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Local nature recovery strategies

Local Nature Recovery Strategies (LNRS) are laid out in the Environment Bill as an approach for delivering national environmental objectives on local and regional scales. This POSTnote examines the LNRS process to create local maps of habitat restoration opportunities alongside a list of environmental priorities. It also highlights the challenges and opportunities for delivering nature recovery through this process.

Overview

- In the UK, around 41% of species have declined in abundance since 1970 due to environmental pressures like habitat loss.
- To help address this, the UK Government is creating Local Nature Recovery Strategies (LNRS) in England, a map of priority habitats to be improved and restored.
- Engaging landowners, land managers, and other key stakeholders to guide decisions on which habitats are included in LNRS, would ensure wider benefits are delivered to both nature and people.
- Effective delivery of the LNRS will require an understanding of the trade-offs between land uses, working across administrative boundaries, and addressing skills and capacity gaps.
- Funding for stakeholders, such as land managers, to deliver LNRS outcomes will be provided from a range of future environmental land management schemes together with private investment.

Background

Since 1970, an estimated 41% of UK species have decreased in abundance, and the average species' population has fallen by 13%.[1] With 80% of land area in the UK being intensively managed for food production and urban development, natural and semi-natural habitats have been degraded and fragmented leading to species' decline.[1–4] The 2010 Lawton review set out a vision to reverse this loss by making existing and restored natural habitats 'bigger, better, more and joined-up' (BBMJ).[5] These would constitute an 'ecological network' of core areas, buffer zones and corridors, which would allow species to move and persist in landscapes (Box 1).[5,6] The 2012 National Planning Policy Framework (Box 2) states that these 'ecological networks' must be considered in local plans.[7] However, until recently, few networks have been identified across England.[8–12] The UK Government's 25 Year Environment Plan (published in 2018) sets out the aim to create a national-scale Nature Recovery Network (NRN) in England, based on Lawton's BBMJ principles.[13,14] 30% of land will be designated as nature sites (Box 2) by 2030,[15,16] alongside plans to create 500,000 hectares of new or improved habitat outside of these designated sites.[17]

In the 2020 Environment Bill (Box 2), Local Nature Recovery Strategies (LNRS) are laid out as a mechanism to deliver the Lawton Review recommendations at a local scale, by mapping ecological networks and identifying habitat restoration priorities.[18,19] There is also an opportunity to achieve multiple benefits beyond reversing nature loss through LNRSs, such as climate mitigation and adaptation.[19] This POSTnote summarises the Government's proposed approach for planning and implementing an LNRS, and the likely opportunities and challenges for improving England's habitat networks for nature's recovery and a wider range of benefits for humans.

The LNRS approach

LNRSs will be tools to inform decision-making about conservation and restoration of habitats for nature's recovery by landowners and managers, public authorities, and NGOs.[20]

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Box 1. Connecting habitats

- **Resilience** has multiple definitions across disciplines,[6,21–24] but in this context is used to describe the ability of the subject (populations, species, ecosystems or networks) to withstand, recover from or adapt to a disturbance, such as pollution or extreme climate events.[6,21]
- **Metapopulation Theory** states that when populations can move between habitat patches to form a larger pool (known as 'metapopulations'), they are more resilient to negative impacts than if they were isolated.[25,26] The four habitat conservation principles **BBMJ** (Bigger, Better, More and Joined-up) help support more resilient metapopulations by increasing the amount of habitat and the ability of individuals to move between patches.[27]
- **Spatial Network Theory** is a development of metapopulation theory, and describes an arrangement of habitats or populations as 'nodes' connected by links that allow individuals to move between them, and together these form an '**ecological network**'.[6,28,29] Various mathematical techniques can be used to describe ecological network structure and predict if they are sufficiently in line with the BBMJ design principles to be resilient, as well as where additional nodes and links could improve resilience.[30–33]
- **Connectivity** describes how successfully individuals can move through the landscape. High connectivity can improve the resilience of networks.[27,34,35] Creating clusters of smaller habitat patches and linear features such as hedgerows, and improving the quality of the 'matrix' (i.e. the land surrounding the network) can improve overall connectivity of the landscape.[6]

Box 2: Biodiversity policy and strategies in England

Biodiversity is the variety of life on Earth (PN-644). Biodiversity policy and strategy is devolved in the UK, although there are similarities across all four nations.

- **Designated Sites.** Previous biodiversity conservation efforts in England have focused on discrete areas designated for nature conservation under the Wildlife and Countryside Act (1981)[48] and the Conservation of Habitats and Species Regulations (2017 as amended).[49] These 'designated sites' have varying degrees of protection placed on them.
- '**Biodiversity 2020**: A strategy for England's wildlife and ecosystem services' (2011)[50] was created to build on **'The Natural Choice'** white paper for England (2011).[51] The strategy concluded in 2020 and is due to be replaced by a new Biodiversity Strategy in 2021.
- **National Planning Policy Framework** (NPPF, amended in 2021)[7] requires 'regard' of designated sites and protected species as well as established ecological networks by relevant authorities when planning development.
- **25 Year Environment Plan** (2018)[14] commits to a national Nature Recovery Network (NRN) to improve connections between nature sites and habitats and increase resilience of England's ecosystems (Box 1).
- **The Environment Bill**[18] is currently moving through the parliamentary session of 2021, and includes a legally binding target to halt species' abundance decline by 2030. LNRSs are proposed as a practical way of delivering the NRN, as well as a way of producing nation-wide ecological network maps on scales appropriate for use in local plans.

Defra suggest they will divide England into approximately 50 non-overlapping county-sized 'strategy areas', which will each have an LNRS. The strategy areas are not yet published but are likely to follow approximate administrative boundaries which contain multiple local or other public authorities. The Environment Bill states that no local authority, other than county councils, will be divided by LNRS area boundaries.[18]

Each LNRS will consist of a spatial plan that sets out key existing national and local wildlife sites and priority sites for future habitat creation,[18,19] alongside a statement listing the priorities for habitat restoration and conservation and other opportunities to deliver environmental benefits.[18,19,36] These will be drawn up in conjunction with stakeholders and through approaches such as 'opportunity mapping' (Box 3). Defra will be required to publish guidance on how LNRS should be taken into account by local planning authorities.[37] Defra also anticipate that LNRS will deliver other policies outlined in the 25 Year Environment Plan, the Environment Bill, and the Agriculture Act 2020.[38] Five LNRS pilot schemes were funded by Defra from September 2020 – May 2021 in Buckinghamshire, Cornwall, Cumbria, Greater Manchester, and Northumberland.[39–46] The pilots followed a sequence of steps to create an LNRS, which can be found in a recent 'Lessons Learned' report published by Defra.[36,45] The feedback from the pilot schemes and a consultation process will help Defra form the official guidance and regulations for the creation of an LNRS.[45,47]

Co-developing plans

A responsible authority in each strategy area will be appointed by Defra to produce the LNRS. Depending on the strategy area, this may be a local authority, the mayor of a combined authority, a National Park authority, or Natural England (NE).[18] LNRS Pilots were supported by 'pilot area teams' which included representatives from bodies such as Defra, NE, Wildlife Trusts and AONBs (Areas of Outstanding Natural Beauty).[45] The 'Lessons Learned' report suggests that LNRSs will be more successful if responsible authorities co-develop plans with relevant stakeholders.[45]

All the LNRS pilot studies had strong partnerships in place to help guide the process.[45] Previous initiatives to create Local Nature Partnerships (LNPs) and Catchment Based Approach Partnerships have laid the groundwork for forming future LNRS steering groups.[52–54] LNPs are usually formed of NGOs, businesses and other parties interested in improving the local environment.[52] These existing partnerships may have generated data appropriate for use in LNRSs, including Natural Capital Assessments (PN-542), pollinator habitat restoration networks (PN-619) and 'Biodiversity Opportunity Area' mapping.[8,55–59] However, reductions in public funding of such partnerships means the presence of these bodies and their ability to contribute to LNRS production is variable.[60]

Relevant stakeholders state that early engagement to co-develop LNRSs will increase the chance of them being effective for delivery of outcomes, and make them more understandable for the end-user.[45,61] These stakeholders include environmental NGOs, local planning authorities, businesses, landowners and managers and community interest groups.[62] A list of opportunities for habitat creation and restoration will be drawn up from stakeholder engagement and prioritised in conjunction with opportunities highlighted in the spatial data work (Box 3).[36] Partnership and stakeholder involvement allows tailoring to local pressures, knowledge, place-based identities and

Box 1: Mapping networks and priorities

The following approaches and data helped pilot area teams to produce LNRS spatial maps and identify priorities.

- **National data acquisition.** National spatial habitat data was supplied to responsible authorities by Defra. The 'Living England' map, a national baseline habitat map for England, will be produced by Natural England for the real LNRSs.[18,20,63] It may include the boundaries of nationally designated sites such as National Nature Reserves, Special Areas of Conservation, Special Protection Areas and Sites of Special Scientific Interest.[13,64]
- **Local data acquisition**. Local spatial data was added to the baseline map, including locally designated sites such as Local Nature Reserves, and Local Wildlife Sites.[18,36,64] Available data about existing non-designated sites for nature and natural heritage was added.[36] This was supplied through engagement with independent organisations such as Local Environmental Records Centres (LERCs). Data from citizen science and land managers can help corroborate or improve LNRS habitat maps.[62]
- **Describing the strategy area.** Available non-spatial biodiversity information such as local priority species and natural capital was documented, based on geographical subdivisions, such as 'National Character Areas'.[65,66]
- **Network mapping.** Opportunities for creating and improving habitat was mapped using spatial network theory (Box 1). A combination of approaches were used by pilot schemes, including: 'Least-Cost Focal Species Mapping',[32,33] which maps buffers around habitat sites to guide habitat creation based on expert opinion; a modelling approach for ecological networks called 'Condatis'[31,67] which predicts which habitats should be conserved or created as a priority; and 'Systematic Conservation Planning', which takes into account cost-effectiveness of measures (PB-42).[68]
- **Opportunity mapping and prioritisation.** Opportunities for providing wider benefits to people through creating or improving habitats were gathered through engagement with stakeholders.[42,69–71] Some pilot areas had access to spatial data on where creating certain habitats could provide wider benefits to people, for example flood prevention, which was added to maps using appropriate Geographical Information System (GIS) platforms for opportunity mapping.[72] Actions to achieve these priorities were listed and presented alongside the map of where they should ideally take place.[36]

values, geographies, and economic priorities (PB-42).[73] The National Farmers Union and Country Land and Business Association are organisations through which LNRS teams can engage landowners and managers.[74] To facilitate engagement with this sector in pilot schemes, NE recruited a 'local convener'.[47] The convenor also considered to what extent LNRSs will be able to target measures to the objectives of environmental land management schemes, which could be used to fund the outcomes (see 'Funding delivery of strategies').[45] The clarity of this integration of LNRS with upcoming funding schemes and policies is likely to improve the success of future engagement with stakeholders.[75] Defra are seeking funding to retain these local convenors for LNRSs.

Informing delivery of multiple benefits

Protecting, restoring, and managing particular habitats to address societal challenges and enhance human wellbeing is referred to as 'nature-based solutions' (NBS, PN-617). Some of the benefits NBS provide to people include carbon storage and sequestration, air purification, local climate regulation, noise regulation, water purification, and accessibility of greenspace for wellbeing.[76–78] Although the core aim of LNRS is to support the recovery of nature, Defra and multiple environmental NGOs would like strategies to prioritise habitat restoration opportunities that provide these wider benefits to humans as NBS. This would help create a 'multifunctional landscape' that benefits both humans and wildlife, and would avoid having multiple conflicting plans and strategies for different environmental outcomes (PN-627).

There may be trade-offs between restoring and managing habitats for wildlife population recovery and other environmental benefits in a given location, such as planting a woodland for flood regulation on species-rich grassland.[79] Spatial planning approaches, such as 'opportunity mapping' (Box 3), can help manage trade-offs and identify where appropriate habitat should be created (PN-623, PN-627).[80] However, creating both ecological network maps (Box 3) and opportunity maps for multiple benefits will require spatial data about habitats, landscape features, land use preferences and natural capital (the 'stock' of natural assets in a region, including geology, soils, air, water, and living organisms, PN-542).[55,68,81] This data varies greatly in quantity and quality across areas and may not always be openly accessible, or match the scale at which ecological processes occur.[82,83] Local data is usually held by Local Environmental Records Centres (LERCs),[84] but funding for these bodies has decreased in recent years, resulting in a growth of private sector provision of local data compared to readily accessible public data and services.[83]

Integrating delivery of multiple policies

A report by the Environmental Audit Committee (EAC) recently recommended that LNRSs should aim to integrate multiple other strategies in the Environment Bill, Agriculture Act and 25 Year Environment Plan through its spatial planning approach.[14,18,85,86] For example, LNRSs will identify habitat restoration opportunities relevant to the England Peatland and Woodland Strategies.[20,87,88] The EAC also recommended that LNRSs inform the forthcoming Planning Bill.[82,89] The Government's Biodiversity Strategy for England, to be published in 2021, will clarify how LNRSs will interact with and bring together other frameworks and proposals.[90]

Challenges for future implementation

Working across administrative boundaries

One of the main aims of LNRSs is to underpin the national-scale Nature Recovery Network (NRN), which will require some coordination of LNRSs across administrative boundaries.[13,14] However, there is no clear legal duty in the Environment Bill for LNRSs to establish ecological networks that support the NRN, and no mechanism to address conflict between local and national priorities.[82] Enabling movement over larger networks is crucial for species with long dispersal ranges, and those shifting their range northwards in response to climate change.[31,34,35,91] Administrative boundaries may have limited relevance to metapopulations (Box 1), and the time and spatial scales at which natural processes occur. To allow movement of species across LNRSs, experts suggest that strategy areas should enable connections between habitats across administrative

borders.[92–94] Defra propose that the planned regulatory process and statutory guidance could include the condition for LNRSs to work together and consider priorities based on each other's plans. Organisations such as LERCs, which may straddle LNRS boundaries, could share data across strategy areas at relevant ecological scales.[95] Defra also envisages a role for NE to give consistent advice to LNRSs and share information about opportunities for restoring connectivity to inform strategies.[73,96]

Trade-offs with more economical land uses

Landowners and managers widely agree that the current financial incentives for environmental land management would need to be improved in order for LNRS to succeed.[97,98] Habitat restoration opportunities may be in direct competition with food production and urban development land uses.[1] To address this, the National Food Strategy called for a rural land use framework that provides detailed assessments of the best way to use any given area of land.[99]

The primary focus of LNRSs is the improvement and restoration of habitat by focussing funding and measures within the mapped ecological network. Outside ecological networks, land management measures that can maintain productivity while minimising environmental impacts, such as providing wildflower and nesting resources for pollinators, can address biodiversity decline in the wider countryside.[100,101] This will be the focus of Defra's future farming schemes, such as the Sustainable Farming Incentive with standards for farm woodland, hedges, arable and horticultural land, grassland and soil health. [102,103]

Monitoring strategy success and delivery

Experts widely agree that adaptive management (Box 4) should be required for LNRSs.[104] The Environment Bill requires responsible authorities to review and update their LNRSs 'from time to time'.[18,20] It also includes conditions for authorities to produce a statement every 5 years on how they have had regard to LNRSs in their policy decisions.[18,20] Defra are considering regulations for relevant authorities to report on their LNRS's achievements, along with any additional priorities or opportunities arising. Defra can choose to align the review and republishing of LNRSs based on this information.

As proposed, the legislation would not place a duty on the responsible authorities to monitor the biodiversity or social outcomes of their LNRS.[98] New artificial intelligence tools like 'E-surveyor' can help land managers track the success of individual habitat restoration projects.[105] Landscape monitoring frameworks have been designed that integrate multiple indicators of landscape quality to evaluate larger-scale interventions.[106,107] Citizen science monitoring initiatives at the landscape scale such as the Catchment Monitoring Cooperative could provide a basis for monitoring outcomes.[108] However, monitoring over entire strategy areas will require Defra to allocate further funding and resources to relevant authorities.[109]

Addressing skills and capacity gaps

LNRS teams will require a broad range of technical (ecological and GIS), legal, management and engagement skills in place to implement strategies.[62,96,110] In 2013, only around one third of local authorities employed in-house ecologists to provide ecological skills and knowledge, and this is likely to have declined further.[113] Some expertise could be brought in privately through consultancies or accessed through existing partnerships.[114] However the EAC have recommended local authorities are given the appropriate resources to employ ecologists and access data.[82] The Green Jobs Taskforce highlights that £12 billion is being invested by the Government to stimulate green jobs, including ecologists and species specialists.[115] Funding for capacity building is unlikely to be in place for the start of LNRSs, but Defra have applied for funding in the 2021 spending review.

Box 4: Adaptive management of LNRSs

Adaptive management is a cyclical process whereby a strategy is monitored and evaluated for its effectiveness and recommendations for improvement are adopted.[104,111] Conservation practice experts suggest both individual strategies and the LNRS policy could be assessed for effectiveness.[82] Adaptive management would mean:

- **Setting clear goals, aims and targets.** It is important to understand the purpose of LNRSs.
- **Setting a baseline** of indicators to measure and monitor changes against which reflect the goals, aims and targets.[106] A range of biodiversity and health and wellbeing indicators exist (PN-644, PB-41).[104,112]
- **Implementing** strategies through the framework and guidance set by Defra.
- **Monitoring** of the set of indicators by taking frequent measurements; this will inform changes in strategy areas.
- **Evaluating** LNRS effectiveness through assessing whether goals, aims and targets are achieved. Stakeholder monitoring is also required to evaluate whether LNRSs are meeting community needs[97].
- **Adapting and implementing** new strategy actions which address any issues in LNRSs. Re-engaging with stakeholders may also inform on new and emerging opportunities to prioritise in LNRSs.

Funding delivery of strategies

Both the LNRS process and the delivery of outcomes will require substantial funding to be successful.[82,109] The main public funding mechanisms for delivering LNRS outcomes are likely to be future environmental land management schemes, such as 'Local Nature Recovery' and 'Landscape Recovery'.[18,102,116] These schemes will have a mechanism that rewards multiple environmental benefits enabled by habitat improvement or restoration to improve land manager uptake and engagement.[117–120] Biodiversity Net Gain is unlikely to be a major source of funding for the outcomes of LNRSs, as studies indicate developers are choosing to generate biodiversity or habitat gains within development sites rather than buying credits to fund habitat restoration elsewhere (PB-34).[121]

Blending public schemes with private payments could fund larger projects to deliver multiple benefits.[117,122,123] Greater Manchester Combined Authority and local NGOs are co-pioneering the Greater Manchester Environment Fund,[124] which aggregates public and private funding and will likely support delivery of their LNRS.[125] This is similar to private platforms mobilising regional ecosystem markets, such as Landscape Enterprise Networks,[126] NatureBid[127] and EnTrade[128] (PN-627).

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