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Workshop Digest

Terrestrial Nature Networks in the UK – A Review

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Acknowledgments:

This report summarises the findings of a UK Nature Network Review meeting, convened via video by the Joint Nature Conservation Committee (JNCC) on 25 March 2020, chaired by Catherine Duigan, organised by Ant Maddock, and with presentations by Natural Resources Wales (NRW) (Sarah Ayling), Natural England (Wanda Fojt and Humphrey Crick), Scottish Natural Heritage (Debbie Bassett) and The Department of Agriculture, Environment and Rural Affairs Northern Ireland (DAERA) (Richard Weyl). Other participants included Clive Walmsley (NRW), Iain Davies (DAERA) and Bev Nichols (JNCC). All of these workshop participants commented on the content of this workshop report.

Additional comments on draft versions of this report were also received from Clive Mitchell (SNH), Eileen Stuart (SNH), Sally Thomas (SNH) and Heather Garrett (NRW).

Summary

A review of nature networks in the UK is timely in the context of current interest in Nature-based Solutions (NbS), developing new UK land management schemes post-European Union membership, and preparations for CoP26. The primary objective of this review was to report on progress with the development of nature networks in the UK over the last decade, but it also considers the policy frameworks, evidence base and needs, network approaches and ways of working, and finally challenges and incentives.

The review took a workshop approach with experts asked to describe the current status of nature networks in their country. The production of this workshop digest was led by the Joint Nature Conservation Committee but was co-authored with the statutory nature conservation bodies (SNCBs) in the UK.

It was found that the concepts of nature networks and ecological resilience are strongly entwined and vary in definition in the science-policy environment. However, they are recognised as key to future nature conservation planning because networks would support and develop environmental and ecological resilience in a changing world. They also assist nature and landscape conservation, restore naturally functioning ecosystems and support and develop ecosystem services for the benefit of society.

The UK is in a nature network implementation phase and the key practical challenge relates to scaling upwards and making connections between projects. A number of operational policy areas could provide the main opportunities for network development on the ground, especially agri-environment schemes, development planning, carbon storage and peatland restoration, and forestry strategy. There is also a strong element of place-based or local policy delivery. This comes with the key test of delivering national or regional objectives at a local scale.

Priority evidence needs include unifying research on the concepts, agreement on key datasets and associated indicators/metrics, producing customised models and mapping tools and integration of aspects of social science. In addition, the evidence base needs to be fit to inform adaptive management cycles at project level and be available for public use locally. Working with people is an essential element of network development and a fundamental challenge relates to public appreciation of biodiversity and ecosystem services. Funding sources are in transition and diverse in nature. They need to be long-term and include adaptive management and monitoring requirements.

On the basis of this review the following recommendations are made:

1. That the policy opportunities in each country are optimised to develop and deliver nature networks.
2. That the JNCC, SNCBs and the research community continue to work together to secure the evidence base, monitoring requirements and trained practitioners to support the development and assessment of networks at a local and larger scale.
3. That the JNCC, SNCBs, non-governmental organisations, wildlife charities and others continue to work together to communicate the value of biodiversity in a changing world.
4. That flexible funding programmes are directed at large scale and long-term projects.
5. That further opportunities are found to work together and to learn from each other as a nature network community in the UK.

Contents

1 Introduction

Across the UK, ecosystems face a common set of large-scale environmental pressures leading to habitat degradation and fragmentation, including climate change, pollution, agricultural and fisheries management, and urbanisation (Hayhow *et al.* 2019). Following the English landmark Making Space for Nature Report (Lawton *et al.* 2010) the development of nature networks became widely recognised as a means to support and develop environmental resilience in a changing world. The shared ambition (individually held by Scotland, Wales, England and Northern Ireland) to create networks represents a potentially unique UK scale nature-based solution towards mitigating biodiversity loss and climate change.

As part of a common conservation agency focus on nature-based solutions in advance of CoP26, JNCC has worked with the four UK country nature conservation bodies (CNCBs) to produce a holistic UK-wide review of nature networks. A review is also timely in terms of the development of new UK land management schemes following exiting the European Union. This paper summarises the finding of a meeting convened by the Joint Nature Conservation Committee on 25 March 2020, with presentations given by Natural Resources Wales, Natural England, Scottish Natural Heritage and The Department of Agriculture, Environment and Rural Affairs (Northern Ireland).

The primary objective of this review was to report on progress with the development of nature networks in the UK. In addition, it sought to address the following supporting objectives:

1. to summarise the policy drivers across the UK and devolved administrations;
2. to identify the evidence base requirements and research needs;
3. to explore the approaches being developed, including partnership working;
4. to specify the incentives needed to build nature networks and to identify development challenges;
5. to inform potential research collaborations; and
6. to produce recommendations for the future.

2 Policy Framework

The definition of types of nature networks has evolved over time. Lawton *et al.* 2010 defined an “ecological network” as comprising a suite of high quality sites which collectively contain the diversity and area of habitat that are needed to support species and which have ecological connections between them that enable species, or at least their genes, to move. Today the concepts and definitions of nature networks and ecological resilience are strongly entwined and vary in definition in the science-policy environment across England, Scotland, Wales and Northern Ireland but generally adhere to the principle of having a connected series of sites. For example, in England the objective of a “Nature Recovery Network” will be to deliver on the recommendations from Lawton *et al.* (2010). See Appendix 1 for definitions and reference to nature networks across the countries of the UK.

In general, nature networks are recognised as key to future nature conservation planning because networks would support and develop environmental and ecological resilience, but also assist nature and landscape conservation, restore naturally functioning ecosystems and support and develop ecosystem services for the benefit of society. As a consequence, the UK policy framework supporting the development of nature networks is complex, with an ambition to deliver across a wide environmental spectrum, including nature conservation, sustainable development and human well-being. It operates at two distinct scales – international UK commitments and country-specific legislation and policy. Common

international drivers include the Convention on Biological Diversity, the Habitats and Species Directive, and Sustainable Development Goals. Appendix 1 summarises the various country specific legislation, policies, strategies and planning processes across Wales, Scotland, England and Northern Ireland.

In Wales and England, the separate Environment Acts (in place and pending) provide the key legislative foundations, with additional support from the Resilient Wales goal in the Well-being of Future Generations Act (2015) in Wales. Where country-specific Acts are relatively less developed the focus is on continued international commitments, and national or more local planning, policies and strategies. For example, The Scottish Biodiversity Strategy has a commitment to establishing a "national ecological network". Also, nature networks have a growing prominence in the UK as a means of addressing the biodiversity crisis and supporting climate change adaptation and mitigation. For example, the vision (by 2045) of the Environment Strategy for Scotland is: "By restoring nature and ending Scotland's contribution to climate change, our country is transformed for the better - helping to secure the wellbeing of our people and planet for generations to come." In general, there is a common UK policy theme around leaving our environment in a better state for future generations.

In some cases, policy development has required government to further define the key concepts. For example, in Wales, the Natural Resources Policy specifies that "resilient ecological networks" are networks of habitat in good ecological condition linking protected sites and other biodiversity hotspots across the wider landscape and providing maximum benefit for biodiversity and well-being. "Ecosystem resilience" is the capacity of ecosystems to deal with disturbances, by resisting them, recovering from them, or adapting to them, whilst retaining their ability to deliver services and benefits now and in the future. At the same time there is a continuously growing scientific literature and understanding of networks and resilience (e.g. Morecroft *et al.* 2012; Natural Resources Wales 2016). Most recently Isaac *et al.* (2018) focused on species and meta-population theory and defined a "resilient ecological network" as one in which species can persist even in the face of natural perturbations and human activities (including climate change). It is yet to be determined if the variation in concepts will produce any network incompatibility between different areas, but it is likely to have implications for the evidence base requirements, on the ground development, and any future reporting and monitoring, which has yet to be determined. A variation in approaches could also be considered desirable as an insurance against the uncertainty associated with climate change impacts.

In Northern Ireland there has been little recent policy directing the development of ecological networks and nature-based solutions. However, the need to more fully develop them both within Northern Ireland and across border areas with the Republic of Ireland is now recognised as an important issue.

There is a consensus around a number of operational policy areas which could provide the main opportunities for network development on the ground in the UK, especially agri-environment schemes, development planning, carbon storage and peatland restoration, and forestry strategy. There is also a strong element of place-based or local policy delivery with nature networks acting as a spatial framework for planning nature recovery (see below).

For example, under the Environment Bill proposed spatial local nature recovery strategies will be developed in England. Each strategy will, for the area that it covers: map the most valuable existing habitat for nature; map specific proposals for creating or improving habitat for nature and wider environment goals; and agree priorities for nature's recovery. In Wales building resilient ecosystems has emerged as a theme in some Area Statements which identify the key challenges in a particular locality and the likely response to improve nature resource management. In addition, public bodies will continue to have specific duties to

conserve biodiversity as part of their operations, such as those identified under the Natural Environment and Rural Communities Act (2006) in England and Environment (Wales) Act 2016. In Scotland, the Environment Strategy (2020 to 2045) provides an overarching policy framework, ensuring policy alignment to address the twin challenges of the climate emergency and biodiversity crisis. Resilient, restored and well-functioning ecosystems are at the heart of the strategy to ensure delivery of multiple benefits for the people of Scotland. Regional Land Use Partnerships will provide a mechanism for delivering ecosystem restoration at a range of landscape scales.

3 Evidence

Research on the concepts of nature networks and increasing ecological resilience is set to be a continuing priority to inform policy and environmental management. Understandably network development on the ground has not been supported by a strategic research programme from the start and it still has a high dependence on available data on land use (e.g. farming, forestry, protected areas) and land cover, species data, and key abiotic datasets, such as soil type and condition, topography and hydrology. The data being used across the UK comes from many sources, including specialist surveys and amalgamated habitat and species maps. There is a strong expectation that Earth Observation will provide a common standard in future. A focus on linear features which may facilitate species movement (e.g. hedgerows, river corridors) will also be required. Additional data on the environmental condition of protected areas and farms are considered very important to support land use interpretation. There is scope for developing a portfolio of key datasets to support nature networks at local, country and UK level as appropriate.

The available datasets are being used in an increasing number of separate network modelling programs and mapping tools to produce a variety of spatial products at different scales. These inform network development and wider landscape decision making, and most importantly provide local partnerships with the information needed to start work. For example, Condatis and BioCoRe are being applied to identify the best locations for habitat creation and restoration to enhance networks and connectivity, while Range Shifter can be used to explore spatial species dynamics. In Scotland and Wales, the spatial position and extent of functional integrated habitat networks were determined through a landscape ecology model from the BEETLE (Biological and Environmental Evaluation Tools for Landscape Ecology) suite of tools.

Local benefits from existing and altered land use and the ecosystem services they provided can be explored with web-based applications, such as the Natural Environment Valuation Online Tool (NEVO) and EcoServe. A more complete analysis of the range of map-based models and planning tools available for network development can be found in Crick *et al.* (2020a). The impact of climate change will bring additional research and modelling requirements for specific issues, such as climate change vulnerability, envelopes and refugia, and extinction debt. Careful consideration also needs to be given to making this range of science usable on practical IT platforms by local communities.

Monitoring is crucial to demonstrating network development and success but needs more coherence and direction, especially outside protected areas, and across countries and the UK as a whole. This would require the definition of network objectives, assessment of what needs to be monitored and a matching exercise against existing monitoring schemes. In particular a spatial reporting mechanism (such as the Living England Map) is thought to be a key element in future reporting requirements assessing network extent and effectiveness.

It is difficult to monitor ecosystem resilience directly, so efforts are being focused on developing and defining attributes and metrics or indicators of resilience. In Wales these attributes and their associated objectives (Natural Resources Wales 2016) are:

a.) Diversity – to maintain and enhance natural diversity, with key role for protected areas; to increase structural diversity at different scales; to diversify productive systems;
b.) Extent – to maintain existing habitats, including mitigation and compensation; to restore and create semi-natural habitats;
c.) Condition – to get protected sites and wider habitats into good environmental condition; to advocate good management generally; to improve condition of soil, air and water quality; and
d.) Connectivity – to maintain and enhance network; to improve or reinstate connective features.

Habitat network maps for Wales have been published as a key resource for understanding and informing interventions to improve ecological connectivity, and hence to help build ecosystem resilience. The maps cover the whole of Wales and are the result of long-term collaborative research using BEETLE that takes into account land cover type, and the habitat area requirements and dispersal abilities of the habitats' typical species (Latham & Rothwell 2019).

In Scotland, fundamental research on the resilience of ecosystems and biodiversity has been undertaken by the Scottish Environment, Food and Agriculture Research Institutes. Examples of research areas investigated, and outputs, include CaperMap (communication tool to facilitate capercaillie conservation), pathogen distribution in a number of landscapes; modelling peatland condition using remote sensing; and the impact of climate and land use on the distribution of priority species.

Depending on local delivery objectives, there may be additional research and indicator needs, such as a specific ecosystem service (e.g. flood defence or recreational access). Other ecological research needs will emerge as networks develop, with key species indicators, species movement, and the application of eDNA at the forefront. Given the focus on community involvement and human well-being, a vital research challenge and opportunity relates to the development and integration of a specific social science programme which could include behavioural insights and systems thinking (Rare and The Behavioural Insights Team 2019). Such a programme of research would have wider applications in terms of understanding the links across environmental change and human behaviour, and applications in the context of nature-based solutions generally.

However, lack of evidence should not necessarily delay action because nature networks are a form of adaptive management, but the best available evidence-based advice and information should be sought in advance. This was the incentive for the production of the Natural England Nature Networks Evidence Handbook (Crick *et al.* 2020a, b) which includes evidence-based rules of thumb that provide detail about how to make a network of sites for nature 'better, bigger, more and joined' (following Lawton *et al.* 2010). In Scotland, the non-government led Landscape Scale Conservation Working Group has established a practitioner's network to share good practice and take forward ideas and projects.

Finally, is also important to develop a project evaluation framework against which projects can be monitored and assessed to improve adaptive management outcomes and inform other projects.

4 Network Approaches

In response to the global scale challenge of biodiversity loss and the increasing competition for natural resources, “the ecosystem approach” was developed as a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. This approach was supported by a set of principles which have been adopted and adapted to form government and agency policy, and specifically as part of the development of nature networks in parts of the UK. Developing a nature network is not just a spatial approach to environmental management but also a way of working.

For example, Natural England are advocating a network way of thinking which combines the planning of resilient nature networks and the benefits for local communities and the wider public: “To make a nature network, in contrast to an ecological network, we need to involve people from the earliest stages in planning and design, to create an overarching vision for the network, taking into account their needs and the services that a landscape provides to society.”

When the principles for network design in England are placed alongside the principles for the sustainable management of natural resources in Wales, common themes emerge involving people, building resilience, using different forms of evidence, thinking long-term, embracing change, dynamism and diversity, adaptive management, monitoring and evaluation, and multiple benefits.

A “Recipe for Success” model is being used in Scotland – engaging, planning, doing, evaluating and sustaining. Good quality engagement of the wider public, as well as a wide range of partners (agencies, landowners and managers, charities, funders) is considered vital throughout the process and a shared vision should be developed. Forward planning is needed to ensure appropriate funds and skills are available to carry out the project. This is followed by doing the practical work that will achieve the vision of resilient landscape level conservation that works across different scales. Project evaluation should be through an established evidence base which would also provide a baseline against which the effects of short, medium and long-term actions can be monitored. Sustaining the project means not leaving legacy thinking until the end of a project. The importance of having a diversity of partnerships working together to deliver nature conservation and other benefits is also recognised in Northern Ireland.

When considered across the UK, the common approaches paint an overall picture of a way of working that involves using evidence to inform local decision making. A suite of separate nature network type projects is underway across the UK but any overall physical coherence as a large-scale network has yet to emerge or be demonstrated. From that perspective, local delivery could be set more clearly within a country and UK framework of environmental objectives and priorities, standards, criteria, evidence and advice.

5 Challenges and Incentives

The fundamental challenge relates to public appreciation of biodiversity and ecosystem services, and societal and landowner interest and willingness to engage. Communicating the importance of nature and understanding human behaviour will become even more important as part of climate change adaptation, mitigation and green recovery from the Covid-19 pandemic.

Given the diversity of nature network related policies and strategies, the development of a common vision for the UK could be considered, with the cultivation of common or diverse

approaches as part of that vision. The creation of nature networks has a strong dependency directly or indirectly on government and statutory nature conservation agency support and incentives, including a diversity of funding sources. At the moment there is a timely opportunity emerging around the development of an alternative to the EU LIFE Programme and post-Common Agricultural Policy funding, including the likelihood of payment for ecosystem services. Other funding opportunities are emerging around policy areas such as heritage, blue-green infrastructure, nature-based solutions, biodiversity net gain, carbon off-setting and the development of national forests. Contributions made as part of corporate social responsibility could also be aligned with network objectives in local areas. An opportunity for international collaboration with the Republic of Ireland and a cross border network could be generated by Peace Process funding.

Large scale delivery on the ground will need secure funding over several years, with additional longer-term monitoring and management requirements. The structure of the funding schemes must also match the need for seasonal work. The size of landholdings has substantial implications for project delivery and community engagement. For example, working with a large single landowner could be more efficient in terms of operational delivery than working with a large number of small farms. Landowners may also be concerned about the risks associated with adaptive management. The alternative to pursuing individual projects could be raising the regulatory requirements for land use activity (e.g. buffer strips along rivers) or through planning mechanisms but these routes would be a country level policy decision.

The nature network practitioner community has proven to be responsive to competitive and challenge fund initiatives, but careful consideration needs to be given to associated bid training, governance requirements and financial risks for partners and charities. Given the technical nature of network development there are also substantial advice and training needs for land managers and specific project officers. Finally, nature network projects should be considered living laboratories and experiments in adaptive management which have the capability of attracting funding to deliver solutions to environmental challenges and support environmental education.

6 Conclusions and Recommendations

Over the last decade the primary UK level response has been the creation of a policy framework for the delivery of varying concepts of nature networks and ecological resilience. Today this framework is well developed but complex, and continuing to evolve at a UK, country and local level. In addition, it is clear that nature networks are set to be a key response to climate change adaptation, sustainable development and post-Covid green recovery as a form of nature-based solution. At the moment, there are time-critical opportunities to integrate these networks into new land management schemes.

Priority evidence needs include unifying research on the ecological concepts, agreement on key datasets and associated indicators/metrics, producing customised models and mapping tools and integration of aspects of social science. Continued focus is required on fundamental land use data needs and the shift to using earth observation to provide these data and monitor change. Given the current emphasis on local delivery it is inevitable that there will be differences in approach to network development, but specific attention needs to be paid to the join-up of policy and approaches across borders. Research investment benefits are exemplified by the range of models and spatial tools now available to inform network development. Monitoring of the development and effectiveness of networks needs to be built into future state of the environment or state of nature reporting at UK and country levels. In general, the evidence base needs to be fit to inform adaptive management cycles.

Nature network development in the UK has moved into an implementation phase, with a network way of thinking and working emerging that combines the planning of resilient nature networks and the benefits for local communities and the wider public. In the longer term this will come with the key test of delivering national or regional objectives at a local scale. Nature networks will need long-term application and commitment to address environmental issues at source (and not just symptoms), and to become true nature-based solutions. Substantial effort is being made to provide evidence-based approaches and guidance to assist more local delivery on the ground. There are an increasing number of relatively large exemplar projects focused on collaborative working. However, the main challenge relates to delivering landscape scale work and continuing to pursue making them “bigger, better and more joined up”. Funding sources are in transition, diverse in nature and vary in time scale, but subject to country level policy network components could also be delivered through Green Recovery Stimulus Plans, regulation and development planning. The practitioner community needs support and training across evidence, governance and finance. There should be nature network associated opportunities for research and innovation collaborations and environmental education.

At some stage in the future a more in-depth technical evaluation of different approaches and their relative benefits and advantages should be undertaken to inform standardised methods and quality control criteria. Comparisons should also be made with ecological network development in other temperate regions. The compilation of a library of case studies, tools and models would be a valuable reference for practitioners. Further joint working will be required to achieve an ecological coherent terrestrial network, including having an overview of network development, and fora to discuss and develop approaches, to stimulate research ideas and proposals, to cultivate collaborations and partnerships and to provide training and guidance to practitioners.

On the basis of this review the following recommendations are made:

1. That the policy opportunities in each country are optimised to develop and deliver nature networks.
2. That the JNCC, SNCBs and the research community continue to work together to secure the evidence base, monitoring requirements and trained practitioners to support the development and assessment of networks at a local and larger scale.
3. That the JNCC, SNCBs, non-governmental organisations, wildlife charities and others continue to work together to communicate the value of biodiversity in a changing world.
4. That flexible funding programmes are directed at large scale and long-term projects.
5. That further opportunities are found to work together and to learn from each other as a nature network community in the UK.

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Appendix 1. A summary of the main country specific legislation, policies, strategies and plans related to nature recovery networks.

WALES	
Legislation	**Well-being of Future Generations (Wales) Act 2015** "A resilient Wales" is one of seven goals. A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change). **Environment (Wales) Act 2016** Biodiversity and resilience of ecosystems duty: Public bodies should "seek to maintain and enhance biodiversity in the exercise of functions… and in so doing promote the resilience of ecosystems".
Policies	**The Natural Resources Policy -** Resilient ecological networks are vital for nature recovery. Definition = Networks of habitat in good ecological condition linking protected sites and other biodiversity hotspots across the wider landscape and providing maximum benefit for biodiversity and well-being. Such networks have existing or potential to support healthy resilient ecosystems which provide a range of important ecosystem services as well as allowing the movement of species across landscapes in response to climate change."
Strategies and Plans	**Natural Resources Wales - Vital nature: Making the connections between biodiversity and the people and places of Wales** Protected sites on land and sea in Wales are an integrated network, ecologically connected with the wider landscape and seascape, resilient to climate change, and where a dynamic approach to site designation and management enables habitats and species to thrive and expand, providing ecosystem services well beyond the site boundaries. **Nature Recovery Action Plan for Wales** - Maintaining and Enhancing Resilient Ecological Networks Theme.

SCOTLAND	
Legislation	**Flood Risk Management Act 2009** - a catchment level approach to managing flood risk sustainably. Managers are required to consider a wide range of solutions, including natural flood management, which promotes techniques that work with nature to enhance, restore or alter natural features and characteristics.
Policies	**Creating places – a policy statement on architecture and space for Scotland** - Green infrastructure should be thought about at every scale of planning, from the strategic framework right down through neighbourhoods and within streets to the individual house or flat.
Strategies and Plans	**The Environment Strategy for Scotland - One Earth. One home. One shared future.** Vision - By 2045: By restoring nature and ending Scotland's contribution to climate change, our country is transformed for

	the better - helping to secure the wellbeing of our people and planet for generations to come. • Scotland's natural environment is central to our identity as a nation. • It is fundamental to our health, our quality of life and our economy. • We want Scotland's nature to be resilient and abundant. • We want to use its full potential to improve the wellbeing of people in Scotland - ensuring everyone can enjoy the life-supporting benefits it provides. **Central Scotland Green Network** - introduced as a National Development in the second National Planning Framework, represents a step change in meeting environmental, economic and social goals through the natural environment. **National Planning Framework 3** – encourages Planning Authorities to promote green infrastructure that will add value to the provision, protection, enhancement and connectivity of open space and habitats; both within and between towns and cities. – through Master plans and development plans. **Scottish Biodiversity Strategy** – Aichi target 11- protected areas and ecological connectivity; Develop a framework for establishing a national ecological network; Greater resilience against adverse changes, such as those arising from climate change; Key work underway outside protected places to meet requirements under the EU Habitats Directive; Agreed regional priorities for the SRDP; A means for planning forest expansion; Local Biodiversity Action Plans contributing to national priorities. **Land Use Strategy** - Highlights that maximizing the benefits provided by nature often requires coordinated action at a landscape scale. Two detailed pilot areas in the Scottish Borders and Aberdeenshire resulting in clearer understanding of multiple benefits gained through integrated land-use planning and management. **Scottish Forestry Strategy** - Supporting the creation of a range of types and scales of new forests and woodlands using native and other tree species for a range of purposes, including production of timber.

NORTHERN IRELAND	
Legislation	Currently no direct country level legislative drivers.
Strategies and Plans	NI Environment Strategy has just completed a consultation phase. New NI Biodiversity Strategy pending.

ENGLAND	
Legislation	**Environment Act – pending.** **The Environment Bill** was introduced into parliament on 15 October 2019. It was re-introduced to parliament following a general election on 30 January 2020. The Environment Bill 2020 sets out a plan to protect and improve the natural environment in the UK. The Bill supplements existing legislation and policy on protected sites and species and introduces new incentives, actions and planning tools to drive further improvements for nature. It also lays the foundation for the Nature Recovery Network. In addition to setting the framework for at least one legally binding target for biodiversity, it establishes spatial mapping and planning tools to help inform nature recovery and, sitting alongside our plans for introducing a new Environmental Land Management Scheme, the actions and incentives to drive change on the ground. **The Natural Environment and Rural Communities Act 2006** (see below).
Strategies and Plans	**Local Nature Recovery Strategies** -The Environment Bill also introduces provisions requiring the development of Local Nature Recovery Strategies across England. These are tools that will support better spatial planning for nature recovery, by setting out priorities and opportunities for protecting and investing in nature within a local area. They will include a map of existing nature assets including protected sites and wildlife-rich habitats and will identify key opportunities for enhancement. Local Nature Recovery Strategies will help local authorities and other public bodies identify priorities and opportunities for conserving and enhancing nature. These tools will also support strategic planning for housing and infrastructure and help direct net gain investment so that it has the greatest benefit for local wildlife and people. Whilst government will provide data, guidance and support for the Local Nature Recovery Strategies, each one will be produced locally ensuring local ownership and knowledge is embraced, and strategies are consistent and link together across England. **The Natural Environment and Rural Communities (NERC) Act 2006** places a duty on public authorities to 'have regard' to conserving biodiversity in the exercise of their functions. With the environmental challenges we are currently facing, the current duty needs to be strengthened in order to ensure public authorities play their part in enacting meaningful change. The Environment Bill strengthens the duty to cover the enhancement, as well as the conservation, of biodiversity, and requires public authorities to actively carry out strategic assessments of the actions they can take to enhance and conserve biodiversity. Designated public authorities will also be required to produce a five-yearly report on the actions taken to comply with the new duty. Together, these

	measures provide an important driver for the effective implementation of the Local Nature Recovery Strategies, providing an effective way to embed consideration of biodiversity across the public sector. Following from the NERC Act, the revised National Planning Policy Framework (NPPF; Ministry of Housing, Communities and Local Government 2018) for England provides a statutory basis for local planning authorities to "take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure', 'enhancement of the natural, … environment, including landscapes and green infrastructure" and "by establishing coherent ecological networks". The NPPF includes frequent references to 'Green Infrastructure' (GI) which it defines as "A network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities." This is a useful concept with respect to the development of nature networks, although with more emphasis on people. **Department for the Environment, Food and Rural Affairs - 25 Year Environment Plan** - Through changes in the way land is managed in England, one aim is to develop a Nature Recovery Network, providing 500,000 hectares of additional wildlife habitat, more effectively linking existing protected sites and landscapes, as well as urban green and blue infrastructure. Such a network will deliver on the recommendations from Lawton *et al*. (2010) that recovering wildlife will require more habitat; habitat in better condition; habitat in bigger patches and that are more closely connected. As well as helping wildlife thrive, the Nature Recovery Network will be designed to bring a wide range of additional benefits: greater public enjoyment; pollination; carbon capture; water quality improvements and flood management. New Nature Strategy post 2020 – is expected to have chapter on nature recovery networks.