explore the catchment to meet different objectives and ambitions. No wider stakeholder engagement or fieldwork took part. The tool isn't meant to be prescriptive. The model is designed to use open source / open govt licence inputs, such as Living England, and open layers from OS.
	The boundaries for the catchments were defined using Environment Agency river waterbody catchments and, for the Pont and Upper Blyth, only the catchment west of the A1 was used. The "flow accumulation" stage of the methodology was produced by using the layer "probable overland flow" from ALERT (Agricultural Land Environmental Risk and Opportunity Tool). Built up areas were removed using a combination of Living England dataset, Built Up Areas from the Office National Statistics (ONS), OS Master Map, and manual checking using aerial mapping. Small fragments (below $1m^2$) were deleted.
Subsidence wetlands	Initial subsidence wetlands in Northumberland were created during 2021, by the North East Records Centre, using remote sensing. An initial project focus area was defined around the SE part of Northumberland, using knowledge of the former coal mining area. It is a challenging habitat to map – as they are in places still forming, can be ephemeral or seasonal, and have a large cultural and historic association. These were then added to through valuable conversations with / feedback from local specialists and by selecting ponds

	from OS Master Map and ponds on either Local Sites or Reserves that we knew were missing. These polygons were snapped to OS Master Map parcels where possible. These were sense-checked by consulting with colleagues who know each area well, or by a regional expert on subsidence ponds.

Woodland, Trees, Scrub and Red Squirrel

Map layer name	Data source and methodology
Improved management of core – ancient semi natural woodland and selected SSSI woodland units	The new Ancient Woodland Inventory was the starting point. Parcels of Ancient Semi Natural Woodland and Ancient Wood Pasture were selected (including some just outside of the N of Tyne boundary). PAWS were not selected as they are mapped as a separate measure. To this were added 18 units from 8 SSSIs[6] that are designated specifically for their woodland interest and are not connected to other woodland features in the landscape. The ASNW "**core**" areas were buffered by 100m. 100m was chosen as an area to focus on for this first LNRS. This is slightly more ambitious than the 75m distance from viable seed source[7] that is part of the EWCO grant. 100m sometimes will end in the middle of an adjoining land parcel / field. We are allowing for a scrub / tussocky grassland margin alongside natural colonisation. A land manager wishing to work on this action could of course extend the 100m to the best natural boundary. The maps are not a planting plan. Within the zones around these core sites, selected parcels from OS Master Map were unionised. Where there were already scattered trees, the suggested action becomes to promote native cover. Road/track or other built up or gardens or slope were removed. OS greenspace was used to further remove various sports facilities e.g., bowling green. Where the land use is more open, the action becomes to consider woodland expansion / tree establishment.
Manage land next to core – to improve quality and increase native tree cover	
Priority woodland expansion - using natural colonisation where possible	

[6] Barelees Pond unit 1; College Valley Woodlands units 1, 2; Hesleyside Park unit 1; Holystone Burn Woods units 1, 2, 3, 4, 5; Irthing Gorge unit 1; River Coquet and Coquet Valley Woodlands units 9, 10, 12; Simonside Hills unit 13; and The Allers and Lilburn Valley Junipers units 1, 2, 3

[7] EWCO natural colonisation eligibility requires that sites are within 75m of a viable seed source that contains at least two native tree seed-bearing species. These can be existing woods, or mature hedges. The 75m EWCO limit can be extended in certain cases. The distance of 75m was established following Bauld et al (2023).

Map layer name	Data source and methodology
	Some manual checking and adjusting was needed, to remove small, isolated pieces, cut off from their "parent" core site by a river, main road, or built-up area. In these places, natural colonisation to make the core more resilient isn't realistic. The wood pasture and infilled wood pasture "**core**" parcels weren't buffered in the same way – because natural colonisation wouldn't be ecologically – the expansion of wood pasture would be more of a managed approach. Where wood pasture and infilled wood pasture are further than 100m away from ANSW sites, they are simply considered "core". Where they are within the 100m buffer (outlined above) around ANSW sites, they will be partly or wholly surrounded by the actions about managing the neighbouring tree-d area or about natural colonisation, that would help make the ASNW more resilient. The final layer was clipped to the N of Tyne boundary.
Ancient Replanted Woodland (PAWS) sites – to be restored to native woodland cover	The new Ancient Woodland Inventory was the starting point. Parcels of Planted Ancient Woodland were selected.
Potential sites for ghyll woodland, tree, and scrub establishment	The method for this is outlined in a webinar from 19/02/2025 by Steve Carver from Wildlands Research Ltd. The model shows incised upland ghylls where an avian predator sitting in the top of a 10m high tree wouldn't "see" out to the flatter ground nesting bird habitat. The mapping was done in partnership with the North Pennines National Landscape. Digital Elevation Model identified key breaks of slope on the valley sides. It is combined with viewshed modelling. National guidance[8] (2024) uses slopes of less than 20 degrees (approximately 1 in 3 gradient) steep, as places where waders might nest. Our methodology used land with less than 8 degrees of slope (about 1 in 7 gradient; less steep) as potential ground nesting bird habitat. The final GIS was simplified and constrained to land above 200m altitude. Our dataset is not ground truthed or discussed with land managers at all. It is not a planting plan, but a starting point for discussions and fieldwork.

[8] https://www.gov.uk/government/publications/guidance-for-afforestation-proposed-on-or-near-nationally-important-upland-breeding-wader-areas/guidance-to-help-inform-when-an-upland-breeding-wader-survey-is-needed-and-when-woodland-creation-is-likely-to-be-appropriate

Coastal, Marine and Wintering Waders

Map layer name	Data source and methodology
Potential wet grasslands and wader roost sites	Parcels based on observations by the Space for Shorebirds project were plotted onto OS Master Map boundaries. Additional local knowledge by the Northumberland Coast National Landscape was added to this using the same method. Fields behind St Mary's were added in to this dataset at the request of the North Tyneside Ecologist and were extracted from OS Master Map.
Blue Mussel restoration and management areas	Survey information (2024) from Northumberland Inshore Fisheries and Conservation Authority (NIFCA).
Seal haul outs	Areas of interest digitised into OS Master Map boundaries based on conversations with local specialists. Further adapted around St Mary's Island to match the local signage "Sensitive Wildlife Area" in discussions with St Mary's Island Wildlife Conservation Society
Potential Saltmarsh creation	Sites manually digitised from a report : these sites are the most likely to progress in the next five years.
Urban Dunes	The Priority Habitat Inventory manually adjusted at Briardene Burn using OS Master Map polygons

Urban Environment and Urban Edge

Map layer name	Data source and methodology
Waggonways	The starting point was two datasets of heritage / historic lines sent from Newcastle and N Tyneside. These were buffered by 5m. These polygons were then intersected with selected greenspace parcels from OS Master Map. We included modern Public Rights of Way and/or Sustrans cycle routes where they added a modern connection to make a sensible feature on the map. Similarly, features were continued features on to the next road or highway Each one was manually "sense checked" on the map and discussed with colleagues in the three local authorities. Removed areas where they are now built up / housing / residential or modern railway line. Other sources of research information included Northumberland Waggonways - Suscram and industrial railways highlighted on Rail Map online - historic transport maps.
Open Mosaic Habitat on previously developed land	See "Important Grassland" section above
Subsidence Wetlands	See "Freshwater" section above
Urban Dunes	See "Coastal and Marine" section above
Potential Saltmarsh creation	See "Coastal and Marine" section above
Buffer and expansion zones around important grasslands	See "Important Grassland" section above
Important undesignated grasslands - sites for protection, restoration, and management	See "Important Grassland" section above
Potential wet grasslands and wader roost sites	See "Important Grassland" section above

Strategic Recovery Areas

Map layer name	Data source and methodology
Ashington to Amble	This area is a combination of a) land owned by many public bodies in this area, b) land part of projects such as the Wilding West Chevington / Wilder Druridge. Following discussions, this was then adjusted to be broadly land between the A197, the main rail line, and the river Coquet.
Hadrian's Wall	The starting point for this area was the emerging Hadrian's Wall Wetlands Landscape Recovery Project. Following discussions, this was slightly adjusted in a few places, to make it a more sensible whole
Mid Northumberland	This area is a combination of the Rothbury Estate, Hepple Wilds, National Trust Wallington Estate, and existing Local Sites or Nature Reserves. Land leased by Forestry England was taken out at their request (Harwood), apart from some key bog habitat. Following discussions, the boundary was adjusted to follow road lines and rivers, to make it more intuitive.
Kielderhead	This area is a combination of the Wild Kielder boundary and the Northumberland Wildlife Trust reserve / NNR at Whitelee.

Wider Countryside

See "Chapter 10: Opportunities for Nature Recovery within the Wider Countryside" for information about the wider countryside pop-ups. The mapping is based on the National Character Areas.