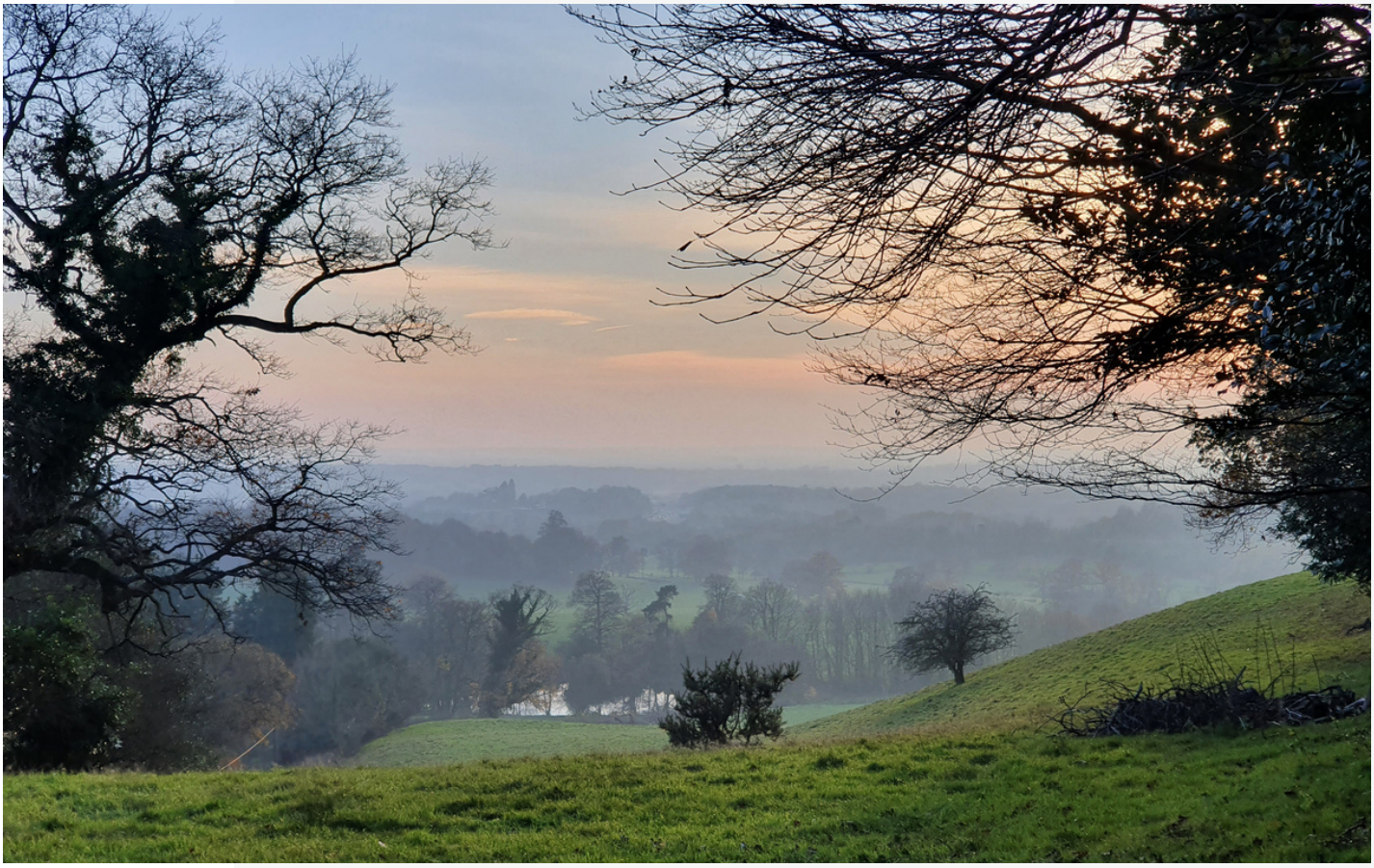
HEALTHY ECOSYSTEM RESTORATION IN OXFORDSHIRE (HERO)

OCTOBER 18 2021

EVIDENCE NEEDS FOR A NATURE STRATEGY IN OXFORDSHIRE

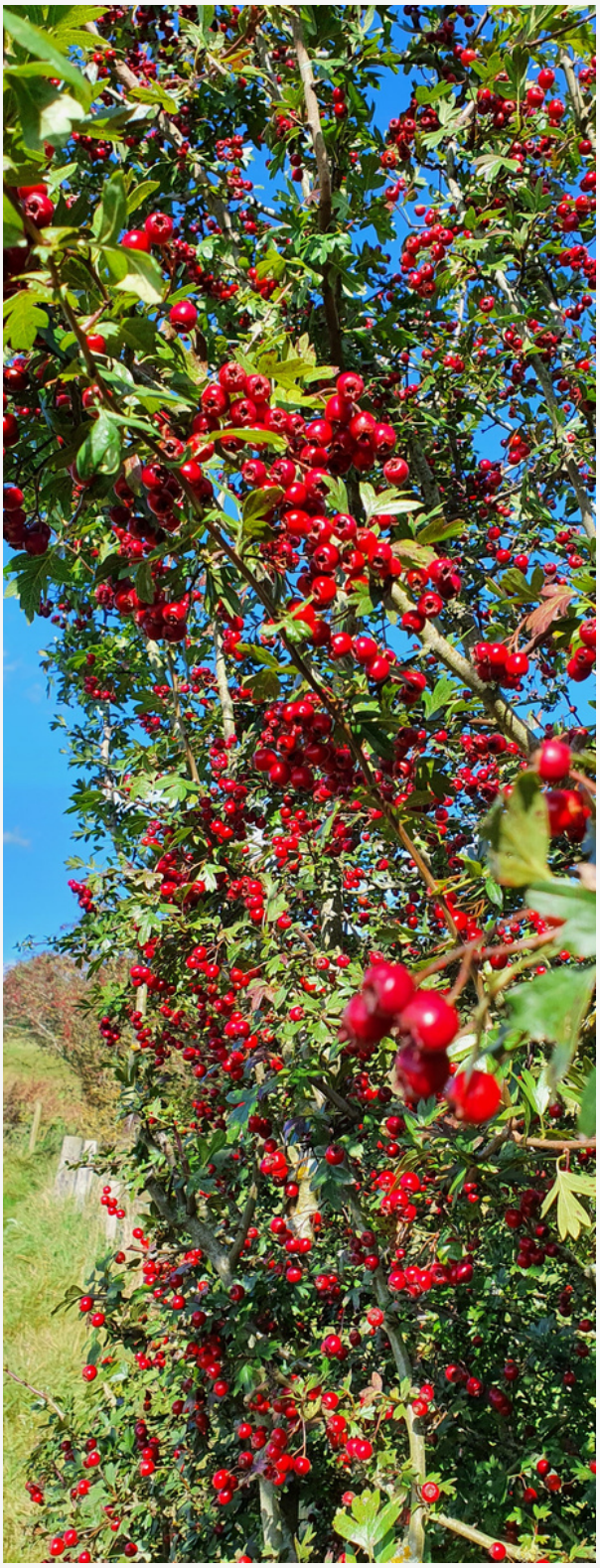


OXFORD MARTIN SCHOOL

UNIVERSITY OF OXFORD

HERO WORKSHOP #3

HELD VIRTUALLY



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Participants:

Yadvinder **Malhi** (University of Oxford), Cecile **Girardin** (University of Oxford), Alison **Smith** (University of Oxford), Camilla **Burrow** (Wild Oxfordshire), Ian **Curtis** (University of Oxford), Sue **Roberts** (Bio abundance Community), Jamie **Hartzell** (Oxfordshire Treescapes Project), David **Macdonald** (University of Oxford), Carlyn **Samuel** (University of Oxford), Steve **Wilkes** (Thames Valley Local Record Centre), Bruce **Winney** (Wildlife and Countryside Link), Sorrel **Johnson-Hughes** (National Trust), Sam **Riley** (Forestry Commission), Isobel **Hawkins** (Conservation International), Tianqi **Wang** (University of Oxford), Robin **Buxton** (Patsy Wood Trust), Caroline **Svendson** (Natural England), Brittni **Engels** (Ramboll Group), Charl Justine **Darapisa** (University of Oxford), Wallerand **Bazin** (University of Oxford / rapporteur)

About HERO

Healthy Ecosystem Restoration Oxfordshire (HERO) is a three year programme (in the first instance) supported by the Oxford Martin School, under their new Programme on Biodiversity and Society. HERO will explore how Oxford University can play a role in efforts to restore ecosystems to health in Oxfordshire, by bringing the University's strengths in academic knowledge, research capacity and convening power to support ongoing and planned nature recovery activities by a range of local partners and stakeholders, including land-owners and farmers.

With its active network of nature recovery groups, Oxfordshire presents a compelling opportunity to test and showcase a portfolio of different ecosystem restoration strategies, to become a model county for nature recovery. HERO aims to build a community of practice between the University and local practitioners, and will also form a resource for the University and its constituent Colleges within broader institutional sustainability goals.

The HERO network brings together researchers from the natural and social sciences with local authorities, environmental organisations, landowners and community groups who are already working on a range of initiatives to help support nature's recovery and enhance the multiple benefits that nature provides in Oxfordshire. We also aim to invite prominent supporters of Oxford's biodiversity research in the business, finance, government and NGO sectors, to strengthen links with external stakeholders.

HERO aims to hold a regular series of workshops and seminars to examine key opportunities, challenges and evidence gaps around nature recovery in Oxfordshire, and also provide a limited amount of research resource to help fill evidence gaps.

About this workshop

This note presents the outputs from the third HERO workshop, which was attended virtually by 19 participants on the 18th of October 2021.

The inception workshop in July 2021 identified the priorities for nature recovery across Oxfordshire and the second workshop in September 2021 identified 5 major challenges posed by the second priority, namely adequate and reliable land mapping: extending, refining and streamlining collected data, mapping land ownership, including farmers in the mapping effort, identifying interactions between nature and other climate issues and mapping change over time.

This third workshop focuses on evidence needs for a nature recovery strategy. Prior to the workshop, the HERO team (Steve Wilkes, David MacDonald, Alison Smith) had gathered a list of datasets on habitats (type and condition) and species (presence/absence, abundance, diversity). At the workshop, these datasets were presented and discussed, and we gathered feedback and insights on key evidence gaps, additional datasets, priorities for researchers to fill these gaps and to guide nature recovery strategies.

Three themes emerged from the discussion:

1. Challenges of data collection and analysis
2. Establishing biodiversity trends and benchmarks for measuring progress towards restoration
3. Setting species targets

PRESENTATION OF HABITAT AND SPECIES DATASETS

(1) THAMES VALLEY ENVIRONMENTAL RECORD CENTRE (TVERC) DATASETS – STEVE WILKES

TVERC transforms raw biological data into useful biological information for practitioners making evidence-based decisions. This work is funded through data search and licencing fees. The dataset presented compiles wildlife information covering the counties of Berkshire and Oxfordshire, for three main types of data: species, habitats, and sites.

In terms of species data, TVERC holds 3.8 million species records of fauna and flora, including 800,000 records of both notable species, a conservation designation based on Natural England's guidance, and protected species, under legal protection of EU and UK legislation. 400,000 of these records are within Oxfordshire itself. Every year, half a million records are added to the dataset and that number expected to increase with the recruitment of a recording coordinator. TVERC mainly works with around 70 national and local recording groups, which include natural historians, environmental consultancies, wildlife surveys, land owning NGOs, government bodies and members of the public. A robust verification process is in place to certify the quality of the information. Steve Wilkes emphasized that a lack of record does not mean the information is not there. Rather, that some species are simply more popular than others and the data collected for other species may not have been submitted.

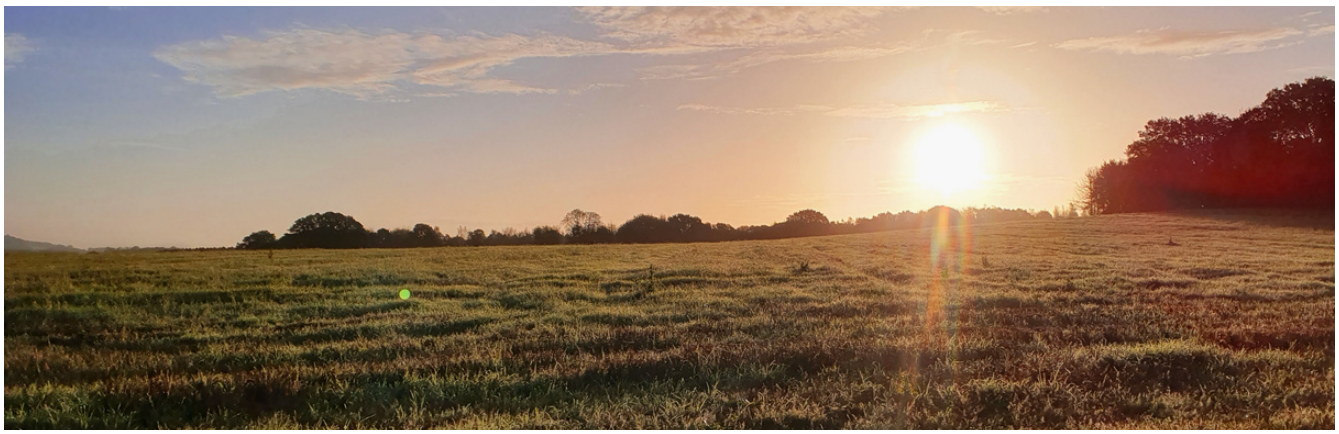
TVERC also collects location information on habitat data, mainly on habitats of critical importance (NERC ACT – S41). The dataset has a complete coverage of habitats in the county, through aerial photography interpretation and field survey, providing maps consistent with Ordnance Survey Mastermap polygons. The team is currently working on transforming the data into the new UKHab habitat classification system.

The sites datasets include local wildlife sites (LWS), including the sites previously termed county wildlife sites as well as BBOWT nature reserves. It includes the 393 LWS that cover 3% of Oxfordshire, a bit less than the national average – 33, 000 LWS cover 5% of the UK's land. These LWS provide better connected landscapes with buffers, stepping stones and corridors. TVERC also have datasets for the 20 designations of statutory and non-statutory sites in the county, and they maintain the dataset for the Conservation Target Areas, which cover 20% of Oxfordshire and show where the greatest gains can be made from habitat enhancement (these underpin the draft Nature Recovery Networks).

(2) ACADEMIC RESEARCH DATASETS – DAVID MACDONALD

Professor David MacDonald shared his perspective on the role academic datasets can play in filling the evidence gap. Beginning in Wytham, his work expanded to the adjoining farms and then throughout the county. As a result, his research subsequently followed a series of organisational layers: from species-specific data (wood mouse, badgers, foxes) to experimental comparisons (e.g., field management systems), to farm comparisons (intensive vs. traditional) and finally to whole catchment level projects, with the Upper Thames Valley Project. Some of these datasets will be made available to Alison and her team.

Prof MacDonald suggested making Wytham the main building block of the project, given the forest's position as an ecological record hub for the county over the years. On David's advice, Alison has already contacted Marc Bruard to obtain access to the Wytham research database, and we should also look through the various initiatives recorded in two major books published by Prof MacDonald which summarise much of this research.



Prof MacDonald's view is that specific datasets have already been collected and the main work will be to navigate this repository, identify those that are missing, and complement them (i.e., ITE, Environmental Agency). Nonetheless, he is unsure how useful this data will be since HERO will mainly be using distributional and wider ecosystem data.

(3) OTHER LOCAL AND NATIONAL DATASETS – ALISON SMITH

Alison Smith presented an updated version of the HERO Excel spreadsheet recording 36 datasets, outlining the specific elements of description for each: dataset name, organisation, scale, location, time period, description, contact, links, habitats, species, soil, water, licence (c.f. table 1; taking as an example the information about the Environmental Change Network dataset).

Table 1: Example record from HERO's dataset of datasets

Dataset name	Environmental Change Network
Organisation(s)	NERC
Scale	Local
Location	Wytham
Time period	From early 1990s to about 2019 but depends on the variable
Description	Long-term species monitoring data going as far back as the early 1990s for ten sites across the UK including Wytham. Also includes some climate, air, soil and water quality data.
Contact	
Contact email	
Links	http://www.ecn.ac.uk/data
Habitats	
Species	Butterflies, Moths, Carabid beetles, Spittle bugs, Birds, Bats, Frogs, Rabbits
Soil	Soil solution measurements: pH, N, P and other elements
Water	pH, DOC, N, P and other elements
License	Freely available

Table 2 and 3 present the main national and local datasets collected so far. However, some datasets are quite old or inaccurate, making comparison difficult. For instance, Alison presented one example where the TVERC Phase 1 Habitat dataset correctly identified a mosaic of grassland with patches of wood pasture and parkland with scattered trees, but the ten-year-old freely available Priority Habitat dataset from Natural England identified the whole area as wood pasture and parkland with scattered trees, while OS mastermap identified the whole area as woodland. The TVERC data is particularly important for identifying patches of semi-natural grassland which are omitted in the Natural England data.

Table 2: Examples of collected Habitat Datasets

Habitat Datasets		
	National	**Local**
Habitat type	• Natural England Priority Habitats (2010) • CEH Land Cover Map (updated every year but less detailed) • National Forest Inventory • OS Mastermap and OS Greenspace (very detailed) CROME crop map (looking at whether agricultural land is grass land or crop land)	• TVERC Phase 1 Habitat and Land Use data • TVERC Priority Habitats • David Bradley ponds dataset, focused on historical and cultural aspects
Habitat condition	• National Designated Sites • UK CEH: Countryside Survey • Countryside stewardship • SSSI conditions (performed irregularly) • Agricultural land class	• Local designated sites (Local wildlife sites, Road verge nature reserves) • Thames Waterblitz • Soil carbon - Cotswold Farm Cluster etc • Floodplain meadows partnership, which identifies where floodplains are and what their condition is.

Table 3: Examples of collected Species Datasets

Species	
National	**Local**
• National Biodiversity Network (NBN) /Biological Records Centre – incorporates over 100 other datasets e.g.: ○ UK Butterfly Monitoring Scheme ○ National Moth Recording Scheme ○ British Trust for Ornithology surveys ○ Botanical Society of Britain and Ireland survey • Treezilla – citizen science urban trees • Ancient Tree Inventory (Woodland Trust) • Toad Crossings (Froglife)	• TVERC species dataset • Environmental Change Network (time series) • Wytham research database • UKCEH surveys and models (James Bullock / Francesca Mancini)

(4) METHODOLOGY FOR NATURE RECOVERY STRATEGIES

Alison Smith proposed the following seven-step methodology and gathered feedback from the participants.

1. **Identify target species**
2. Identify habitat requirements of target species: type of habitat(s); required vegetation species / prey species; structural features; minimum core area for breeding / feeding; connectivity requirements.

3. Where in Oxfordshire do these species currently occur, or have occurred recently?
4. Is there a viable self-sustaining population that is resilient to change?
5. Is their habitat connected into a network that links core areas?
    i. What condition is it in? (Intact, degraded, being restored, protected / unprotected)
    ii. If it was all restored, would there be enough to support the target species?
    iii. If not, what scope is there for converting other land into this habitat?
6. How does their habitat need to be managed? Is this compatible with the needs of other species? How can any trade-offs be managed?
7. Identify nature recovery project pipeline to recover species and their habitats.

DISCUSSION

(1) CHALLENGES OF DATA COLLECTION AND ANALYSIS

Participants raised the concern of **data availability**. For instance, whereas NBN is open access, this is not the case for TVERC and CEH. Nonetheless, TVERC data is arguably of better quality as it has been validated more rigorously.

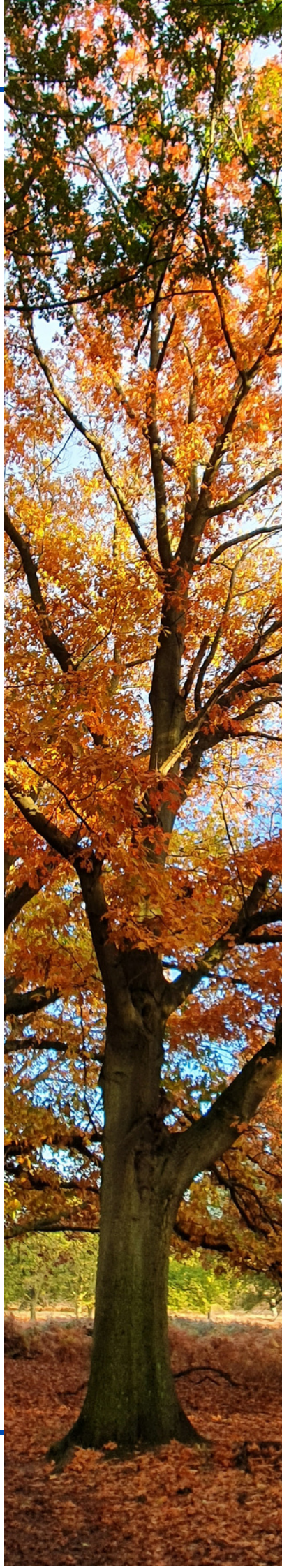
Data redundancy is also a point of attention. TVERC works closely so that their local datasets do not overlap with national datasets, such as NBN.

As mentioned above, **translating past records into the new UK Hab classification** is a challenge. Whereas 80% of the TVERC dataset can be translated quite straightforwardly, the remaining habitat categories will be more difficult.

County-wide data gaps have also been identified, such as reliable hedgerow data, with the three available datasets (CEH, OS and RPA) all having different degrees of inaccuracy. Mirroring an initiative launched by Wendy Morrison (Chilterns Conservation Board), using citizen science data to track hedgerows could be a way to fill that gap. We should also be looking at field boundaries more generally, including stone walls, rather than just hedges.

(2) ESTABLISHING A DIRECTION OF TRAVEL AND BENCHMARK

Participants discussed whether we could assess the level of nature depletion using the current datasets, or whether there were significant challenges. Given that TVERC and NBN are time series datasets covering the whole county, we should be able to establish an overall direction of travel for trends in species abundance and diversity / richness on a given site. However, we need to consider the appropriate scale at which to analyse species data. The State of Nature Report (2017) can provide a historical account of the decline at county scale, but when considering individual sites, we need to pay attention to the impacts of any gaps in data coverage.



Furthermore, participants questioned what baseline and future targets should be chosen. Although some advocated sticking to the Government target of reversing the decline of biodiversity by 2030, others argued that the target should not be one of "when" but of "what" level of biodiversity are we aiming for. This means finding a benchmark, such as a level of biodiversity (abundance, viability and diversity) achieved in the past.

The HERO team emphasised that the Local Nature Recovery Strategy (LNRS) will be established by the Local Nature Partnership, which will in turn be informed by data and analysis from HERO and other sources. Although Oxfordshire is quite advanced in preparatory work for the LNRS, the county should not pre-empt publication of detailed guidance from Defra expected in early 2022. Cecile Girardin reminded participants that the next workshop will discuss biodiversity indicators and setting baselines. Participants stressed that we need to engage with the wider community when developing the LNRS.

(3) SETTING A SPECIES-TARGETED APPROACH

Participants discussed the importance of setting **species targets** and monitoring species impacts, rather than only aiming to restore habitats. Some participants argued in favour of a purely habitat-based approach, which would be simpler and more feasible, given the limited availability of data on viable population sizes and habitat requirements of species. In addition, key tools such as the DEFRA Biodiversity Metric are mainly habitat driven. However, it was also argued that the assumption that if you "create the habitats, then species will come" is dangerous as it fails to consider limits on species dispersal and the importance of maintaining existing species populations throughout the whole life cycle, as well as the need to adaptively manage habitats and species populations in the face of future environmental and social change.

Identifying a short list of keystone species with a high number of historical records could be a good approach. We will aim to identify 2-3 species, for each of the 20 priority habitats. These species should be well-studied and indicative of the overall health of the priority habitat they inhabit, and therefore they can serve as a proxy for the impact on other dependent species. We will then aim to run a pilot test on one or two of these species to determine whether our proposed methodology for setting targets and developing a county-wide restoration strategy (see above) is feasible. A point was made on the difficulty to represent all species according to their ecosystem importance.

Although a restoration strategy should not be a popularity contest, focusing only on the most iconic and appealing species, a point was made concerning the importance of society buy-in. This could be considered when defining biodiversity metrics in the next workshops.

Participants questioned whether we should focus on species abundance or diversity data and targets, or both. Diversity, i.e., focusing on rare rather than common species, may be more conducive to gaining societal support, but both are important from the point of view of achieving and sustaining viable populations. Most species data is simply presence / absence data, but some abundance datasets exist, such as the Environmental Change Network data for Wytham and many of the academic datasets for Wytham, though some of these are very old. The State of Nature Report (2017) also has some abundance data.

NEXT STEPS

- Bruce Winney will introduce Camilla and Alison to the Nature recovery pilots leads in Cumbria and Northern Manchester, who were the only two pilots to adopt a species approach.
- Collaboratively identify a short list of 20 species.
- Identify biodiversity metrics in the next workshop, whilst keeping in mind the importance of using a malleable framework that speaks to the public.
- Continue to compile species and habitat datasets, including habitat condition / restoration status (from the database of restoration initiatives).
- Pick one or two species to test the feasibility of the methodology outline above.

ABOUT HERO

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THE OXFORD MARTIN SCHOOL

The Oxford Martin School was founded with the belief that this century, and specifically the next few decades, is a crucial turning point for humanity. Each research programme brings together academics from more than one field to create the collaboration needed for studying and tackling complex global issues. With more than 20 programmes, subjects are as diverse as the future of the global food system, geo-engineering, human rights of future generations and innovation in healthcare.

The School was founded in 2005 and was made possible through the vision and generosity of Dr James Martin (1933-2013). Today, its community of more than 200 researchers, from Oxford and beyond, are working to address the most pressing global challenges and opportunities of the 21st century.