Species Recovery within Local Nature Recovery Strategies

Advice for Responsible Authorities

Version 1: August 2023

Purpose

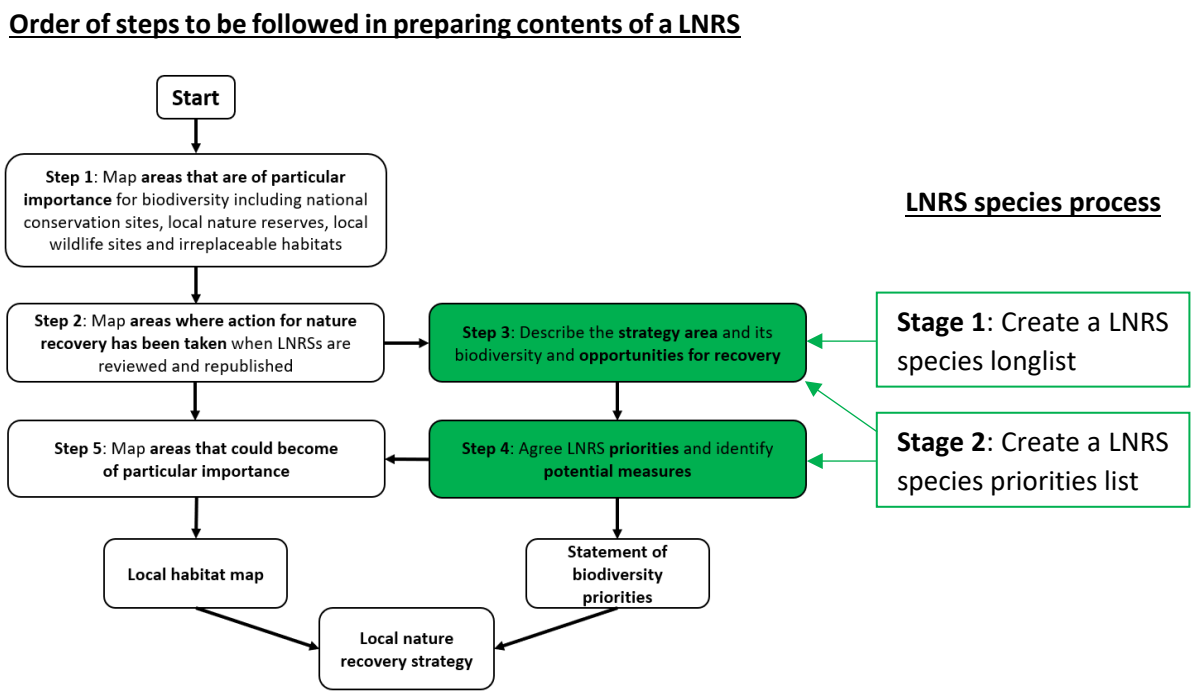
Local Nature Recovery Strategies (LNRS) must describe opportunities, set priorities, and propose potential measures for the recovery and enhancement of species. This document sets out an approach to help responsible authorities (RAs) achieve this goal in a consistent way. The approach involves two broad stages: identifying threatened and other locally significant species relevant to the strategy area, and determining which of these species should be prioritised for recovery action. This process is aligned with the LNRS preparation steps described in the LNRS statutory guidance, and it will be closely supported by Natural England (NE) and other partners.

This advice is informed by 8 LNRS species pilots, which tested methods presented here, as well as various other projects that have run across England exploring how to effectively incorporate species recovery considerations into LNRS preparation.

Contents

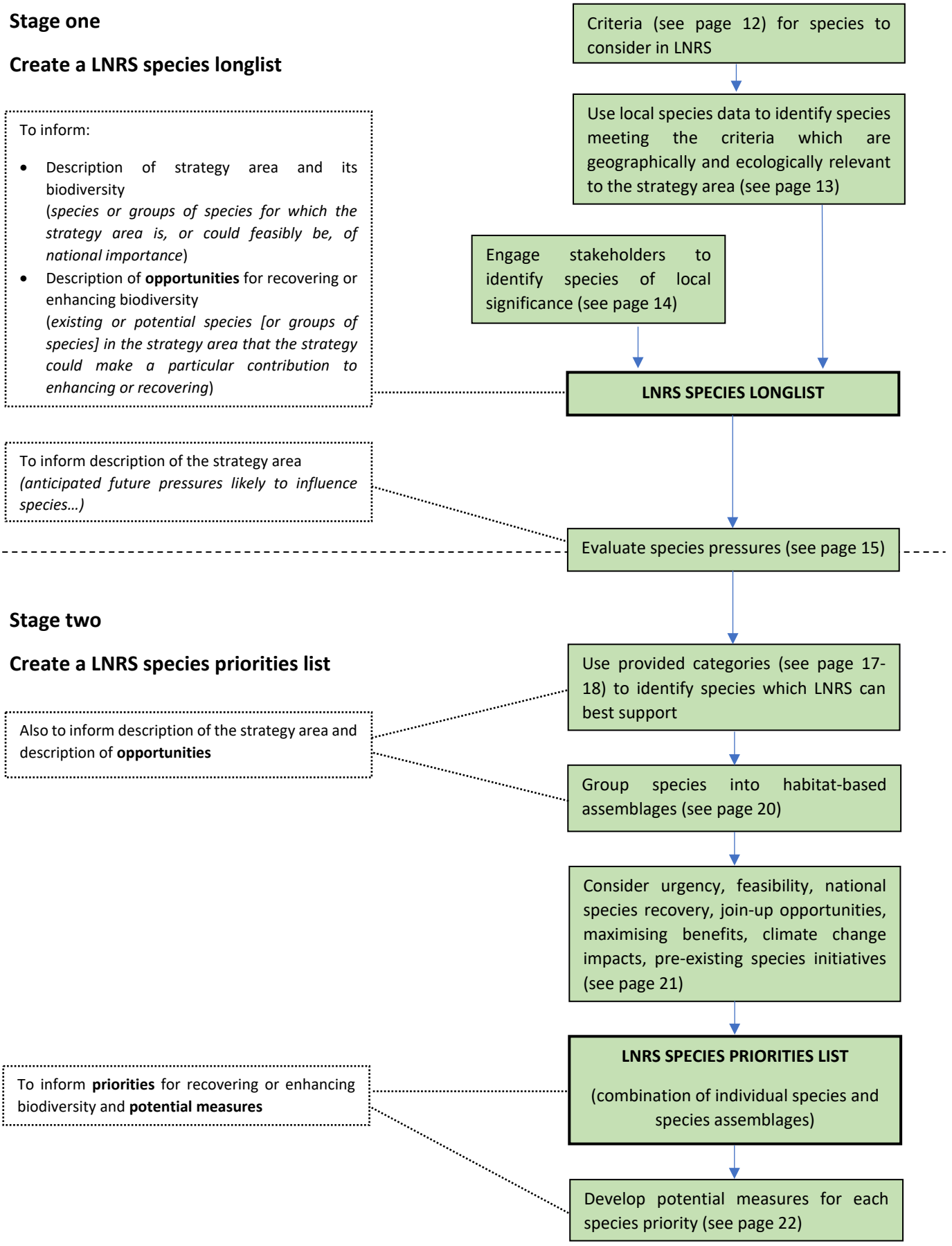
1. Using this document

The central feature of this document is a two-stage process designed to help RAs and their local partners identify opportunities, priorities, and potential measure for species recovery in LNRS. These two stages generate outputs to feed into LNRS preparation steps 3 and 4:



The process in full, and how it can be used to inform the contents of a LNRS, is outlined on the pages that follow. Detailed explanation and supporting information to help RAs work through this process are provided later in the document.

1.1 Process overview



1.2 Process summary

Stage one:

The goal of stage one is to create a 'LNRS species longlist'. This can be used to inform the 'description of the strategy area and its biodiversity' and 'description of opportunities for recovering or enhancing biodiversity' in the statement of biodiversity priorities (LNRS preparation step 3).

This document provides a set of criteria for species to consider in LNRS (see page 12). RAs are advised to collaborate with Local Environmental Record Centres (LERCs) and NE to identify species that meet these criteria which are relevant to the strategy area, using local species data. These species will make up the majority of the species longlist. See page 13 for further information.

RAs are encouraged to engage a range of stakeholders to identify other species of local significance for consideration. These (or a selection of these) species can also be included in the species longlist. See page 14 for further information.

The species longlist can be used for the consideration of species pressures in the 'description of the strategy area and its biodiversity'. RAs are encouraged to identify current local pressures, in addition to anticipated future pressures, that affect or are likely to affect the species on the longlist. As well as feeding into the strategy area description, this will support identification of species priorities in stage two of this process. See page 15 for further information.

Stage two:

The goal of stage two is to create a 'LNRS species priorities list'. This will contain the individual species and groups of species (assemblages) that the LNRS will focus on supporting. These species priorities can be integrated into the wider pool of 'priorities for recovering or enhancing biodiversity' set out in the statement of biodiversity priorities (LNRS preparation step 4). Further information on this is provided on page 16.

The species priorities list will be substantially shorter than the species longlist. It is created by refining the longlist through a three-part prioritisation methodology:

Part 1 of the prioritisation is focussed on identifying the species on the longlist which LNRS can best support. These will be appropriate candidates for the species priorities list. It involves assigning species on the longlist to different categories (see pages 17 - 18) on the basis of their recovery needs. This part of the process can be used to inform the 'description of the strategy area' and the 'description of opportunities'.

Part 2 involves organising the candidate species identified in part 1 into 'habitat-based assemblages' (where possible). These are groups of species which share habitat requirements, are likely to benefit from the same recovery measures, and can therefore be addressed collectively in the LNRS rather than individually. The assemblages (or groups of species) identified can be set out in the 'description of the strategy area' and the 'description of opportunities'. At the end of this part of the process, RAs will have a pool of potential species priorities that is likely to include both assemblages and individual species. See pages 20 - 21 for further information.

In part three, RAs select from this pool of potential priorities a combination of assemblages and individual species to form the species priorities list. RAs are strongly advised to make this list **short and manageable**. This document provides a set of important considerations to help guide the selection of priorities. These are listed on pages 21-22 and further described on pages 26 – 29.

Once RAs have created their species priorities list, they will need to propose potential measures for each priority on the list. The potential measures describe practical actions that, if taken, would contribute to the recovery or enhancement of the priority species or assemblage in question. These potential measures for species can be incorporated into the wider pool of 'proposals as to potential measures' set out in the statement of biodiversity priorities (step 4). Subsequently, RAs will need to map out suitable locations for carrying out these measures on the local habitat map (step 5). Further information is provided on pages 22 – 23.

2. Advice, partnership working, and species technical groups

2.1 Defra Group Support

Natural England (NE) will provide technical support to help RAs work through the process outlined above. As the government's statutory adviser for the natural environment, NE has wide-ranging expertise in species and species recovery with which to support the identification of opportunities, priorities, and potential measures for species recovery in LNRS. NE will provide a LNRS senior adviser to work closely with each RA across England. These senior advisers will bring local ecological expertise from their area teams. Importantly, they will also be supported by NE's national species specialists, who will provide expert advice and evidence to feed into LNRSs.

Environment Agency (EA) and Forestry Commission (FC) area teams will also directly support the preparation of LNRSs, collaborating with NE area teams to deliver this support in an integrated way. EA and FC will provide additional expert species advice, with particular focus on their respective specialisms of water-dependent species and woodland species.

2.2 Working with other LNRS partners

Effective stakeholder engagement, partnership working, and collaboration are key to the development of high-quality priorities and measures for species. Involving a wide range of local people and organisations in participative, transparent decision making enables input of vital expertise, experience, and evidence to shape credible plans for ambitious species recovery in LNRS, while promoting broad collective ownership to support their future delivery.

RAs are advised to undertake proactive planning (see 'LNRS: Advice on governance and working with partners') to identify local stakeholders (and regional / national stakeholders, where appropriate) who should, or could feasibly be involved in preparing and delivering the species aspects of the LNRS. NE, EA, and FC can help RAs identify specific species stakeholders, but in general these should be people and organisations who:

- Can provide expert species advice and data
- Own pre-existing species plans and strategies that could be drawn upon / incorporated into the LNRS
- Are involved in pre-existing species recovery projects relevant to the strategy area
- Represent potential delivery partners

Species stakeholders may include (but are not limited to) landowners and managers, local environmental records centres (LERCs), other environmental non-governmental organisations (eNGOs), neighbouring RAs, supporting authorities (including National Park authorities), areas of outstanding natural beauty (AONBs), other nature / environmental organisations spanning across LNRS boundaries (e.g., local nature partnerships, catchment partnerships), academic institutions, local interest groups, county recorders, and other individual species experts.

Some important species stakeholders (for example, smaller national eNGOs) may lack local capacity for engaging directly in the preparation of LNRSs. NE is exploring how to facilitate the involvement and input of such stakeholders and will be able to advise.

The LNRS species pilots showed that species can be a great hook for wider public and stakeholder engagement with LNRS. RAs may wish to consider the depth of public interest in species and the opportunities that this presents for encouraging broad local participation in the LNRS process.

2.3 Species technical groups

RAs are encouraged to form a technical (task and finish) group dedicated to the species component of the LNRS (henceforth referred to as the 'species technical group'), which can oversee and drive development of the species opportunities, priorities, and potential measures. It is advisable for this group to comprise a select subset of the species stakeholders identified, and ideally it would include expertise covering the major taxonomic groups (amphibians and reptiles, birds, bryophytes, fish, fungi, invertebrates, lichen, mammals, vascular plants). To stress, whilst this species technical group may constitute a core advisory

body, there will be need to build wider local partnerships around the species work and for this to interact effectively with other aspects of LNRS governance. See 'Advice on governance and working with partners' (linked above) for further guidance.

3. How LNRS will contribute to the government's species ambitions

The government has set legally binding targets to:

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

LNRS is a critical new tool for driving the national ambition to increase species abundance and reduce risk of species extinctions. Comprising 48 strategies collectively covering the whole of England, the LNRS system forms a coordinated spatial approach for planning a nationwide network of more, bigger, better, better-connected habitat to support species recovery and resilience. Each strategy contributes to this national picture by planning coherent ecological networks at the local level to help local species populations thrive.

Species abundance is an indicator of the state of nature and the environment. All LNRS measures should positively contribute to biodiversity and wider environmental health and therefore support the government's targets to increase overall species abundance.

To contribute to the government's extinction risk target, RAs are advised to follow the process described in this document to identify *Threatened* and *Near-Threatened* species relevant to the strategy area, determine a set of local species priorities, and propose specific measures to recover and enhance these species, mapped at the locations where they will engender the greatest benefits.

Potential measures for recovering and enhancing species in LNRS may include:

- Creating new habitat for species
- Expanding existing habitat to provide more space for species to flourish
- Enhancing habitat to better support species' needs through new or improved management practices
- Connecting habitat to enable species to move through the landscape and colonise new areas
- Actions to mitigate specific pressures impacting species in the local area, such as recreational disturbance, poor water quality, or the presence of invasive non-native species
- Bespoke actions such as localised surveys or conservation translocations

4. Creating a LNRS species longlist

This section elaborates on the process summary provided on page 6 to give further information on how to create a 'LNRS species longlist'.

The species longlist is likely to comprise between 150 and 500 species. These include species at high risk of extinction in England that are present in the strategy area; species which are not currently present, but could feasibly become established in the strategy area; and other species of local significance. RAs can draw on the species longlist when drafting their 'description of the strategy area and its biodiversity' (i.e., identifying the 'species or groups of species for which the strategy area is, or could feasibly be, or national importance'). The species longlist also provides a basis for the **species opportunities** to be included in the 'description of opportunities for recovering or enhancing biodiversity' (i.e., 'existing or potential species in the strategy area that the strategy could make a particular contribution to enhancing or recovering'). During stage two of the process, the species longlist is distilled through a three-part prioritisation methodology into the substantially shorter 'LNRS species priorities list'. **NE will support RAs through each step of the process.**

4.1 Criteria for species to consider in LNRS

NE, EA, FC, and Defra have developed a set of criteria for species to consider in LNRS. These criteria have been designed to enable LNRS to **contribute to the species extinction risk target** (see section 3). In total, there are roughly 2000 species in England which meet these criteria. As detailed in section 4.2, RAs should use local species data to **isolate and focus on the species meeting these criteria which are geographically and ecologically relevant to the strategy area**. These locally relevant species will make up the majority of the LNRS species longlist. The criteria are gradated in terms of their relative importance for LNRS, allowing RAs and their local partners to exercise local judgment over the content of their longlist (and consequent priorities list).

Critical to consider

- Any native species[1] which have been assessed as Red List *Threatened* against IUCN criteria[2]
- Any native species which have not been formally assessed against IUCN Red List criteria but where strong evidence is provided to show that they would meet the criteria for *Threatened* status (note: such species may fall into the category of 'other species of local significance' inputted by stakeholders – see section 4.3 below)
- Any native species considered to be nationally extinct that re-establish themselves or are rediscovered

Important to consider

- Any native species which have been assessed as Red List *Near Threatened* against IUCN criteria
- Any native species which NE suggest as suitable candidates for conservation translocation, or any native species already subject to translocation efforts (aligning with Reintroductions and other conservation translocations: code and guidance for England) that, on NE's advice, need to be scaled up to maximise success

[1] 'Native species' means any species which naturally occur or have in the past naturally occurred in England, and include regularly occurring migratory species (breeding and non-breeding), natural colonists (species that have arrived in England of their own accord and have become established), and species that have been reintroduced in England following past extinctions.

[2] That is, species which have been assigned to Vulnerable (VU), Endangered (EN), or Critically Endangered (CR) categories in approved GB IUCN Red Lists. See Outcome Indicator Framework for England's 25 Year Environment Plan: D5 Conservation status of our native species, 2022 - NERR124 (nepubprod.appspot.com) for a list of all species for which an IUCN assessment of extinction risk in Great Britain has been completed (data sheet) and explanation (technical document).

4.2 Using local data to identify species meeting the criteria which are relevant to the strategy area

LERCs – holders and experts in the use of local species data – are key to this part of the process. To form the core evidence base for the LNRS species opportunities, priorities, and potential measures, RAs will need to commission their relevant LERC to produce a **list of species recorded as present within the boundary of the strategy area which meet the first four criteria above**. RAs should also request **spatial data** for this list to show the distribution of the species within the strategy area. This is important evidence to inform prioritisation and the targeting and mapping of recovery actions.

RAs are strongly advised to discuss this request with their LERC as early as possible: the LNRS species pilots showed that it can take several months to complete the request. Decisions on the best ways of approaching this task – for example, decisions to include only species recorded in the area after a certain date or to exclude species with fewer than a certain number of records, or decisions relating to the form of the spatial data – should be made collaboratively with the LERC on the basis of their expert advice and in view of specific local circumstances. NE can support this decision making.

RAs are encouraged to work with their LERC to identify issues and limitations of species data in the local area. For the sake of transparency and to support potential improvements to local data flows (not least for the benefit of future LNRS iterations), RAs may wish to include a description of these issues in the 'description of the strategy area and its biodiversity'.

RAs and LERCs should share a provisional draft of the species list with the species technical group (see page 9) and local recorders (plus other local experts, as appropriate) so that they can provide a sense check and identify any data that may be missing. Where data gaps are identified and deemed significant, the species technical group should consider approaches for addressing these, including engaging local species interest groups (such as local taxonomic recording schemes) and, where appropriate, national recording schemes to obtain the data required (the LERC will likely be best placed to lead on this engagement). RAs and LERCs are advised to share any subsequent draft/s of the species list with the species technical group and local recorders for sense-checking.

NE will provide RAs with a list of locally relevant species meeting the fifth criterion to add to the final list that the LERC produces.

4.3 Engaging stakeholders to identify other species of local significance

Once RAs have identified the species meeting the criteria in section 4.1 which are relevant to the strategy area, they are encouraged to gather views from their local partners, wider species stakeholders, and, if they wish, the wider local public on whether any other species of local significance should be included within the LNRS species longlist. This will promote engagement with the strategy and help to develop the sense of shared local ownership which is crucial for its future delivery.

Other species of local significance may be species known to be present in the strategy area which have not yet been Red List assessed in GB (for example, most marine and fungal species) or lack approved Red Lists (for example, moths and Hymenoptera), but for which there is strong evidence to show – or in the absence of this, authoritative expert opinion – that they would meet criteria for *Threatened* status. These may be species which local people suggest as candidates for conservation translocation; however, these must align with the 'Reintroductions and conservation translocations: code and guidance for England' (linked above). These may be species which are subjects of pre-existing plans or projects within or relevant to the strategy area (for example, those cited within AONB Species Action Plans). Or these may be local 'champion' species or species which are iconic for / emblematic of the local area (for example, snake's head fritillary as the county flower for Oxfordshire).

Having garnered suggestions for species of local significance from local people and organisations, RAs and their species technical groups can decide which of these to include in their species longlist, ensuring transparency and appropriate balance of ecological and social considerations (for example, iconic species which may act as a strong flagship / indicator for wider ecosystem improvement). It is advantageous to choose a manageable number, focussing on high-quality suggestions.

5. Evaluating species pressures

The LNRS statutory guidance states that RAs should consider species pressures within the 'description of the strategy area and its biodiversity'. The species longlist, created through stage one described above, provides a useful basis for this. RAs are encouraged to identify and evaluate current pressures, as well as anticipated future pressures, that affect / are likely to affect species on the longlist. This evaluation can be included in the strategy area description and used to support species prioritisation in stage two.

RAs are advised to focus on identifying a small number of key pressures that affect / are likely to affect the longlist species *in the strategy area*, recognising that species are constrained by different factors in different parts of the country. These may be specific local pressures – for example, the impacts of new residential developments in the strategy area – or wider regional pressures – for example, poor catchment water quality. As a starting point, RAs may wish to refer to the classification of pressures linked below, selecting the pressures which are most relevant to the longlist species in the strategy area:
https://cdr.eionet.europa.eu/help/habitats_art17/Reporting2025/List%20of%20pressures%20and%20threats%20for%20reporting%202019-2024%20v1.1.xlsx

Evaluation of the pressures identified could include high-level descriptions of causes, timings, species / groups of species (e.g., 'wintering waders') affected, and impacts on species (e.g., habitat fragmentation). RAs could also consider actions that may be required to address the pressures identified. This will help identification of the longlist species' recovery requirements and support development of species priorities and potential measures.

6. Creating a LNRS species priorities list

This section elaborates on the process summary provided on pages 6 - 7 to give further information on how to create a 'LNRS species priorities list'.

The species priorities list should comprise a manageable number of deliverable species priorities, which may be individual species or species assemblages. It should focus on the species which LNRS can best support and reflect the species issues which are of greatest importance to the strategy area and local people and organisations. The species priorities list is produced by refining the species longlist of stage one, following the three-part methodology described in sections 6.1 – 6.3.

The species priorities can be integrated into the overall 'priorities for recovering or enhancing biodiversity' set out in the statement of biodiversity priorities. RAs and their local partners may decide to incorporate all of the identified species priorities into the wider pool of LNRS priorities, or they may ultimately choose to include some of the species priorities (as critical for the strategy to address) but not others. This document will be updated in due course to provide more detailed advice on how species priorities can be integrated into the overall LNRS priorities, in line with a separate piece of Defra Group guidance on priority setting in LNRS which is currently in development.

The methodology set out below involves prioritising and grouping species on the basis of their requirements. As such, **RAs and their local partners are encouraged to scope and develop potential recovery measures as they work through the process of identifying species priorities.**

2.1 Identifying species which LNRS can best support

Owing to its specific features as a strategic spatial targeting tool, LNRS will support the recovery of certain species more than others. Some species require actions for recovery that are beyond the scope of LNRS – e.g., research. The LNRS species priorities should be focussed on species for which the strategy can bring the greatest benefit. As such, the first step to

refining the species longlist is to identify the species which LNRS can best support and those for which LNRS is not appropriate.

The categories below aim to inform how recovery effort is applied spatially. They are designed to help RAs identify species which will benefit from LNRS and, simultaneously, scope potential recovery measures for these species. RAs should work collaboratively with their species technical groups to assign species on the species longlist to the categories.

This categorisation should be done on the basis of species' **current or anticipated future needs and with a view to the specific local context, referring back to the evaluation of species pressures.** As mentioned previously, pressures that species face are dynamic and regionally variable: species may be assignable to different categories at different times and in different parts of the country.

Note that it may be difficult to assign some species to just one category. In such cases, it may help to think about the overriding pressures on the species and aim to prioritise action on that basis.

Category	Description	Benefit from LNRS?	Suitable LNRS species priorities?
A: Needs more / bigger / better-connected habitat	- Species likely to markedly benefit from general creation, expansion, and improved connectivity of good quality habitats in the strategy area - Species with high recovery potential that do not require specific or targeted recovery measures	Yes	Probably not – species are likely to benefit from LNRS measures generally and do not need to be singled out for specific LNRS measures
B: Needs targeted habitat management	- Species with specific requirements for habitat quality, structure, conditions, or processes above and beyond category A - Species may require specific configurations or complexes of connected or nearby habitat/s, either at site level or across large areas / multiple sites. This may include habitat connectivity measures for species needing support to track climate change. - Causes of decline can be addressed with new or improved management practices	Yes	Yes

Category	Description	Benefit from LNRS?	Suitable LNRS species priorities?
C: Needs improvements in environmental quality	- Species primarily limited by one or more pressures beyond site level that can be mitigated at LNRS scale or wider scales through collaboration with neighbouring RAs - For example, better catchment water quality, improved spatial planning of air pollution sources, mitigation of recreational disturbance	Yes	Yes
D: Needs bespoke conservation action/s	- Species requiring additional, tailored measures *which can be spatially indicated* on the local habitat map - Species may need multiple coordinated actions to bring about recovery, including combinations of local actions and national actions, where LNRS could address the former - Examples of bespoke, spatially targetable local actions include conservation translocations (such as assisted colonisation for climate change adaptation), control of invasive species, and localised surveys **NB.** Species requiring bespoke measures *which cannot be mapped* should be assigned to category E)	Yes	Yes
E: Needs better evidence base / on-the-ground action is not a priority	- Species for which there is insufficient evidence or understanding regarding drivers of decline, required recovery actions, and range / population levels - Species for which the current priority is other than on-the-ground action, for example research or ex-situ conservation	Unknown	No
F: Needs action outside England	- Species with low (or very low) recovery potential due to factors constraining recovery beyond English borders - Evidence shows that action in England is highly unlikely to improve species' prospects - This category is likely to apply only to migratory species (e.g., Afro-Palearctic migratory birds affected by hunting)	No	No
G: Vagrants / occasional visitors	- Species currently outside their normal breeding or wintering range or normal migration route, without an extant population in the strategy area, and which are not suitable for conservation translocation	No	No

Any species which have been assigned to categories E – G require actions for recovery that are beyond the scope of LNRS. These species are thereby not suitable for inclusion in the LNRS species priorities list, however their localities should be considered when drawing up LNRS measures to avoid adverse impacts. Other projects and mechanisms – for example, Species Recovery Projects or Species Conservation Strategies – may be able to support recovery of these species. **RAs should work with NE and other partners to share the valuable information generated through this process to help inform other species initiatives.**

In the interest of keeping the LNRS species priorities list short, workable, and focussed on species requiring the specific recovery actions which LNRS can best support, **species which have been assigned to category A can probably also be ruled out from inclusion in the LNRS species priorities list**. However, this is a decision to be made on a case-by-case basis at the local level; RAs and their partners may wish to list category A species as priorities. Further, **RAs should ensure that their planned habitat measures will cover the needs of species assigned to category A**. If any species require habitats that are not prioritised for action in the LNRS, these species should be moved into category B.

RAs are encouraged to keep a record of the species which have not been deemed suitable as LNRS priorities, and the reasons why, and consider how they might want to explain this to partners. RAs may wish to include information on this in the 'description of the strategy area and its biodiversity'.

Any species which have been assigned to categories B – D are likely to require specific measures that are within the scope of LNRS. These species are thereby suitable for inclusion in the LNRS species priorities list. RAs can describe these species (either on an individual basis or in broad groups) and why they are considered suitable candidates for the species priorities list within the 'description of the opportunities for recovering or enhancing biodiversity'.

6.2 Grouping species into habitat-based assemblages

By working through the method described above, RAs should have reduced the species longlist into a significantly shorter list of appropriate candidates for the species priorities list. As a next step, RAs and their local partners should look to identify where these candidate species might share habitat requirements and might thereby benefit collectively from the same recovery measures.

For example, numerous candidate species may be associated with lowland mixed deciduous woodland. Many, although probably not all, of these species may require a diverse mixture of (and transitions between) closed canopy stands, open woodland with well-developed understory, scrubby areas, well-structured glades and opens rides, as well as plentiful dead and standing wood. The species sharing these requirements are likely to benefit from the same recovery measures, and thus the LNRS can address their needs collectively as a multi-species *assemblage*, rather than individually.

RAs and their local partners are encouraged to group candidate species into habitat-based assemblages wherever possible. These assemblages should be based on species' shared potential to benefit from the same recovery measures. They might comprise species associated with a single habitat type, or combine species associated with multiple habitats. For example, a 'river assemblage' might include species associated with the aquatic habitat in the channel and species associated with the adjacent riparian habitat, where both require unimpeded flow, high water quality, and a natural river channel with good structure (backwaters, woody debris, sediment bars, etc.), and would thus both likely benefit from the same measures.

Assemblages might be named on the basis of pertinent habitat (e.g., 'lowland dry heath assemblage') or habitat mosaic (e.g., 'coastal assemblage'), or they might be named after a flagship (umbrella) species whose requirements are representative of the needs of various others. For example, a 'red-backed shrike assemblage' might include numerous species which would also likely benefit from low-intensity farming at the landscape scale coupled with widespread creation of open grasslands with a mixture of tall and low vegetation, thorny

bushes, hedgerows, and bare ground. Choosing to name an assemblage after a charismatic, iconic, or otherwise locally significant species could prove a compelling hook for landowner and public engagement with the strategy.

It will likely not be possible / appropriate to place every candidate species into an assemblage: some species will require specific, individual recovery measures. After collaborating with local partners to determine the composition and names of appropriate multi-species assemblages, and to identify those species which would need to be addressed individually, RAs will have a pool of potential species priorities that is likely to include both assemblages and individual species. Outcomes from this part of the process, particularly the groups of species identified, can be used to inform 'the description of the strategy area and its biodiversity' and the 'description of the opportunities for recovering or enhancing biodiversity'.

6.3 Selecting LNRS species priorities

As a final step, RAs and their local partners should select from this pool of potential priorities a combination of assemblages and individual species to constitute the (short, manageable) LNRS species priorities list. The important considerations set out below should be used to guide this selection process. These are explained in more detail on pages 26 - 29. These considerations are not exhaustive and there will likely be other factors to consider.

- **Urgency**: do any species / assemblages stand out as having particularly urgent recovery requirements? RAs may wish to prioritise species / assemblages most in need of immediate action.

- **Deliverability**: how feasible will it be to deliver the recovery measures required by a species / assemblage? (This may apply particularly to species requiring translocation or other highly targeted measures.) If, for whatever reason, the required measures are not deliverable, or are highly unlikely to be delivered in the foreseeable future, the species / assemblage in question should not be included within the LNRS species priorities list.

- **Contributions to national species recovery**: is the strategy area of national (or international) significance for the conservation of any species / assemblages? RAs may

wish to prioritise such species / assemblages, and they *should* prioritise species / assemblages which are only found within the strategy area.

- **Cross-boundary considerations**: are there any particular opportunities to join up species recovery plans across LNRS boundaries? RAs may wish to prioritise species / assemblages that could be recovered successfully at regional / catchment scales, working in collaboration with neighbouring RAs.

- **Maximising benefits**: would the recovery of a species /assemblage be likely to bring about other biodiversity and environmental benefits (for instance, positively affecting other species, or providing nature-based solutions)? RAs may wish to prioritise keystone species / ecosystem engineers or assemblages whose required recovery measures could contribute to wider environmental goals.

- **Climate change impacts**: are any species / assemblages likely to be particularly affected by climate change? RAs may wish to prioritise species / assemblages which are particularly vulnerable to climate change impacts, as well as those which might be at the limits of their range in the strategy area.

- **Pre-existing initiatives**: are there any particular opportunities to enhance species recovery gains made recently in the strategy area or beyond, or otherwise support species projects? RAs may wish to prioritise species / assemblages which are the subject of, or which relate to pre-existing local, regional, or national initiatives.

7. Developing potential measures for species

RAs will need to propose potential measures for each of their LNRS species priorities. The potential measures describe specific practical actions that, if taken, would contribute to the recovery or enhancement of the priority species or assemblage in question. As before, it is important that RAs work collaboratively with a wide range of local partners to develop the potential measures, harnessing local ecological expertise and land management experience, and securing buy-in and shared ownership to support future delivery.

As noted, the prioritisation methodology set out in sections 6.1 – 6.3 is intended to encourage RAs and their local partners to develop the potential measures in tandem with the species priorities. During this process, species are prioritised and (in some, but not all cases) grouped

into assemblages on the basis of their recovery requirements; the potential measures describe specific actions to directly address the species / assemblage requirements identified. For the most part, these are likely to be actions to create new habitat, enhance existing habitat, or both. They may also be measures to reduce specific pressures, such as recreational disturbance or invasive non-native species, or bespoke measures, such as conservation translocation.

This document will be updated in due course to provide further advice on potential measures for species and how these can be mapped.

Appendix – supporting information

A1. Creating and enhancing habitat with species in mind

The goal of the process set out in this document is to identify species in need of *specific* recovery measures that can be addressed in LNRS, mostly to reduce risk of extinction. LNRSs will also support the recovery and resilience of other species by planning the creation, expansion, enhancement, and improved connectivity of high-quality habitats.

To make important contributions towards increasing overall species abundance and reducing risk of other species extinctions, **RAs are encouraged to approach all habitat measures with species in mind**. This involves thinking beyond broad habitat provisions to consider how habitats can best support the needs of diverse species, as well as the varying needs of species throughout different stages of their life cycles. High-quality habitats that effectively support the needs of species are more likely to be effective in providing other environmental benefits. The Biodiversity Metric 4.0 criteria for good habitat condition provide useful definitions of this per habitat type.

The most sustainable habitats that deliver the most environmental benefits while delivering for species are those that function naturally. These are the habitats that would naturally occur in a place and would potentially change through time due to natural processes. These habitats will support the species that would naturally occur in a region. They will also be high-quality habitats capable of supporting species which may move into an area due to climate change.

There are five broad components to naturally functioning habitats:

- Hydrology – natural water levels, water level fluctuations, and water movement
- Chemistry – natural nutrient levels, pH, and other chemicals
- Soil / sediment processes – natural soil health and levels of erosion and deposition
- Vegetation controls – natural levels maintained by native herbivores or by livestock grazing and cutting (the higher the intensity of the latter, the lower the degree of natural functioning)

- Native species composition – full diversity of species that would naturally occur; lack of invasive non-native species

RAs are encouraged to aim for the restoration of as much natural functioning as possible. Places where natural processes are given freedom to operate are more likely to have important structural diversity and include transitions between habitat types and mosaics of habitats. This heterogeneity provides a greater number of niches in which species can thrive. Consequently, places can support a greater diversity of species and better accommodate species' changing needs through different life stages.

It will not be possible to restore nationally functioning habitats everywhere, as socio-economic or other factors could prevent this. In such cases, however, the natural functioning of habitats can often still be improved to some extent for the benefit of species and other environmental goals. And where, for whatever reason, natural functioning cannot be re-established, mimicking it is often the next best option.

Larger areas of habitat are more likely to support more species and often have greater capacity for natural functioning. So, the bigger the better. This increases resilience, reduces edge effects, and enhances the capacity of species to be self-sustaining.

More species will be able to move more freely around a landscape if the distance between habitat patches is reduced, if the diversity of habitat patches in an area is increased, if corridors and stepping stones are established, and spaces between habitat patches are made less hostile to species. A rule of thumb for poorly dispersing species is for habitat patches to be < 1 km from each other, and for highly specialised species < 200 m apart. This will increase the resilience of existing populations and enable species to colonise new areas more easily.

NE can provide further advice on the natural functioning of habitats and how this can restored / optimised for the benefit of species and other environmental goals, as well as wider advice on the creation and enhancement of habitats to support species needs.

A2. Important considerations for species recovery in LNRS

The following sections provide further explanation (where deemed necessary) of the important considerations set out on pages 21 – 22 to guide selection of LNRS species priorities.

A2.1 Contributions to national species recovery

It is important that RAs consider how local (and regional) actions can contribute to the recovery and enhancement of our most threatened species nationally. Many LNRSs will cover areas of national (in some cases, international) significance for threatened species: for example, areas with a large proportion (or perhaps the entirety) of the national population of certain species, or areas where actions for certain species or groups of species are particularly important for national recovery. NE will provide national perspective and evidence to inform identification of these areas and actions needed within them. RAs are also encouraged to have recourse to Important Bird Areas, Important Plant Areas, and Important Invertebrate Areas: places which have been identified as nationally and internationally significant for the conservation of species and the habitats they rely on. NE and other partners can advise on the use of these resources.

A2.2 Cross-boundary considerations

The boundaries to LNRS areas are political, rather than ecological. Many species will move across these boundaries as they travel to and from, within and between feeding, roosting, breeding, and overwintering areas, or undertake regional or global migrations. Further, many important areas for species conservation will span these boundaries. For LNRSs to properly reflect requirements for species recovery and resilience, it is important that RAs think beyond the boundaries of their strategy areas. This will require neighbouring RAs to work together to ensure effective join-up and interaction between their strategies, to avoid unintended adverse impacts, and to plan coherent ecological networks that extend over multiple LNRS areas. In the process of identifying specific species priorities and potential measures, the need

may arise for neighbouring RAs to collaborate to plan recovery actions at regional and catchment scales – for example, to improve catchment water quality. The Responsible Authority Network is designed to enable such cross-boundary collaboration and join-up. NE, EA, and FC area teams will also support this, helping RAs to situate their species plans in wider regional and catchment contexts and helping to make adjacent LNRSs aligned and mutually supportive.

A2.3 Maximising benefits

The Environment Act requires LNRSs to focus not just on the recovery and enhancement of biodiversity, but also on how and where the recovery and enhancement of biodiversity can engender other environmental benefits. This is one of the crucial features of LNRS which distinguishes it from previous initiatives. When identifying species opportunities, priorities, and potential measures for their LNRSs, RAs should consider how the recovery and enhancement of certain species might benefit the functioning and structure of ecosystems more broadly and positively contribute to wider environmental goals. One well-known example is the beaver: a keystone species and ecosystem engineer with the ability to create and improve habitat for diverse species and deliver a wide range of environmental benefits for people (flood-risk mitigation, improved water quality, etc.). With countless other examples to consider – from water vole to sphagnum mosses, pearl mussel to lesser spotted woodpecker – attending to the recovery and enhancement of ecosystem engineers could be an efficient way of maximising benefits for biodiversity and the environment.

A2.4 Adaptation to climate change

Climate change will directly or indirectly affect nearly all species. RAs will need to consider climate change impacts for species and how their LNRSs can support species' adaptation. Impacts can be direct, such as warming impacting overwintering survival, or driven by changes to the ecosystems or habitats that species reside in – for example, the loss of coastal habitats due to sea-level rise. Impacts can also be indirect via human responses to climate change,

such as changed cropping patterns or abstraction. Understanding the potential threat that climate change poses is the first step to identifying and embedding adaptation into our responses. RAs are encouraged to consult the NE report on the Risks & Opportunities for Species as a result of climate change, which provides an assessment of this for over 3000 species.

In some cases, the goal will be to ensure species' ongoing persistence within the landscape. In others, the focus will be on ensuring that species are able to track climate change. Where persistence is the goal, building the resilience of ecological networks in line with Lawton principles (more, bigger, better, better-connected) is a good first step, but increasingly this will need to be augmented by more climate-specific action. In LNRS, this could include the identification, enhancement, and protection of *climate change refugia* – areas buffered from climate change relative to their surroundings which offer better chances of species persistence and expansion – or addressing the specific causes of climate threats (including through nature-based solutions). For species needing support to track climate change, interventions that promote directional (south-north, altitudinal) habitat connectivity should be considered. In exceptional circumstances, and with NE's support, RAs might consider possibilities for translocations to assist colonisation of new sites. The NE & RSPB Adaptation Manual provides more detail on the variety of possible approaches and illustrates them for a range of climate-sensitive species. Many other spatial tools exist to support decision making, including for climate change refugia and directional connectivity, and NE can advise on the use of these.

A2.5 Building on pre-existing species initiatives

In every LNRS area, it is likely that species recovery projects are already being delivered, particularly where populations of threatened species occur. It is important to consider and build on any pre-existing local initiatives in the development of LNRSs with a view to making contributions towards / consolidating species recovery gains and enabling local populations to increase their resilience, range, and distribution. Some examples include projects in the development phase of Landscape Recovery Round 1 which have a species recovery focus;

Nature Recovery Projects announced by NE, particularly those with focal species; and projects funded through NE's Species Recovery Programme, including the new capital grant scheme in operation between 2023-2025. RAs are also encouraged to consider how their LNRSs can contribute to species recovery projects operating at wider geographical scales.