WEST OXFORDSHIRE DISTRICT COUNCIL

Supplement for

EXECUTIVE - WEDNESDAY, 10TH SEPTEMBER, 2025

Agenda No Item

11. **West Oxfordshire District Council response to the draft Oxfordshire Local Nature Recovery Strategy (LNRS) (Pages 3 - 250)**

Purpose:
To consider the endorsement of the Oxfordshire Local Nature Recovery Strategy for publication.

Recommendation:
That the Executive resolves to:

1. Endorse the Oxfordshire Local Nature Recovery Strategy for publication by Oxfordshire County Council.

Oxfordshire's Local Nature Recovery Strategy

Final version November 2025

OXFORDSHIRE COUNTY COUNCIL

Statement
by Oxfordshire County Council

In August 2023, Oxfordshire County Council (OCC) was appointed as the 'Responsible Authority' to lead the preparation of our Local Nature Recovery Strategy (LNRS).

Councillor Judy Roberts

Cabinet Member for Place, Environment and Climate Action, Oxfordshire County Council

OCC developed a partnership approach to this, working closely with our Supporting Authorities (Cherwell District Council, Oxford City Council, South Oxfordshire District Council, Vale of White Horse District Council, West Oxfordshire District Council and Natural England) and a partnership of local nature recovery organisations. This partnership, led by OCC, engaged widely with local communities, environmental bodies, and other stakeholders to ensure that the strategy was shaped by local insights, expertise, and knowledge.

Local contributions have been invaluable in identifying priority areas for nature recovery, important species that need bespoke actions, and recommending which practical actions could have the greatest impact.

In addition, this strategy directly contributes to the national effort by the UK Government to deliver the 25 Year Environment Plan and the Environment Act 2021.

Our vision is clear: to achieve a well-connected, biodiversity-rich, network of nature that is resilient into the future, restored for the health and wellbeing of future generations, and for nature's own sake.

The Council has long recognised that the health of our natural environment is fundamental to the health and wellbeing of people and communities within the county. Protecting and enhancing biodiversity is not just important for the environment itself but also for the benefits and resilience it can bring for people, communities, businesses, and the wider economy.

In alignment with this vision, OCC, the Supporting Authorities, and the partnership of organisations who contributed to the LNRS have committed significant resources and effort to ensuring that our strategy is robust, evidence-based, and responds to the priorities identified by local people.

It is now crucial that people and organisations across

Statement
by Oxfordshire County Council

Oxfordshire work together to produce tangible improvements for nature in the county. Actions may include creating or enhancing habitats, improving connectivity between habitats and green spaces, and undertaking projects focused on species recovery.

This strategy aligns with key County Council policies and initiatives including our nationally-recognised programme of climate action work, our flood risk mitigation work, and contributes towards wider objectives in our county.

In future, the strategy will be reviewed and republished to adapt its recommendations to changes in the local environment. Over time, we and other organisations and individuals will be delivering meaningful changes on the ground in Oxfordshire and this County Council is committed to leading by example.

As we all move forwards into collaborative delivery of this strategy, it will be crucial to continue working closely with our communities, farmers, land managers, local businesses, and nature recovery organisations.

Together, we can achieve a resilient network of nature in Oxfordshire that supports wildlife, reverses the loss of local biodiversity, contributes towards national and global commitments, and produces tangible improvements for nature and for the quality of life of people in Oxfordshire. We know what needs to be done, let us not miss this opportunity to invest in nature, restore biodiversity, and meaningfully benefit all future generations to come.

Councillor Judy Roberts

Cabinet Member for Place, Environment and Climate Action, Oxfordshire County Council

Foreword

Chalk and limestone grasslands, extensive open wetlands, and scrubby wet woodland are some of the many fragile, fantastic habitats found in Oxfordshire. Brush through a flower-packed grassland on a sunny summer's day and you might be lucky enough to see an Adonis Blue or a Duke of Burgundy butterfly rise into the air.

Restoring, linking, and expanding these now-rare habitats are just some of the priorities in this Local Nature Recovery Strategy. If we're successful, Oxfordshire will have more wonderful wildflower meadows, clean freshwater habitats, and other habitats which, with luck, will enable the wildlife that depend on them to thrive across our County.

Successfully restoring populations of species, like these butterflies and the habitats that support them can be our Butterfly Effect — a series of actions, that together, add up to significant worldwide change.

Oxfordshire's Local Nature Recovery Strategy (LNRS) is part of an LNRS latticework across England, which aims to halt the decline of wildlife in this country by 2030. That target, in turn, is Westminster's contribution towards a global mission to stop biodiversity loss. The worldwide decline of biodiversity is the story of a billion local losses every day. Turning round the fate of our animals, plants, and fungi, including the 800-900 species which are known to be at risk from local extinction here in Oxfordshire is our responsibility to the world.

To improve the state of nature in Oxfordshire, the county needs to restore around thousands of hectares of "priority habitat" and create around tens of thousands of hectares of semi natural habitat by 2030. The types of habitat and their suitable locations are driven by the priorities set by those who have engaged with the LNRS, overseen by ecologists, and using evidence from an understanding of soil data and geology.

Richard Benwell is chair of Oxfordshire Local Nature Partnership and chief executive of Wildlife and Countryside Link. Previously he has been policy adviser to the Secretary of State at Defra, and worked on policy and advocacy at WWT and RSPB.

Matt Whitney is the Manager of Oxfordshire Local Nature Partnership and has worked closely with the Local Nature Recovery Strategy whilst developing initiatives across Oxfordshire focusing on delivering nature's recovery.

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Foreword

This combination of knowledge has helped the LNRS to create a focused set of priorities and, where particularly suitable, a map of focused opportunity areas showing a county-wide route that could create resilient, connected ecosystems and save threatened wildlife. It is also driven by common sense and pragmatism, identifying priorities that work for communities, businesses, and local people as well as nature.

After the final version of the strategy is published in 2025, delivering that much environmental change in Oxfordshire by 2030 will be a huge challenge.

Oxfordshire's Local Nature Partnership has identified a funding gap of at least £800million to recover nature in Oxfordshire. Closing that gap will need much more public investment in nature-recovery as well as private investment. The ONLP and the LNRS hope that the Government will see the overwhelming case for investment in those who are delivering Local Nature Recovery Strategy priorities as a great way to rebuild natural infrastructure with the support of local communities. There's also a huge need for more Government support to develop people and groups who can provide green skills and nature-positive planning, so that areas across England can plan ahead intelligently and make space for nature alongside the need for development and wildlife-friendly food production.

Even with the most ambitious Government action, delivering the LNRS priorities will need collaborative action from individuals, communities, and businesses across Oxfordshire. Nature's recovery simply cannot succeed without farmers being supported to lead the charge towards regenerative, nature-friendly land management. Similarly, recovery will never get there without investment from local businesses or without action by local communities and individuals engaging with and doing their bit for nature where they live and work.

Whether you're reading this as a home-owner wondering whether to rewild your garden, as a landowner considering the shift to regenerative management, or as a business owner considering how to create a legacy, we must all work together to deliver the LNRS's biodiversity priorities.

It's called a "Local Nature Recovery Strategy", but that's really just the beginning. If we deliver the priorities in these pages, the results won't just be for nature, they'll strengthen our economy, help mitigate and improve Oxfordshire's resilience to climate change, boost public health, and secure an improved, healthy, and functioning environment to support future generations. If we succeed, the benefits won't just be local, they'll be Oxfordshire's answer to international environmental action. Please join us in taking rapid, decisive action for nature in Oxfordshire. Let's bring our County to life

Richard Benwell,
Chair of Oxfordshire Local Nature Partnership (OLNP)

Matt Whitney,
Manager of Oxfordshire Local Nature Partnership (OLNP)

Executive summary

The truth is: the natural world is changing. And we are totally dependent on that world. It provides our food, water and air. It is the most precious thing we have and we need to defend it
– Sir David Attenborough.

Oxfordshire's LNRS identifies local areas that need targeted resource driven towards them in order to create a resilient network of nature. Currently, the most important habitats are fragmented and are negatively impacted by pollution, agricultural intensification, and development, leading to a decline in the local environment and species. Additionally, many habitats are falling out of management which will worsen the situation for local biodiversity. This LNRS proposes that Oxfordshire needs to target local resources towards the delivery of a well-connected, biodiversity-rich network of nature that is resilient to benefit future generations and for nature's own sake. The LNRS identifies key locations to deliver various nature recovery actions on a map of Oxfordshire and also lists countywide actions that need to be delivered all across the county. There are actions for everyone to contribute towards, whether you have a house, garden, local park, or farm.

What's in this document?

This document gives context to the strategy, describes biodiversity in Oxfordshire, introduces what LNRSs are and why they are needed. The document then describes key pressures that threaten biodiversity, actions needed to recover nature and wildlife, and points to the full list of LNRS-recommended actions. Please read this document alongside the other three parts of the LNRS which, together, make up the strategy. The other three parts of the LNRS are the 'Statement of Biodiversity Priorities', the 'Species Priorities List', and the 'Local Habitat Map'.

Executive summary

A healthy natural environment provides the air, water, food and shelter that humans are dependent on. It also mitigates the impacts of extreme weather events, stores carbon, pollinates crops, regulates pests, and offers space for people to enjoy nature and exercise. Many of these benefits have been lost and are still being lost as the environment continues to degrade. To halt and reverse these declines, we must work together to create a more connected, resilient mosaic of quality habitats. Those who deliver these actions are not only helping the environment and wildlife for nature's own sake. They are also providing fundamental public goods to benefit the health and wellbeing of us all.

Oxfordshire is fortunate to have many people and organisations who care deeply for nature and understand the wider benefits of a healthy environment. Over 200 nature recovery groups and organisations, as well as many landowners and farmers, are already making a difference daily and have been leading the way to recover species populations and to improve habitats for wildlife. The LNRS is designed to empower those who are already taking action as well as to help inform project creation and funding opportunities for those who are getting ready to take action.

Use this LNRS to identify which actions you can take, and together through collaborative action, Oxfordshire can create a resilient, connected, and functioning network of nature, restoring biodiversity for the health of nature, people, and future generations.

Acknowledgements

This page shows the 'LNRS partnership' who, led by Oxfordshire County Council, prepared the LNRS for Oxfordshire. Since 2023, these organisations have consistently contributed their time, expertise, and enthusiasm to develop Oxfordshire's Local Nature Recovery Strategy. Collectively referred to as the 'LNRS partnership' within this document, this refers to all the authorities and organisations represented on this page. **The LNRS could not have been created without them and their support.**

Oxfordshire County Council
Cherwell District Council North Oxfordshire
West Oxfordshire District Council
Chilterns National Landscape
Vale of White Horse District Council
South Oxfordshire District Council
Listening Learning Leading
Oxford City Council
Cotswolds National Landscape
Wild Oxfordshire
Berkshire Buckinghamshire & Oxfordshire Wildlife Trust
Natural England
North Wessex Downs National Landscape
Environment Agency
Forestry Commission
NFU
CLA
Leverhulme Centre for Nature Recovery
eci
Agile Initiative
Oxford Martin School
University of Oxford
OxLEP driving economic growth
Thames Valley Environmental Records Centre
The CAG Project Community Action Groups
OLNP Oxfordshire Local Nature Partnership

Oxfordshire County Council would also like to thank the thousands of additional people and organisations across Oxfordshire, not displayed here, who also contributed significant time and energy into the LNRS through engagement, contributions to the project, data-sharing, and more.

Contents

This page aims to help you navigate this document to find the key information that is relevant for you. You can either scroll to the relevant page(s) or you can click directly on these headings and the document should take you to that section.

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Where are we now?

Biodiversity in the UK and Local Nature Recovery Strategies (LNRS)

Introduction

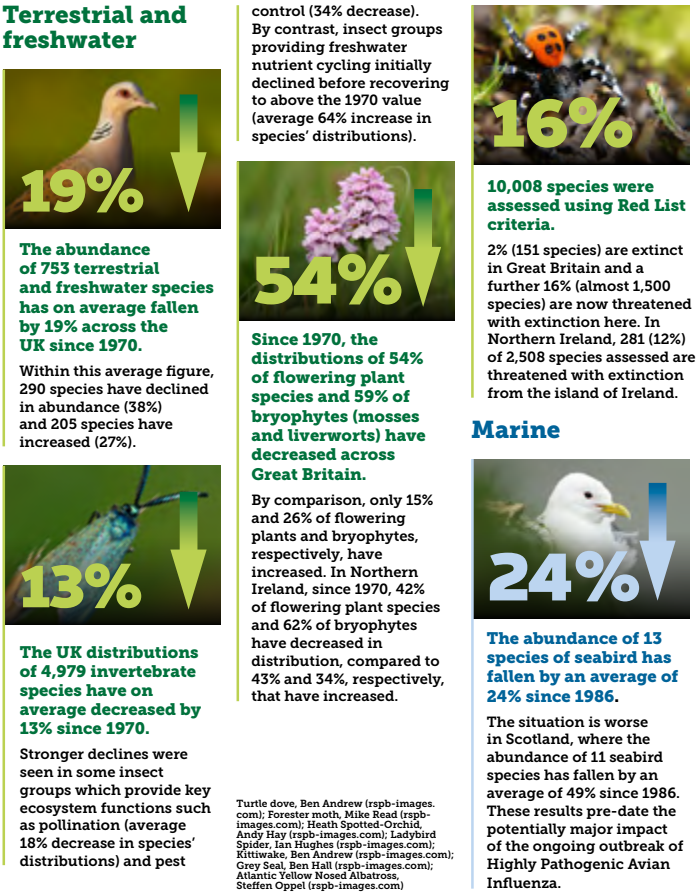
'Biodiversity' refers to the variety of all life forms, including plants, animals, fungi, and micro-organisms. A landscape that is rich in healthy biodiversity provides the essential necessities for the survival of humans and wildlife, from fresh water, clean air and climate regulation to food, medicines and more. These benefits do not come from individual species but from a rich variety of species and functioning habitats working together.

Global Biodiversity status

On average, countries across the world only have an average of 75% of their biodiversity remaining since recording began. Unfortunately, the UK ranks in the bottom 10% of countries meaning that we are among the world's most nature depleted countries.

UK biodiversity decline

According to the State of Nature 2023 report, nearly one in six of the UK's species are at risk of extinction (of those which are sufficiently well recorded) and since 1970, the UK has experienced a 19% decline in the abundance of species. England itself has experienced a 32% decline in species numbers. This decline in biodiversity is primarily due to habitat loss and fragmentation resulting from human land use competing with nature including intensive agriculture and development. The report recognizes the need for a different approach, one that enables people and nature to live well together.



State of nature 2023, p4. A description of trends in biodiversity over time

19%

Across the UK species studied have declined on average by 19% since 1970.

16%

Nearly one in six species are threatened with extinction from Great Britain.

Government initiatives

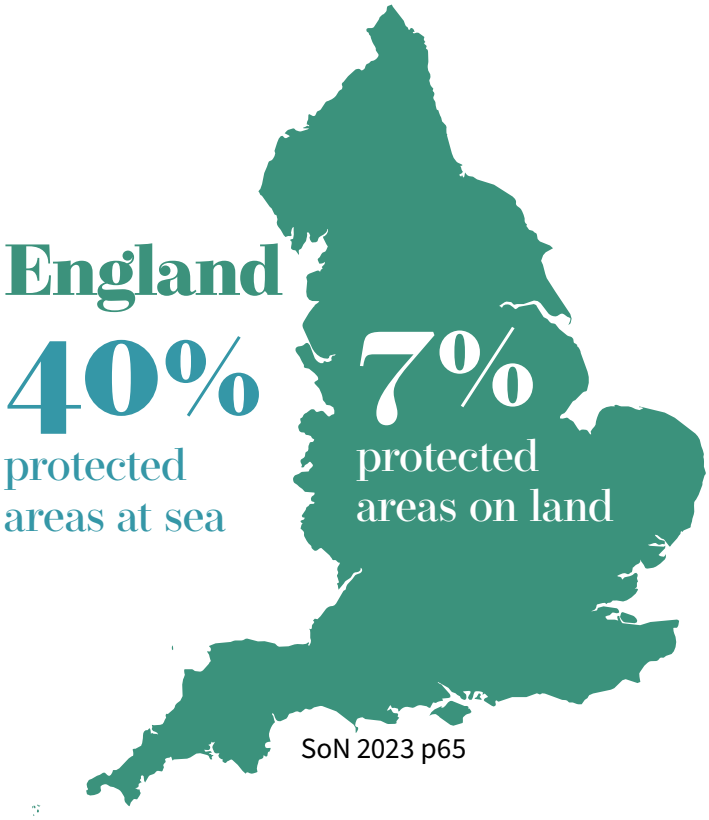
The government's message is becoming louder, that the UK must act to reverse biodiversity losses. This means that the LNRSs are being created across England at an exciting time, a time where policy and funding are beginning to come together at a national level in recognition of the biodiversity crisis, alongside commitments and targets for positive change. This presents an exciting opportunity for nature and wildlife in the UK.

For example, projects in England have recently been funded by Defra and Natural England to deliver landscape-scale change including restoring biodiversity across 99,000 hectares of landscape including the West Midlands, Cambridgeshire, the Peak District, Norfolk, and Somerset. Projects in Oxfordshire have also had two recent successes in their bids for funding to deliver Landscape Recovery projects.

The two Landscape Recovery projects in Oxfordshire include the Evenlode landscape recovery project along the Evenlode river, and the second is the Ock and Thame landscape recovery project. These projects will focus on a range of benefits including delivering high quality habitat networks with high carbon storage on low productivity land helping to create financially and environmentally sustainable farming systems and local environment. The projects will be delivered by local farmers and land managers in partnership with local people and conservation organisations to focus on outcomes such as clean and plentiful water, healthy soils, and thriving plants and wildlife.

Legislation and Implementation

Local Nature Recovery Strategies (LNRS) were introduced by the UK government through the Environment Act 2021. Authorities in England were asked to start developing these in June 2023 and to publish these online in 2025. The legislation requires authorities all across England to create a list of priorities to achieve in each area which will be developed through engagement and consultation activities with local people and organisations. Alongside the list of priorities to achieve for both habitats and species, LNRSs are asked to create a map of their area to highlight areas of particular importance where habitats should be prioritised for creation or improvement work to benefit local biodiversity.



SoN 2023 p65

Nature Recovery

The term 'nature recovery' can be interpreted in a range of ways. For the LNRS, 'nature recovery' refers to the process of enhancing or creating habitats through actions on the ground. These actions, if delivered, would enable wildlife to recover in number and abundance and would deliver benefits for local people like helping to mitigate flood risk. This is what the LNRS means by nature recovery work. The LNRS has a certain level of 'scope' (things that it has the legal power to achieve) and LNRSs are expected to contribute towards nature recovery by creating a list of focused priorities and actions to achieve in the local area, and to map where those actions should be taken in the county to provide the greatest benefits for biodiversity and the wider environment.

Oxfordshire County Council's Role

In June 2023, Oxfordshire County Council was appointed by Defra as the 'Responsible Authority' for leading the production of the first LNRS for Oxfordshire and were tasked with leading the preparation of the strategy. Oxfordshire County Council then set up the 'LNRS Partnership', a set of organisations shown on page 8 who closely supported and shaped the development of the strategy and gave oversight throughout its preparation. Defra and Natural England provided statutory guidance to responsible authorities showing the steps that they expect LNRS production to follow (see Figure 1).

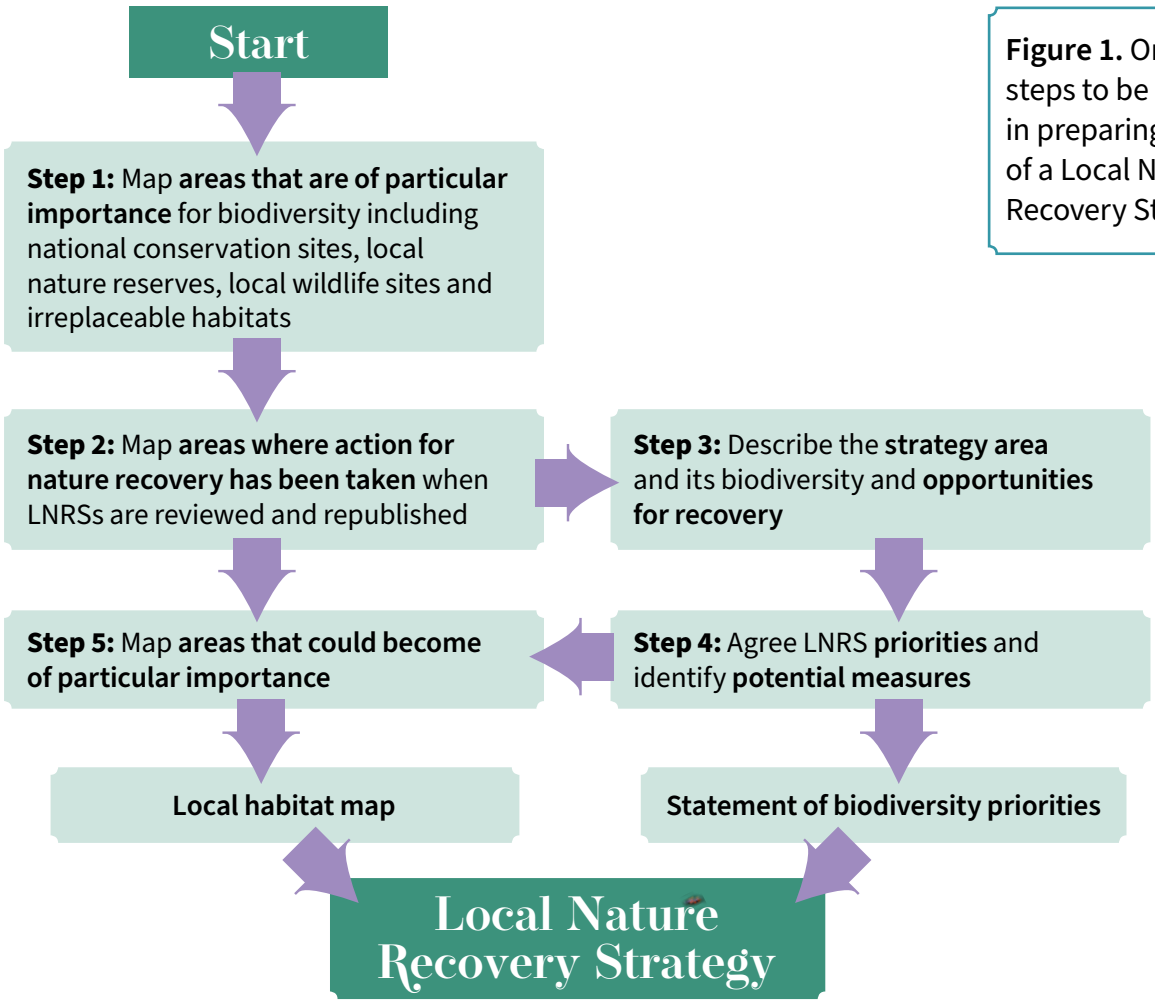


Figure 1. Order of steps to be followed in preparing contents of a Local Nature Recovery Strategy

What is the difference between the draft LNRS and the final LNRS?

The LNRS is expected to help people and organisations across the county to co-ordinate nature recovery efforts and funding opportunities. The purpose of the LNRS is to indicate which areas of the county need which targeted actions to create a create a bigger, better, and more joined up network for biodiversity to recover. The Local Nature Recovery Strategy (LNRS) has created four key elements which, together, make up the strategy. These are:

A Description of the Strategy Area (this document)

- A written description of biodiversity in Oxfordshire, the opportunities, and the pressures on biodiversity with a summary of what needs to be done.

A Statement of Biodiversity Priorities

- A written list of the most important outcomes (priorities) to achieve for biodiversity in Oxfordshire and a list of actions (potential measures) that would need be taken to achieve the priorities.

A Species Priorities List

- A written list of species that need additional, bespoke actions above and beyond the general habitat improvements on the Statement of Biodiversity Priorities (above). This species priorities list states the specific actions needed to recover particular individual species or groups of species.

A Local Habitat Map – an online and interactive map tool which shows:

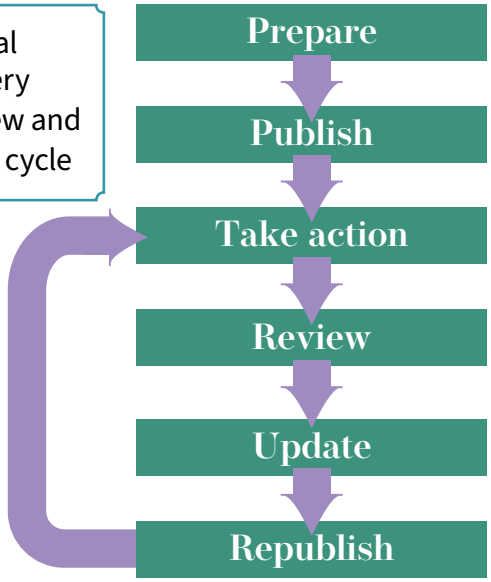
- The existing areas of Oxfordshire that are particularly important for biodiversity
- Areas that could become particularly important for biodiversity. These are priority locations for creating a nature recovery network in Oxfordshire and the LNRS has mapped a range of habitat creation and enhancement priorities as well as some species-specific actions to deliver in these locations.
- Some select, wider biodiversity information about Oxfordshire to support people and organisations to develop nature recovery projects that can maximise wider benefits too, such as natural flood management.

The LNRS is expected to help people and organisations across the county co-ordinate effort and funding opportunities towards the delivery of a bigger, better, and more joined up network for nature. Some actions will be spatially targeted to key areas in the county whereas other actions will be important for as many people as possible to deliver across the county to improve the landscape and environment as a whole.

Can LNRSs be changed in future?

Defra have outlined a process of preparation and publication for Local Nature Recovery Strategies. They have also outlined a review and republication process to update these strategies in the future (see Figure 2). Once a strategy is published, the authority has a period of between 3 – 10 years before the Secretary of State is expected to ask all authorities to review and republish the strategy as part of a national review and update. During the 3 – 10 year interim period, the maps and documents are not typically allowed to be changed.

Figure 2. Local nature recovery strategy review and republication cycle



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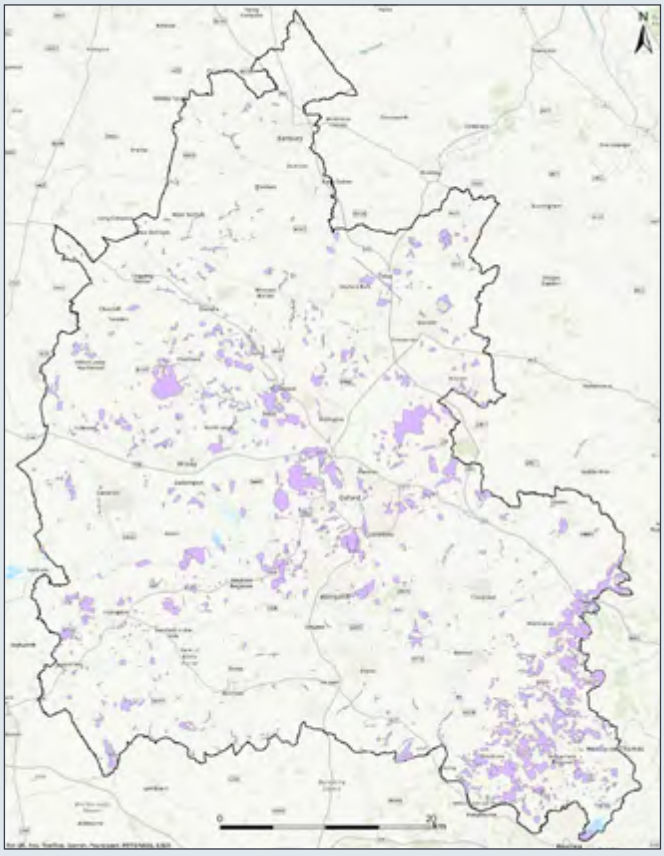
Biodiversity in Oxfordshire

Oxfordshire's biodiversity: a summary

Oxfordshire covers 260,595 hectares of southern England and is the most rural county in the South East (Oxfordshire Joint Strategic Needs Assessment 2023). The State of Nature in Oxfordshire report (2017) describes the county as having **"a diverse and interesting geology, criss-crossed by eight river systems, that create a gentle yet complex landscape. As such, it supports a variety of habitats, from fragrant chalk grasslands scented with wild thyme, to fungi-strewn beech woods; from pockets of damp, reedy fen and acid grassland to marshy meadows full of birds."** Throughout the document this variety of habitats, species and the landscape in which they are found is referred to as 'nature' and the collective variety of our animals, plants, fungi, and microorganisms is often referred to as 'biodiversity'.



However, when we map out the locations in Oxfordshire that Government consider to be 'of particular importance for biodiversity' a fragmented picture can be seen. The existing habitats in the county are small, separated, not necessarily in good condition, and show that some areas contain far more space dedicated to nature and biodiversity than others. In total, only 6.5% of Oxfordshire (16,866 hectares) currently meets the criteria for 'areas of particular importance to biodiversity'. Please see the map on the next page and see Appendix A for more detail about how this map was made.

You can read full details about how the areas of particular importance were mapped by Thames Valley Environmental Records Centre (TVERC) on the LNRS webpage. Sites which could be mapped included National Nature Reserves (NNRs), Local Nature Reserves (LNRs), Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Local Wildlife Sites (LWS) and areas of 'irreplaceable habitat' (defined in the National Planning Policy Framework) including lowland fen, ancient woodland, and ancient and veteran trees. Some of these types of sites overlap with each other (i.e. there may be ancient woodland or fen sites within Local Wildlife Sites or SSSIs).

View large map

Of the total areas mapped, the table below shows that 4.3% (11,197.4 hectares) of the county consists of local and national conservation sites (NNRs, SACs, SSSIs, LNRs, and LWSs). 3.7% (9,624.3 hectares) classifies as irreplaceable Ancient Woodland & Lowland Fen habitat, much of which is contained within existing local or national conservation sites. In addition, 0.3% (894.5 hectares) of the county is covered by patches of Wood Pasture and Parkland which contain ancient or veteran trees and there are also an additional 1,700 ancient and veteran trees recorded outside of wood pasture and parkland which cover a further 0.06% (148.4 hectares) of the county, However ancient and veteran tree records are not yet comprehensive across the country and are regularly being updated across England as more trees are being recorded.

Site type	Area (ha)	% Oxfordshire
Local and national conservation sites	11,197.4	4.3%
Irreplaceable habitat: Ancient woodland and lowland fen	9,624.3	3.7%
Irreplaceable habitat: Ancient and veteran trees	148.4	0.06%
Irreplaceable habitat: Wood pasture and parkland with ancient and veteran trees	894.5	0.34%
Total area (accounting for overlaps)	**16,866.1**	**6.5%**

Table 1. The values in this table represent the total area of each site or habitat type, and the total area is presented accounting for any overlaps

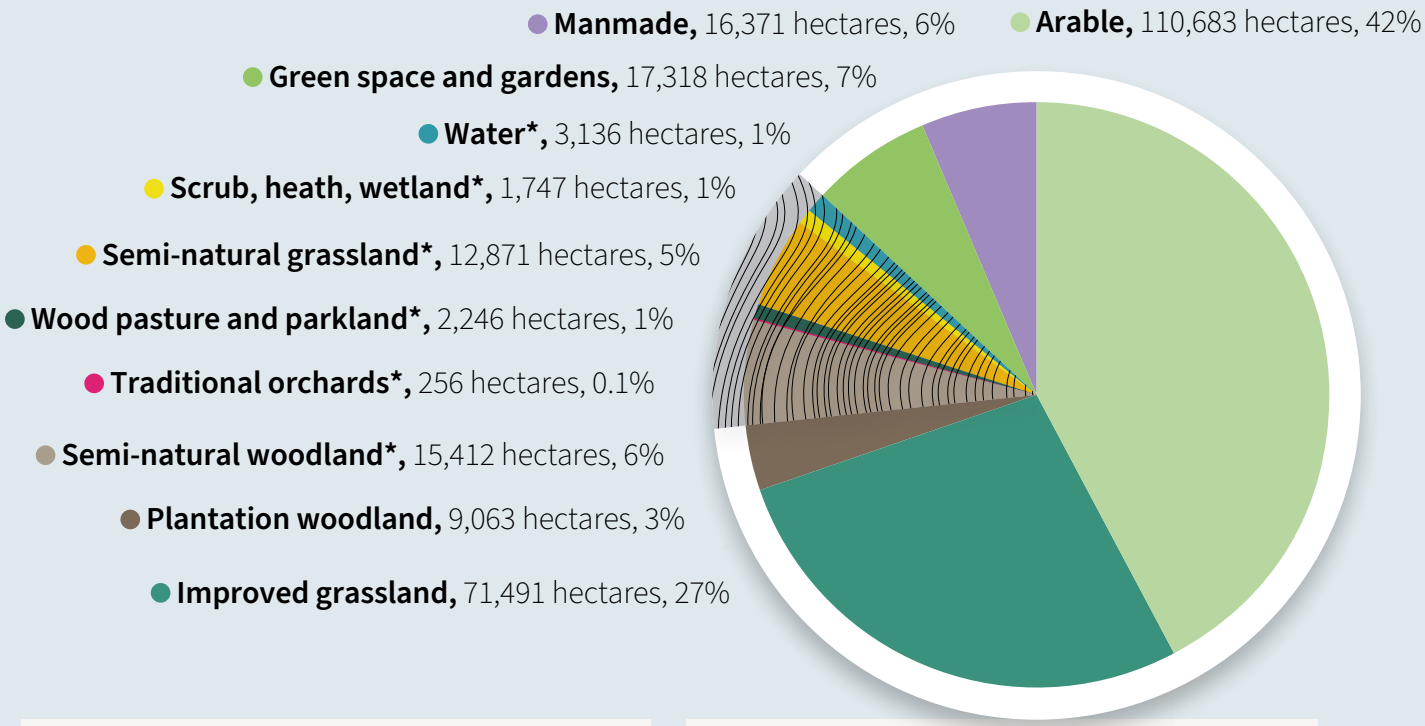
Of all of the 6.5% of mapped areas that are particularly important for biodiversity, a third of the total area (5,693 hectares) is currently not protected by any national or local designation and exists outside of a conservation reserve or area. The above map presents an updated view of the core biodiversity-rich locations in Oxfordshire and was specifically requested by Defra to act as a starting point from which LNRSs were expected to plan a bigger, better, and more joined up network of nature in Oxfordshire.

There are many further areas across Oxfordshire which experts also consider to be important or irreplaceable which don't currently meet government criteria to be mapped as an 'area of particular importance for biodiversity', and experts were invited to share their knowledge to be incorporated into the LNRS's vision for the bigger, better, more joined-up network.

Oxfordshire's land use and natural resources

The map on the previous page describes a very small percentage of the county and there are many habitats and types of land cover (farms, buildings, golf courses etc) which cover the rest of the county. This section describes the types of habitats and land use (land cover) which can be found across Oxfordshire's 260,595 hectares.

(Source: Agile Nature Recovery Map of Oxfordshire, University of Oxford)



Sub-total of area that is *semi-natural, 35,668.29 hectares, 14%

Oxfordshire total area, all landcover types 260,595 hectares, 100%

Agricultural land

The majority of Oxfordshire's land (73%) is used for agriculture and much of that area is, and has been, intensively farmed using a significant amount of chemical inputs to produce crops and food. Of the 73%, 43% is arable, 27% as improved grassland, with 3% under other classifications. However, both arable and grassland fields can make space for nature, arable by creating margins, buffer strips, or permanent areas that are set-aside for nature, and grassland by managing grazing and creating areas of habitat like in-field trees and ponds in addition to enhancing the species diversity of the grassland. In this way, farmland can contain space for nature that complements their main purpose of food production, and there have been changes in farming practices with large numbers of farmers moving towards schemes that benefit nature alongside food production as part of their business.

Managed sensitively, productive farmland can support a wide range of wildlife and offer corridors that connect habitats across the county. Agricultural practices to improve soil organic matter can both increase the biodiversity of the soil and store additional carbon. Additionally, having wildlife and habitats on farms can provide pollinators, integrated pest control options, wind-breaks, and shade which can all benefit the production of food.

Urban and settlements

About 6% of Oxfordshire is covered by manmade 'built development' including houses, buildings, bridges, roads, railways, sealed surfaces and so on. A further 7% is domestic gardens and urban greenspace such as playing fields and allotments. Together this means 13% of the county is currently used as homes, gardens, places of work, and other buildings and infrastructure.

The area used for homes is expected to grow in Oxfordshire. Growth has already been underway here in recent years. In the 6-years between 2014 and 2020, 2,710 hectares of sealed surfaces (e.g. paved areas, car parks, driveways) were created. In comparison, in the 6-years between 2017 and 2023, just 0.4 hectares of lowland heathland were restored, 2.3 additional hectares of reedbed were created, 7.4 hectares of traditional orchards were created, and woodland cover increased by 0.2% (about 520 hectares).

Semi-natural habitats

'Semi-natural habitats' are those which have most of their ecological processes and biodiversity intact, although many of these have still been altered by human activity and may be dependent on ongoing management. 14% (about 36,500 hectares) of Oxfordshire is classified as semi-natural habitat. Of that 14%, 6% (about 15,500 hectares) is semi-natural woodland, and 8% (about 20,800 hectares) is other semi-natural habitats including flood plain meadows, chalk grassland, parkland with scattered trees, wetland, scrub, heath, and a tiny area of traditional orchards (see a more detailed chart on the next pages). There are also around 17,000km of hedgerows and lines of trees along field boundaries.

Woodland

As of 2020, woodland covered 9.2% (about 24,000 hectares) of Oxfordshire, just under the average 9.9% woodland cover for England (data from TVERC). Approximately one third of Oxfordshire's woodland is plantation (woods which have been planted to grow timber and so are not 'semi-natural habitat'). Many of Oxfordshire's woodlands are small – 38% are less than 10 hectares in size, indicating a scattered and fragmented habitat type. 3.4% of all woodland in Oxfordshire is ancient (about 11,500 hectares). Of that ancient woodland area, just over 2,500 hectares are plantations on ancient woodland sites (PAWS).

Carbon storage

It is estimated that 23 million tonnes of carbon is stored in Oxfordshire's soils and vegetation, and that in addition 115,000 tonnes of carbon is sequestered each year by healthy soils and vegetation. A further 3.5 million tonnes of carbon would be sequestered between 2020 and 2050 if there was no further change in land-use or ecosystem condition (Pathways to Zero Carbon Oxfordshire). By creating more habitat, there is opportunity to store even more carbon.

Minerals

The geology of the County has enabled a thriving minerals industry to develop, providing sand and gravel from the river valleys, soft sand in the south west of the County, and limestone and ironstone in the north and west. A survey in 2009 found that 78% of sand and gravel and 51% of crushed rock produced in the county is used in Oxfordshire. Many large areas of habitat creation have or will be delivered through the restoration of minerals sites in the County, including through the Lower Windrush Valley Project.

Definitions relevant to pie-chart and the above section:

- **Arable:** land used for growing and producing crops, also includes intensive orchards.
- **Improved grassland:** grasslands for pasture that have been highly modified through reseeding and frequent fertiliser application. Typically over 50% perennial ryegrass, white clover and other high-productivity agricultural species. Also includes unidentified natural surface.
- **Plantation woodland:** coniferous, mixed and broadleaved plantations, unknown woodland and felled woodland
- **Semi-natural grassland:** acid, calcareous and neutral grassland, purple moor grass and rush pastures, unidentified semi-improved grassland (including 'rough grassland' from OS Mastermap), 'marshy grassland' (some of which is just improved grassland on the floodplain), poor semi-improved grassland, tall herb and fern, bracken, and ephemeral vegetation
- **Scrub, heath and wetland** also includes a few hedgerows which are on the TVERC habitat map (typically because this has been provided by a restoration project; most hedgerows are not included)
- **Water:** rivers, streams, canals, drainage ditches, lakes, ponds and reservoirs
- **Greenspace and gardens:** domestic gardens, parks, cemeteries, churchyards, playing fields, allotments, amenity grass, grassed roundabouts and verges
- **Man-made:** buildings, sealed surfaces, roads, rail, tracks, bare ground, landfill, quarry, Open Mosaic Habitat on Previously Developed Land (a priority habitat comprised of a mosaic of early successional habitats), sand, and new development

Important habitats, species and designated sites in Oxfordshire

The value of some habitats in Oxfordshire are recognised with a range of statutory and non-statutory designations which aim to protect the county's best and exemplar spaces for nature.

National landscapes

Oxfordshire contains parts of three National Landscapes which cover about 25% of the county and are designated to conserve and enhance their outstanding natural beauty. Oxfordshire's three National Landscapes are:

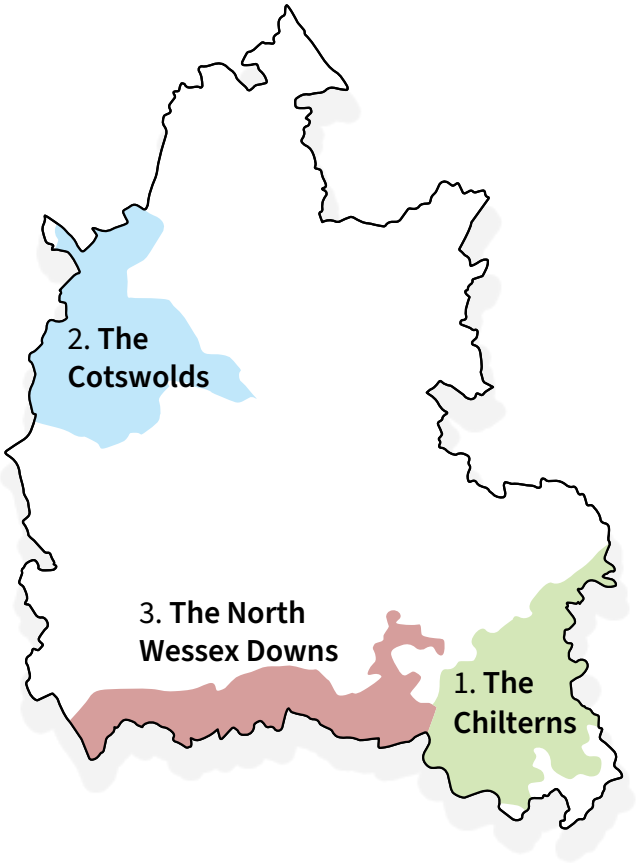
1. **The Chilterns** National Landscape. Oxfordshire is home to 28% of the Chilterns National Landscape (233km^2 which covers 8.9% of Oxfordshire). This area is well known for its ancient woodlands, chalk downland, chalk streams and scrub communities (including important juniper scrub).

2. **The Cotswolds** National Landscape. Oxfordshire is home to 12% of the Cotswolds National Landscape (248km^2 which covers 9.5% of Oxfordshire). This area is well known for areas of open High Wold, the Evenlode and Windrush river valleys, the Wychwood Forest, areas of unimproved limestone grassland and floodplain meadows. A good population of farmland birds still exists on arable land in this area.

3. **The North Wessex Downs** National Landscape. Oxfordshire is home to 186km^2 of the North Wessex Downs National Landscape (covering 7.2% of Oxfordshire). This area is well known for chalk grassland, chalk streams, populations of farmland birds and veteran trees.

World heritage sites

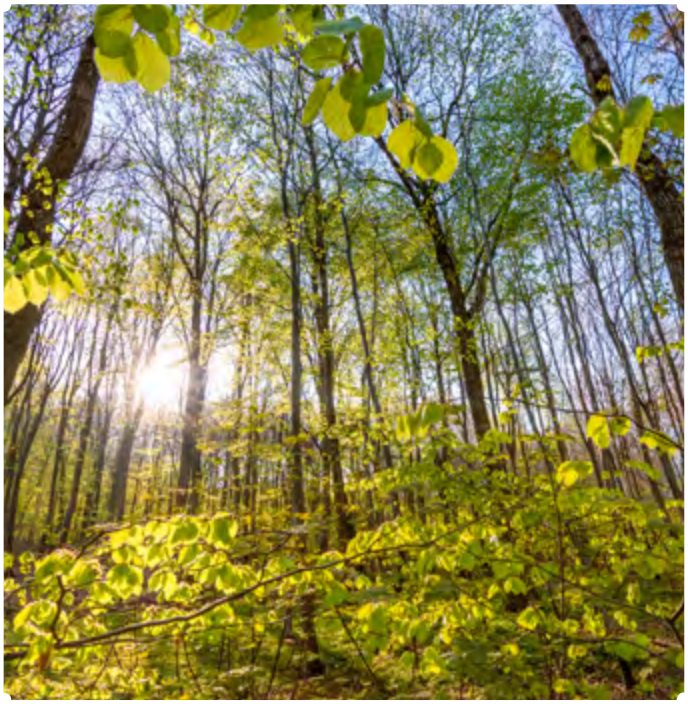
Blenheim Palace and Park was awarded World Heritage Site status in 1987 and is one of only 17 registered sites in England (one of 30 in the UK). Blenheim Park also contains an important SSSI, containing one of the finest areas of ancient oak-dominated pasture woodland in the country with lakes of regional importance for breeding and wintering birds.



Special Areas of Conservation (SAC)

Oxfordshire has seven internationally designated Special Areas of Conservation (SAC) which fall partly or entirely within the county. SACs are designated where they support internationally important habitats and/or species and the sites receive strict legal protection.

- **Aston Rowant:** One of the best remaining examples in the UK of lowland juniper scrub on chalk.
- **Chilterns Beechwoods:** Beech forests on neutral to rich soils, stag beetle *Lucanus cervus*, dry grassland and scrublands on chalk.
- **Cothill Fen:** Largest surviving example of alkaline fen in central England, alder woodland on floodplains.
- **Hackpen Hill:** Dry grasslands and scrubland on chalk with a significant population of early gentian *Gentianella anglica*.
- **Hartslock Wood:** Yew woodland and chalk grassland supporting one of only three UK populations of monkey orchid *Orchis simia*.
- **Little Wittenham:** One of the best studied great crested newt *Triturus cristatus* sites in the UK.
- **Oxford Meadows:** Lowland hay meadows including the larger of only two known sites in the UK for creeping marshwort *Helosciadium repens*.



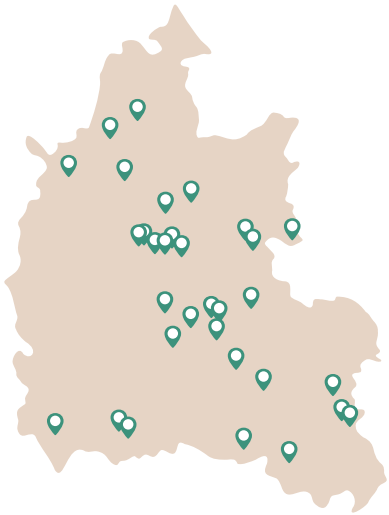
Sites of Special Scientific Interest (SSSIs)

There are 113 Sites of Special Scientific Interest (SSSI) in Oxfordshire that cover a total of 4475.7 hectares (which is 1.17% of Oxfordshire). These SSSI sites are designated as important nationally for their wildlife or geology. 50.48% of Oxfordshire's SSSIs are in favourable condition (by area), with 47.45% in favourable recovering condition. 0.99% SSSIs by area are considered to show no change, with 0.76% declining and 0.19% destroyed (Natural England 2024). A list of the 113 SSSIs can be viewed in the TVERC reports on the County Council LNRS webpage.

add link

Local Wildlife Sites (LWS)

Local Wildlife Sites (LWS) are sites identified at a County-wide level for their wildlife-rich habitats, or particularly important species. All Local Wildlife Sites that meet the necessary criteria are designated; this differs significantly from the process of identifying SSSIs, as the latter are a representative sample of sites. Local Wildlife Sites don't receive legal protection but are identified and protected through the planning process. Like SSSIs, LWS are surveyed on a rolling programme, with most sites being reassessed approximately every 10 years.



Between 2005 and November 2024, 36 sites were removed and 94 sites were added to the total number of Local Wildlife Sites. At the latest update in 2024, Oxfordshire had 399 Local Wildlife Sites (6670.4 hectares which is 2.5% of Oxfordshire) with a further 71 proposed new or proposed extensions to LWS (1195.8 hectares in total) under assessment (TVERC, 2023). Currently the percentage of the county covered by LWS is 2.5%, much lower than in some neighbouring counties such as Berkshire (8%), and much lower than the English average (5%) (The Wildlife Trusts, 2016).

In Oxfordshire, 45% of Local Wildlife Sites were recorded to be in positive conservation management in 2023 - 2024. For context, the equivalent figure across England in 2023 -2024 was 35%. There has been a gradual improvement in the proportion of Local Wildlife Sites in positive management in the County from 34% in 2016- 2017.

Road Verge Nature Reserves (RVNRs)

Road Verge Nature Reserves (RVNRs) are verges rich in biodiversity, often including a number of scarce and threatened plants and habitats. RVNRs provide connectivity between wildlife areas, helping to maintain and restore a green network through which wildlife can move and survive. Green verges provide a vital link between what can otherwise be inhospitable landscapes, providing benefits for both wildlife and people. There are currently 52 RVNRs located across the county, including examples of limestone and chalk grassland, acid grassland and neutral grassland.

Habitats of Principal Importance

The Natural Environment and Rural Communities Act 2006 identifies 56 types of habitat in England that it calls 'habitats of principal importance' for the conservation of biodiversity. The list is intended to help public bodies be aware of biodiversity conservation in their policy or decision making, to inform landowners planning nature recovery and to help funding bodies support suitable nature recovery. Oxfordshire is home to 20 types of 'habitats of principal importance', which are described in the table on next page:

Lowland Meadows:	a key habitat in Oxfordshire, dependent on low fertility soils and traditional management methods. Flower rich, important for invertebrates and ground nesting birds such as skylark. The county holds 25% of all of UK's floodplain lowland meadows (a rare community of the NVC 'MG4' plant assemblage).
Lowland calcareous grassland:	a key habitat in Oxfordshire, associated with areas of chalk and limestone geology, found particularly in the North Wessex Downs, Chilterns and Cotswolds. Flower rich, important for invertebrates (particularly butterflies).
Acid grassland:	of restricted distribution in Oxfordshire, associated with sandy soils such as those on the Mid-vale Ridge. Generally, not flower rich but important for rare plants and invertebrates.
Floodplain Grazing Marsh:	a key habitat in Oxfordshire, associated with river floodplains. Sometimes flower rich, important for wading birds.
Lowland Fens:	a key habitat in Oxfordshire, particularly in the Cothill area. Important for rare invertebrates and plants. May support water vole and safe resting sites for otter.
Eutrophic Standing Waters:	likely to be found in old gravel pits and reservoirs, often important for waterfowl.
Mesotrophic Lakes:	these have lower levels of nutrients than Eutrophic Standing Waters, and can be particularly rich in plant and invertebrate species. There are only a few examples in Oxfordshire, to be found mainly amongst the old gravel pits of the Lower Windrush Valley.
Ponds:	found throughout Oxfordshire, may be rich in plants and invertebrates. Likely to be the most important breeding sites for amphibians, including great crested newt, as well as many dragonfly species.
Reedbeds:	of restricted distribution in Oxfordshire, important for birds including the Bittern, may support water voles or rare plants.
Rivers:	found throughout Oxfordshire, provide important wildlife corridors. Likely to support water vole, otter, and a variety of invertebrates. All of Oxfordshire's river catchments fall into a number of catchment partnerships, set up by the Environment Agency and hosted and run by local groups to oversee the implementation of actions to address pressures on the water environment. Chalk streams in the Chilterns and North Wessex Downs are a local and special habitat type which is rare globally with the majority of all the world's chalk streams found within England.

Purple Moor Grass and Rush Pastures:	these wet pastures are of restricted distribution in Oxfordshire, found mainly around Otmoor and the Shill Brook in West Oxfordshire.
Lowland Wood Pasture and Parkland:	important for veteran trees, invertebrates and bats. Found mainly on Oxfordshire's old estates.
Lowland Beech and Yew Woodland:	a key habitat in Oxfordshire, found mainly in the Chilterns.
Lowland Mixed Deciduous Woodland:	found across Oxfordshire, those with rich ground flora are of particular biodiversity interest. Also important for bats, woodland birds and butterflies, occasionally support dormice.
Wet woodland:	of restricted distribution in Oxfordshire, likely to be adjacent to waterbodies or part of a mosaic of wetland habitats. Supports birds and rare invertebrates.
Traditional orchards:	of restricted distribution in Oxfordshire, dependent on traditional management methods. Important for bats, rare invertebrates, mosses, lichens.
Arable Field Margins:	strips around field edges managed to provide benefits for wildlife – can provide important food sources for birds and invertebrates.
Hedgerows:	an important linking habitat found throughout Oxfordshire, of particular biodiversity value when they consist of a large proportion of native woody species. Used by foraging birds and bats, dormice and a range of invertebrates.
Lowland Heathland:	of restricted distribution, important for reptiles and invertebrates
Open Mosaic Habitats on Previously Developed Land (OMHPDL):	examples in Oxfordshire include former quarries and ash lagoons – can be particularly important for birds, invertebrates and specialist plants.

Wildlife rich habitats that do not meet the current criteria for priority habitats

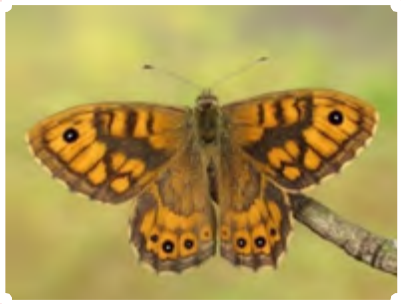
In addition to the above list of Habitats of Principal Importance, there are numerous other habitats that are wildlife-rich but do not meet the strict criteria to become a Habitat of Principal Importance. These habitats include scrub; wildflower grassland that is species-rich but that does not meet the criteria of the three grassland priority habitats; and mosaics of habitats made up of a mixture of any or all of scrub, grassland, woodland, and ponds and other wetland habitats. The importance of these other habitats is reflected in the LNRS 'Statement of Biodiversity Priorities', which includes numerous measures dedicated to the enhancement and creation of these habitats.

Species trends in Oxfordshire

Species trends in Oxfordshire generally reflect patterns seen across England. For some species we have local data sets and can understand local trends in more detail. The following trends mostly come from the State of Nature in Oxfordshire Report (2017).

Species 'on the brink' (at risk of being lost) in Oxfordshire

Whilst there have been significant historical losses of a wide range of species, the species below represent some of the species that have been declining particularly fast in recent years (many since 1998) to the point that species are now considered extinct or near extinct in Oxfordshire. This is not an exhaustive or definitive list, there may be other species which meet this categorisation which we do not yet have sufficient information about.



Wall butterflies, grassland specialists. Previously widespread, now considered extinct in the County having not been recorded since 2009.

The **marsh fritillary** which was rapidly declining in 1998 is now considered near extinct in Oxfordshire

Nightingale had disappeared from Oxfordshire with the last confirmed breeding records in the County from 1998 and only 2 sightings in 2020 and in 2021. However, a land manager has recently recorded the first breeding pairs in the county in the past 4 years after dedicated habitat management work and their range is expected to expand with the creation of suitable habitat.

We have recently lost the **wood white butterfly** which was last recorded in 2008.

Hazel Dormouse: there are very few records for Dormice in the County. It is unclear whether this is partially due to under-recording of this species.

Following recent significant declines, the only native crayfish, the **white clawed crayfish** is now extremely rare in Oxfordshire and has been particularly damaged by the introduction of American Signal Crayfish.

The **adder** is typically found in heathland habitats but is now very rare (all but extinct) in Oxfordshire. Whilst it was considered to have a stable population in 1998, there are only a handful of records in the county since 2010.

In 2017 Otmoor was the only reliable site in Oxfordshire where **turtle doves** still bred, they have not been recorded breeding there since 2020. Through the work of **Operation Turtle Dove** there is potential for this species to recover.

Declining species

Apart from at the RSPB's Otmoor reserve, **curlew** numbers decreased by 51%, **lapwing** by 21%, **snipe** by 88% and **redshank** by 50% in Oxfordshire between 2005 and 2015. These declines are attributed to loss of wet grassland habitat and predation. More recently, the Curlew Recovery Project estimates that there is currently a total population of 60 pairs of Curlew in the Upper Thames (including a few in Buckinghamshire), with strong recovery continuing at Otmoor, but there is also evidence of declines in many of the smaller populations.

The Upper Thames Butterfly Atlas 2016 data (Asher et al., 2016) shows declining trends of the wider countryside butterfly species, which are now experiencing the same sort of drop in abundance that the habitat specialists suffered 30 years ago. The black **hairstreak butterfly**, found only in hedgerows and thickets of blackthorn in woodlands on the heavy clay soils between Oxford and Peterborough, has suffered a dramatic decline nationally (losing 43% of its population since the 1970's) but the Buckinghamshire and Oxfordshire colonies seem stable due to targeted conservation efforts to maintain habitats for these species in certain locations.

Willow tits, which like scrub and wet woodland, are the most rapidly declining woodland bird species locally. Several other woodland bird species in Oxfordshire have been in long term decline and on the Red List for Birds for some time (BoCC4, 2015) include **lesser spotted woodpecker**, **marsh tit** and **hawfinch**.

Banbury Ornithological Society (BOS) "Winter Random Square Survey" has shown that several **resident farmland birds**, including **yellowhammer** and **linnet**, declined greatly in the 70s and 80s, before stabilising somewhat in the late 90s and 2000s. For a few, the declines are continuing, notably **corn bunting** and **tree sparrow** (ed. Easterbrook, 2013).

Increasing species

Between 1900 and 1998, **water voles** *(Arvicola amphibius)* suffered a 95% reduction in their range in the UK. During the period 2009 to 2024, against the backdrop of a national decline, the total spatial coverage of water vole 'Local Key Areas' in Oxfordshire increased by 85% as a result of co-ordinated water vole conservation and mink control activities; this can be interpreted as an overall improvement in the fortunes of this species in the county.

In the first three national otter surveys of England (late 1970s to early 1990s), **otters** were just starting to recover from their extensive national declines and were almost entirely absent from the Thames catchment and Oxfordshire. However, the banning of toxic chemicals, improvements in water quality and legal protection have all helped to bring otters back to the Thames catchment, augmented by a small independent re-introduction of captive-bred animals by the Otter Trust in 1999. The first few positive sites in Oxfordshire came in the 1991-94 survey and now otters are widespread across the county both in urban and rural areas, reflecting their gradual but continued national recovery.

After an absence from the county of about 200 years, **bittern**, **marsh harrier** and **common crane** have returned to breed in the new reedbed at RSPB's Otmoor reserve.

The **Adonis Blue**, **silver washed fritillary**, **purple emperor** and **brown argus** are all butterfly species which have expanded in range, if not abundance (Upper Thames Butterfly Conservation, 2016).

Re-introductions

This section focuses on some key species which have either been introduced to Oxfordshire, or could, in future be reintroduced to Oxfordshire.

Natterjack toad. With its specialist habitat requirements, the natterjack toad has always been rare in the county. This species went extinct from the county in the twentieth century but was more recently re-introduced to a sandy-heathland site on a farm in Oxfordshire where a breeding population has become established.

Red kites became extinct in England as a result of persecution. In 1990 they were successfully re-introduced at a site on the Oxfordshire/ Buckinghamshire border in the Chilterns, establishing a self-sustaining and expanding population.

Photo © Tony Hisgett

Eurasian Beavers have begun to be reintroduced in England. Local Nature Recovery Strategies are asked to consider species which could be suitable for reintroduction to their relevant counties and people and organisations across Oxfordshire have repeatedly mentioned the opportunity to reintroduce beavers. It would be crucial to plan this reintroduction carefully with the support from relevant landowners and with management plans for future populations.

Nationally important populations of species and their habitats which can be found within Oxfordshire

Oxfordshire is home to a number of species and habitats which are important at a national level. This is often because they are found in few (or no) other locations in the country.

Plants

- Oxfordshire's calcareous grasslands support nationally important rare plants, including the bulk of the UK populations of downy woundwort, meadow clary, early gentian and Chiltern gentian and all of these species are in decline. Downy woundwort is found nowhere else in the UK but the Oxfordshire population has been struggling and would benefit from targeted recovery work.
- Oxfordshire has one of the largest UK populations of the nationally rare downy-fruited sedge *Carex filiformis*. Our wet grasslands and fens support the vast majority of the UK's population of creeping marshwort Helosciadium repens and fen violet *Viola persicifolia*.
- The River Ray floodplain is a stronghold for the rare true *foxsedge Carex vulpina* (Feber, 2013).
- One of only three UK populations of monkey orchid is found at Hartslock nature reserve.
- Bluebells *Hyacinthoides* nonscripta are widespread in Oxfordshire woodlands but under threat globally.
- One of Britain's rarest trees, the native black poplar is a tree of wet woodland and forested floodplain. Thought to be declining over the long-term in Oxfordshire, more information is needed about this species using DNA-testing to confirm the identity of the true native trees. Planting projects could enable recovery.
- Box woodland is extremely limited in the UK, localised to only about 10 sites in the country. There is a location in Chinnor where an example of mature box woodland can still be found.

Breeding curlew

- The Eurasian Curlew is identified as Near Threatened at a global scale by the IUCN. With 58,000 pairs reported in the UK in 2020, the UK holds 40% of the European curlew population and 25% of the global population. With an estimated 60 breeding pairs, the Upper Thames is one of the important lowland breeding sites with an active partnership working on The Curlew Recovery Project.





Lowland Meadows

- Oxford Meadows Special Area of Conservation (SAC) is considered to be one of the best lowland hay meadow areas in the UK, with vegetation communities that are perhaps entirely unique which reflects the influence of long-term grazing and hay-cutting on lowland hay meadows. Other good examples of this habitat are found in the floodplains of the Thames, Cherwell and Ray. One example includes the Thames at Swinford, landscape-scale community restoration plans are well underway led by the Nature Recovery Network to restore over 210 hectares of ancient, restored, and recreated meadow. This area includes the internationally rare ancient floodplain meadows (MG4). There are only 1200 hectares of MG4 lowland floodplain meadows remaining in the UK, 25% is in Oxfordshire and reconnecting these will support their survival.

Calcareous fens

- Oxfordshire hosts a complex of calcareous species-rich fens that form the largest remaining group of such habitats outside East Anglia and North Wales. Cothill Fen SAC (JNCC, 2016) is the largest surviving example of alkaline fen in central England, which supports the Clubbed General Soldierfly, Southern Damselfly, rare horseflies as well as endangered Black Bog Rush and Broad-leaved Cotton Grass (indicative of the rare M13 plant assemblage).

Chalk Streams

- Streams arising from chalk aquifers such as the Letcombe Brook, Chalgrove Brook and Ewelme Stream support characteristic species such as brown trout, bullhead and other species dependant on clear, fast flowing water and gravel substrates. Chalk streams are a globally rare habitat, with only 224 in England (TVERC data).

Veteran Trees and Wood Pasture

- Blenheim Palace in Woodstock hosts one of the greatest collections of ancient oak trees in Europe, including one that is 1,000 years old. There are a range of other sites of importance for veteran trees and wood pasture; an English Nature report of 2005 concluded that the many parklands and long history of wood pasture management in the Thames & Chilterns region highlights its national and international importance for habitats and species associated with veteran trees.

Research Sites

- Wytham Wood, owned by the University of Oxford, is one of the most well-studied woodlands in the world.
- Oxford has a long-standing cultural and scientific association with swifts – the colony at the Oxford University Museum of Natural History has been the subject of the Oxford Swift Research Project, started by David and Elizabeth Lack in 1947. This is one of the longest running studies of any species of bird and has contributed greatly to our knowledge of the species.
- Little Wittenham Special Area of Conservation is one of the best-studied great crested newt sites in the UK.

Water Environment

- Oxfordshire is home to several rivers and river catchment areas. The county contains freshwater features like chalk streams, ponds, temporary pools, fens, and is classified as one of Freshwater Habitat Trust's (FHT) 'Important Freshwater Areas' which you can read more about in their Freshwater Network brochure. FHT state that these areas, including a large part of Oxfordshire have "nationally significant concentrations of freshwater biodiversity, rich in threatened plants and animals. These places, from upland river landscapes to lush lowland pondscapes, are under threat, but they are also our biggest hope for freshwater biodiversity recovery."
As one of the 24 Important Freshwater Areas in England, Oxfordshire has a significant opportunity as one of the most important areas in the UK for freshwater life, to target action to recognise and restore all freshwater habitat types across the county at a landscape scale. In the long-term, Oxfordshire could restore naturally functioning, self-sustaining populations of freshwater plant and animal species.

Rivers and River catchments in Oxfordshire

Oxfordshire is largely situated in the Thames River basin, with just small parts of the county draining to the Warwickshire Avon and the Great Ouse. The county contains over 3670 kilometres of watercouse including the designated main rivers (1015km) and their smaller tributary streams and headwaters (2660km).

Through the LNRS engagement process with people and organisations across Oxfordshire it has been clear that improving the quality of freshwater habitats such as rivers, streams, and their catchments is a top priority. Watercourses act as opportunities to connect people and nature in a continuous pathway even amidst densely populated urban areas and intensively farmed landscapes. However, barriers such as weirs and locks do block natural fish migration. Rivers and their connected environments have key roles as crucial habitats for wildlife and provide an array of eco-system services, and therefore, warrant a high level of focus for restoration.

For those looking for more detail about the history, character, and biodiversity recovery opportunities of each river and catchment in Oxfordshire, Appendix B gives a comprehensive overview of the key challenges and opportunities for biodiversity in each catchment and provides information about each Catchment Partnership (groups of organisations working together to improve water quality and habitats in the catchment area of each river). Appendix B is organised by catchment and river, and readers can navigate to the page or pages that relate to the specific catchment/river they are most interested in. The order of the document starts with an introduction to Oxfordshire's rivers and catchments, followed by sections on the River Thames, River Windrush, River Evenlode, River Cherwell (including the River Ray), River Ock, and River Thame. Each section discusses the unique characteristics, ecological importance, challenges, and opportunities for biodiversity within that catchment.

Rivers in the Ock operational catchment

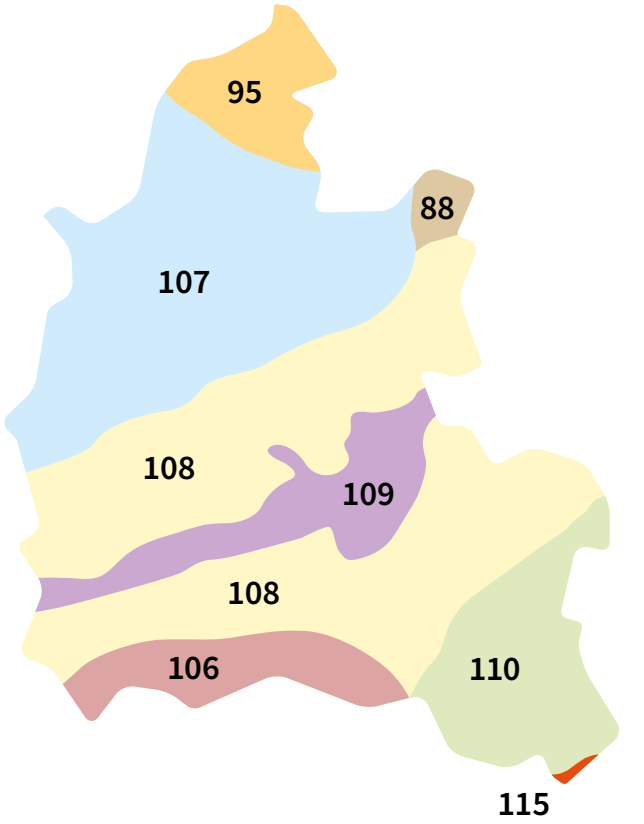
Oxfordshire's opportunities for nature recovery by National Character Area

Oxfordshire's national and landscape character types

Biodiversity varies across the UK and variations in the type of landscape, geology, and how people have used the land does influence the type of wildlife and habitats found in different parts of the country. The government's environmental advisory body Natural England categorizes England into 159 National Character Areas (NCAs), each with distinct geological, cultural, and biodiversity characteristics. Eight of these NCAs are present in Oxfordshire and each area is associated with a particular set of landscapes, geology, and particualr recreational or cultural associations with the area including heritage sites and certain types of businesses.

The map illustrates the 'National Character Areas' which run across Oxfordshire's landscape. Each coloured area represents a unique type of landscape distinguished by different geology, soil types, biodiversity, history, or land-use. These differences give rise to different types of habitats, wildlife, and features in the landscape that also shape our sense of place within Oxfordshire. Historic towns, open farm fields, and woodlands, are all integral parts of the character of these areas.

Appendix C provides an overview of the distinct NCAs in Oxfordshire, detailing their geology, biodiversity, cultural land-use, and notable species in the area. Each section emphasizes what could be done to maintain and enhance habitats relevant to that area and describes how nature benefits both wildlife and people in the NCA. If you'd like to delve into further detail for any of the particular National Character Areas of Oxfordshire and see which nature recovery actions might be most suitable for the specific landscapes local to you, you can find a 1-3 page description of each area within Appendix C. Many of the details in Appendix C have been collated from Natural England's National Character Area profiles, the Oxfordshire Wildlife and Landscape Study and Wild Oxfordshire's website.

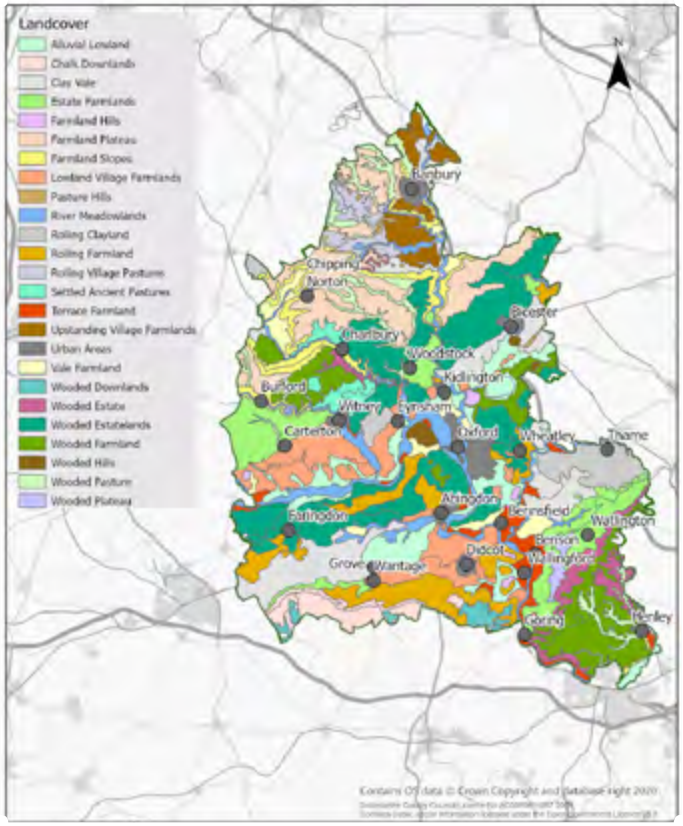


Oxfordshire Wildlife and Landscape Study

In addition to the NCA areas a previous initiative in Oxfordshire, the **Oxfordshire Wildlife and Landscape Study** (2004), created a breakdown of the county showing 25 different types of further, more detailed Landscape Character Types (LCAs) which cover Oxfordshire. Each Landscape Character Area shows the typical habitats and biodiversity for different areas of the county. To use a more interactive version of the OWLS Landscape Character Types and read about other landscape character assessments, please view the **website**.

These varied landscape character types can help guide biodiversity actions in each area to ensure that actions are complementary to the relevant landscape type.

OWLS Landscape character types in Oxfordshire



View large map

The different landscapes, habitats, and soil types found in Oxfordshire shaped which nature recovery actions the LNRS's Local Habitat Map has mapped into different locations. Recent 2023/2024 data on soil types were used as well as recent data on the location and types of habitats in Oxfordshire. Despite using the latest available data, it is still important for people who are looking to take action to check their sites and consider how their nature recovery projects or actions can complement the various landscape types found across Oxfordshire. You can find more information about the OWLS Landscape Character Types in your area of Oxfordshire by looking at Appendix C which contains more detail and describes the characteristics of the different parts of Oxfordshire.

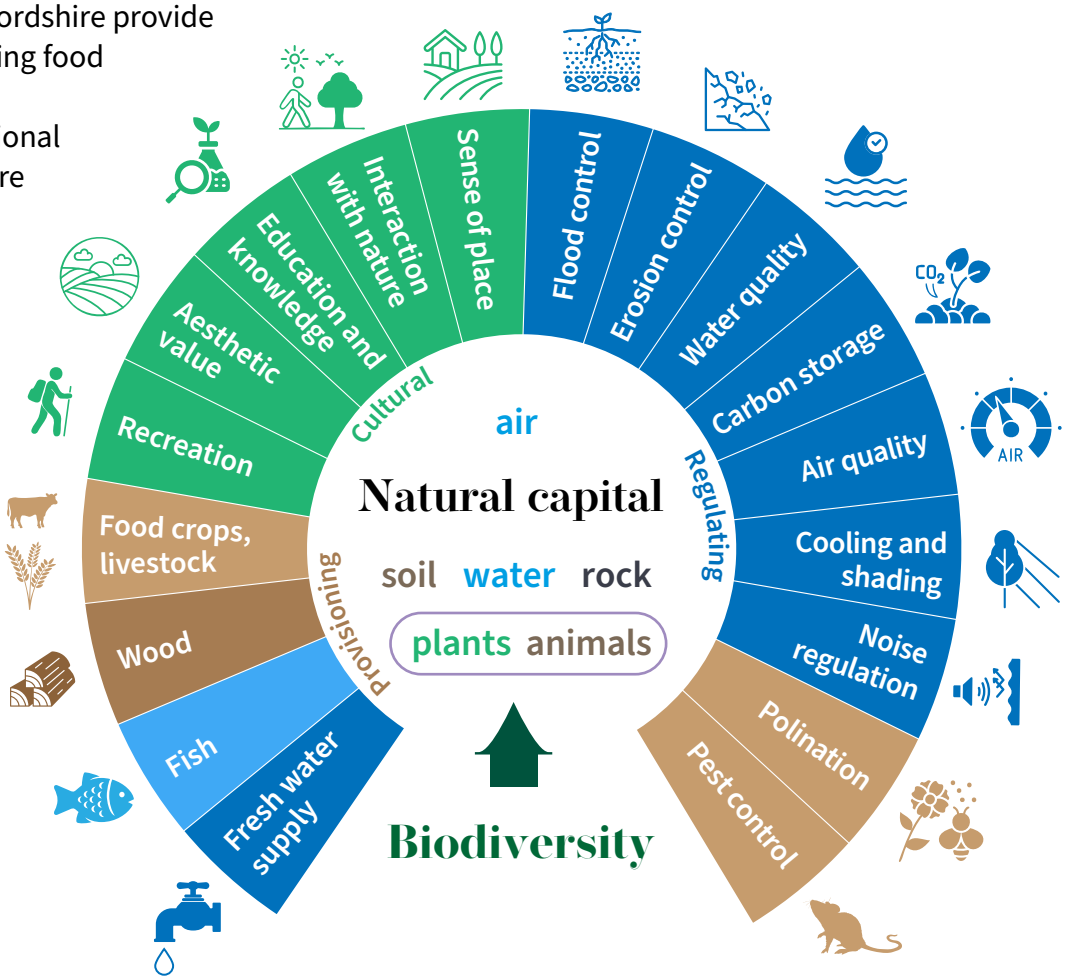
Benefits of nature

As well as being vital to human survival, by providing air, water, food and shelter, nature provides numerous other gifts which are described in this section. Natural habitats provide essential a great range of services as shown on the image below, including water purification, flood regulation, and carbon sequestration. Accessible, outdoor spaces also offer opportunities for people to connect with nature and enjoy the outdoors, promoting both physical and mental well-being and offering key educational opportunities for people to learn about nature and biodiversity. In addition, some parts of the county have geology that has been identified as having key resources that we rely on to live well and provide building materials to produce homes and infrastructure.

Healthy ecosystems in Oxfordshire provide numerous benefits, including food production, water quality improvement, and recreational opportunities. If Oxfordshire can maintain a healthy natural environment, then the county will be in a better position to ensure the long-term provision of these services and benefits described on this page.

Without effort to restore nature, the county should expect to continue to lose these gifts that nature provides. Many people in the county have already experienced challenges with growing food, managing water, a decline of species, difficulty cooling down, poorer air qualiy and other impacts.

Nature recovery actions described in the LNRS not only help our wildlife and species to thrive, but if well-coordinated across the UK, could significantly improve human health and wellbeing into the future and enhance local resilience to climate change. The image on this page illustrates the range of 'services' that a healthy landscape can provide and reminds us all of the importance of nature to our day-to-day wellbeing.



Source: Natural Capital in Oxfordshire Short report, Alison Smith

sources to be added once we have them

Nature and people

Thriving natural systems and ways for people to connect with nature are fundamental to wellbeing. The benefits or gifts that we receive from nature, such as the food we eat, outdoor spaces for physical and social activities, and mitigation of floods and heat, all rely on actions from people that enable a healthy natural environment. Undertaking environmentally positive actions help us maintain a positive relationship with the natural world.

Oxfordshire is a relatively wealthy county, but there are significant socioeconomic and health inequalities. Ten areas of Oxfordshire are ranked among the 20% most deprived areas in England, with 1 in 5 children living in poverty. The impact is profound, people in more affluent areas are expected to live around 11-12 years longer than those in poorer areas of the county. Oxfordshire also has higher than average levels of social isolation and loneliness, with a quarter of adults not meeting physical activity recommendations. Rates of depression and other types of poor mental health are also rising, especially in deprived areas, influenced by a complex range of behavioural, socioeconomic, structural, and environmental factors which all impact people's health and wellbeing.

The positive impacts of access to greenspace and connection with nature on wellbeing are well established. Physical and mental health are boosted through:

- Increased physical activity in nature-rich outdoor spaces, social contact, community connectedness, skills enhancement, and nature connection.
- Mitigation of environmental harms such as extreme heat, increased risk of flooding, and the impacts of air pollution.
- Other environmental benefits like natural flood management, soil health, food security, education, and employment.

Nature not only helps keep individuals fit and well but access to areas of nature can also help reduce inequality, e.g. by reducing common health problems that are often worse in places with lower access to nature. Improving access to areas of nature can improve health and quality of life for people in the local community by offering:

- High-quality green infrastructure to enable people to get around, exercise, and be outdoors
- Community engagement initiatives that bring people together and offer ways to boost wellbeing and reduce loneliness
- Opportunities for new types of healthcare, such as green social prescribing (which supports people to engage in nature-based activities to improve their mental and physical health)

Since the typical approach to healthcare requires a lot of resources (and is responsible for 4% of carbon emissions nationally), improving the environment and access to nature offers effective, nature-friendly ways to treat and prevent conditions and boost the quality of life amongst local communities. The evidence for incorporating nature recovery into a strategic approach to inclusive and sustainable economies is growing.

However, opportunities to connect with nature and experience its benefits are not equally distributed in Oxfordshire. Groups that consistently miss out include those from lower-income households,

minoritised ethnic groups, people who have been forcibly displaced (such as refugees and people seeing asylum), and people with disabilities or long-term conditions. These groups are also disproportionately affected by the climate and nature crises and are currently underrepresented in the UK environment sector.

In recent years, Oxfordshire has developed a strong commitment to environmental equity and Healthy Place Shaping, in line with the Environment Improvement Plan 2023. Our understanding of local environmental inequalities is expanding, as evidenced in the 2024 Director of Public Health Annual Report and research from the Leverhulme Centre for Nature Recovery, which highlights 16 priority areas where inadequate accessible greenspace collides with social deprivation in Oxfordshire. You can find these 16 priority areas on the LNRS Local Habitat Map too showing where nature recovery efforts could also offer great benefits to local communities.

These issues are now recognised in national and local health and environmental policy, with increasing attention to high-quality green infrastructure that offers regular opportunities to connect with nature as part of your daily life, and targeted initiatives to support vulnerable groups. This includes funds through allocated towards the national Green Social Prescribing programme.

How are urban areas represented within the Local Nature Recovery Strategy?

Within this LNRS you will find actions to deliver in urban areas. These actions help to increase biodiversity and areas of nature in villages, towns, and cities in Oxfordshire and these actions can be referenced to enable local communities to make a case for nature recovery projects including projects that harness the power of nature to help mitigate heat and manage water and flood risk in urban areas. Actions that are recommended include increasing the number of street trees, creating innovative spaces for nature like green roofs, producing wildlife friendly gardens and parks, or adding spaces for nature such as bird boxes, swift bricks, hedgehog houses and more.

Gardens and greenspaces make up 7% of Oxfordshire's land, buildings make up a further 6%. This 13% of the county represents a very real opportunity for local people, parishes, and community groups to make space for nature. You will find some corridors and locations mapped out on the LNRS Local Habitat Map as being opportunity areas that could particularly contribute towards the creation of a joined-up network of nature. However, urban actions are important to deliver across the county, anywhere that people live, work, and go to school. The LNRS aims to bring greater recognition to the importance of actions in villages, towns, and cities across Oxfordshire where many people, groups, and parishes are already delivering impressive nature recovery projects and initiatives.

Pressures on Oxfordshire's environment and wildlife

What is a 'pressure'?

In the context of the Local Nature Recovery Strategy (LNRS), a 'pressure' is considered to be something that threatens Oxfordshire's biodiversity (animals, plants, fungi, and soil microorganisms) and puts it at significant risk of long-term harm (for example, something that may hinder or prevent a species or type of habitat from being able to survive) or prevents its recovery. In other words, the pressures listed below are listed because they may cause (or be causing) significant damage to nature and wildlife locally. In addition to the creation and enhancement of future habitats, pressures must be managed to prevent harm to the remaining areas of nature. The current pressures in Oxfordshire include:

Climate change

Climate change is accelerating at a rapid pace and significantly quicker than many climate models had previously anticipated. Changes in weather events because of this climate change threaten biodiversity in a number of ways including:

- More regular and prolonged heatwaves of increasing intensity,
- Increasingly dry summers periods with minimal rainfall, resulting in drought conditions,
- More intense periods of rainfall during winter leading to increased flooding,
- Increasing number of storms and high winds.
- Changes in phenology (seasonal changes in plants and animals from year to year e.g. emergence of insects and flowering of plants).

These changes are taking place at such a rapid pace and at sufficient magnitude that many species and habitats will increasingly find themselves exposed to environmental conditions that do not support their survival. Spring is now advancing by 2.5 days per decade, plants are flowering and fruiting earlier and leaf fall is delayed; this can affect food chains with some species that rely on one another falling out of sync. High genetic and species diversity in natural populations are essential to enable successful adaptation to climate change in the long term. However, it is expected that species will struggle to adapt quickly enough to climate change therefore their best chances of survival will be to have the chance to move and migrate in order to find new locations with suitable environmental conditions. This requires a joined-up network of varied habitats to enable species to move. Changes to weather patterns are expected to be a catalyst that pushes many species to need to move from their current locations into new cooler, drier, more sheltered areas. It is predicted that many species may need to move northwards to survive these changes in weather and conditions. In addition, climate change is contributing to the increasing prevalence of a range of invasive species, pests and disease that have already created a significant burden on native species and will continue to threaten biodiversity.

Creating new habitats and improving existing habitats to create a larger network for nature which is bigger, better, and more joined up offers opportunities to improve nature's resilience to climate change, whilst offering a range of co-benefits including carbon sequestration, urban cooling, and natural flood management.

Insufficient resource, support, and trained professionals

A key pressure is the lack of investment in the enablers of nature recovery. Delivery of the actions needed won't be possible without financial investment, trained and willing people, and resources and equipment suitable to improve and create habitats. For example, the delivery of nature recovery actions will rely on the availability of suitably trained professionals including (but not limited to) ecologists, foresters, arboriculturists, hydrologists, entomologists, species recorders, and many more. Without these people, we cannot expect knowledge and skills to be shared more widely with the public.

Managing Growth (Housing and Infrastructure Development)

Growth and development are significant pressures on nature in Oxfordshire. There is a growing requirement for development sites, mineral extraction sites, and landfill sites. This growth negatively impacts nature when habitats are damaged or destroyed, but also when they are disturbed, fragmented, and/or when development results in pollution such as light, noise or sewage. Between 2011 and 2020, an average of 3,154 houses were built each year in Oxfordshire (Pathways to a Zero Carbon Oxfordshire, p.29). The county's resident population is predicted to expand from the current 725,000 to 853,000 by 2030 so Oxfordshire must carefully consider how to safeguard wildlife, nature, and people. To help nature recover, growth should be carefully planned to avoid harming existing biodiversity-rich spaces and should deliver net gains in biodiversity which support local nature recovery, as well as providing space for nature within developments, including planting native species of local provenance, providing roosting and nesting features within buildings and enhancing genuine public access to nature in a way that supports local wildlife. Conserving and enhancing the natural environment should be a key consideration for new developments and infrastructure and designs should prioritise the creation of corridors that enable wildlife to move through the county unhindered. Housing and infrastructure developers, and mineral and waste operators must make space for nature and must limit damage to existing habitats and species. Managing this pressure must include timely improvements to sewage treatment infrastructure to limit pollution entering the environment as a result of development, as well as the development of sustainable supplies of natural resources that minimise the adverse impacts on the natural world. Whilst the LNRS is not intended to be used to prevent development, it recognises the clear historical impact on nature from development and supports the principle of sustainability and planning positively to support local nature recovery through future growth.

Recreational pressure

While Oxfordshire does have publicly accessible greenspace, the majority of the county's greenspace is not publicly accessible and there is no single accessible site larger than 500 hectares that meets the ANGST criteria of being close to residents (Oxfordshire's green space deprived neighbourhoods, Martha Crockatt 2024). Habitats and green spaces in Oxfordshire are used by people and pets, which can impact adversely on wildlife in sensitive sites. Access to these spaces is an important asset for people's health and wellbeing, but it needs to be managed and respected to avoid damaging sensitive habitats or causing declines in species that are more sensitive to disturbance. Increased provision of multi-functional greenspaces which provide for both wildlife and people could reduce the pressure on sensitive wildlife areas, whilst also contributing towards the priorities in the LNRS by creating more habitats across the county that are bigger, better, and more connected.

Dogs and Cats

Pets are known to cause damage to wildlife. Cats can harm birds and mammals, while dogs that are not under close, effective control can either directly harm wildlife if chased or caught, or indirectly damage populations by disturbing nests and preventing ground-nesting birds from breeding (Countryside Code). This may mean that dogs should be kept on leads in certain places or at certain times of year to support wildlife. If domestic animal waste (such as dog waste) is not collected it can pollute the area and impact other animals especially if bags of waste are left in the environment. Tick and flea treatments also pollute the environment when animals are washed and water enters the environment or when they swim in ponds and rivers which builds up toxins in the water and damages a range of wildlife. Pet owners must be willing to engage responsibly with the environment and understand their responsibilities throughout the lifespan of their pets to minimize damage to nature.

Pollution

A number of pollutants are described within the pressures section already but there are a range of other pollutants from various sources, including industry, agriculture, transportation, traffic and congestion, wastewater, sewage, and household activities that contaminate the air, soil, water and impact the health of wildlife and people. Reducing the diverse range of pollutants that enter the environment was a repeated, clear request from people and organisations across the county we engaged with when developing the LNRS and this action sits with every person, business, and organisation. The greatest impacts come from the largest polluters but cumulative actions by individuals also create significant change.

Air quality

In Oxfordshire there have been significant improvements in air quality in recent decades, primarily due to reductions in coal burning (Director of Health Annual Report 2023/24), with reductions in nitrogen dioxides, and particulate matter between 2010 and 2021, however ammonia emissions have remained largely the same. Ammonia and Nitrogen Dioxide pollution result in increased nitrogen deposition which can affect many sensitive habitats and species which cannot tolerate raised levels of pollution. High risk areas for nitrogen deposition include habitats close to urban areas and major roads, combustion plants and intensive livestock units (apis.co.uk)

Agricultural Intensification

Intensive, conventional farming practices, such as the heavy use of pesticides and fertilizers, degrade soil quality, reduce biodiversity, and harm fungi and soil life. This in turn damages the soil and soil life until the land is no longer able to support food production, wildlife, or habitats. Since more than 70% of Oxfordshire's land is farmed to produce food, there is a significant opportunity within the county to offer more space for nature if farmers can be supported to integrate sustainable farming practices, and space for habitats, into their businesses. Many farmers in the county are already taking action to increase tree cover, change cultivation practices, use cover crops and leys, and allocate more land to support biodiversity. However, without financial support, these positive steps (and the public services they provide) are at risk. Farmers who manage their land to support nature while producing food offer very real opportunities to tackle the biodiversity crisis and create a more resilient network of nature throughout Oxfordshire.

Pests and Disease

Diseases and pests change over time and we are currently experiencing significant impacts on wildlife due to disease and pest damage. It is expected that warmer average temperatures and wetter environments could further increase the prevalence of pests and diseases in the UK. Within the past 100 years, the UK has lost around 30 million Elm trees due to Dutch Elm Disease. The Elm used to be one of the common English tree species, alongside Ash and Oak. Now, Ash faces a current threat of extinction from Ash Dieback, a relatively new disease to the UK. Around 90% of Ash trees are predicted to be lost; however, research continues. These are just two examples of many other pests and diseases that are increasing the vulnerability of Oxfordshire's wildlife and habitats. Because of the increasing prevalence of pests and diseases, it is more important than ever to be ambitious in our efforts to enable nature to adapt and build resilience to pests by increasing the area of biodiverse habitat, improving management, and connecting habitats up.

Invasive Non-Native Species and Unsustainably High Populations of Species

Introducing non-native species can threaten native flora and fauna and disrupt ecological balances (Great Britain Invasive Species Strategy). The Woodland Trust states that non-native species alone cost the UK economy a startling £4 billion per year, whilst also causing steep declines in certain native species like white-clawed crayfish, red squirrels, and water voles. In Oxfordshire, species such as the white-clawed crayfish have already been pushed to the brink of survival due to the introduction of the American Signal Crayfish. Currently, there are a number of invasive and/or non-native species present in Oxfordshire, as well as native species that have reached unsustainably large population sizes, causing excessive damage to habitats and other species. Invasive/non-native species include American Signal Crayfish, American Mink, Himalayan Balsam, grey squirrels, and some deer. Some native deer species have also reached such large population sizes that they present a key challenge for biodiversity by causing excessive levels of damage to other species. Not all non-native species carry the same risks or threats to biodiversity but those that do can exterminate local populations of species or cause significant damage to habitats across the country. This pressure from invasive species is expected to change over time as weather patterns and species compositions change. Local actions will need to adapt quickly in response to these pressures.

Pressures on Oxfordshire's rivers and waterways

Habitat Degradation

Historic alterations have been carried out on most of Oxfordshire's watercourses such as dredging, embanking, straightening channels, building obstruction in the river channels such as weirs, and drainage of the adjacent floodplains, as well as building on these floodplains which puts these developments at risk. The cumulative effect of these actions across the landscape disrupts natural in-river and floodplain processes, diminish habitat diversity, and impede the movement of freshwater species, degrading rivers and freshwater habitats across the county. Although much has been done to restore our rivers and remove or bypass barriers in the last few decades, there is still much more to do to restore habitat quality and properly reconnect rivers with their floodplains.

Water Abstraction

The high demand for water for conventional agriculture, industry, and domestic use (which will increase as more homes are built) means that a significant amount of water has to be abstracted from our groundwaters and watercourses to meet this need. This water is taken partly from groundwater sources such as the Cotswold limestone aquifer that feeds some of the headwaters of the rivers that flow into Oxfordshire, and also the major surface water abstraction at Farmoor, west of Oxford, from the River Thames. Abstraction from groundwater and surface waters can result in low water levels and reduced flows in our rivers, changing and degrading the habitat that aquatic species rely on.

Much has been done to alleviate these impacts in the county and wider Thames catchment as far as possible without jeopardising supply, but further reductions in abstraction pressure (particularly from the Thames at Farmoor during the summer) will require the development of new sustainable water resources. Careful water management, including reducing personal consumption, re-use of grey water and installing water butts to capture rainwater for garden use, and improved leakage control and demand management by water companies are all important in reducing future abstraction need.

Pollution

Pollution from various sources, including agricultural runoff, urban runoff, and untreated sewage storm discharges, contaminates water bodies with nutrients, chemicals, and pathogens, degrading water quality and threatening freshwater ecosystems and biodiversity. Across the county rivers will be expected to take on the increased wastewater from any new housing developments and this should be carefully considered around areas that are already pushed to their limit, highly polluted, or are upstream of others who are already liable to flooding. Within the Thames there are 31 major sewage treatment works in the catchment area and the pressure to develop new homes is placing increased pressure on these sewage works, especially in the light of the infrastructure replacement which is needed to combat the growing problem of the ingress of groundwater and flood waters into sewerage systems. Continued investment into improving the quality of treated effluent, and an upsurge in funding to address storm discharges, are expected to have positive benefit for biodiversity river health, freshwater habitats, and people, but it also important that measures continue to be taken to address diffuse pollution from agriculture and urban areas.

Summary of pressures

The LNRS identifies some specific measures to reduce some of these pressures and overall aims for a biodiversity-rich network for nature which is bigger, better, and more joined up; achievement of such a network will help increase nature's resilience to many of the pressures mentioned. However, many of the pressures above relate to wider issues including how people treat the environment, the perceived value of nature, practical problems that need improvements such as infrastructure and sewage systems, and the influence of climate change.

The Oxfordshire LNRS vision

A well-connected, biodiversity-rich, network of nature that is resilient into the future, restored for the health and wellbeing of future generations, and for nature's own sake.

It's clear that Oxfordshire is home to a diverse array of habitats and wildlife, but that many of these are decling rapidly due to pressures such as development, pollution, and agricultural intensification. It is important that Oxfordshire restores the local environment both for nature's own sake, and for the health and wellbeing of people and wildlife. The LNRS is based on three following principles that guide the species actions, habitat actions, and the locations that the LNRS has mapped out as focused areas for nature recovery work.

LNRS Principles

1 Enhance what we have	Take action to enhance and manage the areas that are already important for biodiversity in Oxfordshire. This must be the foundation of nature recovery efforts so that wildlife does not further decline and has biodiversity-rich core sites to disperse out from.
2 Create more habitats to achieve a connected network of nature	Focus local efforts and resources towards the creation of a strategic network of habitats that prioritises connectivity. Ensure that environmental improvement considers nature as a connected set of habitats and species. Create and enahnce habitats to achieve a wide ranage of biodiversity-rich habitat types that are joined by corridors and together, create a resilient network of nature that will be resilient to pressures such as climate change.
3 Make space for nature everywhere	Take action to create spaces for wildlife across the county thorugh individual or group actions at home, at work, in local community spaces, and in schools to make nature part of daily life for everyone helping both biodiversity and addressing unequal access to nature across Oxfordshire. Take actions to support species to survive and spread across the county in all areas, both urban and rural. Across the rural landscape, managers of agricultulral land must be supported and incentivised to deliver sustainable agricultural practices to help wildlife flourish across the wider landscape of Oxfordshire. Focus on healthy soils, low/no chemical inputs, setting aside space for wildlife to help with pests and pollintion, improve water quality, create space for water to be held across the landscape, minmise soil erosion, and create high nature-value food and fibre production systems.

This image was produced during one of the early LNRS workshops with local community members. It tells a story that was repeated by groups and people throughout Oxfordshire and represents the local ambition for ecological recovery. It displays core ambitions, actions, and priorities that have shaped the LNRS and acts as a call-to-action for both individual and community involvement in environmental stewardship.

Shaping the vision for nature

Throughout its preparation, the strategy was shaped by input from local people and organisations. We heard from people through surveys, workshops, in-person meetings, and map data shared by more than 3,000 people and organisations in Oxfordshire. Throughout this process, the decisions made were overseen by the LNRS Partnership, a group of authorities and representatives for Oxfordshire's environment (see page 8).

Outline of the engagement process

1. Early 2024

Asking people what the biodiversity priorites Oxfordshire's LNRS should be. The LNRS held 14 workshops with around 400 people and held an online survey with around 650 responses.

2. Mid 2024

Inviting people to tell us about locations where they are recoving nature using a map tool with around 200 responses.

3. Late 2024

Presenting a first draft version of the strategy to local people and inviting the public to suggest changes to the draft LNRS thorugh a formal public consultation. We had around 2,100 responses showing strong, positive engagement with the strategy.

4. 2025

Publishing what we heard from the consultation responses, making changes to the strategy based on public responses, and finalising the strategy to invite local authorities to approve its publication.

In addition to the farmers, landowners, businesses, schools, local community groups, nature recovery orgnaistions and many other who were part of shaping the strategy, the LNRS also held regular meetings with neighbouring auhtorities to ensure that our six neighbouring LNRS authorities were informed of our progress, and vice-versa. This enabled us to modify the LNRS map at our boundaries to create smooth, continouous corridors for nature across beaurocratic borders.

A summary of the full engagement process, demographics of those who engaged, and the data we captured from the different steps is available to download and view on our LNRS webpage.

quotes here, where to find them?

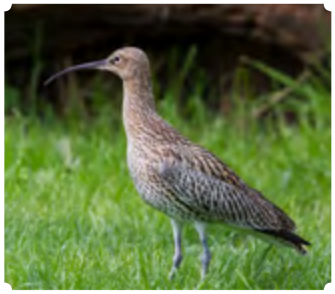
insert 2x link where 'here' is

LNRS Nature recovery actions – How to achieve the LNRS vision

Habitat actions

Having reviewed habitats that are important for biodiversity in the county and hearing the priorities held by local people and organisations in Oxfordshire, this LNRS created a list of important biodiversity actions to deliver in Oxfordshire. These are listed in the LNRS 'Statement of Biodiversity Priorites' which states an agreed set of **84 important actions** to deliver in the county to achieve biodiversity priorites like improved water quality, improved connectivity between habitats, improving the condition of our existing habtiats of importance, creating new habitats, and enhancing areas for nature in both the urban and agricultural environments across the county. You can view the full list of actions here.

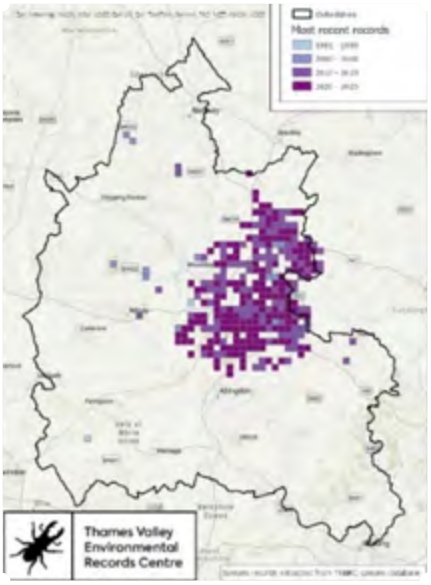
By delivering any of the actions on this list, you can be confident that your project is contributing towards a widely agreed set of local nature recovery priorities. A diverse range of projects will be required to achieve nature recovery and achieve all of the priorities.



Species-specific actions

Many species in the county will benefit from the broad habitat improvements described in the Statement of Biodviersity Priorites (above). However, some species in Oxfordshire will need more bespoke actions to recover. For example, some species may need to be introduced into the county (like the beaver), some certain ground-nesting birds may require fencing or help to protect their nests whilst their chicks hatch and fledge (like the Curlew), and fish across the county need suitable fish passes to be created to enable them to move throughout rivers and streams to breed and disperse. In cases like these, creating a broadly good habitat is not, by itself sufficient to recover those species who need an additional bespoke action. The LNRS has therefore identified **63 bespoke species** actions on the LNRS 'Species Priorities List'. You can view the full list of species actions here.

Blackthorn butterflies records 1990-2025
(Black hairstreak, brown hairstreak)



View large map

All of these actions are needed to help recover species that need more bespoke actions in addition to the general enhancement of habitats across the wider environment. The 63 actions focus on species such as hedgehogs, swifts and house martins, bats, juniper, and many more. By taking these actions you can be confident that you are helping to halt the loss of biodiversity in Oxfordshire. The list also shows you where those species have recently been recorded in the county help if you're not sure whether you're in the right area to support those species (see image).

Great-Crested Newt
Triturus cristatus

Bittern
Botaurus stellaris

Corn Bunting
Emberiza calandra

Yellowhammer
Emberiza citrinella

Tawny Owl
Strix aluco

Dark Green Fritillary
Poecile montanus

Dark green Fritillary
Speyeria aglaja

Silver-spotted Skipper
Hesperia comma

Brown Trout
Salmo trutta

Bird's Nest Orchid
Neottia nidus-avis

Violet Dor Beetle
Geotrupes mutator

Noble Chafer
Gnorimus nobilis

Southern Damselfly
Coenagrion mercuriale

Bats

Beaver

Devil's-Bit Scabious
Succisa pratensis

Meadow Clary
Salvia pratensis

Monkey Orchid
Orchis simia

Adder
Vipera berus

Common Lizzard
Zootoca vivipara

LNRS Nature recovery locations – where to deliver the LNRS

View large map

In the case of both species and habitats, many people and organisations in the county told us that they are willing and able to take action to support nature but many people reported to the LNRS that they were unsure where to act or what to do. The LNRS supports you through the 'Local Habitat Map'.

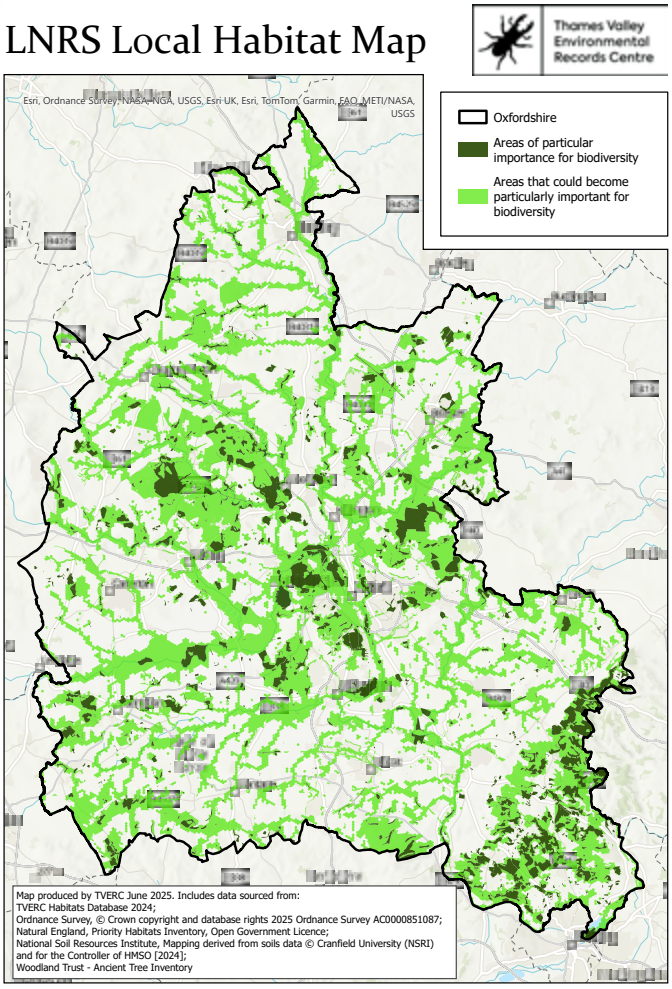
The Local Habitat Map

The Local Habitat Map sets out a collaboratively created vision for which areas of the county could become of particular importance for biodiversity in the future. This map offers a blueprint that organisations, landowners, and individuals across the county can contribute towards and can deliver, together. Together these areas show where the vision of the LNRS could be achieved. If Oxfordshire can deliver nature recovery actions in the majority of these areas we would all have achieved a bigger, better, more connected and resilient network of nature to share with future generations.

The dark green areas show the existing areas that are particularly important for biodiversity. The light green areas are the areas that the LNRS recommends for targeted nature recovery actions. They are areas that could become important for biodiversity if nature recovery actions can be delivered in those locations. Together, the green areas cover 40% of Oxfordshire and show the overall network that could be achieved.

Within that overall area, the LNRS has picked out which different actions are recommended in which locations of the county (e.g. where to create woodland, restore fens, manage scrub, or create ponds). See the multicoloured image below to get a sense of this variety. The map is designed to be viewed and used online as an interactive tool to enable you to view which actions to take in your local area. Please click here to view the online map.

LNRS Local Habitat Map



Even if you're not in the green network, there are still countywide (unmapped) actions that you can take to support nature recovery in any part of Oxfordshire.

update link

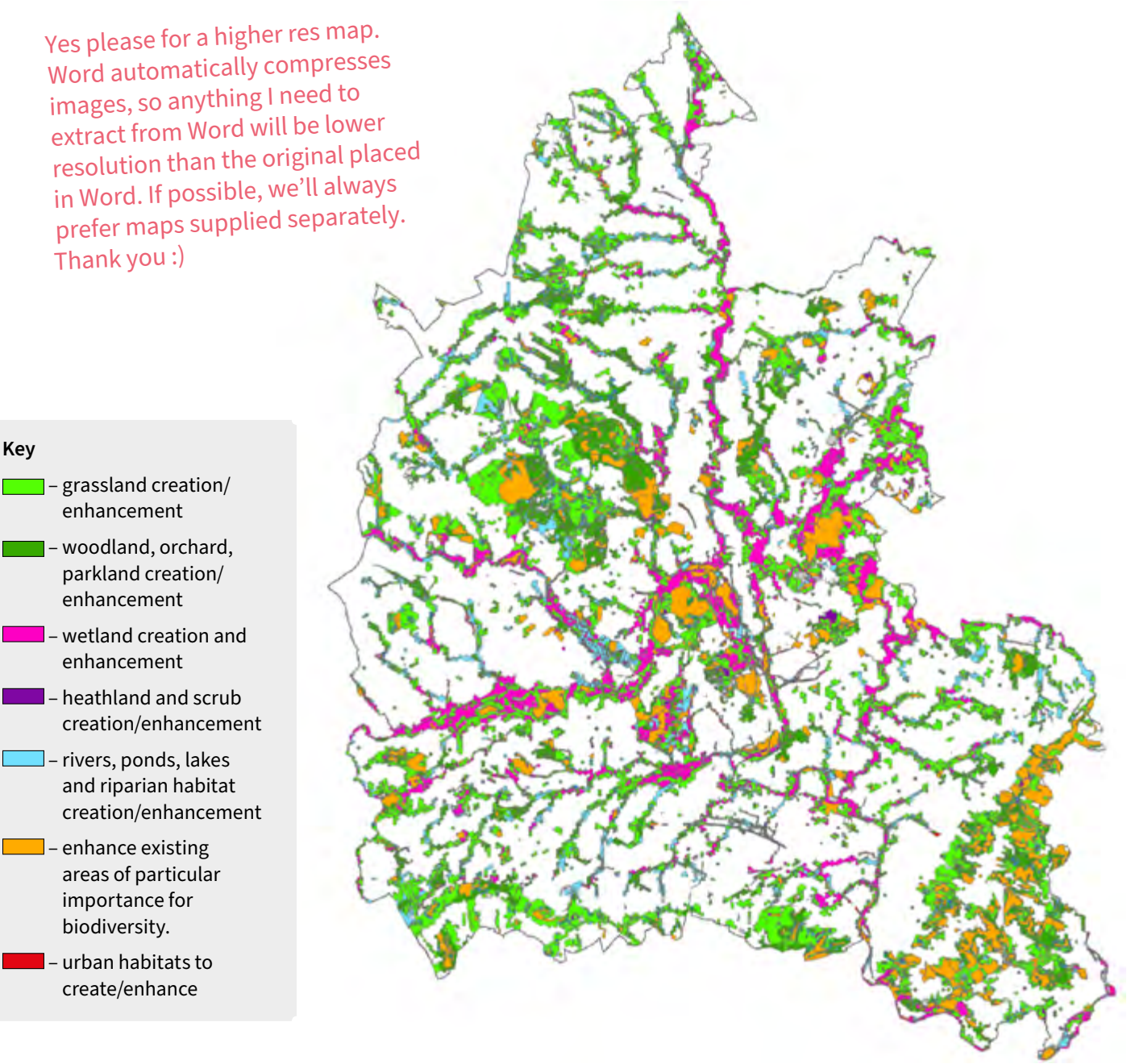
Users of the strategy can use the LNRS's interactive 'Local Habitat Map' tool to see which areas of the county have been recommended for which nature recovery actions (e.g. woodland creation, fen restoration, pond creation or any of the other mapped actions for habitats or species).

This image is designed to a give a sense of the range of actions being recommended in various areas of the county but it does not exactly prescribe what must be done in those locations.

There are further actions that overlap in various areas, or which are too small-scale to see at this county-view (e.g. actions for particular species). All sites must undergo 'on the ground' assessments to ensure that they are suitably ground-truthed before taking actions. To best view these, please zoom into areas using the 'Local Habitat Map' and read the LNRS 'Before you Start' guide on the webpage.

insert link

Yes please for a higher res map. Word automatically compresses images, so anything I need to extract from Word will be lower resolution than the original placed in Word. If possible, we'll always prefer maps supplied separately. Thank you :)



How was the Local Habitat Map made?

The mapped areas were informed by local ambition, guidance, and data from more than 3,000 local people and organisations in Oxfordshire during workshops, surveys, meetings, and more. These mapped areas create a targeted set of locations where focused habitat creation or enhancement actions are recommended.

This is a high-level summary of an in-depth process. For the full technical detail of how the map was created, please see the report in Appendix E.

Start

Step 1

Ask people to tell us about important habitats and priorities that the LNRS map should focus on

- We heard a huge amount including the priority to create connectivity, and particular features that should be mapped like chalk streams, fens, scrub, rivers, and areas to enhance urban biodiversity.

Step 2

Collect data to understand where the important features are, or where they could be in future

- The LNRS used 62 different datasets that helped us to map different, important features in the county. See the full list in Appendix D.
- For example, we had map data that told us where Oxfordshire's existing habitats are (orchards, woodlands, ponds and so on) and others that told us where the urban greenspaces are, where the high productivity farmland is, and so on.
- Some datasets, like the Cranfield Soil data helped inform our mapping of where future habitats could be created.

Step 3

Agree which important features we could include in the map, which we may need to avoid, and how much of them we could include

- For example, it was agreed to include 100% of all the chalk streams and fens in Oxfordshire. Some habitats that were less rare had lower targets. This is the process of prioritising, we could not select every area of every habitat otherwise we would not be prioritising.
- We set some areas of the county to be more suitable for nature recovery action (like the National Landscapes), we set other areas of the county, like the best and most productive farmland to be less suitable for habitat creation actions, and we also set a goal to spread nature recovery actions across the county, to ensure that each district had a certain amount to deliver.
- These targets and settings were tweaked based on engagement with local people and organisations and the decisions were made by the LNRS Partnership including nature recovery organisations and authorities from across Oxfordshire.

Step 4

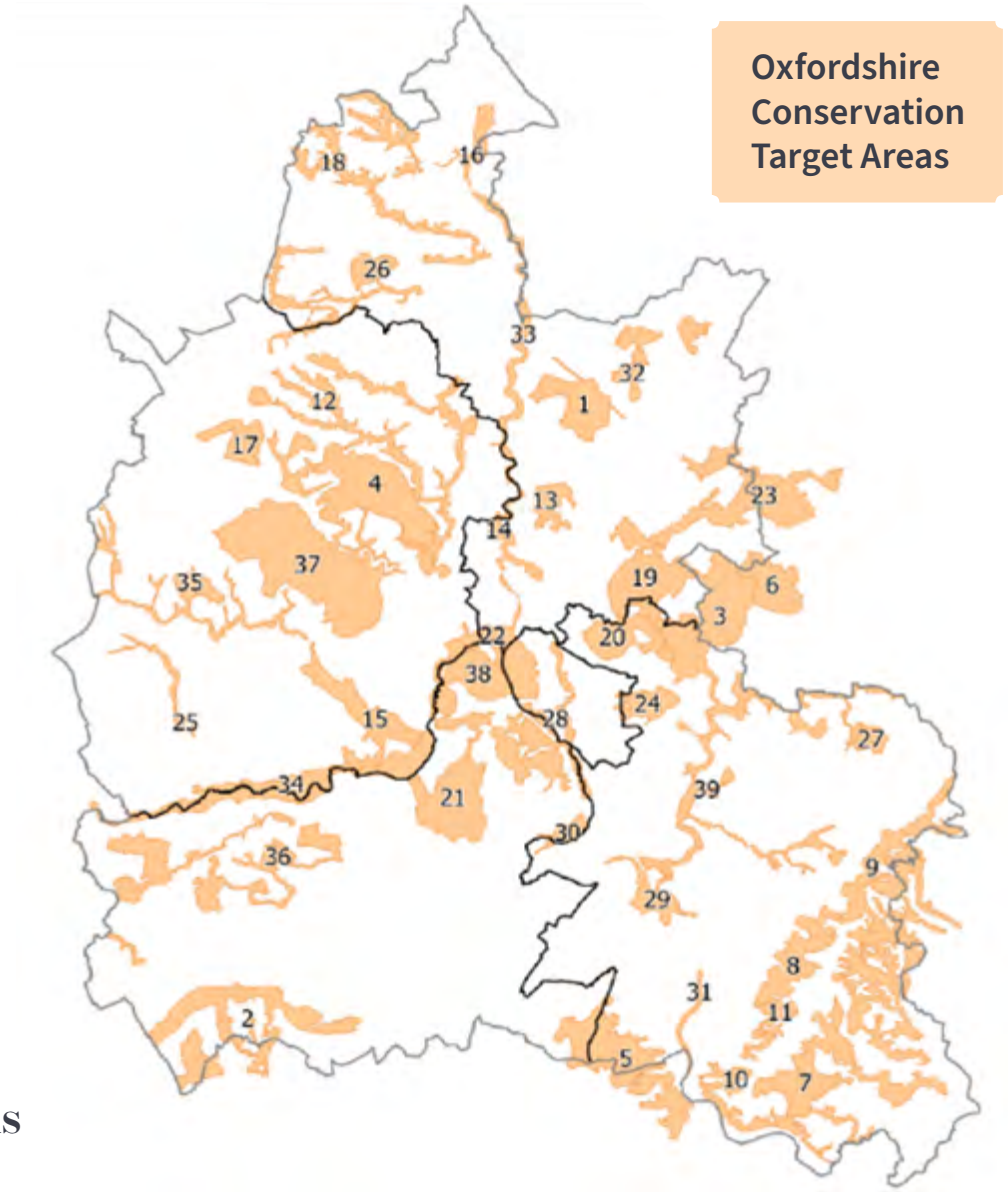
A draft version of the map was presented to the public for oversight and we had strong participation from people across the county

- We received nearly 2,000 comments across the map with agreement, ideas, and suggestions for changes from individuals, developers, farmers, local authorities, and more.

Step 5

We made changes to the mapping to produce the final version of the Local Habitat Map

- Where we heard requests for minor changes we made these (e.g. adjusting the boundaries of the mapping slightly)
- Where we heard about any errors, these were corrected
- Where we received evidence of nature recovery projects underway, these were built into the mapping.

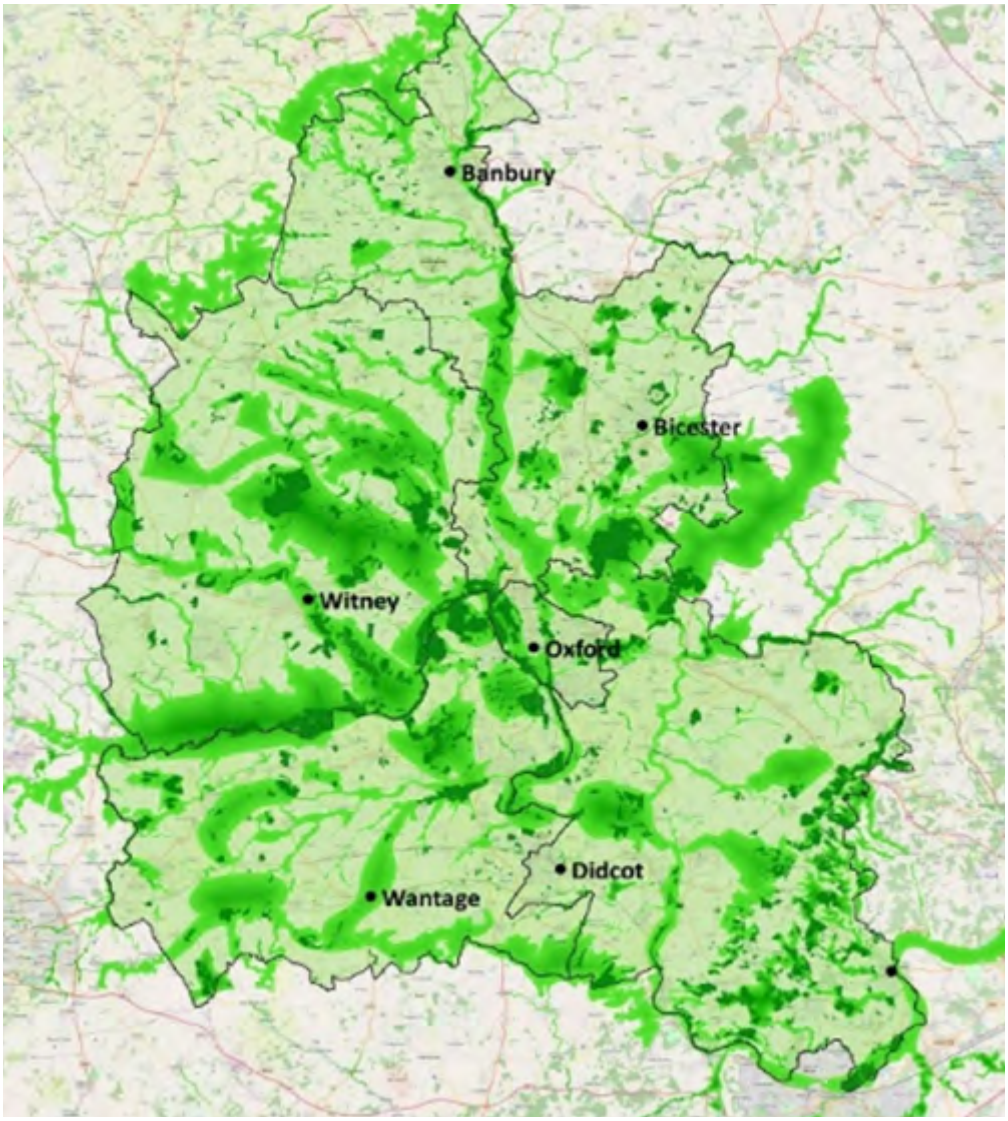


Building on previous work in the county

Identifying target areas for nature recovery is not new for Oxfordshire. Groups across the county had worked on a number of previous initiatives to prioritise where habitat creation and enhancement work should be targeted. Local people and organisations made a clear case that the LNRS should build on this previous work, using the areas as a foundation for the LNRS map to amplify the previous work whilst also bringing in wider audiences and the latest local information and knowledge. The Oxfordshire Local Nature Recovery Strategy builds upon a rich history of conservation efforts within the county, leveraging past initiatives such as the Conservation Target Areas (CTAs) and the draft Nature Recovery Network (NRN).

The Conservation Target Areas (CTAs) began in 2006 and were a pivotal tool for mapping out which areas of the county hold significant ecological value. As of 2025, there are now 39 such CTA areas in Oxfordshire that cover about 20% of the county. Their purpose has been to identify which areas of the county should be prioritised for nature recovery actions. This targeted mapping aimed to preserve existing habitats, enhance their quality, and create better-connections between them to help wildlife thrive. See more about CTAs on Wild Oxfordshire's webpage here. These areas continue to be managed and the areas are evolving over time.

Draft Oxfordshire Nature Recovery Network



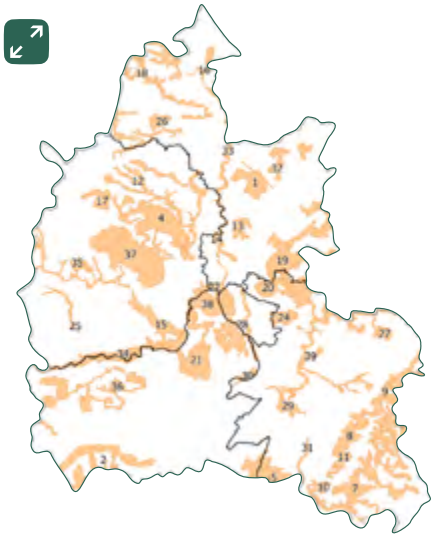
After the momentum of the CTAs, ecologists and environmental organisations came together in Oxfordshire to develop local mapping further. They produced a draft Nature Recovery Network (NRN) - read more here on Wild Oxfordshire's website. The draft NRN aimed to identify which places are 'core' habitats that should be enhanced, and which areas could be 'recovery' areas where habitats could be created to link up the 'core' sites. It aimed to expand conservation efforts, seeking to create a more extensive and interconnected system of natural spaces, promoting the idea that nature recovery needs to be a county-wide endeavour. The NRN emphasized the importance of spatial targeting.

In essence, the LNRS Local Habitat Map represents an evolution of past conservation efforts, combining the targeted approach of the CTAs with the expansive, interconnected vision of the NRN, whilst ensuring that there are opportunities a wide range of people and organisations across the county to input into the creation of the strategy. The LNRS incorporated both the CTAs and the NRN areas into the LNRS Local Habitat Map. It mapped the CTA areas to ensure that conservation efforts would still be targeted towards these locations and it covers the majority of the draft NRN area but with further corridors and connections shaped by local input.

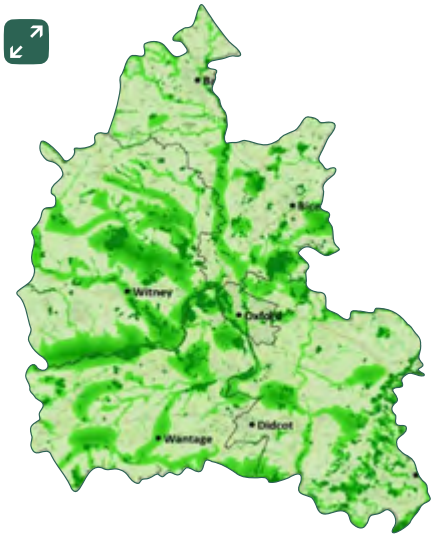
The LNRS is not expected to map every nature recovery action that could happen in every part of the county. The government guidance tasked LNRSs to prioritise and consider trade offs understanding that there are a range of pressures and expectations on Oxfordshire's land, from food production to space for housing and the LNRS aimed to identify the most beneficial areas to target nature recovery whilst balancing other needs e.g. by choosing land with lower agricultural value.

This shows the evolution from the CTAs, the draft NRN, through to the LNRS Local Habitat Map.

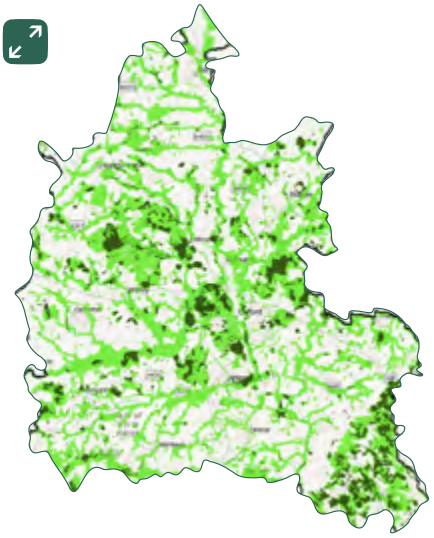
Conservation target areas began in 2006 and covers about **20%** of the county.



Draft NRN areas developed in 2020 and covers about **30%** of the county.



The LNRS areas developed in 2025 and covers about **40%** of the county.



What are the key differences in the LNRS Local Habitat Map compared with previous spatial strategies?

- A wide range of around 3,000 responses went into shaping the strategy from people and organisations across Oxfordshire. These contributions of local knowledge and data helped to create the actions, species, and locations recommended for recovery. This is the largest audience contributing to a countywide biodiversity strategy in Oxfordshire to-date.
- Greater focus was put into freshwater habitats and using the watercourses as natural opportunities to enhance connectivity and prioritise freshwater habitat improvements.
- Within the LNRS Local Habitat Map network, there are specific actions mapped to each of those locations. This has not been done in previous mapping.
- Map users can interact with the map and click on any area of the map to see which nature recovery actions are recommended in that area.
- There are still actions to take in the wider landscape outside the network for habitats, farmland, rural areas, and the urban environment.
- There are actions to take for both habitats and for specific species to promote their recovery with a particular process followed to identify the species that would benefit most from bespoke actions.
- More urban habitats and community land are included for specific biodiversity enhancements in the LNRS. The LNRS not only aims to reverse the decline of biodiversity but also to foster a sense of pride and stewardship among the community, empowering everyone to do their bit in their local area to contribute towards a joined-up, healthy, environment in Oxfordshire.
- The Responsible Authorities will have a requirement to monitor nature recovery actions taken in the future, to report on these, and to review and republish this strategy (including the map) during the next 3 – 10 years.

How to deliver the LNRS?

How can nature recovery actions be rolled out across Oxfordshire

If Oxfordshire delivers the majority of the LNRS's mapped actions, the total area of nature-rich habitats would more than double benefitting future generations and for nature's own sake. This will:

- Enhance biodiversity, halting the loss of species
- Boost resilience against climate change
- Provide public benefits, helping to alleviate flooding and extreme heat, and providing clean water, recreation spaces, and improving health and wellbeing.

The mission of the LNRS is to empower everyone in Oxfordshire to do something for nature recovery and contribute towards the creation of a more resilient network of nature. With this strategy, Oxfordshire is in a better position to know what needs to happen, and where those actions could be delivered.

Who is expected to deliver the LNRS?

All of us. All people and organisations across Oxfordshire are the delivery partners of the Local Nature Recovery Strategy and many are already delivering brilliant work to help nature recover. The LNRS helps us to build on this. Some people may contribute through direct actions on the ground, others may be enabling actions by offering funding or providing the land to take action on.

These are actions that individuals, communities, nature recovery organisations, landowners, farmers, businesses, utilities companies, developers, minerals and waste teams, and authorities can be taking and enabling to enhance the local environment to benefit both people and wildlife. Some people may be able to enable others through funding, or volunteering for example, others may have land or areas of land that they wish to dedicate towards biodiversity, others may be writing policies that help these priorities and actions to be delivered or building visitor centres and preparing educational materials to help people access and learn about the environment. There is no single person or organisation who is expected to deliver the LNRS alone, everyone has something they can do to support biodiversity to recover.

Delivery of actions is expected to happen by a large range of people including local communities, landscape partnerships, owners of local wildlife sites, managers of other designated sites, local authorities, nature-friendly farmers, and by project teams working across county borders. Actions in the LNRS are expected to be delivered and enabled by the following people (including but not limited to):

Regional and national bodies	Local organisations/groups/ authorities	Communities/individuals
Government, Natural England, Forestry Commission, Environment Agency, Health and social services, Utilities companies, minerals operators, developers, National Farmers Union, Country Land and Business Association, land and business advisors, national businesses, the three National Landscapes, Canal and River Trust, neighbouring counties and authorities, British Association for Shooting and Conservation, Game & Wildlife Conservation Trust, RSPB	Local Authorities (County, District, and City councils), Oxfordshire's Local Nature Partnership, BBOWT, Wild Oxfordshire, CAG Oxfordshire, farm cluster groups, catchment partnerships, Freshwater Habitats Trust, Thames 21, Trust for Oxfordshire's Environment, Earth Trust, partnership projects for nature recovery.	You and other individuals at home/work/university/school/ community spaces, farmers, landowners, land managers, parish and town councils, local community action groups, local businesses.

Cross-border working and delivery projects

Some projects will need to be particularly large scale to ensure that England's future environment is fit to support wildlife. These include cross-border, regional, and national projects. Often these regional and cross-border projects will contain a programme of activity working across varied landscapes and will bring together a range of partners, seeking to enhance ecological networks. Projects may also look for opportunities to support the northward movement of species in response to changing climates, and since Oxfordshire is situated between a large number of counties, it has a key strategic role to allow species to move, into, across, and up through the county.

Landscape scale projects should aim to

- Unite partners across political and institutional boundaries
- Set clear priorities that guide funders and policymakers
- Plan to enable species to move and adapt in response to climate change over the next 10, 50 and 100 years

The LNRS encourages people to consider delivering projects of scale and there are regional projects that cross into Oxfordshire that are proposing landscape-scale benefits for biodiversity. See the State of Nature in Oxfordshire 2017 for a more detailed description of a range of ongoing projects in Oxfordshire. Some of the larger scale proposals include Big Chalk, initiatives underway in the Bernwood, Otmoor Ray area, and landscape recovery work being delivered in partnership often with support from farm clusters, and catchment partnerships. For a sense of the scale of these projects, Big Chalk aims to create a robust ecological network of all habitats found on calcareous landscapes across 19% of England (24,000 kilometres squared) a scale hitherto unimagined. There has also been a bold proposal

to create a '100 square mile Regional Nature Park' across Buckinghamshire and Oxfordshire which can be read about here. This LNRS has also been shared with neighbouring counties to foster cross-border opportunities for nature recovery. Collaborative efforts are crucial for ensuring a cohesive approach to habitat restoration and wildlife conservation.

Monitoring the delivery of the LNRS

As actions are delivered across the county, the LNRS will need to record what has happened, and where. This will help us monitor the delivery and effectiveness of the strategy.

- **Cyclical monitoring:** Every 3-10 years Defra will instruct authorites to review and republish their LNRSs in a repeating cyle.
- **Reporting:** Authorities will be asked to report which nature recovery actions have been delivered for habitats and species and to map out the delivery locations.

Further guidance from Defra is expected to be shared with authorities to enable them to prepare their monitoring process in accordance with national plans. We expect that we will be asked to monitor and report on the actions that are delivered for habitats and for species across Oxfordshire.

Once we have received guidance on monitoring expectations from Defra, we plan to develop monitoring processes and create local targets during the delivery phase. The targets will be SMART Oxfordshire targets created in collaboration with Oxfordshire's Local Nature Partnership and will link to national objectives.

Funding and support

For some actions such as making your garden hedgehog friendly, creating a small orchard, making a pond, or putting up bird boxes on farms or at home, some people will be able to deliver these without additional funding. Some others may have enough resources themselves to start surveying their sites, talking to the relevant organisations, and getting the okay to deliver those actions. However, for the majority of larger-scale nature recovery projects, community projects, and landscape-scale actions significant financial investment (grants an payments) will be required to enable people in Oxfordshire to deliver landscape scale changes. Typically, such funding and payments currently comes from local authority schemes, national charities, Biodiversity Net Gain developments, agri-environment and land management schemes, government grants, and local or regional funding bodies.

The LNRS webpage has a section called 'How to help nature now' with a range of links to organisations and support to help you take action. A range of organisations already offer funding and investment to support nature recovery efforts and you can make a case to these funders and highlight how your project will deliver LNRS actions.

Whilst LNRSs do lay out a clear blueprint for action, plans alone won't stop biodiversity loss. The recommended actions must be funded and supported by a diverse range of people, organisations, and partnerships. LNRSs are intended to guide national, regional and local funders (via mechanisms such as Biodiversity Net Gain, green finance and future agri environment schemes) to channel resources into creating larger, better connected networks for nature, though government has yet to clarify exactly how LNRSs will link with agri environment payments.

Advice and engagement

After the publication of the LNRS, it is expected that many local people and organisations will need some help to understand, use, and deliver the LNRS. Many local nature recovery organisations and authorities are already helping lcoal people take actions that align with the LNRS and they will continue to provide support.

Additionally, those working on the LNRS intend to engage and meet directly with people who want to deliver nature recovery actions. This may include creating opportunities such as a forum for local people to access advice on how to deliver LNRS actions and how to report any actions they have taken. This is particularly relevant to farmers since agricultural land accounts for more than 70% of the county. However there needs to be a range of advice for all audiences across Oxfordshire such as parish and town councils, catchment partnerships, community groups, and businesses to enable them to understand and deliver actions for species and habitats in appropriate locations using LNRS recommendations combined with professional advice.

Influencing planning policy

All public authorities will have a duty to have regard to the LNRS which will be another way that the LNRS helps to deliver nature recovery actions and influences planning policy. The recent update to the Planning Practice Guidance contains a new legislative requirement for all Local Planning Authorities (LPAs) to 'have regard' to LNRSs.
A meeting was held between the Responsible Authority (Oxfordshire County Council), Natural England and representatives from Oxfordshire's Local Planning Authorities (Cherwell, West Oxfordshire, Oxford City, South Oxfordshire, and Vale of White Horse, and Oxfordshire County Council).

The authorities agreed that:

It is important to recognise that some of the Local Planning Authorities in Oxfordshire were at an advanced stage in plan preparation when this LNRS was being developed. For Local Plans being prepared whilst the LNRS was still in draft form (before November 2025), it was clearly not possible for the individual LPAs to fully consider and describe how their plans should 'have regard' to this final version of the LNRS.

Local Planning Authorities in the early stages of plan preparation should be able to fully consider how their plans and policies interact with the LNRS and should seek to take a positive approach, where possible identifying opportunities to help delivery of the LNRS. It may not always be possible to avoid situations where allocations for alternative uses overlap with the mapped extent of the LNRS, particularly where land suitable for development is in very short supply. In these circumstances, LPAs should seek to plan positively for the delivery of the potential measures identified in the LNRS within the proposed development and use this as a driver for the delivery of on-site BNG and green infrastructure networks.

Where existing or proposed allocations within more advanced Local Plans overlap with the mapped extent of the LNRS, this can be viewed as a positive opportunity for the potential measures identified for that part of the network to be delivered. This could include targeting on-site BNG at delivery of the potential habitat measures identified in the LNRS and integrating appropriate habitats into green-infrastructure networks and landscaping for the proposed development. It may not always be possible to accommodate the exact mapped extent of the LNRS within the developments but opportunities to link and connect habitats within the sites green infrastructure should be taken.

National objectives

How would the delivery of the LNRS contribute towards national objectives and targets?

There are some national obejctives and targets that we know the LNRS is expected to contribute to and these are laid out below along with information about how the Oxfordshire LNRS contributes towards these. The overarching ambition of DEFRA's 25 Year Environment Plan is to 'leave our environment in a better state than we found it and to pass on to the next generation a natural environment protected and enhanced for the future'. The plan highlights six key areas for action, one being to establish a Nature Recovery Network. The LNRS's Local Habitat Map is one of the 48 local habitat maps that will be joined together across England to produce the national 'Nature Recovery Network'. It is expected that the national Nature Recovery Network will offer a tool to drive the strategic protection and restoration of nature and wildlife, as well as providing greater public enjoyment of the countryside; increased carbon capture; and improvements in water quality and flood management. This section summarises the relevant national environmental objectives (NEOs) that Local Nature Recovery Strategies seek to contribute towards.

ENVIRONMENT ACT (2021)

The Environment Act sets new legally binding targets for nature, water, air quality and waste reduction in England.

National objectives	How the strategy contributes
Biodiversity on land - Restore or create in excess of 500,000 hectares of a range of wildlife-rich habitat outside protected sites by 2042, compared to 2022 levels	Oxfordshire's LNRS identifies locations where 'potential measures' (actions) could be taken to create or enhance habitats. Oxfordshire's share of the national target is to deliver at least 10,000 hectares.
Biodiversity on land – Halt the decline of species abundance by 2030. Ensure that species abundance in 2042 is greater than in 2022, and at least 10% greater than 2030	All habitat actions proposed in Oxfordshire's LNRS are designed to make a positive contribution for a huge number of species. Additionally, targeted measures have been created to address species needing bespoke support.
Biodiversity on land - Reduce the risk of species' extinction by 2042, when compared to the risk of species' extinction in 2022	The strategy recommends and identifies targeted habitat creation and enhancement actions to support the recovery of threatened and near threatened local species.
Woodland cover - Increase total tree and woodland cover from 14.5% of land area now to 16.5% by 2050	The strategy identifies where new woodland and trees can be planted, where existing woodlands can be expanded, and where to create or enhance areas of trees outside of woodlands to benefit nature and deliver other environmental outcomes. This includes recommended actions to plant trees in urban environments to people and biodiversity.
Improve water quality and availability - Reduce nitrogen (N), phosphorus (P) and sediment pollution from agriculture into the water environment by at least 40% by 2038, compared to a 2018 baseline	Actions suggested by the strategy can help improve the water environment. For example, by creating riparian buffers along water courses it is possible to reduce the surface water input of pollution to watercourses whilst also creating wildlife corridors.

ENVIRONMENTAL IMPROVEMENT PLAN (2023)

The Environmental Improvement Plan introduced several additional commitments in addition to the aims and objectives in the Environment Act to guide government's approach to restoring the environment.

Objective	How this LNRS can contribute
Work to ensure that everyone in England lives within 15 minutes' walk of a green or blue space	Oxfordshire's LNRS identifies opportunities to create and enhance habitats and greenspaces near to homes to support access, biodiversity, and wellbeing as well as a range of other benefits.
Restore 75% of our water bodies to good ecological status	Oxfordshire's LNRS establishes county priorities to improve water quality and the structural diversity of rivers with some additional measures focused on particular species such as beavers, fish, and water voles. These habitat and specie actions would make a significant, positive contribution to the water environment.
Protect 30% of land and of sea in the UK for nature's recovery by 2030	Oxfordshire's LNRS identifies opportunities to create and enhance wildlife-rich habitat across 40% of the county including National Landscapes and new habitat areas that could meet 30by30.
Support farmers to create or restore 30,000 miles of hedgerows by 2037 and 45,000 miles of hedgerows by 2050	Oxfordshire's LNRS establishes a priority to enhance and create hedgerows, recommending countywide delivery of hedgerow planting as well as the sensitive management of all existing hedgerows. This LNRS supports this action wherever it is possible. The map does have some species locations identified where certain species may particularly benefit from hedgerow creation or management.
Manage our woodlands for biodiversity, climate and sustainable forestry.	Oxfordshire's LNRS identifies sites for woodland management to enhance woodland condition and offer benefits for nature as well as wider benefits.
Restore 75% of Sites of Special Scientific Interest to favourable condition by 2042. By 31 January 2028 50% of SSSIs will have actions on track to achieve favourable condition.	Oxfordshire's LNRS targets habitat creation and enhancement near to SSSIs and recommends appropriate management to enhance the condition of all designated sites.
Ensure delivery & management of actions & policies that contribute towards our 25YEP goals are suitable & adaptive to a changing climate	Oxfordshire's LNRS focuses on creating more, larger, better-connected habitat areas to support climate resilience and to enable species to move and respond to climate change. Creating a resilient network of good quality habitats is our best opportunity to defend nature.

Objective	How this LNRS can contribute
Make sure LNRSs include proposals for Nature-based Solutions which improve flood risk management where appropriate	Oxfordshire's LNRS has mapped and prioritised habitat measures in flood-prone areas and provided information about natural flood management actions across the county as well as specific locations. The LNRS also incentivises sustainable drainage systems in settlements in Oxfordshire to manage rainwater. The LNRS Local Habitat Map recommends many potential measures near to waterbodies and within flood risk zones to reduce the impacts of flooding.
Reduce emissions of nitrogen oxides by 73% and ammonia by 16% by 2030 relative to 2005 levels	Oxfordshire's LNRS Statement of Biodiversity Priorities promotes the creation of buffers around habitats and sensitive sites to support emission reduction indirectly through land use changes. Whilst we have done this to try to support sensitive habitats, the LNRS itself has a limited ability to influence nitrogen oxide emissions.
Reducing the rates of introduction and establishment of invasive non-native species by at least 50%, by 2030	Restoration of habitats may sometimes involve the removal of invasive non-native species and this LNRS has recommended management of such species where necessary as a priority and an unmapped, countywide potential measure.

30 by 30

The UK has committed to protect 30% of land and sea for nature by 2030 (30by30) and government recognise that this vision will require significant investment to deliver. This LNRS has been prepared to help contribute towards 30 by 30, acting as a strategic tool that could be used to drive investment towards nature recovery actions in key locations in Oxfordshire to contribute towards the national and international 30by30 target to protect and manage 30% of land and water for nature by 2030.

Projects in the LNRS delivery phase could deliver part of the 30by30 vision if their project sites meet the following three criteria:

- the purpose or management objectives include positive conservation outcomes for nature
- there are long term commitments to biodiversity and protections against loss or damage to biodiversity
- management and monitoring are in place to deliver and evaluate the intended benefits for nature.

To support the creation of such sites, the LNRS local habitat map has mapped a range of locations totalling an area greater than 30% that could be suitable for these criteria although sites will need to be assessed on an individual basis.

What you can do now

Throughout the process of preparing this Local Nature Recovery Strategy (LNRS), it was clear that people are excited and motivated to help nature to recover. When our first survey asked 650 people whether they would like to do more to increase nature in Oxfordshire, 97% (626 people) either agreed or said they were already doing the most that they can. You can see a further breakdown of responses to our survey on the LNRS webpage.

97%
of respondents said they would like to do more to increase nature in Oxfordshire

To decide on what to do next, you could:

- View the Local Habitat Map, find recommended actions near you
- Read the Statement of Biodiversity Priorities, a list of countywide actions that need to be taken to recover the local environment
- Check the Species Priorities List, target your project to support species that need extra actions
- Visit 'How to Help Nature Now' on the LNRS website for toolkits, "Before You Start" guidance, local contacts (BBOWT, Wild Oxfordshire, NFU), and funding links.
- Don't forget your site assessment. Before you begin creating or changing habitats, remember that all sites must be assessed in person to first ensure the planned actions are appropriate.

  You will need to contact relevant professionals, survey habitats, check for species, check for any archaeological features, and verify whether the soil type is suitable for the intended actions. The LNRS has created a short 'Before you Start' guide to support you with these site assessment checks and help you plan your project with confidence. You can find this on our website.

Together, people and organisations can turn this strategy into reality and secure Oxfordshire's nature for generations to come.

Glossary

Whilst we aim to explain most terms as they are used throughout the strategic documents a number of acronyms are regularly used and this page explains what each acronym stands for.

- **APIB** – areas of particular importance for biodiversity, these are existing sites that meet certain criteria assigned by Defra
- **ACB** – areas that could become of particular importance for biodiversity, these areas are targeted for habitat creation and enhancement work by LNRSs
- **BBOWT** – Berks, Bucks, and Oxon Wildlife Trust
- **CTA** – Conservation Target Area, locations in Oxfordshire that have been identified as target areas for conservation action
- **draft NRN** – draft Nature Recovery Network, a previous spatial plan for recovering nature in Oxfordshire produced in 2020
- **LCT** – Landscape Character Types, an area in Oxfordshire that has is given a name to describe common shared biodiversity, natural, cultural, or historic features found in that geographical area
- **LNR** – Local Nature Reserve
- **LNRS** – Local Nature Recovery Strategy, which is made up from this document, the Statement of Biodiversity Priorities, the Species Priorities List, and the Local Habitat Map
- **LNRS Partnership** – a number of organisations and authorities who all regularly and consistently contributed to the development of the LNRS since 2023
- **LWS** – Local Wildlife Site
- **NCA** – National Character Area. These areas each have distinct geological, cultural, and biodiversity characteristics and have unique names
- **NNR** – National Nature Reserve
- **OCC** – Oxfordshire County Council
- **OLNP** – Oxfordshire Local Nature Partnership, a partnership made up of representatives from the public, private, third, and health sectors. Its purpose is to radically enhance nature, its positive impact on the climate and the priority its given, helping to make Oxfordshire a place where people and nature thrive
- **OWLS** – Oxfordshire Wildlife and Landscape Study (2004), created 25 different types of Landscape Character Types which cover Oxfordshire
- **PM** – Potential measure. An LNRS-recommended action that could be taken to create/enhance habitats or to benefit particular species
- **RA** – Responsible Authority, the authority appointed by government to lead the preparation of the strategy
- **SA** – Supporting Authority, the local planning authorities and Natural England who have a key role in developing and approving the strategy
- **SAC** – Special Areas of Conservation
- **SBP** – Statement of Biodiversity Priorities, one of the core LNRS documents that lists important actions to deliver to enhance and create habitats in Oxfordshire
- **SPL** – Species Priorities List, a list of bespoke actions needed by certain species in Oxfordshire to enable their recovery
- **SSSI** – Site of Special Scientific Interest
- **TVERC** – Thames Valley Environmental Records Centre, the Local Environmental Records Centre for Oxfordshire

Appendices

- **Appendix A** (here) **– Report on designated sites, irreplaceable habitats and areas of particular importance for biodiversity.** A detailed report listing the county's designated sites and irreplaceable habitats in Oxfordshire showing how 6.5% of Oxfordshire meets criteria to be an area of particular importance for biodiversity. Produced by TVERC, find it here on the LNRS webpage.

- **Appendix B** (here) **– Description of the biodiversity features and recovery opportunities associated with each river and catchment in Oxfordshire.** Each river and its catchment has a 1-2 page description of the river's history, modifications, pressures, biodiversity of note, and key opportunities for recovery including maps of each river, headwater streams, any chalk streams, and the boundary of the catchment.

- **Appendix C** (here) **– Description of the biodiversity features and recovery opportunities associated with each National Character Area (NCA) in Oxfordshire.** Each NCA has a 1-2 page description of the areas geology, landscape character type, biodiversity, cultural land-use, and notable species in the area. Each description gives examples of actions that could be taken in those areas to benefit local species or to create, manage, or enhance habitats. There are maps of the OWLS landscape character types found within each NCA area.

- **Appendix D** (here) **– A table of over 60 datasets used to inform the LNRS mapping.**

- **Appendix E** (here) **– The technical report describing how the LNRS Local Habitat Map was created.**

Statement of Biodiversity Priorities

Oxfordshire's Local Nature Recovery Strategy

Final version October 2025

OXFORDSHIRE COUNTY COUNCIL

Contents

Introduction

'Biodiversity' is a term that refers to the variety of all life forms or 'species' including plants, animals, fungi, and micro-organisms.

A stable and healthy variety of species provides a wide range of benefits that enable people to survive, from fresh water, clean air, and climate regulation to food, medicines, mental and physical wellbeing and more.

These benefits do not typically come from individual species but from a rich variety of species working together and interacting with each other in their natural habitats (ecosystems).

What is the Statement of Biodiversity Priorities?

In 2023, authorities across England were asked by Government to start developing Local Nature Recovery Strategies (LNRSs) to publish in 2025. This was a requirement from the Environment Act 2021. The Act also explained that the written statement of biodiversity priorities must include:

- a description of the strategy area and its biodiversity (which can be found as one of our key LNRS documents called the 'Description of Strategy Area')
- a description of the opportunities for recovering or enhancing biodiversity in the strategy area
- the priorities for recovering or enhancing biodiversity (found within this document, taking into account the contribution that this can also make to other environmental benefits)
- proposals for potential measures relating to those priorities (found within this document. The potential measures which are specific to particular species can be found on the LNRS 'Species Priorities List').

This Statement of Biodiversity Priorities sets out priorities for biodiversity that are of great importance to achieve locally and indicates which wider benefits could be achieved (See Appendix A). The 'priorities' are the outcomes that collectively, would result in the recovery of nature across Oxfordshire. Each priority, listed below, has a set of 'potential measures' with them which are the actions that need to be taken to achieve the priority outcome.

The types of actions which could be included as LNRS 'potential measures' are:

- Actions to create, improve, or restore habitats (expanding and/or enhancing habitat or changing management practices to better support biodiversity)
- Actions needed to benefit specific local species*

Actions to connect up habitat areas to improve the resilience of nature and enable species to move through the landscape.

* Local species in this document means those that are already present in (or near) an area, and those that could become local or present in or near that area (considering those species that may migrate or move, and species that may be translocated or introduced to suitable habitats).

Is every potential measure mapped onto the Local Habitat Map?

Not all the measures have a specific location mapped for their delivery.

The table in this document indicates whether a 'potential measure' (an action) could be undertaken "countywide" or whether the measure is "mapped" to specific locations.

If a measure is labelled "mapped", then this means that specific areas have been identified on the LNRS Local Habitat Map as priority locations to deliver the measure.

These locations are prioritised because they are expected to provide the greatest benefits for biodiversity and help to focus delivery in a way that would create a more resilient, connected network of nature in Oxfordshire.

Typically, the mapping helps to expand existing areas that are important for biodiversity, buffer areas, and join up existing areas of importance to biodiversity. Whilst some measures are mapped to such locations, the measures could also be delivered in other suitable locations within the county.

The measures do not have to be restricted to the mapped locations since actions outside of the mapped areas would still support the recovery of nature, just perhaps not to the same extent as the mapped network.

Although care has been taken to map actions which are expected to be suitable for the soil type and location, all sites must still be assessed on-the-ground to ensure that the site is suitable for the proposed actions, including compliance with regulations such as those related to heritage.

At present, it has been feasible to map prioritised locations for about half of the listed measures. Some are not mapped, and this is usually because they could be delivered, to great benefit, in many different locations across the county, or because we do not currently have sufficient data to map them.

This does not mean they are of less importance than mapped measures. These unmapped, countywide measures should also be supported and delivered in suitable locations.

How to navigate this document?

On the next page, you will see the table which contains 40 biodiversity 'priorities' and 85 'potential measures'. The measures are actions that could be taken to achieve their relevant priorities.

The priorities are grouped into sections, mostly by habitat type e.g. 'Grasslands (including scrub) and road verges'.

Each priority and each potential measure also has an identification code which increases in numerical order (e.g. 'PM01', 'PM02' and so on) so that you can more easily look up codes for measures shown on the Local Habitat Map to find further information.

Links are included throughout this document to help readers find useful guidance on how to create or improve habitats but you can search for alternative guides, for example here and we recommend you seek expert advice before planning a nature recovery project.

A note on climate change

At the time of writing, the below actions were expected to be the most suitable ways to support the recovery of these habitats.

However, there are expected changes to climate patterns with warmer, wetter winters and hotter, drier summers predicted, as well as increasing extremes in weather events and storms, although the exact nature of the changing patterns may be unpredictable.

The LNRS recommends that the actions listed below should be adapted, if necessary, based on the latest understanding of climate change in order to best support the recovery of these habitats in Oxfordshire.

How was this list made?

This 'Statement of Biodiversity Priorities' was produced by first collecting the actions and priorities from local people and organisations, grouping them into themes e.g. 'create meadows', 'improve river condition', and filtering out those which didn't relate to habitat creation or enhancement.

These were then refined into the priorities and measures by local experts from a range of organisations.

For more information on the process, Appendix D, and the Oxfordshire County Council's LNRS website.

The next pages list the Statement of Biodiversity Priorities and the potential measures in a table.

Statement of Biodiversity Priorities

Existing areas of particular importance for biodiversity (APIBs)

You can see these areas identified on the LNRS Local Habitat Map [LINK added at launch].

Code	Priority In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	The code of each measure (and whether they are mapped)	Potential Measure (PM) In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P1	**Enhance the ecological condition of Oxfordshire's existing designated sites and irreplaceable habitats. Aim to achieve good ecological condition.** Wider benefits: Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Water supply, Flood protection, Erosion protection, Water quality regulation, Carbon storage, Air quality regulation, Cooling and shading, Noise reduction, Pollination, Pest control.	PM01 (mapped)	**Enhance and maintain existing areas that are particularly important for biodiversity in Oxfordshire.** Enhance (and maintain in good condition) the sites in Oxfordshire that are designated for biodiversity or considered to be irreplaceable. Also look for ways to enhance/maintain the land that buffers these sites. For Oxfordshire, this includes designated sites such as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Local Wildlife Sites (LWS), National Nature Reserves (NNR), Local Nature Reserves (LNR), and Oxfordshire's irreplaceable habitats including ancient and veteran trees, ancient woodland, and lowland fens. The 'sites' are mapped for their importance to biodiversity either as designated, locally important, or irreplaceable habitats. Within the sites themselves, aim to enhance the area to either achieve, or maintain a good ecological condition and benefit local species. It is important for SACs and SSSIs that advice is sought from Natural England regarding appropriate management. For Local Wildlife Sites, advice may be available from the Berks, Bucks and Oxon Wildlife Trust. Contact the Thames Valley Environmental Records

			Centre for more detail about the importance of a particular site within the APIBs, including citations for designated sites which identify the habitats and species for which the site is important. On the land around/adjacent to the existing sites, it would be important and beneficial to provide a suitable buffer area of appropriate, complementary habitat to benefit the site and the wildlife around it. Actions in the buffer area could aim to enhance any existing habitats, create new complementary habitat areas, or reduce disturbance or pollution in that area including reduced run off or chemical inputs. Ultimately, these actions should aim to benefit the ecological health of the neighbouring irreplaceable or designated site. Different sites will need different types/sizes of buffer habitat to offer the greatest benefits to wildlife in the area. Typically, it will be of benefit to create areas of low intervention land use in the land that buffers existing areas of importance for biodiversity, or to create mosaic habitat areas at these buffer edges that complement the adjacent site.

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Connectivity and boundaries

Code	Priority In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	The code of each measure (and whether they are mapped)	Potential Measure (PM) In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P2	**Improve the connectivity of habitats and reduce fragmentation. Create and enhance habitats to create more areas of nature that are bigger, better, and more joined up.** Wider benefits: Recreation and leisure, Aesthetic value, Interaction with nature, Sense of place, Erosion protection, Flood protection, Erosion protection, Water quality regulation, Carbon storage, Air quality regulation, Cooling and shading, Noise reduction Pollination, Pest control.	PM02 (countywide)	**Prioritise connectivity when creating and maintaining habitats to join up areas of nature and habitats more effectively** Strengthen and maintain ecological corridors, prioritise the creation of new habitats that can enable wildlife to move, feed, reproduce, and disperse across the landscape. This is particularly important between existing wildlife-rich areas. The creation of new habitats should be prioritised in locations where they could make existing areas of habitat bigger and more joined up across Oxfordshire. This would contribute towards creating a large, functioning ecological network of diverse habitats that are fit for purpose, and which allow wildlife to move though landscapes, expand their range, and respond and adapt to climate change. Connectivity requirements should be factored into long term site management objectives. Large, connected spaces could be achieved through ambitious projects with a long-term vision (likely to involve multiple partners) and could create nationally important large nature areas, perhaps thousands of hectares in size, if possible, in one or more areas of Oxfordshire. Connectivity can be achieved or enhanced in different ways, including (1) by creating new habitat to join existing habitats, or maintaining and enhancing existing wildlife-friendly corridors such as watercourses, canals, railway embankments, road verges, cycle ways, hedgerows, and other linear features, (2) by creating and maintaining ‘stepping stones’, distinct wildlife rich areas between existing, larger

			sites to allow species to move and disperse across the landscape, and (3) by creating, enhancing, or maintaining habitats near to existing wildlife-rich habitats to produce larger blocks of habitat. To achieve the best outcomes, newly created habitats should look to complement the local wildlife-rich habitats and species that already exist. Habitat creation should seek to connect “like with like” and consider how species move through the landscape. New habitats could include (but are not limited to), grassland, woodlands, wetlands, open and mosaic habitats, orchards, parkland, and wood pasture. If existing sites are made bigger and better with more links like corridors and stepping stones to enable species to move across the county, Oxfordshire will be able to pass on to future generations a network of healthier more functional ecosystems. This would benefit wildlife as the climate changes and will improve opportunities for people to enjoy wildlife. Improving connectivity and reducing fragmentation is likely to be best achieved through co-ordination with neighbouring land managers. Some areas of the County have farmer clusters, Conservation Target Areas (CTAs) and catchment partnerships which help facilitate this approach. Whilst this measure isn’t directly mapped, the Local Habitat Map has been created with this priority built in and most of the mapped areas offer strategic places to create habitats to contribute towards this priority. Read more about the importance of connecting England’s wildlife sites, managing them, and creating more, bigger, better, joined up ecological network here.
		PM03 (mapped)	**Create, maintain, or enhance wildlife passages to reduce habitat fragmentation by roads, rail, and other infrastructure.** Wildlife passages include ‘green bridges’ as well as other creative solutions that are designed to enable wildlife to move between areas of habitats such as tunnels, viaducts, underpasses, overpasses, stream and river crossings and culverts.

			Create crossings through new or existing infrastructure that can join up habitats, help wildlife to move across the landscape, stop species from becoming isolated, and also reducing the number of traffic accidents. This handbook describes a range of options like canopy bridges, bat crossings, viaducts and wildlife underpasses, as well as overpasses, adapted culverts, and more. Specific examples of wildlife passages include the Scotney Castle Land Bridge, adder tunnel, and a range of 33 multi-species crossing points including otter ledges in Cornwall. Priority locations for these wildlife passages may change over time as wildlife moves and infrastructure changes. Whilst this version of the LNRS has mapped some key locations of the strategic road network where National Highways could take this action in Oxfordshire, the creation of passages would also be suitable for other road, rail, and infrastructure networks across the county to reduce the fragmentation of habitats and should be supported accordingly.
P3	**Enhance and create wildlife-friendly boundaries that act as habitats to support species to spread through the county.** Wider benefits: Recreation and leisure, Aesthetic value, Interaction with nature.	PM04 (countywide)	**Create or improve boundaries using natural products that support biodiversity.** Where possible, improve the biodiversity value of boundaries. Where appropriate, consider replacing or enhancing existing boundaries like post and wire or rail fences with hedges, untreated wood fencing, and/or dry-stone walls. Where possible use local businesses and sustainably sourced local materials. This may not be suitable in cases where the boundaries are historic features e.g. park railings or in protected landscapes where openness is a special quality and where species such as ground-nesting birds require open conditions. Target habitats: UK Hab Species-rich native hedgerow h2a5, or habitats with additional secondary code 114 (dry stone wall), 117 (laid hedgerow).

Grassland (including scrub) and road verges

Code	Priority In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	The code of each measure (and whether they are mapped)	Potential Measure (PM) In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P4	**Create new areas of species-rich grassland (including scrub and mosaic habitats) in Oxfordshire that are managed to support biodiversity and to achieve a good ecological condition.** Wider benefits: Food production, Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Erosion protection, Water quality regulation, Carbon storage, Pollination, Pest control.	PM05 (mapped)	**Create areas of calcareous species-rich grasslands in suitable locations, particularly slopes.** Semi-improved or modified grasslands can be diversified by preparing low nutrient ground and over seeding. Where appropriate, arable areas can be reverted to wildflower grassland through seeding, following site preparation. Plants grown as plugs can be used for species that do not spread well as seed. Use seed or plug sources of local provenance and similar soil conditions as far as possible. Green hay from similar wildflower grasslands can be spread as an alternative to seed. See creation and management guidance to create new areas of calcareous grassland. They include further details about ground preparation and suitable soils. Some locations were regularly mentioned by people and organisations for this action to occur, however this is not an exhaustive list: White Horse Hill and Hackpen Hill, steep calcareous banks and slopes, Berkshire Downs border. Target habitats (UK Habs codes): lowland calcareous grassland (g2a including g2a5 and g2a6) National Vegetation Classification (NVC) CG1-CG7
		PM06 (mapped)	**Create areas of neutral species-rich grasslands in suitable locations** Existing semi-improved or modified grasslands can be diversified by over seeding following site preparation. Where appropriate, arable areas can also be reverted to wildflower grassland through seeding, following site preparation. Plants grown as

			plugs can be used for species that do not spread well as seed. Use seed or plug sources of local provenance and similar soil conditions. Green hay from similar wildflower meadows can be spread as an alternative to seed. See management guidance and handbooks for further details. Follow management guidance and handbooks to create new areas of neutral grassland habitat including ground preparation on suitable soils. Test soils to determine if conditions would be suitable for lowland meadow creation, otherwise aim for species-rich neutral grasslands. Target habitats (UK Habs codes): lowland meadows (g3a including g3a5 and g3a6) and other neutral grassland (g3c, only where it qualifies as species-rich grassland – secondary code 18) National Vegetation Classification (NVC) MG4, MG8, and MG5 and species-rich examples of MG1, MG6, MG9 and MG10.
		PM07 (mapped)	**Create areas of species-rich acid grasslands in suitable locations** Acid grasslands can be created on suitably sandy and acidic soils. These grasslands are characterised by short fine grasses and patches of bare soil which support a particular range of insects, spiders, and reptiles. Acid grassland is also strongly associated with heathland and these two habitat types are rare in Oxfordshire. See management guidance and handbooks for further details. Some examples of acid grassland in Oxfordshire can be found in areas including Boars Hill, Frilford Heath, and Shotover. Target habitats (UK Habs codes): lowland dry acid grassland (g1a6) National Vegetation Classification (NVC) U1-U4
		PM08 (mapped)	**Create varied physical ground structure when creating new grassland habitats.** Whilst creating new grasslands, consider using techniques to create a varied physical ground structure similar to the lumps and bumps of historic delves. Seek opportunities to keep areas of thin skeletal soils as well as areas of rocky, bare, and disturbed ground with a variety of aspects and gradients. Aim to support varieties of sward heights suitable to the location and local species. These actions can be taken whilst creating new grassland habitat (including quarry restoration). This

			guide gives some examples of the varied features that may be found in grassland habitats.
		PM09 (mapped)	**Create new areas of lowland meadow by creating and restoring meadows in suitable locations (particularly on floodplains).** This action is suitable for both floodplain areas and areas of lowland meadow on drier soils. Within floodplains, appropriate actions should be taken to allow water to easily come both onto, and off lowland meadow to help reconnect floodplain meadows with rivers. This can include embanking or deepening of the watercourse to ensure adequate discharge of water after flood events. In suitable locations, meadows could be restored through a range of techniques including by spreading green or dry hay, or brush harvested seed, into the floodplain soils. This can be done by sourcing hay or seed from existing floodplain meadows (as long as this doesn't compromise the condition of those meadows). See the Floodplain Meadows Partnership for advice on meadow creation and funding for farmers. This is a particularly important action for suitable arable fields and in other locations where existing hydrological conditions are appropriate. Floodplain meadows are amongst the UK's rarest and most biodiverse habitats whilst drier meadows are less rare. In the UK, only 1,200 hectares of MG4 floodplain meadow remains. More than 25% of this area is within Oxfordshire meaning that Oxfordshire has a strategically important role in supporting the recovery and expansion of MG4 floodplain lowland hay meadows. In addition, these floodplain habitats have particularly good capacity to store carbon and can improve the soil's ability to hold and capture water to help manage the flow of water and improve water quality. A technical handbook on floodplain meadows can be found here. Target habitats (UK Habs codes): lowland meadows (**g3a5 and g3a6)**, National Vegetation Classification (NVC) MG4, MG8, and MG5

P5	**Enhance and manage existing grasslands to achieve and maintain species-rich grasslands that are in good ecological condition (long-term).** Wider benefits: Food production, Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Erosion protection, Water quality regulation, Carbon storage, Pollination, Pest control	PM10 (mapped)	**Enhance (or maintain a good condition of) existing calcareous grassland.** Use land management techniques to improve or support grassland biodiversity, especially in ancient and unimproved grassland. Plan to maintain low nutrient levels by undertake cutting, collecting, and/or grazing of vegetation according to the broad habitat requirements whilst working to meet the specialist needs of species in the area. Where appropriate, continue hay-making practices and manage grazing of sites flexibly in response to seasonal variations in vegetation growth. See guidance on management or a detailed handbook here. Ensure that a thick thatch of grassy matter doesn't develop to increase nutrients, suppress wildflowers, or create a fire risk. Target habitats (UK Habs codes): lowland calcareous grassland (g2a, including g2a5 and g2a6) National Vegetation Classification (NVC) CG1-CG7
		PM11 (mapped)	**Enhance (or maintain a good condition of) existing neutral species-rich grasslands** Use land management techniques to improve or support grassland biodiversity, especially in ancient and unimproved grasslands. Plan to maintain low nutrient levels by undertaking cutting, collecting, and/or grazing of vegetation according to the broad habitat requirements whilst working to meet the specialist needs of species in the area. Ensure that grazing or cutting includes the removal of the cuttings (arisings). Where appropriate, continue hay-making practices and manage the grazing of sites flexibly in response to seasonal variations in vegetation growth. Ensure that a thick thatch of grassy matter doesn't develop to increase nutrients, suppress wildflowers, or create a fire risk. Further information about meadows can be found from Plantlife. Target habitats (UK Habs codes): lowland meadows g3a (including g3a5 and g3a6) and other neutral grassland g3c only where it qualifies as species-rich grassland – secondary code 18) National Vegetation Classification (NVC) MG4, MG8, and MG5 and species-rich examples of MG1, MG6, MG9 and MG10.

		PM12 (mapped)	**Enhance (or maintain a good condition of) existing acid grasslands** Use suitable techniques like grazing, or cutting if grazing cannot be arranged, to enhance the condition and diversity of acid grassland. On acid grassland, aim to create and manage a variety of sward heights including areas of short sward with bare ground and soil disturbance. See more detailed management guides to better understand what might be suitable on a given site. Ensure that grazing or cutting includes the removal of the cuttings to prevent nutrient levels from building up. Ensure that a thick thatch of grassy matter doesn't develop to increase nutrients, suppress wildflowers, or create a fire risk. There are some examples of these types of habitats found across Boars Hill, Frilford Heath, Shotover and other areas in Oxfordshire. Target habitats (UK Habs codes): lowland dry acid grassland (g1a6) National Vegetation Classification (NVC) U1-U4
		PM13 (countywide)	**Maintain or introduce grazing or cutting techniques that enhance the structural diversity of grasslands and support local species.** On grasslands, including ancient and species-rich grasslands, introduce or maintain management techniques and grazing regimes that are site-appropriate using breeds that achieve a variety of sward heights and structures to benefit local species. Consider utilising traditional and rare breeds which are hardy and well suited to conservation grazing. Aim, where possible, to create patches of bare ground via periodic disturbance of the soil and turf which encourages the dispersal of many flowering plant species. Where species require short turf, cut & graze, some areas of grassland vegetation across calcareous, acid, and sandy sites to maintain a short sward and a low nutrient grassland. A similar result can be achieved by the presence of rabbits and on some sites it may be appropriate to encourage them by providing suitable cover, see more details here. Grazing is often a good way to maintain grassland sward and to disturb the soil, typically in spring, autumn, and winter but grazing and cutting times may change

			based on seasonal weather patterns or particular species that you may be working to conserve. Sometimes summer grazing may be appropriate on sites that require extensive grazing.
		PM14 (mapped)	**Enhance existing lowland meadows through grazing, cutting, or a combination to increase and support species diversity (particularly for floodplain and MG4 habitats).** This action is suitable for both floodplain lowland meadow, and for lowland meadow on drier soils. Manage these lowland meadows by introducing or maintaining appropriate management techniques like hay-cutting, grazing, and/or mowing regimes which are most appropriate to the site conditions, grassland type, species present, and any hay-making activities. Ensure that arisings are removed. For grazing regimes, manage stocking densities and the timing of any grazing flexibly, aiming to respond to seasonal conditions and variation as well as preventing either under-grazing or over-grazing. Consider using traditional and/or rare breeds that are hardy and well suited to conservation grazing. See further advice and guidance on managing floodplain meadows from the Floodplain Meadows Partnership. For hay cuts, the timing of the hay-cut is critical to the long-term sustainability of species-rich meadows. There will be a need for increased flexibility in both the date and extent of management options in response to long-term seasonal variability in growing conditions and climates. Lowland meadow will need an adequate supply, temporal variation, and quality of water to adapt to changes in climate. Floodplain meadows are amongst the UK's rarest and most species-rich (biodiverse) habitats whilst drier meadows are less rare. In the UK, only 1,200 hectares of MG4 floodplain meadow remains. More than 25% of this area is within Oxfordshire meaning that Oxfordshire has a strategically important role in supporting the recovery and expansion of MG4 floodplain lowland meadows. This is particularly true around Pixey, Yarton, and Osney Meads where work has been underway to connect 210 hectares of rare floodplain in a connected network with opportunity to expand this further in future. It should be noted that these floodplain

			habitats have particularly good capacity to store carbon, hold and capture water, manage the flow of water, and improve water quality. See the technical handbook for floodplain meadows here. See further Natural England handbooks, guidance, and advice for detailed management. Additionally, organisations like Plantlife, and Buglife have resources and information that may be of interest. Target habitats (UK Habs codes): lowland meadows (g3a5 and g3a6), National Vegetation Classification (NVC) MG4, MG8, and MG5
		PM15 (countywide)	**Implement conservation grazing techniques that minimise or reduce the need for permanent physical fencing** Within pasture and grasslands or other appropriate habitats, consider approaches like regularly moving livestock through grazed areas by creating 'cells' within field parcels that you move regularly using, for example, electric wire fencing. Collar-based virtual fencing and other technology is also rapidly developing and could enable grazing animals to be focussed on particular locations and moved as needed to achieve the best conservation outcomes. A particular location within Oxfordshire where you can see this being practiced is FAI farm in Wytham.
P6	**Create and retain more area of scrub and pockets of 'messier, less tidy' habitat for their importance to biodiversity.** Wider benefits: Education and knowledge, Interaction with nature, Carbon storage, Flood protection, Erosion protection, Air quality regulation, Cooling and shading, Pollination, Pest control.	PM16 (countywide)	**Create and maintain pockets of diverse scrub on grasslands as appropriate**. Continue management that prevents excessive amounts of scrub from taking over species-rich wildflower grasslands but, where appropriate, integrate scrub creation into the site to increase structural variety to benefit biodiversity. This can be achieved through allowing occasional areas of scrub to grow as habitats within or around grasslands, to provide shade for animals, livestock, people, and to offer food, nectar, and shelter to invertebrates, birds, and wider species. Scrub habitats on floodplains can provide a refuge for invertebrates and reptiles during prolonged flooding. Aim to allow different pockets of scrub to grow up at different points in time

			to create a variety of ages including the development of old scrub which supports particular invertebrate communities. Also aim for diversity of tree and shrub species, various shapes, and sizes of scrub pockets. This could be achieved through low intervention techniques (e.g. fencing an area off from browsing and/or allowing natural regeneration). Accept changes to community composition (the types and amounts of different species within your scrub growth) when driven by climate change. It is not expected to integrate the development of scrub into ancient meadows including floodplain meadows where hay has to be taken. A large number of locations were mentioned by people and organisations for this action to occur and this should be applied to all appropriate grasslands including parish nature reserves and local projects where suitable land has been acquired to allow nature to recover itself. Target habitats (UK Habs codes): Dense scrub (h3 - except for h3c and h3g), grassland (g) with secondary code – 10 (scattered scrub). National Vegetation Classification W21, W22
		PM17 (mapped)	**Manage existing areas of scrub to create a varied age and physical structure including glades and scalloped edges**. Unless the scrub has encroached excessively, avoid damaging or removing existing scrub habitat for fear of untidiness. Scrub habitat is dynamic (changes quickly) and is a complex mix of grassland and woody habitats that offer great value to biodiversity. Manage the area to allow different pockets of scrub to grow up at different points in time to create a variety of ages and encourage and aim to keep any older or old scrub which supports particular invertebrate communities. See Natural England's guide on scrub management. or see here for some examples of managing scrub on chalk grassland. Target habitats (UK Habs codes): Dense scrub (h3 - except for h3c and h3g), grassland (g) with secondary code – 10 (scattered scrub). National Vegetation Classification W21, W22

P7	**Create and enhance more road verges that are managed to allow wildflowers to grow in safe locations across Oxfordshire**. Wider benefits: Aesthetic value, Sense of place, Erosion protection, Carbon storage, Pollination, Pest control.	PM18 (mapped)	**Enhance (or maintain a good condition of) existing grassland around roads and infrastructure including road verge nature reserves (RVNR) to increase biodiversity.** This measure can apply to embankments, road verges, roundabouts and other suitable areas of grassland in both urban and rural settings. Manage the cutting regime flexibly for these grassland areas based on the species that are present or that could become present to allow them to grow, flower, and set seed. Over time, this management helps to make the verge less grass-dominant, and will create a lower growing, more diverse verge/habitat which should require fewer cuts. Reducing cutting patterns can help to support a greater range of wildlife including insects. Where road verges and other areas are already being managed in this way, continue to do so in safe and suitable locations where vegetation and any cuttings do not reduce the safety of road or path users (i.e. they do not block paths, roads, or lines of sight). After cutting, the best practice is to collect any arisings and remove them to reduce nutrient levels and promote floristic diversity. Ensure that enough management is undertaken to avoid any unintended scrub encroachment. You can access further urban grassland and road verge guidance here. Target habitats (UK Habs codes): lowland meadows (g3a6) and other neutral grassland (g3c) only where it qualifies as species-rich grassland – secondary code 18. National Vegetation Classification (NVC) MG5, and lowland calcareous grassland (g2a) and other calcareous grassland (g2c) only where it qualifies as species-rich grassland – secondary code 18 National Vegetation Classification (NVC) CG1-CG7, and Lowland dry acid grassland (g1a6) National Vegetation Classification (NVC) U1-U4
		PM19 (countywide)	**Create new road verge nature reserves (RVNR) to allow wildflowers to grow, flower, and set seed by changing their management**. Creating new RVNRs should be completed in safe and suitable locations where vegetation and cuttings would not block paths, roads, or lines of sight. Avoid using topsoil to create new verges, consider laying out cuttings from existing local road verge nature reserves to spread local seeds and increase biodiversity. Plan for long-term changes to the cutting pattern to reduce the number of cuts, this allows existing seeds from those places to flower and set seeds again. Ensure that

			enough management is undertaken to avoid any unintended scrub encroachment. You can access urban grassland and verge guidance here, find information about building community support here, and if you have an area that could become a road verge nature reserve you can propose that it becomes one here. Target habitats (UK Habs codes): lowland meadows (g3a6) and other neutral grassland (g3c) only where it qualifies as species-rich grassland – secondary code 18. National Vegetation Classification (NVC) MG5. Lowland calcareous grassland (g2a) and other calcareous grassland (g2c) only where it qualifies as species-rich grassland – secondary code 18 National Vegetation Classification (NVC) CG1-CG7. Lowland dry acid grassland (g1a6) National Vegetation Classification (NVC) U1-U4
		PM20 (countywide)	**Where new roads are created assess the opportunity for new road verge nature reserves**. Create and manage road verges, roundabouts, and other suitable spaces to promote biodiversity. The use of subsoil can create opportunities for new wildflower grasslands along new roads, while using species such as yellow rattle can potentially reduce frequency of cutting (and collecting). New grasslands need to be managed through well-timed cutting and collection of arisings. You can access urban grassland and verge guidance here.
P8	**Improve the abundance and range of grassland and scrub species that need specific additional potential measures** Wider benefits: Education and knowledge, Interaction with nature, Sense of place, Pollination, Pest control.	N/a	See the 'Species Priorities List' [LINK added at launch] to see the potential measures that could be taken to support species that use and benefit from habitats within this type of environment. Some of these measures are mapped.

Heathland

Code	Priority In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	The code of each measure (and whether they are mapped)	Potential Measure (PM) In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P9	**Enhance the condition of Oxfordshire's existing pockets of lowland heathland** Wider benefits: Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Erosion protection, Pollination, Pest control.	PM21 (mapped)	**Enhance (or maintain a good condition of) existing heathland.** Manage heathland areas to enhance their condition and structural diversity in Oxfordshire. Aim to retain or create a mosaic of vegetation types and prevent rapid colonisation of the heathland by excessive amounts of scrub, bracken, or woodland (through creating or retaining some pockets of scrub can be beneficial to structural diversity). There is more detail on how to achieve this kind of balance in a manner that is suitable to your site here. Grazing is the preferred management tool for maintaining a heathland mosaic, but other techniques may be required. Incorporate actions to support any specialist species that are, or could become, present in the area. Preventing nutrient enrichment is important in this habitat type and it can be important to prevent some activities that present particular challenges to heathland success (trampling and disturbance). An overview of heathland management techniques can be found here by Buglife. Detailed heathland management guides from Natural England can be found here. The government outline how to manage lowland heathland for those using Countryside Stewardship. There are some examples of these types of habitats including Boars Hill, Frilford Heath, and Shotover. Target habitats (UK Habs codes): lowland heathland (h1a) National Vegetation Classification (NVC) H1 and H2 including any m16 wet heath if present.

P10	**Create (or restore) areas of lowland heathland in Oxfordshire**. Wider benefits: Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Erosion protection, Carbon storage, Pollination, Pest control.	PM22 (mapped)	**Create new areas of heathland on suitable soil types**. Create new areas of heathland with a commitment to long term management. The opportunities in Oxfordshire are very limited for this habitat creation because the type of soil and site requirements are very specific. Aim to create a diversity of vegetation structure with a variety of habitat niches including patches of bare soil. This guide includes information from Natural England about heathland creation for wildlife. Check government websites for payments for farmers e.g. to create heathland here. Target habitats (UK Habs codes): lowland heathland (h1a) National Vegetation Classification (NVC) H1 and H2
P11	**Improve the abundance and range of species that need specific additional potential measures within heathland habitats.** Wider benefits: Education and knowledge, Interaction with nature, Sense of place, Pollination, Pest control.	N/a	See the 'Species Priorities List' to see actions that could be taken to support specific species in Oxfordshire that are threatened or near-threatened with extinction. Some of these species actions are mapped to particular locations.

Mixed habitats including wood pasture, parkland, orchards and open mosaic habitats			
Code	**Priority** In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	**The code of each measure** (and whether they are mapped)	**Potential Measure (PM)** In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P12	**Enhance and manage existing habitats to support biodiversity and to enhance their ecological condition. This includes wood pasture, parkland, orchards, open mosaic habitats, and mosaic habitats, which have a mixture of habitat types within a given area.** Wider benefits: Food production, Wood production, Recreation and leisure, Aesthetic value, Interaction with nature, Education and knowledge, Sense of place, Carbon storage, Air quality regulation, Cooling and shading, Pollination, Pest control.	PM23 (mapped)	**Enhance (or maintain a good condition of) existing wood pasture and parkland to support local species and future climates.** Within wood pasture and parkland, manage the habitats and trees to maximise the longevity of site-appropriate species and retain mature and large trees (including dead, dying, and decaying trees and wood in a manner that is considerate of public safety). Where trees are coming to maturity or end of life, ensure the emergence (or planting) of new, site-suitable trees within the existing habitat. This practice is designed to diversify the ages of trees present in the habitat and to ensure the possibility of future generations of veteran and ancient trees. Preferably, start allowing the growth of (or planting of) new generations before the existing mature trees are lost. Trees should be suited to the conditions of the particular location and, if planted, should prioritise diversity and resilience to future climates. Maintain the grassland within wood pasture and parkland areas using suitable, extensive grazing or cutting regimes. Where appropriate the grassland component of this habitat can be floristically improved by overseeding and/or plug planting. In appropriate locations consider the creation of cover to encourage habitat variety through rabbit grazing and disturbance. Within these habitats, scrub can play an important role as part of an overall mosaic and supports certain stages of lifecycles for different species. Look for opportunities to create and manage scrub if appropriate to the site conditions.

			Many locations were regularly mentioned by people and organisations for this action to occur however this is not an exhaustive list of existing parks and estates: Ashdown Park, Ditchley Park, Blenheim Park, Broughton Castle, Glympton Park, Kiddington Park, Heythrop Park, Middle Barton and Sandford St. Martin Park, Watlington Park, Kirtlington Park, Bletchingdon Park, Tusmore and Shelswell Parks, Coleshill Park and Buscot Park, Faringdon, Barcote and Pusey, Cornbury Park, Eynsham Hall, Shotover House. Target habitats (UK Habs codes): grassland, woodland, heath or wetland with secondary code 26
		PM24 (countywide)	**Enhance (or maintain a good condition of) existing ancient and veteran trees and the species that they support**. Veteran and ancient trees (including those that are dying or dead) should be managed to achieve a good ecological condition, respective to their age. These trees should be managed to support important varieties of species based on the age, species, and local context of the trees. Prioritise actions that can increase the longevity of existing mature and veteran trees implementing whole life-cycle management to ensure a provision of dead and decaying wood where safe and possible, and either use natural regeneration techniques or plant new trees (of suitable species) close to existing veteran and ancient trees to provide an ecological continuity of veteran trees. Oxfordshire is home to some exemplar ancient and veteran trees and groups of trees including at Blenheim (which is believed to have the largest collection of ancient oaks in Europe) and Ashdown Park. Many ancient trees like oaks can also be seen within hedgerows across the county and the action applies for all ancient or veteran trees.
		PM25 (countywide)	**Selectively create more veteran features in mature non-veteran trees where appropriate.** Veteranisation techniques create veteran features in suitable, non-veteran trees. Identify locations and trees that may be suitable for veteranisation. Apply these techniques selectively to trees in locations where species are particularly expected to benefit from more veteran features. See more information about veteranisation

			here. Using these veteranisation techniques, aim to create habitat niches in established trees that mimic the features that would normally be found in ancient and veteran trees. This can include the creation of crevices and cavities in trees, or creating canopy deadwood by selective ringbarking to mimic and produce valuable habitats that are typically found on older trees and which support a range of rare and declining species. The use of these techniques should not be seen as a replacement for veteran trees. You can download guidance manuals about veteran trees and future veteran trees here.
		PM26 (mapped)	**Improve (or maintain a good condition of) existing orchards for biodiversity.** Manage orchard trees to maintain health and longevity of the trees. Allow dead, decaying, dying wood, and fungi to be present in the orchard in a manner that doesn't significantly compromise the health of the trees. For example, retain cushion bracket fungus on Prunus fruit trees and try to avoid removing or burning deadwood unless necessary (e.g. taking into account public safety if the site is open access). Retain and encourage mature and over-mature standing trees, and keep some standing deadwood and deadwood on living orchard trees. Plant successionally to maintain a strong overlap of younger, mature, and veteran fruit trees, and gap up where trees have died. Ideally, the age structure should allow for an overlap of 50 years which is how long it takes for a fruit tree to develop veteran features. When restocking existing orchards, consider including rootstocks, varieties, or species of tree with a view to future-proofing the orchards from changing weather patterns. Control scrub within orchards (allowing for small pockets to develop or remain where possible) and manage invasive species which cause significant damage to orchards. Target habitats: UK Habs codes grassland or woodland with secondary code 27

		PM27 (countywide)	**Enhance, create, or maintain a good condition of existing 'open mosaic habitat on previously developed land' (OMHPDL) to conserve and enhance biodiversity on these open, dynamic areas.** Conserve and enhance land where open habitats of mixed scrub, grassland, and wetlands with areas of bare ground have developed on brownfield sites. Manage these sites to support species that may be present and maintain an open, dynamic nature to these areas including patches of bare ground where suitable to support invertebrates (including beetles, bees, and wasps). The creation of bare substrate as a result of minerals extraction can present an opportunity to create the mosaic of early successional communities that are characteristic of this habitat as part of the restoration of quarries. Further management guidance from Natural England can be found here. Target habitats (Uk Habs codes): grassland, woodland, wetland, heathland, urban, sparsely vegetated land or rivers and lakes with secondary code 80
		PM28 (countywide)	**Improve habitat condition and biodiversity by introducing or maintaining flexible grazing regimes where appropriate (and/or cutting and collecting).** Where grazing or cutting is suitable and possible, maintain flexible options to be able to respond to increased variation in weather patterns, floods, and drought. Consider using traditional and rare breeds which are hardy and well suited to conservation grazing. Where necessary, protect trees from possible long-term damage that can be caused by grazing animals.
P13	**Create more areas of mixed habitat in Oxfordshire including wood pasture, parkland, orchard, and open mosaic habitats to support biodiversity**.	PM29 (mapped)	**Create (and manage) areas of new parkland and wood pasture, planning to produce future ancient and veteran trees.** Plant (or facilitate the growth of) new trees to create new wood pasture and parkland, using appropriate tree species that are adapted for the location and future climates and/or could support local wildlife. It should be noted that oaks are particularly important within such habitat settings. New trees could be established

	Wider benefits: Food production, Wood production, Recreation and leisure, Aesthetic value, Education and knowledge, Sense of place, Carbon storage, Air quality regulation, Flood regulation, Erosion regulation, Water quality regulation, Cooling and shading, Pollination, Pest control.		by fencing off suitable areas and allowing trees to grow up naturally, by planting seeds, or by planting and managing suitable young trees. Expanding existing areas of mature parkland and wood pasture can be particularly beneficial. Local seed sourcing should be supported as one option for expanding parkland and wood pasture. If planting trees or seeds, consider using local species where possible and consider sourcing some trees or seed from a provenance that can tolerate various climate conditions where necessary. Diverse tree selection may better enable newly planted trees to be able to survive and become ancient and veterans in a warmer future climate although these decisions should be based on the latest climate prediction and the specific planting site. The Forestry Commission has an Ecological Site Classification tool that can help determine which species could be suitable. Where appropriate, the species richness of the grassland components within wood pasture/parkland can be created or enhanced using species-rich grassland creation techniques such as overseeding, spreading green hay, and/or planting plug plants. Plan for suitable, future grazing or cutting regimes and where appropriate. In appropriate locations, consider the creation of scrub cover to encourage habitat variety through opportunities for e.g. rabbit grazing and disturbance. Within these habitats, scrub can also play an important role as part of an overall mosaic and supports certain stages of lifecycles for different species. Look for opportunities to create and manage scrub if appropriate to the site conditions and local species. Target habitats (UK Habs codes): grassland, woodland, heathland or wetland with secondary code 26
		PM30 (mapped)	**Create new areas of habitat that contain a matrix of habitat types including small woodland patches, scattered trees, scrub, and grassland.** Create new areas of habitat that include (but are not limited to) a mix of trees, scrub, and grassland. This could be achieved through tree planting, natural

			regeneration techniques, or other options that achieve the end result. This action is often suitable near woodland edges to create a transition habitat between woodland and grassland. Creating these areas can support both woodland and grassland species. New large areas of this kind of mosaic habitat can also be created by practicing light grazing across a large area and allowing natural processes to take place. The species richness of the grassland components can be increased using species-rich grassland creation techniques such as overseeding, spreading green hay, and/or plug planting. Create and manage scrub in a manner that complements the site and local species. Where appropriate, allow varied pockets of scrub to grow up at different points in time to create a variety of ages, retaining any older or old scrub which supports particular invertebrate communities. See this guide on scrub management.
		PM31 (countywide)	**Create new orchards or restore orchards in areas where there used to be traditional orchards, using a diverse range of trees.** Create orchards by planting and growing fruiting trees and plan for their management. This can be done in both urban and rural areas. Choose tree types that are well suited to the site's conditions including local or heritage varieties if possible and consider varieties that could tolerate future climates. Orchard trees can vary by rootstock, fruit type, and variety. Where possible, aim to create a diverse orchard habitat with varieties that differ from, but complement, neighbouring orchards. Orchards should have a management plan for the long-term care of the trees as well as any species like birds or insects that are found in or near to the orchard. Additionally, outline the purpose of fruit that is produced, whether for people, biodiversity, or both. There are examples of projects that support people to create community orchards and this page contains further details. The species richness of the grassland components can also be created or enhanced using species-rich grassland creation techniques such as overseeding, spreading green hay, and/or plug planting. See a guide from Natural England about orchard creation here. Target habitats: UK Habs codes grassland or woodland with secondary code 27

P14	**Create more, large, connected, functioning areas of ecosystems that contain a matrix of diverse habitat types within them to create rich, biodiverse natural spaces**. Wider benefits: Food production (wild), Wood production, Water supply, Recreation and leisure, Education and knowledge, Interaction with nature, Sense of place, Flood protection, Water quality regulation, Carbon storage, Air quality regulation, Cooling and shading, Noise reduction, Pollination, Pest control.	PM32 (countywide)	**Create new areas that contain a mix of habitats suitable to the site to benefit wildlife.** In suitable spaces, use natural processes of succession and techniques that mimic this to produce complex mosaic habitat types. These, ideally large, areas are encouraged to include a variety of suitable habitat types for the area, possibly including but not limited to: grazed grassland, scrub, trees, open water, wetland, rivers, and/or woodland. Consider allowing natural processes like natural colonisation of trees to create a complex mosaic of new habitats that are encouraged to be wild, diverse, and connected. Consider reducing intensive human management of habitats in these spaces and consider utilising traditional breeds and species which are hardy and well suited to conservation grazing or creating dynamic habitats that support biodiversity. The species richness of the grassland components can be increased using species-rich grassland creation techniques such as overseeding, spreading green hay, and/or plug planting. This action could be delivered at a range of scales across a range of locations, not all locations can fit on this list. Some examples were regularly mentioned by people and organisations including: Gibbets Close Hill, Witney and the Bernwood Otmoor Ray area where proposals are underway to create a strategic landscape-scale project to connect the Otmoor, Bernwood, and Ray Nature Recovery Area across county borders.
P15	**Improve the abundance and range of species that need specific additional potential measures within mixed habitats including wood pasture, parkland, orchards, and open mosaic habitats.** Wider benefits: Education and knowledge, Interaction with nature, Sense of place, Pollination, Pest control.	N/a	See the 'Species Priorities List' to see the potential measures that could be taken to support species that use and benefit from these habitat types. Some of these measures are mapped.

Woodlands			
Code	**Priority** In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	**The code of each measure** (and whether they are mapped)	**Potential Measure (PM)** In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P16	**Enhance and manage existing woodlands to achieve structural diversity and good ecological condition enabling woodlands to act as a rich source of biodiversity for wildlife to disperse across the landscape.** Wider benefits: Food production (wild), Wood production, Recreation and leisure, Aesthetic value, Interaction with nature, Sense of place, Flood protection, Erosion protection, Water quality regulation, Carbon storage, Air quality regulation, Cooling and shading, Noise reduction, Pollination, Pest control.	PM33 (mapped)	**Enhance existing woodlands to achieve a diverse structure and good ecological condition, suitable for the woodland type, age, and nearby species**. Create and implement a management plan for existing woodlands that include strategies to enhance biodiversity and ecological condition. Include plans for managing older trees, planning for succession by younger trees, enhancing genetic diversity within trees and shrubs to combat pests and disease, specific actions to support local wildlife, and actions to manage unsustainable populations of invasive species. Enhancement work should aim to achieve healthy woodlands that have a diversity of tree ages, woodland structure, woodland edges, rides, glades, and ground flora. Aim to have shrub and scrub species planted or growing around the edges of the woodland perimeter and in open areas within the woodland (if appropriate to the site's flora and fauna). Create and manage rides and glades within woodlands to increase light penetration to the ground in suitable locations and achieve wide, open areas with zones that achieve a variety of shade and ground cover. Avoid overshading the ground flora and allow periodic disturbance along rides to support ground flora to set seeds (can be achieved through time-limited, controlled grazing by cattle/horses). Position rides and glades to encourage greater continuity and connectivity of grassland and grassland edge habitats. Avoid compacting or waterlogging the soil to retain

			important fungal networks. Along woodland edges, create buffer areas of grassland margins with scrub transition areas where suitable for the area. Consider using areas affected by significant diseases to create glades and open spaces within woodlands. Create, retain, and mange ponds and areas of water within woodlands aiming to achieve greater continuity and connectivity of water corridors across habitats. Consider rewetting woodlands, where appropriate by blocking drainage which can support invertebrate populations and provide more food for insectivorous birds. See woodland management toolkits, advice, and the UK Forestry Standard to better understand specific requirements that may apply to your woodland. This action is suitable for all woodlands. Diverse woodlands can be found across Oxfordshire with particular examples in Wychwood Forest, Waterperry, Shabbington Woods, Shotover, and Brasenose Wood but there are many more. Target habitats (UK Habs codes): lowland beech and yew woodland (w1c), wet woodland (w1d), lowland mixed deciduous woodland (w1f), other broad-leaved woodland (w1g). National Vegetation Classification W1, W5, W6, W7, W8, W10, W12, W13, W14, W15, W16
		PM34 (countywide)	**Manage populations of species that reach unsustainable levels so that existing woodlands can achieve good ecological condition to support a diverse range of species**. This includes managing grey squirrels, deer populations, rhododendron and any invasive species or species that reach unsustainable numbers. Where possible, collaborate across land ownership boundaries to undertake effective management techniques that could control such species at a scale that could help to support the natural regrowth of woodlands and regeneration of new young trees. Consider the use of fencing, tree protection, sustainable population control, and emerging new techniques using relevant professionals or organisations.
		PM35 (mapped)	**Enhance existing ancient woodland to improve structural diversity, woodland condition, and benefit local species**.

			Create management plans specific to the particular ancient woodland. Aim to enhance structural diversity where appropriate by creating or maintaining rides, glades, and edges in suitable locations (use the UK Forestry Standard to best understand what's appropriate for your site). Periodically thin 'high forest' type woodlands where/when necessary. These are woodlands with mostly tall trees and little to no understory (a lower growing set of trees, shrubs and plants). Prioritise techniques that minimise soil compaction to help safeguard the ancient soil communities, structures, and floristic diversity that are unique to ancient woodlands. In addition, undertake best practice woodland management techniques that support local species. Apply this measure sensitively, aiming for an outcome that reflects the local context and which complements the history and character of the particular woodland (as well as historical features or structures). Whilst some are mapped for particular focus, this was also felt to be an important, beneficial action for all existing ancient woodlands which currently cover 3.4% of Oxfordshire. Target habitats (UK Habs codes): woodland habitats with secondary code 28
		PM36 (mapped)	**Enhance the biodiversity value of existing ancient woodlands that are 'plantations on ancient woodland sites' (PAWS).** Create a management plan specific for the site to steadily remove plantation trees from 'plantations on ancient woodland sites' (PAWS) and restore the woodland ecosystem back towards native woodland trees where possible. A sudden removal of all plantation trees could damage relict ancient woodland features like any remaining veteran trees and/or ground flora. Selective felling of plantation trees around any such remaining, relict features can support the survival of veteran trees, encourage natural regeneration and floristic diversity, and/or prevent overshading within the woodlands depending on the species present. Target habitats (UK Habs codes): woodland habitats with secondary codes 28
		PM37	**Enhance and/or create areas of active, worked coppice in Oxfordshire**.

		(countywide)	Various tree species can be coppiced on a rotation. Coppices offer important nesting and foraging sites within woodlands and can support unique and rare species. Manage existing coppices to retain flowering trees and shrubs within worked coppice compartments to benefit woodland species. Reintroduce coppicing particularly to suitable areas of historic, derelict sites where coppicing was previously practiced. Create new areas of coppice by planting (or enabling the growth of) a variety of new trees with a plan to manage these on a specified coppice rotation e.g. long, short, or a specific cycle (usually defined by a number of years). This can take into account the need of particular species as/when they emerge. For new and existing coppices, plan the management around any local species to best accommodate a range of species. For example, some wildlife particularly depend upon young, dense, coppices of willow, aspen, and poplar with areas that are allowed to build up deadwood and become less 'tidy' to support those species. Other coppice species include but are not limited to; lime, ash, oak, sweet chestnut, hazel and many more. Plant or retain flowering trees and dense shrub layers within worked coppice compartments to support invertebrates. All remaining derelict coppice or existing coppice areas could be important locations to deliver this action and there are a few exemplar coppice habitats in Oxfordshire including on MOD sites near Bicester. Target habitats (UK Habs codes): woodlands with secondary code 210 or 211
P17	**Create new, diverse woodlands in Oxfordshire that mature into good ecological condition and are managed to support biodiversity.** Wider benefits: Food production (wild), Wood production, Recreation and leisure,	PM38 (mapped)	**Create new woodland by planting trees (or enabling their natural regeneration) using species that are suited to the soil type and site conditions**. Create and manage new woodland that complements the landscape across a range of habitats and contains a variety of tree species. Produce a long-term plan to manage the habitat with the aim to achieve a good ecological condition, this should include any relevant management in the early years as the woodland

	Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Flood protection, Erosion protection, Water quality regulation, Carbon storage, Air quality regulation, Cooling and shading, Noise reduction, Pollination, Pest control		establishes. To establish new woodland, trees may be planted but particularly near existing and ancient woodlands, consider using natural regeneration/colonisation or directly drilling locally sourced seeds to establish young trees. All techniques will still require suitable forms of protection (guards or fencing) as appropriate to the site. Protection should aim to allow the new woodland to successfully establish whilst minimising damage from grazing and disturbance. If the new woodland is isolated from other woodlands, consider introducing locally sourced field-layer flora appropriate to the site conditions (this must be legally obtained and appropriate to the woodland). Prior to creation, design new woodland planting plans to achieve structural diversity in the future woodland. Plan to create a variety of possible components including rides, glades, open areas, dense shrubs, scrub components, and irregular edges. Aim for shrubs and scrub to grow within, and at the edges of woodland. Create a management plan to maintain a variety of these components as habitat niches within the woodland, including a plan for succession by younger trees over time to create a variety of tree ages within the woodland. Trees could be planted or allowed to grow naturally using protection from browsing animals over a number of years. If planting trees, consider tree species that suit the soil type for that area and which are likely to survive in a changing climate, with decision being made using the latest climatic predictions. The creation of new woodland is particularly beneficial in areas that adjoin existing woodland and especially adjoining ancient woodland to make existing woodlands larger, or to join up existing areas of woodland. See this woodland creation guide from the Woodland Trust. Target habitats (UK Habs codes): lowland beech and yew woodland (w1c), wet woodland (w1d), lowland mixed deciduous woodland (w1f), other broad-leaved woodland (w1g). National Vegetation Classification W1, W5, W6, W7, W8, W10, W12, W13, W14, W15, W16
		PM39 (countywide)	**Use low intervention woodland creation techniques including natural regeneration where appropriate, especially near existing ancient woodland**.

			Consider, and where appropriate opt for natural regeneration techniques as a method for the creation of new woodland habitats or mosaic habitats that include trees and wooded areas. If the site is isolated from existing woodlands and seed sources, then direct seeding could be an alternative option to establish new trees instead of planting young trees. Whilst waiting for the seeds/young trees to grow and establish, ensure they have sufficient levels of protection from grazing and disturbance to allow the woodland area to establish. If tree guards are necessary, consider effective degradable or reusable tree protection options over non-biodegradable, single-use options.
		PM40 (mapped)	**Create new areas of wet woodland along rivers, river corridors, and riparian land as appropriate.** In suitable wet areas such as river corridors, spring lines, and riparian land, plant (or allow the growth of) a variety of wet woodland trees along river corridors or as areas of wet woodland. Plan to create and manage open areas within the woodland and consider planting willow and alder species. If water flows have previously been diverted away from the woodland, or if water levels were artificially lowered, seek advice about opportunities to restore water flows or groundwater levels to rewet suitable woodlands and/or allow wet woodland to develop. Wet woodland creation can offer benefits to help 'slow the flow' of water during high rainfall flood events (helping to mitigate flooding) and can regulate and improve water quality across the landscape. If the new woodland is isolated from other woodlands, consider introducing locally sourced field-layer flora appropriate to the site conditions (this must be legally obtained and appropriate to the woodland). Some locations were mentioned by people and organisations thought this is not an exhaustive list. Areas included; around flooded gravel pits, Kirtlington Park, Gallos Brook, Priory Mill, Chipping Norton, areas adjoining Radley Pits Local Wildlife Site, Burcot, Little Wittenham, and Shillingford. Target habitats (UK Habs codes): wet woodland w1d (w1d5) National Vegetation Classification W1, W5, W6, W7.

P18	**Improve the abundance and range of woodland species that need specific additional potential measures** Wider benefits: Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Pest control.	N/a	See the 'Species Priorities List' to see the potential measures that could be taken to support species that use and benefit from habitats within this type of environment. Some of these measures are mapped.
Rivers, streams, ponds, standing water and wetland habitats			
Code	**Priority** In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	**The code of each measure** (and whether they are mapped)	**Potential Measure (PM)** In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P19	**Improve water quality within freshwater habitats across the county to support biodiversity by making clean, healthy, and plentiful water more available in Oxfordshire (rivers, canals, lakes, ponds, ditches, reedbeds, and more).** Wider benefits: Fish production, Water supply, Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Water quality regulation.	PM41 (countywide)	**Improve water quality through action(s) that help to reduce or stop pollution of freshwater habitats** This includes but is not limited to: 1. Timely and appropriate upgrades to the sewerage network and sewage treatment, 2. Nature based solutions like constructed wetlands, 3. Working in catchment partnerships and with authorities such as Natural England and the Environment Agency to reduce surface water pollution from agricultural runoff. This action is also of great importance in areas where people live (in both urban and rural areas) where water corridors often act as key corridors that connect areas of the environment. Water courses, lakes, and other freshwater habitats are culturally and recreationally significant to people in Oxfordshire.

			To achieve widespread, good water quality, actions need to happen across the whole landscape (across catchments) anywhere where rainwater falls or where water moves on its way into the local rivers. This measure can be delivered by a range of partners and is where local Catchment Partnerships and their projects play a key role in delivering improved water quality across the county. Work with planning authorities, landowners and the water company (Thames Water) to increase the number of waterbodies in good ecological status via improving water quality. This may be through targeted, evidence-based upgrades to sewage treatment works, nature-based solutions like constructed wetlands, or encouraging landowners to adopt water friendly farming practices which minimise run-off.
P20	**Enhance and manage existing freshwater habitats in Oxfordshire to achieve good ecological condition and support biodiversity through clean, healthy, and plentiful water (rivers, canals, lakes, ponds, ditches, and reedbeds).** Improving the condition of rivers and freshwater habitats emerged as the top priority for people across Oxfordshire. Wider benefits: Fish production, Water supply, Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Flood protection, Erosion protection, Water quality regulation, Carbon storage, Cooling and shading.	PM42 (mapped)	**Restore river diversity and manage rivers and their riparian (riverside) habitats to achieve good ecological condition that supports species**. This refers to the restoration of river habitat diversity to support a wide range of species. Undertake restoration work to restore structurally diverse rivers and riverside habitats (including banks and marginal vegetation) which support a wide range of species. Techniques to enhance and restore river physical habitat condition and biodiversity will be site-specific and will depend on the degree of modification and the ecological context, as well as river typology. Expert advice should be sought (e.g. from the Environment Agency and local catchment partnerships), and appropriate permits obtained if required Techniques to enhance river condition and biodiversity vary and will be site-specific. The techniques may include raising channel beds of rivers to reconnect with their floodplain and to form a habitat matrix of wetlands, riparian woodlands and wet meadow wildflower grasslands, all of which can buffer and reduce the impact of pollution into rivers. This may be achieved through a variety of interventions which could range in intensity from the use of machinery and import of gravels, through to establishing ecosystem engineer species, in this case beavers, which if re-established in the county have a unique ability to manipulate riparian habitats. Consider de-culverting, removing artificial banks, and techniques to naturalise

			modified watercourse channels. Within rivers, improve connectivity especially for fish, by the removal of barriers to fish passage (and thereby improving instream habitat), or where this is not possible provide fish bypass channels or other fish pass solutions to allow fish to migrate and utilise upstream habitats. Seek expert advice on the most appropriate fish passage solutions. Target habitats (UK Habs codes): Rivers - priority habitat (r2a)
		PM43 (countywide)	**Restore, create and enhance marginal habitats** Marginal habitats on rivers are vital ecological features which can be important for much of the wildlife associated with them; ensure appropriate management of these habitats so that they are retained (often requiring no management at all), and seek to create/restore them where they are absent due to artificial vertical bank structures and steep-sided profiles, taking expert advice as to what is appropriate on a site-specific basis.
		PM44 (countywide)	**Manage operational canals to enhance (or maintain good condition of) habitats or wildlife corridors through Oxfordshire**. Identify opportunities to support more species to live, forage, or move alongside canals. This could include creating or dedicating areas that are not disturbed and maintaining or restoring marginal vegetation, bank-side scrub, and/or woodland in suitable locations that don't interfere with the navigation. This will support the species that use canals as habitats and as wildlife corridors. Guidance for supporting biodiversity along canals can be found through the Canal & River Trust. Target habitats (UK Habs codes): Canals (r1e)
		PM45 (mapped)	**Enhance the condition (or maintain a good condition) of lakes in Oxfordshire**. Implement good management techniques across lakes in Oxfordshire to support local species. Across lakes in Oxfordshire, take actions to minimise the input of

			polluted and nutrient-rich water to the lake from surrounding land-uses, establish and protect marginal habitats, establish quiet zones for wildlife on multiple-use lakes, and if relevant consider how fish-stocking and angling activities can be undertaken in a way which is compatible with the wildlife interest. This measure would contribute significantly towards the priority if taken in 'mesotrophic lakes' which are lakes with lower levels of nutrients than 'Eutrophic Standing Waters' and can therefore be particularly rich in plant and invertebrate life but the measure is relevant for all lakes. There are only a few examples of mesotrophic lakes in Oxfordshire found mainly amongst the old gravel pits of the Lower Windrush Valley. Typically, lakes are equal to, or larger than 2 hectares, whilst ponds are typically smaller than 2 hectares (Uk Habs). Therefore, this action has been mapped to standing waterbodies that are 2 hectares or more in size. Target habitats (UK Habs codes): eutrophic lakes (r1a), mesotrophic lakes (r1b)
		PM46 (mapped)	**Enhance existing ponds by undertaking sensitive management and restoration of ponds and pond complexes to improve biodiversity and water quality.** Manage ponds through low intervention techniques that cause minimal damage to local species and where possible, incorporate grazing to manage vegetation. Pond management and restoration is very individual to the type, age, and structure of existing ponds. Through management, aim to retain and enhance existing positive features of the particular pond. Further management techniques should aim to create diversity in the pond structure, depths, edges, shape, vegetation growth, and areas of shade, often keeping the south side more open and sunny. Techniques also depend on any local species that rely on the pond. It is helpful to biodiversity to create habitat buffers around suitable existing ponds. The buffer areas can contain varied vegetation to offer cover for species. Additionally, consider incorporating deadwood into and around existing ponds to support biodiversity. Aim to maintain or create a buffer of low-intensity land use around the pond as large as possible/appropriate aiming to balance the buffer size with other land-use in the

			area. For 'priority ponds', Freshwater Habitats Trust advise a buffer of 50 metres (or more) where possible. See guidance about how to manage existing ponds here. Target habitats: (UK Habs codes) Standing open water (r1) with secondary code 40, ponds (priority habitat)
		PM47 (countywide)	**Enhance (or maintain a good quality of) existing reedbeds to create a varied vegetation structure that supports reedbed species**. Well-functioning reedbeds can clean water before it enters rivers and streams and are a rare habitat type that supports reedbed-specialist species. Most reedbeds require cutting, grazing, or management of different parts of the reedbed over a cycle of e.g. 4 – 7 years to create a variety of ages and structures that support the health of the habitat and species. Normally no more than 5% of the area is recommended to be scrub or young trees to avoid losing the reedbed to ecological succession. Target habitats (UK Habs codes): reedbeds (f2e). National Vegetation Classification (NVC) S4
P21	**Enhance and manage Oxfordshire's chalk rivers and streams to achieve ecologically healthy examples of this special and globally rare habitat type.** Wider benefits: Fish production, Water supply, Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Water quality regulation, Cooling and shading, Pollination, Pest control.	PM48 (mapped)	**Enhance, restore, or manage chalk rivers and streams to achieve (or maintain a good condition of) physical habitat and water quality.** Undertake appropriate physical habitat restoration of damaged chalk stream habitat seeking expert assessments and advice on the most appropriate techniques, including relevant species actions such as the removal of barriers to fish passage wherever possible. Establish buffer zones of un-intensive land-use and aim to establish diverse wildlife habitat running along the banks of the chalk stream corridors (preferably extending out a minimum of 10 metres either side of the bank) and seek to reduce pressures from agricultural management particularly in chalk stream headwaters. Advice can be sought from the Environment Agency, local catchment partnerships, the Chilterns Chalk Streams Project and from the CaBa chalk stream hub.

			In Oxfordshire there are a number of chalk streams and action should be taken across them all, some examples of chalk streams include (but are not limited to) Letcombe Brook, Holton Brook, Chalgrove Brook, Lewknor Brook, Cuttle Brook, Hendred Brook, Ginge Brook and Lockinge Brook. Target habitats (UK Habs codes): rivers (priority habitat) (r2a) with secondary code 51. National Vegetation Classification A17.
P22	**Enhance and manage ditches in Oxfordshire more sensitively to create wildlife-rich habitats that support biodiversity**. Wider benefits: Water supply, Flood protection, Erosion protection, Water quality regulation, Cooling and shading.	PM49 (countywide)	**Create, improve, and manage the variety of ditches across Oxfordshire to benefit biodiversity in appropriate locations**. Ditches vary from dry to wet and creating and maintaining ditches that hold water throughout the year holds greater value for biodiversity. For existing ditch systems, adopt best practice management measures to maximise their ecological diversity. Create new ditch habitats in appropriate locations e.g. in conjunction with the restoration of floodplain grazing marsh, and buffer ditch habitats with low-intensity land use or buffer strips in order to benefit water quality and maximise opportunities for biodiversity. See management guides and advice which recommend restoring ditch profiles (including on farms) and rotationally (not annually) managing ditches with vegetation buffers that are managed sensitively. Target habitats (UK Habs codes): habitats with secondary code 50
P23	**Enhance and manage fen habitats in Oxfordshire through appropriate management techniques to achieve good ecological condition of fens and support a wide range of (often rare) species in this irreplaceable habitat.** Wider benefits: Water supply, Aesthetic value, Education and knowledge,	PM50 (mapped)	**Enhance existing fens through appropriate management and restoration to achieve good ecological condition.** Fens are an irreplaceable type of habitat and they are only possible on unique geology types that happen to be found across Oxfordshire making this county a national hotspot for fen habitats. However, many fens have been lost as land use changed, management stopped, and scrub and woodlands took over. Most of the known remaining fens are in poor condition and require focused effort to recover their condition. Oxfordshire's fens support a range of particularly rare species which are at risk of becoming extinct from the UK.

	Interaction with nature, Sense of place, Flood protection, Erosion protection, Water quality regulation, Carbon storage, Cooling and shading.		Additionally, fens are a type of freshwater peat-forming wetland and the production of new peat is extremely efficient at pulling carbon dioxide out of the atmosphere, converting it into living plants and their dead remains into carbon-rich deposits in the soil. Restoring and maintaining habitats, particularly fens is essential if we are to maintain the effectiveness of these carbon sinks (Wildlife and Wetland Trust). There are two types of fen habitats and they have different management needs. The two types are (1) surface water-fed fens and (2) groundwater fens (sometimes called spring- or seepage fens). Before starting management, assess the fen type to distinguish which type it is and then plan and deliver management based on this. (1) **Surface water-fed fens** typically benefit from cutting and collecting a third of the vegetation annually and cutting the next third in the following year, and so on. In this way, you manage a third of the site each year on rotation. Graze, cut, and/or rake pond marginal vegetation to ensure light, low nutrient, shallow pools and wet runnels. Additionally, scrub tends to require management to allow some but avoid taking over the fen pools. Scattered bushes and trees such as sallows can provide a valuable resource for invertebrates. This is the more common type of fen often found in floodplains with mixed, tall wetland vegetation, see detailed guidance here. (2) **Groundwater fed (seepage) fens** rely on very low nutrient, high calcium, alkaline water from underground limestone or chalk water (aquifers). This base-rich spring-fen type is extremely rare (see UK map here) and a special habitat in Oxfordshire, found especially in the South, Vale, and Oxford City. These fens benefit from grazing or cutting (and removing the vegetation) every year to maintain a short structure that mimics historic grazing. Expert hydrological advice will benefit the management plan of these fen types, as nearby land use within the ground and surface water catchments has significant impacts on the health and condition of the fen. Groundwater fens have much rarer and at-risk plant and invertebrate species which will simply disappear if not cut every year. A detailed management and restoration guide for these fens can be found here. Freshwater Habitats Trust have an

			Oxfordshire Fens Project to work with communities and landowners across the county, get in touch for advice and support. See some of Oxfordshire fen locations and read more about fens here. For all fens, aim to allow the production of a continuous supply of deadwood (of various sizes) to benefit a range of species (invertebrates and fungal species). Consider which time of year management will be undertaken on fens based on any rare species (invertebrates, plants, and others) that are present to allow them to emerge and reproduce. Whilst the LNRS has mapped this action onto the currently known fen locations, these measures are still a priority to deliver on any fens that are identified in the future if data changes after the publication of the LNRS (including ghost fens which occur where fens have been 'lost' to tree and scrub growth). Oxfordshire has a number of fens that are being worked on by local people and organisations to create exemplar habitats. This includes (but is not limited to) Cothill Fen, Lye Valley Fen, and Hinksey Heights Fen. You can see more about Oxfordshire's Fen Project here. Target habitats (UK Habs codes): lowland fens (f2a). National Vegetation Classification: Swamp: S3,S5,S6,S7,S8,S12,S13,S14,S19,S22,S23,S28,Tall-herb fen: S25 Fen Mire and Fen Meadow M13,M22,M24
		PM51 (mapped)	**Manage fen buffer areas to create and enhance areas of rough vegetation that help to enhance the condition of the fen habitat** Around fens, aim to achieve a 10-metre buffer zone of rough vegetation or low earth bunds to help enhance the health of the fen habitat and/or in this buffer area, aim to achieve low/no applications of nutrients. Many fens may benefit from wider buffer areas if possible and achievable. Whilst the first 5 to 10 metres of the buffer zone has been reported as being the most important for nutrient removal, the optimum width of the buffer depends on the slope of the area, the size of the catchment, the type of soil, and the degree of enrichment. More details can be found here in the fen management handbook.

		PM52 (countywide)	**Where appropriate, retain and/or create 'fen carr', a wet woodland fen habitat that tends to be made up from 'sallow' willow species and alder.** In appropriate locations create, maintain, or enhance fen carr habitats. Within fen carr habitats, maintain or create an open structure by utilising grazing or other suitable techniques to ensure the existence of open areas within wet woodlands. Fen carr habitats can be suitable on floodplains which have historically held fen carr and which don't hold strong potential to become biodiverse floodplain meadows. There are situations where the retention/creation of fen carr may not be suitable, for example if the fen carr is, instead, a tree-colonised ghost spring (groundwater) seepage fen that could benefit from restoration. The initial step is to accurately identify the fen type in order to understand whether to retain/create/remove fen carr. For assistance or advice about fen carr, contact Freshwater Habitats Trust who can support with fen identification. Target habitats (UK Habs Codes): Alder woodland on floodplains (w1d5). National Vegetation Classification W1, W5.
		PM53 (countywide)	**Ensure that fens in Oxfordshire retain continued, appropriate flow rates of clean water into fen habitats to support their ecological condition** Fens are some of the most botanically diverse habitats in England and are mainly irrigated by groundwater discharge from springs and seepages, with the water table close to the surface all year round. Without clean and consistent flows of water, fens cannot survive. Prioritise, maintain, and enhance the ecological condition of fens by ensuring a consistent flow of clean water into fen habitats. The groundwater catchment of any fen should not be contaminated with nutrient-rich water. This is particularly important for the rarer spring fens. Catchment sizes can vary for each fen and can spread hundreds of metres out from fens. The best management of the fen groundwater catchment to help clean the water supply to the spring fen by creating, maintaining, or enhancing areas of permanent grasslands like hay meadows or grazed pasture with no-inputs. You can read about fen catchment mapping in Oxfordshire here.

P24	**Create more, new (or restored) high quality freshwater habitats in Oxfordshire including ponds, lakes, reedbeds, and marsh.** Wider benefits: Fish production, Water supply, Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Flood protection, Water quality regulation, Carbon storage, Cooling and shading, Pest control.	PM54 (mapped)	**Create wetland habitats that contain a matrix of various habitat types suitable for the site (e.g. wet grassland, ponds, ditches, hedgerows, trees, or wet woodland)** Restore and enhance degraded or lost floodplain wetland habitats by restoring rivers to improve hydrological connectivity with floodplains, managing water levels where appropriate, and creating new habitats and features such as ponds, ditches, wet woodland, trees, hedges and more habitats suitable as part of a wetland matrix. Connect existing floodplain wetlands by the creation of new wetlands to act as stepping stones for wildlife and increase the overall habitat available for key wetland species. Target habitats (UK Habs codes): Fen, marsh, swamp, grassland, rivers, lakes and wet woodland with floodplain wetland mosaic secondary code 55
		PM55 (mapped)	**Create new, varied ponds in suitable locations across all habitat types to increase biodiversity and create more clean water habitats**. Creating ponds in areas away from pollution offers one of the quickest ways to bring clean water back into the landscape (FHT). Create ponds that are varied in structure, sun exposure, locations, and shape. Within each pond, create a variety of depths and types of pond edges including a gradual, shallow bank to allow animals into and out of the pond. Allow plants to grow naturally at pond edges with piles of stone, deadwood, and/or areas of longer vegetation near to ponds. When creating multiple ponds, create them at different points in time so that landscapes have older ponds, younger ponds, and ponds that are allowed to dry/die out. Prevent ponds becoming overgrown by tall, dominant reeds and sedges. Maintain these ponds to allow a variety of sun exposure with areas of no shade (especially on the southern side of the pond) and include deadwood within ponds. See further guidance here. FHT recommend creating 10 new 'priority ponds' per every 100 hectares of habitat creation. Across Oxfordshire, ponds offer great value to biodiversity including exemplar habitats at gravel pits sites and sites like Otmoor. Pond and wetland

			creation can also be designed to aid the management of water through the county offering wider benefits to people and farm businesses (preventing flooding and storing water). Target habitats (UK Habs codes): Standing water (r1) with secondary code 40 ponds (priority habitat), other temporary ponds and scrapes (r1f6)
		PM56 (countywide)	**Create more reedbed habitat at suitable locations to provide habitat for reedbed specialists (often as part of larger wetland mosaics)** Create new reedbeds in suitable locations. Reedbeds are wetland areas where common reed is dominant; looking at areas where reeds already grow is a good indicator of a suitable location. Reedbeds can filter potentially polluted water from settlements before it is discharged to rivers. This habitat type is typically found in river floodplains and can exist as reed swamp (flooded all year) or reed fen (flooded periodically). Reeds are often used to supply thatch. Often created within floodplain grazing marsh to complement the overall wetland habitat mosaic. Target habitats (UK Habs codes): reedbeds (f2e). National Vegetation Classification (NVC) S4
		PM57 (countywide)	**Enhance any existing fen, marsh and swamp wetland habitat areas.** Enhance and maintain wetland habitat areas to achieve a variety of appropriate vegetation types and habitat elements that are suitable to both the area and to the source, supply, and flow of freshwater. Aim to achieve a diversity of edges, structures, and include areas of open water where suitable for the site. More information on the management of fen, marsh, and swamp habitats can be found here. Target habitats (UK Habs codes): Fen, marsh, swamp, rivers, lakes with floodplain wetland mosaic secondary code 55
P25	**Create, enhance and manage habitats within Oxfordshire's**	PM58 (mapped)	**Create areas of new good quality grazing marsh and enhance (or maintain a good condition) of existing floodplain grazing marsh.**

	floodplains including wet grasslands and wetland habitats to achieve biodiverse habitats that support a rich array of species. Link and connect these habitats by creating and managing wildlife corridors along rivers and streams, providing natural flood management services and improved water quality. Wider benefits: Food production, Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place, Flood protection, Erosion protection, Water quality regulation, Carbon storage, Pollination.		Floodplain grazing marsh benefits from management that allows it to be periodically covered by shallow standing water. These habitats can often be found within, around, or near to a mix of other wetland habitat types. Found close to water, floodplain grazing marsh habitats have ditches running through them which require sensitive, rotational management to support species. Within the management plan for grazing marsh, aim to achieve a varied vegetational structure with appropriate levels of rush cover to support breeding waders and a diversity of ground cover including patches of bare ground and pockets of scrub to provide a broad range of niches for invertebrates and other species. These sites require light grazing (not overgrazing) to maintain plant diversity and cattle are typically a particularly good option. Avoid draining these habitats and instead aim to maintain water levels so that they are close to the field level throughout the year with natural and steady variation above and below that level throughout the year. Target habitats (UK Habs codes): grassland, wetland or rivers and lakes with secondary code 19.
P26	**Enhance and manage 'riparian land' (the land running along the sides of our rivers and streams) to achieve good ecological condition to benefit wildlife, enhance freshwater habitats, and create joined-up corridors of connectivity through Oxfordshire.** Wider benefits: Fish production, Recreation and leisure, Flood protection, Erosion protection, Water quality regulation, Cooling and shading, Pollination, Pest control.	PM59 (countywide)	**Create and manage biodiverse habitat alongside riverbanks to enhance biodiversity, improve water quality, and offer a corridor to enable wildlife to move along rivers, banks, and watercourses.** Enhance habitats and biodiversity along riverbanks by creating vegetative buffers and, where suitable, plant (or allow the growth of) new trees that are well suited to the soils alongside the river (this can include but is not limited to willow, alder, birch, and poplar). Consider and plan for the future management of these trees and vegetation. This action has the ability to create a corridor of connected habitats and can often be appropriate along towpaths and pathways. This action can be undertaken in both urban and rural settings to improve the condition and diversity of land alongside rivers and streams benefitting both people and wildlife.

P27	**Improve the abundance and range of freshwater species that rely on rivers, streams, standing water, and wetland habitats and need specific additional potential measures.** Wider benefits: Fish production, Education and knowledge, Interaction with nature, Sense of place, Pest control	N/a	See the 'Species Priorities List' to see the potential measures that could be taken to support species that use and benefit from habitats within this type of environment. Some of these measures are mapped.
Deadwood			
Code	**Priority** In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	**The code of each measure** (and whether they are mapped)	**Potential Measure (PM)** In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P28	**Retain more deadwood across all habitat types in Oxfordshire to support a wide range of species.** Wider benefits: Education and knowledge, Interaction with nature, Sense of place, Flood protection, Erosion protection, Carbon storage, Pollination, Pest control.	PM60 (countywide)	**Across all habitat types that have trees, retain dead, decaying, and/or dying wood in the environment where it is safe to do so (including deadwood in water).** Aim to retain and add new deadwood (in a range of sizes and ages) into all habitat types and expose the deadwood to a range of conditions (submerged in water, wet, dry, damp, heavily shaded, partial shade, and sunny open areas). Retain deadwood in a variety of structures; standing deadwood (upright trees, trunks, or stumps that are dead or dying), fallen deadwood (wood on the floor), and deadwood branches on alive trees. Hollows within standing trees support a wide range of species. Avoid using fungicides around these trees to allow and encourage fungal growth on this deadwood. Manage trees and branches using techniques that can enable you to regularly add new deadwood to the environment. Where

			necessary, reduce dead and dying tree height in stages to make the tree safe & prolong the presence of dead and dying wood in this location. Manage deadwood in accordance with any species priorities for the site. Where safe to do so, leave dead and dying ash trees in situ. Where ash trees have to be removed, look for opportunities to retain standing deadwood and/or stumps. Implement measures to introduce veteran tree characteristics to a range of tree ages and species.
Hedgerows and hedgerow trees			
Code	**Priority** In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	**The code of each measure** (and whether they are mapped)	**Potential Measure (PM)** In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P29	**Enhance and sympathetically manage hedgerows and hedgerow trees to achieve good ecological condition and support biodiversity.** Wider benefits: Food production, Aesthetic value, Interaction with nature, Sense of place, Carbon storage, Air quality regulation, Cooling and shading, Flood protection, Erosion protection, Water quality regulation, Pollination, Pest control.	PM61 (countywide)	**Manage existing hedgerows and hedgerow trees to enhance their condition and longevity to benefit biodiversity.** Refer to hedgerow guidance and organisations like Hedgelink. Allow hedgerows to grow to a thick and tall condition or to be laid into appropriate or traditional 'profiles' (shapes and designs). Instead of cutting all hedges annually, consider moving to a two- or three-year management regime for suitable hedgerows, or longer where possible. Where possible (on sites with lots of hedges) ensure that the 2–3-year management regime is not undertaken on all the hedges on a holding at the same time. Retain hedgerow trees for as long as is safe to do so and, where suitable, manage tree-less hedgerows in a way that allows new hedgerow trees to emerge at suitable intervals. Lay or coppice suitable hedgerows on a long rotation to regenerate them when they show signs of becoming gappy. Aim to trim hedges after berries have been taken by wintering birds and avoid hedge cutting or

			trimming during bird nesting periods. Retain dead, dying, and decaying wood where safe and practicable in hedges and hedgerow trees. Target habitats (UK Habs codes): Species-rich native hedgerow (h2a5)
P30	**Create more hedgerows across Oxfordshire to support biodiversity**. Wider benefits: Food production, Aesthetic value, Interaction with nature, Sense of place, Carbon storage, Air quality regulation, Cooling and shading, Flood protection, Erosion protection, Water quality regulation, Pollination, Pest control.	PM62 (countywide)	**Plant, or allow the growth of, new and diverse hedgerows.** Establish a diverse range of hedgerow species, particularly native species and those adapted to the particular location or range of climatic conditions. Plan to grow and manage hedgerow trees within the hedgerow at suitable intervals to increase the connectivity of these habitats for species. Consider planting native fruiting hedgerow species that provide nectar in spring and fruit in summer and autumn; for example, hawthorn, blackthorn, and grey willow would support a wide range of rare species and establishing Wild Pear (Pyrus pyraster) could help to re-establish this rare species in the county. Plan for maintenance and management whilst the young hedgerow establishes. Aim to enhance connectivity by planting and establishing new hedgerows so that they join up to existing habitats, especially any existing hedgerows or patches of semi-natural habitat to promote the movement of species through the landscape and offer a corridor. Target habitats (UK Habs codes): Species-rich native hedgerow (h2a5)

Invasive species

Code	Priority In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	The code of each measure (and whether they are mapped)	Potential Measure (PM) In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P31	**Reduce damage to local species and habitats from invasive species or unsustainably high populations of species. Reduce the spread of invasive or problematic species across all necessary habitat types.** Wider benefits: Wood production.	PM63 (countywide)	**Slow, stop, and/or reverse the spread of invasive species that compromise the health of habitats in Oxfordshire.** Support or develop initiatives and actions to control or eradicate unsustainably high levels of invasive non-native species throughout all habitat types (including but not limited to, woodlands and freshwater habitats like rivers). If eradication is not possible or appropriate, actions to reduce, slow, or stop the spread of invasive, non-native species should be supported. Actions must be in alignment with the legislation about moving/handling/disposing of species. There is a UK Government list of invasive species which can be seen here. At the time of writing, some of the invasive species that are particularly relevant to Oxfordshire include, but are not limited to: Freshwater-associated species - American Mink, American Signal Crayfish, New Zealand Pygmyweed, and Himalayan Balsam. Woodland-associated species – Grey squirrel, Muntjac deer. Problematic and invasive species are expected to change with future climatic variation and this action should be adapted to the specific, relevant, invasive, or problematic species at the time. More information about what to do and how to record invasive species can be seen here with research and evidence available to read here.

Wider environment – agricultural (improved grassland and arable) and rural landholdings.

Please note, you may wish to refer to priorities for other habitats in the above sections if they are present on your landholdings (e.g. grasslands and scrub, woodlands, rivers, floodplain grazing marsh, orchards, and others).

Code	Priority In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	The code of each measure (and whether they are mapped)	Potential Measure (PM) In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P32	**Support farm businesses, rural landholdings, and tenant farmers to make more space for nature within the farmed landscape, regenerate healthy soils, incorporate wildlife-rich habitats, include agroforestry, and improve water quality. This would create excellent food/fibre production systems that offer valuable, connected spaces for biodiversity too, enabling species to spread through Oxfordshire's fields, edges, and corridors.** Wider benefits: Food production, Wood production, Water supply, Recreation and leisure, Interaction with nature, Sense of place, Flood protection, Erosion protection, Water quality regulation,	PM64 (countywide)	**Create and manage graded margins up to hedgerows and dry-stone walls to support birds and other farmland species**. Within fields that have hedges, provide margins that are graded in height (shortest near the field, longest grass at the hedgerow). These graded margins next to a thick hedgerow offer important nesting sites for birds including who seek long grass at hedgerow bases. Target habitats (UK Habs codes): arable field margins (c1a)
		PM65 (countywide)	**Create and manage wide arable field margins and in-field strips as wildflower grassland.** Methods vary and could include rotational mowing regimes to create wide in-field strips or margins (e.g. 3 – 18 metres) which offer cover for small mammals and refuge over winter for invertebrates. Remove arisings as needed to avoid enriching the soils and to avoid losing wildflowers to vigorous grasses. Manage arable fields, their margins, and in-field strips to encourage and retain populations of arable flowers and avoid spraying these areas. Alongside increasing biodiversity in those places, field margins and in-field strips can be positioned to connect to each other within farm holdings or between neighbouring holdings to help species to move

	Carbon storage, Cooling and shading, Pollination, Pest control.		through the landscape. Wide margins are particularly important alongside water courses and ditches to reduce diffuse pollution, erosion and enhance the biodiversity of the water course. Target habitats (UK Habs codes): arable field margins (c1a)
		PM66 (countywide)	**Create and manage field margins to improve and increase biodiversity around fields**. Maximise the diversity of field margins to provide a range of habitats within margins. Aim to vary management of margins to increase diversity. For example, annual cutting of the strip nearest the crop but with less frequent cutting nearer the field boundary. Variety could also be introduced by managing blocks, strips or whole margins at different intervals. In planted margins, tailor the seed mix diversity to include a variety of flowering plants that could provide continued options for pollen and nectar throughout an extended season. Include species in planted margins that are able to tolerate and flower under hotter and drier summers. Target habitats (UK Habs codes): arable field margins (c1a)
		PM67 (countywide)	**Create and improve areas that support rare arable plants on farmland.** If species of arable plants are present, and if it is appropriate for those species, you can support arable plant species on any relevant soil types by disturbing or cultivating some areas of suitable soil (typically each year in autumn) and allowing arable plant seeds to grow in the following years. Minimise or stop the use of herbicides within this area. Target habitats (UK Habs codes): arable fields – cultivated for annual flora (c1c9)
		PM68 (countywide)	**Support farmland birds over winter**. Implement measures to assist farmland birds survive across the hungry gap (mid-February to Mid-April): overwinter stubble, seed-rich winter cover crops using wild bird seed mixtures, unsprayed and unharvested arable headlands, and/or supplementary feeding.

			Target habitats (UK Habs codes): winter stubble (c1c5), arable fields - wild bird mix (c1c6), arable field margins (c1a)
		PM69 (countywide)	**Take action to improve farmland bird nesting success.** Offer and retain nesting and roosting sites for birds including; bird boxes, trees with hollows, standing deadwood, areas of scrub, dense hedges, suitable buildings and barns (including those derelict).
		PM70 (countywide)	**Retain, improve, or create habitat to increase the opportunity for wildlife to move through the landscape (e.g. wildlife corridors).** Improve the connectivity of habitats or of any permanent areas of uncultivated land that support species to move through the landscape. Aim to join up areas of habitat within farms and between neighbouring farms.
P33	**Increase biodiversity within farmland soils.** Wider benefits: Food production, Flood protection, Erosion protection, Water quality regulation, Carbon storage, Pest control.	PM71 (countywide)	**Across Oxfordshire's farmland, increase the biodiversity in soils by choosing cultivation practices that can regenerate species and produce healthy soils**. Take actions and use techniques that are suitable to the farm type and location to improve the abundance and health of species that produce good quality soils (e.g. minimum cultivation, cover crops, leys, grazing techniques, and crop rotations). Measure, and aim to improve the health, abundance, and diversity of soil species. Improving soil biodiversity will enhance the structure and quality of the soil enhancing productivity, building carbon content, and improving water retention and infiltration to help reduce runoff and leaving of soil nutrients. The actions to enhance grassland health and condition are described in the grassland section at the top of this document. Target habitats (UK Habs codes): temporary grass and clover leys (c1b), rye-grass and clover ley (c1b5), Legume-rich ley (c1b6), herb-rich ley (c1b7)
P34	**Increase the number, diversity and health of trees on farmland**	PM72 (countywide)	**Plant (or allow the growth of) diverse trees of various ages and types on farmland**.

	Wider benefits: Wood production, Food production, Aesthetic value, Interaction with nature, Sense of place, Flood protection, Erosion protection, Water quality regulation, Carbon storage, Cooling and shading, Pollination, Pest control.		Plant trees, or allow trees to grow up, across different years (successional planting/successional growth) to broaden the age diversity of trees. This could include agroforestry, woodland, standard trees in hedgerows, scrub growth, shelterbelts, silvopasture, individual trees and/or orchards. You could create shelterbelts (windbreaks) made up of trees to protect livestock and crops from inclement weather (see the benefits of trees on arable farms here). Alternatively/additionally, you could incorporate trees or agroforestry into agricultural systems, particularly livestock grazing systems (silvopasture), or alongside crop production (silvoarable systems). This could include trees that can produce a fruit or nut crop (see agroforestry handbook).
		PM73 (countywide)	**Retain and/or plant in-field trees with suitable buffer zones to ensure continuity of open grown trees (live, dead, or dying) that support species across the landscape.** Retain existing trees within the farmed landscape, particularly veteran and ancient trees, and fence off ancient and veteran trees if necessary to protect them and their root zones from soil compaction and/or to enable new trees to grow nearby (see guidance on managing such trees).
P35	**Farm with nature by creating and implementing integrated pest management plans that reduce the need for chemical control of on plants, insects, and/or fungi**. Wider benefits: Food production, Interaction with nature, Pollination, Pest Control.	PM74 (countywide)	**Create a tailored integrated pest management plan to reduce the use of artificial fertilisers and pesticides**. When thinking about how to manage crop pests, plants, and diseases within farmland, implement measures that can support and work with biodiversity to work with nature to produce food (for example, NFU integrated pest management plans)
P36	**Improve the abundance and range of species that need specific additional potential measures within agricultural land.**	N/a	See the 'Species Priorities List' to see the potential measures that could be taken to support species that use and benefit from habitats within this type of environment. Some of these measures are mapped.

	Wider benefits: Education and knowledge, Interaction with nature, Sense of place, Pollination, Pest Control		
Wider environment – Archaeological and heritage assets			
Code	**Priority** In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	**The code of each measure** (and whether they are mapped)	**Potential Measure (PM)** In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P37	**Restore and enhance biodiversity across the landscape in a manner that complements the landscape and historical and cultural features.** Wider benefits: Flood protection, Erosion protection, Water quality regulation, Carbon storage, Pollination, Recreation and leisure, Aesthetic value, Education and knowledge, Interaction with nature, Sense of place	PM75 (mapped)	**Restore biodiversity around heritage assets and scheduled monuments in a complementary manner.** If appropriate and suitable, take action to create, enhance, or maintain habitats around heritage assets and scheduled monuments. Actions should aim to achieve a good ecological condition to benefit biodiversity and should be undertaken in a manner that is complementary to the heritage feature(s), and not in a way that would cause them damage. Often, but not always, grassland actions are likely to be possible, sometimes other actions may be suitable too. However, this must be checked before plans can be agreed or formalised. Before planning habitat actions on sites with heritage assets, consult with the relevant authorities like the County Council Archaeology team (archaeologydc@oxfordshire.gov.uk) and Historic England.

Wider environment – village, towns, cities and green spaces

Please note, in addition to the measures below, you may also wish to deliver other measures that might be present in your local area (e.g. grasslands, scrub, road verges and road verge nature reserves, woodlands, rivers, orchards, and others). The relevant measures for those habitat types can be found in the above sections of this list.

Code	Priority In bold you will find the priority. A priority is a key outcome to achieve for Oxfordshire. Underneath the priority, you will see wider benefits which could be delivered by achieving each priority.	The code of each measure (and whether they are mapped)	Potential Measure (PM) In bold you will find the potential measure (action) that, if taken, would be expected to contribute towards achieving the priority (left). Underneath the potential measure you will find further information.
P38	**Enhance and create more, connected, habitats and spaces for nature in Oxfordshire's villages, towns, and cities to make biodiversity and a connection with nature part of daily life (at home, at work, and in parks and gardens) and to realise the wider benefits of nature in urban areas such as urban cooling, reduce surface water run-off and cleaner air.** Wider benefits: Recreation, Aesthetic value, Interaction with nature, Sense of place, Flood regulation, Air quality regulation, Carbon storage, Cooling and shading, Noise reduction, Pollination, Pest control	PM76 (mapped)	**Create and/or manage greenspaces and habitats in urban areas to enhance their condition to benefit wildlife, improve connectivity, and provide wider benefits.** Consider opportunities to create, enhance, or manage habitats and wildlife-friendly features. In and around settlements, various actions can be taken to create and/or enhance greenspaces, and habitats like those listed within this document (above), including but not limited to; grasslands, scrub, road verge nature reserves, orchards, parkland, woodland, mosaic habitats, wetlands, freshwater habitats, and rivers. Many of the sections above have further advice and guidance to help with these actions. Vary the action to be suitable to the scale, size, and type of habitat or greenspace in question as well as any species present or nearby. Any actions taken should also be compatible with the current land-use and should respect community preferences. See Wild Oxfordshire's guidance here for supporting nature on your local patch. In urban environments, prioritise connectivity so that wildlife can more easily move between neighbouring land, and aim to establish a robust ecological network that supports wildlife movement through urban areas, making nature a part of daily life.

			Actions to benefit biodiversity can also be tailored to deliver important benefits for local communities, including addressing inequitable distribution of environmental determinants of health and wellbeing', and improving climate resilience. Such actions could include innovative solutions like green (or brown) roofs, biodiverse swales, or rainwater gardens to mitigate the impacts of flooding. Other actions could include the use of vegetation cover to provide shade to mitigate excess heat and to filter particulate air pollution. The advice sheet offers guidance on managing parks and green spaces for pollinators but you can refer up to other sections in this list for guidance about e.g. creating orchards, enhancing woodlands, creating ponds, and more.
		PM77 (countywide)	**Integrate wildlife-friendly measures into homes, gardens, greenspaces and developments.** Take action to enhance these spaces for wildlife and consider key species that you could support in gardens and greenspaces. These may include birds, bats, hedgehogs, frogs, toads, bees, butterflies, and more. Consider installing bird boxes, bat boxes, swift bricks and other options that support wildlife in and around buildings where appropriate. For new homes being built, see this Wildlife Trust guide on 'Homes and wildlife - How to build housing in a nature friendly way'. In existing gardens and greenspaces follow suggestions for 'Wildlife gardening' e.g. how to build wildlife ponds, attract pollinators, plant native shrubs, trees, and hedges. Ensure any fences or walls have 13 by 13cm holes to create 'Hedgehog Highways' that allow hedgehogs to move through gardens. See a list of hedgehog friendly fencing suppliers here. Avoid using pesticides or peat-based compost in gardens and avoid introducing potentially invasive non-native species into gardens and other outdoor spaces. Remove existing invasive species where possible. See a list of invasive plant species here. Retrofit wildlife kerbs to existing gullies, particularly near existing nature sites, and install wildlife kerbs on new gullies as standard. This will provide safer passage for amphibians and small mammals around road gullies and drainage openings.

			Reduce recreational pressure on wildlife and habitats in urban areas by maintaining clear paths, keeping dogs under close, effective control, reducing the impact of cats on wildlife, and aiming to create or enhance some areas for wildlife in areas in places where there is little-to-no disturbance. Whilst these are important actions to take across the county, the impact of providing nature-rich spaces is likely to be highest near/within public infrastructure such as schools and hospitals where the health and social benefits of nature connection are particularly marked.
		PM78 (mapped)	**Create or enhance a mosaic of habitats in a manner and size that complements the current use of the land by the local community.** This action is suitable to take in and around community-use areas like playing fields, play spaces, cemeteries, golf courses, allotments, public parks, religious grounds and other community spaces or gardens. On land used by local communities, look for complementary opportunities to enhance the area to support wildlife and create space for biodiversity. This can be done in edges and patches and doesn't have to be the whole space. Consider opportunities like planting trees, hedges, orchards, creating ponds, enhancing grassland, allowing corners of scrub to develop, and keeping deadwood in the area. Actions should complement the needs of the local community for safety and access. Think about what species are present or nearby that this space might be able to support through, for example; hedgehog highways, bird boxes, bat boxes, beetle banks, bug hotels, and more. There are a range of organisations that can support you with this (BBOWT, CAG Oxfordshire, Wild Oxfordshire, TOE, Caring for God's Acre, and Sports England to name a few). Sports England have an action plan supported by committed funding that could be applied to local pitches (see case studies here). Whilst this is an important action across the county, actions that produce nature-rich spaces can be particularly beneficial near-to, or within, areas of public infrastructure like school, hospitals, and accessible green/blue spaces. In these spaces, the

			health and social benefits of nature connection can be great. Additionally, there are particularly deprived areas of Oxfordshire (see this report, page 22) that could be a focus for these actions.
		PM79 (countywide)	**Create and enhance wildlife-rich corridors of suitable habitat between, through, or near settlements in Oxfordshire.** Create new corridors or enhance existing corridors that offer room for nature and wildlife to move through towns, cities, gardens, parks, and villages and which include habitat for foraging and for resting/nesting. Consider the importance of dark corridors with minimal artificial lighting to benefit wildlife (read more about lighting and guidance here). Corridors should ideally join up habitats and may be possible through, between, or near to settlements and could be created alongside active travel corridors, providing benefits for both people and wildlife. Such corridors may include Public Rights of Way, permissive paths, accessible walking/wheeling routes, watercourses, footpaths, hedgerows, greenways and others.
		PM80 (countywide)	**Ensure that actions in urban areas offer wider benefits and meet relevant green space standards.** Whilst benefitting biodiversity, actions can also be tailored to deliver benefits for local communities, including addressing inequitable distribution of environmental determinants of health and wellbeing', and improving climate resilience. This could include innovative solutions like green (or brown) rooves, biodiverse swales, or rainwater gardens to mitigate flooding or actions such as increasing vegetation cover to mitigate excess heat through shading or to filter particulate air pollution. The Environmental Benefits from Nature Tool can be used to understand the wider benefits that might be gained or lost from changes in land use. Where relevant and appropriate, create or enhance multifunctional parks and green spaces to ensure that residents of new (and existing) housing have sufficient access to larger green spaces (meeting Natural England Access to Green Space Standards). This should be prioritised in areas with the least local access to

			greenspaces, where significant housing development is expected, where local habitats and species are under pressure from high levels of use by local communities, and/or where people and homes are highly vulnerable to negative impacts such as air pollution, urban heat island effects, flood risk, and others. See guidance in the Green Infrastructure Framework and read about the public health benefits of accessible greenspaces here. Consider opportunities to create and enhance greenways in cities to improve people's access to rivers and provide nature-rich corridors. Design and deliver new housing developments with sufficient accessible, nature-rich spaces for residents (meeting Building with Nature Standards). Whilst this is an important action across the county, actions that produce nature-rich spaces can be particularly beneficial near-to, or within, areas of public infrastructure like schools, hospitals, and accessible green/blue spaces. In these spaces, the health and social benefits of nature connection can be great. Additionally, 16 priority neighbourhoods have been identified in Oxfordshire(see this report, page 22) that could be prioritised for efforts to improve access to greenspace and could be a focus for these actions.
		PM81 (countywide)	**Increase tree canopy cover in Oxfordshire by planting and managing trees and woodlands in built up areas.** Plant trees and/or woodlands that can cool and shade the local environment and improve air quality. These trees could also create or maintain corridors for wildlife to support species to cross the county (in both rural and urban environments). This action offers particular benefits to human health by mitigating the impact of excessive heat and filtering particulate pollutants from the air. Planting trees and creating canopy cover in warmer areas of the county (especially urban environments) helps to reduce temperatures and increase the resilience of urban areas in the face of climate change. Planting trees between sources of particulate pollution (such as road traffic) and particularly sensitive areas such as schools, active travel corridors, and residential areas will have the most benefits for human health from improvements in air quality.

			Suitable locations could include green space, gardens, parks, schools, or as street trees. When planting new trees, plan for their long-term management, and plant them strategically, aiming to create corridors of trees that connect up urban greenspaces, gardens, or other habitats. Corridors could connect either to each other and/or to the wider countryside where possible. These corridors of canopies help local species to move and join-up their populations. Whilst this is an important action to take all across the county, this would be particularly important action to support and incentivise in built-up areas that have low tree cover, and in locations that experience particularly high vulnerability to heat or particulate air pollution. See this guide on how to select and plant urban trees, and see this new 'Trees outside woodland map' to see extent and location of woodlands and trees in England. Some of Oxfordshire's neighbourhoods have particularly low tree cover or access to green space and actions could be focused on these locations to maximise the benefits for people, health, and nature.
		PM82 (countywide)	**Carry out wildlife-friendly actions that also reduce flood-risk and the impact of heat in built-up areas.** Areas of Oxfordshire are increasingly vulnerable to the effects of changing climate patterns (including flooding, drought and excess heat). There are solutions that can reduce these impacts which also benefit nature, these are called nature-based solutions. Install more green walls, green roofs, or innovative surfaces on new or existing buildings that help to cool urban areas, catch water, and provide more space for nature. Link to further guidance. Increase vegetation cover to mitigate excess heat through shading and intercept rainfall. Keep gardens instead of creating more impermeable hard surfaces, and where possible, remove hard-standing surfaces in favour of permeable surfaces (ideally natural, green options that also benefit wildlife). These options to retain and create more permeable space helps to soak up water, reducing the risk of surface

			water flooding. Read about the impact of hard surfaces and the problem with paved gardens here. Integrate sustainable drainage systems (SuDS) to capture, hold, and manage the flow of water near built up areas and developments. SuDS are designed to manage rainfall and stormwater runoff in ways that mimic natural drainage processes and can also enhance the local ecosystem. Examples include rain gardens, mini ponds, orchards, wetlands, and balancing ponds. These SuDS features not only contribute to flood risk management but also serve to support biodiversity by creating habitats for plants, animals, and insects. Oxford City has published a Design and Evaluation Guide to help navigate sustainable drainage options and there are national standards for SuDS here.
		PM83 (countywide)	**Create and/or enhance community and local growing spaces, community farms, and allotments to improve soil health and benefit biodiversity.** Take actions to increase biodiversity and improve the health of soils in local growing spaces (farms, orchards, allotments) to enable long-term healthy food production that benefits local people and wildlife. Actions should be supported by local communities and suitable to the type of growing space. Look at guides which offer detail about growing food in community settings, permaculture principles, using water more sustainably and reducing the need for chemicals during food production. The National Allotment Society have lots of supportive information. Options will vary based on the type of site and could include the creation of ponds, hedges, hibernaculum, compost sites, and managing the area in a different or regenerative ways. Actions could also be taken for particular species like birds, bats, frogs, newts, snakes, and toads by creating areas of imperfection, nesting spaces, breeding spaces, and habitats or areas that benefit them.

		PM84 (countywide)	**Reduce pollution and damage to the environment by changing products, behaviours, and actions.** Support initiatives that could help to prevent damage to the environment and which contribute towards enhancing the condition of the environment (by reducing pollution into the environment across Oxfordshire, including in places where people live and work). There are a large range of actions that could be supported like preventing run-off, preventing littering, or cleaning up litter from local areas. Additionally, damage and pollution could be limited by changing commonplace habits, for example, reducing the use of chemical controls in the environment (such as herbicides), helping people to purchase products that are less harmful to the environment when put down drains, or to change sources of fuel. Some actions may focus on changes to diets or enabling people to buy more local produce. Other actions could include increasing healthcare options: for instance, offering more green social prescribing treatments to people, which can reduce the amount of pharmaceutical pollution in our waterways from medications taken by people. Oxfordshire Community Action Groups is a network of over 100 community action groups working in local communities across Oxfordshire to make it a safer, fairer, greener, more sustainable place to live, work and visit.
P39	**Build more awareness of biodiversity and enable more people to join and engage with habitat enhancement, creation, and education initiatives so that more people in Oxfordshire are connected with nature and feel more able to act as stewards for Oxfordshire's current and future environment.** Wider benefits: Recreation and leisure, Education and knowledge, Interaction with nature, Sense of place	PM85 (countywide)	**Offer courses, spaces, and opportunities for people of all ages to connect with nature and learn about nature recovery and practice environmental stewardship.** In order to deliver this kind of action, a variety of landowner and land manager projects would need to be enabled and supported in partnership with a range of organisations (where suitable). For example, the creation of visitor centres, of more areas of nature with accessible routes, and more accessible education opportunities for adults and young people that relate to nature recovery (including nature-friendly farming). Aim to improve awareness of the biodiversity crisis and efforts to address this, and address barriers to involvement so that more people from across all communities are taking action for nature. This can include opportunities around the identification

			and recording of species and habitats to contribute towards our understanding of local biodiversity.
P40	**Improve the abundance and range of species that need specific additional potential measures within, and around, settlements, people, and buildings.** Wider benefits: Education and knowledge, Interaction with nature, Sense of place, Pollination, Pest Control	N/a	See the 'Species Priorities List' to see the additional potential measures that could be taken to support species that use and benefit from habitats within this type of environment. Some of these measures are mapped.

You have reached the end of the LNRS Statement of Biodiversity Priorities.

Appendix A – Wider benefits from nature recovery

The benefits that nature provides to people are often known as ‘ecosystem services’. In developing the LNRS we considered how nature recovery priorities could contribute towards delivering 18 ecosystem services.

Healthy ecosystems, including plants, animals, soil and water (our ‘natural capital) deliver a range of services (Figure A1). These include the provision of food, water, timber and fish, as well as cultural services such as nature-rich green spaces for recreation, beauty, education and interaction with nature.

Nature also provides a range of regulating services including the control of floods, erosion, air and water quality, noise and climate, as well as pollination and natural pest control.

All these services are described in Table A1.

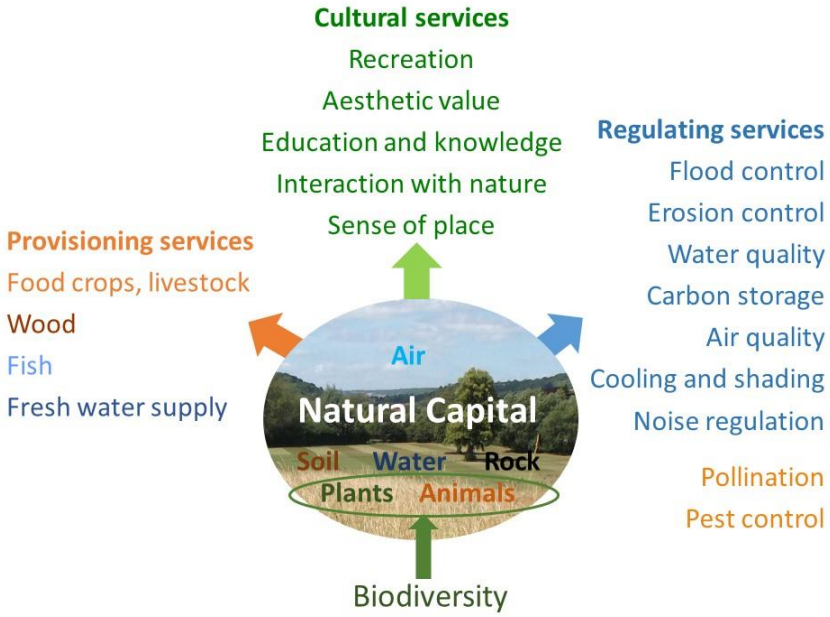


Figure A1. Healthy ecosystems can contribute to 18 ecosystem services.
Source: Alison Smith (2021) ‘Natural Capital in Oxfordshire Short report’, page 3. Environmental Change Institute, University of Oxford.

Table A1: The 18 ecosystem services that were considered when identifying wider benefits for people from the LNRS. Source: Alison Smith (2021) 'Natural Capital in Oxfordshire Short report', page 4. Environmental Change Institute, University of Oxford.

Provisioning	**Food production**	Arable crops, horticulture, livestock, orchards, allotments, urban food, wild food (e.g. gathering berries or mushrooms).
	Wood production	Timber, wood production for paper, woody biofuel crops, coppice wood or wood waste used for biofuel.
	Fish production	Aquaculture, commercial fishing, recreational fishing (recreational fishing is also a cultural service, but the habitat conditions match those for fish production).
	Water supply	Impact of soil and vegetation on rainwater runoff and infiltration, and thus on groundwater recharge or surface water flow.
Regulating	**Flood protection**	Reduction of surface runoff, peak flow, flood extent and flood depth through canopy interception, evapotranspiration, soil infiltration and physical slowing of water flow.
	Erosion protection	The ability of vegetation to stabilise soil against erosion and mass wastage by protecting the soil from the erosive power of rainfall and overland flow, trapping sediment, and binding soil particles together with roots.
	Water quality regulation	Direct uptake of pollutants by terrestrial or aquatic vegetation; interception of overland flow and trapping / filtration of pollutants and sediment by vegetation before it reaches watercourses; breakdown of pollutants into harmless forms e.g. by denitrifying bacteria that convert nitrates into nitrogen gas. Also infiltration into the ground, allowing pollutants to be filtered out by the soil and preventing pollution of watercourses – though pollutants could enter groundwater supplies.
	Carbon storage	Carbon stored in vegetation and soil. In the context of land use change (with complete loss of habitats and often major soil disturbance), this is more relevant than carbon sequestered annually. The 'time to reach target condition' reflects the time taken for a new habitat to reach a typical carbon sequestration rate for a mature habitat.
	Air quality regulation	Removal of air pollutants by deposition, absorption and/or breakdown by vegetation. Fine particles ($PM_{2.5}$) are the most damaging type of pollution, but vegetation can also remove ozone and nitrogen oxides (by absorption into pores).
	Cooling and shading	Shade, shelter and cooling effect of vegetation and water, especially urban trees close to buildings, green roofs and green walls, which can reduce heating and cooling costs, or trees in urban parks which can provide shade on hot days.
	Noise reduction	Attenuation of noise by vegetation.
	Pollination	Pollination of crops (and wild plants, supporting other ES) by wild insects (mainly bees and hoverflies). Excludes pollination by managed honeybees.
	Pest control	Predation of crop or tree pests by invertebrates (e.g. beetles, spiders, wasps), birds and bats.

Cultural	**Recreation and leisure**	Provision of green and blue spaces that can be used for any leisure activity, e.g. walking, cycling, running, picnicking, camping, boating, playing or just relaxing.
	Aesthetic value	Provision of attractive views, beautiful surroundings, and pleasing, calming or inspiring sights, sounds and smells of nature.
	Education and knowledge	Opportunities for formal education (e.g. school trips), scientific research, local knowledge and informal learning (e.g. from information boards or experiences).
	Interaction with nature	Provision of opportunities for formal or informal nature-related activities, e.g. bird watching, botany, random encounters with wildlife, or feeling 'connected to nature'. There is some overlap with biodiversity, but access by people can have negative impacts on some wildlife habitats. Excludes recreational fishing; hunting / shooting (not covered); the intrinsic value of nature (covered by the biodiversity metric); existence value (from just knowing that nature exists).
	Sense of place	The aspects of a place that make it special and distinctive – this could include locally characteristic species, habitats, landscapes or features; places related to historic and cultural events, or places important to people for spiritual or emotional reasons.

Within this set of LNRS priorities and measures you will see 'wider benefits' associated with each priority. These are examples of the main benefits that each group of actions could provide alongside achieving the biodiversity priorities.

This shows how nature recovery can play a key role in other priorities for the county, including climate resilience, health and well-being, air and water quality, and wider socio-economic benefits. Detailed examples are provided in the sections below.

It is important to understand that the actual benefits delivered will depend on the type of nature recovery action, the type and age of habitat, the location, public accessibility, and a range of other factors.

This means that nature recovery actions can be optimised to deliver wider benefits and minimise trade-offs between goals. For example, in urban areas, trees or hedgerows can be positioned to act as air pollution barriers between busy roads and houses or schools. To help protect water quality, buffer strips of tussocky grass, trees and shrubs can be created alongside watercourses to intercept polluted run-off from farmland. Trees can be planted on steep slopes and erodible soils to help reduce soil erosion.

Actions such as creating or improving parks, planting street trees, and creating wildflower meadows or community orchards can be targeted in urban areas that currently don't have much green space (see Oxfordshire's greenspace-deprived neighbourhoods).

There can also be trade-offs for some services. For example, planting woodland on farmland will produce benefits for carbon storage and flood protection but also means it can no longer be used for food production.

We have taken account of this when mapping the best locations for each measure. For example, we made it harder for the most productive farmland being selected for habitat creation actions (although some is still included).

There are also limits to what nature can do. For example, while nature recovery can help to absorb carbon dioxide and reduce air and water pollution, this must not distract from the urgent need to reduce emissions and pollution at source, which will have a far greater impact. Indeed, habitats used as a 'buffer' to soak up noise or pollution may have less value for wildlife.

Below are some more detailed examples of how measures in the LNRS can deliver wider benefits for people.

Climate change mitigation

It is estimated that Oxfordshire's soils and vegetation currently store about 85 million tonnes of carbon dioxide. That is equivalent to over 20 times the amount we produce every year by burning fossil fuels (four million tonnes).

Oxfordshire's habitats also soak up about 316,000 tonnes of CO2 every year – about 8% of our annual emissions. So, while the most urgent priority is to reduce emissions from fossil fuels and other sources, it is also vital to protect and enhance the great amounts of carbon stored in Oxfordshire's habitats.

The LNRS can support this priority by prioritising areas to keep existing habitats in good condition and by recommending the creation of new areas of woodland, scrub, grassland, and wetland in places where they offer the greatest benefits for biodiversity too.

On farmland, measures such as PM73 (increasing biodiversity in farmland soils) can also help to store a lot more carbon in the soil, and in urban areas measure PM78 (increase tree canopy cover) can also store large amounts of carbon in urban trees.

Climate change adaptation

The LNRS measures can play a key role in helping the county adapt to climate change. One of the main benefits can come from natural flood management, such as by planting trees in upper catchments to intercept and soak up rainwater, reducing flooding downstream (PM35, PM39). Also, rivers can be reconnected to their floodplains (PM40) to allow floodwater to gradually seep into the ground or slowly back into the river, reducing flood peaks in settlements downstream.

In urban areas, creating more nature-rich green space (PM77) and tree canopy cover (PM78) can help to cool urban areas and provide shade in heatwaves, as well as soaking up heavy rain and reducing urban flooding. On farmland, measures such as PM73 (increasing biodiversity in farmland soils) can improve the infiltration in the soil, so that heavy rain is

absorbed rather than running off the surface, eroding the soil and polluting nearby watercourses.

Many of the actions in PM73 also add more organic matter to the soil, which helps it to store more moisture, meaning the soils are more resilient to droughts as well as enabling the land to hold more water and increase infiltration rates into bedrock helping to reduce flooding. Planting and maintaining trees on appropriate areas within the farmland landscape (PM74 and 75) are very important for providing shade and shelter for livestock in very hot or stormy weather.

Hedgerows (PM62 and PM63) also play a valuable role in reducing soil erosion and flooding during extreme weather events. All these farmland measures for reducing the impact of floods, droughts and heatwaves can reduce the economic cost of crop and livestock yield losses for farmers.

Pollination and natural pest control

There has been a dramatic decline in insect populations in the UK over the last few decades, including beneficial insects such as pollinating bees and hoverflies, and pest predators such as beetles, spiders and wasps. This has had a knock-on effect on other species that depend on insects for food, including birds, bats, reptiles and amphibians (frogs, toads and newts) – and these are also natural pest predators.

Supporting pollinators and natural pest predators can increase crop yield and reduce the need for farmers to use expensive and dangerous agro chemicals such as pesticides and herbicides.

Many of the LNRS measures can help to support our struggling pollinators and pest predators by providing habitat and food resources. Measures that create and maintain scrub, wildflowers and dead wood are particularly important, because insects need nectar from flowers as well as structurally diverse (‘messy’) habitats to use for nesting and over-wintering sites.

Habitats including tussocky grass, dead hollow stems, leaf litter, different ages of scrub, dead wood, old trees with hollows, flaking bark and crevices, and patches of bare ground are all really valuable. The Oxfordshire LNRS consultation revealed strong support for more of these naturally diverse mosaic habitats.

Examples of key measures include PM03 (creating grasslands with a bumpy ground structure and different sward heights), PM05 and PM06 (creating and maintaining flower-rich grasslands), PM07 and PM08 (creating and maintaining varied scrub patches on grasslands), PM17 to PM27 (creating and maintaining mosaic habitats including wood pasture and parkland with veteran trees), PM37 (creating dense shrubby habitat in woodlands), PM60 (creating dead wood habitat), PM61 to PM64 (creating and maintaining hedgerows and walls), PM66 to PM69 (creating flower-rich field margins) and PM76 (integrated pest management to reduce use of agrochemicals).

Human health and wellbeing

There is now strong evidence that nature-rich green spaces can improve human physical and mental health and well-

being and can have wider socio-economic benefits. For example, interaction with nature can improve a range of health conditions including heart and lung health, high blood pressure, diabetes, immune function, depression and anxiety.

Nature-rich green spaces in and around urban areas can make them a better place to live, work and invest, helping to attract visitors and businesses to the area and improving local economies.

Urban trees (PM78) and hedgerows (PM61 to 63) can also help to trap air pollution and act as a noise barrier in urban areas.

Water quality

Improving water quality and improving the health of rivers and freshwater habitats emerged as most people's top priority from earlier workshops and surveys which were held in 2024 to inform the LNRS.

The main route for tackling poor water quality is by reducing discharges of untreated sewage however this particular action is beyond the control of the LNRS. Reducing untreated sewage discharges is an action that needs to be enforced by the relevant organisations within industry and by national government which is why it is out of scope of the LNRS. However, some of the LNRS 'potential measures' in the table above can help to reduce water pollution including another source of water pollution – runoff from agricultural fields.

Key measures include creating riparian buffers of trees, shrubs and tall, tussocky grassland on the edge of watercourses (PM40), chalk streams (PM45) and ponds (PM43), creating wet woodland in riparian areas (PM38), and creating reedbeds (PM44 and PM53) and wetland mosaics (PM51 and PM54).

Measures to reduce soil erosion can also help to stop polluted soil being washed into watercourses: this could include ensuring that new woodlands (PM35), woodland/scrub/grassland mosaics (PM24), tussocky grasslands (PM03) and hedgerows (PM61 to 63) are created on steep slopes, especially where there are soils that are vulnerable to erosion.

Finally, there are a number of habitat measures around the freshwater environment that will improve the structure, condition, and diversity of rivers, ponds and wetland habitats although these alone will not directly improve water quality.

Appendix B - The strategies and plans reviewed during the LNRS preparation.

During the development of the Local Nature Recovery Strategy 'priorities' and 'potential measures' you will see that, after we listed priorities and potential measures from workshops and the survey, we then reviewed these against local plans and strategies to add in, or add detail to priorities and measures.

When reviewing strategies or documents, those reviewing them were asked to look for whether any potential priorities, potential measures, particular locations, or particular targets were mentioned that needed to be considered when we finalised our list of priorities, potential measures, and targets for this LNRS. The strategies reviewed included:

National

- National Environmental Objectives
- Environmental Improvement Plan Objectives
- River Catchment management plans
- Water framework directive

Regional, local, and county projects

- Chilterns Nature Recovery Plan
- Cotswolds National Landscape Management Plan
- Chilterns National Landscape Management Plan
- North Wessex Downs National Landscape Management Plan
- Cotswolds Nature Recovery Plan
- National Landscape Target 8
- North Wessex Downs Nature Recovery Plan
- Conservation Target Areas

County council

- Oxfordshire County Council - Oxfordshire Environmental Principles
- Oxfordshire County Council - Minerals and Waste Local Plan
- Tree Policy for Oxfordshire
- Oxfordshire Net Zero Route Map and Action Plan 2023-2050

District and city council Local Plans and Green Infrastructure Strategies

- South Oxfordshire and Vale of White Horse Joint Local Plan 2041 Preferred Options (January 2024).
- Oxford Local Plan 2036
- Oxford Local Plan 2040 (submission draft)
- Cherwell Green and Blue Infrastructure Strategy
- Cherwell Local Plans available to view: Local Plans | Cherwell District Council
- Salt Cross Area Action Plan - yet to be adopted
- South Oxfordshire and Vale of White Horse Green Infrastructure Strategy (Chris Blandford Associates, October 2017).
- South Oxfordshire Local Plan 2035 (adopted December 2020)
- Vale of White Horse Local Plan 2031 Part 1 (adopted December 2016)
- Vale of White Horse Local Plan 2031 Part 2 (adopted October 2019)
- South Oxfordshire and Vale of White Horse Joint Local Plan 2041 Pre-submission publication version (October 2024). This is available to view online: https://theconversation.southandvale.gov.uk/jlp/.
- South Oxfordshire and Vale of White Horse District Councils Green Infrastructure Strategy and Open Space Study (LUC, September 2024). This is available to view online:

https://www.southandvale.gov.uk/joint-local-plan-2041-supporting-documents/

- South Oxfordshire and Vale of White Horse District Councils, new evidence on lowland fens to inform the new Joint Local Plan: Lowland Fens: Identifying sites and mapping hydrological risk zones in South Oxfordshire and Vale of White Horse (Freshwater Habitats Trust, 2024). The report is available to view online: https://www.southandvale.gov.uk/joint-local-plan-2041-supporting-documents/
- West Oxfordshire Local Plan 2031 – adopted
- West Oxfordshire Local Plan 2041. Focused Consultation: Ideas and Objectives. Aug 2023
- West Oxfordshire District Council Nature Recovery Plan 2024 – 2030
- Oxford Urban Forest Strategy A Master Plan to 2050 SEPTEMBER 2021.

It is important to recognise that emerging local plans across the county have progressed in parallel to the production of the LNRS.

Whilst there was limited resource to review the neighbourhood plans at this stage, Oxfordshire's LNRS has run specific activities and events to engage with the 300+ parish and town councils within Oxfordshire through the Oxfordshire Association of Local Councils. Parish and town councils were encouraged to participate in our surveys and workshops as well as other in-person events so that we could incorporate their priorities and potential measures.

In addition to written strategy documents, many organisations provided the LNRS with further information and data about locations where key activities are being undertaken or could be undertaken including information from Forestry Commission, Freshwater Habitats Trust, BBOWT, and many more. This has been used within our mapping process to create the Local Habitat Map.

Appendix C – project partner representatives who oversaw the priority setting for Oxfordshire.

The priorities and potential measures decision-making was overseen by a group of representatives from each and all of:

- Oxfordshire County Council
- The District and City Councils, biodiversity and planning representatives
- Natural England
- Forestry Commission
- Environment Agency
- Cotswolds National Landscape (representing protected landscapes in Oxfordshire)
- BBOWT - Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust
- Oxfordshire's Local Nature Partnership
- Wild Oxfordshire
- Thames Valley Environmental Records Centre (TVERC)
- Director of the Durrell Institute of Conservation and Ecology (DICE)
- University of Oxford, Environmental Change Institute, Leverhulme Centre for Nature Recovery

Appendix D – How was this list made?

This ‘Statement of Biodiversity Priorities’ was produced by first collecting actions and priorities that were recommended to support biodiversity by local people and organisations who joined our workshops and used our survey in February and March 2024.

We received 7,959 mentions of priorities and actions that people wanted to see be achieved in Oxfordshire and these were grouped into themes e.g. ‘create meadows’, ‘improve river condition’. The LNRS was able to include the 4,667 comments that mentioned creating or improving habitats for biodiversity.

We were unable to include actions that didn’t relate to habitat creation or enhancement LNRSs are expected to focus mostly on actions to create and/or enhance habitats.

The other requests mostly included requests to:

- Stop or reduce house building, developments, and infrastructure
- Regulate, fine, or punish, for poor practice
- Stop the creation of pollution
- Reduce traffic, or pets

Whilst it is beyond the scope of the LNRS to resolve those requests, it is of key importance to nature recovery that each of these issues are addressed by their relevant authorities and organisations.

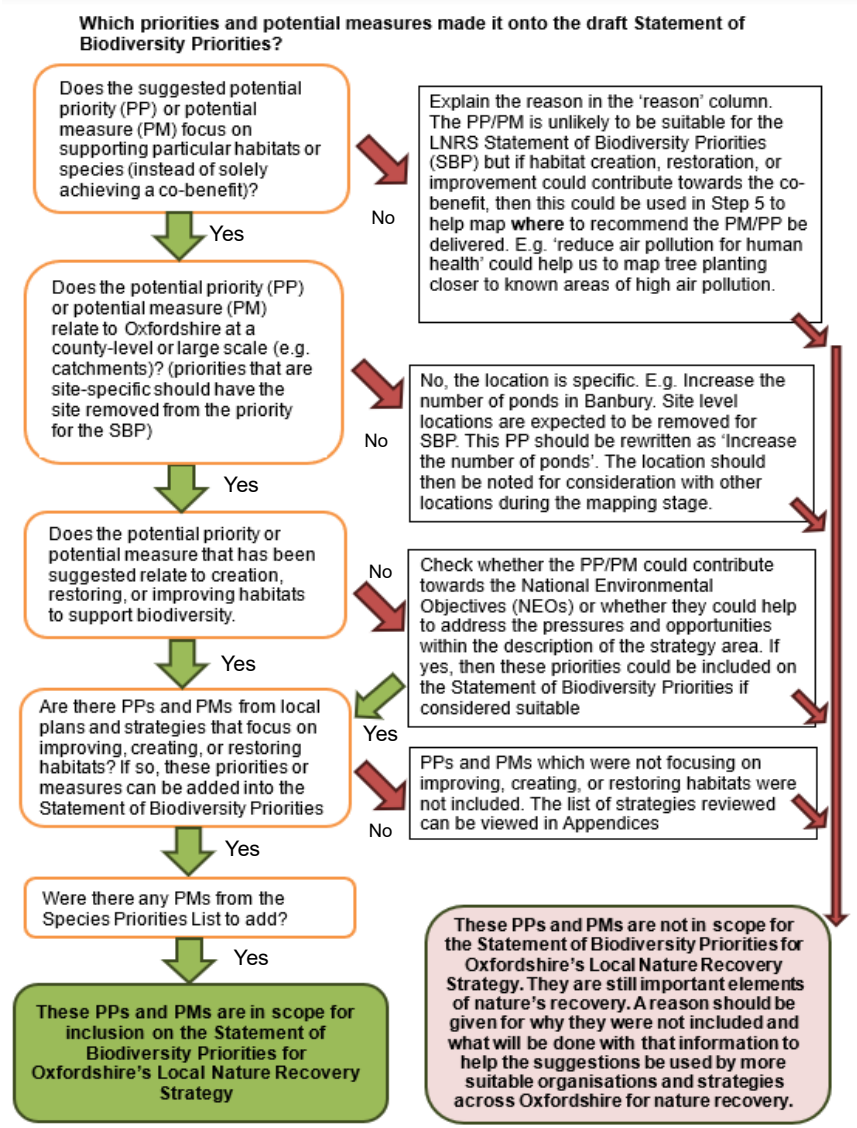
The image of the flowchart in this document shows the process that was taken to decide whether proposed priorities and potential measures could be included on this list.

The full process and further information about the 7,959 comments we received can be viewed on the LNRS website. The strategies that contributed to this process can be found in Appendix B.

In Oxfordshire, the process of agreeing the priorities and potential measures that are included in this document was overseen by representatives from a range of organisations (see Appendix C).

These representatives helped to shape and refine priorities and potential measures and helped to sense-check the process whilst reviewing the priorities of local people and organisations from our workshop and survey results.

To view further documents and spreadsheets that show how the statement of biodiversity priorities was made in more detail, please view the documents on Oxfordshire County Council’s LNRS website.


Which priorities and potential measures made it onto the draft Statement of Biodiversity Priorities?
Does the suggested potential priority (PP) or potential measure (PM) focus on supporting particular habitats or species (instead of solely achieving a co-benefit)?
No
Explain the reason in the 'reason' column. The PP/PM is unlikely to be suitable for the LNRS Statement of Biodiversity Priorities (SBP) but if habitat creation, restoration, or improvement could contribute towards the co-benefit, then this could be used in Step 5 to help map where to recommend the PM/PP be delivered. E.g. 'reduce air pollution for human health' could help us to map tree planting closer to known areas of high air pollution.
Yes
Does the potential priority (PP) or potential measure (PM) relate to Oxfordshire at a county-level or large scale (e.g. catchments)? (priorities that are site-specific should have the site removed from the priority for the SBP)
No
No, the location is specific. E.g. Increase the number of ponds in Banbury. Site level locations are expected to be removed for SBP. This PP should be rewritten as 'Increase the number of ponds'. The location should then be noted for consideration with other locations during the mapping stage.
Yes
Does the potential priority or potential measure that has been suggested relate to creation, restoring, or improving habitats to support biodiversity.
No
Check whether the PP/PM could contribute towards the National Environmental Objectives (NEOs) or whether they could help to address the pressures and opportunities within the description of the strategy area. If yes, then these priorities could be included on the Statement of Biodiversity Priorities if considered suitable
Yes
Are there PPs and PMs from local plans and strategies that focus on improving, creating, or restoring habitats? If so, these priorities or measures can be added into the Statement of Biodiversity Priorities
Yes
PPs and PMs which were not focusing on improving, creating, or restoring habitats were not included. The list of strategies reviewed can be viewed in Appendices
No
Yes
Were there any PMs from the Species Priorities List to add?
Yes
These PPs and PMs are in scope for inclusion on the Statement of Biodiversity Priorities for Oxfordshire's Local Nature Recovery Strategy
These PPs and PMs are not in scope for the Statement of Biodiversity Priorities for Oxfordshire's Local Nature Recovery Strategy. They are still important elements of nature's recovery. A reason should be given for why they were not included and what will be done with that information to help the suggestions be used by more suitable organisations and strategies across Oxfordshire for nature recovery.

Species Priorities List

Oxfordshire's Local Nature Recovery Strategy

Final version: October 2025

OXFORDSHIRE COUNTY COUNCIL

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Contents

Introduction

‘Species’ are the types of animals, plants, fungi, and other living things that exist as part of nature. Local Nature Recovery Strategies (LNRS) are designed to help to recover populations of species, especially those who are at risk of extinction from the local area.

Many species are expected to benefit from general habitat improvement and creation actions (e.g. enhancing woodlands and creating ponds).

The LNRS already recommends these general habitat actions on the LNRS’s ‘Statement of Biodiversity Priorities’ document and this should benefit a wide range of species. However, some species need more specific actions that aren’t part of general habitat creation or enhancements.

To ensure that the LNRS also supports those species with more specific needs, this document identifies those species in Oxfordshire which are believed to need more targeted recovery actions.

This list is expected to be reviewed and republished every 3 – 10 years along with all other LNRS documents. The exact timing of the review is decided by the Secretary of State.

What is the Species Priorities List?

The ‘LNRS Species Priorities List’ is one of four parts of the LNRS (there are three written documents and one map tool). The Species Priorities List is a table of species that need very specific actions to support them to survive, recover, or spread further in Oxfordshire. The Government asked for these LNRS Species Priorities Lists to contain a manageable number of deliverable actions to help focus local resources towards halting the loss of biodiversity. LNRSs were advised to include the species that are most likely to benefit from specific, targeted actions as well as species which the local area has a particular national stronghold of.

In brief, the species on this list are all species that require specific actions over and above the general good management and creation of diverse habitats.

Examples of such specific actions that could be suitable for this list include bespoke habitats being created or managed in a particular way for certain species, reintroductions and translocations of species, or taking practical actions to stop the negative impacts of a particular threat or pressure on a species. These actions must be above and beyond the actions we have already listed on the Statement of Biodiversity Priorities.

f Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work 3

How was this list made?

This 'Species Priorities List' was produced in steps following a methodology created by Natural England and Defra which can be viewed on the LNRS website.

First, the LNRS asked Thames Valley Environmental Records Centre (TVERC) to identify which species in Oxfordshire are considered to be 'threatened' or 'near threatened' with extinction. This list was 879 species long.

We then invited local species experts to review the list and add any species that they thought we had missed, the number of species on this list rose to 883.

Next, the list of 883 species were reviewed, one-by-one to work out what action they would need to recover. Some may need bigger woodlands, others may need particular grazing patterns, and some may need more research. Based on the type of action that the species needed, the LNRS assigned them into a certain category (seen in the table below.

For a full description of the process, see the LNRS website.

A	B	C	D	E	F	G
Needs more / bigger / better / more connected habitats	Needs targeted habitat management	Needs improvements in environmental quality	Needs bespoke conservation action(s)	Needs better evidence base / on-the-ground action isn't the priority	Needs action outside of England	Vagrant species / occasional visitors / invasive species
These species are likely to benefit from the LNRS measures (actions) listed on the Statement of Biodiversity Priorities and do not need to be singled out for specific LNRS Species actions.	Yes, these species are likely to be suitable for LNRS species priorities	Yes, likely to be suitable for LNRS species priorities	Yes, likely to be suitable for LNRS species priorities. (Species which have no/poor data about their locations should be assigned to Category E.)	Not suitable for LNRS species priorities list	Not suitable for LNRS species priorities list	Not suitable for LNRS species priorities list

f Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

The categories (A – G) in the table were created by Natural England to support LNRSs to separate species out. We categorised each and all of the 883 species into the categories A – G with support from Thames Valley Environmental Centre and local species experts.

Experts helped to add and remove species from categories, sense-check the process, inform the LNRS about which species needed which actions, which locations are important for which species, and the types of habitats that these species rely on for survival.

During the process of separating species into categories and working out which actions they needed, there were many species that were expected to benefit from widespread, broad, habitat-level actions (e.g. enhancing grasslands, leaving deadwood in woodlands, creating ponds).

These widespread habitat actions are already recommended in the LNRS's 'Statement of Biodiversity Priorities' which means that the LNRS has already listed the actions which should support the recovery of those species. They haven't therefore been listed again here. In comparison, there were some species that need a more specific action (e.g. create electric fencing around nests to prevent predators from getting to them).

Since the actions are quite specific, they would likely be missed out of general habitat creation or management techniques but listing them individually here allows the LNRS to focus effort towards their more specific recovery needs.

To halt the loss of biodiversity in Oxfordshire, it is of key importance to support both sets of priorities (the specific species actions on this list, and the habitat-level actions on the 'Statement of Biodiversity Priorities').

f Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work 5

How will LNRS 'Species Priorities Lists' contribute towards 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 per cent greater than in 2030
- Reduce the risk of species' extinction by 2042, when compared to the risk of species' extinction in 2022

LNRSs were advised by the government's Department for the Environment, Food, and Rural Affairs (DEFRA) that the "LNRS is a critical new tool for driving the national ambition to increase species abundance and reduce risk of species extinctions… 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."

To support species, LNRSs are advised to follow particular processes to create a written list of local priority species and to propose specific measures (actions) which would help to recover and enhance local populations.

In some suitable cases, actions have been mapped onto the LNRSs 'Local Habitat Map' to show where those actions could produce the greatest benefits for the species. This may be particularly important where isolated populations of rare species remain.

A note on climate change

At the time of writing, the below actions were expected to be the most suitable ways to support the recovery of these species.

However, there are expected changes to climate patterns with warmer, wetter winters and hotter, drier summers predicted, as well as increasing extremes in weather events and storms, although these changing patterns may be unpredictable.

The LNRS recommends that the actions listed on the following pages should be adapted based on the latest understanding of changing climates in order to best support the recovery of these species

f Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work 6

How to navigate this document?

The target species in this document are organised into broad categories shown in bold below. The categories are organised in alphabetical order.

You can click on any of the headings on the page below to navigate to the relevant species.

For species in the groupings below, most will have a picture, their name, and a map which you can see through the link at the end of the document.

Next to their name is a column that tells you:

- the recommended action (potential measure) to support their recovery
- a column that tells you particular locations where focused effort could be beneficial (if known)
- a column with names of other threatened and near threatened species that would also benefit from the action.

You can view a list of these species in alphabetic order in Appendix A at the end of this document.

Key

Settlements and buildings	
Agricultural land	
Semi-natural grasslands	
Freshwater and wetlands	
Woodlands and trees	

- **Amphibians**
  - Great Crested Newt.
- **Birds**
  - Bittern (and Marsh Harrier), Breeding Waders, Curlew, Farmland Birds, Montagu's Harrier, Nightingale, Stone Curlew, Swifts and House Martins, Tawny Owl, Turtle Dove, Willow Tit.
- **Butterflies and moths**
  - Barberry Carpet Moth, Blackthorn butterflies, Dark Green Fritillary, Duke of Burgundy Butterfly, Liquorice Piercer Moth, Moths of Dyer's Greenweed, Silver Spotted Skipper, Small Blue butterfly, Striped Lychnis Moth, White Admiral, White Letter Hairstreak, Wood White butterfly.
- **Fish, crustaceans, and snails**
  - Fish, White Clawed Crayfish, Desmoulin's Whorl Snail, Mountain Bulin Snail.
- **Fungi and Lichens**
  - Fungi and fungi-associated plants found with woodland, Lichens (on veteran trees).
- **Insects and spiders**
  - Beetle of Autumn Gentian, Cigarello Gall-Fly, Clubbed general soldierly, Dung specialists and dung beetles, Ellipteroides alboscutellatus, Lousewort flea beetle, Meadow Ant Hoverfly, Noble chafer, Snail killing fly, Southern Damselfly, Spider (Tuberta maerens).
- **Mammals**
  - Bats, Beaver, Hazel Dormouse, Hedgehog, Otter, Water Vole.
- **Plants, flowers, and trees**
  - Black Poplar, Creeping Marshwort, Devil's bit scabious (and Marsh fritillary), Downy Woundwort, Fen violet, Juniper, Limestone fern.
- **Reptiles**
  - Adder, Common Lizard.

The next pages contain the Species Priorities List for Oxfordshire.

Amphibians

Species by Common Name (ordered A – Z)	Potential measure (the action needed to help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most?	Habitat
Great-Crested Newt  Link to map	**Create or maintain fish free ponds, which ideally are within 1km of other ponds that could support Great Crested Newts.** Aim to have diversity within pond structure, depth, shape, and edge vegetation. Include a gently sloping entrance to suitable pond edges. Within suitable range of breeding ponds, ensure the existence of foraging habitats and undisturbed areas of deadwood or stones for hibernation which can include creating hibernacula. New development/infrastructure could include amphibian-friendly landscaping e.g. dropped kerbs, wildlife-friendly gully pots, SuDS ponds, and large amphibian tunnels. Varied pond sizes and shapes are beneficial to a range of species, the most suitable size for Great Crested Newts is considered to be between 450m2 to 500m2. Ideal pond criteria is set out in this Habitat Suitability Index. Great Crested Newts have suffered significant declines and as a result are listed as species of principle importance under legislation offering them a high degree of protection as a European protected species. Creating ponds to support this species would also support a wide range of species. Support Great Crested Newts by managing habitats to meet relevant requirements with organisations who can support this or following habitat guidance. See this example pond at Bicester Garrison.	Nature Space pond-creation priority locations.	Great Crested Newt (Triturus cristatus), Common Toad (Bufo Bufo)	

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Birds

Species by Common Name (ordered A – Z)	Potential measure (the action needed to help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most?	Habitat
Bittern  Link to map	**Create or manage large reedbeds in wetland habitats to recover Bittern populations.** Within wetlands, create, extend, and manage large reedbeds (ideally of 20 hectares or more) for Bitterns. Re-wet reedbeds that are at risk from drying out and manage the reed structure to achieve diversity within the reedbed. Aim for no more than 30 per cent being older than 7 years and no more than 5 per cent of the area being scrub. Manage the reedbed through cyclical cutting of different sections of reed over time and regularly remove willow. Bitterns breed in the UK's largest and least disturbed reedbeds which are typically within a mosaic of wetland habitats. Habitat loss and disturbance has been a major challenge for the success of these birds and Bittern numbers previously declined to the point where this bird became extinct from the UK. However, they returned and are now present in the UK again with some populations showing recent signs of recovery as a result of large-scale reedbed creation and targeted habitat management techniques. Bitterns are found in Oxfordshire but breeding is currently restricted to one locality (Otmoor). They are a bird which is expected to improve in number and breeding success if more large reedbed complexes can be created with the right habitat management.	Otmoor, Lower Windrush Valley	**Birds** Eurasian Bittern (Botaurus stellaris), Marsh Harrier, (Circus aeruginosus)	

	The numbers above (20 hectares, 30 per cent, and 5 per cent) are based on ideal guidelines but management should be tailored to what is working for Bitterns in Oxfordshire. You can re-wet reedbeds that are at risk of drying out either by raising the water-level, or by lowering the ground level.			
Breeding waders  Link to map	**Create (and maintain) areas of grassland with extensive, shallow, water during breeding months including reeds and greater pond sedges for nesting. Manage habitats with grazing (ideally) and exclude and manage predators.** This guide describes how to manage grazing land for waders. Also see this RSPB land management sheet for Snipe. Typical ideal breeding wader sites have moist soils that hold surface water on approximately 10 – 30 per cent of the site from April/May with water levels reducing in June and covering only a small area of the site in July – August. Seasonal grazing on these sites helps to create an optimal sward. Avoid agricultural activities or activities of high disturbance on breeding sites during breeding season and consider reducing the shooting of any species considered to be 'game' species within this group to support populations to recover. Alongside those more specific measures, this LNRS will support these species and others by recommending that Oxfordshire improve existing wetland sites and create new wetland mosaic habitats. Within Oxfordshire, we are lucky to have 485 hectares of Otmoor, an expansive floodplain grazing marsh area which is a reliable hotspot and home for many species including wading birds where particular care is taken to manage this area of Oxfordshire for these birds.	Otmoor, Lower Windrush Valley	**Breeding wader birds:** Common Snipe (Gallinago gallinago), Common Redshank (Tringa tetanus), Lapwing (Vanellus vanellus) **Other birds** Common crane (Grus grus)	

	This national asset means that Oxfordshire is a particularly important location within the UK for breeding waders and other species.			
Curlew  Link to map	**Manage nesting fields for Curlews and protect their nests from predation using predator control, electric fencing and/or other techniques which increase Curlew breeding success to hatch, rear, and fledge chicks**. Curlew breeding populations in the UK are recorded as having declined by 48 per cent between 1995-2020 and Curlews are one of Britain's most endangered birds. They rely on grassland habitats (particularly lowland wet grassland and hay meadows) but many of these habitats have been lost through land use change and drainage of land. Alongside extensive creation and expansion of well-managed grasslands, especially lowland wet grassland, predator control techniques need to be implemented to prevent the loss of nesting adults, eggs, and chicks to predators (predators can be both mammals and birds). Temporary electric fencing is one tool with a good success rate in Oxfordshire that can prevent mammal predation but other techniques across the wider landscape are important to prevent other forms of predation on these birds to enable them to recover their populations. Many people, including Oxfordshire's farmers, nature recovery organisations, and volunteers are already supporting curlew recovery efforts and should continue to be supported to take these actions.	Otmoor, Upper Thames Curlew Recovery Project areas, upper Cherwell areas.	Eurasian Curlew (Numenius Arquata)	

Farmland birds  Link to map	**Support farmland birds in fields, field margins, and hedges by providing nesting sites, chick rearing food, adult food, and overwinter food for the target bird species.** A good population of farmland birds are present in Oxfordshire, with strong populations noted in farmland across the county, particularly in the Cotswolds National Landscape and the North Wessex Downs National Landscape. Since more than 70 per cent of Oxfordshire's land is used for agriculture, it is of key importance to focus on supporting those species which can benefit from good sustainable farmland management to achieve population recovery and Oxfordshire's farmland birds are a great example of species which, have been recovering and can continue to do so in future with support like that already ongoing by Farmland Bird Aid projects in Oxfordshire. All three elements (chick food, adult food, and nesting space) need to be appropriate to the species and available in the specific area to suitably support these birds. This can be achieved by providing plants, seeds, and habitat areas that meet the needs of both the adult farmland birds and their chicks, within the same location. The different species have the following, specific needs: **Hedge-nesting birds** Hedges, trees or scrub are needed for nesting. Also offer these additional food sources for adult hedge-nesting birds; seeds, chickweed, cereals or spring-sown crops. Offer these additional food sources for the chicks of hedge-nesting birds; insects, larvae, worms (often provided by having nearby areas of field margins/buffer strips/grassland/pasture). **Linnet –** require a plentiful supply of seeds all year and a thick hedgerow, scrub, gorse or bramble for nesting. Advice for farmers here.	All across the county's farmland, with a specific 4-mile stretch of the River Thames already under management for the Yellow Wagtail Partnership.	**Farmland birds**: Corn bunting (Emberiza calandra), Grey Partridge (Perdix perdix), Lapwing (Vanellus vanellus), Linnet (Linaria cannabina), Skylark (Alauda arvensis arvensis), Tree sparrow (Passer montanus), Yellowhammer (Emberiza citrinella), Yellow wagtail (Motacilla flava flavissima)	

	Tree Sparrows – also need overwintering stubble to find food, and good nearby scrub, thick and tall hedgerows, and/or young woodland cover for nesting. Advice for farmers here. **Yellowhammers** – also need thick hedges or scrub (cut late in the year), often alongside ditch vegetation or margins at the foot of the hedge. Advice for farmers here. **Ground nesting birds** Offer suitable, species-specific nesting sites and also offer these additional food sources for adult ground nesting birds; seeds, chickweed, cereals, overwinter stubble, or spring-sown crops. Offer the following additional food sources for the chicks of ground nesting birds; insects, larvae, worms (needs field margins or buffer strips or grassland or pasture). **Corn Buntings** – need patches of double-drilled crop that is not harvested, to nest. Advice for farmers here. **Skylarks** - need skylark plots (unsown squares in the field) of bare earth to nest. Advice for farmers here. **Lapwings** – need lapwing plots (large stony areas) to nest in, near pasture. Do not plant trees or hedges here. Advice for farmers here. **Grey Partridge** – also needs safe nesting cover in hedge bottoms, grass margins, and dead tussocky grass left from the previous year (RSPB). Adults require a food source of seeds and shoots throughout the year (typically found in winter stubble, harvested root crops, newly sown crops, and arable weeds in the crop margins).			

	Also, to enable species recovery, chicks require access to a range of insects close to their nesting sites like beetles, ants, caterpillars, aphids mostly found in crop margins. Advice for farmers here. **Yellow wagtails** – also need an open, sparse sward to nest in on the fringes of wetland habitats with arable crops nearby. They are expected to respond particularly well in Oxfordshire if habitat management can meet their needs, and local projects are already working to achieve this. Advice for farmers here. At some sites, recovery may also require additional lethal control of foxes, carrion crows, and mink in conjunction with the actions above.			
Montagu's Harrier  Link to map	**Locate and protect the nesting sites of breeding Montagu's Harriers on farmland fields. Landowners and local organisations can work together to monitor nesting birds and secure their breeding success.** Montagu's Harriers visit the UK in early summer and only very few (8 pairs) breed in the UK each year. Oxfordshire has 137 records of Montagu's Harrier in in the past 30 years and Oxfordshire is one of the counties where this species is known to be found breeding. Typically the birds breed on the ground in arable fields of maturing crops. This bird feeds on small mammals, birds, and other small animals. When nesting birds are observed, contact local organisations which support bird conservation for support and advice.		Montagu's Harrier (Circus pygargus)	

Nightingale  Link to map	**Manage woodlands and scrub for Nightingales. Coppice on rotation and encourage dense layers of shrub in woodlands with scrub at the edges.** Introduce coppicing to woodlands and manage it so that all stages of the coppice lifecycle are always present in the woodland. To do this, coppice coupes (groups of trees) that are cut on rotation. Within woodlands, encourage dense layers of shrub to develop (including bramble) and control deer where necessary to prevent them from eating the shrub layer. On woodland edges allow dense scrub and shrubs to develop to offer feeding and nesting habitat and create woodland rides and glades that have space for a scrub zone. Re-wet woodlands to improve invertebrate presence and food supply for these birds. Connect existing suitable habitats with tall, thick hedges. Nightingales fly from West Africa to the UK in April for about 3 months to breed before flying back. Numbers of breeding birds are thought to have reduced by over 90 per cent since the 1960s. In Oxfordshire, breeding Nightingales had been lost from the county for 2-3 decades but around 2020 after dedicated habitat work by MOD Bicester, nightingales returned once again, to breed in Oxfordshire. Habitat actions should be focused towards areas where Nightingale records emerge in Oxfordshire and Nightingales are also expected to benefit from countywide creation of large scrub and woodland mosaic habitats. Nightingales prefer to nest in the medium growth stage of coppiced trees (aged 4 – 10 years since they were coppiced). It takes about 7 years for scrub to be sufficiently dense for nightingale breeding. View conservation advice guide here.	Southeast of Bicester, between Bicester and Brill	Common Nightingale (Luscinia megarhynchos)	

Stone Curlew  Link to map	**Create and manage protected, undisturbed plots to encourage Stone Curlews to nest. Create and manage areas of open, sparsely vegetated grassland with stony ground, grazed short (typically by rabbits or sheep).** In suitable arable fields, create specially prepared plots of open, stony ground with buffer zones that are managed to protect nesting birds and chicks from predation, machinery, and disturbance. These plots offer suitable, less disturbed nesting spaces and can be supported by organisations who can also ring and monitor the birds. Stone Curlew numbers have been in decline in the UK until the 1980s where dedicated conservation efforts more than doubled the breeding numbers and these birds are increasingly present in the UK when habitats are managed to meet their needs. These birds do appear to favour locations where suitable habitat plots are created and managed for them. Typically, they fly from Spain and Northern Africa to the UK in early summer to breed here on open, stony ground (typically farmland) and farmers can work with organisations to organise this, see an example here. The success of these birds relies on suitable support being available to enable farmers to recover Stone Curlew populations. See information about Defra incentives here and recent, successful RSPB projects with farmers here.		Stone-Curlew (Burhinus oedicnemus)	

Swifts and house martins  	**Provide new nesting spaces that are suitable for Common Swifts and House Martins and do not disturb, remove nests, or try to limit these birds from nesting**. Common swift numbers are estimated to have declined by 60 per cent between 1995 – 2020. Similarly the House Martin is present throughout the county but numbers notably declined by 37 per cent between 1995-2020. Each year, these birds migrate from Africa to the UK for summer to breed and Oxfordshire is a particular national stronghold for these birds with projects that you can get involved across the county (e.g. Oxford, Cherwell, and Harwell). Both species offer real opportunities for people to support and enjoy nature on (or above) their doorsteps. They nest in and around houses, buildings, and structures but many nest sites have been lost to building renovations. Buildings act as a habitat for a variety of species but the nest sites of Swifts and House Martins are often lost during the renovation or redevelopment of existing buildings and other structures like bridges. The loss of these nesting sites has contributed to a decline in the populations of both species but these birds are expected to be able to recover significant numbers if additional nesting spaces are provided (boxes, swift bricks, spaces in buildings and structures), and if existing nesting sites are retained for these birds. Existing nest sites for building-dependent species such as swifts and house martins (endangered red-listed species) should be protected as far as possible. These species are known to return annually to their traditional nest sites and mitigation should be provided if these nest sites cannot be protected.	Swifts; across Oxfordshire, including Oxford City, all the towns in the county, and a majority of villages as well (Harwell, Bodicote, Shilton and Tetsworth for example). House Martins; less widespread but still breed throughout the county.	Common Swift (Apus apus), House Martin (Delichon urbicum).	

	New development and extensions provide an opportunity to includes measures such as swift bricks. Swift bricks are a universal nest brick that can support a variety of small bird species (like house sparrows and starlings) and should be installed in new developments including extensions, in accordance with best-practice guidance such as BS 42021, NHBC NF89 Biodiversity in new housing developments: creating wildlife-friendly communities, or CIEEM which require at least one swift brick per home on average for each development. Artificial nest cups for house martins may be proposed instead of swift bricks where recommended (e.g. by an ecologist). In addition to nesting spaces, they require good foraging habitats, particularly along rivers, to capture insects. Habitat improvement is being addressed in the LNRS through actions recommended on the LNRS Statement of Biodiversity Priorities.			
Tawny Owl 	**Provide nesting holes and/or boxes for Tawny Owls.** Tawny owls and other owl species have experienced declines across England and whilst they require habitat improvements. Whilst they would benefit from general habitat improvements, especially to woodlands, it is also believed that their range and numbers could be significantly supported by offering more, suitable nesting boxes/holes. Tawny owls can live for over 20 years and often return to their territories and nest holes/boxes throughout their life. This could be in areas where these owls are present or could be present including; woodlands, large urban parks, and suburban or rural gardens (see further information here).		Tawny Owl (Strix aluco)	

	Learn how to build or position boxes for Tawny owls (here) In addition to nest boxes, these species are expected to benefit from the wider creation of a more connected set of habitats, especially woodlands, and have been noted to avoid major roads. This means that the creation of new infrastructure could further fragment Tawny Owl habitats and should be carefully considered within decision making. The creation or provision of green bridges could be an opportunity to better connect habitats across major infrastructure (new or existing) which may benefit this species (and others).			
Turtle Dove 	**In appropriate areas on, or near to farmland, create and manage scrub with trees and habitats that support Turtle Doves.** The UK numbers of breeding Turtle Doves has dropped by 99 per cent between 1967 and 2020 which shows how perilous the situation is for Turtle Doves in the UK. This species used to be common across farmland and certain farmland practices could greatly benefit the Turtle Doves which fly to the UK from Africa to breed in summer. See how you can help Turtle Doves here. Turtle Dove advice for land managers can be found here. Turtle Doves typically need 3 key things within close proximity (RSPB recommend within 300m) of each other. These are: 1. Lots of small seeds to be provided as a food source - either as seeds or by planting strips of plants which are left to go to seed. 2. Thick scrub, hedgerows, and trees to be created or managed as nesting sites	Otmoor	Turtle Dove (Streptopelia turtur)	

	3. Nearby accessible freshwater like ponds or streams to be created or enhanced offering shallow edges.			
Willow tit 	**Support Willow Tits by linking up wet woodland, dense scrub, and hedgerow habitats along river corridors with lots of deadwood and stumps.** Retain and create a successive supply of deadwood, such as tall stumps, within and around wet woodland and scrub. Create structural diversity and promote dense scrub growth near Willow Tit nesting sites through selective felling or the reintroduction of coppicing within damp woodlands. Restore wet woodlands by reversing drainage where suitable. To improve the stability of Willow Tit populations, link up suitable habitats by creating or retaining scrub lined river corridors and mature hedgerows. Willow Tits are found throughout the UK but are less common in the South East of England but they are present in Oxfordshire. The measures above should be considered in addition to the need for good woodland management and the creation of new wet woodlands. When creating tall deadwood stumps, the ideal trees are willow and alder with stumps at least 1.5 metres tall. Scrub growth around wet woodland should aim to achieve height of 2-4 metres and it may be necessary to control browsing animals to achieve this. Where coppicing is practiced, willow is preferable over alder. For more information, see the Willow Tit habitat guide.		Willow tit (Poecile montanus)	

Butterflies and moths

Species by Common Name (ordered A – Z)	Potential measure (the action needed to help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most?	Habitat
Barberry Carpet Moth 	**Plant new Barberry plants in suitable locations to support the Barberry Carpet Moth. Aim to connect up existing areas of Common Barberry and increase the spread of this plant.** The Barberry Carpet Moth is a rare and declining species in the UK, and is a local priority since one of its largest remaining UK colonies is in Oxfordshire. The only other known sites are in Wiltshire, with single sites left in Dorset and Gloucestershire. Read more about bringing this species back here, see their habitat requirements here, and see this guide that explains what a recently funded project did to support this species.	West Oxfordshire where a small population is established	Barberry Carpet Moth (Pareulype berberata)	
Blackthorn butterflies  Link to map	**Retain, manage, plant, and connect up Blackthorn hedgerows, trees, and scrub for Black and Brown Hairstreak butterflies** Retain existing thickets of blackthorn (Prunus spinosa) and mature blackthorn within hedgerows. Plant new thickets and hedgerows containing blackthorn, especially where they connect to existing blackthorn hedgerows or stands of blackthorn trees or scrub. Carry out management and coppicing routines for these blackthorn hedgerows, trees, and scrub areas in a manner that suits the Black Hairstreak and Brown Hairstreak.	Oxford City. MOD Bicester. Hotspot record sites for Black Hairstreak. Otmoor for Brown Hairstreak	Black Hairstreak (Satyrium pruni), Brown Hairstreak (Thecla betulae)	

	Encourage blackthorn in and around woodlands where suitable, create wide rides, glades, and scrub edges in and around those woodlands. In the UK, most black hairstreak butterflies are only found in Buckinghamshire and Oxfordshire making them a priority species for Oxfordshire to support. The brown hairstreak is also present in Oxfordshire with a strong population in Otmoor that is spreading into Oxford city. The main threat to the success of these species is the damage, poor management, or removal of mature blackthorn habitats. These rare butterflies would benefit from long-term habitat restoration and creation to maintain and create sheltered (but unshaded) stands of blackthorn which are allowed to spread and grow to about 5 metres in height. These butterflies don't typically spread far from the blackthorn so the creation of connected blackthorn stands/hedges/trees is key to expanding their populations. Before winter hedge-cutting or coppicing, try to check blackthorn for eggs. These eggs are particularly vulnerable to hedge-trimming since they are laid on the youngest tips of blackthorn growth. Consider the importance of Ash trees and retain these trees as long as possible and safe to do so, particularly around known Brown Hairstreak locations. Male and female butterflies congregate on these tall ash trees to mate before then laying their eggs on blackthorn (read more here).			

Dark green Fritillary  Link to map	**Create or enhance suitable flower-rich grassland habitats with plentiful populations of violets and light patches of scrub for the Dark Green Fritillary.** These butterflies can benefit from a few grassland habitats which you can read about here. These include: 1. Chalk and limestone grassland. 2. Grassland with bracken 3. Damp grassland, flushes and moorland. In all cases, aim to create a plentiful population of violets growing amongst light scrub (if appropriate to the site). Manage scrub and woodland rides to promote violet abundance. The Dark Green Fritillary breeds in lightly scrubbed grassland. After a long period of decline in Oxon it has been spreading a little in recent years but remains very localised to suitable habitat. Habitat recovery could see it become more widespread here, see information about its lifecycle and habitat requirements here.		Dark green Fritillary (Speyeria aglaja)	
Duke of Burgundy butterfly  Link to map	**Create (or maintain existing areas of) scrubby calcareous grassland slopes which face East, North, or West and have strongly growing populations of cowslip and primrose to encourage Duke of Burgundy butterflies.** The Duke of Burgundy butterfly has declined by over 50 per cent in recent decades in the UK and remains in only very small and restricted areas on scrubby chalk grasslands and clearings of ancient woodlands.	One tiny population known to remain in Oxfordshire with some records adjacent to West Berkshire and in West Oxfordshire.	Duke of Burgundy (Hamearis lucina)	

	In Oxfordshire, one small grassland population is known to remain but woodland populations of this butterfly have been extinct in the county since the 1990s. See habitat creation and management suggestions here. On grasslands, light grazing (not by sheep) can create open, sunny conditions which support this species. Within the grassland, aim for 10 per cent - 20 per cent of the area to be scrub of varying ages, types, and structures cut on rotation to avoid overshading the grassland. Allow new scrub areas to emerge. Cut or bruise dense bracken areas. In woodland near or on these slopes, enhance or create woodland rides and keep or create bare patches of ground. The butterflies typically breed in vegetation at woodland edges 2 – 5 years after the vegetation was last cut so rotational coppicing of trees at edges or rides over a 3 – 10 year cycle would support these butterflies.			
Liquorice Piercer Moth  Link to map	**Maintain and increase Wild Liquorice plants and their seed pods on suitable rough, unimproved calcareous grassland, lanes and scrub margins for the Liquorice Piercer Moth. Introduce suitable grazing regimes.** Time-limited, light cattle grazing is a beneficial regime to manage the foodplant (Wild Liquorice - Astralagus glycophyllos) for the Liquorice Piercer Moth and support seeds to set where cattle disturb the ground. Where grazing is not possible small-scale management should aim to reduce competing vegetation in and around wild liquorice. Ideally this should be undertaken in late autumn/winter on a	Chilswell	Liquorice Piercer (Grapholita pallifrontana)	

	rotation so that not all the site is managed in any one year. Remove arisings from the site (detailed guidance here). Read about a project site being managed for wild liquorice, and other species here. This Liquorice Piercer Moth is very local to sites in a few southern counties in England and their numbers are declining. However, there are a number of strong colonies in Oxfordshire, particularly in the Chilswell area. The caterpillar of this moth feeds only on the seedpods of the wild Liquorice plant during July, August and September. As this species has an annual lifecycle, it requires the foodplant to flower and set seed on an annual basis to survive.			
Moths of Dyer's Greenweed	**Manage meadows to increase populations of Dyer's Greenweed for moths by preventing scrub and grasses outcompeting this plant.** Manage meadows (particularly older, uncut calcareous meadows and rough pastures) to increase Dyer's Greenweed plant populations to benefit the Greenweed Flatbody moth. Grazing and cutting should be managed flexibly according to habitat requirements to support the moths that rely on this plant for survival. This moth is now rare after significant recent declines in its populations but it is present in and around Bicester and Otmoor MOD meaning that Oxfordshire is still home to a strong population which is regularly monitored by Butterfly Conservation and it may be present at other sites in the area (Arncott MOD, Wendlebury Meads).	Otmoor, MOD Bicester, Cotswolds, Chilterns, Banbury.	**Plant:** Dyer's Greenweed (Genista tinctoria) **Moth**: Greenweed flatbody (Agonopterix atomella),moth (Mirificarma lentigosella)	

	Carry out surveys and monitoring in suitable locations to monitor and report moth sightings at sites with Dyer's Greenweed.			
Silver-spotted skipper  Link to map	**Create and manage south-facing calcareous grassland, grazed to extremely short turf with Sheep's Fescue growing, to benefit the Silver Spotted Skipper.** The Silver Spotted Skipper is only found in chalk downs in southern England but has good potential to expand its range over the coming years. However, they need sustained habitat management to maintain short turf conditions. Sometimes this short turf can be achieved through rabbit grazing but, in the absence of sufficient rabbit grazing, recommendations are to implement a rotational grazing regime with sheep or cattle in a manner that doesn't overgraze the foodplant (sheep's fescue). See this guide for more information. In Oxfordshire, there is one critically endangered small population remaining where management can be targeted. Additionally, if suitable conditions are created elsewhere in the county, consider translocating the Silver-spotted skipper into those suitable sites since natural colonisation is unlikely.	Aston Rowant NNR	Silver-spotted skipper (Hesperia comma)	
Small blue butterfly 	**Create and manage wide field margins and sheltered grasslands to contain Kidney Vetch (Anthyllis vulneraria) on low nutrient soils which get disturbed, to support Small Blue butterflies.** The Small Blue is England's smallest resident butterfly and requires habitat management to recover their numbers in Oxfordshire.		Small blue (Cupido minimus)	

Link to map	Oxfordshire is reported to have local populations which are declining but this species is expected to be able to recover if suitable habitats are created and maintained. See this guide about creating bare ground for butterflies.			
Striped Lychnis moth  Link to map	**Plant (and manage) Dark Mullein on grassland in and around the Chilterns to support the Striped Lychnis Moth.** The Striped Lychnis Moth has been declining since the 1970s in Britain but has a stronghold across the Chilterns National Landscape and appears to be doing well here. The caterpillars of this moth feed on the plant Dark Mullein (Verbascum nigrum) and some cases have been reported on White Mullein (Verbascum lychnitis) and ornamental mulleins in gardens. The priority action is to plant and establish Dark Mullein plants on open, sunny grassland habitats like downland, field margins, verges and even in gardens within the Chilterns. This can be done from seed or from plug plants as needed. Dark Mullein establishes most successfully where there has been ground disturbance but persists for up to 7 years (possibly more) in open grassland. The crucial thing is that the grassland must not be mown during the egg-laying and larval periods, which are typically June to August. Management will be needed to limit scrub and to maintain the verges/grassland habitats/gardens that contain Dark Mullein to stay open and sunny to remain successful for Striped Lychnis Moths.	Open, sunny, grasslands (and gardens) in the Chilterns National Landscape	Striped Lychnis moth (Shargacucullia lychnitis)	

	There is a recent report of Moth records here by the Butterfly Conservation (Upper Thames Branch). This action builds on previous projects to spread and manage Dark Mullein which you can read about here.			
White Admiral 	**Manage woodlands for White Admiral butterflies achieving partial shade with honeysuckle, brambles, and areas of bare ground.** Local White Admiral populations have declined and some have been lost in the past 30 years but the creation of suitable woodland conditions is expected to support populations to re-establish. See this guide to see what actions to take in existing woodlands and how to create new woodlands where the new habitat could mature into a suitable woodland to support these butterflies to spread in future. Create and manage woodlands to achieve partially-shaded conditions (not dark) with honey suckle growing in sheltered conditions for White Admirals to lay eggs on. Manage and enhance woodland rides and glades to have zones with bare ground present and allow brambles to grow and flower in large patches to offer nectar. Consider management through coppicing woodlands on 12 – 30-year rotations, retaining trees which support honeysuckle. Control browsing by deer to promote coppice regrowth and seek to create and connect open areas within the woodland.		White Admiral (Limenitis camilla)	

White-letter Hairstreak 	**Retain Elm trees for White Letter Hairstreaks and plant or grow new disease- resistant Elms, especially within 2km of existing Elm woodlands.** The White-Letter Hairstreak still remains in small populations where elms are present including large, isolated elm trees and hedgerows, scrub, and woodland rides or edges which contain elm. Many butterflies have been lost over recent decades during the period where many Elms were lost to Dutch Elm Disease. Elm is now a relatively rare tree species and these butterflies need targeted action around remaining or newly planted Elm sites in Oxfordshire to expand and/or connect butterfly populations. Do not fell mature, healthy Elm trees as a precaution against Dutch Elm disease. Allow Elm suckers to grow where they appear. In areas where scrub or woods show evidence of Dutch Elm disease, introduce coppicing on a 10-year cycle. Manage hedgerow shelterbelts that contain elm and avoid cutting edges where new elm suckers appear. Enhance rides and glades and create extensive ride and glade networks within woodlands. Connect habitats with hedgerows containing Wych Elm (Ulmus glabra) as a hedging plant and disease-resistant elms as hedgerow trees.	Elm sites in Oxfordshire	**Butterfly:** White-letter hairstreak (Satyrium w-album) **Lichen:** Orange fruited elm lichen (Caloplaca luteoalba)	
Wood White Butterfly	**Manage woodlands for the Wood White butterfly and then consider reintroductions of the butterfly to suitable woodlands.** The Wood White species is reported to no longer be present in Oxfordshire and it is not well understood why. The species is still	Woodlands in Northeast Oxfordshire close to Buckinghamshire populations	Wood white butterfly (Leptidea sinapis)	

	present on the Buckinghamshire side of the Oxfordshire's North-Eastern border meaning that Wood White populations could be recoverable and re-established if woodlands can be managed to achieve suitable conditions. See a management guide here. Reintroduce the Wood White butterfly to suitable woodlands and manage woodland ride sides to provide shelter and a tapered edge between tracks and maturing timber. Consider management through coppice techniques on rotations of fewer than 12 years and create connections between open areas in woodlands. Supplemental seeding of primary larval foodplants may be necessary eg. Bitter-vetch (Lathyrus linifolius), Common Bird's-foot-trefoil (Lotus corniculatus), Greater Bird's-foot-trefoil (Lotus pedunculatus), Meadow Vetchling (Lathyrus pratensis) and Tufted Vetch (Vicia cracca).			

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Fish, crustaceans and molluscs

Species by Common Name (ordered A – Z)	Potential measure (the action needed to help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most?	Habitat
Desmoulin's Whorl Snail  Link to map	**Manage sites that have, or could have, Desmoulin's Whorl Snail to maintain an appropriate vegetation structure.** The Desmoulin's Whorl Snail is a tiny snail with a very limited international and national range. The Oxfordshire populations represent a key proportion of the national records and bespoke management is required to support this species. They are typically found in tall wetland grasses, sedges, and reeds in fens, swamps, and marshes that border rivers and lakes. Where this snail is already present, it is important not to significantly change the habitat management at the sites. Instead, the priority aim is to safeguard and maintain the existing vegetation structure through the continuation of previous low-intervention management practices to prevent loss of this species. They rely on tall wetland grasses, sedges and reeds in consistently damp or wet ground (not dry and not deeply flooded). Aim to retain consistent, high, groundwater levels at the site to provide humid conditions. Also keep the site open and sunny by preventing scrub growth and limit or prevent livestock grazing, mowing, and cutting since heavy trampling or loss of vegetation would eradicate the snail populations.	Cothill, Cholsey Marsh.	Desmoulin's Whorl Snail (Vertigo moulinsiana)	

	If possible, consider extending this management out from sites where the snail is present out to adjacent locations to expand the footprint of habitat to support this species. For more detail, see this guide from Natural England about managing habitats for this species.			
Fish  	**Create and maintain fish passes or remove structures within rivers to enable fish to migrate and reproduce.** Remove physical structures that blockade the river (if the blockade is currently redundant and serves no essential purpose). For structures which cannot be removed, provide bespoke fish passes at these structures along rivers to enable fish to migrate and move between river sections and to access spawning ground (to lay eggs to reproduce). Fish passages are essential in addition to the more general restoration along more areas of modified river channels to reduce excess siltation by e.g. narrowing over-wide channels and replacing gravel beds, which will provide habitat diversity and improve spawning habitat for a greater diversity of fish species. Eels are a migratory species which spawn at sea but grow on in freshwaters and are experiencing a major global decline in numbers including within Oxfordshire rivers in the past 30 years. Local declines are also noted for Brown Trout and Grayling. Alongside overall improvement to river quality and river habitat, all fish also need to be able to move through river systems to access good habitat for breeding and growing, but the legacy of the numerous	Across the county's rivers.	Brown trout (Salmo trutta), European Eel (Anguilla Anguilla), Grayling (Thymallus thymallus)	

	structures built on rivers for milling, navigation and amenity has created numerous barriers to fish movement. Creating fish passes (multi-species passes for trout and coarse fish, and eel passes for eels) would help fish to move between sections of river to access places to reproduce and leave their eggs. Contact the Environment Agency's Fisheries and Biodiversity teams who can advise on key locations to provide fish passages and river restoration. Oxfordshire's local catchment partnerships are also a valuable point of contact.			
Mountain Bulin snail  Link to map	**Develop a dense, undisturbed litter layer in woodlands, particularly ancient beech woods, and manage them to achieve partial shade for the Mountain Bulin Snail** Manage suitable woodlands to achieve shaded conditions particularly in ancient beech native woodland. Light thinning or selective felling may be appropriate when regeneration of trees or the shrub layer is required. Minimise the disturbance of the ground, leaflitter, and wet areas within woodland as much as possible. Control grazing to minimise disturbance, some light grazing may be suitable to control coarse vegetation but can also be achieved through small-scale mechanical means. Maintain graded woodland margins with site-native trees on external wood-edges. Where appropriate, introduce management through rotational coppice in small coupes, on rotations of more than 12 years which can be highly beneficial to developing the dense litter layer required. Land snails like the Mountain Bulin Snail are highly sensitive to local disturbance.	Cotswolds and Chilterns	Mountain Bulin (Ena montana)	

	Good woodland management is important whilst following the actions above and generally, longer coppice rotations seem to be more beneficial to invertebrate communities living in the woodland litter.			
White clawed crayfish 	**Conserve remaining White Clawed Crayfish populations by managing the river habitat and improving water quality. Also look for suitable sites to expand their range.** The UK is thought to support a quarter of the world's population of White Clawed Crayfish - the UK's only native crayfish species. It is under threat due to the spread of American Signal Crayfish (an invasive species) and the disease they carry which quickly exterminates native white clawed crayfish populations. White Clawed Crayfish numbers dropped dramatically in recent years. In Oxfordshire, this species remains in 1 or 2 watercourses as isolated populations. Without action and support, it is expected that this species will be lost from Oxfordshire and, potentially, from the UK. If future, effective techniques emerge that can exclude American Signal Crayfish, this will be an important action to take but there are no clear methods to achieve this at present. Oxfordshire should try to conserve the very restricted remaining populations of white-clawed crayfish in the county by ensuring sensitive watercourse management, retention of refuge features for crayfish (cobbles, tree roots), and maintaining and improving water quality. Oxfordshire should use targeted surveys (potentially using eDNA techniques) on suitable watercourses to monitor whether there are/could be any other remaining populations of white clawed crayfish in the county.	Chalk and limestone streams in Oxfordshire.	White-clawed crayfish (Austropotamobius pallipes)	

	Suitable watercourses are those without American signal crayfish and which have barriers to colonisation by American signal crayfish. Some survey methods for white-clawed crayfish require a protected species licence. Any remaining Oxfordshire populations of white clawed crayfish that are deemed to be 'at-risk' could be carefully considered for relocation. Consider introducing or translocating White Clawed Crayfish into suitable 'offline' sites (waterbodies which are not connected to a river) which are identified as suitable sites away from the risk of competitive American signal crayfish (such safe sites are known as Ark sites). See habitat management guidance for White Clawed Crayfish here and details about Ark sites and mineral extraction guidance for this species here.			

Fungi and lichens

Species by Common Name (ordered A – Z)	Potential measure (the action needed to help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most?	Habitat
Fungi and fungi-associated plants found with woodland   Link to map	**Ensure the long-term continuity of suitable tree species with careful management to support rare woodland fungi and plants.** Retain trees where these plants and fungi are found. Ensure the long-term continuity of suitable tree species in these locations (saplings through to veterans) through planting or encouraging regeneration. In hotspot areas of these species protect soils by avoiding felling or coppicing trees and avoid fires, fertilisers, and using heavy machinery. Avoid mowing during peak fruiting/flowering periods and control vegetation competing with the target species. Control deer and limit scrub and bramble encroachment. Consider fencing off populations of these species where necessary. To increase the population of these species, create new areas of suitable tree species adjacent to the sites where these species are currently found. These plants and fungi may be found in a range of habitats including woodlands, parkland, hedgerows. Oxfordshire is a particular stronghold for these species found amongst the ancient and veteran trees which have been retained and well-managed (sites like Blenheim, Aston Rowant, and Headington).	Various records exist around the county including for fungi at Blenheim, Aston Rowant & Headington.	**Flowering plants:** Bird's-nest Orchid (Neottia nidus-avis), Narrow-lipped Helleborine (Epipactis leptochila), Yellow Bird's-Nest (Hypopitys monotropa) and its subspecies (Hypopitys monotropa subsp. Hypophegea), White Helleborine (Cephalanthera damasonium), Ghost orchid (Epipogium aphyllum). **Fungi:** (Boletus aereus), Devil's	

	These ancient and veteran trees have long-established soils that still support populations of these now rare species and expansion needs to start from sites where these species are present.		bolete (Boletus satanus),	
Lichens (on veteran trees)  Link to map	**Retain veteran trees which host rare lichens and manage woodlands and trees to increase future lichen populations.** Selectively thin trees around veteran trees that host lichens to open overstocked woods and create structural variety. In lichen hotspots, control the regeneration of young trees to maintain an open wood structure through actions such as reintroducing grazing where historically lost, paying consideration to grazing pressure from wild herbivores. Consider creating glades around the woodland that vary in age and size. Reduce local air pollution levels to as low as possible, including reducing intensive agricultural practices locally to enable lichens to survive. This action is important alongside broader good woodland management (including the control of invasive species like rhododendron and to create and retain deadwood). Look for opportunities to reconnect existing populations of lichens through pasture, tree, woodland, or hedgerow creation. Lichens are an excellent indicator of good quality, clean air so measures taken to support this species are also measures which can improve air quality for people and the wider environment (e.g. reducing local air pollution levels). To best support these lichens, Forestry Commission advise creating glades through approximately a third of the woodland area.	Usnea articulata (only in Nettlebed common)	**Lichens;** (Bacidia incompta), (Buellia hyperbolica), (Lecanora quercicola), (Lecanora sublivescens), (Usnea articulata)	

Insects and spiders

Species by Common Name (ordered A – Z)	Potential measure (the action needed to help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most?	Habitat
Beetle of Autumn Gentian  Link to map	**Manage existing populations of Autumn Gentian and where suitable, create new areas of Autumn Gentian, allowing the range and population of the Autumn Gentain beetle to expand.** This beetle reproduces by producing larvae in the roots of Autumn Gentian (Gentianella amarella), a late flowering plant which favours dry, chalk grassland. The plant itself is relatively common across southern England but the populations of this beetle are rare and populations do exist in Oxfordshire including Aston Rowant NNR.	Aston Rowant NNR	**Beetle**: (Smicronyx reichi) **Flowering plant**: Autumn Gentian (Gentianella amarella)	
Cigarello Gall-fly Link to map	**Manage and cut reedbeds on long rotation and prevent scrub and trees from invading, to support the Cigarello Gall-fly.** After being absent from records in Oxfordshire for at least 30 years, the Cigarello Gall-fly was recently found and recorded in Oxfordshire's Chilswell Valley. They need targeted and tailored habitat management of reedbeds to support the species to survive.	Chilswell Valley	Cigarello gall-fly (Lipara similis)	

Clubbed general soldierfly  Link to map	**Ensure that alkaline tufa spring-fed fens in Oxfordshire have a flow of clean calcareous spring flow into the fen and graze, or cut and rake vegetation to keep open, short, sunny pools to support Clubbed General Soldierflies.** The only records of this soldierfly in England are in Oxfordshire meaning we have a key role in preventing the loss of this species through targeted habitat management including ensuring that clean aquifer water continues to feed the habitats which are found to support these species. If population size and health allow, consider reintroductions of the soldierfly to suitable fen sites.	Cothill fen SSSI and Dry Sandford pit SSSI, potential for reintroduction to suitable fen sites like Lye Valley	Clubbed general soldierfly (Stratiomys chamaeleon)	
Dung specialists and dung beetles  Link to map	**Graze pastures with unmedicated animals to supply unmedicated dung to support rare dung specialist species and dung beetles.** Ensure the continuation of this unmedicated grazing and management on sites where unmedicated animal grazing has been long-established and introduce it to adjacent sites. Additionally, introduce this grazing management to new sites across the county. This action particularly applies to horses and cattle not treated with anthelmintics, to produce dung that enables rare species to survive and spread including the Hornet Robberfly and dung beetles like the Violet D'Or beetle. A paper about Hornet Robberflies and habitat management to support them can be found here with a detailed resource here. See information here about helping 'Dung Beetles for Farmers'. Many beetles like dung beetles are threatened by the loss of permanent pasture (being disturbed or converted to another use), the		Hornet Robberfly (Asilus crabroniformis), and dung beetles including the Violet Dor Beetle (Geotrupes mutator).	

	cessation or change in routine of grazing animals, a lack or change of dung supply, and the use of parasite medications (endectocides) as a routine treatment for livestock (Natural England report) found here. Many medications are used to keep livestock healthy. However, there is rising evidence about the negative impact of Avermectins on wildlife and the environment. The toxins build up in the dung, soil, and water with negative effects on plants and soil invertebrates like dung beetles. The dung itself also contains significant amounts of the toxin which impacts dung-dependant species. However, there are non-chemical and reduced-chemical options available to farmers, read more here.			
Ellipteroides alboscutellatus	**Increase the presence of the moss (palustriella commutate) in tufa springs with open woodland. Moss growth could be encouraged by managing woodland to achieve consistent, partially shaded seepages along tufa springs.** This fly relies on the presence of this moss for survival and the fly itself is a very rare species with fewer than 20 records in England at the time of writing with a recent record in Worton Wood, Oxfordshire. If the woodland is suitable for coppicing, this could be introduced to achieve partial shade conditions.	Worton Wood	True fly (Ellipteroides alboscutellatus)	

Lousewort flea beetle Link to map	**Conserve, manage, and enhance suitable areas to increase populations of Marsh Lousewort for the Lousewort Flea Beetle.** Marsh Lousewort is a rare plant which can be found in alkaline fens. The Lousewort Flea Beetle requires this plant to be able to breed. In Oxfordshire this beetle is only known to be present in Cothill Fen SSSI. See information about the plant here.	Cothill fen SSSI	Lousewort flea beetle (Longitarsus holsaticus)	
Meadow ant hoverfly 	**Manage grasslands that are good quality, warm, sunny, and open to encourage and retain yellow meadow anthills (mounds). Graze to a short sward using suitable species like sheep to support the Meadow Ant Hoverfly.** This hoverfly lives in the ant nests (mounds) of 'Lasius flavus' (yellow ants) which need good quality grassland. In sites that already have the yellow ant mounds, mange the site through grazing and avoid damaging the anthill (mounds) with machinery. In suitable grassland reversion projects, consider the reintroduction of yellow ants if they have not, or are not likely to, naturally colonise the area.	Aston Rowant NNR, Barracks lane meadow.	Meadow ant hoverfly (Microdon devius)	

Noble Chafer  Link to map	**Manage and create orchards with deadwood to support Noble Chafer beetles.** A rare metallic-green beetle which can be found in traditional orchards. Support Noble Chafer populations by keeping mature, large, dead, dying, and decaying wood within traditional orchards where this species is present or could become present. Avoid removing or burning deadwood from these areas and keep mature, suitable tree species in and around the orchard. Introduce Chafer boxes to create temporary habitat for Noble Chafers whilst an orchard establishes and/or sufficient deadwood is supplied. Plan to grow a future succession of trees that will become mature. For orchard creation, consider using early-maturing varieties of fruit trees. See this set of facts, survey tips, and management advice specific to Noble Chafers and orchards. There are six records of Noble Chafers in Oxfordshire in the past 30 years showing that this is a species right on the brink of being lost from the county (and the country). The Noble Chafer relies on dead and dying wood for it's young (larvae) to survive in, particularly on orchard trees. The larvae feed on deadwood for up to three years before the adults emerge as a beetles for six weeks in summer to reproduce. Adult beetles are known to choose the nectar of hogweed and meadowsweet which can be encouraged or grown around the edge of orchards to provide nectar sources to attract or support noble chafers beetles. Use techniques to retain, increase, and prompt new deadwood each year in orchards where noble chafers are known to be present or could be present in future (e.g. through translocation).	Very restricted to traditional orchards and gardens with mature and declining fruit trees.	Noble chafer (Gnorimus nobilis)	

	Ensure the longevity and presence of large, mature, veteran, and dying trees within the orchard and alongside orchard trees consider planting nearby oak and beech which can also support Noble Chafers.			
Snail killing fly  Link to map	**Continue extensive grazing management (or cutting and raking) over suitable large areas to keep wetlands short and open throughout the year. Retain or create pools in open wetlands to host snails for this fly.** This fly is found in very few locations in England, one of which is Oxfordshire's Port Meadow. It is of key importance to extensively graze these open wetlands and to create areas on the site which can host snails (which this fly relies on to survive). Other species are also expected to benefit from this open wetland with nutrient rich mud and pools.	Port Meadow	Snail killing fly (Sciomyza dryomyzina), Marsh Dock (Rumex palustris)	
Southern Damselfly 	**Create unpolluted, shallow streams to support Southern Damselflies.** Manage sites where Southern Damselflies are known to be present or could become present to create unpolluted, base-rich shallow streams with a constant moderate flow rate of water and relatively high-water temperatures. Maintain open banksides with unshaded streams. Endangered in England and at risk of extinction globally, Southern Damselflies remain in the UK in approximately ten areas including one location in Oxfordshire, Dry Sandford Pit. This species requires channels with a permanent flow of water which does not dry out or freeze. They occur in heathland streams, water meadow ditches on chalk habitats, and fen habitat.	Dry Sandford Pit	Southern Damselfly (Coenagrion mercuriale)	

	See the management handbook for Southern Damselfly for further, detailed action.			
Spider (Tuberta maerens)	**Create new areas of connected coppice with standard trees including oaks (Quercus robur) especially in and around Brasenose Wood, to support the spider (Tuberta maerens).** This spider is reported to be highly specialised to managed habitats and its range is greatly limited to Oxfordshire, Dorset, Berkshire and Wiltshire. Whilst the exact, ideal management actions aren't fully clear, the greatest abundance of this species was associated with oak trees (Quercus robur) in a coppice-with-standards woodland 12 years after coppicing. The spiders were particularly found on the South and West facing areas of the tree trunks.	Brasenose Wood	Spider (Tuberta maerens)	

Mammals

Species by Common Name (ordered A – Z)	Potential measure (the action needed to help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most?	Habitat
Bats  Link to map	**Design, create, and enhance wildlife corridors to support bats (in both urban and rural areas).** Survey areas for bats in urban and rural areas to identify bat corridors. Bats use corridors through the natural environment to move (commute), feed (forage), and get to their roosts. Often, they use tree-lined corridors, hedgerows, woodland, and trees in gardens and greenspaces to move through both rural and urban areas. Ponds, rivers, and watercourses also help to attract insects that bats feed on and can be a key part of the foraging corridors. Minimise loss or damage to existing bat corridors, and enhance existing wildlife corridors and features that support bats. Where possible, create new corridors, habitats, and features in suitable locations that better support bats to forage, commute, or roost. New corridors could aim to connect to existing hedgerows, woodlands, lines of trees, trees in gardens and greenspaces. New corridors can act as stepping stones to help mobile species move through urban and rural areas However, these species are known to be negatively impacted by lighting. Read more about the impacts of lighting and what you can do	Horspath Tunnel		

	to help bats here. Care should be taken to minimise or shield lights to benefit bats (and other species) in rural and urban areas. Get in touch with Bat Conservation to get help with bat-friendly gardens, monitoring bats, and more. For local advice, information, and support, get in touch with Oxfordshire Bat Group. When designing changes to the environment to create or enhance urban areas and buildings – see this detailed guide, by Bat Conservation to create an urban environment that can support bats and biodiversity.			
Bats (woodland specialists)  Link to map	**Manage woodlands for bats. Typically, retain deadwood and mature trees with dark, humid conditions with well-connected foraging/commuting corridors nearby.** There are 18 bat species in the UK, 14 of which were recorded in Oxfordshire between 2019 – 2023. In 2024, a very rare, almost extinct species of bat was also found in Oxfordshire's woodlands – Bechstein's bat. This bat, and the others listed (right) are strongly associated with woodlands and need particular types of woodland management to support them. See this link by Bat Conservation Trust to see the bat woodland specialists. Survey bats in rural areas and identify woodlands where bats are present or roosting and report sightings to the Environmental Records Centre TVERC. Maintain the woodland and surrounding area to support any bat species that are already present (see the needs of different species here).	Bernwood, Tackley Woods, Begbrooke Woods		

	Generally, in woodlands aim to retain mature, dead, damaged, and dying standing trees, especially trees with cracks, loose bark, ivy, and holes (or hollows). Maintain dark, humid conditions around these trees through management such as growing out understory layers, creating woodland ponds or blocking or slowing the flow of drainage ditches. Create foraging corridors across the county (particularly if there are known bat roosts nearby) by planting trees, hedgerow, or woodland. For detailed information about bat actions in woodlands, see this guide.			
Beaver 	**Reintroduce beavers into suitable locations where they are given space and time to naturally restore river diversity and wetland ecosystems.** Beavers are a native UK species but they have been extinct from England for several centuries. In recent decades, some were allowed to come to England in enclosures but there have been no confirmed beavers in Oxfordshire for approximately 400 years. However, as of 2025, wild releases became legal in England and Natural England will now consider applications for the wild release of beavers. They will require sufficient evidence of the suitability of the location and the reintroductions are subject to national policy and licensing. The focus of reintroductions should be to promote biodiversity as well as wider benefits that beavers can bring. For example, beavers can create resilient wetland habitats which can store and hold water. These wider benefits include mitigating damage during flood events and drought events because they can create resilient wetlands that store and hold water benefitting both people and biodiversity.			

	Beaver habitats have also been shown to improve water quality in areas where they live. Since beavers are now starting to be released into the wild, a plan for their management will be important to ensure that they live well, maximise benefits, and limit conflicts with people.			
Hazel dormouse  Link to map	**Create, manage, and enhance connected corridors of coppice, woodland, and hedgerows to support Hazel Dormice.** Hazel dormice are unable to spread far from their current locations or from reintroduction sites without directly connecting habitats. Within 1km of sites where Hazel Dormice have been recorded or could become present, create and/or enhance a suitable network of connecting habitats e.g. coppice, woodland, and/or thick hedgerows (these should connect to the original site where the Hazel Dormouse was recorded). Retain trees which have cracks, crevices, and deadwood and retain woody species like blackthorn and hazel in sunny, open areas. Ensure that there are arboreal connections across woodland rides at least every 50-100m and erect dormouse boxes and/or tubes to encourage nesting opportunities. Retain woodland understories in winter and avoid clear felling in known dormouse locations. Consider managing woodland through traditional coppice of non-adjacent coupes. of sites where Hazel Dormice have been recorded or could become present, create and/or enhance a suitable network of connecting habitats e.g. coppice, woodland, and/or thick hedgerows (these should connect to the original site where the Hazel Dormouse was recorded).			

	Retain trees which have cracks, crevices, and deadwood and retain woody species like blackthorn and hazel in sunny, open areas. Ensure that there are arboreal connections across woodland rides at least every 50-100m and erect dormouse boxes and/or tubes to encourage nesting opportunities. Retain woodland understories in winter and avoid clear felling in known dormouse locations. Consider managing woodland through traditional coppice of non-adjacent coupes. Hazel Dormouse populations are estimated to have fallen by 52 per cent since 1995 and are a species that are at risk of extinction in the UK. It requires the above specific measures as well as good woodland management techniques (see this management guide) to improve the structure and diversity of woodlands. Within conifer plantations, maintain the margins of deciduous trees and shrubs beside rides, glades and edges. For more detailed woodland management information, please see the English Nature management handbook for dormice conservation.			
Hedgehog  Link to map	**Manage gardens, parks, urban environments, and new developments for hedgehogs.** In gardens, parks, urban greenspaces, and new developments, reduce or stop the use of slug pellets and pesticides, create 13cm x 13cm holes through fences and walls to create 'hedgehog highways' to help hedgehogs move through gardens and greenspaces to forage and mate. Create or install 'hedgehog houses' that provide undisturbed, safe space for them.	Hedgehog roadkill hotspots, new developments		

	Sweep fallen leaves into permanent leaf stores where they may take shelter, and manage grass in gardens and parks to create a mosaic of long grass, short turf, open soil, and tussocks where they may search for food like beetles, caterpillars and earthworms. Hedgehog numbers have declined greatly. They used to be a common sight in both rural and urban areas. In addition to the more urban actions above, the rural hedgehog populations are expected to benefit from broader, general habitat improvements including the creation and good management of hedges, scrub, woodlands, deadwood, and grasslands as well as increasing regenerative farming practices. Wider actions to support hedgehogs can be read about here which would also support a range of other species.			

Otter  Link to map	**Prevent otters from drowning in traps by ensuring that any fish and crayfish traps being used are legally compliant and have properly-fixed otter guards.** Otters are still considered 'near threatened' with extinction globally, and their population numbers are impacted by human-caused mortality (e.g. being caught in traps). Although the use of nets and traps is a regulated activity by the Environment Agency, it is important that the numerous fishing clubs and syndicates ensure that all use of such traps on their waters are compliant with the law to avoid otter mortalities.	Countywide		
	In locations where there are regular otter roadkills, consider adapting infrastructure to improve their chances of survival as they move across land and watercourses. Otter populations have been recovering in Oxfordshire in recent decades but their populations can be vulnerable to the impacts of human-caused mortality (e.g. roadkill). Developers, local authorities and National Highways are best placed to implement measures (such as the provision of ledges and underpasses and the use of barrier fencing) to reduce the risk of otter roadkill at hotspots, and the Environment Agency can advise on where the several Oxfordshire hotspots are. In addition to the actions above, Otters and other species require safe and secure breeding and resting sites, which can be provided by the protection and general improvements to riverside habitats which are already measures that the LNRS is promoting. There is information for landowners and woodland owners for otter habitat management. Developments and planners should also use available information to support otters.	Otter roadkill hotspots (information can be requested from the Environment Agency)		

Water vole 	**Manage (or enhance) riverside banks, ditches, and watercourses for Water Voles.** This action can be to support existing Water voles, or to create suitable habitat for new water voles to colonise. Manage riverside banks, ditches, and watercourses to create or maintain areas of sunny shallow water margins with marginal and bankside vegetation and avoid excess or extensive overshadowing of the water by scrub or trees (especially if water vole colonies are already present). Avoid trampling or intensive grazing along the watercourse edge which can damage water vole burrows. Ensure that American Mink are being controlled with the aim to achieve their exclusion where water voles are present. Water voles have experienced drastic declines in the UK. Their numbers dropped by almost 90 per cent between 1989 - 1998 but water voles can still be found in the banks and waters of Oxfordshire's fens, rivers, streams, and ditches. They are most commonly found in areas of slower flowing water with abundant vegetation and steep sided banks (for burrowing into) that have small ledges at their base. Effort should be made to improve habitats where the remaining populations could be joined up with each other. Alongside improved bank and ditch management, it is key to control the (invasive species) American mink which predate on water voles in an unsustainable manner and cause local extinctions which have driven the decline of this species. Water vole recovery is primarily based on whether the efforts to control American Mink are successful. Mink were introduced to the country and are the primary cause of the decline of water voles. Water vole projects, like that of BBOWT, bring	Areas that bridge a gap between existing populations		

	together habitat restoration and mink management and have played a major role in safeguarding Oxfordshire populations. Improved monitoring and trap-alarm systems now provide an opportunity to create a mink-free Oxfordshire if sufficient resource and support can be found. To support Water Voles, see management factsheets, handbooks, conservation handbooks for water voles, advice for landowners, and advice for planning decisions.			

Plants, flowers and trees

Species by Common Name (ordered A – Z)	Potential measure (the action needed to help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most?	Habitat
Black poplar trees 	**Plant or enable Black Poplars to grow in Oxfordshire and retain dead and dying poplars where they have been growing. Retain deadwood where possible.** Black poplar trees used to be commonplace across England but are now few and far between. The black poplar is considered to be Britain's rarest tree species associated with wet woodland and forested floodplain. One cause of the decline for this wetland tree was the extensive draining of agricultural land across the country. Now that there are so few black poplars left, it is unlikely that they can pollinate each other due to the distance between the trees. Careful propagation and planting should be undertaken to grow male and female black poplars close to each other where their seeds can land on damp ground. In this way, population numbers may start to recover. Oxfordshire used to have strong populations of this tree since it grows particularly well in wetlands, floodplains, and near ditches. The tree itself supports a wide range of other rare species. Efforts to plant new black poplars could be targeted near to the remaining black poplar trees in Oxfordshire as well as other wetland sites in the county that are suitable to support the growth of new black poplars. See a Black Poplar action plan here. Avoid removing or burning the deadwood of any remaining black	River Thame catchment	**Fly:** True fly (Solva marginata)  **Tree:** Black Poplar (Populus nigra)	

	poplars where practicable and possible (accounting for public safety and access). This deadwood itself offers a very rare habitat to other species which are at risk of extinction like the true fly (*Solva marginata*) which breeds under the bark of live, dead, and dying poplars. It requires dead, dying, and rotting poplar trees to be kept in the environment, not removed or burned. For this species it would be particularly beneficial to plant new suitable poplar species in locations near to mature, dead, and dying poplars to ensure a local new source of aging poplars. A local initiative to restore black poplar populations would greatly support the recovery of these trees. Examples include projects for native Black Poplars in Herefordshire and Dorset often offering free trees to expand the UK's populations.			
Creeping Marshwort  Link to map	**Within appropriate floodplain habitats, recover Creeping Marshwort by maintaining and creating damp grassland on the margins of ponds that flood in winter. Maintain consistently short, sparse vegetation through regular, extensive grazing**. Local information about Creeping Marshwort can be found here with a description of the plant here. This plant grows in wet, heavily grazed, grassland that floods in winter. Suitable sites are typically by rivers however Creeping Marshwort is now very rare with the UK's main population found only in Oxfordshire. Plantlife and Freshwater Habitats Trust suggest that there are only 2 other smaller populations in the UK. On sites with Creeping Marshwort, it is essential to mimic or implement heavy year-round grazing by cows or horses. If, in Oxfordshire, the grazing pattern is lost, if the land use changes significantly, or if the habitats are damaged or under-managed, the species is at great risk of being lost from the UK.	Oxford Meadows SAC (Port Meadow), and a recent reintroductions to Willow Walk Meadow (Oxford), Lye Valley, North Hinksey, Mill Meadow, Henley, Cutteslowe (Cherwell floodplains).	Creeping marshwort (Helosciadium repens)	

	Oxfordshire's sites represent key, national populations of this endangered plant and maintaining a bespoke management regime is a necessary requirement to recover populations of this species. This is also true for sites where Creeping Marshwort is (re)introduced.			
Devil's bit scabious 	**Enhance existing areas of Devil's bit scabious and create new large areas in suitable, large habitats. In suitable sites, reintroduce Marsh Fritillary butterflies.** Propagate, plant, and establish Devil's-bit Scabious to create extensive patches of this plant (throughout the year, including winter) and introduce or maintain appropriate grazing or other suitable techniques that support this plant species. Where suitable, reintroduce Marsh Fritillary butterflies to areas which have very large populations of Devil's-bit Scabious. The Marsh Fritillary butterfly has become locally extinct due to habitat loss. It relies on well-managed, very large areas of grassland (e.g. wet meadows and calcareous grasslands) which contain Devil's-bit scabious and are appropriately grazed. Guidance suggests that good habitat should exceed 70 hectares with at least 20 per cent of the area containing three or more Devil's bit scabious plants per square metre. To support this butterfly, Devil's-bit Scabious needs to be retained on large sites including adequate areas retained throughout winter. Extensive grazing regimes are ideal to support this. Devil's-bit Scabious creates no seedbank which is why it requires regular, consistent management to maintain its populations and avoid losing both the species mentioned here.	Existing sites of Devil's bit Scabious Otmoor, Cothill Fen NNR, Lye Valley SSSI, Yarton Mead, Long Mead.	Devil's-Bit Scabious (Succisa pratensis), Marsh Fritillary (Euphydryas aurinia).  **Moths**: Narrow-Bordered Bee Hawk Moth (Hemaris Tityus), **Fungi** Devil's bit Wart, (Synchytrium succisae), Devil's bit anther smut, (Microbotryum succisae)	

Downy Woundwort  Link to map	**Undertake management to increase the presence of Downy Woundwort.** Support existing populations of Downy Woundwort and previously populated areas by managing woodland edges, rides, glades, roadside verges, and hedgerows to limit competitive vegetation growth and create suitable soil disturbance to help this species to spread. Clear scrub on sites where this species has previously grown. Perhaps England's most endangered native wildflower, this species of flowering plant has only been recorded in four sites in England since 1930, all in West Oxfordshire meaning that Oxfordshire has a particular responsibility to try to recover this species. It has been noted to grow along tracks, ancient pathways, and woodland and hedgerow edges on thin disturbed soil above oolitic limestone. In one of those four sites, the most recent survey found one plant. The species relies on its long-lived seed which can survive in the soil for many years. Therefore, the actions to help recover this species include causing soil disturbance to places where there may have previously been downy woundwort populations. Habitat management suggestions can be found here (p67) and here.	Burford and Charlbury. See Distribution map and page 62 of Wats17p59.pdf (bsbi.org.uk)	Downy Woundwort (Stachys germanica)	
Fen violet	**Maintain populations of, or (re)introduce, Fen Violets at suitable sites.** There are only three known sites where the Fen Violet remains in England. One is Otmoor in Oxfordshire (described here). There is a high threat of national extinction to this species and there is ongoing work by local people and Freshwater Habitats Trust to recover the populations of rare plants including Fen Violet.	Otmoor, and sites where this species has previously been present	Fen violet (Viola stagnina)	

 Link to map	Existing sites should be managed to the benefit of this species and to appropriately expose any historic seedbanks. Suitable fen or marsh sites should be considered for (re)introduction of this species to increase its distribution. Possible sites could include areas where the plant was historically present, or they may be new sites. Consider contacting Freshwater Habitats Trust and Oxfordshire Flora Group to request advice about this species including management or (re)introduction. Winter inundation with waters down in spring, flowering and setting seed before vegetation gets too tall for it in summer. Careful grazing management is key to enable it to succeed. Focusing on existing sites to then increase population sites and abundance outward from these sites (particularly around Otmoor).			

Greater Water-Parsnip  Link to map	**Propagate and translocate Greater Water Parsnip out to locations to restore its historic distribution in Oxfordshire.** Greater Water Parsnip was once abundant in Oxfordshire's rivers and floodplains. However the abundance of this plant has declined rapidly in the past 200 years as a result of water pollution (eutrophication), wetland drainage, and inappropriate ditch management. The plant requires enough disturbance and grazing to avoid the area scrubbing over but not so much that the plants are all eaten and the habitat trampled. Propagate this plant and support translocation efforts into suitable wetland and riparian sites with a suitable balance of management or grazing for this species. Get in touch with Freshwater Habitats Trust to find out more about what's best for this species. Suitable habitats for translocation are: fens, and emergent and fringing vegetation by rivers, streams, canals, ditches, lakes and ponds. This guide can give you more information about identifying the plant and understanding its range and habitat requirements.		Greater Water-parsnip (Sium latifolium)	

Juniper 	**Regenerate Juniper and manage sites to recover Juniper populations.** Regenerate and increase the presence of Juniper by creating scrapes down to bare soil to establish the seeds and then manage the area for Juniper (and associated species). Where necessary to benefit Juniper regeneration, exclude rabbits, deer, and sheep from these areas. Mature Juniper colonies have been dying out in lowland England and have not, by themselves been naturally regenerating any new young Juniper with any success in the past 60 years. Without Juniper regeneration projects this plant is expected to go extinct within the next 50 years from lowland England. Oxfordshire is one of a few counties which have key suitable areas of southern chalk grassland where Juniper could be re-established, and work is being undertaken to better understand and develop natural regeneration methods to prevent the loss of Juniper and dependent species form Oxfordshire. Bare earth, ruderal plants (plants which colonise bare ground), and invertebrates are a particularly important components of chalk and limestone grasslands which will also benefit from juniper scrapes. Species which are likely to benefit from Juniper projects include rock-rose, wild thyme, horseshoe and kidney vetch along with several species of blue and skipper butterfly.	Aston Upthorpe and Aston Rowant NNR	Juniper (Juniperus communis), Moth (Argyresthia praecocella)	

Limestone fern  Link to map	**Create new areas of bare limestone in woodlands, along rivers, in walls, built structures, and gardens to encourage Limestone Ferns.** The creation of limestone structures like dry stone walls, buildings, bridges can support this species as can techniques to expose patches of limestone soils and rock in areas of suitable habitat. The creation of bare patches should not aim to eradicate large areas of other existing habitats but should be conducted in a complementary manner to add biodiversity value to sites where this species could colonise the cracks or scree in limestone rock and exposed areas of limestone-rich soils. The creation of new areas of exposed limestone will be required over time to maintain a population of this species.	West Oxfordshire, the Cotswolds, North of Bicester, and East of Watlington.	Limestone Fern (Gymnocarpium robertianum)	
Long-Leaved Helleborine 	**Maintain permanent areas of suitable glades, rides, or open spaces within woodlands where long-leaved helleborine are present.** Create and/or enhance glades and open spaces (like wide rides) within suitable woodlands to create permanently light areas within the woodland. Retain a few trees or shrubs in open areas to avoid exposing these plants to too much light as they can be prone to drying out. Manage and control competing vegetation (particularly in the permanently open areas). Vegetation control with occasional soil disturbance in open areas can be achieved through time-limited grazing by suitable animals or other suitable methods. This helleborine is associated with ancient or mature calcareous woodlands where the plant has been found. This plant does not enjoy changing conditions and benefits from permanent open, sunny		Long-Leaved Helleborine (Cephalanthera longifolia)	

	areas in woodlands with enough shade to avoid drying out. Similarly, the land should be moist and not waterlogged or dried out. Typically, cattle or horses are used for grazing in a time-limited manner to thin competing vegetation and cause slight soil disturbance without compacting the soil or overgrazing. Avoid herbicides, pesticides, and fungicides.			
Meadow Clary  Link to map	**Maintain low soil nutrient levels, prevent scrub encroachment, and graze at key times to reduce coarse, dominant grasses in suitable sites where Meadow Clary is present or has been present.** The removal of sward by hay cutting or grazing after plants have flowered and set seed is advised, in addition to maintaining a degree of disturbance to provide bare patches of soil for seedling recruitment. It would be important to maintain or introduce careful grazing regimes on grasslands and meadows where this species has been present, practice low-input sustainable farming methods to enhance and achieve greater areas of unimproved grassland. Meadow Clary declined rapidly when agricultural practices began to increase the fertility of grassland by ploughing, applying fertiliser, and re-seeding with 'more productive' grassland species. Now this plant is very restricted in its national range, down to about 20-30 known sites in the UK (mostly in the Cotswolds) of which about half are reported to be in Oxfordshire. As such, Oxfordshire has a particularly important role for the national recovery of this species. Do consider the climate predictions for Meadow Clary's range over time by the Met Office.	Cotswolds sites where the species is, or has been present.	Meadow Clary (Salvia pratensis)	

Military Orchid  Link to map	**Manage woodlands for Military Orchids and create open conditions in glades. Exclude and control deer and rabbits and clear moss cover as necessary around the orchids.** Open conditions can be achieved through selective felling to expand glades, controlled time-limited grazing, seasonal mowing, or raking vegetation to control encroaching scrub near existing orchid populations. Oxfordshire has 6 records of Military Orchids in the past 30 years. This orchid takes four years to grow from seed but can live for 15 years. Because they take such a long time to grow, management of sites where they already exist is of key importance to their survival in Oxfordshire.	Woodlands south of Lower Assendon and south of Christmas Common	Military orchid (Orchis militaris)	
Monkey Orchid  Link to map	**Manage chalk grassland to retain moisture and increase populations of the Monkey Orchid. Identify suitable sites (without Lady Orchids) to reintroduce and manage Monkey Orchids to expand their range and prevent extinction.** There are three known populations of Monkey Orchid in the UK and Oxfordshire has one of these remaining populations present at Hartslock nature reserve. Here the chalk grassland supports a range of rare species including one of the UK's three populations of Monkey Orchid. This orchid typically flowers earlier than others (around May) and care should be taken to manage the area according to its flowering period. A potential major risk to the Hartslock population is their hybridisation with Lady Orchids which are present at the same site.	Hartslock nature reserve	Monkey Orchid (Orchis simia)	

	Targeted reintroduction of Monkey orchids to suitable sites where Lady Orchids are absent offers a way to secure the future for this species.			

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Reptiles

Species by Common Name (ordered A – Z)	Potential measure (the action needed to help the relevant species to recover). Potential measures are in bold with additional detail about the species added below.	Particularly important locations for the action(s)	Which species are intended to benefit most?	Habitat
Adder  Link to map	**Create new Adder habitats with mosaic areas of heathland, scrub, grassland, and woodland. Or manage and enhance existing mosaics to reintroduce adders.** Find detailed advice about managing habitat for adders here. Create or manage habitats that have a diverse vegetation structure (a mixture of different heights) with open, sunny areas for basking. Rides and glades at woodland edges can be important and the ground topography should be varied to create features for basking, shelter, and safe hibernation. Limit disturbance within these mosaic habitats and follow advice about game bird releases and management to limit impacts on flora and fauna. Adders used to be widespread in Oxfordshire before the year 2000 but recent evidence shows strong declines across northern Europe. Oxfordshire itself may have one remaining population of adders which were previously reintroduced back into the county. Small and fragmented populations are highly vulnerable to extinction. Major threats to adders include predation by game birds, disturbance and persecution by people. There is potential for expanding existing habitats where adders remain, and for carefully targeted re-introduction of adders into suitable locations following IUCN guidelines and working with authorities and local reptile organisations across borders to restore habitat connectivity with populations in neighbouring counties.	The final Oxfordshire adder population in the Chilterns. Most likely to be suitable in the Chilterns or Cotswolds.	Adder (Vipera berus)	

Common lizard  Link to map	**Carefully manage habitat near known lizard colonies to create open, sunny places in dry, exposed sites with areas of dense cover nearby where they can feed on spiders and insects.** Common lizards have been widespread across Oxfordshire but their current numbers and range are not as well-known besides some protected sites like Otmoor and Wychwood. Where they are known to be present, and where habitat management is appropriate, they are doing well. The greatest threats to their success include the fragmentation and disturbance of their habitats and predation by birds. If common lizards are lost from a site, there is little to no opportunity that they will naturally recolonise the location so additional survey and monitoring work is also needed to understand where populations are present locally.	Otmoor, Wychwood, Banbury County Park	Common lizard (Zootoca vivipara)	

You have now reached the end of Oxfordshire's LNRS Species Priorities List. Please report any sightings of these (and other) species to TVERC to help inform future biodiversity recovery work.

Summary

The list above contains **63 specific actions** which support **61 key species** e.g. 'Monkey orchid' (or groups of species e.g. 'Bats').

Whilst those actions are targeted towards 61 key species and species-groups, the actions are expected to benefit a total of 105 species which are considered to be threatened or near threatened with extinction. You can find each and all of these 105 species listed in the right-hand column of the above table.

In addition, these species-specific actions would also have knock-on wider benefits to a further, non-exhaustive list of species which cannot all be mentioned here. The column of 'particularly important locations' were noted to add context for readers but those locations should not limit people from taking actions in other places.

How will other threatened and near-threatened species be supported in the LNRS?

There are approximately 800 other threatened and near threatened species in Oxfordshire in addition to the listed above. You can view the full list of over 800 species on the Local Nature Recovery Strategy webpage.

Whilst those additional 800 species are also important species to recover, it is expected that they will benefit through the large-scale habitat improvement(s) which are listed on the LNRS's Statement of Biodiversity.

These actions involve enhancing existing habitats, improving landscape-scale connectivity between habitats, and the creation of new habitats to help the population numbers of many of those species to recover and spread.

In some cases, some of the other 800 species require more evidence to better understand what actions they need to help them recover.

Acknowledgements

The LNRS would like to acknowledge the support given by the LNRS partners as well as species experts and county recorders (nationally and locally) who have helped to create this Species Priorities List.

Collecting the specific actions needed by nearly 900 threatened and near-threatened species is a significant undertaking and we have only been able to create this with the support from individuals and organisations who have collaborated with this project.

During the longlisting and shortlisting processes, Oxfordshire received support for the LNRS partner organisations (see logos below) as well as contact with over 70 species experts. Alongside the LNRS partner organisations we also heard responses from species representatives at:

- Banbury Ornithological Society
- Banbury Town Council
- Butterfly Conservation Upper Thames Group
- Centre for Hydrology and Ecology
- Environment Agency
- Forestry Commission
- Natural England
- Oxfordshire Amphibian and Reptile Group
- Oxfordshire Bat Group
- Oxfordshire Ornithological Society (OOS)
- Plant Life
- RSPB
- RSPB Otmoor
- Species Recovery Trust
- The Ashmolean Natural History Society of Oxfordshire (ANHSO)
- The Fungus Survey of Oxfordshire
- The River Thame Conservation Trust
- Over 20 further county recorders and individuals with expertise in habitat management for a variety of species.
- Representatives from each of the LNRS project partner organisations (see image)

Images and credits

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3. Bats: Myotis bechsteinii | Netopier Bechsteinov Bechstein's Bat | Ján Svetlík | Flickr
4. Bats (woodland specialists): Myotis bechsteinii | Gilles San Martin | Flickr
5. Beaver: (explored) Beaver in the neighbourhood, Almere, May 2021 | Flickr
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8. Black Poplar trees: Black Poplar Trees - Worcestershire | Pool / Berrow Down / C… | Flickr and true fly: Wood soldier fly (Solva marginata, Xylomyidae), Parc de Wo… | Flickr
9. Blackthorn butterflies: Black Hairstreak - butterfly | Black Hairstreak, Glapthorn C… | Flickr
10. Breeding waders: Common snipe 2016-08-05_07 | Thomas Landgren | Flickr
11. Common lizard: Common Lizard | Common Lizard (Zootoca vivipara) © Natural E… | Flickr
12. Cigarello Gall-Fly: no image
13. Clubbed general soldierfly: Stratiomys chamaeleon (Diptera: Stratiomyidae), ♀ | Stratiom… | Flickr
14. Creeping Marshwort: photo provided, courtesy of Judy Webb
15. Curlew: Curlew | Scotland | caroline legg | Flickr
16. Dark Green Fritillary: Speyeria aglaja | dark green fritillary Großer Perlmuttfalte… | xulescu_g | Flickr
17. Desmoulin's Whorl Snail: Vertigo moulinsiana | This very small snail (3-4mm) is one o… | Flickr
18. Devil's-bit Scabious Devil's-bit Scabious (Succisa pratensis) Dipsacaceae | Flickr and Marsh Fritillary: Marsh Fritillary | Etienne Gosse | Flickr
19. Downy Woundwort: Stachys germanica, Saltway | Sam Thomas | Flickr
20. Duke of Burgundy Butterfly: Hamearis lucina | Duke of Burgundy Schlüsselblumen-Würfelfal… | xulescu_g | Flickr
21. Dung specialists and dung beetles: Asilus crabroniformis | Hornet Robberfly female Finistère, F… | Flickr
22. Ellipteroides alboscutellatus: no image
23. Farmland Birds: Alvéola-amarela, Yellow Wagtail | Motacilla flava, Leziria g… | Flickr
24. Fen violet: Fen violet | Fen violet Viola stagnina Cambridgeshire Copyri… | Flickr
25. Fish: Brown Trout at Seedskadee National Wildlife Refuge | Flickr and European Eel (Anguilla anguilla) | Aquarium du Val-de-Loire,… | Flickr
26. Fungi and fungi-associated plants found with woodland: Yellow Bird's-nest, Hypopitis monotropa, Brierley Wood SK3… | Flickr and Satan's Bolete, Devil's Bolete (Rubroboletus satanus) (Bol… | Flickr
27. Great Crested Newt: Great-crested newt | Streatham Common, The Rookery | Carron Brown | Flickr
28. Greater Water-Parsnip: Greater Water-parsnip | At Upton Marshes Nature Reserve, Nor… | Flickr
29. Hazel dormouse: Hazel dormouse (Muscardinus avellanarius), Skole, Lviv Obl… | Flickr
30. Hedgehog: Twinklehog comes to say hi | Beautiful mature Hedgehog trund… | Flickr

31. Juniper: Juniperus communis | Juniperus communis | Joan Simon | Flickr
32. Lichens (on veteran trees): Usnea articulata on dead hawthorn twigs | Usnea articulata (… | Flickr
33. Limestone fern: Gymnocarpium robertianum, Nr. Killour, Mayo | Sam Thomas | Flickr
34. Liquorice Piercer Moth: Grapholita pallifrontana | Exemplar found: Russia, Moscow Ob… | Flickr
35. Long-Leaved Helleborine: Miekkavalkku, narrow-leaved helleborine (Cephalanthera lon… | Flickr
36. Lousewort flea beetle: no image
37. Meadow Ant Hoverfly: Microdon devius, North Wales, June 2016 | Janet Graham | Flickr
38. Meadow Clary: Meadow sage - Salvia pratensis | Björn S... | Flickr
39. Military Orchid: Military orchid - Orchis militaris | Björn S... | Flickr
40. Monkey Orchid: Monkey Orchid Orchis simia | Parkgate Kent | Len Worthington | Flickr
41. Montagu's Harrier (cropped image): A Montagu's Harrier in flight | A migratory raptor from Cent… | Flickr
42. Moths of Dyer's Greenweed: no image
43. Mountain Bulin snail (cropped image and rotated): Ena montana | gastropods.wordpress.com/2017/07/07/photo-of-t… | Flickr
44. Nightingale: Nightingale | Mathijs van Lisdonk Photography | Flickr
45. Noble chafer: Noble Chafer - Gnorimus nobilis on Meadowsweet | WWT Grafton… | Flickr
46. Otter: old world otter eating a fish | A picture of an otter | Flickr
47. Silver Spotted Skipper: silver spotted skipper - Hesperia comma | Thanks to Hippobos… | Flickr
48. Small Blue butterfly - Small Blue | Cupido minimus - Pitstone, Buckinghamshire, UK,… | Flickr
49. Snail killing fly: Sciomyza dryomyzina male - Brook Meadow, Warwickshire 2009… | Flickr
50. Southern Damselfly: Southern Damselfy at rest | At a location in the New Forest | Flickr
51. Spider (Tuberta maerens): no image
52. Stone Curlew: Alcaravão | Alcaravão Burhinus oedicnemus Eurasian Thick-kne… | Flickr
53. Striped Lychnis Moth: Striped lychnis caterpillar 2a - Shargacucullia lychnitis | Flickr
54. Swifts and House martins: Gierzwaluw - Apus apus | Gierzwaluw - Apus apus | Flickr and House Martin | An archive shot from the Romney Marsh, during… | Flickr and Tornseglare i holk | Fem dagar efter uppsättning sitter en t… | Flickr and House Martin (Delichon urbicum) | The photos contained in th… | Flickr
55. Turtle Dove: Turtle Dove (Streptopelia turtur) ... Sutton Bank , York… | Flickr
56. Water Vole: Water Vole | Seen at the British Wildlife Centre, Newchapel,… | Flickr
57. White Admiral: Väikelumik; Limenitis camilla; White Admiral | Tirbiku, Lään… | Flickr
58. White Clawed Crayfish: White-footed Crayfish (Austropotamobius pallipes) | Aquarium… | Flickr
59. White letter hairstreak: White-Letter Hairstreak | At Brockholes | HELEN M BUSHE | Flickr
60. Willow Tit: Willow Tit | Willow Tit - Parus montanus - Пухляк Russia, Mo… | Flickr
61. Wood White butterfly: Leptidea sinapis-reali 170717 116.jpg | Jürgen Mangelsdorf | Flickr

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Appendix A

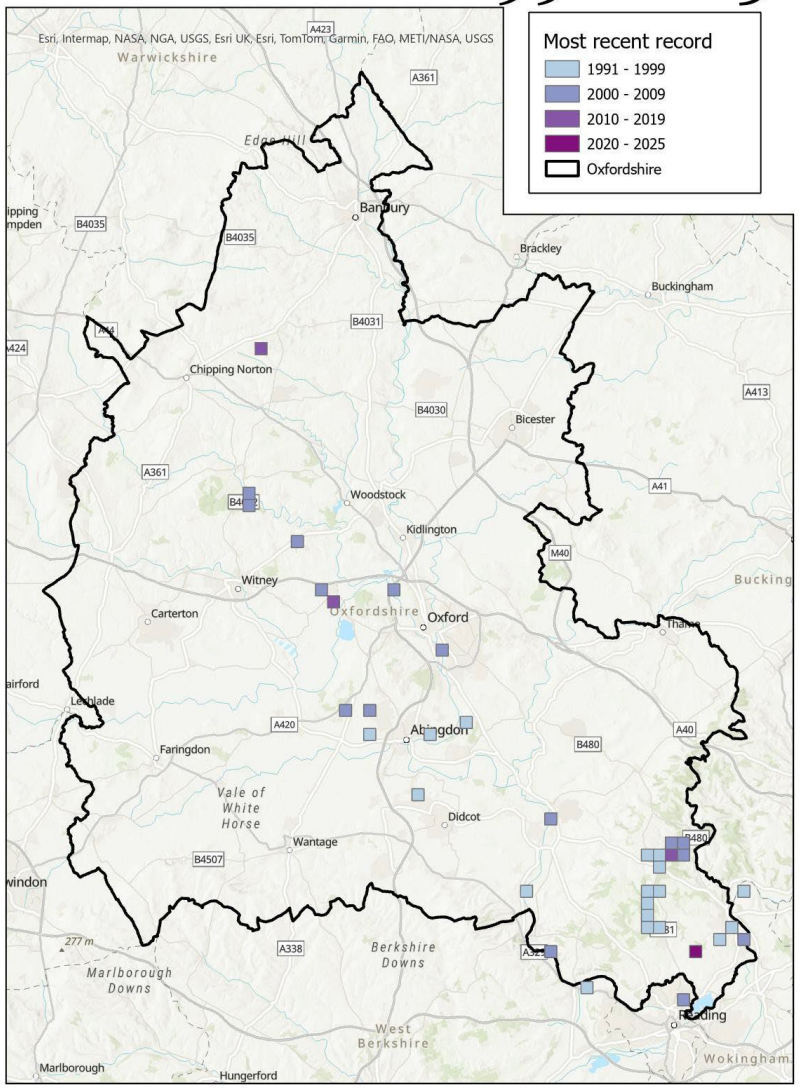
This list shows all the species from Oxfordshire's LNRS Species Priorities List in alphabetical order by their common or group name

- Adder
- Barberry Carpet Moth
- Bats
- Beaver
- Beetle of Autumn Gentian
- Bittern (and Marsh Harrier)
- Black Poplar trees
- Blackthorn butterflies
- Breeding waders
- Cigarello Gall-Fly
- Clubbed general soldierfly
- Common lizard
- Creeping Marshwort
- Curlew
- Dark Green Fritillary
- Desmoulin's Whorl Snail
- Devil's bit scabious (and Marsh fritillary)
- Downy Woundwort
- Duke of Burgundy Butterfly
- Dung specialists and dung beetles
- Ellipteroides alboscutellatus
- Farmland Birds
- Fen violet
- Fish
- Fungi and fungi-associated plants found with woodland
- Great Crested Newt
- Greater Water-Parsnip
- Hazel dormouse
- Hedgehog
- Juniper
- Lichens (on veteran trees)
- Limestone fern
- Liquorice Piercer Moth
- Lousewort flea beetle
- Long-Leaved Helleborine
- Meadow Ant Hoverfly
- Meadow Clary
- Military Orchid
- Monkey Orchid
- Montagu's Harrier
- Moths of Dyer's Greenweed
- Mountain Bulin snail
- Nightingale
- Noble chafer
- Otter
- Silver Spotted Skipper
- Small Blue butterfly
- Snail killing fly
- Southern Damselfly
- Spider (Tuberta maerens)
- Stone Curlew
- Striped Lychnis Moth
- Swifts and House martins
- Tawny Owl
- Turtle Dove
- Water Vole
- White Admiral
- White Clawed Crayfish
- White Letter Hairstreak
- Willow Tit
- Wood White butterfly

Appendix B

The full set of distribution maps for each and all the species on this Species Priority List. On the following pages you can see the maps that are linked to from the list of species above. The maps indicate where each species or group of species has previously been recorded in the county. It does not mean that actions to support species has to be taken only in those locations. Instead the purpose of these maps is to enable people to get a sense of whether the action is likely to be relevant in their area of the county. If these species are found in other areas of the county in future, the LNRS supports you to take the relevant species-specific actions in those locations too.

Adder records 1990-2025



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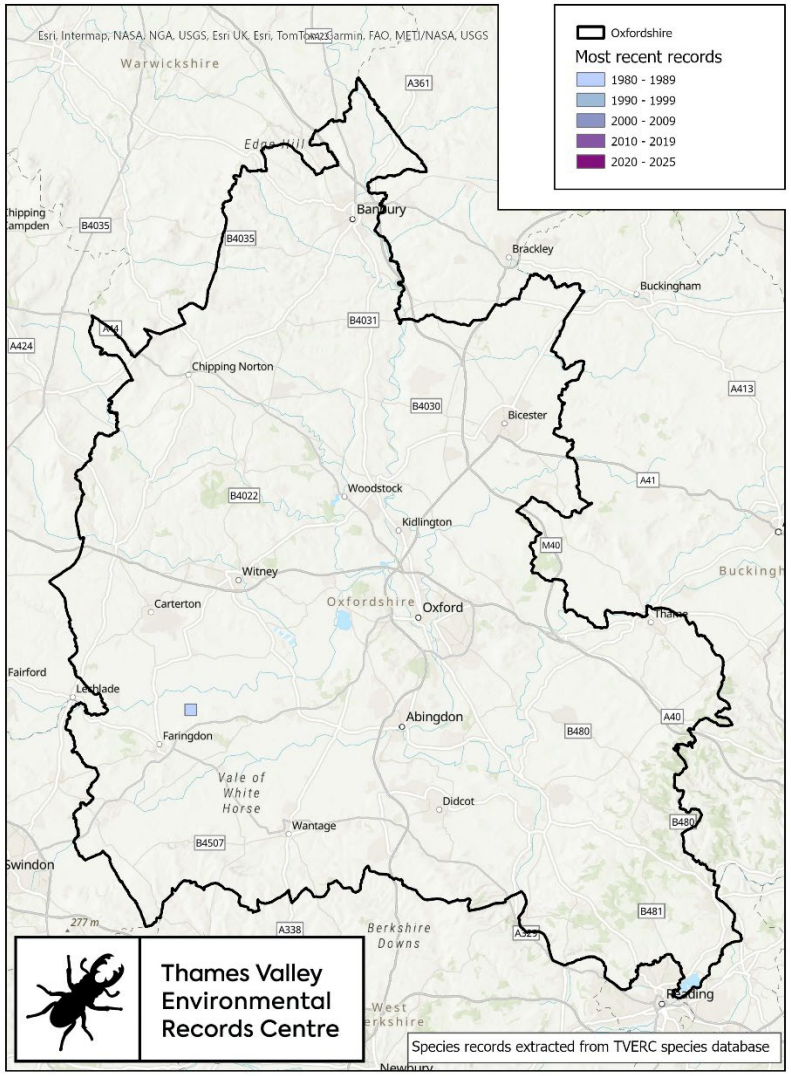
Barberry Carpet Moth records 1980-2025



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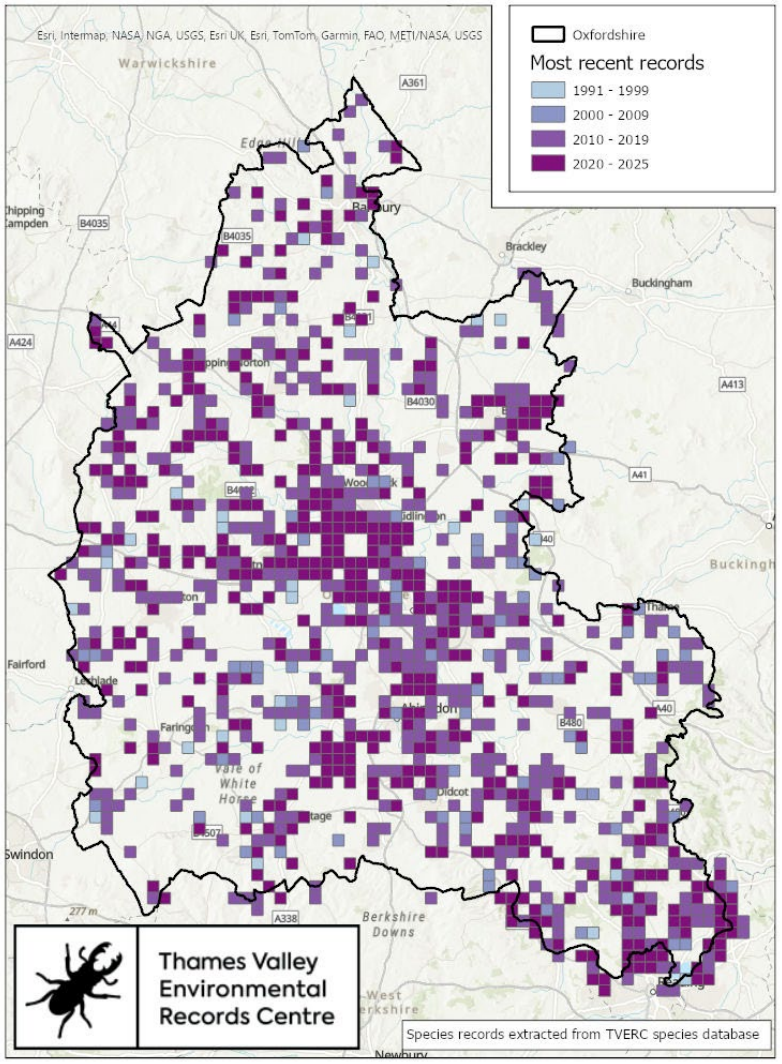
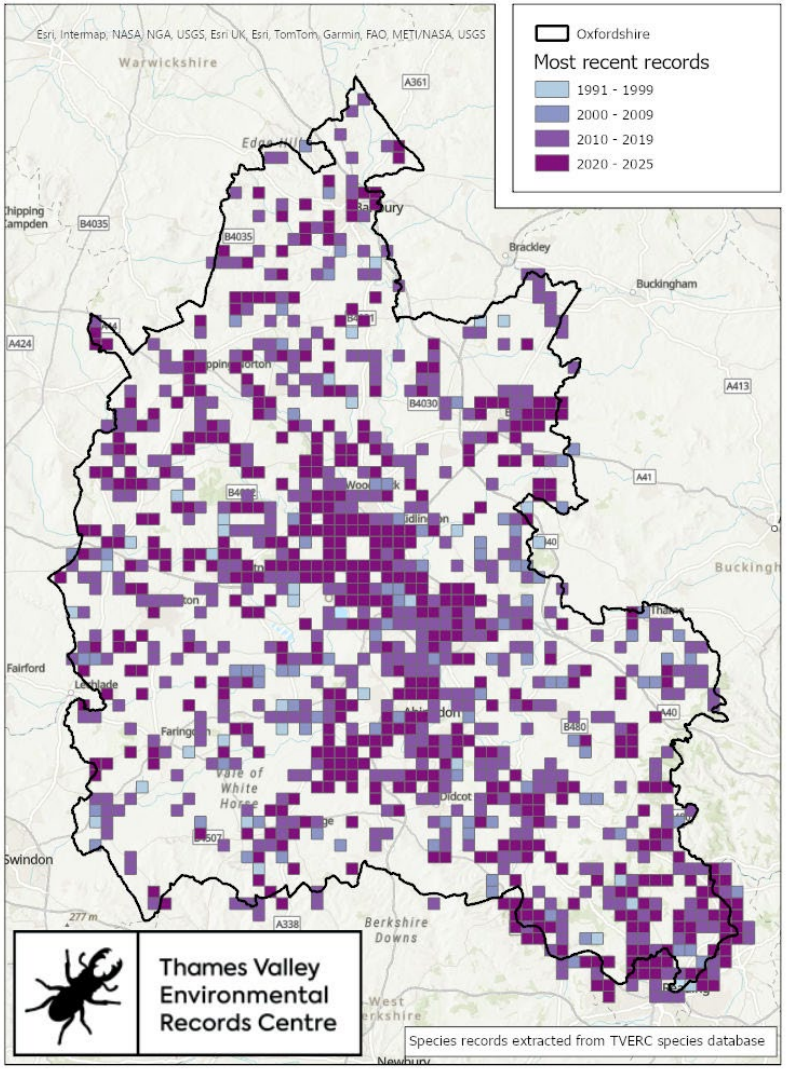
Bat (woodland specialists) records 1990-2025



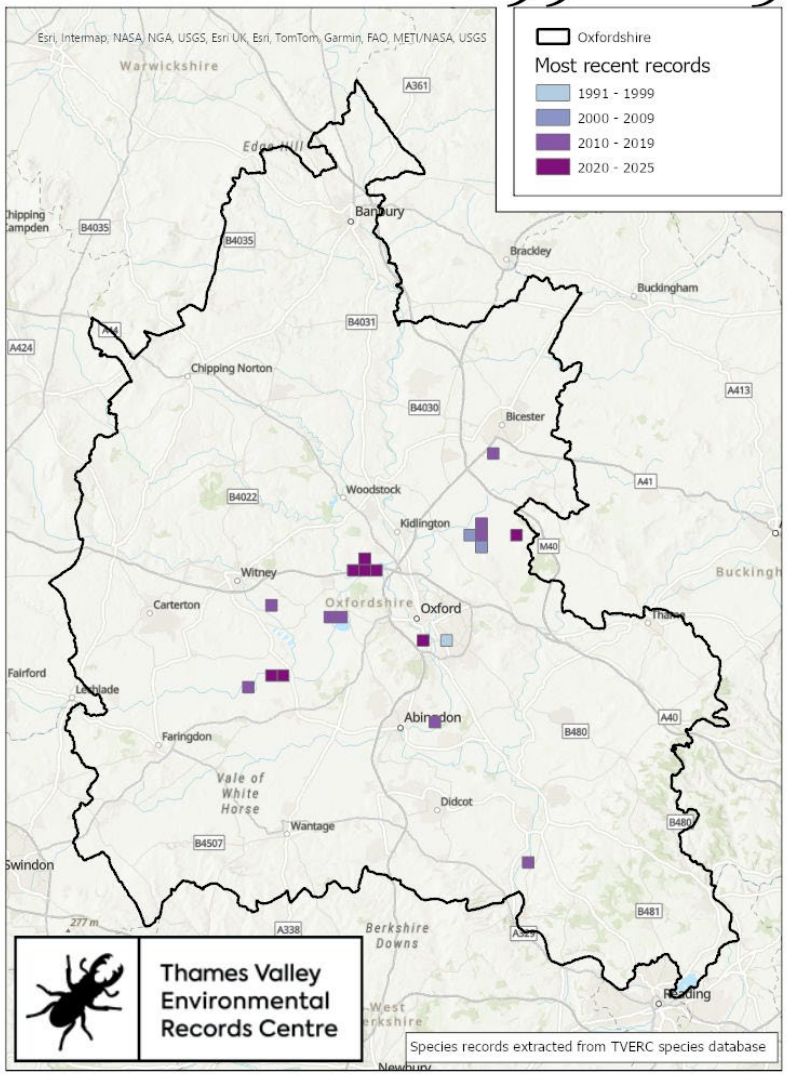
Return to list

Bats (general) records 1990-2025



Return to list

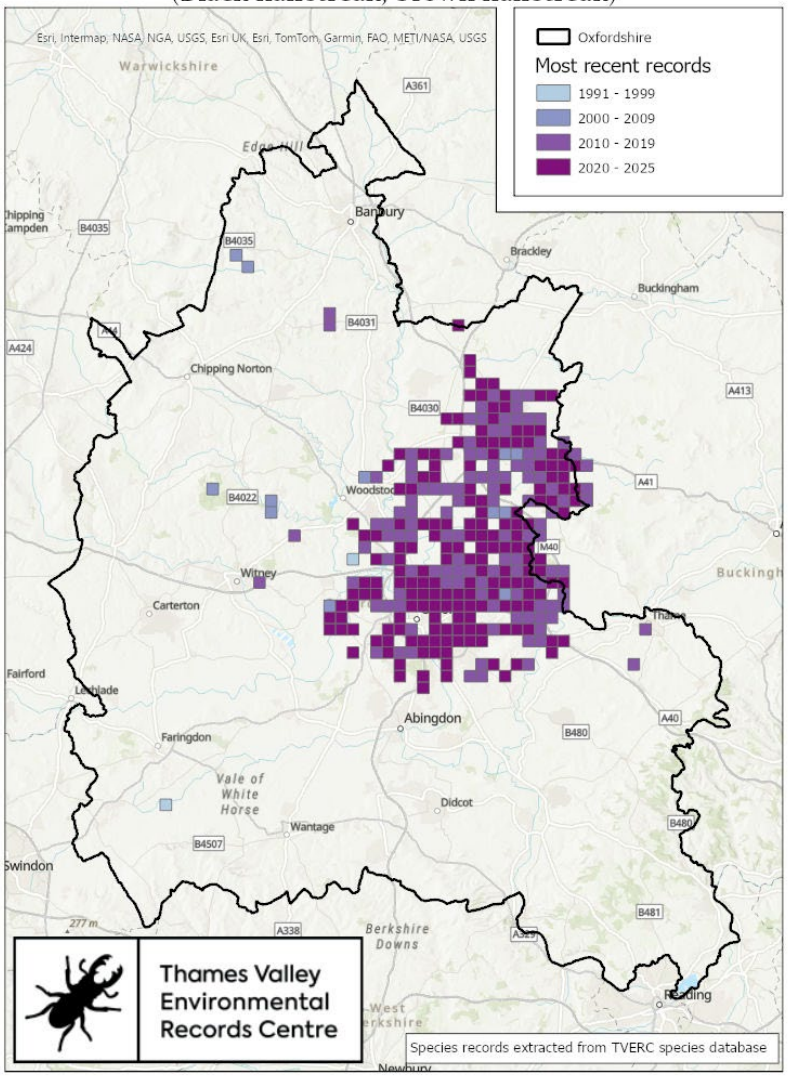
Bittern records 1990-2025



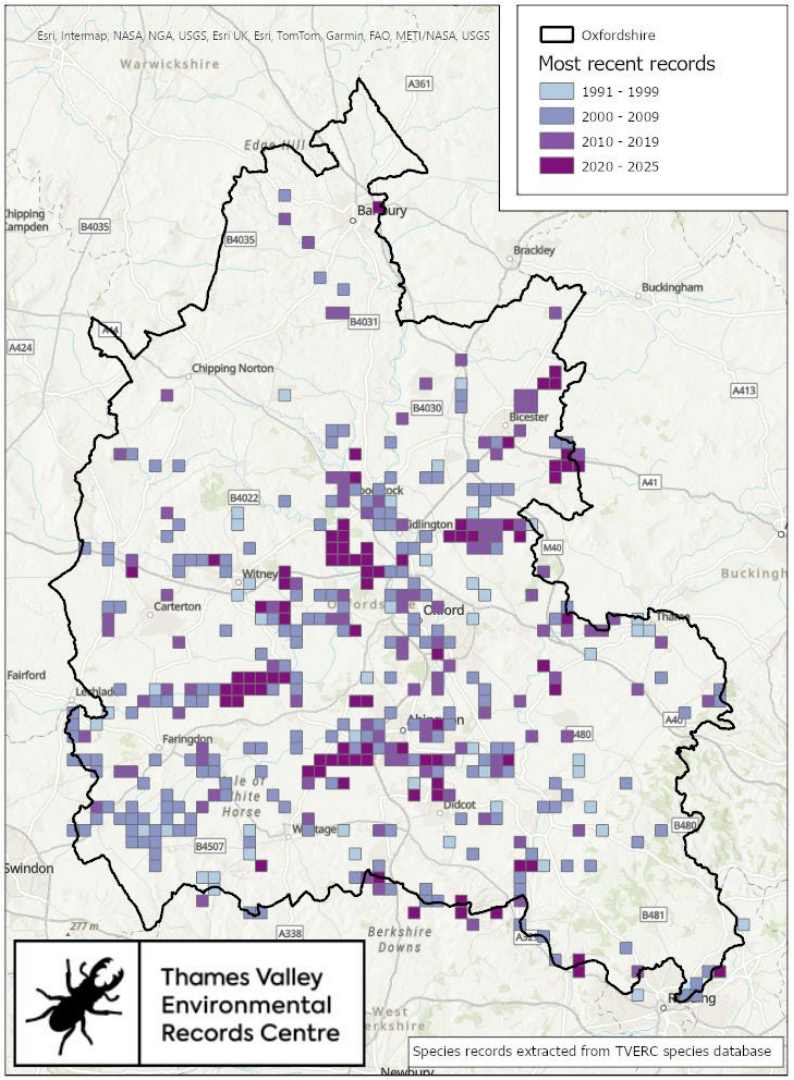
Return to list

Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

Blackthorn butterflies records 1990-2025
(Black hairstreak, brown hairstreak)



Breeding Waders records 1990-2025
(Lapwing, crane, snipe, redshank)



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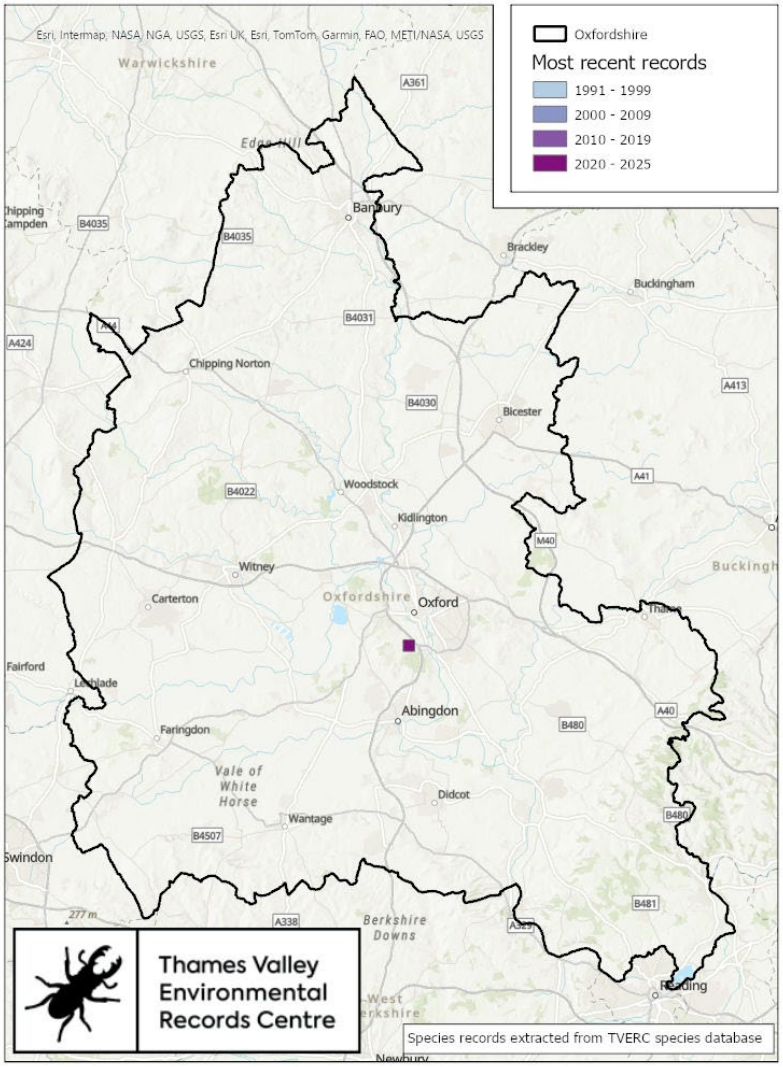
Cigarillo gall-fly records 1990-2025



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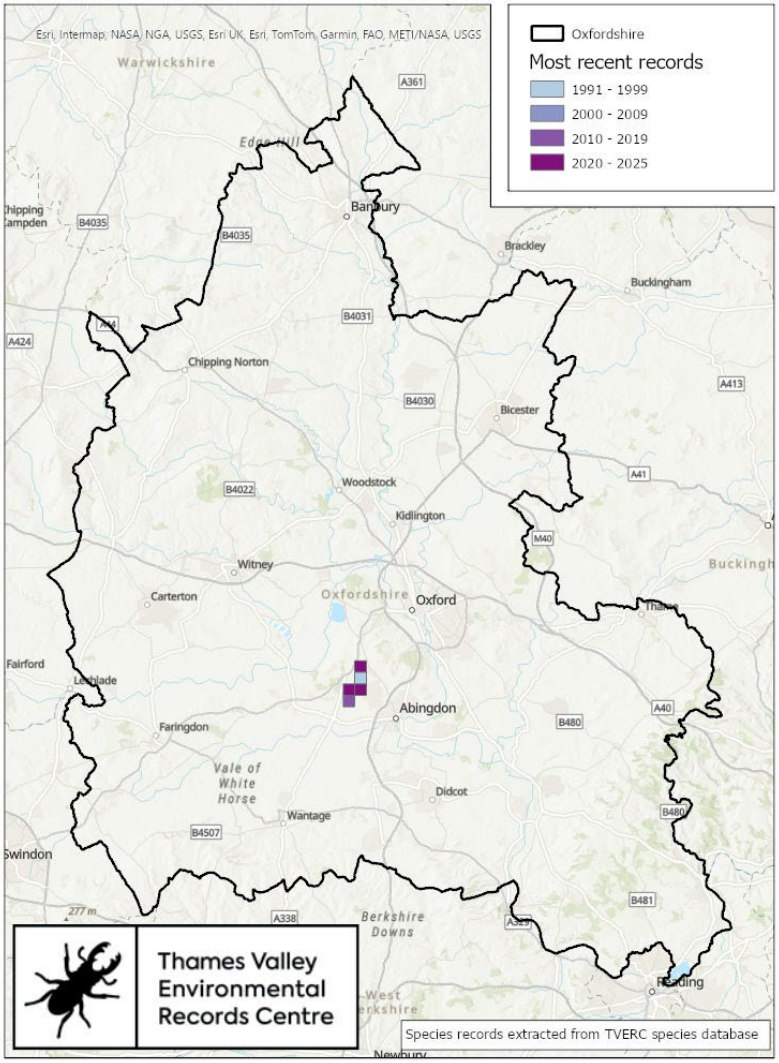
Clubbed general soldierfly records 1990-2025



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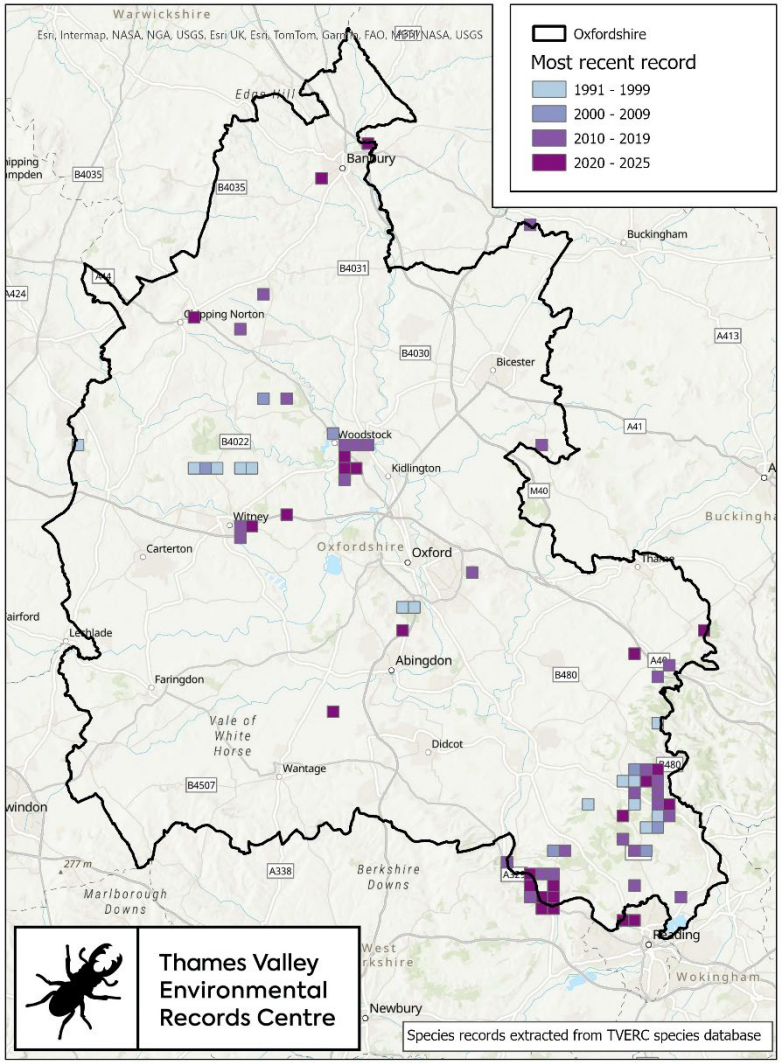
Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

Hazel dormouse records 1990-2025



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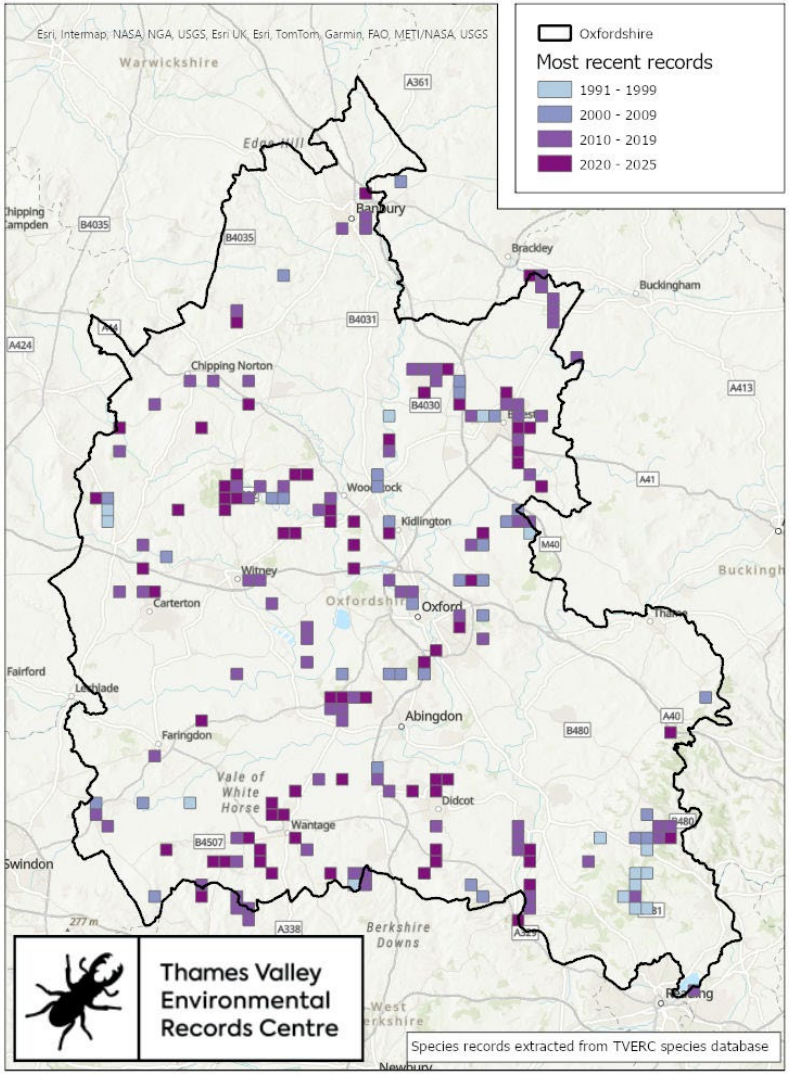
Common lizard records 1990-2025



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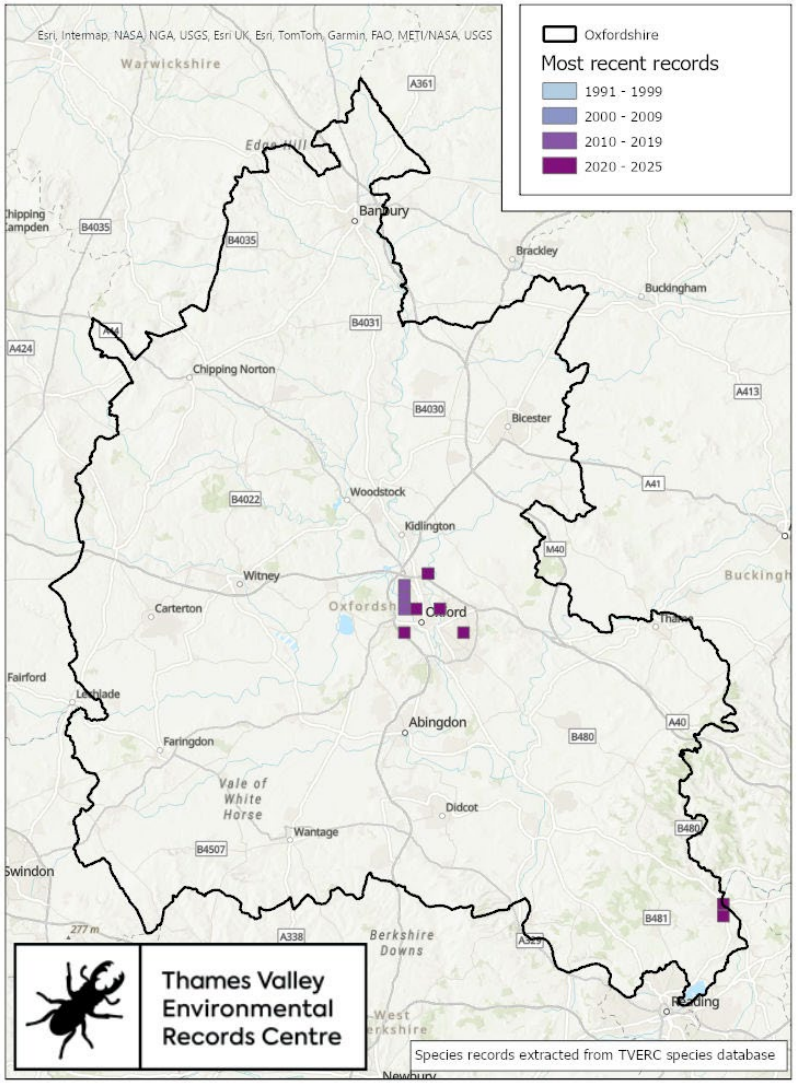
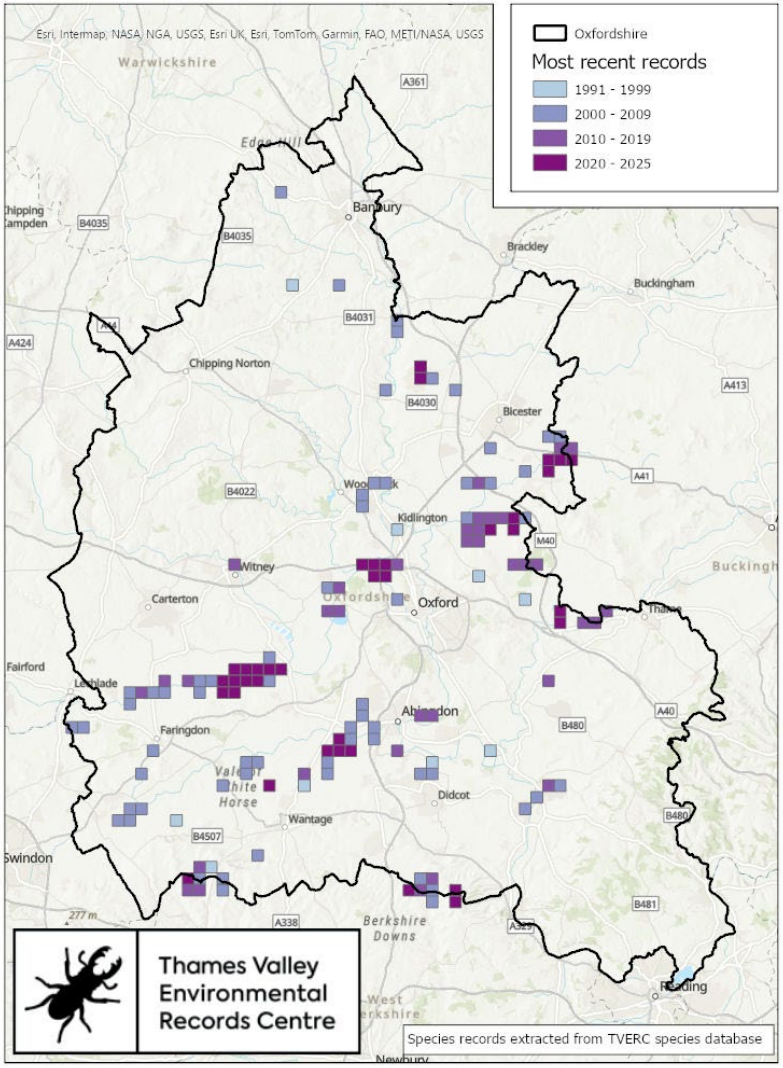
Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

Creeping Marshwort records 1990-2025



Curlew records 1990-2025



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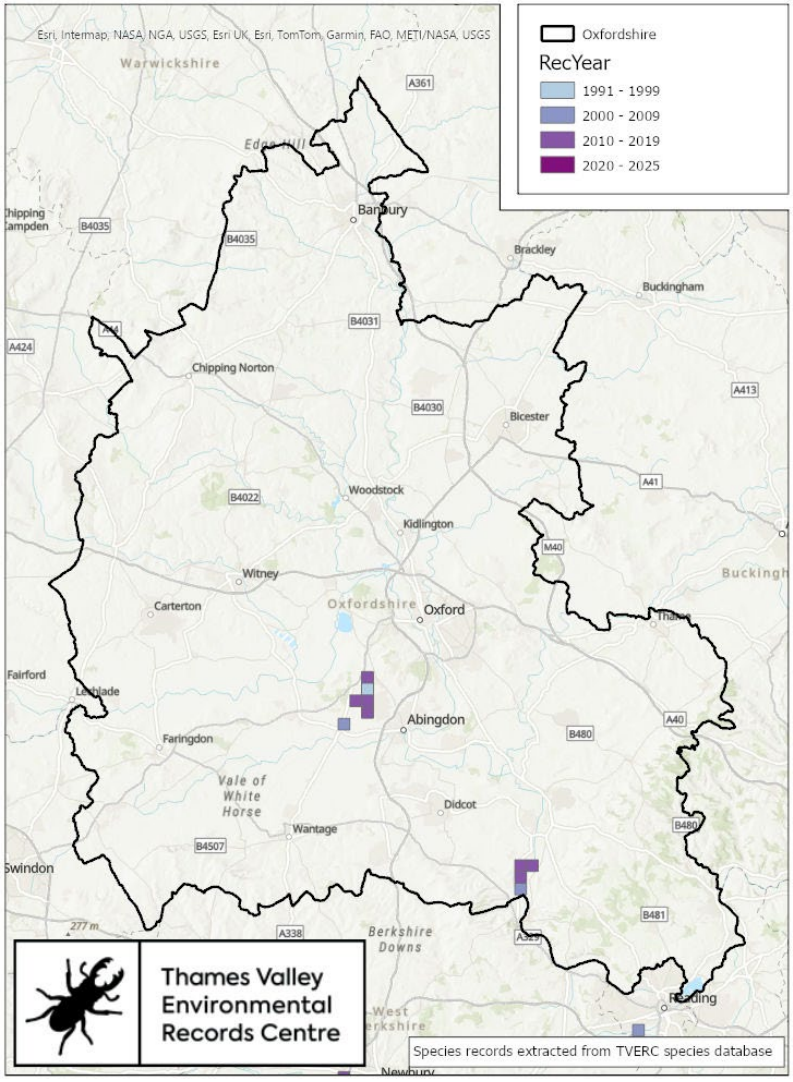
Desmoulin's Whorl Snail records 1990-2025



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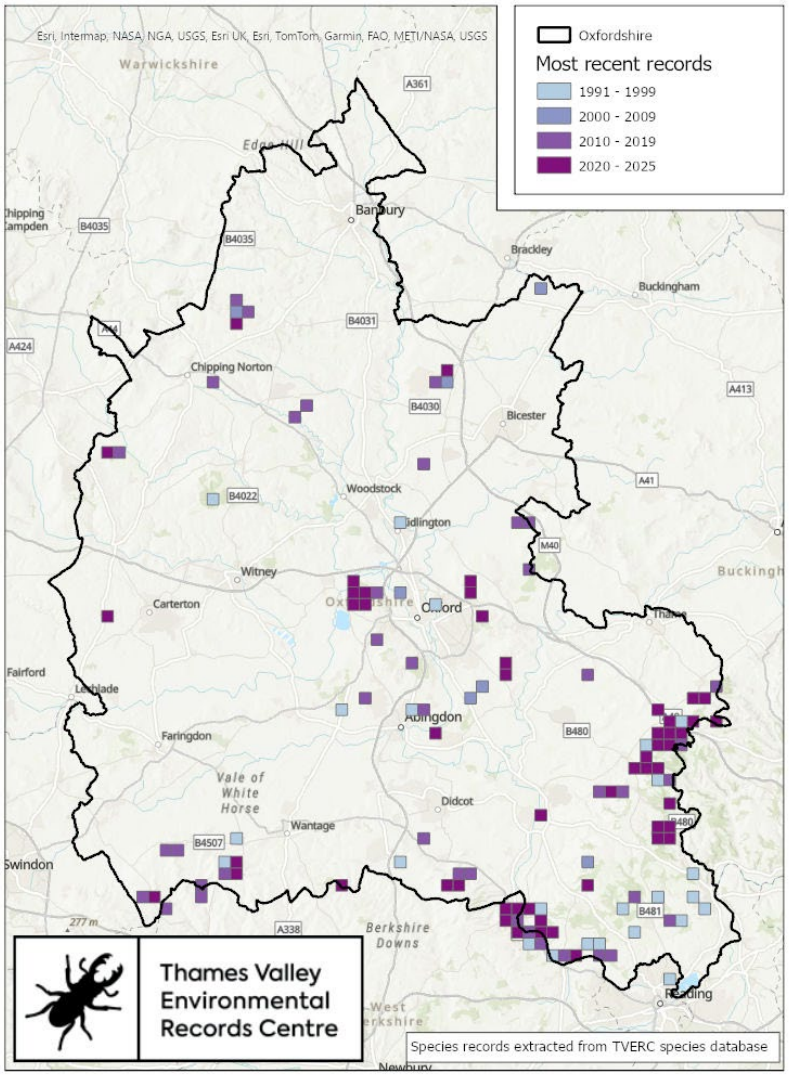
Dark Green Fritillary records 1990-2025



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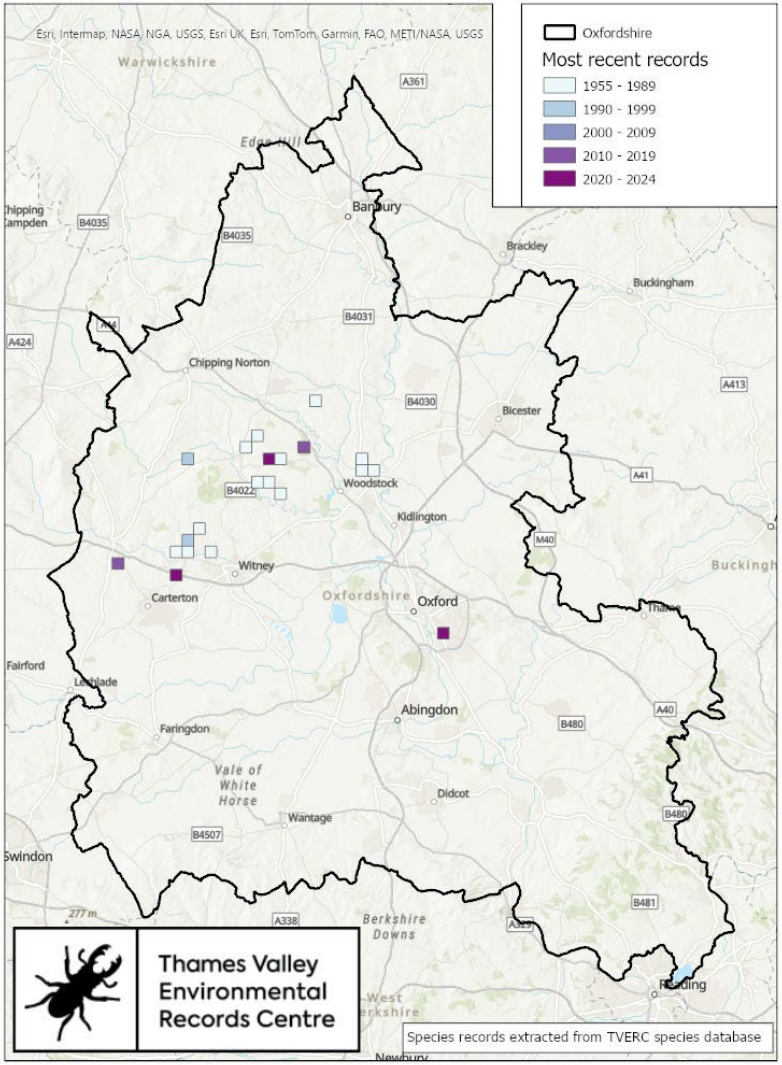
Downy Woundwort records 1950-2025



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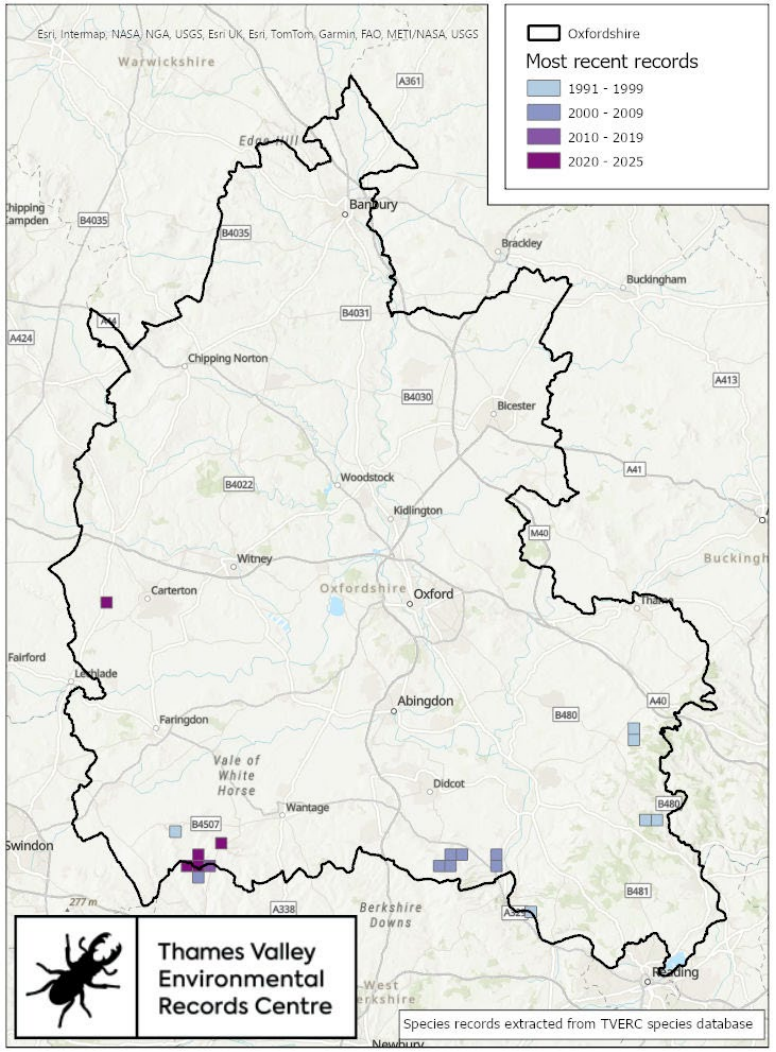
Duke of Burgundy records 1990-2025



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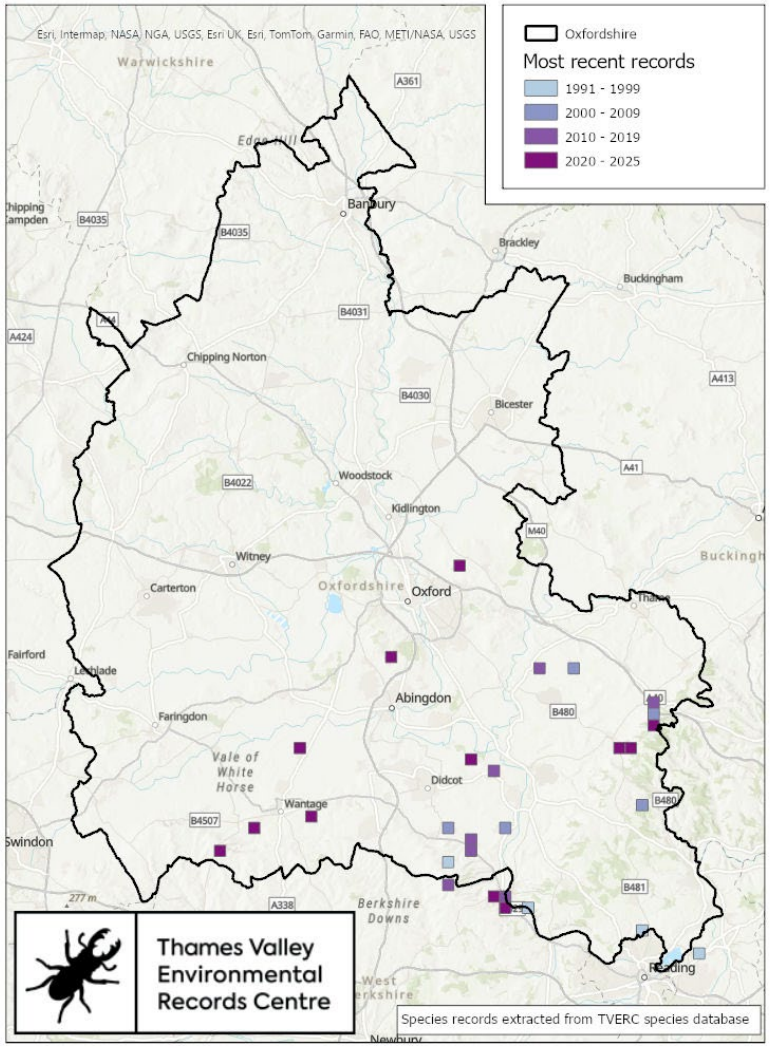
Dung specialists records 1990-2025

(Hornet robberfly, violet dor beetle)



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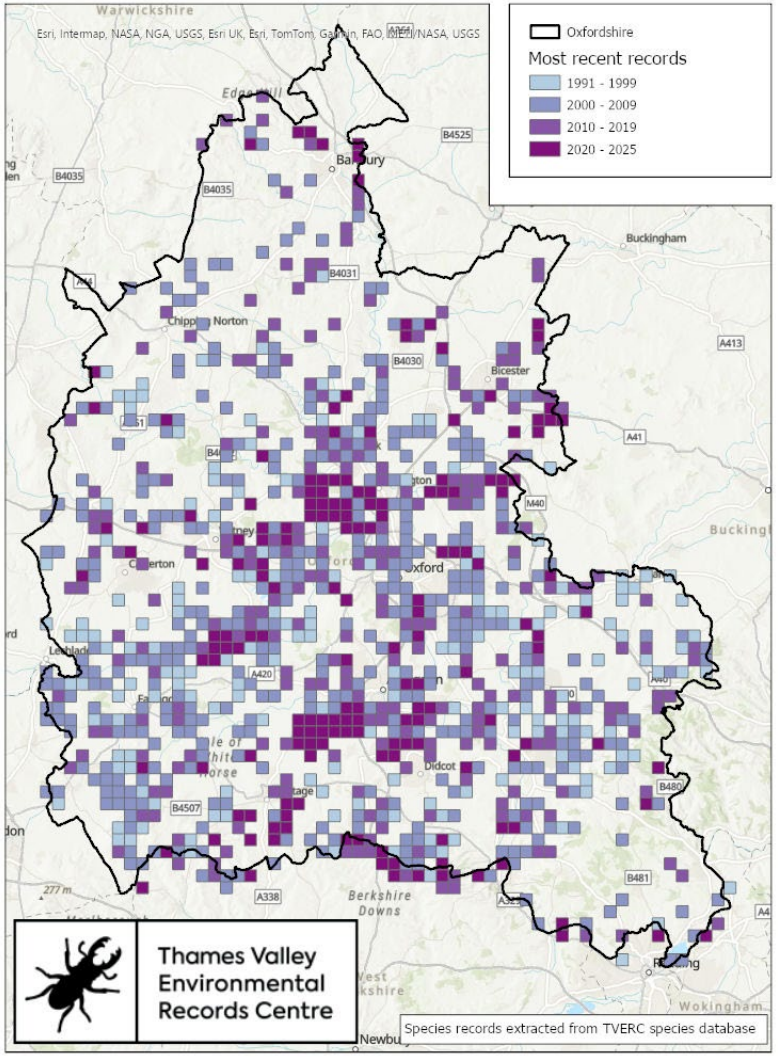
Farmland bird records 1990-2025

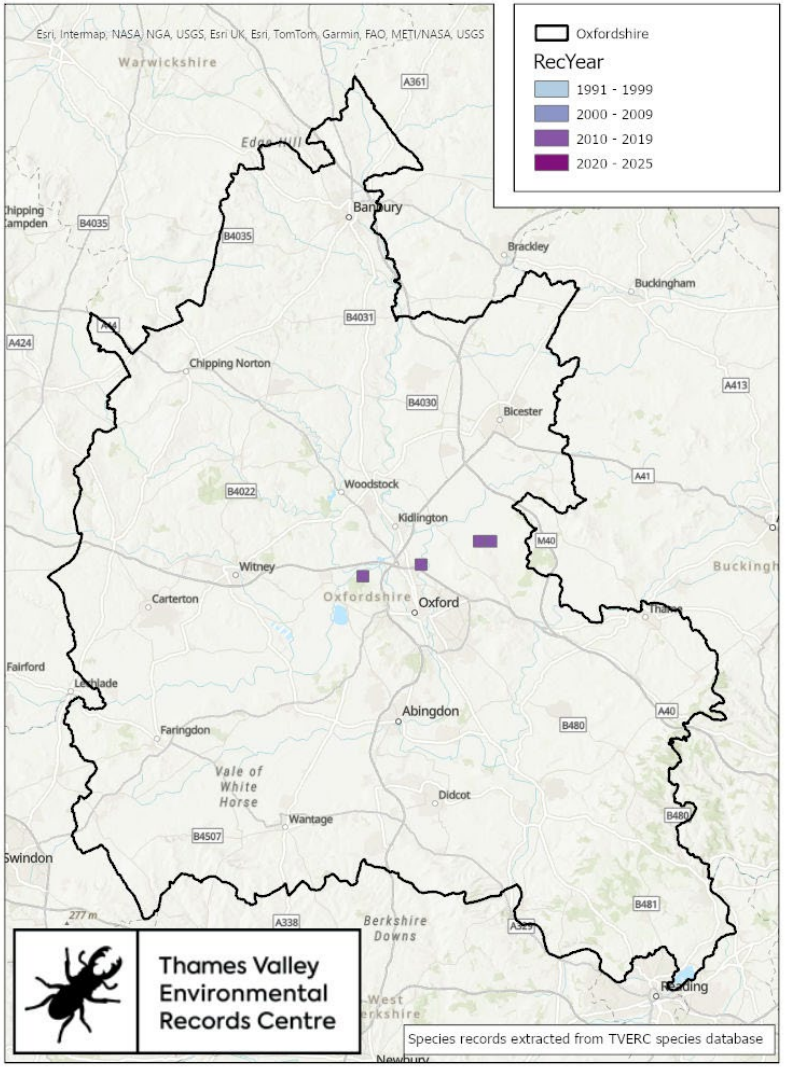
(Corn bunting, grey partridge, lapwing, linnet, tree sparrow, yellow wagtail, yellowhammer)



Return to list

Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

Fen Violet records 1990-2025



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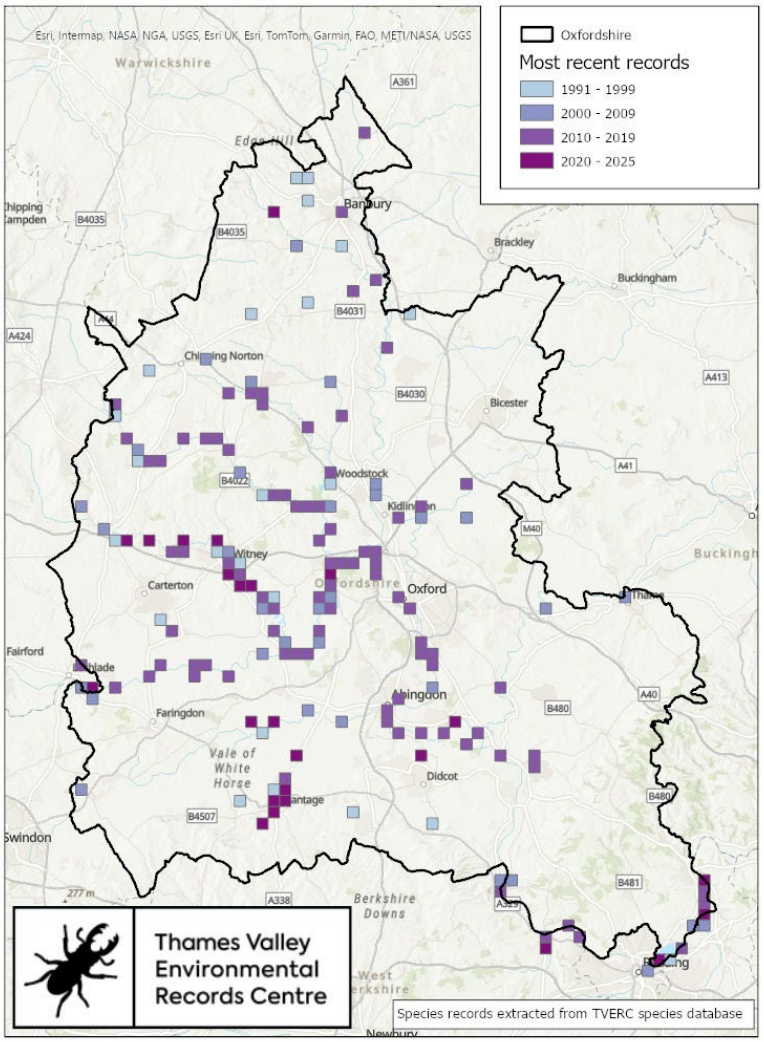
Fish records 1990-2025
(Brown trout, eel, grayling)



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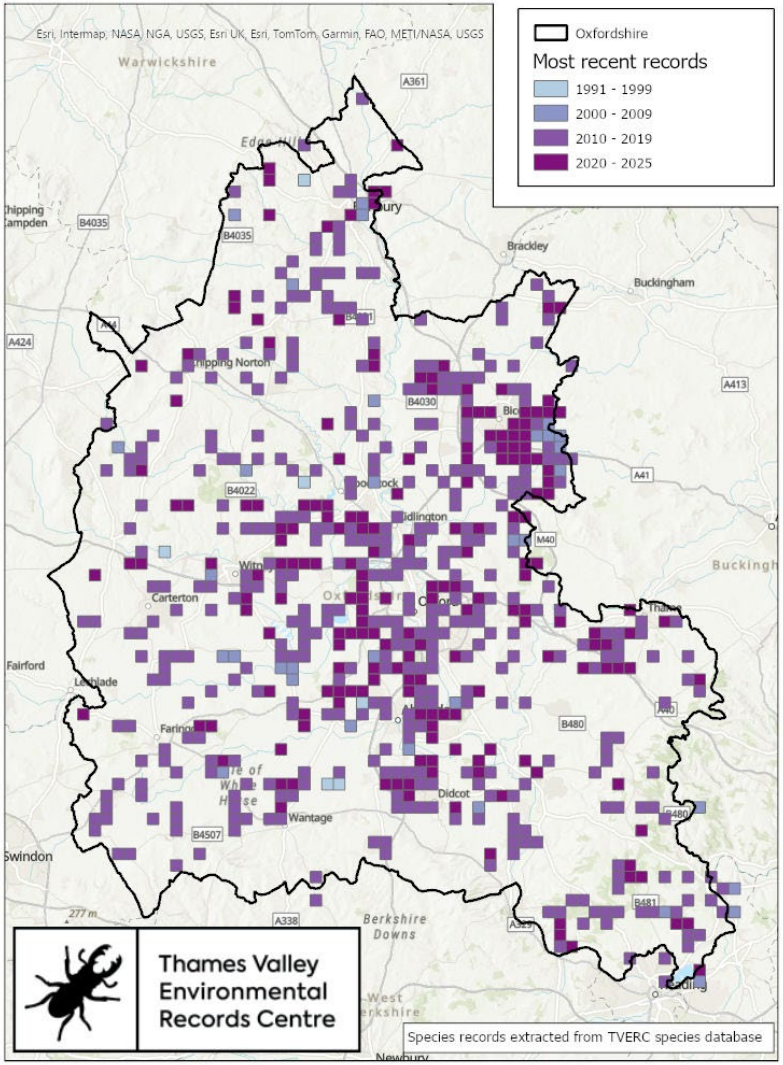
Great crested newt records 1990-2025



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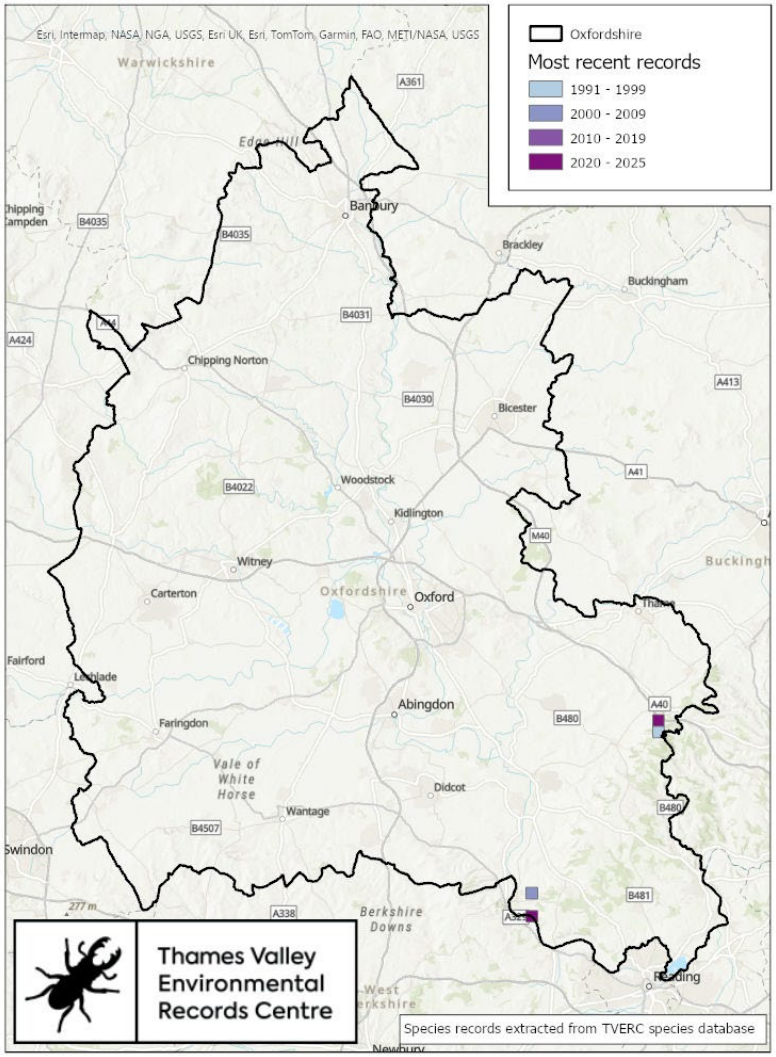
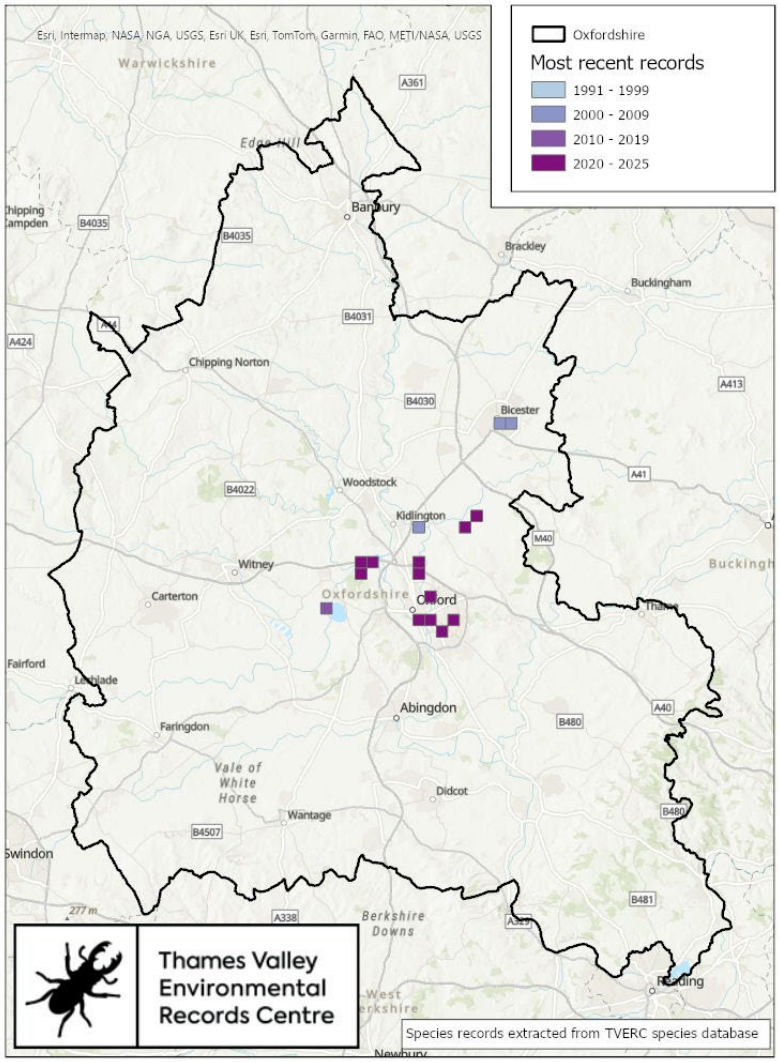
Gentian Beetle records 1990-2025



Return to list

Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

Greater Water-Parsnip records 1990-2025



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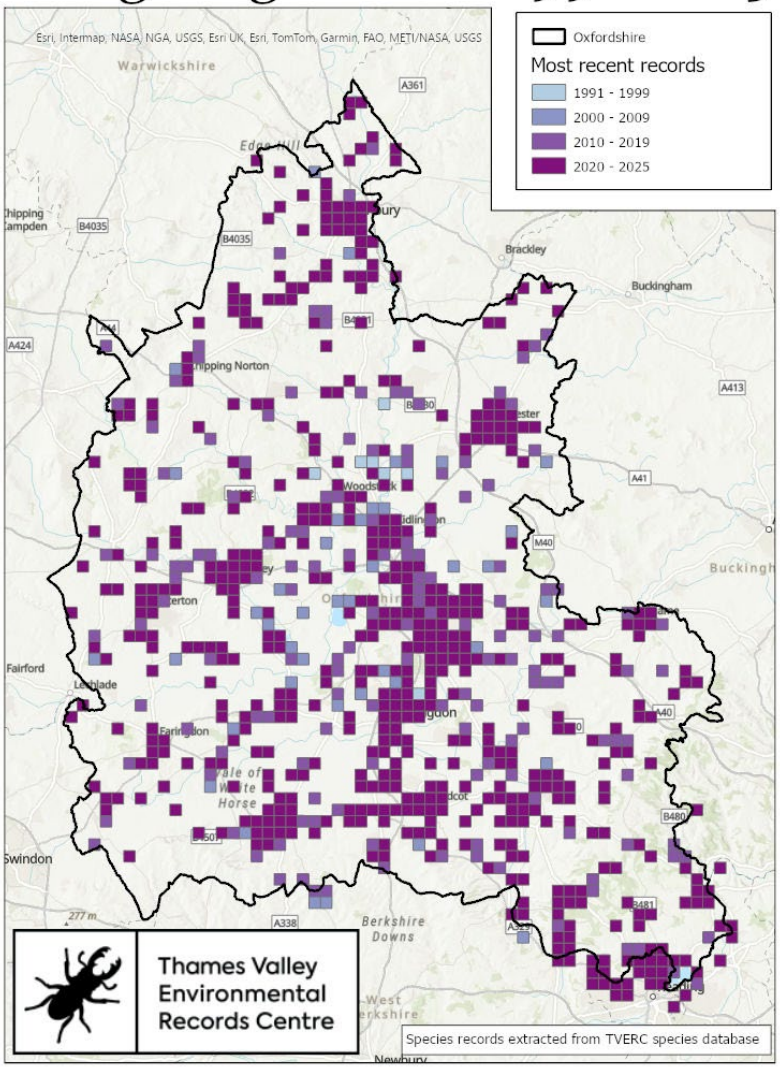
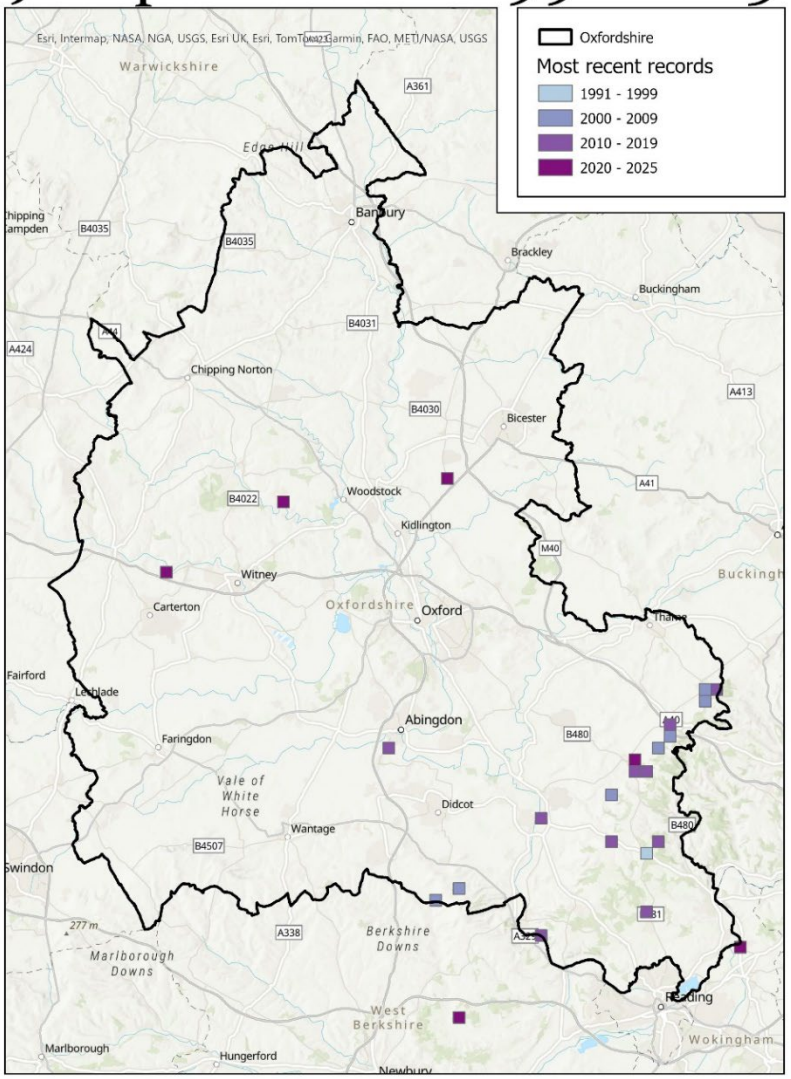
Hedgehog records 1990-2025



Return to list

Juniper records 1990-2025



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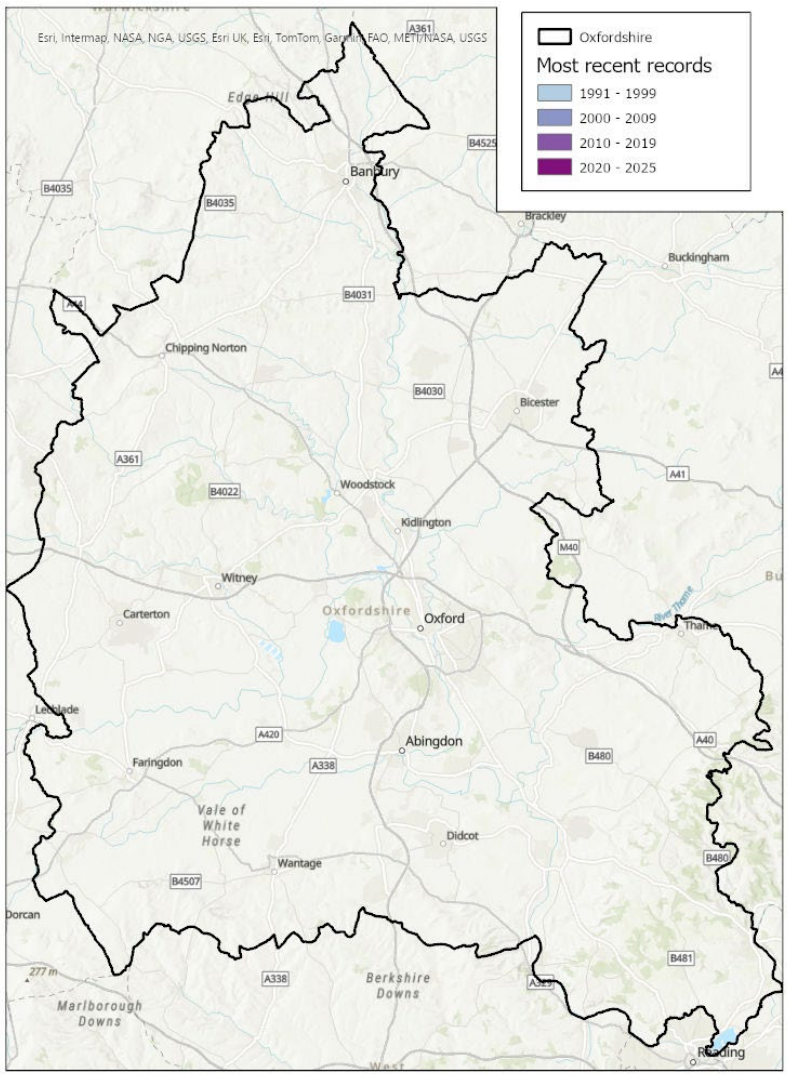
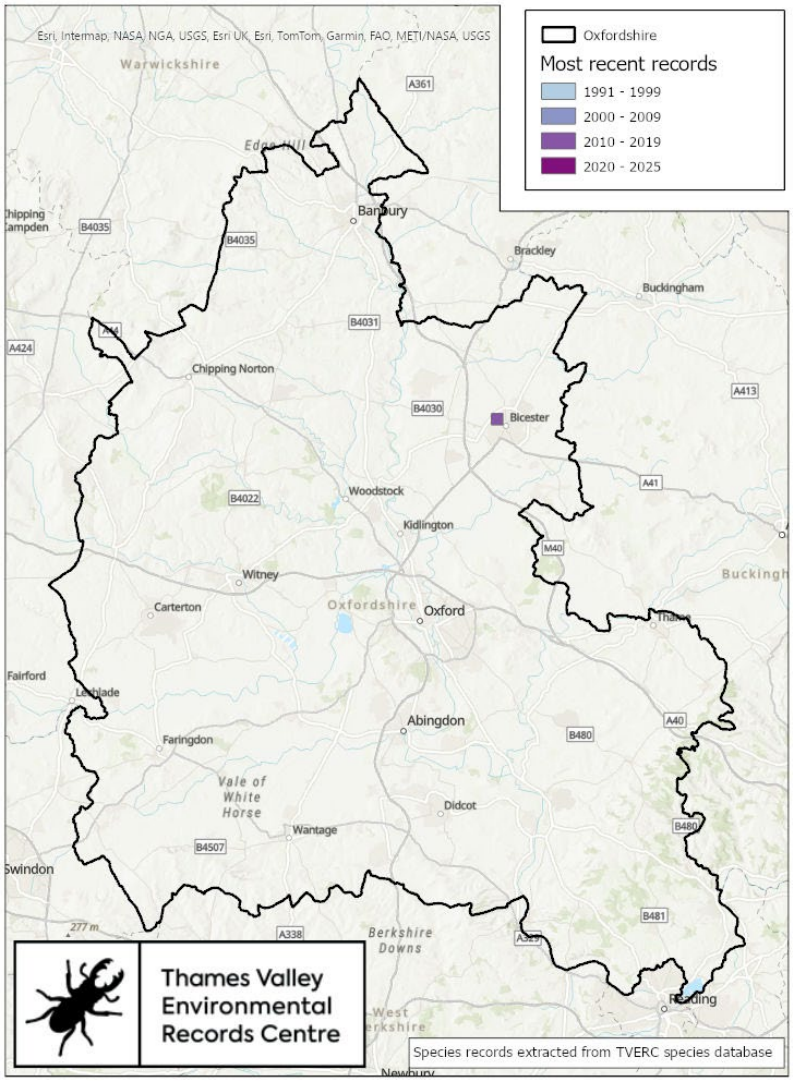
Long-Leaved Helleborine records 1990-2025



Return to list

Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

Limestone fern records 1990-2025



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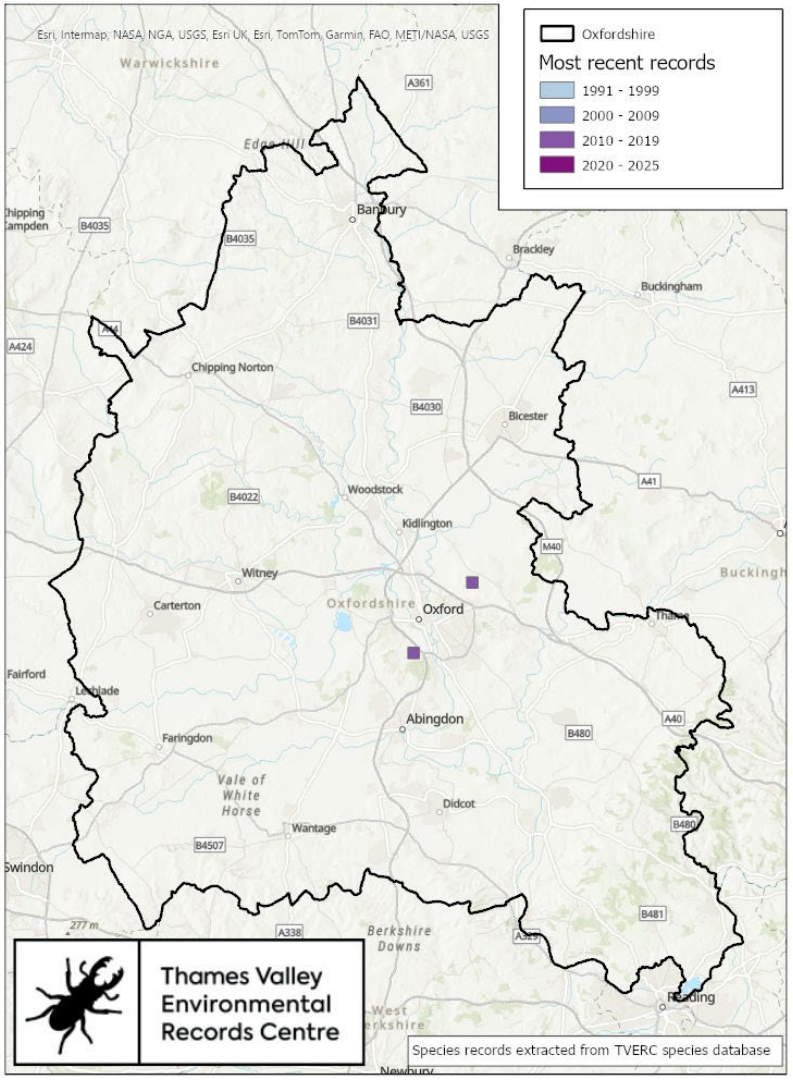
Liquorice piercer records 1990-2025



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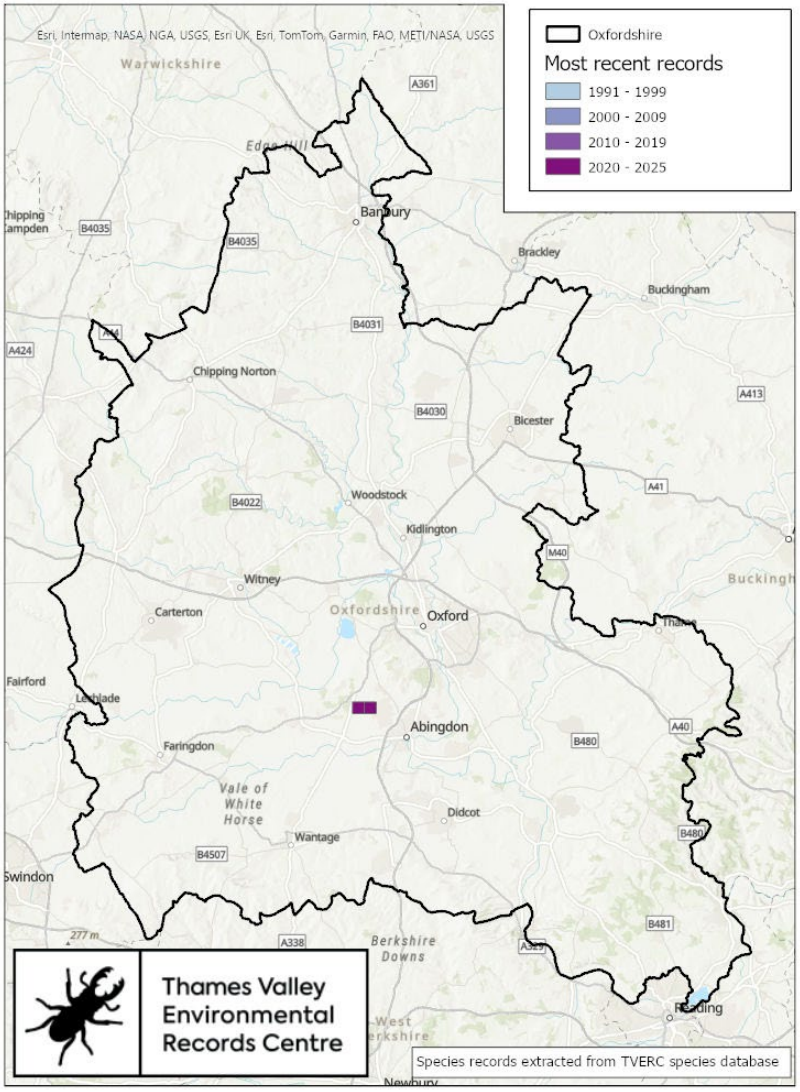
Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

Lousewort Flea Beetle records 1990-2025



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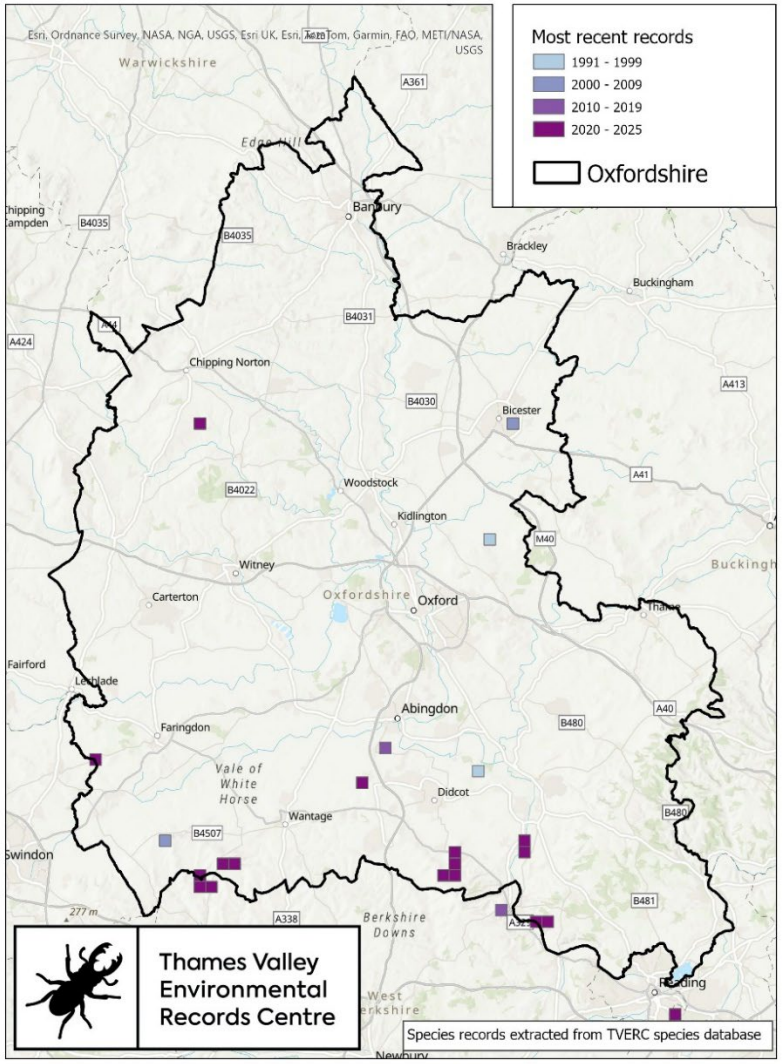
Marsh Fritillary records 1990-2025



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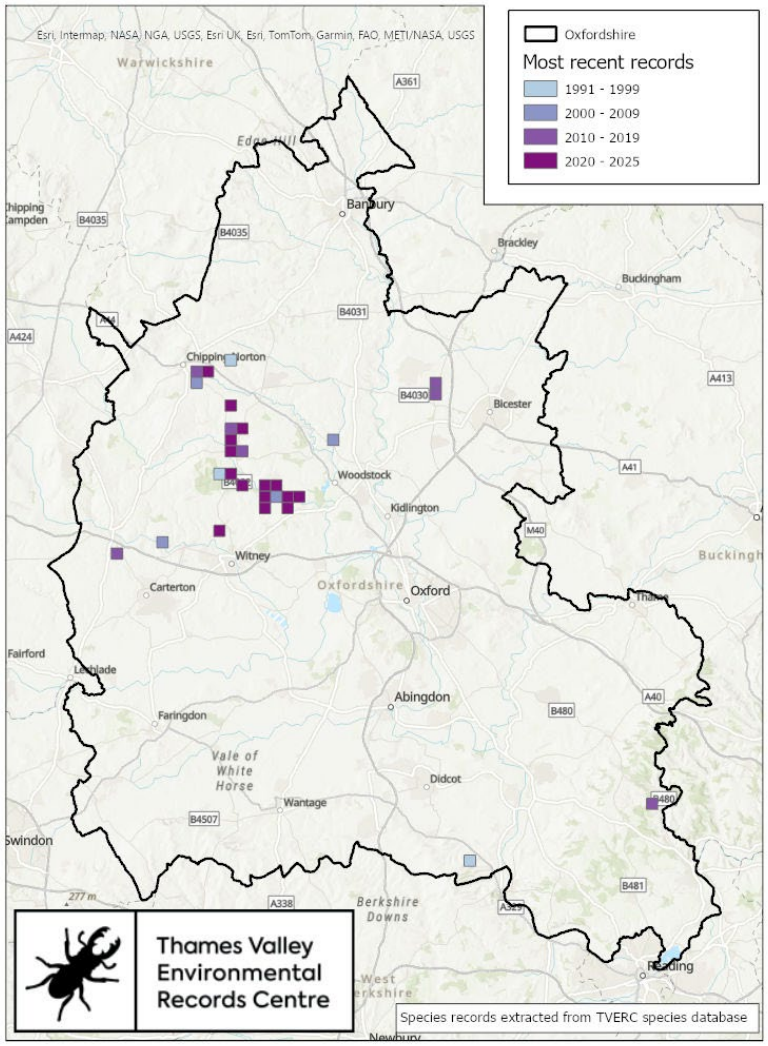
Meadow Clary records 1990-2025



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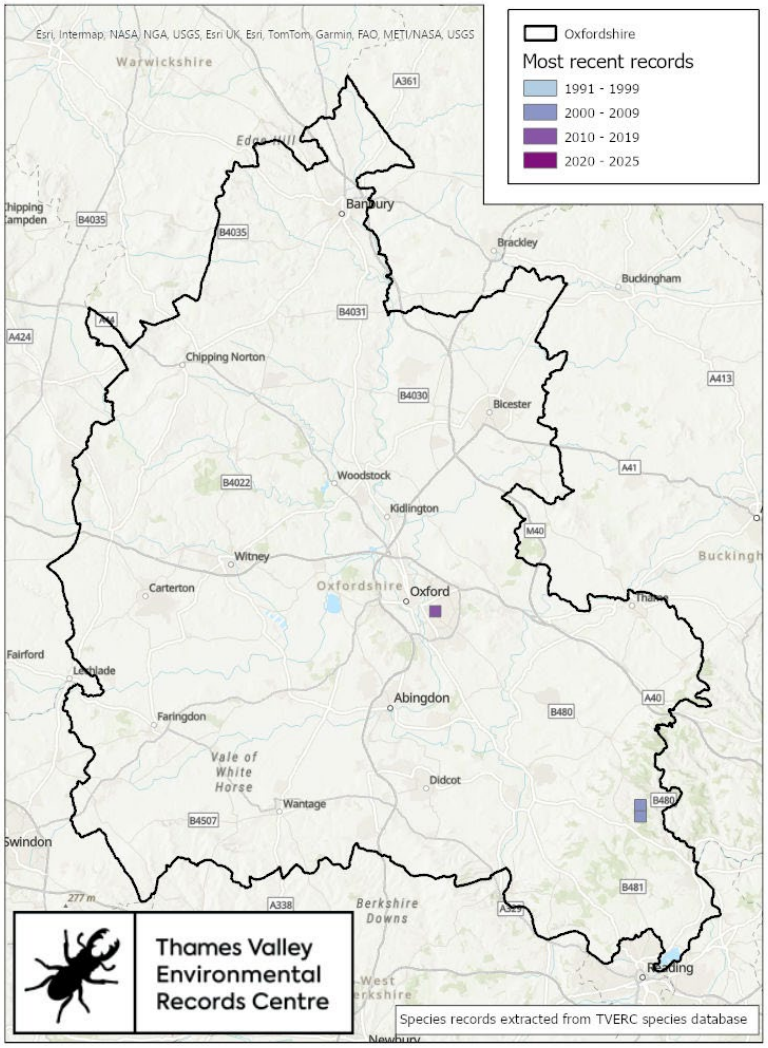
Yellow meadow ant hoverfly records 1990-2025



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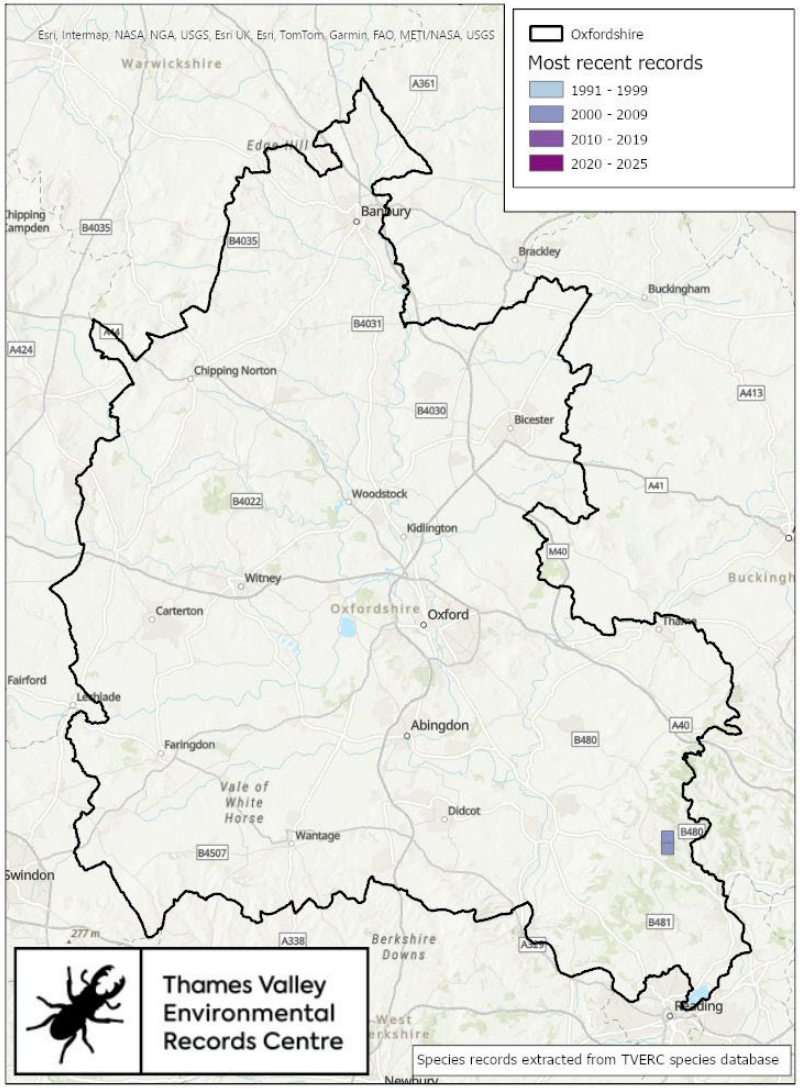
Military Orchid records 1990-2025



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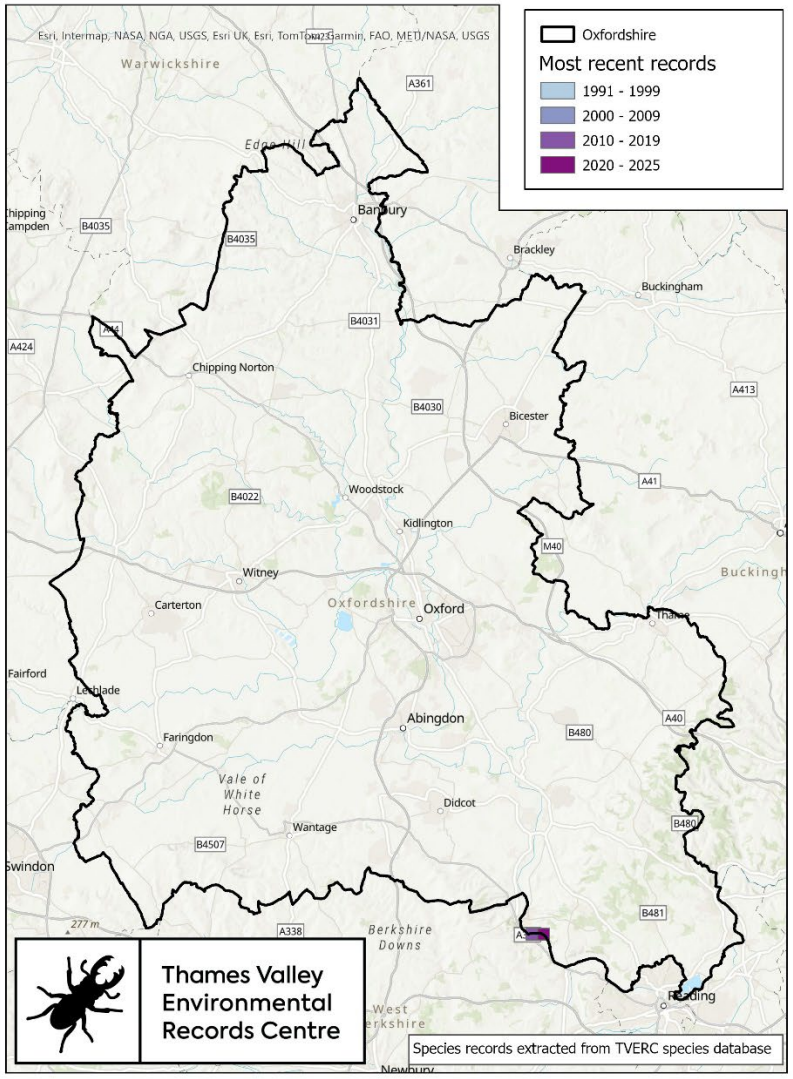
Monkey Orchid records 1990-2025



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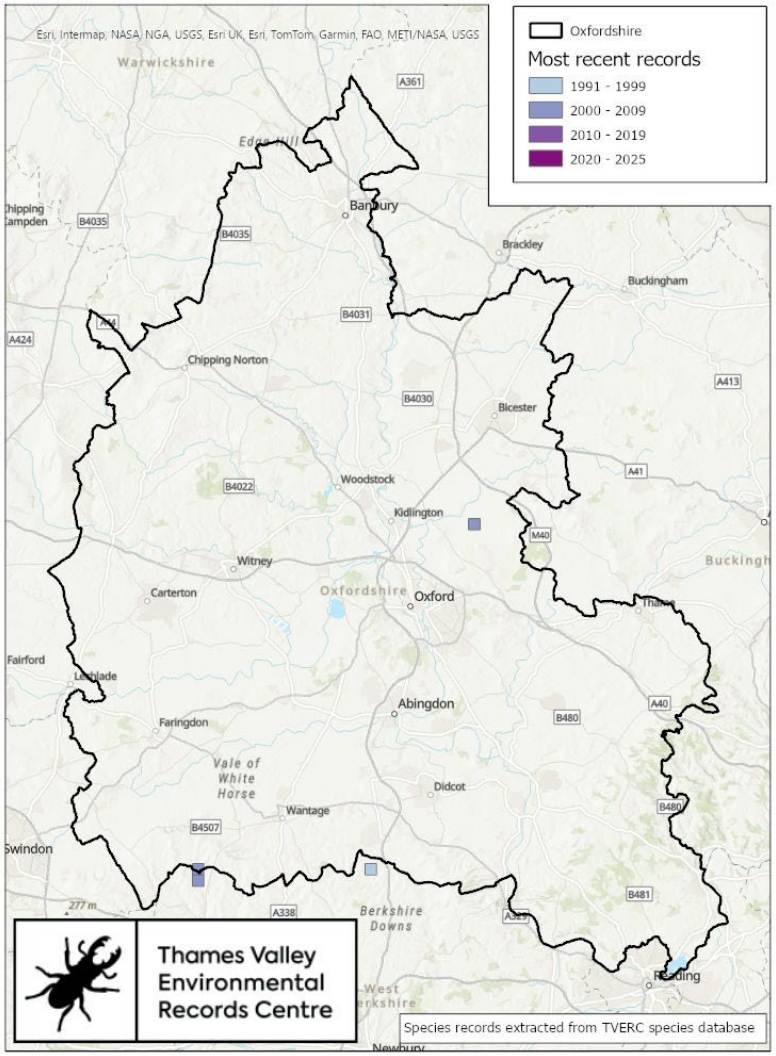
Montagu's Harrier records 1990-2025



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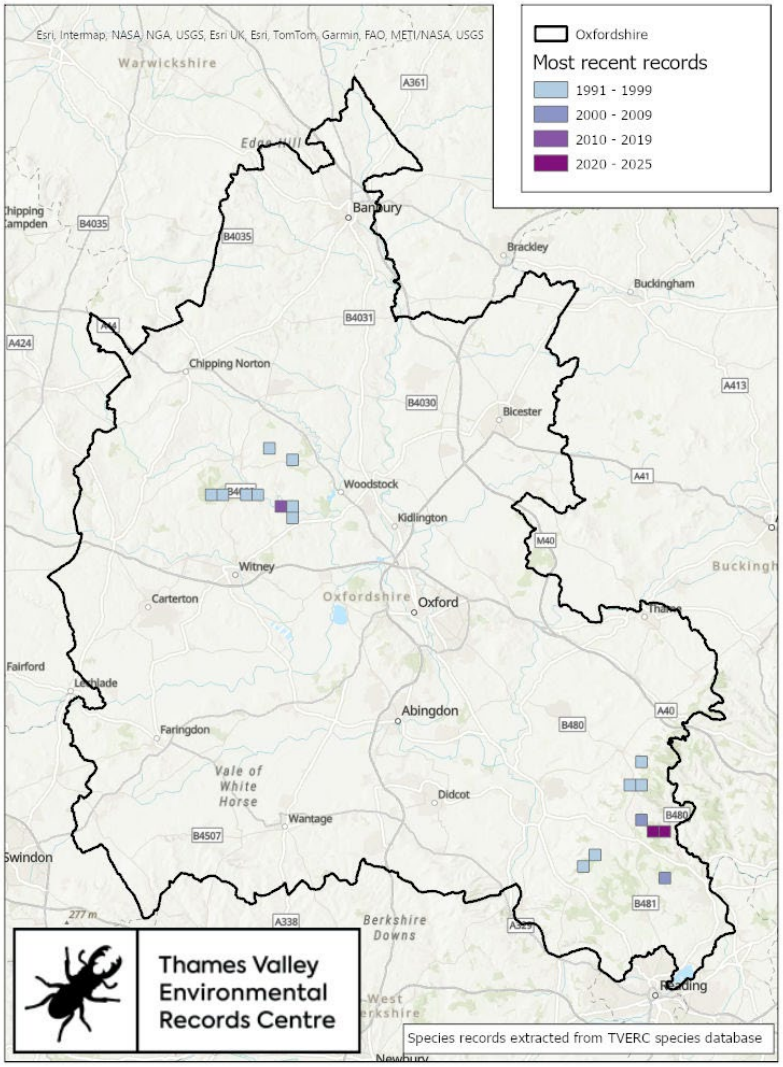
Mountain Bulin records 1990-2025



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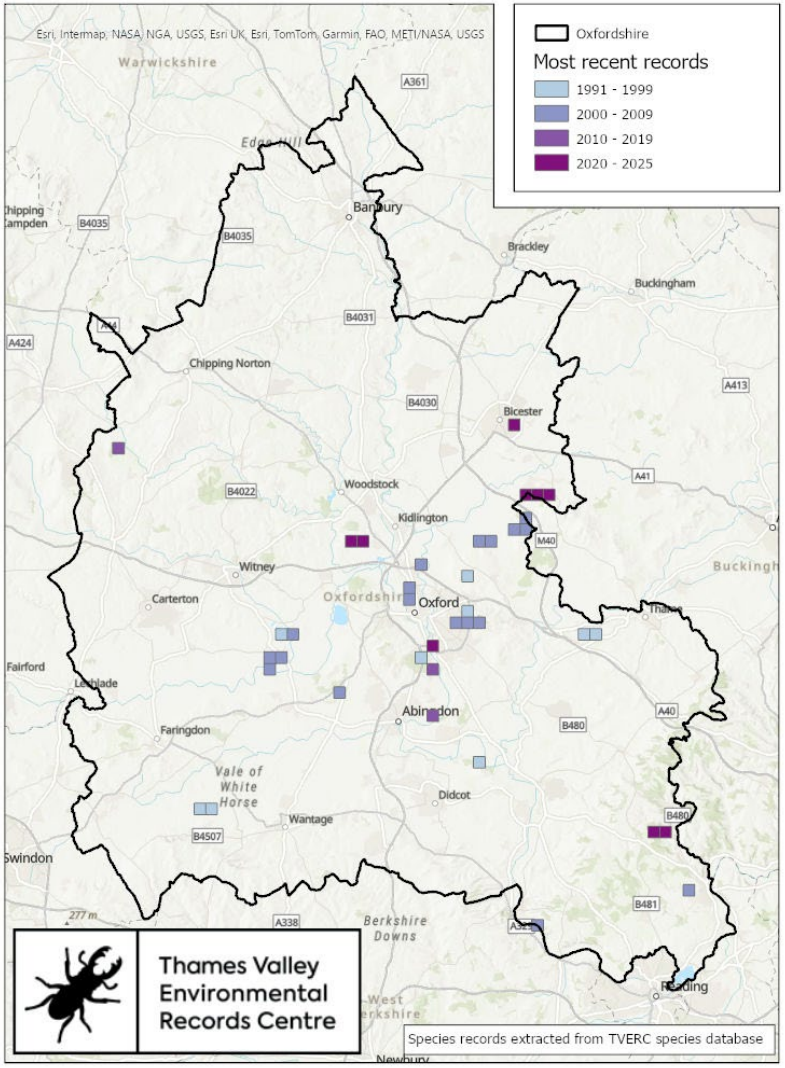
Nightingale records 1990-2025



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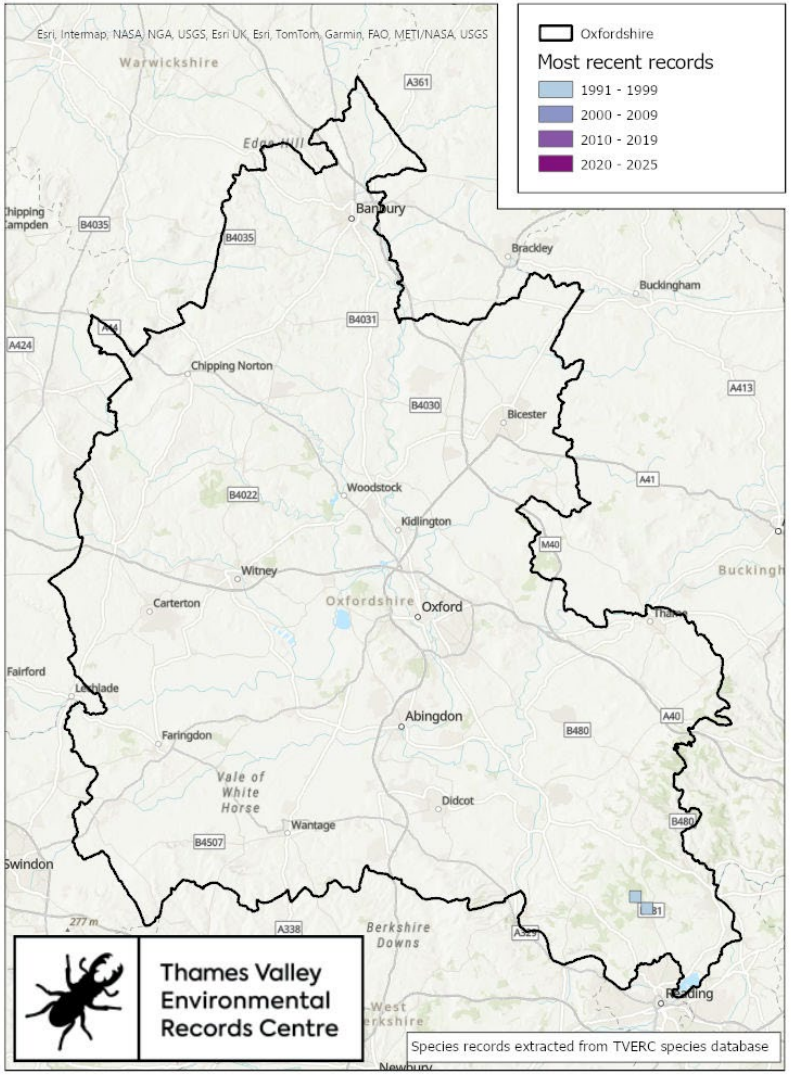
Noble chafer records 1990-2025



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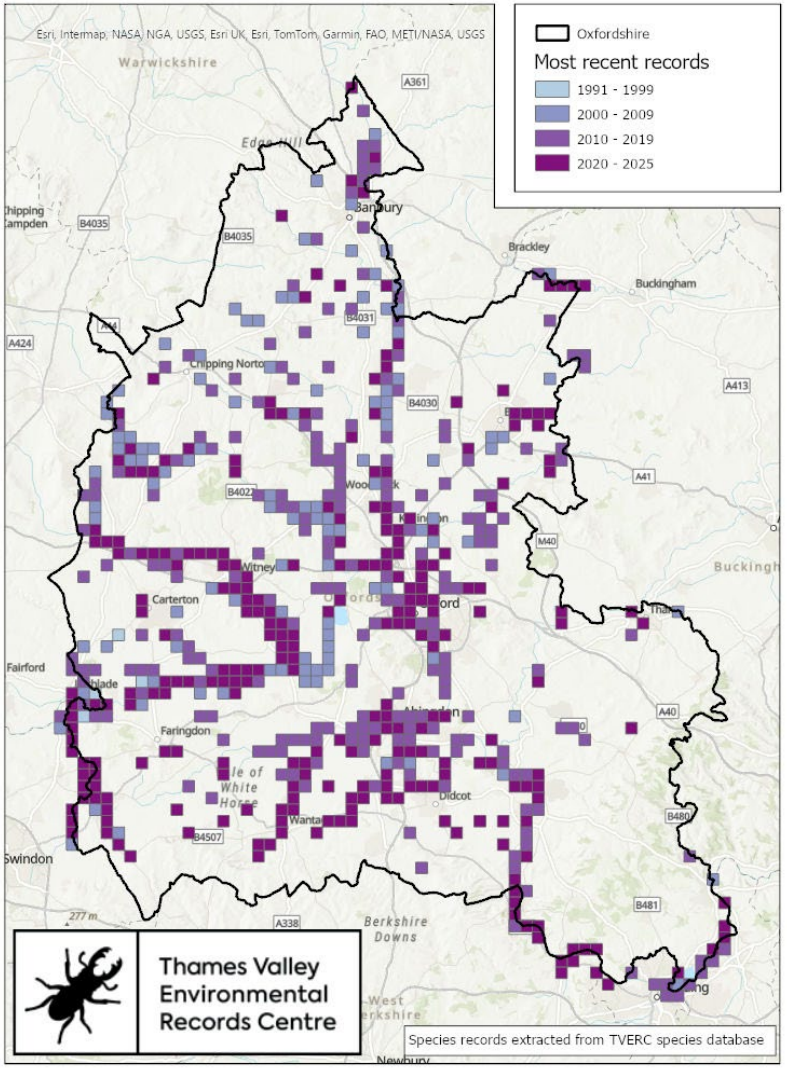
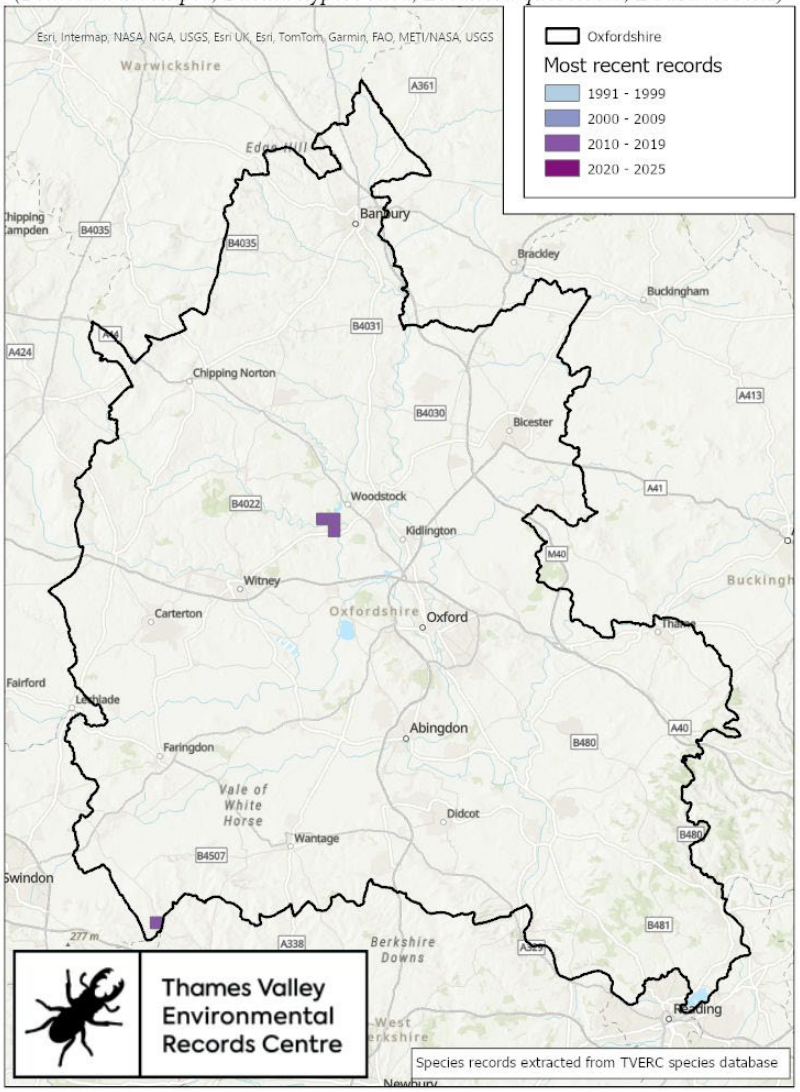
Otter records 1990-2025



Parkland lichens records 1990-2025

(Bellicidia incompta, Buellia hyperbolica, Lecanora quercicola, L sublivescens)



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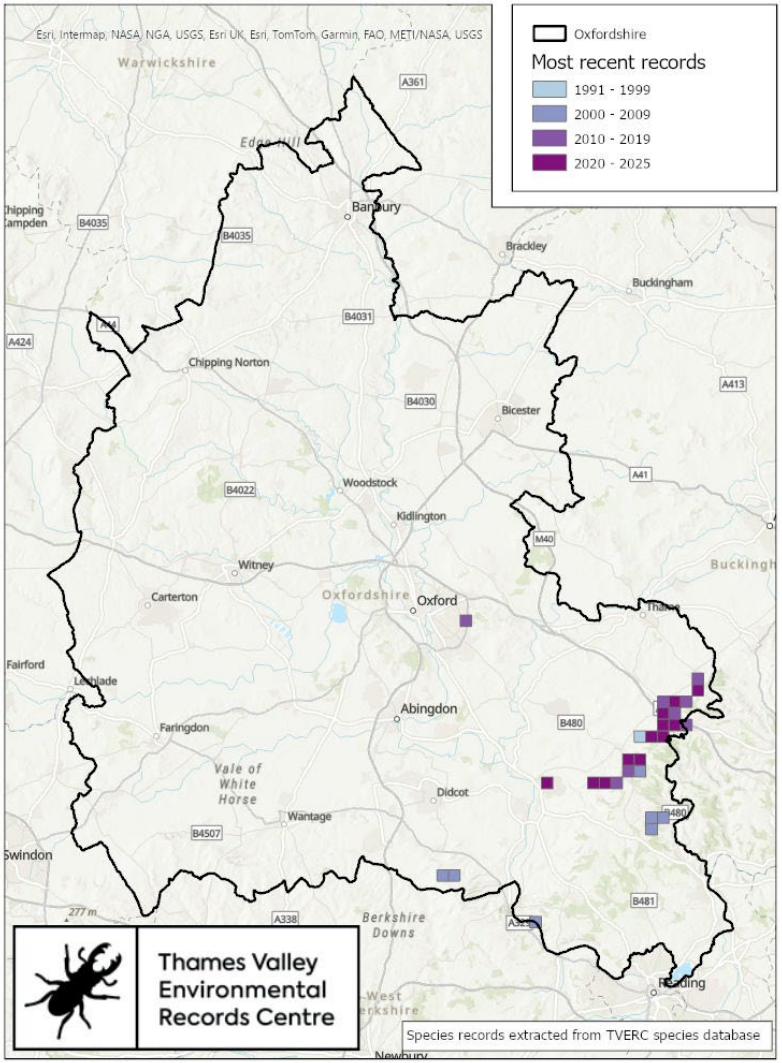
Silver-spotted skipper records 1990-2025



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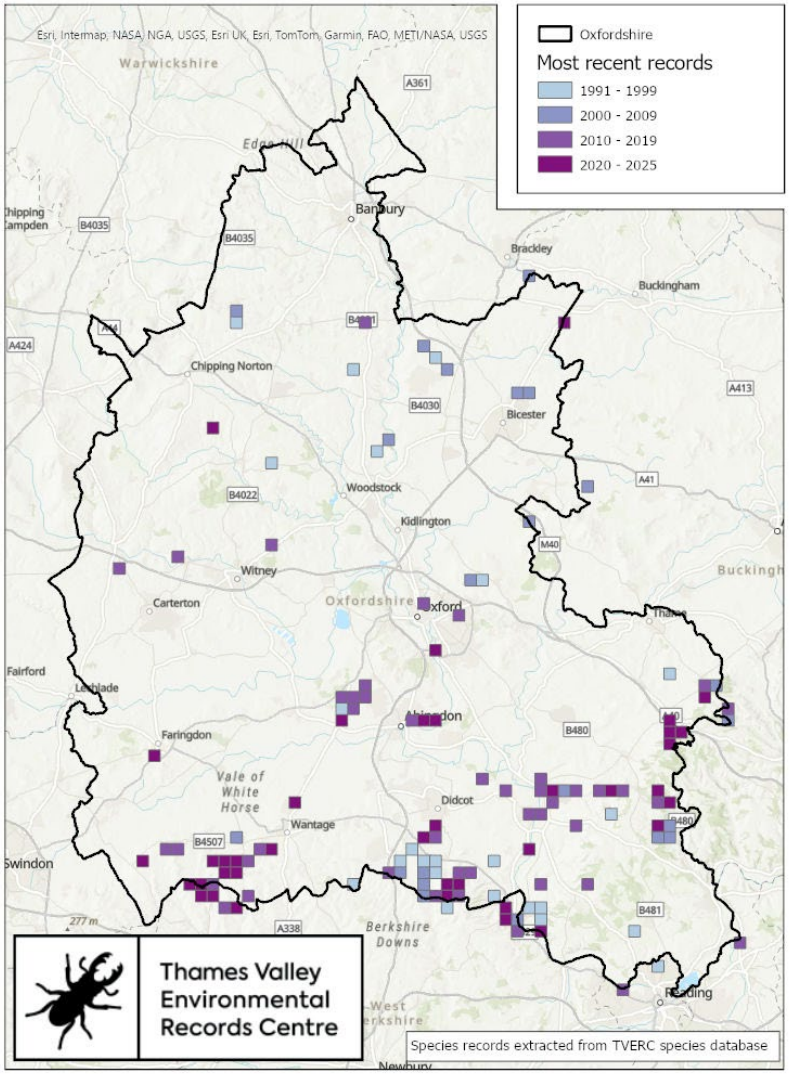
Small blue records 1990-2025



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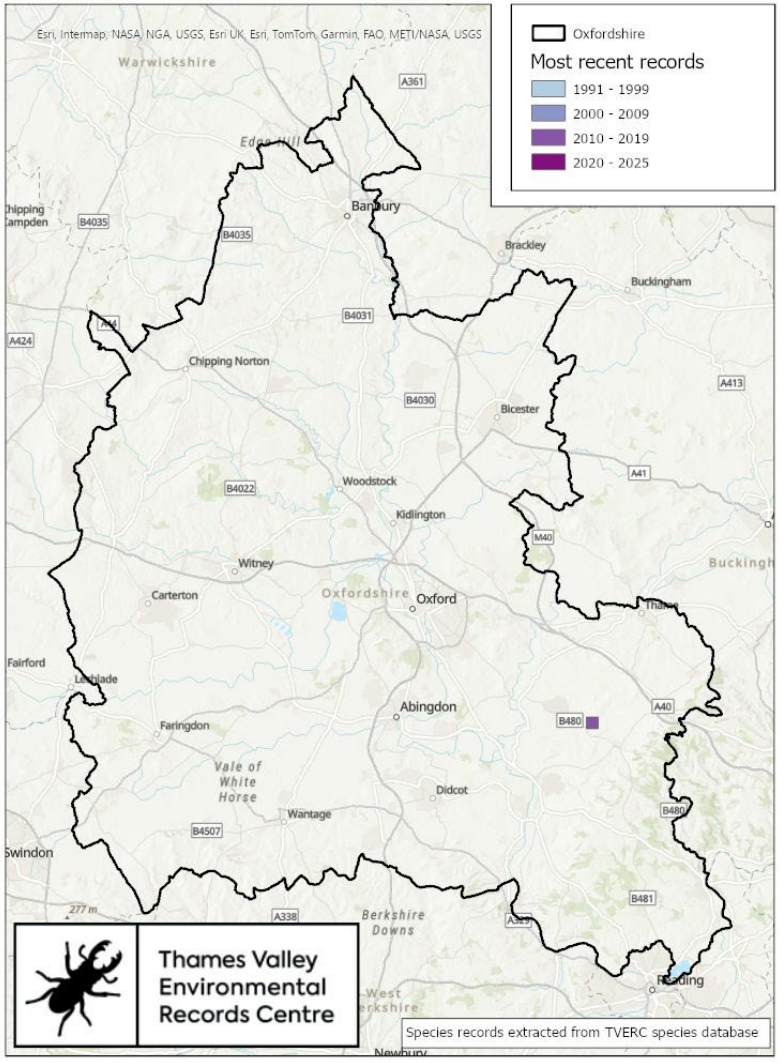
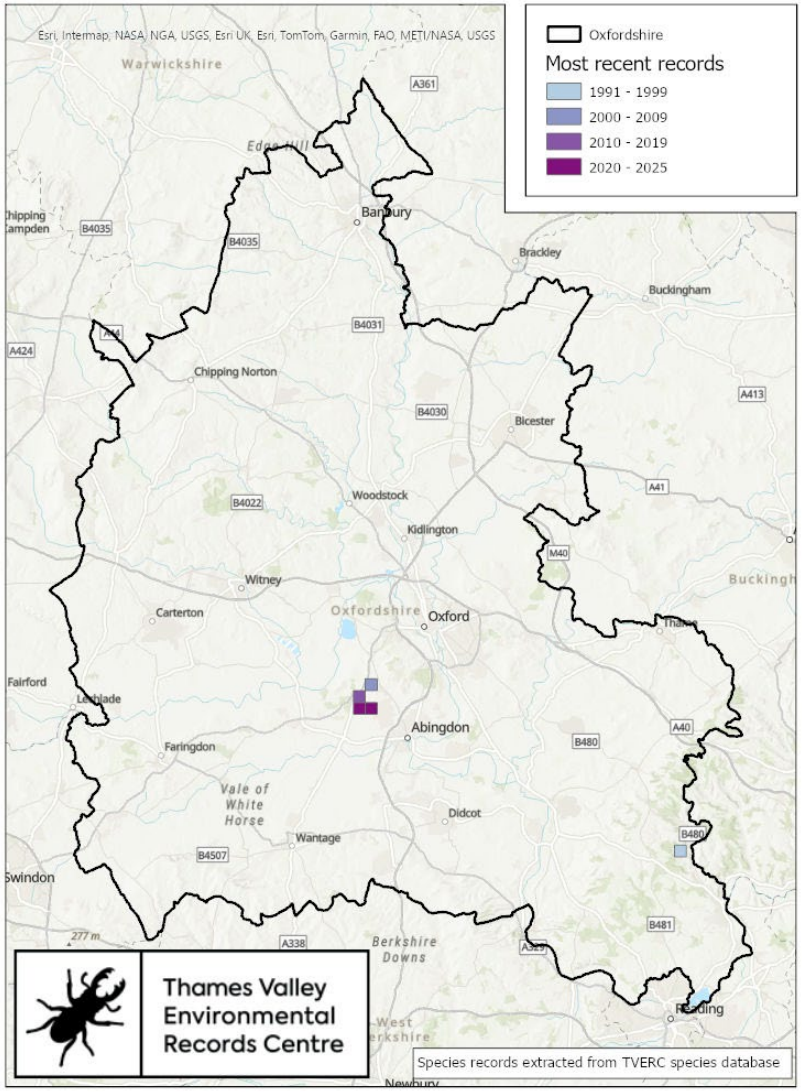
Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

Snail-killing fly records 1990-2025



Southern damselfly records 1990-2025



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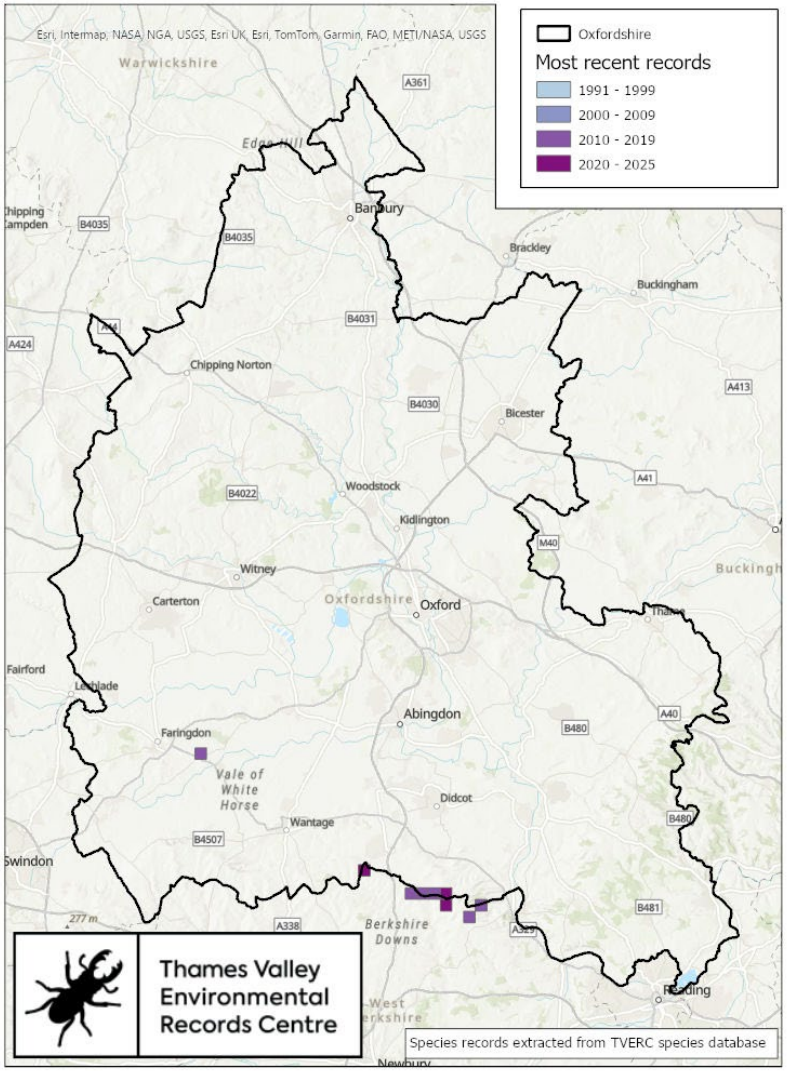
Stone Curlew records 1990-2025



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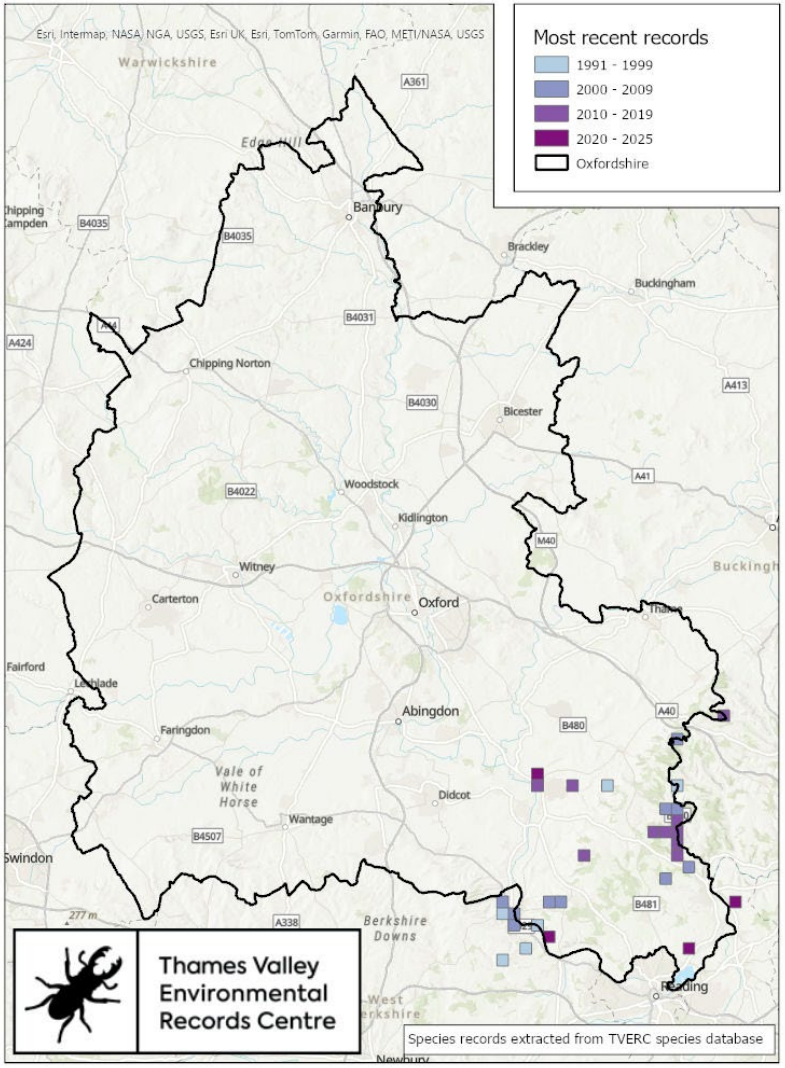
Striped Lychnis Moth records 1990-2025



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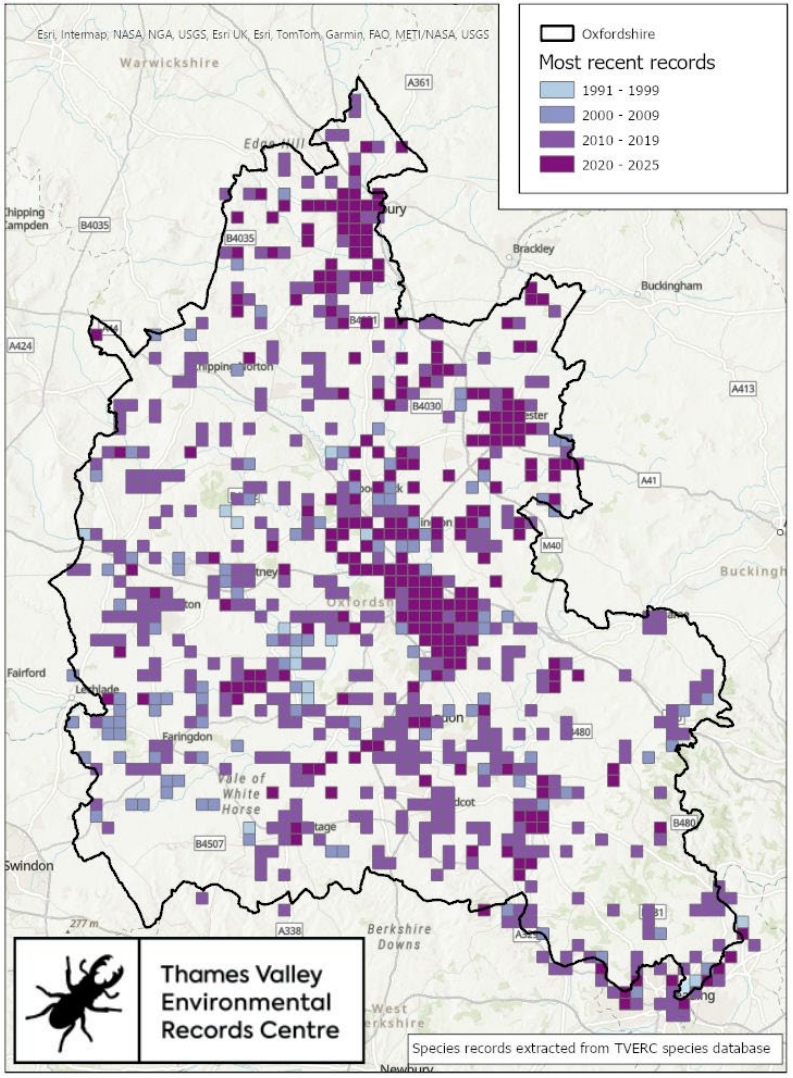
Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

Swift and house martin records 1990-2025



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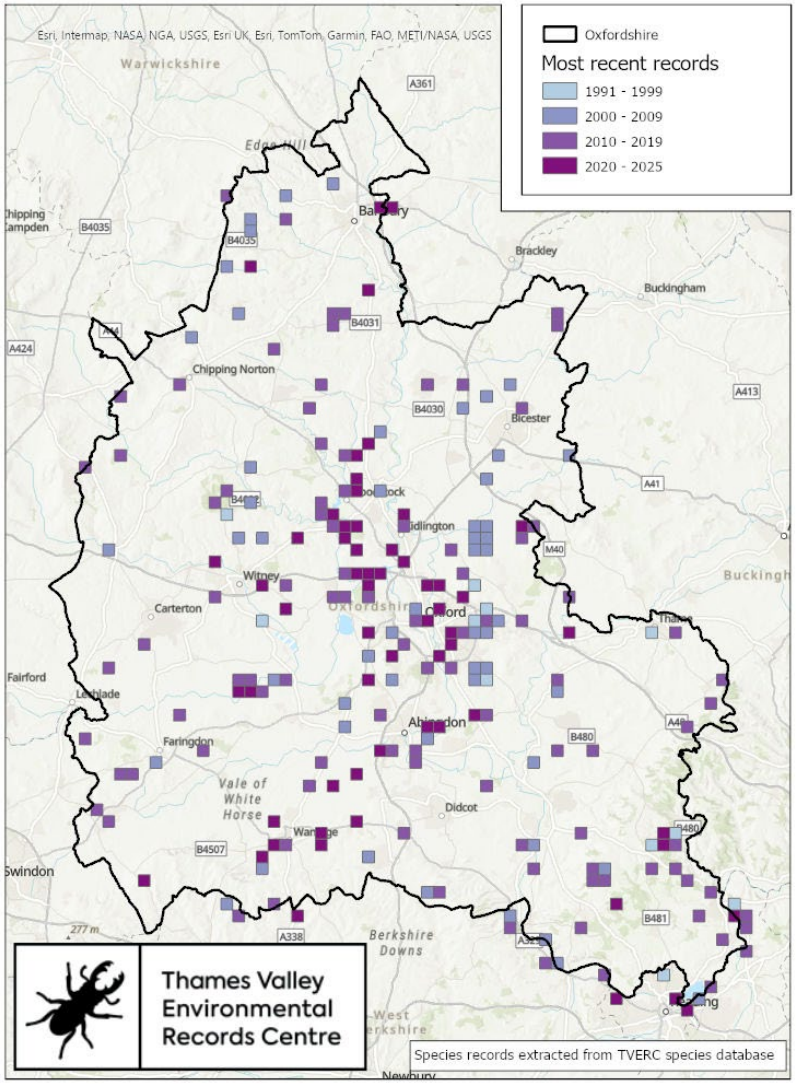
Tawny Owl records 1990-2025



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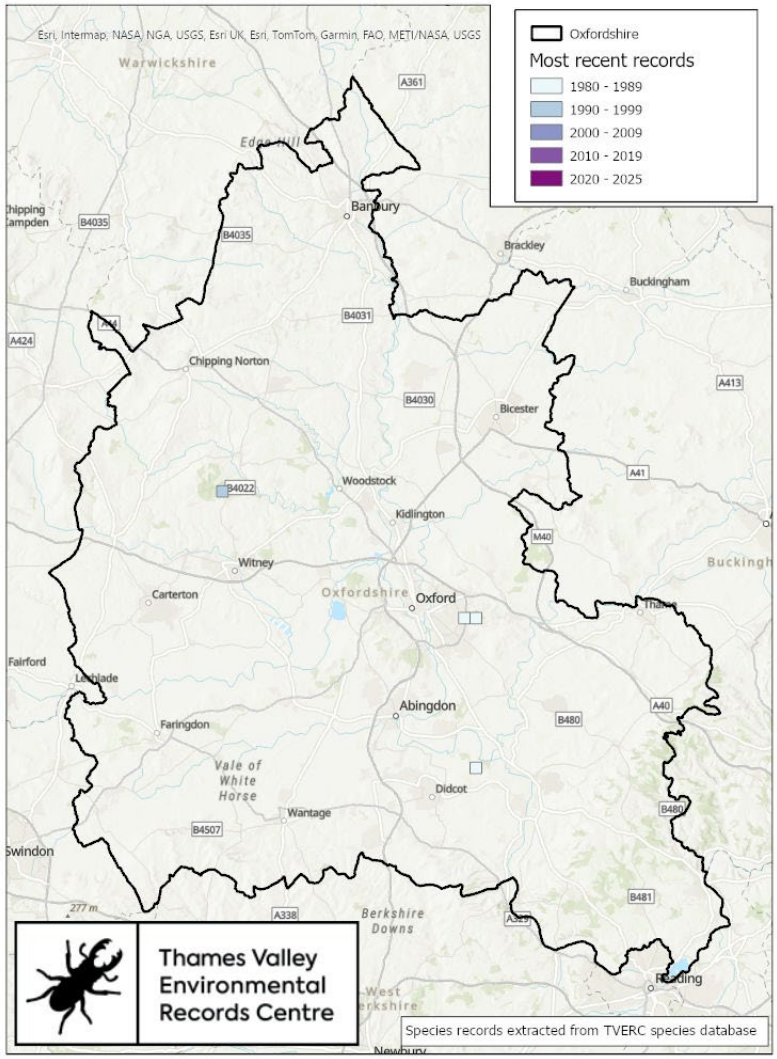
Tuberta maerens records 1990-2025



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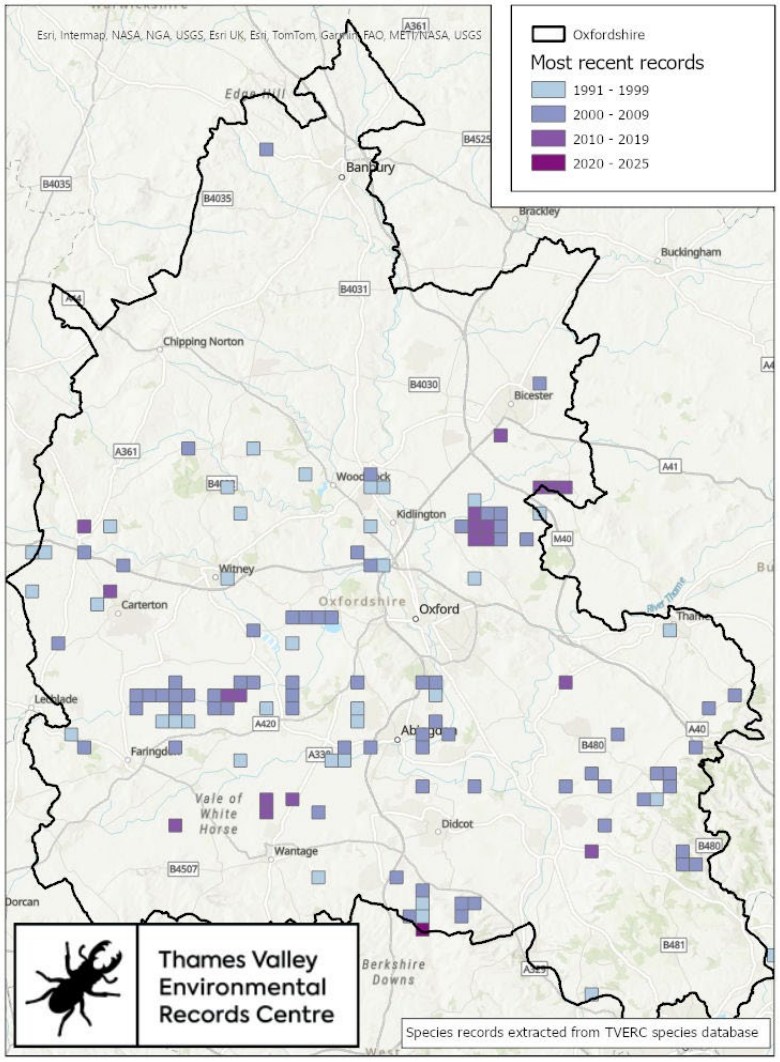
Turtle Dove records 1990-2025



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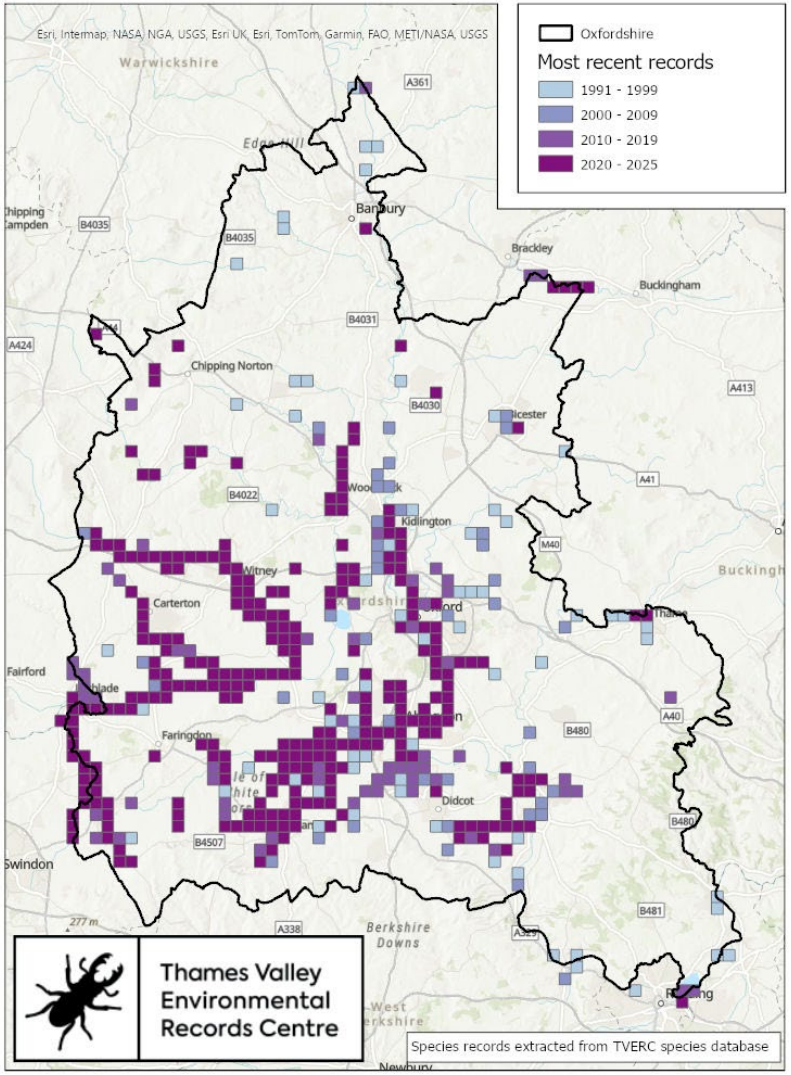
Water Vole records 1990-2025



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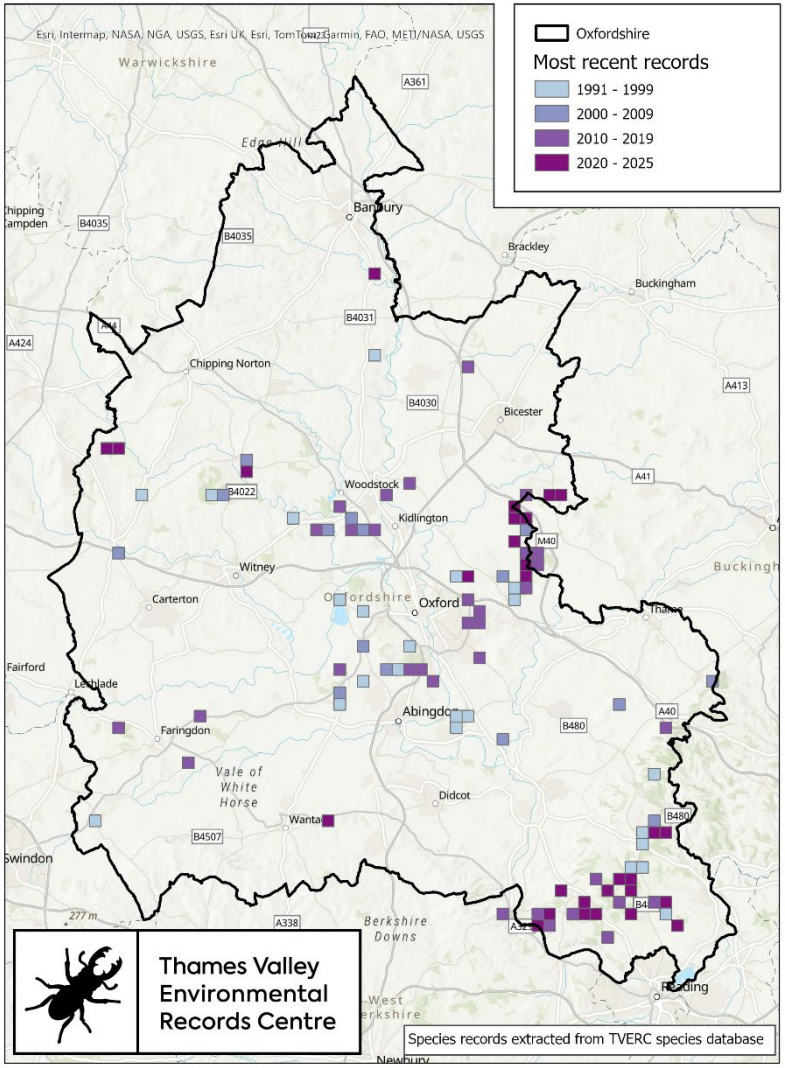
White Admiral records 1990-2025



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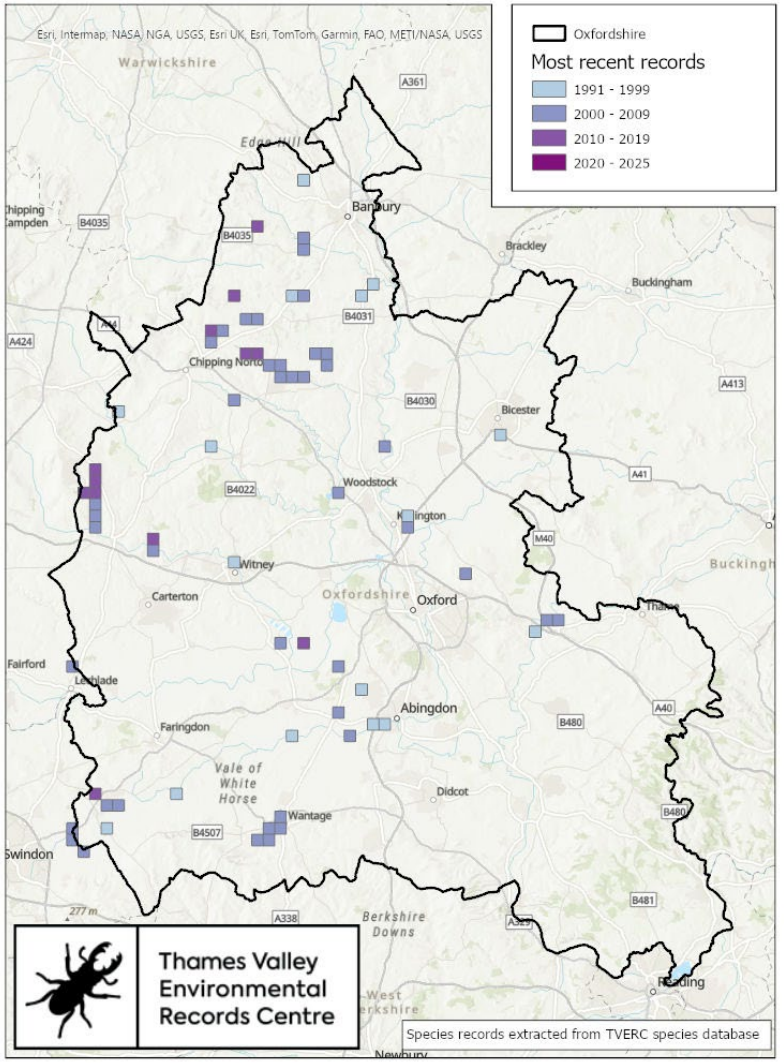
White-clawed Crayfish records 1990-2025



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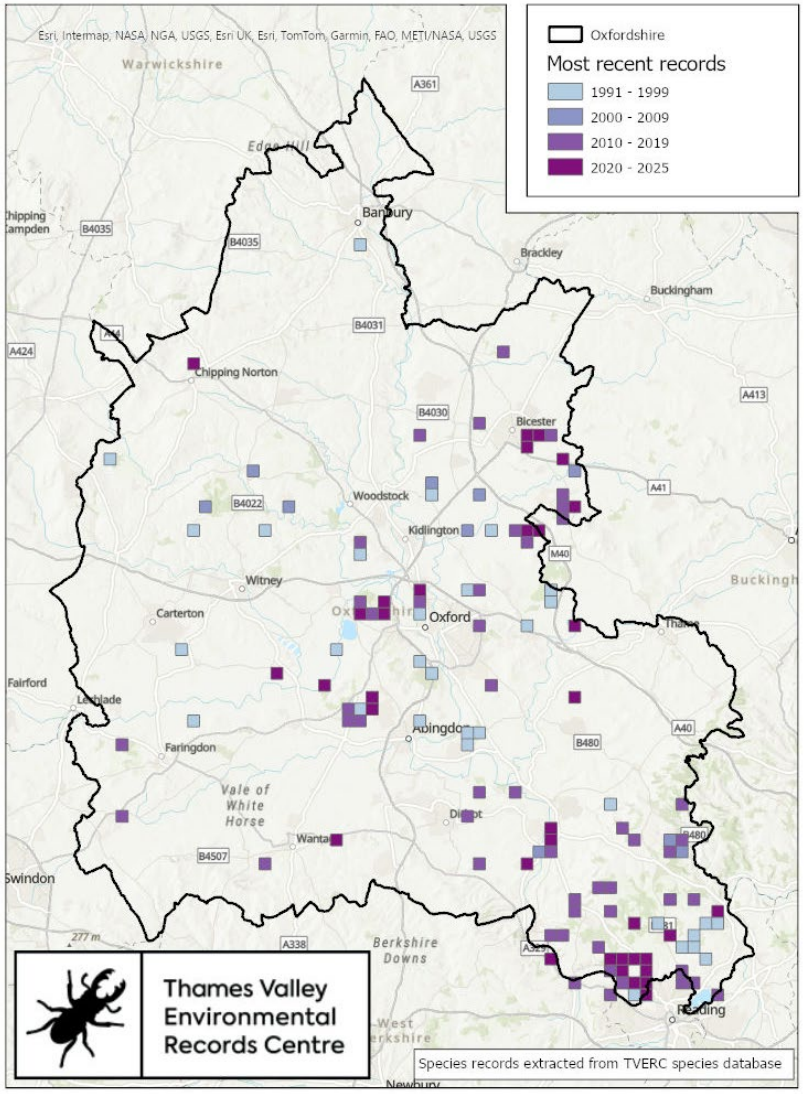
Please report sightings of these species to Thames Valley Environmental Records Centre to inform future work

White-letter Hairstreak records 1990-2025



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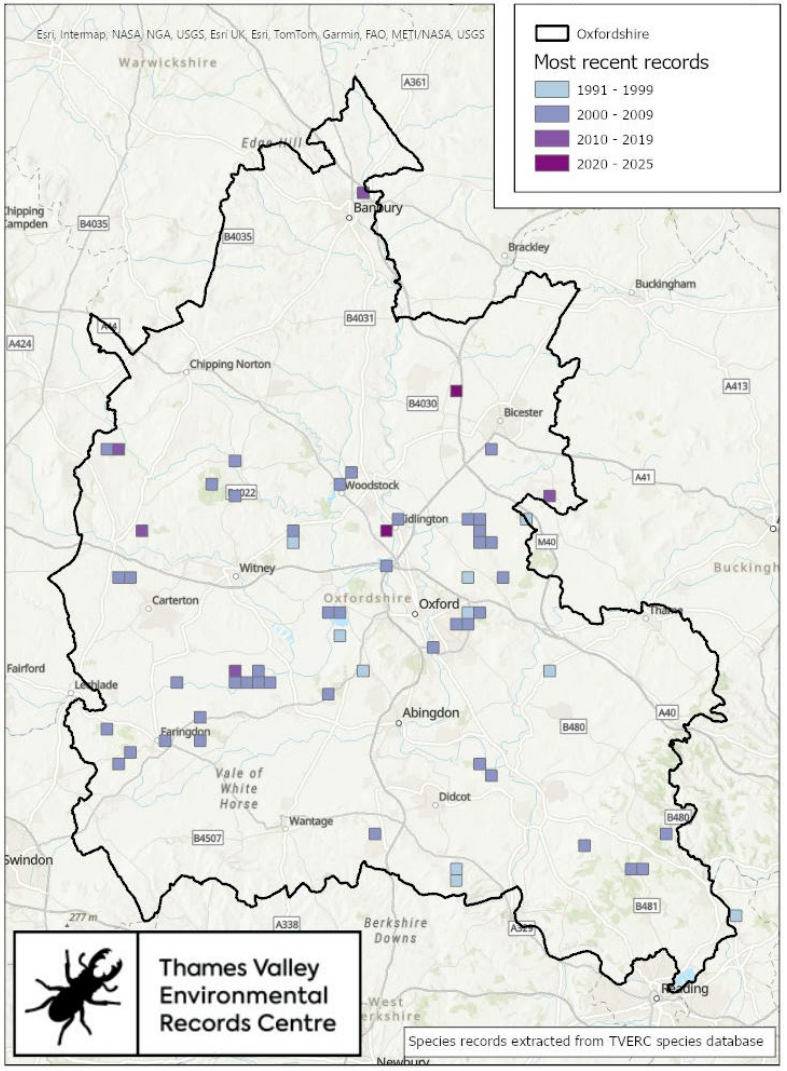
Willow Tit records 1990-2025



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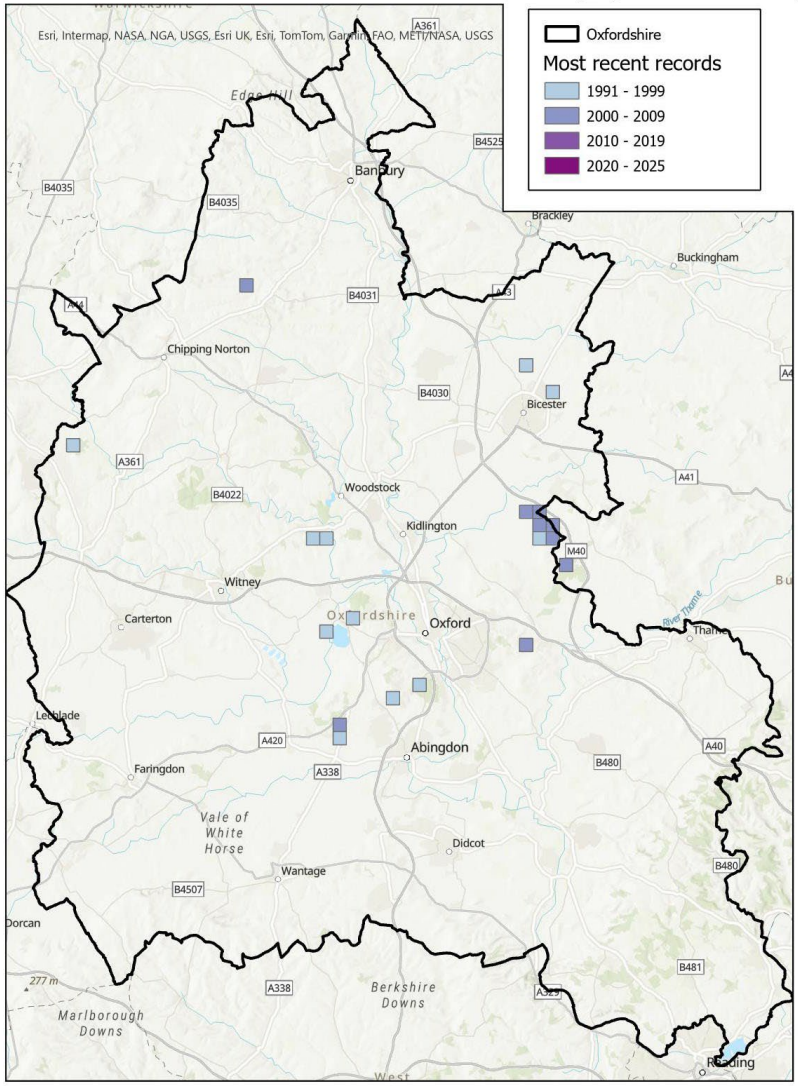
Wood White records 1990-2025



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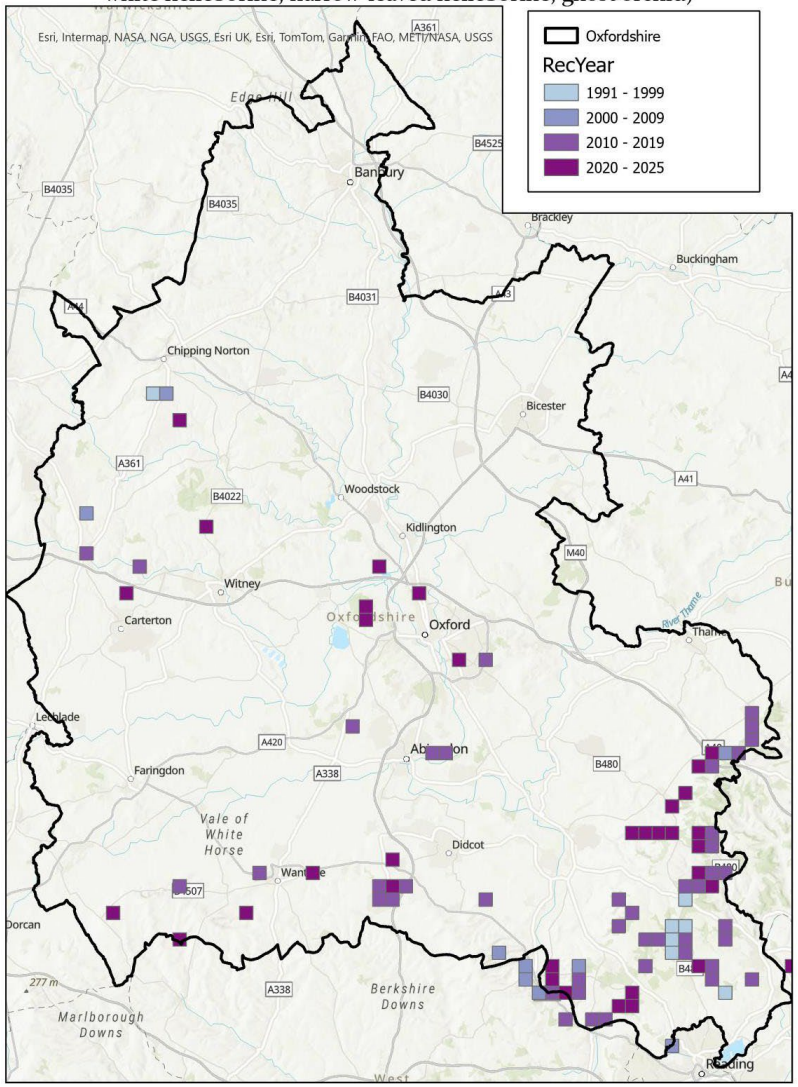
Woodland fungi and fungus-associated plant records 1990-2025
(Bronze bolete, Devil's bolete, bird's-nest orchid, yellow bird's nest, white helleborine, narrow-leaved helleborine, ghost orchid)



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