North Yorkshire and York Local Nature Recovery Strategy (LNRS)

Appendix 3: Mapping methodology and datasets

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Contents

1. The Local Habitat Map

The Local Habitat Map component of the Local Nature Recovery Strategy (LNRS) has two statutory components:

- Areas of Particular Importance for Biodiversity (APIB)
- Areas that Could Become Particularly Important for Biodiversity (ACB)

The map can have other elements as determined by the Responsible Authority (RA). However, the aim is for the local habitat map to be simple and uncluttered, containing only information that will be useful to its users.

2. Areas of Particular Importance for Biodiversity (APIB)

Areas of Particular Importance for Biodiversity (APIB) are identified by the Responsible Authority in accordance with the guidance issued by Defra and include:

(i) Nationally Designated Sites
(ii) Locally Designated Sites
(iii) Irreplaceable Habitats (as defined by Defra)

Sites under item (i) have legal protection and sites under item (ii) have protection through the planning system and the expectation is that all these sites have a level of management for nature conservation and should form the starting point for any nature recovery proposals.

3. Areas that Could Become particularly important for Biodiversity (ACB)

Areas that could become of particular importance for biodiversity (ACB) are those in which habitats can most effectively be put on a trajectory towards achieving a habitat condition commensurate with designation (though that does not imply that these areas will be designated in the future). It is not expected that all the habitat within these areas will be subject to nature recovery measures, nor will all habitats that are being managed for nature recovery reach target condition during the first iteration of the LNRS.

The area of land identified as ACB has been targeted to facilitate the achievement of national targets. The total area of land within the North Yorkshire and York LNRS geography which falls within an APIB or comes under active management under the LNRS and is therefore on a Nature Recovery trajectory, will be sufficient to accommodate 30% land-cover target and, in addition, meet the regional targets for specific habitat types.

Collectively, the ACBs form a strategic network, which will be the focus for LNRS activity during the delivery phase.

ACBs include some urban and suburban areas, and this is informed by the modelling process identified under item 4. It is recognised that nature recovery measures may be less feasible in some more developed areas.

4. Identification of ACBs

Basic ethos

- Transparent
- Repeatable
- Open Source
- Data Sources
- Spatial Framework
- Typology

Mapping Habitats – The AGILE framework

To enable the identification of land with the potential to make habitats better, bigger, more numerous and more joined up, and to target specific measures to this land requires, as a pre-requisite, a map of semi-natural habitats. The map must use a consistent spatial framework and habitat typology across the whole LNRS geography. No pre-existing habitat map existed for North Yorkshire and York prior to the commencement of the LNRS process.

The North Yorkshire and York LNRS has adopted a habitat map and mapping framework produced by the Oxford Martin School as part of the AGILE project.[1,2] Although still in development, this provides a framework for continuous improvement of habitat data during LNRS delivery and was judged to be the most suitable tool available within the LNRS development timescales.

Identifying Opportunities for Better, Bigger, More and More Joined Up

Since the publication of 'Making Space for Nature' in 2010, 'Better, Bigger, More and More Joined Up' have become guiding principles of nature recovery policy and practice in England. The North Yorkshire and York LNRS used the AGILE framework to identify areas where it may be possible to improve areas of existing habitat, increase their size, provide protection through buffering, create areas of new habitat, and create new linkages across the landscape.

The initial process involved first identifying core areas of existing habitat from the AGILE habitat map, where condition could potentially be improved through habitat management and, second, working out from these in nested concentric rings to identify opportunities to expand or buffer existing habitat areas, create sympathetic habitats in close proximity to the existing ones, and link these clusters across the landscape with stepping-stones and corridors to increase their ecological functionality.

[1] The Agile Initiative at the Oxford Martin School – Oxford Martin School https://www.agile-initiative.ox.ac.uk/
[2] Agile Nature Recovery and NBS Opportunity Maps: Description – University of Oxford https://nbshub.naturebasedsolutionsinitiative.org/wp-content/uploads/2024/02/AGILE-NbS-opportunity-maps-Description-V1.1.pdf

Working with available data for each broad habitat type, a small number of criteria were used to determine whether a land parcel within the buffers around existing core areas should be earmarked for potential nature recovery and assigned a corresponding opportunity type.

Creating a Strategic Network

The previous step identifies a considerable potential for Nature Recovery in North Yorkshire and York; far more than the notional targets for land area being protected through designation or reaching a quality and condition equivalent to existing protected areas. To focus activity during the first iteration of the LNRS, it is necessary to select from within the total potential to identify an optimum network that will provide sufficient opportunity to contribute to the over-arching target of 30% and individual habitat targets, set nationally, whilst at the same time encompassing the local habitat priorities established by the RA through the LNRS stakeholder engagement process and taking account of practical constraints.

To identify an optimum network, comprising over twenty habitat and opportunity type combinations, the North Yorkshire and York LNRS employed the software tools CLUZ[3] (Conservation Land-Use Zoning) and Marxan,[4] which are based on well-established Systematic Conservation Planning methodologies.

To create the optimum network, the procedural steps were:

- The complexity of the land boundaries across North Yorkshire and York were reduced to a regular grid of hexagonal ‘planning units’, each with an area of 20ha (equivalent to the footprint of approximately 28 football pitches).
- Planning units that contained APIBs were identified as ‘already conserved’ and automatically form part of the strategic network, with the premise that the strategic network would make APIBs ‘bigger, better, more and more joined up’.
- Areas that for reasons of policy or safety were not suitable for consideration as part of the LNRS were excluded from selection. This included some military facilities with prior agreement from the Ministry of Defence (MoD).
- All other planning units were considered as ‘available’ to potentially become part of the optimum strategic network.
- The area of each habitat and opportunity combination falling within each planning unit was calculated and assigned as an attribute of that planning unit.
- The total area of each habitat and opportunity type combination across the whole geography was calculated.
- The area of each habitat and opportunity type falling within an existing APIB was calculated.

[3] Smith, RJ (2019). The CLUZ plugin for QGIS: designing conservation area systems and other ecological networks. Research Ideas and Outcomes 5, e33510

[4] Ball, I, Possingham, H, and Watts, M (2009). Marxan and relatives: Software for spatial conservation prioritization. In A. Moilanen, K. Wilson, & H. Possingham (Eds.), Spatial conservation prioritisation: Quantitative methods and computational tools (pp. 185–195). Oxford University Press.

- Targets were set for each habitat and opportunity type such that the total area of the optimised network would cover between 45% and 55% of the total area of North Yorkshire and York. This target was set in recognition that the opportunity for Nature Recovery would not cover the entire area of each planning unit. A network covering up to 55% of the land area would provide flexibility in relation to achieving 30% nature recovery.
- Marxan generates millions of iterative network solutions and identifies those that best meet the target criteria using the minimum number of planning units.
- The optimum strategic network identified by Marxan was reviewed by expert stakeholders and a number of further areas (additional planning units) were added to the network, reflecting stakeholder feedback. This focused in particular on creating additional linkages between areas of the strategic network identified by Marxan and incorporating additional known key sites.

Constraints on Nature Recovery

Whilst the LNRS is primarily a ‘nature first’ strategy, the consultation process to date has identified a range of positive and negative factors that encourage or pose constraints on nature recovery across North Yorkshire and York. These were combined into a ‘cost layer’ which ascribes a relative cost of inclusion of each planning unit within the strategic network, based on the coincidence of positive and negative constraints at that point. Marxan takes the ‘cost layer’ into account when identifying the optimum strategic network. For example, this included the preferential selection of planning units with continuous linkages, rather than smaller isolated clumps. By way of contrast, allocated sites* in Local Plans were included as a negative constraint in the ‘cost layer’ and they are less likely to be selected to form part of the strategic network.

* *Including allocated sites as a negative constraint had prior agreement with the respective planning policy managers from North Yorkshire Council and City of York Council*.

Mapping Measures

The Statement of Biodiversity Priorities component of the LNRS consists of a list of priorities for the current LNRS iteration. Each of these has a number of associated practical measures, some of which are land management activities that can be delivered on the ground. Where habitat and other supporting data are available, areas where each of these measures could potentially be carried out have been mapped.

5. Bringing the Map Together

The LNRS mapping process generates three primary products:

- Map of existing APIBs.
- Map of proposed ACBs where mapped measures occur (outside existing APIBs)
- A ‘Mapped Measures’ layer configured into 20ha hexagonal ‘planning units’ identifying where each of the mappable measures could potentially be delivered.

These are brought together in an online local habitat map, which will allow the user to see the locations of the APIBs, ACBs and the Mapped Measures layer.

6. Summary of Nature Recovery Network (Local Habitat Map)

Opportunities to recover nature through habitat creation within the Nature Recovery Network have been categorised by broad habitat type and whether they contribute to “Better”, ‘bigger’, ‘more’ or ‘more joined up’:

- Better: Improving existing habitat.
- Bigger: Creating new habitat to extend an existing area.
- More: Creation of a habitat at a new location not directly linked to an existing location.
- More joined up: Creation of habitat with the primary function of facilitating connectivity across the region.

As woodland and grassland tend to have more ubiquitous environmental needs, it was possible to identify areas of no constraint at much larger distances from the core habitat than was possible for the other habitat types. These may provide additional opportunity within a location as a general habitat in-fill, hence the inclusion of broader ‘Network’ opportunities for these habitat types.

7. Publishing the Map

During the delivery phase of the LNRS, the Local Habitat Map will be published online by North Yorkshire Council as the Responsible Authority.

Table 2: GIS Layers Used in LNRS Mapping

Mapping Stage	**Layers**
Identification of Areas of Particular Importance for Biodiversity	• Local Nature Reserves (England) • Marine Conservation Zones (England) • National Nature Reserves (England) • Ramsar Sites (England) • Sites of Special Scientific Interest (England) • Special Areas of Conservation (England) • Special Protection Areas (England) • NYC SINCs (Local Wildlife Sites) • NYC LNRs (Local Nature Reserves) • Priority Habitat Inventory v3.0 • Local Habitat Layers Held by NEYEDC
Habitat and Opportunity Mapping	Habitat mapping stage uses the AGILE mapping framework. Details of the layers used are available in AGILE opportunity NBS Maps: Data Source Guide, which can be found online here: https://www.agile-initiative.ox.ac.uk/ For future iterations of this work, local data will be integrated with the framework. AGILE is based on the OS MasterMap spatial framework. Additional habitat data was compiled by NEYEDC from its data holdings to provide additional information about scarce habitats.
Cost Layer	The cost layer, used in the identification of the strategic network, used the following data layers: • Chalk Rivers England • Flood Map for Planning Rivers and Sea Zone 3 • EWCO Nfc Ammonia Emissions Capture for SSSI protection • EWCO 80% water quality • Heritage Coast England • Boundary of Yorkshire Coast Partnership Area of Influence • York Green Corridors • EA Priority Habitat and Creation • FC Woodland Creation Full Sensitivity Map v4 • River Headwater Data • North Yorkshire Council SINC i.e. Local Wildlife Sites (local data) • North Yorkshire Council Candidate SINC i.e. Local Wildlifee Sites (local data) • City of York Council Local Wildlife Sites (local data) • YWT Reserves (local data) • Sites where nature recovery is already underway (local data) • Access Data Mapping England • FC Floodplain Reconnection potential. • FC Woodland that is sustainably managed • FC National Forest Inventory

	• FC Floodplain Woodland Potential • FC Low Sensitivity Woodland Planting Potential • FC Floodplain Woodland Potential • FC Riparian Woodland Potential • North Yorkshire Council Planning Allocations (Local Plan) • City of York Council Planning Allocations (Local Plan) • Climate Change Vulnerability • EWCO Flood risk Management • EWCO – NfC Social • EWCO - Keeping Rivers Cool Riparian Buffers • Priority Rivers Habitat – Rivers • Priority Rivers Habitat – Headwaters • Runoff Attenuation Features 3% • WWNP Woodland Constraints • NE Angst Data • Index of Multiple Deprivation. • Record of Scheduled Ancient Monuments
Targets	Overall network area targets were set by the LNRS RA core team in discussion with NEYEDC. Additional targets to inform the development of the strategic network were discussed with members of the LNRS Technical Advisory Group including members of Defra arms-length bodies.
Strategic Network Identification	The strategic network identification used data from the opportunity mapping and the cost layer.
Mapping of measures	• Local habitat data held by NEYEDC • North Yorkshire Council Local Wildlife Site Habitat Data • City of York Council Local Wildlife Site Habitat Data • OS Mastermap • Peaty Soils Layer • Statutory Main River Map • AIMS Spatial Flood Defences (inc. standardised attributes) • Potential Habitat Creation Sites Within the Current Floodplain • AGILE Habitat Mapping • Agricultural land classification • Chalk Rivers (England) • Crop Map • Open Mosaic Habitats • Priority Habitats Inventory • Provisional Agricultural Land Classification • Crop Map • River Obstacles • Saltmarsh Extents and Zonation • National Forest Inventory • Canal Mapping (generated locally from C&RT data) • Drain Mapping (generated locally from OS data) • Disused Railway Lines (generated from OS data) • Pond mapping (extracted from OS data) • Hedgerow mapping (Obtained from UKCEH Landcover plus Hedgerows 2016 - 2021 • FC Priority Habitat Network • FC Sustainably Managed Woodland • FC Woodland Creation Full Sensitivity Map v4

	• EA Heavily Modified Water Bodies • EA Spatial Prioritisation of Catchments Suitable for NFM • National Heritage List for England NHLE • EWCO – Keeping Rivers Cool Riparian Buffers • WNNP Riparian Woodland Potential • Priority River Habitat Headwaters Areas England • River Obstacles Public View • NE Wood Pasture and Parkland BAP Priority habitats • Pillwort species data (local data) • Medicinal leach species data (local data) • Petty Whin data (local data) • Red Squirrel Data (local data) • FC Urban Tree Challenge Trees Close to People • EWCO Biodiversity – Priority Species – Red Squirrel