The Buckinghamshire and Milton Keynes Local Nature Recovery Strategy

Early Morning Ivinghoe Photo: Chris Smith

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FOREWORD

What is our Local Nature Recovery Strategy and why do we need it?

Nature is in crisis. We are living through a mass global biodiversity extinction event, with biodiversity declining faster than at any time in human history. And we are beginning to see tangible impacts of climate change - increased flooding, more storms and rising temperatures. The dramatic loss of biodiversity means we stand to lose important habitats and species locally too - and with them, the significant nature benefits that they provide and that we all rely on, including: cleaner air, clean water, food production, flood risk protection, access to nature, and its education, health and wellbeing benefits, to name just a few. Improving, or recovering, nature means we all benefit. And nature itself provides part of the solution to the threats we all face.

Our Local Nature Recovery Strategy (LNRS) for Buckinghamshire and Milton Keynes is the culmination of efforts involving hundreds of people and thousands of inputs and ideas over 2 years. The LNRS sets out the habitats and species that are important in our area, a shortlist of priorities for nature recovery, and selected potential measures, or actions, to achieve them, showing the best-placed locations to take those actions in our Local Habitat Map.

Outputs of our LNRS

- Our **LNRS interactive summary** is available here. This takes you through the key components of the LNRS and provides links to more detailed information.
- You can view our **shortlist of priorities and measures** for local nature recovery on the consultation portal
- Our **local habitat map**, showing important habitats and species, and where best to take action for nature recovery, is available here: *Buckinghamshire and Milton Keynes Local Nature Recovery Strategy Local Habitat Map tool*

- Our **species work**, including our shortlist of the area's important species, is available on the consultation portal.

Our LNRS responds to pressures on nature and opportunities for its recovery to safeguard and enhance nature's benefits

The nature recovery priorities, measures and mapping work build on the area's wide range of landscapes, habitats and species, how our area has changed over time, and the significant threats to nature locally. In our area, pressures on nature are being experienced as a result of climate change, development needs, land management changes and invasive pests and diseases. These threaten nature and the benefits it provides to all.

The LNRS also builds on the significant opportunities for nature recovery in Buckinghamshire and Milton Keynes. These range from creating more wildlife-important habitats (such as woodlands, hedgerows and trees; species-rich grassland, scrub and edge habitats; wildflower-rich meadows; ponds, rivers and streams; wetland habitats including floodplain grazing marsh, fen and reedbeds; and heathlands), to improving existing habitats, connecting habitats across the landscape into networks, re-naturalising rivers, reconnecting rivers with their floodplains, and incorporating wildlife-rich green infrastructure into new and existing development. Working **to create more bigger, better and more joined habitat and wildlife areas** at the landscape scale is needed to tackle and adapt to the enormity of the pressures that nature faces.

How you can help deliver nature recovery in Buckinghamshire and Milton Keynes

While the strategy, and the process of producing it, is a major step forward in linking the importance of nature with how our land is used and managed, the true significance of the LNRS will be through implementing it. We all need to take action and work together towards the common vision for nature recovery set out in the LNRS, identifying and building new collaborations and networks, working and joining up actions and priorities across borders.

So, as well as presentation of a strategy representing local needs, priorities and nature recovery options, this LNRS is a call to action. **We all have a part to play – and much to gain – from nature recovery in Buckinghamshire and Milton Keynes.**

Everyone can do something for nature recovery, no matter how small. So, we encourage you to sign up or make your pledge for nature here by telling us about your project and how it contributes to our nature recovery priorities or our measures. *[link to projects map to be made available at launch].*

Navigating our LNRS

Where to start - **The Interactive LNRS Summary** [available here]
The interactive summary is an online resource that provides a summary of the various sections of the LNRS, with links available throughout to more detailed information should you wish to access it, as well as to our online mapping tool and the list of priorities and measures.

This document (that you are reading) provides the detailed LNRS information. It goes hand-in-hand with our online mapping tool and our priorities and measures.

Next steps

We are grateful to the Buckinghamshire and Milton Keynes Natural Environment Partnership, the NEP, for leading the work to produce this LNRS. Now we must turn to delivering it, which is crucial.

Acknowledgements – from the Responsible Authority, Buckinghamshire Council

The LNRS process is the result of significant effort and input from stakeholders, partners, expertise and many organisations and individuals across Buckinghamshire and Milton Keynes over 2 years. As the Responsible Authority, with responsibility delegated by Government for producing the LNRS for our area, Buckinghamshire Council would like to thank in particular the following organisations, and their representatives who have been involved in producing the LNRS:

The Buckinghamshire and Milton Keynes Natural Environment Partnership (the "NEP") – the area's Local Nature Partnership. The NEP was commissioned by Buckinghamshire Council to lead and project-manage the entire LNRS process, with our input and oversight throughout.

Milton Keynes City Council and Natural England – the LNRS Supporting Authorities, with which we have worked closely throughout the process - for their support, advice and guidance.

All members of the LNRS Steering Group – with representation from:

- Berks, Bucks and Oxon Wildlife Trust (BBOWT)
- Buckinghamshire Council (ecology and planning teams)
- Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC)
- Buckinghamshire and Milton Keynes Natural Environment Partnership
- Chilterns National Landscape
- Environment Agency
- Forestry Commission
- Milton Keynes City Council (ecology, planning and floods teams)
- The Parks Trust
- Natural England

Fellow colleagues at Buckinghamshire Council - the Responsible Authority (planning, estates, public health, flooding, climate, economic development

communications, GIS, country parks and environment teams, Buckinghamshire Council's Rural Forum and Developers Forum, among others)

All members of the LNRS working groups, theme expert groups and organisations that assisted with distributing information about, or participating in, or analysing results of, our workshops and survey – with representation from, where in addition to the above:

- Buckinghamshire & Milton Keynes Association of Local Councils (BMKALC)
- Open University
- CLA (Country Land and Business Association)
- NFU (National Farmers Union)
- Buckinghamshire Business First
- Freshwater Habitats Trust
- River Thame Conservation Trust
- Colne Valley Regional Park
- Chiltern Rangers
- Ngage Solutions
- City of London Corporation

All individuals and organisations from the multiple sectors we actively engaged with during our workshops, survey and beyond (farmers, landowners and foresters; businesses; developers; environmental organisations; town and parish councils; and the general public) and to everyone else who has been involved in all our workshops, the survey, individual or group discussions, for all their input, time, energy and expertise.

Speakers at our stakeholder engagement workshops from our sector-groups:

- Tony Langford, Pitchcott Farm
- Jo Alden, Barratt Redrow
- Dr Helen Read, Burnham Beeches & Stoke Common
- Mel Woof, Buckinghamshire and Milton Keynes Association of Local Councils
- Adrian Porter, Wild Amersham
- Chris Bridgman, Bridgman & Bridgman LLP

- Peter Hobbs, Rectory Farm

The specialist consultants employed for various aspects of the LNRS, namely:

- Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) - for leading the specialist species work, and to their own recorder volunteers to pool expertise and create a shortlist of important species in the area and identify target areas for taking action.
- Future Nature WTC – for their analysis of our stakeholder inputs and initial scoping and shortlisting of priorities and measures arising from our workshop and survey activities.
- Natural Capital Solutions – for their expertise, calmness, flexibility and advice in bringing together so many datasets and mapping and modelling expertise to produce our LNRS local habitat map and our summary LNRS storymap. Also, for their project management expertise from September 2024 to bring the range of work together into our final draft.
- Wildpear CIC and Kath Daly Associates – for bringing the LNRS to life at our initial deep-dive sector-based stakeholder workshops, and at our final multi-sector stakeholder event, and for their post-workshop analyses and insights.

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EXECUTIVE SUMMARY

1.1 About the LNRS

Local Nature Recovery Strategies (LNRSs) are a new spatial strategy for nature and are required by the Environment Act 2021, in recognition of the significant global decline in biodiversity and nature.

Their purpose is to **locally-agree a shortlist of priorities (aims) and measures (practical actions) for nature's recovery and the wider environment**, and to **map where best to take action.**

There are 48 Local Nature Recovery Strategy areas covering the whole of England, with no gaps or overlaps. The **aim is for LNRSs to together form a national "nature recovery network" to boost nature's recovery at scale**. Collectively, the LNRSs are intended to help achieve the overarching, or **"apex goal"** of the national Environmental Improvement Plan (EIP) that the UK Government set out in 2023 – **to improve nature by halting the decline in biodiversity and achieving thriving plants and wildlife**. Working at scale like this aims to improve, connect and make space for nature.

Every LNRS is required to produce two outputs. Each includes an element related to how nature is now (the baseline) and a future-element, looking to what's needed for nature recovery in the future:

1. **A statement of biodiversity priorities**
   This describes the area's important landscapes, habitats and species as well as the pressures on nature and opportunities for nature recovery. Looking to the future, it also includes a shortlist of priorities for nature recovery and potential measures (practical actions) to achieve the priorities relevant to the area, based on stakeholder engagement, expert input, a review of existing relevant environmental and spatial plans and strategies, and taking into account the pressures on nature and opportunities for its recovery.

   - The Shortlist of **LNRS priorities and potential measures**, is available on the consultation portal
   - The Description of the Strategy area is summarised here [*Description of the LNRS area]* and a full version is available here: [*Nature in Buckinghamshire and Milton Keynes - our range of landscapes, habitats and associated species.]*

- Our species work is available in summary here [Section 1.5, *Important Species*] and in full here [*Important Species*] Our species shortlist and niches and our species target areas documents are available on the consultation portal.

2. **A local habitat map**
   The mapping element of the LNRS contains two maps. The first is a baseline map to show areas that are of particular biodiversity importance at the moment, the "**Areas of Particular Importance for Biodiversity" (APIB)**. The second map is a targeted map showing future nature recovery opportunities, known as the **"Areas that Could Become of Particular Important for Biodiversity" (ACB) map**. This shows, on the basis of best-available mapping, modelling and data, where the measures (practical actions) for achieving the area's shortlisted nature recovery priorities would be best located to make the most difference to nature. To view the local habitat map, see here.

   - To view the APIB basemap, click all boxes off except for "Areas of Particular Importance (APIB).
   - To view the APIB together with all available measures or opportunities for nature recovery, click the APIB, then the priority and measure(s) of interest.
   - To view the ACB map only (where action for nature recovery into the future would be best targeted), click all boxes off except Area that Could Become of Particular Important for Biodiversity (ACB).

The Buckinghamshire and Milton Keynes LNRS

In 2022, the then-Government formally selected "Responsible Authorities" to lead the production of LNRSs locally. Buckinghamshire Council is the Responsible Authority for the LNRS covering the collective Buckinghamshire and Milton Keynes area. The "Supporting Authorities" are Milton Keynes City Council and Natural England. The Environment Act states that LNRSs will be reviewed every 3-10 years.

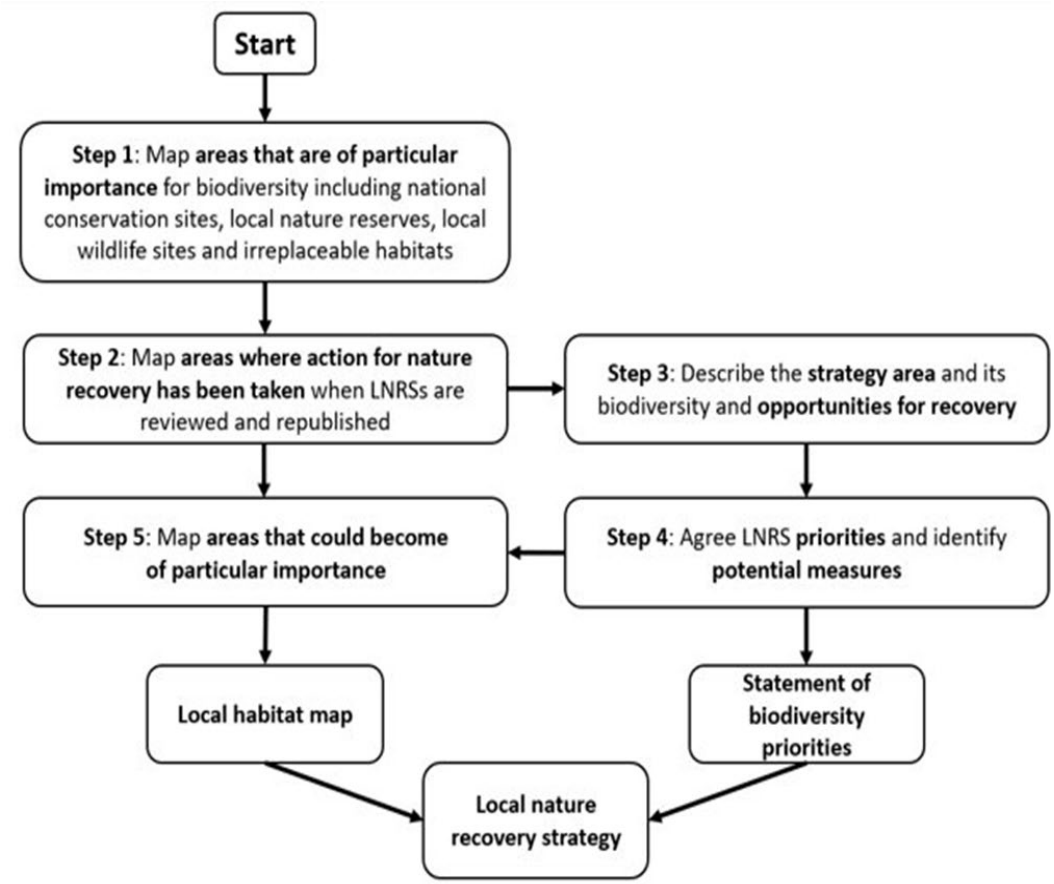
Our LNRS identifies the priorities for nature recovery in Buckinghamshire and Milton Keynes, and how, and where best, to take actions to achieve them.

How the Buckinghamshire and Milton Keynes LNRS was created - the LNRS stepped process

The LNRS for Buckinghamshire and Milton Keynes follows the 5 steps (outlined below) required to produce an LNRS set by Government. Buckinghamshire Council commissioned

the Buckinghamshire and Milton Keynes Natural Environment Partnership, (the "NEP"), the area's formally-recognised Local Nature Partnership, to lead the work.

***Figure 1**. Order of steps to be followed in preparing contents of a Local Nature Recovery Strategy (Source: Local Nature Recovery Strategy Statutory Guidance. UK Government, 2023).*



Governance - many organisations, people and sectors have been involved

Our LNRS is the result of significant input from many organisations, sectors and individual stakeholders including members of the public, all working together and under a governance structure and stakeholder engagement process specifically set up for the LNRS, although building on existing networks and partnerships. In particular, the area's Local Nature Partnership, the Buckinghamshire and Milton Keynes Natural Environment Partnership (the NEP) was asked to oversee and lead the production of the Local Nature Recovery Strategy.

To do this, the NEP employed a full-time Project Manager, and set up:

- A cross-sector Steering Group, which agreed a Charter of Conduct, and met at least monthly, to oversee progress and provide a steer on key decisions.

- Our LNRS "Core Group", comprising representation from the NEP, both councils and Natural England, met initially twice per month for most of 2023, and then weekly, to review more detailed progress and take on key tasks as well as finalise decisions.
- Working groups and task and finish groups as required – for example our mapping and data working group reviewed inclusions for the baseline APIB map. Our Stakeholder Engagement task and finish group drew on expertise to advise and guide the format and content of sector-based workshops, our survey to check emerging findings, and the analysis and LNRS priorities shortlisting process. Our Council Officers Group ensured the many departments and experts across both Councils involved in the process were aware of the LNRS and were able to contribute.
- Theme groups of experts were convened from across the area to help review and finalise the measures and the final shortlist of priorities for nature recovery.

The process also drew on existing plans and strategies relevant to nature recovery in Buckinghamshire and Milton Keynes, and expertise and inputs to determine the finalised set of priorities, measures and local ACB map.

The area's Local Records Centre, the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) led our species shortlisting work, drawing on their network of species specialists.

We also employed consultants to help us with engaging stakeholders at workshops, to support with the initial analysis of the hundreds of stakeholder inputs and ideas gathered via workshops and our survey, and to produce our final nature recovery ACB map based on extensive data analysis and mapping of measures for achieving the shortlisted nature recovery priorities. The NEP also employed a full-time Project Manager to oversee the work; and from September 2024 this process was taken on part-time by a consultant, closely working alongside the NEP and other members of the Core Group. The diagram below shows how the various groups decision-making organisations worked alongside each other.

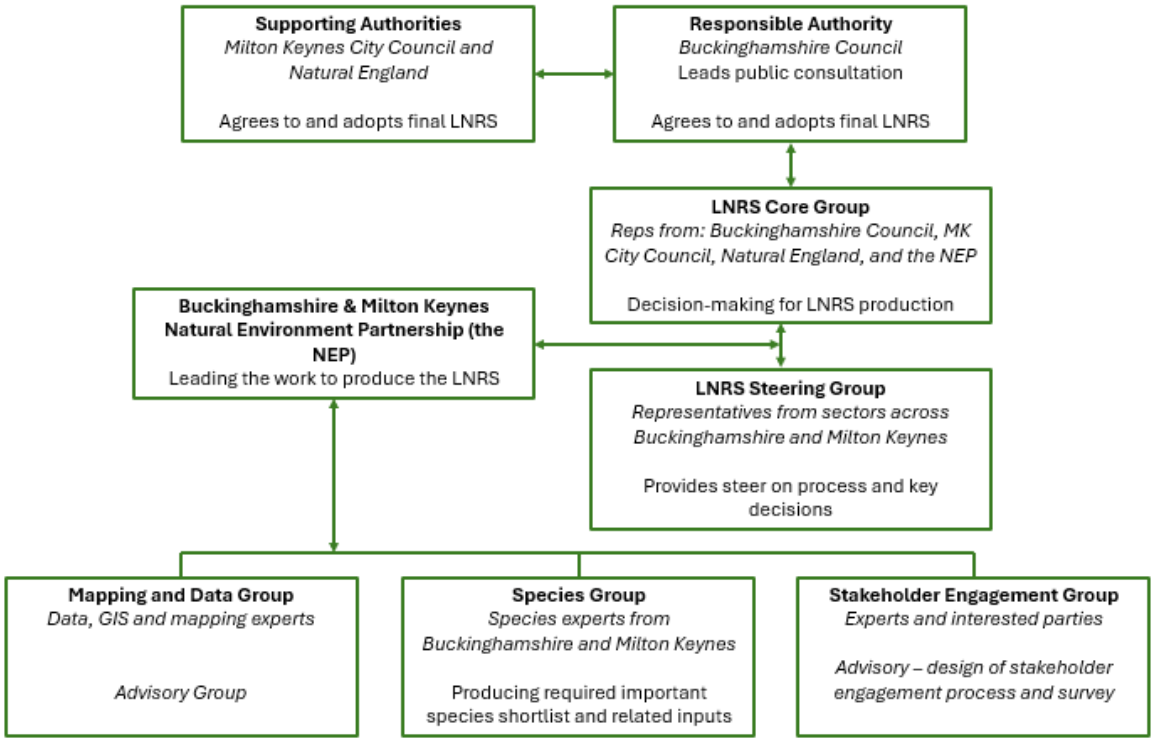
Our combined **methodology statements** for each LNRS step are available are available on the consultation portal.

In addition, we have detailed **stakeholder engagement** and **data analysis methodology** technical statements that are contained within the combined methodology statement document which is available on the consultation portal.

The **NEP website** contains a host of information including the LNRS, including our FAQs: https://bucksmknep.co.uk/nature-strategy/overview/.

Our Glossary is available at *Appendix P, Glossary.*

Figure 2. *The Buckinghamshire and Milton Keynes LNRS Governance Structue.*



How the Government envisages LNRSs will be used

The Government has highlighted that LNRSs can be used as a:

- **Shared creation** - encouraging local organisations, land managers, local councils & individuals interested in nature recovery to work together on opportunities to deliver a wider vision for nature's recovery
- **Guide for mandatory biodiversity net gain investments –** an uplift in biodiversity units is created on areas identified by LNRS mapping
- **Channel for investment into local priorities** – for protection and enhancement from both private and public sources i.e. woodland creation funds, Environmental Land Management scheme
- **Evidence base for local planning authorities as part of local plan -** understand locations important for conserving and enhancing biodiversity and those that could become of particular importance.

LNRS links to Planning

- LNRSs have been designed from the outset with the planning system in mind. LNRSs will inform the preparation of Local Plans enabling them to more effectively identify, map and safeguard areas for nature recovery, as required by national planning

policy. They will be **one source of evidence used to inform the preparation of plans** which will determine where development should occur.

- At the time of writing, the government is currently making changes to the National Planning Policy Framework and is due to provide guidance on **how LPAs must have particular regard to LNRS** in all aspects of their planning functions as is required by the Environment Act.
- LNRSs will also be used to determine where habitat creation or enhancement for **Biodiversity Net Gain (BNG)** will be of 'high strategic significance'. This means that creation or enhancement of habitat to generate biodiversity units for the purposes of biodiversity net gain benefits from a 15% uplift in the biodiversity metric if that creation or enhancement is in an area mapped in LNRS *and* the measure/s identified for nature recovery in that area are actioned.
- NB - **LNRSs do NOT place new restrictions on developing land.** They are not intended to be used to stop planning.
- Instead, the LNRS presents **opportunities** for nature recovery and a clear shared vision of nature's recovery.

1.2 Pressures on Nature and Opportunities for Recovery

Nature and its benefits are important but are under threat

Biodiversity is the key to life. Our range of habitats and species provide food, water, shelter and so resilience for wildlife. We also rely on nature to provide many benefits to people – including clean air, water, productive soil for food, flood protection, control of diseases and space for recreation.

But globally, biodiversity is declining faster than at any time in human history. In the UK, around 41% of the UK's species have declined in recent decades and a quarter of the UK's mammals face extinction. **Our natural world faces real and significant pressures**, at all scales – from climate change to development to pests and diseases**. These pressures threaten not just nature and biodiversity, but all of nature's benefits** that we rely on that underpin society and economic prosperity.

Biodiversity loss and nature degradation is therefore a concern and threat to all of us.

Figure 3 Lodge Lake balancing lake, Loughton Valley Linear Park, Milton Keynes. Photo: David Bailey

In common with other parts of the UK, particularly the developed south-east, Buckinghamshire & Milton Keynes have severely damaged ecosystems as a result of

pressures including climate change, population growth, new development, changes in land use and unsustainable land management, river channel alteration, pollution, the overuse of resources, generation of waste, and invasive non-native pests and diseases.

Nature provides solutions to many of the pressures it currently faces. The way we manage our land and encourage nature has a significant part to play in tackling these pressures, such as helping to address flood risk or the impacts of climate change. These opportunities for nature are described below.

Nature recovery means restoring habitats for wildlife, supporting species and supporting nature to provide wider environmental benefits. A thriving natural environment locally is in all our interests – to help tackle the threats that nature faces that affect us too, and to ensure nature continues to provide its benefits to all.

*Find out more about what the LNRS is and why it is important here [*About the LNRS *and* Pressures on Nature and Opportunities for Recovery*]*

Find out about why nature is important here [*Nature is important* ***and*** *Nature, and all its benefits, are under threat]*

Find out more about the pressures on nature that our LNRS area faces here [Pressures on nature in Buckinghamshire and Milton Keynes*]*

Opportunities for nature recovery

Recovering nature is not just good for wildlife, our habitats and species. As well as encouraging all the benefits that nature provides, the way we manage land and encourage nature could help address several wider environmental issues – and provide nature-based solutions to them, at all scales.

For example, managing land better for nature can help to:

- Reduce flood risk
- Combat the causes and impacts of climate change through carbon capture and cooling (particularly in urban areas)
- Improve water quality, habitats and flow
- Improve air quality
- Provide more and better-connected habitats for wildlife
- Improve soil health – positively affecting farming production, carbon capture, and wildlife.

***Figure 4**. Chilterns Gentian. Photo: BMERC.*

In Buckinghamshire and Milton Keynes, the area's most recent Biodiversity Action Plan (Forward to 2030, produced by the NEP in 2021) set out opportunities for nature recovery based on the pressures on nature and the need to make space for nature through "more, bigger, better and more joined" ecological networks. These four principles follow the findings of an influential 2010 review by Sir John Lawton, which looked at how England's wildlife sites need to respond to the challenges of climate change and demands on land such as development and farming.

The main opportunities for nature recovery in Buckinghamshire and Milton Keynes, stemming from key environmental plans for the area, and which contribute to Lawton's principles, are:

- **More** habitats - create new habitats to improve benefits to wildlife – specifically:
    - More and restored "priority habitats" - which are habitats nationally identified as important for conservation
    - More wildlife-important habitats such as trees, woodlands and hedgerows, species-rich grassland, scrub and edge habitats, wildflower-rich meadows, ponds rivers and streams, wetland habitats including floodplain grazing marsh, fen and reedbeds and heathlands.

- **Better** habitats:
    - Improving the condition of existing habitats and improving land management to encourage important species
    - Re-naturalising river channels and reconnecting rivers with their floodplains
- **Bigger and more joined** habitats
    - Connect quality habitats across the landscape to create networks
    - Buffers around high-quality sites can connect areas together and protect them from disturbance
- Incorporate well-designed local wildlife-rich green infrastructure[1] on existing and new development

There are also several "cross border" opportunities for nature recovery, providing potential for coordinated nature recovery at scale. For example, the Colne Valley in the south, with its lakes on the edge of Buckinghamshire, Hertfordshire and London, is nationally-important for water birds and; there is potential for large-scale chalk grassland and chalk stream restoration and recovery of other chalk habitats and species across the "Big Chalk" area stretching from Somerset to the Wash, and its potential importance for species migration in the light of climate change. Similar landscape-scale opportunities for nature recovery apply to the Bernwood, Otmoor, Ray area which straddles the Buckinghamshire / Oxfordshire border; the Greensand ridge into Bedfordshire; and Salcey Forest into Northamptonshire.

The purpose of the LNRS is to identify where to take the most appropriate action to target and support nature recovery. If delivered, a better and more extensive and connective natural environment can help address nature's decline arising from pressures on nature, and focus on opportunities for its recovery. Nature recovery is good for species and habitats, provides wider environmental benefits and nature-based solutions to key pressures, and provides wider environmental, social and economic benefits to all.

Find out more about nature-based solutions and opportunities for nature recovery, including what "Biodiversity Opportunity Areas" are in Section 2, *Opportunities for Nature Recovery.*

[1] Green infrastructure is a network of multi-functional green space and other green features, urban and rural, which can deliver quality of life and environmental benefits for communities (Town and Country Planning Association definition. Available at: What is Green Infrastructure? - Town and Country Planning Association)

1.3 Description of the LNRS area

Nature in Buckinghamshire and Milton Keynes – our range of landscapes, habitats and species

The Buckinghamshire and Milton Keynes Local Nature Recovery Strategy area is a mainly low-lying area in inland central England. It boasts varied landscapes and habitats, many of which extend beyond its boundary – from the Great Ouse Valley in the Milton Keynes area, to low-lying farmland of Aylesbury Vale, the floodplain grasslands of the Upper Ray Valley, ancient woodlands, including remnants of royal hunting forests, along with chalk grasslands and internationally important chalk streams of the Chiltern Hills, to the streams and rivers that feed the River Thames. The tip of the Greensand Ridge also stretches in from neighbouring Bedfordshire, with its acidic soils, heaths and woodlands.

Figure 5. *Ancient woodland at Ashridge. Photo: Nicola Thomas.*

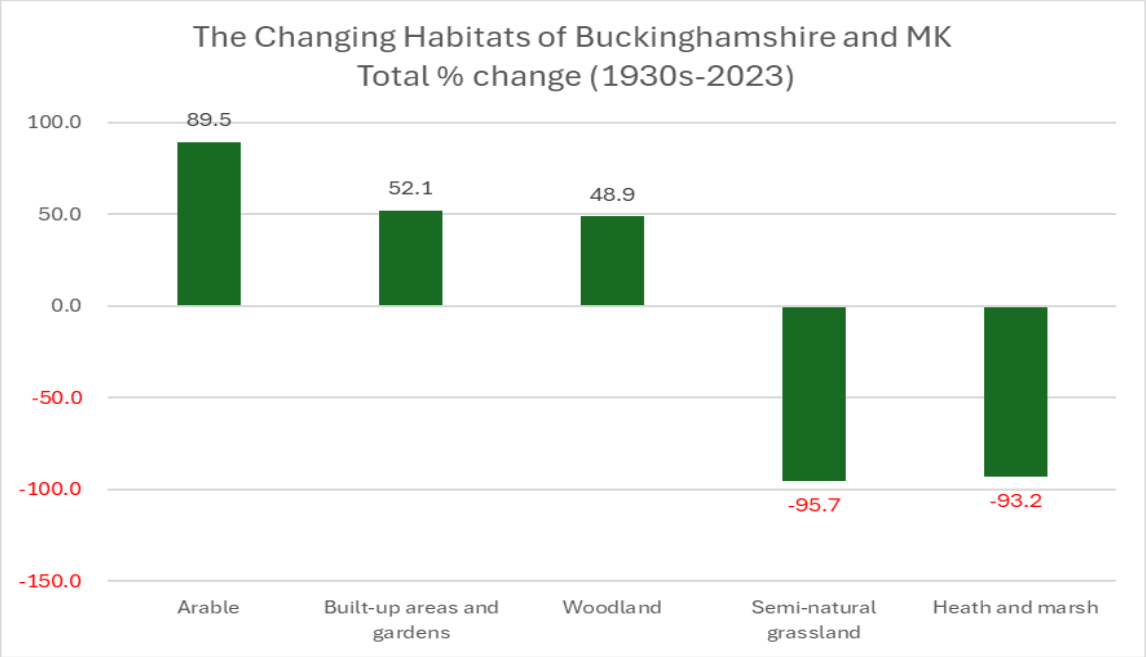
The area is mainly a farmed landscape, with agricultural land covering 62% of the combined Buckinghamshire and Milton Keynes area. Woodland covers 12% of the area, all types of grassland 39%, and water environments around 1%. However, this hasn't always been the case.

Figure 5. *Agricultural land near Ivinghoe Beacon. Photo Nicola Thomas.*

New historic analysis produced for the LNRS process illustrates how nature in Buckinghamshire and Milton Keynes has changed over the last 90 years.

The vast majority of our semi-natural habitats have been replaced since the 1930s, mainly by arable farming or improved (modified) grassland. Heathland has also decreased significantly. Elsewhere, there has been a significant increase of over 50% in built-up areas and gardens. Woodland expansion by nearly 50% since the 1930s, mainly in plantation forestry, followed a previous period of decline.

Figure 6. *Historic Analysis showing changes in nature in Buckinghamshire and Milton Keynes over the last 90 Years. [adapted from Natural Capital Solutions Report, 2024 available at: Changing habitats over time in Bucks and MK – Buckinghamshire & Milton Keynes Natural Environment Partnership).*



The urban landscape also plays an important role for biodiversity, providing habitats and connecting nature across built-up areas. For example, the city of Milton Keynes is renowned for the way it was planned to include a network of linear parks and landscaped transport corridors.

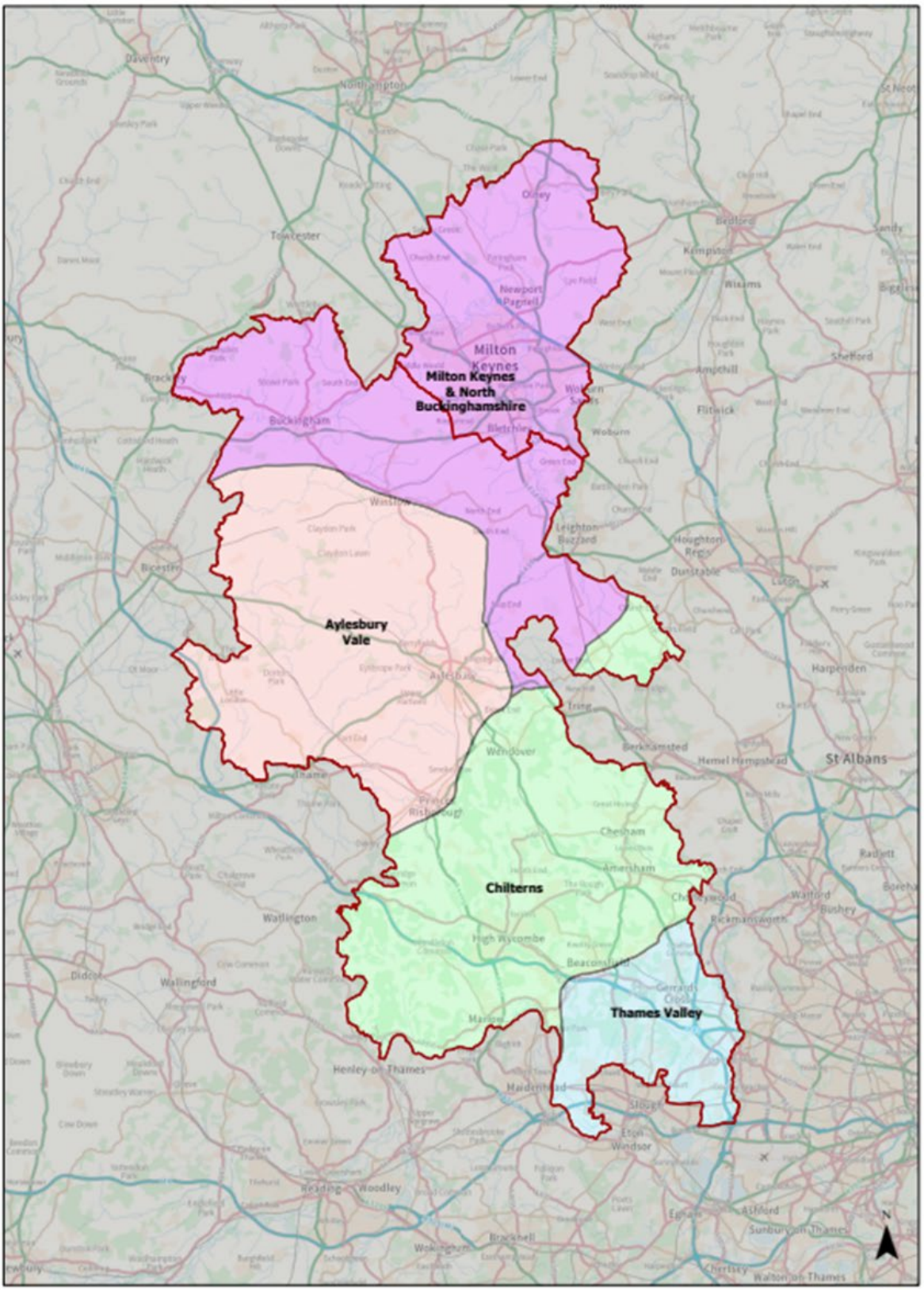
Figure 7. *Haymaking on the meadows at Campbell Park. Photo: MK Parks Trust.*

Buckinghamshire and Milton Keynes also boast wildlife-rich natural habitats that support rare species such as hazel dormice, black hairstreak butterflies, wading birds, many species of bat, the **Chiltern Gentian** and **Chalkhill Blue butterfly**, alongside **otter** and **water vole**.

Figure 8. *Hazel dormouse in the hand. photo: Clare Gray (Gwent Wildlife Trust).*

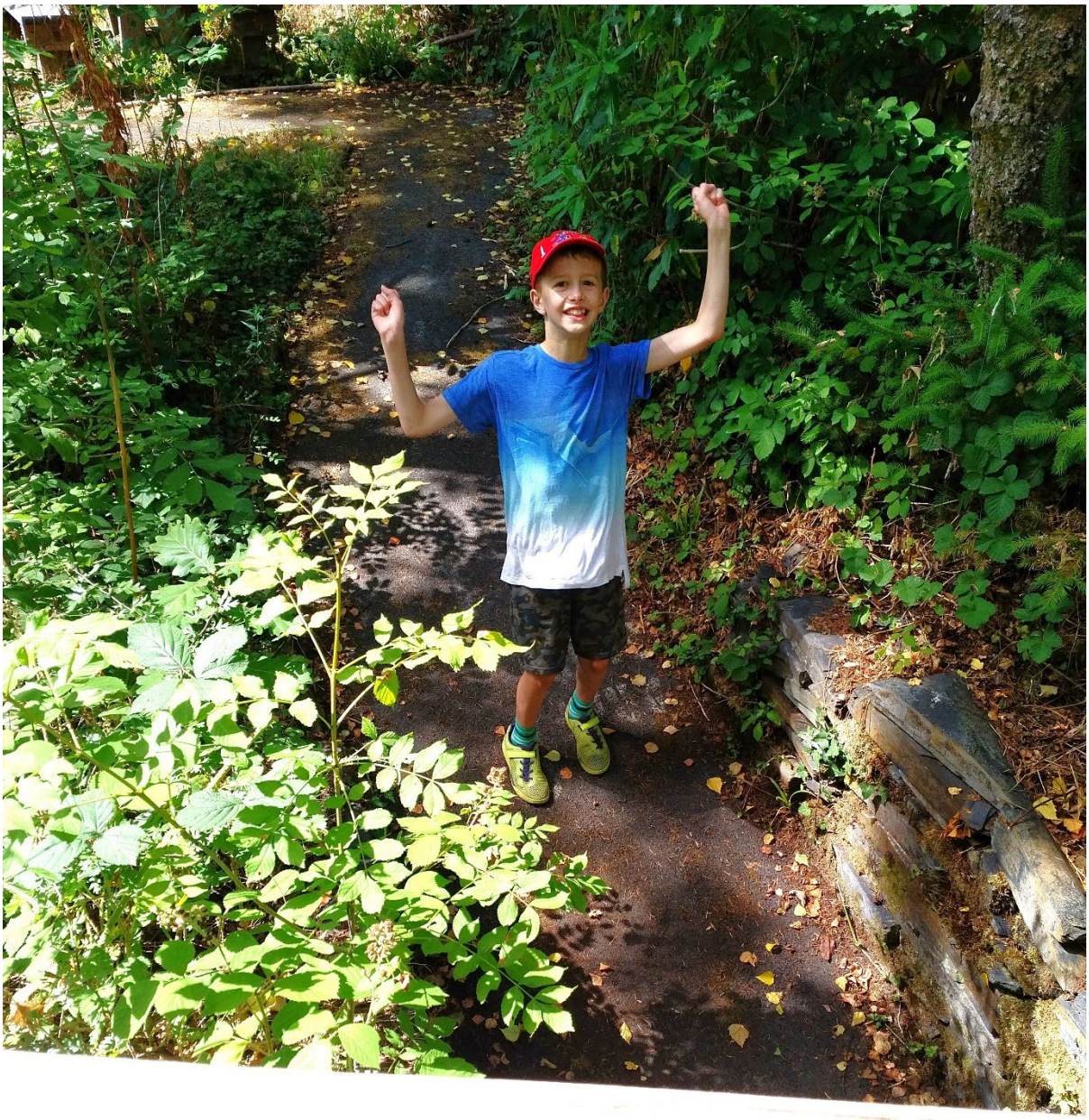
For the purposes of constructing the LNRS, we gathered information and evidence around four LNRS zones within Buckinghamshire and Milton Keynes, based on underlying areas of similar landscape character, geology and ecology, or “national character areas”.

***Figure 9**. The four "LNRS zones" in Buckinghamshire and Milton Keynes, based on underlying National Character Areas, used for producing the LNRS.*



Our description of Buckinghamshire and Milton Keynes also covers the benefits from nature for wildlife and people – ranging from improved air and water quality, reduced flood risk, carbon storage and sequestration, noise regulation, food provision and various health and wellbeing benefits. The LNRS process takes into account these wider benefits, both to nature and to people, when identifying where best to locate the measures (actions) that will make the most difference to nature recovery.

Figure 10. *Nature's benefits to health and wellbeing Photo: Nicola Thomas, NEP.*



The wide-ranging and important benefits from nature are under threat from pressures that are depleting biodiversity severely, globally to locally, including climate change and development.

However, there are many ways in which nature itself can help provide solutions to these threats – for example planting upstream can slow the flow of water and help reduce flood risk; vegetation in urban areas can provide shade and cooling in a heating world and help reduce air pollution; and better soil health and land management can help reduce sediment and chemicals runoff to water courses, and can lock in carbon.

Please click on the information about our strategy area that you would like to find out about from the list below. The full suite of information here makes up our "description of the strategy area" requirement of the LNRS (output 1 of the LNRS).

- ***Full description of nature in our four LNRS zones:*** *See here [Our four "LNRS zones" in Buckinghamshire and Milton Keynes: habitats, species, pressures and opportunities] for a full description of nature in our four "LNRS zones", describing for each, the landscapes, habitats, important species, pressures and opportunities for nature.*

- ***Nature's Benefits:*** *See here* - [*Natural Capital – a summary of the area's nature benefits to people, nature and the economy*] *for a description of our area's natural capital and nature's benefits in the four LNRS zones.*

- *Click here [Why we need a Local Nature Recovery Strategy] for more information about the* ***pressures on nature.***

- *Click* here [*Opportunities for Nature Recovery*] ***for the opportunities for nature recovery*** *that apply right across Buckinghamshire and Milton Keynes.*

- *Click here for a* ***narrative tour*** *of the landscapes, habitats and species in Buckinghamshire and Milton Keynes and a summary of habitat types, amounts and their distribution [Nature in Buckinghamshire and Milton Keynes - our range of landscapes, habitats and associated Species*]

- ***What, how much and where?*** *To read about habitat types, amounts and their distribution, including a map showing broad habitat types and a description of locally important and priority habitats, click here: [*Where our broad habitat types are located; *also see the data table at Appendix C Landcover by habitat data]*

- ***Historic change over time:*** *A summary of how our habitats have changed over time can be found here [How our habitats have changed over time] or see Appendix G [Historic Analysis] for the full report.*

- ***Species - Local habitats important for scarce or declining species*** *– [see Section 5, Important Species] and the outputs of our species work here: Appendix M Species Mapping including Target Areas and Appendix N Species Shortlist*

- **How did we do it?** Select the Step 3 methodology statement from Appendix I, *Methodology statements*, to read about how we produced the description of the strategy area.

Locally important habitats: our baseline, or "Area of Particular Importance for Biodiversity" map

The LNRS process requires a baseline map to show 'areas of particular importance for biodiversity', or 'APIB' – which must include:

- National conservation sites
- Other areas of particular importance required by the LNRS guidance:
  - Local wildlife sites (Local Wildlife Sites and other sites with equivalent status in the planning system)
  - Irreplaceable habitats (defined according to the LNRS guidance)
  - Other areas identified by the Secretary of State (not provided for this round of LNRSs)

Our required **LNRS APIB map** was put together involving local experts, including, the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) and is available *here*.

The APIB map shows areas of particular importance that already exist for biodiversity across Buckinghamshire and Milton Keynes, and have been fed into the LNRS mapping process.

Our local experts also considered that additional areas were particularly important for biodiversity and should be included in the LNRS work. This analysis identified additional habitats considered locally to be "irreplaceable", such as chalk streams, as well as several other priority habitats.

The additional habitats considered of equal importance as "irreplaceable" locally, are all priority habitats. Although these additional sites are not displayed in the required APIB map, they have been captured within our final Local Habitat Map either because they are picked up within various "enhance" measures relating to existing sites, or because they are already in the APIB as a designated site.

Links: *Our baseline (APIB) map showing areas of particular importance for biodiversity – including national conservation sites, Local Nature Reserves, local wildlife sites and irreplaceable habitats is available here. A summary of how the APIB map was constructed is available at the Step 5 mapping methodology statement, available at Appendix I Methodology statements*

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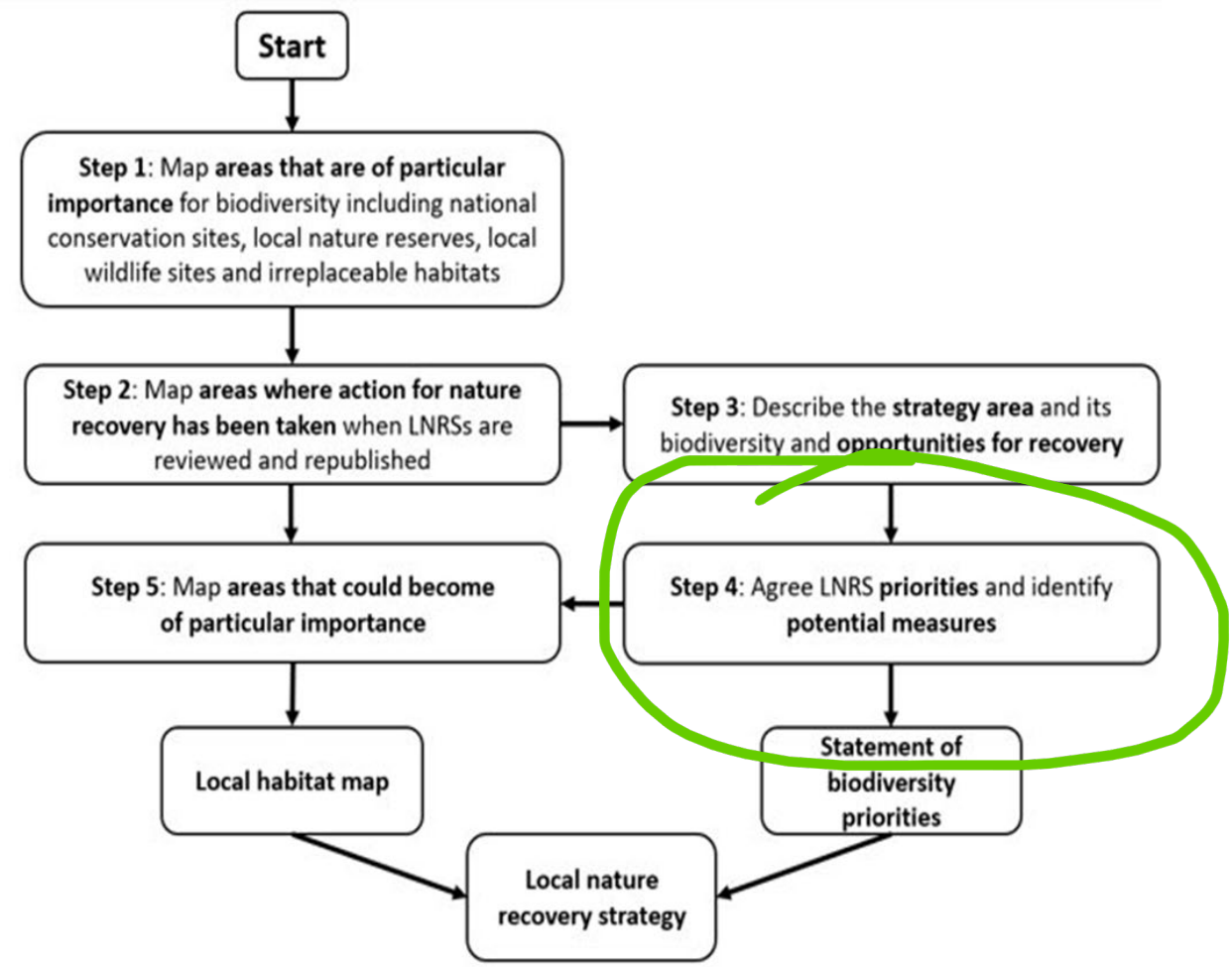
1.4 Priorities and Measures for Nature Recovery

As part of the LNRS, we are required to identify and agree priorities for nature recovery and potential measures, or practical actions, to support achieving them. This is step 4 of the LNRS process:

***Figure 11**. Order of steps to be followed in preparing contents of a Local Nature Recovery Strategy (Source: Local Nature Recovery Strategy Statutory Guidance. UK Government, 2023).*



Our agreed priorities and potential measures are available on the consultation portal

What we mean by LNRS "priorities" and "measures" is described below, along with the process we followed to produce the agreed shortlist of priorities and potential measures, alongside links to more detailed explanations of what else is shown in the priorities and measures shortlist.

What are priorities and measures?

Priorities are "the end results that the strategy is seeking to achieve" (LNRS statutory guidance, Para 51). They are the objectives for the LNRS for recovering or enhancing biodiversity. They focus on habitats and species, as well the improvement to the wider natural environment that can be achieved by conserving and enhancing those habitats and species.

For example, tree planting can improve a habitat for wildlife – but trees can also contribute to action against climate change, providing a "**nature-based solution**" to improved air quality or can help slow the flow of water and reduce flooding risks downstream. Similarly, creating wetlands may provide valuable habitat to wading bird species, but also improve the water environment. These benefits beyond direct nature recovery are known as "**wider environmental benefits".**

Measures are the "specific practical actions" (LNRS statutory guidance, paragraph 51) **that, if taken, would make positive contributions to achieving the priorities.**
Most of the measures relate to ways of enhancing existing habitats or creating new habitats. There may be a number of measures that would need to be carried out to support any one priority. Similarly, one measure may help achieve a number of priorities.

Our agreed list of priorities and measures for nature recovery across Buckinghamshire and Milton Keynes is the result of both extensive stakeholder engagement, consideration of existing relevant plans and strategies covering the area, as well as expert input. This way, the priorities reflect local circumstances and build on the most important issues identified by local people and organisations for nature recovery. The final list also contributes to a balanced range of national environmental objectives [see Appendix *L: National Environmental Objectives*] and wider environmental benefits.

The priorities and measures are the backbone of the LNRS. They build on the area's existing and important landscapes, habitats and species, working to address the challenges and build on nature recovery opportunities, as outlined in our Description of the LNRS area . **Identifying the best places to carry out the measures is the main purpose of the LNRS –** which are summarised in the final *Local Habitat Map*. [To read about our mapping methodology, select the step 5 mapping methodology statement at Appendix *I, Methodology statements]*

The area's priorities and measures for nature recovery connect the area's existing biodiversity, and pressures and opportunities facing it, to the LNRS map which displays the best places for nature recovery opportunities.

About our agreed shortlist of Priorities and Measures

Themes: a way to organise our priorities and measures and communicate the overall purpose of our LNRS

Our final shortlist groups all 22 of our priorities for nature recovery into nine nature recovery "**themes**". These overarching themes help to summarise the main common purpose of several priorities taken together. We felt that the nine themes also help to communicate the overall purpose of the nature recovery strategy and makes the final shortlist more manageable. There are then 119 measures in the final list that, if taken, would help to deliver the shortlisted 22 nature recovery priorities. A summary of our themes and priorities is provided in the diagram below.

Our full agreed shortlist of priorities and potential measures for nature recovery displays all nine themes, and captures the 22 priorities and the underlying 119 measures and is available on the consultation portal.

Themes and priorities in the Buckinghamshire and Milton Keynes LNRS		
THEMES arising from shortlisting of priorities	**Priority number**	**PRIORITY description**
THEME 1: **Conserve, create enhance and restore land-based habitats**	1	Conserve, create, enhance and restore trees and woodland habitats
	2	Conserve, create, enhance and restore hedgerows and field margins
	3	Conserve, create, enahhnce and restore species-rich grasslands
	4	Conserve, create, enhance and restore heathlands
	5	Conserve, create, restore and connect chalk and limestone (lowland calcareous) grasslands
	6	Conserve, create and enhance traditional orchards, open mosaic habitats and other important sites
	7	Strategic enhancement, expansion and linking of our existing high value sites and areas
	8	Reduce recreational pressure on irreplaceable, priority and other important habitats
THEME 2: **Improve rivers, their floodplains and the quality of their waters**	9	Renaturalise river habitats using appropriate habitat restoration techniques and enhance the ecological value of river corridors and their floodplains
	10	Improve river water quality
	11	Conserve, enhance and restore chalk streams
THEME 3: **Conserve, create, enhance and maintain wetland habitats**	12	Conserve, create, enhance, restore and connect exising ponds, rivers, lakes and lagoons to create a diversity of wetlands and pond sizes and depths to maximise and increase biodiversity
THEME 4: More Farmers and rural land managers to adopt **wildlife-friendly land management** practices and take action to **improve soil health**	13	Farm businesses and rural landholdings enhance and create connected and diverse wildlife-rich habitats across the landscape as an integral part of their businesses, recognising the importance of wildlife for pollination, crop and soil and water health.
	14	Improve soil health by increasing micro-organisms, animals and plants living within the soil, improve soil structure and increase organic matter. This will increase soil fertility, water retention, lock up carbon, and reduce the need for chemical fertilisers and pesticides.
THEME 5: **Improve biodiversity in built-up areas**	15	Manage existing green and blue spaces in built-up areas better for wildlife
	16	Create more space for nature when designing new development
	17	Provide habitats for nature along and around transport infrastructure
THEME 6: **Create connections between high quality areas for wildlife and habitats to flourish**	18	Connect habitats to make wildlife corridors and stepping stones at landscape scale
THEME 7: **Manage the effects of a changing climate and improve air quality**	19	Use nature to capture carbon and weaken climate change
	20	Adopt nature-based solutions to address climate change impacts, water management and improve air quality
THEME 8: **Tackle non-native invasive species, pests and diseases**	21	Reduce and prevent the spread of non-native invasive species, pests and diseases which can occur in high densities to the detriment of a broader range of wildlife
THEME 9: **Improve the environment for important species**	22	Conserve, create, enhance, restore and connect specific areas that are important for the area's important species

Figure 12. *Our 22 shortlisted priorities for nature recovery, grouped into nine themes*[2].*

Wider environmental benefits

Measures in the shortlist, if taken, will support achievement of the relevant priorities. However, alongside the nature recovery priority that each measure is listed within, many of the measures will also help achieve multiple wider environmental benefits, and in multiple ways.

Rather than list all the wider environmental benefits that each priority or measure contributes to, our final agreed priorities and potential measures list identifies the key wider environmental benefits that a particular priority is *particularly good at* delivering. This shows the range of wider benefits that each measure can contribute to, alongside a measure's contribution to the main habitats or species for nature recovery.

National Environmental Objectives

The LNRS process also requires us to ensure that our final shortlist of priorities and measures contributes to a "balanced range of the national environmental objectives" that LNRSs are aiming to support. Our list therefore states the national environmental objectives (NEOs) related to each set of priorities and measures to show this contribution. The full list of NEOs that we were asked to consider is available at Appendix *L [National Environmental Objectives*].

How we identified and agreed on our shortlist of priorities and measures

The priorities for nature recovery were shortlisted from ideas and inputs from a wide variety of stakeholders and from existing relevant publications, plans and strategies, alongside expert input.

In summary, and in line with Defra's LNRS guidance on "identifying and agreeing priorities and potential measures within LNRSs", we:

1. Asked stakeholders about their priorities for nature recovery:
    - 10 workshops in March and April 2024, among 6 sectors (farmers / land managers; public; town and parish councils; businesses; developers; environmental organisations) across Buckinghamshire and Milton Keynes (147 participants)
    - Buckinghamshire Youth Summit survey (40 secondary school respondents)
    - Survey to stakeholders throughout Buckinghamshire and Milton Keynes in July – August 2024 (444 responses)

2. Reviewed existing plans and strategies that could support the Local Nature Recovery Strategy to identify priorities and measures – such as Local Plans and the area's Biodiversity Action Plan. [See Appendix K, page 126 for the plans and strategies that were reviewed to inform the LNRS and how they were captured]

2. Collated all the information and identified which inputs should be priorities for nature recovery and which were measures that could help achieve the priorities.

3. Scoped the priorities to make a longlist – removing any that didn't relate to nature recovery and so are outside the legal scope of what an LNRS is designed to achieve.

4. Shortlisted the priorities – using specific and agreed criteria, including whether the priority covers habitats and species important for the area, whether it helps to achieve national environmental objectives, the urgency of the issues and frequency of mention. See the shortlisting methodology within the Step 4 methodology statement "data analysis methodology" available via Appendix 125

4. Identified corresponding measures to achieve the priorities – taking ideas from stakeholder input and existing plans and strategies already identified, and also bringing in experts to review specific themes related to the habitats and species identified.

5. Consolidated, simplified and refined the shortlist to make it manageable – mainly undertaken by the Core Group, Steering Group and theme experts.

6. Reviewed the shortlisted priorities and measures to ensure they contributed to a balanced range of National Environmental Objectives, that they addressed the opportunities and pressures identified at Step 3 of the LNRS process, that they covered the variation of landscapes and ecosystems, balanced contributions from the different types of stakeholders and ensured there is a manageable number of agreed priorities. Section 8 (*Our Shortlisted Priorities and Potential Measures – and their links to pressures on nature and opportunities for nature recovery)* describes and evidences the link between the shortlisted themes, priorities and measures and the pressures and opportunities for nature recovery.

Locations and "co-benefits" – not used in shortlisting but logged to inform final mapping

In creating the priorities shortlist, and in line with released guidance, the specific locations of any measures mentioned by stakeholders were not brought into the shortlisting process. However, these are displayed within the final set of priorities and measures and are taken into account during the final mapping.

Co-benefits (i.e. priorities not related to species, habitats or nature, but that relate to other benefits such as human health and wellbeing, education or access) were also scoped out of the LNRS shortlisting stage as required by the statutory guidance. A list of co-benefits identified was kept, again for use at final mapping stages. Three key co-benefits were identified by stakeholders during engagement and were logged:

- **Nature as an education resource**- to encourage reconnection to nature / to manage the environment / about food choices, soil health
- **Nature to improve mental and physical health and wellbeing** – including better access to nature
- **Nature to help build professional skills** - e.g. via citizen science and helping to monitor nature

You can read more about how we created and finalised the priorities and measures in our methodology statement which is available on the consultation portal. Our process is in line with national guidance produced in November 2023 for "*Identifying and agreeing priorities and potential measures within Local Nature Recovery Strategies*". *Appendix K* lists the existing plans and strategies that fed into the shortlist, and *Appendix L* lists the National Environmental Objectives we were required to take into consideration in finalising the shortlist.

Direct and supporting measures

The process of scoping and shortlisting the priorities and associated measures resulted in a list of measures that were not all directly related to action on the ground for habitats, species or wider environmental benefits, as suggested by the guidance, but which still would be necessary to achieve a strategy priority.

We have therefore labelled our measures as to whether they are **"direct**" (related to on-ground work to enhance habitats or create new ones) or "**supporting**", or more indirect, but nevertheless important to achieve the shortlisted priorities.

Mapped and not-mapped measures

Not all of our direct measures were mapped in the final LNRS Nature Recovery Opportunities Target Map. This could be because a certain measure could be suited to such an extensive area across Buckinghamshire and Milton Keynes that mapping it would not help to target nature recovery (e.g. M17, establish, connect, restore and manage

hedgerows). In effect, this means the measure is a viable option for nature recovery extensively and mapping it would mean most of the area would be identified.

Other measures were not mapped if data or information was not available to allow the measure to be mapped accurately or appropriately (e.g. M14, maintain existing wet woodland with appropriate management of water level; or M72, reduce pesticide use by alternative methods of removal or management).

Our shortlist of priorities and measures for nature recovery in Buckinghamshire and Milton Keynes [*Appendix O, Our Shortlisted Priorities and Measures*] contains 119 measures, of which 79 are direct measures and 40 are supporting measures. 52 of the total set of measures (around 44%) are mapped.

1.5 Important Species

Role of LNRSs in tackling pressures on our species

The State of Nature Report 2023 disclosed that nearly 1 in 6 species are threatened with extinction from Great Britain. Evidence suggests that we are well on our way to a 6th global mass extinction event and that action must be taken quickly to reverse the decline in species abundance and distribution.

The UK Government has signed an international agreement to halt species loss by 2030 and has set interim targets to ensure overall species abundance is increasing by 2030, and increasing by 10 percent by 2042, compared with 2030.

To support the reversal of the decline in species abundance and distribution, Local Nature Recovery Strategies (LNRS) must describe opportunities, set priorities, and propose potential measures (actions) for the recovery and enhancement of species.

The LNRS contains a shortlist of species that require direct action, over and above standard management practice for a habitat and where action for that species can be delivered through the implementation of the LNRS. The shortlist of species document is available on the consultation portal.

Figure 13. *Fly Orchid. Dancersend. Photo: BMERC.*

How we created the species shortlist

Species prioritisation in the Buckinghamshire and Milton Keynes LNRS

The species prioritisation was led by Buckinghamshire and Milton Keynes Environmental Record Centre (BMERC). Throughout the process of creating and refining the long and resultant Species Shortlist, Target Areas for Important Species, and key ecological Niches, partners were invited into the process. Many generously provided support, data, guidance and technical expertise at various stages. Consultees comprised representatives from across the landscape of conservation organisations and individuals.

Creating a longlist of threatened species for Buckinghamshire and Milton Keynes

Data was collated from a range of sources for species that can be found in Buckinghamshire and Milton Keynes and are considered threatened, namely:

- Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC)
- National recording schemes (such a Butterfly Recording Scheme, Breeding Bird Survey, National Plant Monitoring Scheme, Spider Recording Scheme, Fungal Records Database of Britain and Ireland etc)
- iRecord
- National Biodiversity Network Atlas referenced records
- County recorders
- Local and regional experts

The following criteria were used to decide which species to include on the longlist:

- Species that were considered threatened on the International Union for Conservation of Nature Red List for Great Britain and England
- For invertebrates, species highlighted within the Centre for Ecology and Hydrology's Pantheon system were used also to reflect updates in knowledge on that species, its rarity and level of threat. Pantheons concept of Species Quality Indices was used as an additional source of data, higher SQI species were added to the longlist, if they had not already been flagged for inclusion under the Red List status sifts.
- There were recent records within the LNRS area
- There were recent records close to the border of the LNRS area
- Records that are verified sources

Through a range of stakeholder engagement activities, the list of species was sense-checked to remove records that local experts considered questionable (e.g. were single records of species that were likely to be just passing through, accidental releases or incorrectly identified, or the record was too old and the species likely extinct). Species were added where it was considered that the LNRS area held a significant proportion of the national

population (e.g. Black Poplar), was of other local significance, or where climate change is altering the range of a species, and it is likely that it will appear in the LNRS area in the next 5 years.

Refining the longlist to create The Species Shortlist

In line with the national LNRS species guidance, species were not included in the shortlist if:

- Their needs could be covered by more, bigger, better and connected habitat as these needs aim to be met through the habitat related measures within the LNRS
- It is unclear what is causing their decline or on the ground action is not the main action needed to recover the species
- The factors constraining their recovery lie outside of England

Additionally,

- Species that were found only in single sites or the needs of the species are not well known
- Some species were grouped together, where those species had very similar needs

The species shortlist is available on the consultation portal.

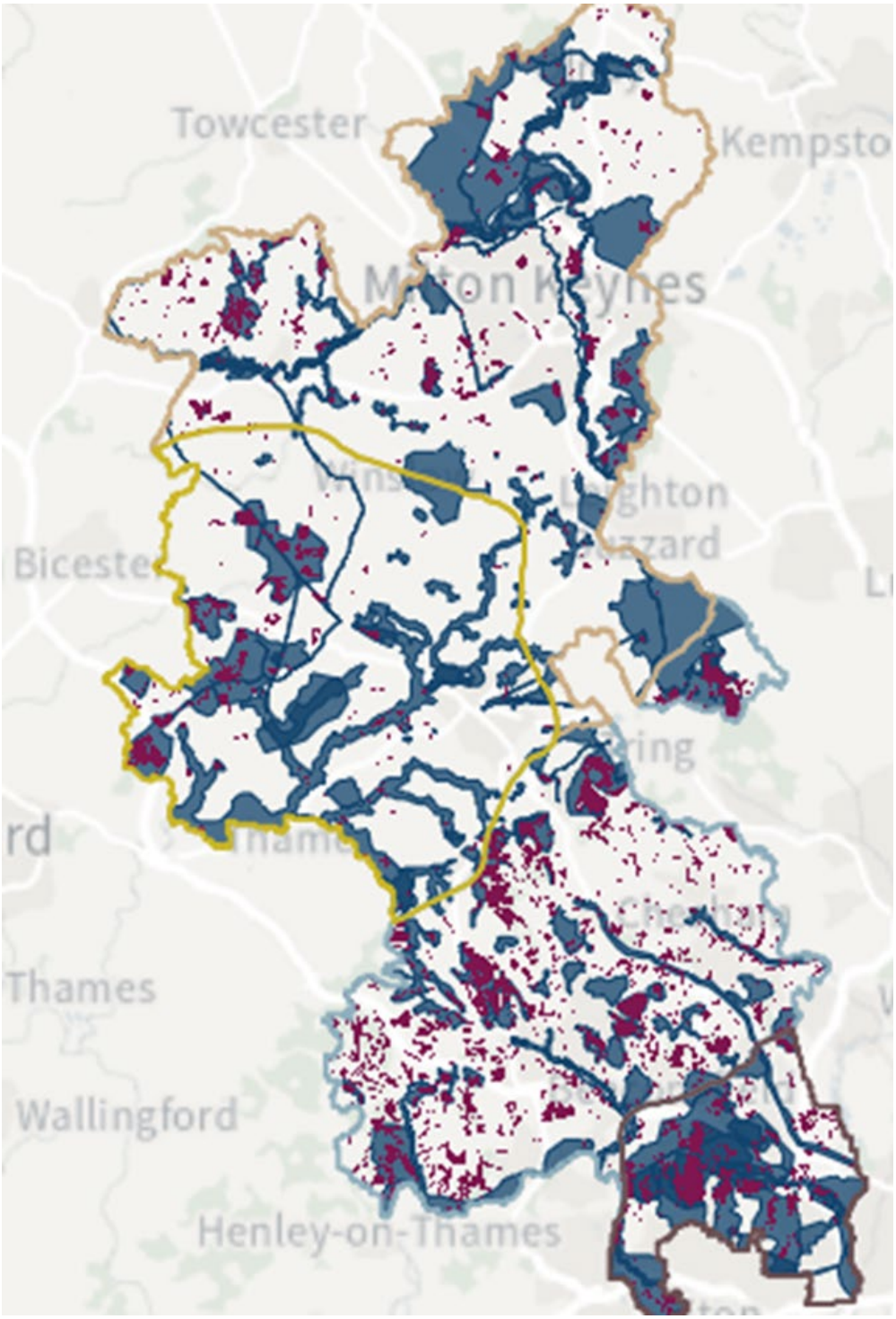
Target Areas for Important Species – an expert-led, data-supported approach

A large amount of data is gathered on where individual species occur across the LNRS. This data can tell us a huge amount about certain species, their population trends and general distribution. However, for the purposes of the LNRS – defining place-based measures (actions) for individual species across the LNRS area – the coverage of data is inevitably incomplete and imperfect. Some groups of species are well recorded, others less so. The reasons for this are varied, for example, access to private land may be difficult to obtain, some species require extremely specialist knowledge that may not be held locally or by so few people that coverage of the area may not be possible. Certain species can only be recorded by either damaging the habitat they inhabit or the species themselves. Records of species can be skewed around locations where recorders operate. For these reasons, an expert led, data supported, approach was taken to create a map to target areas for species.

Experts from across the range of species specialisms were invited to the workshops, to use the best-available data and pool their expert knowledge to highlight the key areas for species across the LNRS area. These Target Areas of Important Species were identified on the maps, noting which groups of species they were important for, species specific expansion buffers were added, and areas were linked (where biogeography suggested it).

Within the LNRS map, the areas can be selected to provide details of the species they are important for and then linked through to the document that provides information on the target area and the measures or actions that would best be taken to support those species. The Target Areas for Important Species table is available on the consultation portal. An overview of the map is provided here.

Figure 14. *Map of combined Target Areas of Important Species (blue) and APIB map (burgundy).*



Niches

Many species at threat have very specific habitat requirements, which cannot be met by the other measures (actions) in the LNRS. These very specific habitat requirements (niches) have been captured in the species shortlist. An introduction to how niches differ from Habitats of Principle Importance and descriptions of the niches highlighted for Buckinghamshire and Milton Keynes is available on the consultation portal.

Stakeholder engagement activities

Movement from the longlist to a more focussed shortlist and creation of specific target areas for action was managed through many stakeholder engagement activities, in various forms to encourage inclusion from across the biological recording and expert community. These ranged from one-to-one conversations to small group reviews and ultimately workshops. Two workshops (in Milton Keynes and Chesham) were created to garner wider and additional input.

The methodology statement for the species work can be found via Appendix I Methodology statements.

1.6 Local Habitat Maps

The LNRS process requires two outputs - a "local habitat map" and a written "Statement of Biodiversity Priorities".

In this section, we describe the mapping work completed to produce the local habitat map, and show and describe the findings.

The required "Local Habitat Map" actually contains two underlying maps:

1. **A baseline map** of the LNRS area showing existing "**areas that are particularly important for biodiversity**", known as the "APIB" map.
2. Looking more to opportunities for the future, the second is a map showing "**areas that could become of particular importance**" (or ACB) for nature recovery. This is effectively a map of future opportunities for targeted nature recovery.

The descriptions below summarise the work we did to create the maps, and describe what they show. If you would like to go straight to our maps they are available at our interactive LNRS mapping tool here.

Locally important habitats – our baseline Areas of Particular Importance for Biodiversity ("APIB") map

The LNRS process requires a baseline map to show 'areas of particular importance for biodiversity', or 'APIBs'. This is described in Section 1.3, Description of the LNRS area.

Our required **LNRS APIB map** was put together involving local experts, including, the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) and is available here.

This APIB map shows areas of particular importance that already exist for biodiversity across Buckinghamshire and Milton Keynes – including national conservation sites, local nature reserves, local wildlife sites and irreplaceable habitats.

Our local experts also considered that additional areas were particularly important for biodiversity and should be included in the LNRS work. This analysis identified additional habitats considered locally to be "irreplaceable", including chalk streams, as well as other priority habitats in the area. The additional habitats considered of equal "irreplaceable" status locally have been used to inform our final "target areas" map (see below).

Our Nature Recovery Opportunities Target Areas Map (Areas that Could Become of Particular Importance for Biodiversity)3

Our **LNRS final map** is available here. It shows the locations where LNRS measures (or practical actions) would be best suited to help achieve nature recovery.

The map plots a number of the shortlisted measures from our final priorities and measures shortlist. These are the measures that directly relate to habitats and species and wider environmental benefits, and for which a defined, or targeted, area can be identified, where significant uplift in biodiversity is possible.

The nature recovery opportunities target areas map shows *opportunities* for nature recovery. In particular, it shows areas where the measures identified to achieve the shortlisted priorities are most suited – known as "Areas that Could Become of Particular Importance".

The locations are based on underlying best-available data, and take into account existing habitat locations and type, topography, land use, soils and the location of various constraints including overhead power lines, all buildings and infrastructure or historic assets such as scheduled ancient monuments. Certain measures take into account other factors too, such as the provision of wider environmental benefits, the location of demand for these (e.g. access to nature in urban areas), typical dispersal distances for species and the permeability of the landscape.

Our full mapping methodology statement, explaining how the measures were mapped to identify the best locations for delivery, is available via *Appendix I, Methodology statements].*

The map and wider LNRS work DOES NOT:

- **Offer any new legal protections to land** for the purposes of nature recovery or otherwise, that create restrictions on how land can be used or managed. LNRSs do not propose new nature reserves or any other kind of legal designation.
- **Stop development, or place new restrictions on developing land** – LNRSs will be one source of evidence used to inform Local Plans that determine where development should occur.
- ***Require* action to be taken by land owners or managers as it is mapped** – this will always remain their choice. The LNRS is a set of options where actions make best sense for nature – based on considerations such as existing local ecology, habitats, species dispersal distances, geology, soil type and topography.

[3] These are known as "Areas that Could Become of Particular Importance for biodiversity"

- **Prevent nature recovery work in areas not prioritised by the LNRS.** The LNRS does not mean that areas within mapped locations are the only places where nature recovery actions should take place. We encourage action everywhere.
- **Determine regulatory decisions,** such as the result of Environmental Impact Assessments.

In total, our mapping covers the following percentage of the Buckinghamshire and Milton Keynes land area:

- Areas of Particular Importance for Biodiversity map – **8.5%**
- Areas that could become of particular importance for Biodiversity – **30%**
- Areas that could become of particular importance with the species target layer – **41%**

How the map should be used - providing opportunities for any one plot of land

LNRS have been designed to be a tool with many uses but fundamentally they are about informing what type of habitat to create where for greatest environmental benefit. They represent an opportunity to target, align and integrate action for nature's recovery that delivers the greatest overall benefit.

LNRS are designed to work with other legal requirements of the Environment Act 2021

- **Targeting Biodiversity Net Gain.** LNRSs will determine where habitat creation or enhancement for BNG will be of 'high strategic significance' and benefit from a 15% uplift in the statutory biodiversity net gain metric
- **Duty of public authorities to conserve and enhance the environment.** LNRSs will inform how all public authorities (water companies, government departments), in England meet their legal duties to conserve and enhance biodiversity. This could be through:
    - managing areas of land they are responsible for in a way that supports what the LNRS proposes.
    - using the LNRS to inform relevant regulatory decisions that enable others to do so.
- **Planning.** Guidance is awaited from the government to explain how Local Planning Authorities must comply with their duty to have 'particular regard' to LNRS.

As well as the legal role detailed above, the LNRS maps are designed to be used as follows:

- **Farmers/land managers**
    - The LNRS map will provide information to farmers and land managers to help them choose which Countryside Stewardship and Sustainable Farming Incentive options would be appropriate for their land.

  - The LNRS map will help groups of farmers and land managers shape nature recovery priorities for their area, and encourage collaboration across holdings and landscapes.
  - The LNRS maps help identify opportunities for Landscape Recovery project proposals, and provide evidence to support their application and project development.
  - LNRSs will inform how Defra's arms length bodies carry out existing functions to better support nature recovery. For example, drawing on LNRS priorities and proposals when providing land management advice to farmers, or when selecting locations for nature-based solutions such as natural flood management and tree planting.

- **Councils**
  - LNRSs will be used to determine where habitat creation or enhancement for Biodiversity Net Gain (BNG) will be of 'high strategic significance'. This means that creation or enhancement of habitat to generate biodiversity units for the purposes of biodiversity net gain gets a 15% uplift in the biodiversity metric, if that creation or enhancement follows what is set out in the LNRS.
  - LNRSs will inform the preparation of Local Plans enabling them to more effectively identify, map and safeguard areas for nature recovery, as required by national planning policy.
  - LNRSs will be one source of evidence used to inform the preparation of development plans which will determine where development should occur. These plan preparation processes have their own consultation and engagement requirements so that different needs for land can be balanced by the plan maker.

- **Environmental Non-Governmental Organisations**
  - LNRSs can leverage and target funding for environmental projects by LNRS Responsible Authorities and delivery partnerships (e.g. Local Nature Partnerships).

- **Business/private sector**
  - LNRSs can be used to inform where private companies choose to provide corporate donations for habitat creation or enhancement projects that deliver LNRS proposals.

- **Protected Landscape**
  - LNRSs will inform the development and implementation of a Protected Landscape management plan for the Chilterns, by identifying locations and

measures that will drive delivery of the agreed targets and outcomes set out in this plan.

- **Wider use**
    - LNRSs will be used as criterion by Government when considering applications for funding for specific nature recovery activities.
    - To leverage and target funding for environmental projects where they could have the most impact for nature and wider environment.
    -

LNRS and Biodiversity Net Gain

The Environment Act 2021 created a new biodiversity net gain requirement for planning permissions. Developments will have to leave the natural environment in a measurably better state than it was before. Project leads, such as developers, must use the statutory biodiversity metric to calculate the biodiversity net gain of a project or development.

Development projects that create, enhance or recover habitat in locations which are mapped in the LNRS will get a higher biodiversity value in the biodiversity metric than they would in other locations. This is because they are in a more strategic location for nature recovery.

The LNRS is mapping the right habitat in the right place, whilst at the same time recognising that often this will be a range of habitats and mosaics in preference to large blocks of specific habitats. As such in some areas a number of measures have been mapped to allow for that flexibility. Whilst the LNRS has been prepared using the best available data it recognises that soil/ground conditions may indicate that the higher distinctive habitat in the mapped measures in the ACPIB is not achievable or appropriate and in these circumstances other priority habitat and mosaics will be considered that are consistent for that location.

How we produced the maps

Further information about how we constructed the maps and who was involved can be found in our detailed methodology statement that is available within the combined methodology statements document on the consultation portal.

1.7 Next steps – LNRS Delivery

Our Local Nature Recovery Strategy will help people to spatially see where action to recover nature in their area would be most effective. Collectively this will support the governments' overall ambition to halt the decline in our biodiversity so we can achieve thriving plants and wildlife.

The proposals in our LNRS are intended to guide where public, private and voluntary sectors best focus our collective nature recovery efforts and funding for greatest collective impact. We all have a part to play in delivering this shared vision and partnerships between these sectors will become increasingly important in the delivery of nature recovery measures and relevant funding mechanisms.

We have learnt through the extensive stakeholder engagement process that there is a clear willingness to deliver measures for nature's recovery and that delivery partners are very active across the whole LNRS area. As such we need to make best use of existing advice, collaboration and delivery networks i.e. Local Nature Partnership and farm clusters to help unlock opportunities and join projects to both public and private funding.

The Government has put in place a package of measures to encourage and support people to carry out proposals in each local nature recovery strategy. The measures include:

- a new duty on all public authorities to have particular regard to relevant local nature recovery strategies
- an incentive in how the new requirement for biodiversity net gain is calculated - to recognise the added impact of taking action where the local nature recovery strategy proposes
- integration of local nature recovery strategies into the planning system, so that areas of greatest potential for nature recovery can be better reflected in planning decisions
- funding for specific activities that local nature recovery strategies will be expected to propose locations for i.e, environmental land management scheme, woodland creation fund, protected species funding, natural flood management funding etc

Together these measures will help generate momentum and encourage all those who helped shape the strategy to take further action to support its delivery.

Following formal approval of the LNRS, there will be a link in the online mapping portal to allow stakeholders to record projects that are being implemented to help deliver LNRS measures and thus help us record and keep track of what action is being taken and where.

As a designated Responsible Authority, Buckinghamshire Council will then be required to review progress periodically and to update the strategy to reflect what has been done and where more action is needed.

LNRS OUTPUT 1: STATEMENT OF BIODIVERSITY PRIORITIES

Description of the strategy area and its biodiversity and opportunities for recovery

1) Why we need a Local Nature Recovery Strategy

Nature and its benefits are important but are under threat

Biodiversity is the key to life. Our range of habitats and species provide food, water, shelter and so resilience for wildlife. We also rely on nature to provide many benefits to people – including clean air, water, productive soil, flood protection, control of diseases and space for recreation.

But globally, biodiversity is declining faster than at any time in human history. In the UK, around 41% of the UK's species have declined in recent decades and a quarter of the UK's mammals face extinction. **Our natural world faces real and significant pressures**, at all scales – from climate change to development to pests and diseases**. These pressures threaten not just nature and biodiversity, but all of nature's benefits** that we rely on that underpin society and economic prosperity. **Biodiversity loss and nature degradation is therefore a concern and threat to all of us.**

In common with other parts of the UK, particularly the developed south-east, Buckinghamshire & Milton Keynes have severely damaged ecosystems as a result of **pressures** including climate change, population growth and development, changes in land use and unsustainable land management, river channel alternation, pollution, the overuse of resources, generation of waste, and invasive non-native pests and diseases.

Nature provides solutions to many of the pressures it currently faces. The way we manage our land and encourage nature has a significant part to play in tackling these pressures, such as helping to address flood risk or the impacts of climate change.

Nature recovery means restoring habitats for wildlife, supporting species and supporting nature to provide wider environmental benefits. A thriving natural environment locally is in all our interests – to help tackle the threats that nature faces that affect us too, and to ensure nature continues to provide its benefits to all.

The Local Nature Recovery Strategy follows a process set by the government to identify the priorities for nature recovery in Buckinghamshire and Milton Keynes, and how and where best to achieve them. The Local Habitat Map is a targeted map of nature recovery opportunities to identify where action should be taken to make the most difference.

Find out more about what the LNRS is and why it is important here
Find out about why nature is important here
Find out more about the pressures on nature that our LNRS area faces here

Nature is important

1. Biodiversity is the key to all life. Our wildlife relies on the diversity of habitats and species to provide food, water and shelter for survival. For people too, we rely on nature's benefits – for food, clean and plentiful water, clean air, productive soil, flood protection, control of diseases, shading and cooling, and space for recreation, education and wellbeing.

2. Biodiversity is also crucial to tackling climate change as well as to our entire private, commercial and public infrastructure. A sustainable local economy will require our land resource to be ecologically robust on a landscape-scale and provide the fullest spectrum of wider ecosystem benefits. A thriving and diverse natural world is the foundation of our health, prosperity, identity, and heritage.

3. However, our natural world faces real and significant pressures that threaten our wildlife, habitats and species - and which also threaten all the wider benefits that nature provides that we all rely on.

Nature, and all its benefits, are under threat

4. Globally, we are in the middle of a mass extinction event. Biodiversity is declining faster than at any time in human history. Since 1970, there has been an almost 70% decline in the global populations of mammals, birds, fish, reptiles and amphibians. Around a quarter of the world's animal and plant species, amounting to around 1 million species, are threatened with extinction[4].

5. In the UK, around 41% of the UK's species have declined in recent decades and a quarter of the UK's mammals face extinction.[5] More than half of our flowering plants, mosses and their relatives have been lost from areas where they used to thrive[6]. The UK is also one of the worlds' most nature-depleted countries, in the bottom 10% globally, with an average of around half its biodiversity left – far below the global average.

6. Given the benefits nature provides to all of us, it is vital that we restore and improve nature urgently. But nature in Buckinghamshire and Milton Keynes faces many pressures acting at different scales and often acting together. We need to work differently and at scale, to recover nature faster, to guard against and to help provide solutions to these pressures.

[4] IUCN Red List of Threatened Species – one in four are at risk of extinction
[5] National Biodiversity Network (2019) State of Nature 2019. Available at: State of Nature 2019 Reports - National Biodiversity Network
[6] State of Nature Partnership (2023), "State of Nature" Available at: TP25999-State-of-Nature-main-report_2023_FULL-DOC-v12.pdf

Pressures on nature in Buckinghamshire and Milton Keynes

Buckinghamshire and Milton Keynes may look green, but our nature, and all the benefits it provides, are under threat.

7. The green landscapes across Milton Keynes and Buckinghamshire disguise dramatic recent declines in species diversity and abundance. These have been caused by pressures on nature including climate change, development, changes in farming and land management practices, and river channel alteration, higher demand for drinking water and pollution, including in our rare chalk streams. Locally, none of our internationally-rare chalk streams are in a "good" ecological status.

8. The main pressures facing habitats and species now and into the future across the whole of Buckinghamshire and Milton Keynes are described below.

Climate change

9. Rainfall patterns are changing, sea levels are rising, as is the risk of heatwaves, floods, droughts and fires. Seasonal changes, heat stress and the rise in pests and diseases, for example, are causing losses in biodiversity – affecting wildlife and crop growth and human health. Global temperatures have risen more than 1^0C since the 1850s, and the 6 years from 2015 to 2020 were the hottest ever recorded[7]. Climate change is a significant global pressure on nature but is a real and present threat locally. As a result, we have seen deteriorating woodland, wetland habitats and for rivers, extremes of flow, in drought then flood conditions. Climate change also exacerbates the impact of other pressures acting locally.

Major development, including new infrastructure and disconnection

10. Changes in land use, such as from development, mean less spaces for nature. Between 1990 – 2023 Buckinghamshire and Milton Keynes combined experienced nearly 58% increase in built-up areas[8].

11. Development needs, for example, due to growth in demand for housing, can lead to either direct habitat loss or more fragmented habitats. It can also lead to indirect impacts on nearby wildlife, for example, through visitor pressure, as has happened recently at Burnham

[7] Statistics taken from the Met Office website, accessed October 20204 available here: Effects of climate change - Met Office

[8] Natural Capital Solutions (2024), The changing habitats of Buckinghamshire and Milton Keynes: A historic perspective over 90 years. Available at: Changing habitats over time in Bucks and MK – Buckinghamshire & Milton Keynes Natural Environment Partnership

Beeches and Ashridge,[9] alongside rising demand for resources such as water, and more waste being generated.

12. Habitats that are disconnected by major development can become isolated and fragmented, and major infrastructure projects such as HS2 can create a barrier to species movement. Recent analysis suggests 2,800ha of land allocated under Local Plans or to HS2 in Buckinghamshire means we will lose 12.7has of ancient woodland, an irreplaceable habitat, in the near future [10].

Changes in farming practices since 1945 (intensification)

13. Intensification of farming has resulted in a loss of farmland birds, arable weeds and many kilometres of hedgerows have been removed or left unmanaged, leading to their gradual loss; reducing connectivity between habitats and so reducing wildlife value. Improvements in farming practice to farm with nature in mind are encouraged through the Environmental Land Management Scheme, introduced in 2021, which targets payments for farmers based on provision of environmental and climate goods and services.

Increased flood risk from historic land drainage and river channel modification

14. Historic land drainage and river channel modification, for example to drain land or defend it from flooding, took place before current controls were in place. Altered river channels can cause long-term damage to river habitats and disconnect rivers from their floodplains, leading to reduced floodplain habitat diversity, particularly of wetland habitats.

Lack of, or inappropriate, management of the land or water for nature

15. The way we manage land can result in biodiversity decline. For example, lack of management of woodlands has led to a decline in the condition of some woodland habitats and reduced the number of species within them. In-water structures such as weirs affect river flow and fish migration. Division of land ownership and management methods, with changes of use, can also lead to habitats being disconnected, or fragmented, which impedes the movement of species for migration or to find food.

Over-abstraction of water due to growing public demand or agricultural use

[9] Studies showed that people visiting Burnham Beeches SAC were having a negative impact on the soils and health of the beech trees and this resulted in the need for a mitigation strategy which was adopted as a Supplementary Planning Document. This includes a 500m zone around the nature reserve where no additional dwellings can be built and a 500m to 5.6km zone where developer contributions fund a variety of mitigation projects, for example an additional ranger post to help change visitor behaviour. A similar mitigation strategy is in place for Ashridge.

[10] Buckinghamshire Biodiversity Assessment, Natural Capital Solutions (2023).

16. Public water supply and the abstraction of water for agriculture can place a considerable pressure on water resources and the water available for the natural environment. For example, Milton Keynes is in the Ruthamford South Water Resource Zone, which is described as an area of the Anglian region that is most water stressed. As such, improving water efficiency in new buildings is seen as an important method of reducing water scarcity, as per Anglian Water's Water Resource Management Plan to reduce water deficits. Further south in Buckinghamshire, the pumping of water and over-abstraction from the chalk aquifer in combination with a changing climate can result in large lengths drying out, with the death of fauna and flora due to deterioration in water quality and dissolved oxygen level, critical to healthy ecosystems in chalk streams. The national Chalk Stream Restoration Strategy identified the need to address river habitat in conjunction with water quantity and quality issues.

Invasive, non-native pests and diseases can reduce biodiversity

17. Non-native pests and diseases can establish on land and in the water, in ways that pose threats to native species – resulting in a loss of biodiversity, habitats and the benefits they provide to all. For example, specific tree species suffer specific diseases, which threaten both the trees and their associated specialist lichens, fungi and invertebrates, as well as affecting the canopy and the wider woodland ecosystems. Ash dieback has had a dramatic impact on Ash trees locally, leading to felling and removal. Elsewhere, increasing deer populations eat young trees and the plants that grow in the woodland floor and shrub layer, causing issues in woodlands, and so reduce biodiversity. In the water environment, Water Vole populations have been decimated by American Mink, and the invasive Signal Crayfish have affected the native white-clawed Crayfish, freshwater invertebrates and fish populations. More pests and diseases are expected in the future, particularly alongside climate change.

Pollution

18. Our natural environment is affected by pollution, whether this is too much sound pollution, light pollution, air pollution or waste. Pollution, therefore, also affects nature's ability to provide the benefits that people and wildlife depend on. Waste and chemical pollution can have direct impacts on water courses and connected habitats. This pollution arises from isolated incidents, agricultural runoff, soil erosion, poor water treatment or sewage discharge and runoff from roads. Direct impacts on rivers and streams, such as sedimentation, or reduced water quality, can spread downstream. Elsewhere, species work has highlighted the risk of domestic animal wormers affecting other species. Pesticides too have been criticised for being non-specific, thereby affecting more than the target species. In all cases, pollution can affect the mix and functioning of biodiversity and ecosystems.

Nature often suffers from the impacts of more than one pressure at once

19. Many of our area's habitats suffer from the effects of a number of these pressures at once. For example, the rivers and watercourses in Buckinghamshire and Milton Keynes area are all

subject to the impacts of past channel modification as well as pollution from various sources and a growing demand for water. Our woodlands have suffered losses from pests and diseases affecting woodland health and wooded corridors. Many woods suffer from increasing deer populations, and in some cases, woodlands have been fragmented, or disconnected, due to division of ownership preventing woodlands from being managed better across larger areas.

20. Each of these pressures on nature can act alone or in combination, separately or at the same time. And they exacerbate the potentially catastrophic consequences of climate change and the loss of species and habitats currently being experienced across the globe. Our responses should therefore be multi-faceted to address biodiversity loss at multiple scales, while seeking to safeguard and improve the provision of nature's services that we all benefit from.

2) Opportunities for Nature Recovery

Summary: Nature Recovery opportunities in Buckinghamshire and Milton Keynes

Recovering nature is not just good for wildlife, our habitats and species. As well as encouraging all the benefits that nature provides, the way we manage land and encourage nature could help address several wider environmental issues – and provide nature-based solutions to them, at all scales.

For example, managing land better for nature can help to:

- Reduce flood risk
- Combat the causes and impacts of climate change through carbon capture and cooling (particularly in urban areas)
- Improve water quality, habitats and flow
- Improve air quality
- Provide more and better-connected habitats for wildlife
- Improve soil health – positively affecting farming production, carbon capture, and wildlife.

In Buckinghamshire and Milton Keynes, the area's most recent Biodiversity Action Plan set out opportunities for nature recovery based on the pressures on nature and the need to make space for nature through "more, bigger, better and more joined" ecological networks. These four principles follow the findings of an influential 2010 review by Sir John Lawton, which looked at how England's wildlife sites need to respond to the challenges of climate change and demands on land such as development and farming.

Our area's Biodiversity Action Plan suggests the following are key opportunities for nature recovery in Buckinghamshire and Milton Keynes:

- More and restored "priority habitats" - which are those nationally identified as important for conservation
- More wildlife-important habitats such as trees, woodlands and hedgerows, species-rich grassland, scrub and edge habitats, wildflower-rich meadows, ponds rivers and streams, wetland habitats including floodplain grazing marsh, fen and reedbeds and heathlands
- Create new habitats to improve benefits to wildlife
- Incorporate well-designed local wildlife-rich green infrastructure on existing and new development
- Better habitats – improving the condition of existing habitats and improving land management to encourage important species
- Connect quality habitats across the landscape to create networks. Buffers around high-quality sites can connect areas together and protect them from disturbance
- Re-naturalising river channels and reconnecting rivers with their floodplains

The purpose of the LNRS is to identify where to take the most appropriate action to target and support nature recovery. If delivered, a better and more extensive and connective natural environment can help address nature's decline arising from pressures on nature, and focus on opportunities for its recovery. Nature recovery is good for species and habitats, provides wider environmental benefits and nature-based solutions to key pressures, and provides wider environmental, social and economic benefits to all.

Nature-based solutions: nature recovery restores nature's benefits to all

21. Robust natural habitats provide solutions to many of the pressures that nature currently faces. Recovering nature and allowing it to thrive through the way we manage our land and habitats will help combat the impacts of several environmental pressures affecting nature in Buckinghamshire and Milton Keynes and safeguard the benefits that nature provides to us all.

22. For example, nature can help to address:

- **Flood risk** – planting vegetation can "slow the flow" of runoff
- **Climate** change and increasing (particularly urban) temperatures – vegetation including trees absorb carbon dioxide and, alongside green spaces, can provide shading and cooling, particular in urban areas. Elsewhere natural-functioning floodplains can help in water management and reduce flood risk downstream.
- **Declining water quality and availability** – restored water habitats and habitat buffers alongside or around waterbodies help improve water quality and flow
- **Air quality** – vegetation can absorb air pollutants, and support efforts to reduce pollution
- **Loss of terrestrial habitats and connectivity** for wildlife
- **Declining soil health** – for example "regenerative agriculture" aims to retain and improve soil structure, nutrient and water retention, to boost soil health and productivity, which can help reduce the need for chemical applications.

23. Trees in particular can remove pollutants and absorb particulates and so help to provide cleaner air for nature. Vegetation in river catchments can filter and slow runoff to improve river water quality, reduce erosion and reduce flood risk that could threaten wildlife and habitats. Nature and nutrient cycling provide soil and nutrients for vegetation growth; and ecosystems such as wetlands and woodlands absorb and store carbon to help regulate the climate. Since its original inception, Milton Keynes has sought to reduce existing flood risk via the development of an innovative strategic water management system and planned green infrastructure provision.

Opportunities for nature recovery in Buckinghamshire and Milton Keynes

24. Like pressures, opportunities for nature's recovery, to provide benefits to habitats, species and the wider environment, exist at all scales – from the landscape-scale to the local scale -

or can be specific to local geographies (such as those described at Section 3, *Nature in Buckinghamshire and Milton Keynes - our range of landscapes, habitats and associated species*).

25. But there are several opportunities for nature recovery that are relevant everywhere, and are not specific to a particular location within Buckinghamshire and Milton Keynes.

Opportunities for nature recovery from existing national and local environmental plans and strategies

26. Many of the opportunities relevant to recovering nature and biodiversity, in terms of enhancing habitats and species across the whole of Buckinghamshire and Milton Keynes, have already been identified in relevant spatial and environmental plans – either nationally, and which apply to our LNRS area, or in local plans and strategies.

27. For example, in his seminal 'Making Space for Nature: a review of England's wildlife sites and ecological networks' report in 2010[11], Professor Sir John Lawton reviewed England's wildlife sites and ecological networks. The report concluded that wildlife sites were too small and isolated to be able to respond to the challenges of climate change and demands for land such as intensive agriculture and development. Such rapid changes were leading to declines in many characteristic species of plants and animals, where species are unable to move or adapt quickly enough. Losing wildlife and biodiversity also meant declines in the benefits that nature provides to people.

28. Lawton concluded that what was needed was 'more space for nature'. He recommended action at the landscape-scale to reverse the effects of fragmentation and environmental degradation. **A more connected ecological network at scale** would help wildlife cope with rapid change and improve the ability of the natural environment to provide wider benefits.

29. Lawton set out a series of four 'principles' to highlight what needed to be done to build the resilience and coherence of England's ecological network: **more, bigger, better and joined**, which can be seen as broad scale opportunities that:

- **more** – create more nature everywhere
- **bigger** – expand existing nature sites
- **better** – improve the quality of sites
- **joined** – connect areas up so wildlife can move and habitats can be more resilient to external pressures such as climate change or habitat loss

[11] Sir John Lawton (2010 Making Space for Nature: a review of England's wildlife sites and Ecological Network Available at: gov.uk national archives: https://webarchive.nationalarchives.gov.uk/ukgwa/20170305123119/http://assets.kew.org/files/Making%20Space%20For%20Nature%20-%20The%20Lawton%20Report.pdf

30. Locally, the area's most recent Biodiversity Action Plan (2021)[12] was written by the Buckinghamshire and Milton Keynes Natural Environment Partnership (the "NEP", the area's Local Nature Partnership) experts, and, together with the NEP's Green and Blue Infrastructure Vision and Principles work (2016),[13] identifies the following opportunities for biodiversity and nature's recovery that are relevant across the whole LNRS area. The area-wide opportunities for nature recovery are summarised at *Figure 16* , below. Each contributes to one or more of the Lawton principles for nature recovery.

31. **To support the long-term achievement of opportunities for nature,** the same set of existing local environmental plans and strategies suggest several factors could assist in realising them:

- Direct funding towards nature's recovery – for example, biodiversity net gain and reforms to the farming system to encourage more farming with nature in mind.

- Plan for the long-term management of good quality diverse habitats throughout the landscape to enhance connectivity for a range of species.

- Improve people's connectedness with nature - engaging people with nature encourages more management of land for wildlife.

[12] Forward to 2030: Biodiversity Action Plan for Buckinghamshire and Milton Keynes. Bucks & MK NEP (2021). Available at: https://bucksmknep.co.uk/download/3338/?tmstv=1732307751

[13] Vision and Principles for the Improvement of Green Infrastructure in Buckinghamshire & Milton Keynes. Bucks & MK NEP (2016), Available at: https://www.milton-keynes.gov.uk/sites/default/files/2022-01/Vision%20and%20Principles%20for%20Improvement%20of%20GI%20in%20Bucks%20and%20MK%20MKENV009.pdf

Figure 16. Opportunities for Nature Recovery relevant across all of Buckinghamshire and Milton Keynes - framed into Lawton's call for more, bigger, better and more joined habitats needed for nature recovery.

Opportunities for Nature Recovery across the whole LNRS area

"More, bigger…"

More and restored Priority Habitats

- Create new, expand or enhance the condition and extent of priority habitats Priority habitats are those that are identified nationally of principle importance for conservation in England. The NEP's Biodiversity Action Plan identified specific creation and improvement targets for the area's priority habitats.

More land for nature

- Increase the overall land area of wildlife-important habitats and land positively managed for wildlife. These include:
  - trees, woodland and hedgerows
  - species-rich grassland
  - native semi-natural woodland
  - scrub and edge habitats including wilder road verges
  - wildflower-rich meadows
  - ponds, rivers and streams
  - wetland habitats floodplain grazing marsh, Fen, Reedbed
  - heathlands

- Create new habitats to improve benefits to wildlife – and (secondary) for people.
- Incorporate well-designed, local, wildlife-rich green infrastructure (a network of multi-functional green space and other green features, urban and rural, which can deliver quality of life and environmental benefits for communities) in existing and new development

"…Better…"

Improve Existing habitats

- Enhance and improve the condition of existing habitats
- Improve land management to encourage important species

"and More Joined…"

Connect quality habitats across the landscape

- Create large, more joined up habitat networks. Reconnecting surviving habitat pockets and connecting green spaces makes it easier for wildlife to move and improves their resilience to pressures. Including habitat mosaics of good quality diverse habitats provides better connectivity for a range of species.
- 'Buffers' around high quality sites connect areas together and protect them from disturbance.

Re-naturalise river channels and reconnect rivers with their floodplains

Where do the opportunities for nature recovery exist across our LNRS area?

32. The purpose of the LNRS is to identify the areas where taking action is a priority for nature recovery. Some of the underling opportunities for nature recovery exist right across the LNRS area, whereas some opportunities are specific to particular geographies within it. *Section 6, below,* identifies the four geographies, or "LNRS zones" we used to produce the LNRS, and includes a description of nature for each, including both the pressures and opportunities of particular relevance to the individual zones.

Cross-border nature recovery opportunities

33. There are also several "cross border" opportunities for nature recovery at the larger scale, in terms of the potential for coordinated nature recovery. For example, the Colne Valley in the south, with its lakes on the edge of Buckinghamshire, Hertfordshire and London, is nationally-important for water birds and there is potential for large-scale chalk grassland and chalk stream restoration and recovery of other chalk habitats and species across the "Big Chalk" area stretching from Somerset to the Wash, and its potential importance for species migration in the light of climate change. Similar landscape-scale opportunities for nature recovery apply to the Bernwood, Otmoor, Ray area which straddles the Buckinghamshire / Oxfordshire border; the Greensand ridge into Bedfordshire; and Salcey Forest into Northamptonshire.

Biodiversity Opportunity Areas (BOAs) – opportunity areas for recovery of priority habitats

34. **Biodiversity Opportunity Areas** (BOAs) are areas where opportunities, particularly focussed on the recovery and restoration of **Priority Habitats**[14] exist. BOAs are particular areas within Buckinghamshire and Milton Keynes that were identified by experts by taking into account information on existing concentrations of nationally-important habitats, rare species, land with potential for habitat restoration and other factors including geology, topography and hydrology. A map of the BOA areas is shown at *Figure 17,* below.

35. BOAs are regionally-important areas of opportunity for the creation and restoration of priority species. Prior to the LNRS process, they have been used as the most important areas for biodiversity. They represent the key locations across Buckinghamshire and Milton Keynes where the greatest opportunities for habitat creation and restoration lie, and represent a more efficient way of delivering action on the ground – to locations where action will have the greatest positive conservation impact, act as the basis for an ecological

[14] See *Appendix P, Glossary*

network. Like nature itself, BOA areas do not adhere to either the LNRS zone boundaries, or administrative ones.

36. The NEP's BAP prioritises action in BOAs for priority habitats to reverse biodiversity decline above other actions and locations:

"The BAP has a strategic aim - to work together to create more, bigger, better and more joined-up habitats across Buckinghamshire and Milton Keynes by 2030, to reverse biodiversity decline. It also suggested that to achieve this aim, activity should be focussed on the following, in order of priority:

i. Priority habitats (new or improved) within BOAs
ii. Other habitats in BOAs
iii. Creation of other habitats outside BOAs, but informed by relevant plans and strategies
iv. Outside these areas, anywhere else."

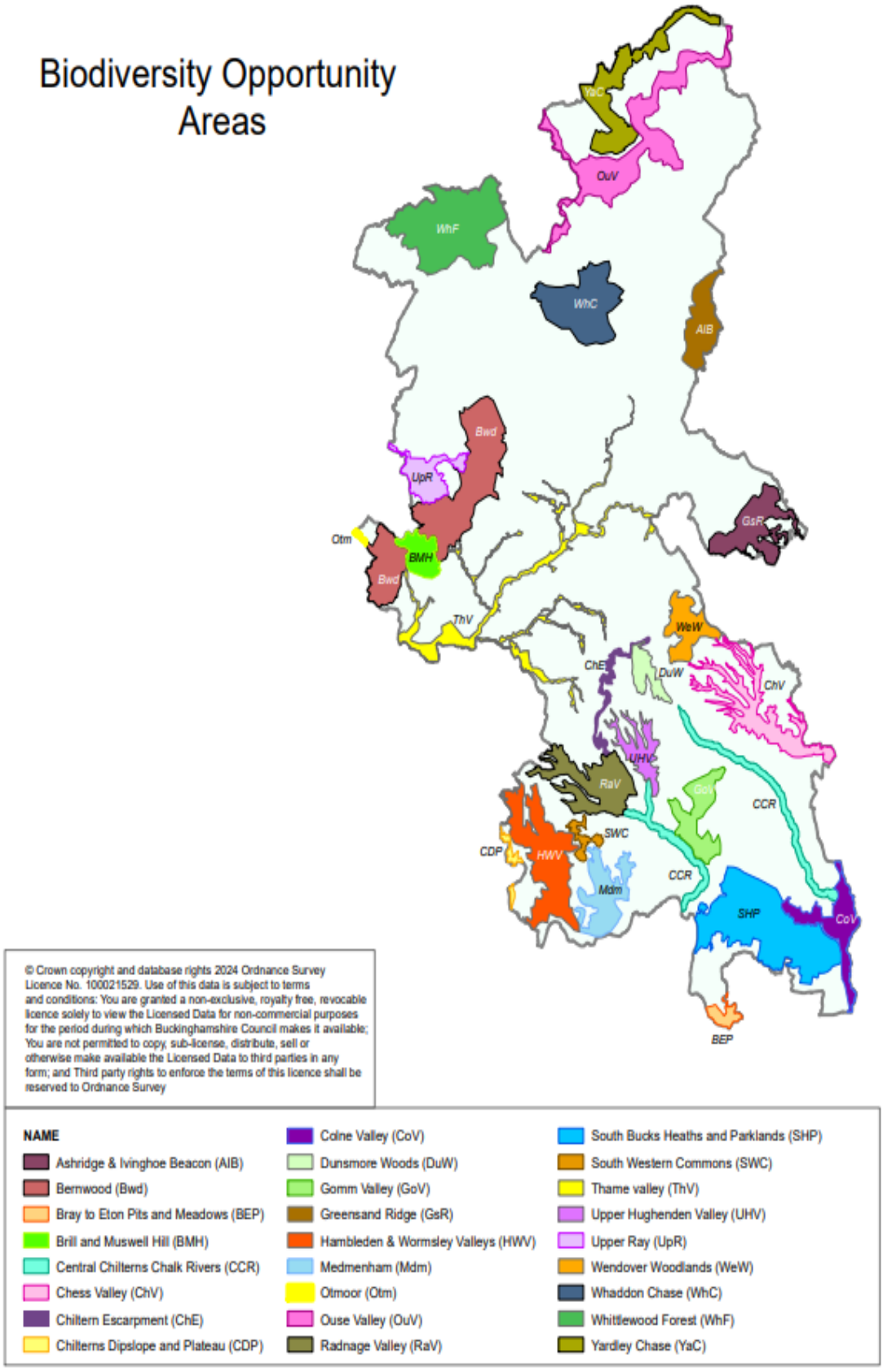
37. The geography of the area's BOAs, and BOA targets for habitat restoration have been taken into account in development of the final LNRS Local Habitat map. BOAs have not been used to identify areas of opportunity, but have been used to help refine the mapping and target action where otherwise it could be taken across a wide area.

38. More information about BOAs, and how they are designated, can be found on the NEP's website[15].

39. Information about how BOAs have been used to review and refine the final LNRS local habitat map is provided in the mapping methodology statement that is contained in the combined methodology statements and available on the consultation portal *[Appendix I, Methodology statements].*

[15] Available at: Biodiversity Opportunity Areas – Buckinghamshire & Milton Keynes Natural Environment Partnership

Figure 15. *Biodiversity Opportunity Areas in Buckinghamshire and Milton Keynes (at Nov 24).*



3) Nature in Buckinghamshire and Milton Keynes - our range of landscapes, habitats and associated species

Summary - Nature in Buckinghamshire and Milton Keynes

Buckinghamshire and Milton Keynes contain a variety of landscapes – from the Great Ouse Valley in Milton Keynes and floodplain grasslands of the Upper Ray Valley, to ancient woodlands, rare chalk grasslands and internationally important chalk stream

The Buckinghamshire and Milton Keynes Local Nature Recovery Strategy area is a mainly low-lying area in inland central England. The area boasts varied landscapes – from the Great Ouse Valley in the Milton Keynes area, to low-lying farmland of Aylesbury Vale, the floodplain grasslands of the Upper Ray Valley, ancient woodlands, chalk grasslands and internationally important chalk streams of the Chiltern Hills, to the streams and rivers that feed the River Thames. The tip of the Greensand Ridge also stretches in from neighbouring Bedfordshire, with its acidic soils, heaths and woodlands. The area is mainly a farmed landscape, with agricultural land covering 62% of the combined Buckinghamshire and Milton Keynes areas. Woodland covers 11% of the area, all types of grassland 39%, and water environments around 1%. However, this hasn't always been the case.

New historic analysis produced for the LNRS process illustrates how nature in Buckinghamshire and Milton Keynes has changed over the last 90 years. The vast majority of our semi-natural habitats have been replaced since the 1930s, mainly by arable farming or improved (modified) grassland. Heathland has also decreased significantly. Elsewhere, there has been a significant increase of over 50% in built-up areas and gardens. Woodland expansion by nearly 50% since the 1930s, mainly in plantation forestry, followed a previous period of decline.

The urban landscape also plays an important role for biodiversity, providing habitats and connecting nature across built-up areas. For example, the city of Milton Keynes is renowned for the way it was planned to include a network of linear parks and landscaped transport corridors.

Buckinghamshire and Milton Keynes also boasts wildlife-rich natural habitats that support rare species such as hazel dormice, black hairstreak butterflies, wading birds, many species of bat, the Chiltern Gentian and Chalkhill Blue butterfly, alongside otters and water vole.

For the purposes of constructing the LNRS, we gathered information and evidence around four LNRS zones within Buckinghamshire and Milton Keynes, based on underlying areas of similar landscape character, geology and ecology, or "national character areas".

See Section 6 for a full description of nature in our four "LNRS zones", describing for each, the landscapes, habitats, important species, pressures and opportunities for nature
See here for a description of nature's benefits in these zones.
See Section 3) for a narrative tour of the landscapes, habitats and species in Buckinghamshire and Milton Keynes and a summary of habitat types, amounts and their distribution.

Nature stretches beyond our boundaries

40. Buckinghamshire and Milton Keynes (the "LNRS area") cover 1,873.5 sq km in inland central England. Mainly low-lying, the LNRS area contains several contrasting landscape and natural features that extend beyond its boundary. These include the Chiltern Hills (from Reading to Luton, itself part of the "Big Chalk[16]" area stretching from Somerset to the Wash, the focus of an ambitious programme to restore nature, enhance wildlife and tackle climate change at regional scale), the tip of the Greensand Ridge stretching from neighbouring Bedfordshire, the Great Ouse River Valley around Milton Keynes and the Thames Valley in the southern part of Buckinghamshire.

Figure 16. *View from the Chiltern Hills towards the Value of Aylesbury. Photo: Nicola Thomas.*

41. The area also sits within several other important areas for nature, also extending beyond our boundary, such as Colne Valley Regional Park in the south, with its network of rivers and wetlands extending across Hertfordshire, Berkshire, London and Surrey as well as Buckinghamshire, the Bernwood-Otmoor-Ray complex of ancient woodland, floodplain

[16] For further information, see https://www.big-chalk.org/

meadows and wetlands stretching into Oxfordshire in the west, the Ashridge ancient forest in the north-east of Buckinghamshire, and Yardley Chase and Salcey Forest stretching from the Milton Keynes area into Northamptonshire.

42. As nature does not obey local authority boundaries, so the process of producing the LNRS, the location of the most important opportunities for action to achieve significant nature recovery, and its subsequent delivery, must also coordinate with activity beyond our boundary.

43. There are 48 Local Nature Recovery Strategy areas covering the whole of England. The aim is for LNRSs to together form a national "nature recovery network" to boost nature's recovery at scale. Together, the LNRSs are intended to help achieve the overarching, or "apex goal" of the national Environmental Improvement Plan (EIP) that the UK Government set out in 2023 – to improve nature by halting the decline in biodiversity and achieving thriving plants and wildlife. Working at scale like this aims to improve, connect and make space for nature.

Our landscapes, range of habitats and associated species[17]

44. To the far north, there are wide, meandering floodplains and harder limestone outcrops. The Great Ouse River Valley is a major feature, with floodplain grasslands and, around Milton Keynes, restored sand and gravel extraction sites are important for wetlands and wet woodland habitats. The remnants of royal hunting forests, networks of hedgerows, flood meadows and wet pastures along river corridors combine along with ancient trees to provide important and wildlife-rich natural habitats that support rare species such as the **Barbastelle bat** and **black hairstreak butterfly**.

45. Travelling southwards, the woodlands quickly give way to a landscape dominated by low-lying farmland and floodplains of the Thame valley into the Aylesbury clay vale. The Upper Ray Valley is known for its concentration of floodplain grasslands, much of which is rare, and its importance for wading birds. The nearby area around Bernwood is famous for ancient woodland and nationally important for the **Bechstein's bat**.

46. The Chiltern Hills, south of the Aylesbury clay vale, are dramatically more diverse, containing numerous areas of ancient woodland, chalk grasslands and internationally rare and important chalk streams. This is where many of the sites designated for nature conservation

[17] NB – the species highlighted throughout this description are those considered representative or important in the LNRS area described. The examples used therefore do not all match to the shortlist of important species that resulted from the species shortlisting work – see *Appendix N, Species Shortlist and niches* and *Section 5* for further details.

(meaning they are formally protected), are found, along with several rare species such as the **Chiltern Gentian** and **Chalkhill Blue butterfly**.

Figure 19. *Chalk grassland at Yoesden Bank, Radnage Valley (Photo credit: Allen Beechey).*

47. To the south of the Chiltern Hills lies the Thames Valley, with its **streams and rivers** feeding into the River Thames on the southern county boundary. Open water bodies associated with gravel extraction sites are frequent and large areas of **parkland** are also found here. The Colne Valley Regional Park, with its numerous protected sites important for wildlife regionally and nationally, contains a network of over 70 lakes, hundreds of kilometres of rivers and associated wetland habitats.

48. The precious chalk streams have fish communities characterised by **brown trout** and a number of salmonid fish species alongside rich invertebrate life. The Thames has several species occupying a range of ecological niches. **Otters** are now found throughout the area's chalk rivers, following their substantive recovery in the last few decades, whereas **water voles** are currently restricted to populations on the Great Ouse, Chess, Colne and Misbourne.

49. Rivers, lakes and groundwater in Buckinghamshire and Milton Keynes are protected under the UK Water Framework Directive (WFD) Regulations. The varied geology produces a range of river types, which are predominantly clay- or chalk-dominated. The main pressures on rivers across Buckinghamshire and Milton Keynes are physical modification, which alters natural flows and habitats, pollution and runoff from agriculture and rural land, and

pollution from wastewater. Clay rivers have often been highly modified in the past due to their flashy nature, to facilitate land drainage. For instance, the Buckinghamshire part of the Ray has impoverished fish wildlife, due to its inherent low summer baseflow, historic river engineering, pollution and loss of habitat. Climate change, with its extreme droughts and flooding, along with invasive species, also threaten our area's nature in and along our watercourses.

50. The **urban landscape** also plays an important role for biodiversity, often having developed over a long period, and with a range of landscapes playing important roles in providing benefits for nature and the wider environment. For example, public land and corporate estates can manage land for wildlife; roadside edging and verges can be altered to promote wildflower growth; and gardens can be significant for pollinating insects. House values are directly affected by the perceived quality of the surrounding green and blue spaces. It is therefore in the interest of developers to factor-in features which will support a wider range of wildlife.

Figure 17. *Haymaking on the meadows at Campbell Park. Photo: MK Parks Trust.*

51. The city of Milton Keynes, in the north of the LNRS area, is the largest new town in the UK and is renowned for the way it was planned to include a network of linear parks and landscaped transport corridors. The planned greenspace includes areas of ancient woodland, tracts of floodplain with biodiverse grasslands and extensive maturing, interconnected tree plantations.

Where our broad habitat types are located[18]

52. *Figure 21* and *Figure 22* , below, show the main land area types in Buckinghamshire and Milton Keynes. The next section summarises the findings.

Farmland

53. The LNRS area is dominated by farmland. In total, just under 60% (111,968ha) of the land area in Buckinghamshire and Milton Keynes (61% of Buckinghamshire and 53% of Milton Keynes) is either cultivated (being used to grow crops or raise livestock) or is improved grassland, meaning it is intensively managed for farming and tends to have a lower species diversity. This is less than surrounding counties.

Woodland, trees and scrub

54. At around 13%, (20,011ha, including scrub), the proportion of Buckinghamshire (only) that is wooded is considerably higher than surrounding counties. Most of Buckinghamshire's woodland, scrub and tree habitat is in the Chilterns and further south. Around 9% of the MK area (2,822ha including scrub) is wooded, a slightly lower coverage than in Buckinghamshire. Across the whole LNRS area, 12% (22,377 ha) is woodland or scrub, and 5.2% is ancient woodland (3.2% being ancient semi-natural woodland, and 2% plantations on ancient woodland sites, known as "PAWS"[19]).

Semi-natural grasslands and marshy grasslands

55. These areas make up 5.9% of Buckinghamshire, and around half of this proportion, at 3.1%, of the Milton Keynes area (and around 5.4% of the total LNRS area). Most of Buckinghamshire's semi-natural grassland (i.e. grasslands that are not intensely cultivated or fertilised, including meadows and pasture) is found in the northern part of the county, particularly the north-west and north-east tips; whereas most of the existing broadleaved woodland is in the south of the county. In Milton Keynes, much of the semi-natural and marshy grasslands line the river catchments through and on the edge of the city area.

[18] For full details of all available land cover statistics in this section, see *Appendix C, Landcover by habitat data*

[19] PAWS are "Plantations on Ancient Woodland Sites" – sites that were once ancient woodland but have been converted to planted forests.

Figure 21. *The broad habitat types in Buckinghamshire. Natural Capital Solutions. 2024.*

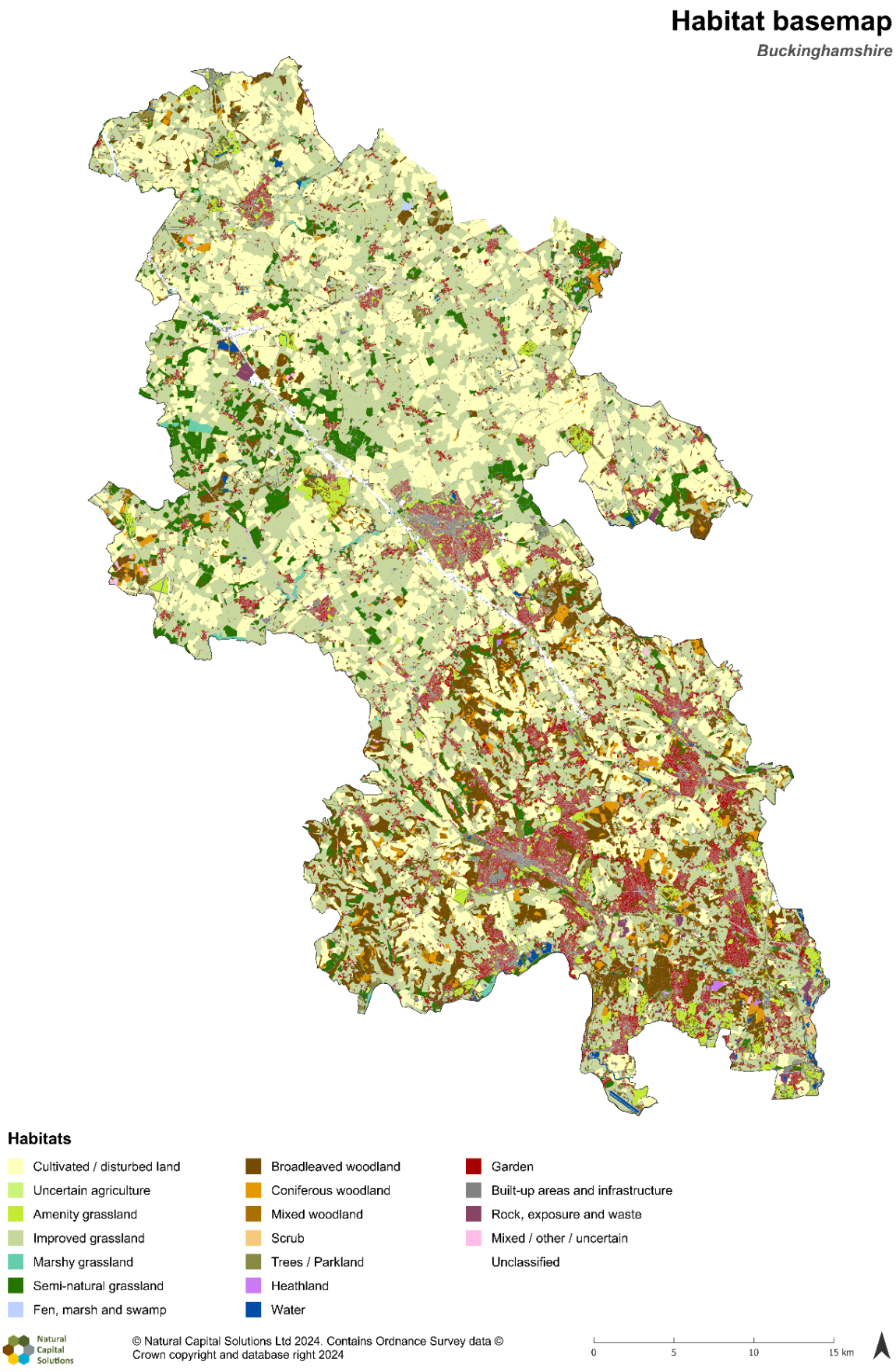
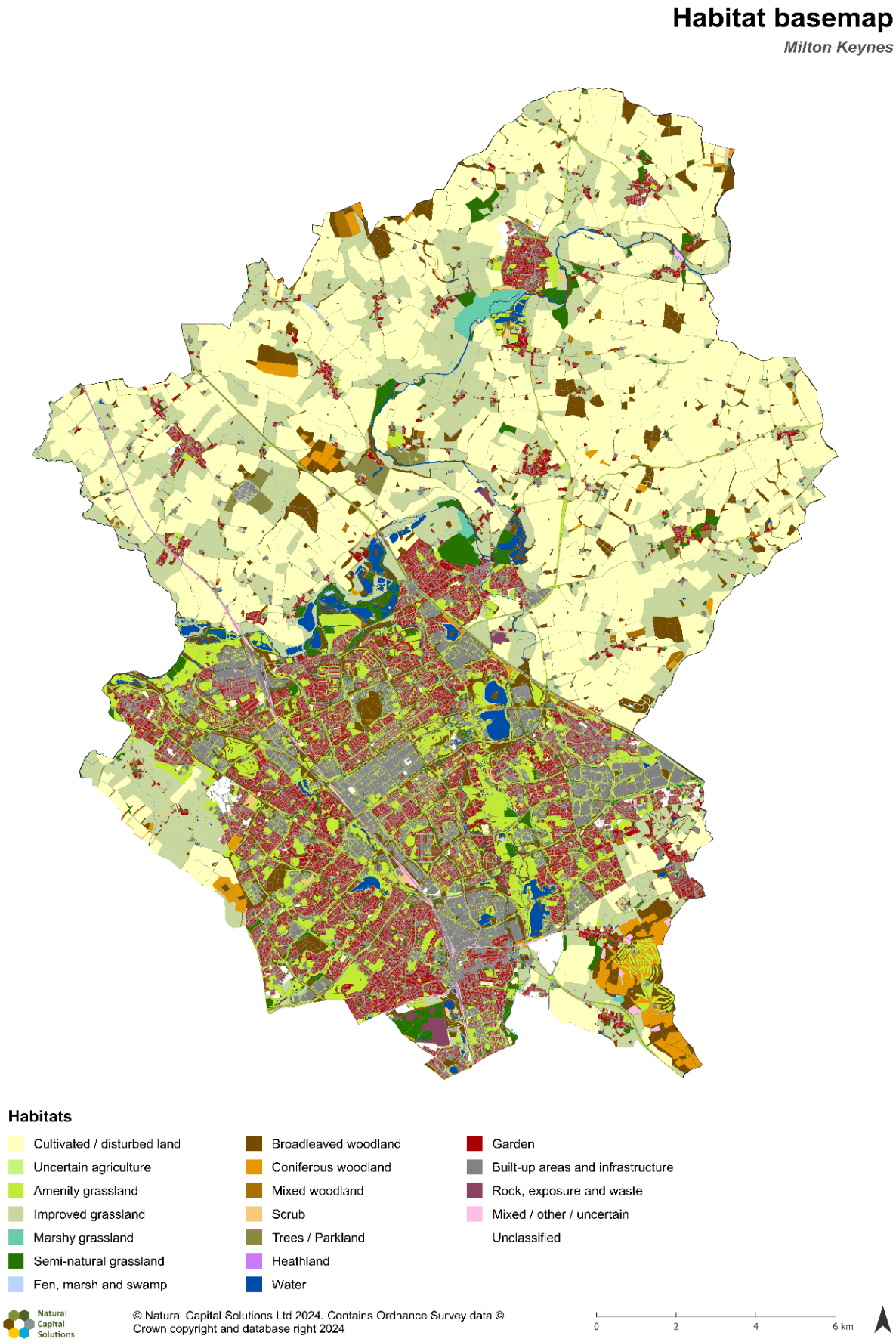


Figure 22. *The broad habitat types across Milton Keynes. Natural Capital Solutions. 2024.*



Built up areas, infrastructure (roads, railways, pavements and paths) and gardens

56. Built up areas and infrastructure make up nearly 7% of the land area in Buckinghamshire, compared with around double that, at around 14% in the Milton Keynes local authority area, which is dominated by the city of Milton Keynes. Within the city of Milton Keynes itself, just under 37% is built-up or infrastructure (buildings, roads, paths), around 17% is gardens, and the majority of the remaining 47% is blue or green space. Across the Milton Keynes local authority area as a whole, 14.2% is built up or infrastructure; in Buckinghamshire this is 6.7% of the land area.

57. Gardens comprise a similar proportion of land area – around 6% in Buckinghamshire and around 7% in Milton Keynes (6.3% of the overall LNRS land area)[20]. The land covered by amenity grassland, such as parks and playing fields, in Milton Keynes is around 10% - so two-and-a-half times more than in Buckinghamshire (just over 4%); and is around 5% for the LNRS area as a whole.

Water

58. Surface water (that is, rivers, canals, streams, ditches, ponds, lakes, but not groundwater features) makes up just 0.8% of Buckinghamshire by land area and 2% of the Milton Keynes local authority, and just 1% of the overall LNRS area. Water areas are both an important habitat in their own right and provide corridors for wildlife. The total length of rivers in Buckinghamshire and Milton Keynes is 559km. This includes around 90km of internationally-rare chalk streams arising from the Chilterns in Buckinghamshire, a significant proportion of the world's chalk streams.[21]

[20] See *Appendix A, **Our Rivers** – detailed description* for details.

[21] Environment Agency-supplied figures based on reviser captured by the Water Framework Directive. The chalk streams figures of 90km is approximate due to uncertainty around where the chalk influence ends.

Locally important habitats

Summary - Locally Important Habitats

The LNRS process requires a baseline map to show 'areas of particular importance for biodiversity', or 'APIBs' – which must include:

- National conservation sites[1]
- Other areas of particular importance required by the LNRS guidance:
    - Local wildlife sites
    - Irreplaceable habitats (defined according to the LNRS guidance)
    - Other area identified by the Secretary of State (not provided for this round of LNRSs)

Our **LNRS APIB map,** which forms Step 1 of the LNRS process, was put together involving local experts, including, the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) and is available on our *Local Habitat Map, here*.

Our local experts also determined that additional areas should be considered to be particularly important for biodiversity. These include additional irreplaceable habitats such as rivers and streams including chalk streams, as well as several other priority habitats. These areas are already captured in our final LNRS mapping as they are priority habitats.

The APIB map show areas of particular importance for biodiversity that exist now across Buckinghamshire and Milton Keynes. It acts as a basemap of important nature areas, and has been fed into the LNRS "Areas the Could Become of Particular Importance for Biodiversity" mapping process.

Our Priority Habitats

59. "Priority habitats" are recognised in law as the habitats of principal importance for conservation in England. They represent the rarest and most threatened habitats and species requiring targeted conservation action. The Government produces national targets for **priority habitats and priority species** which are protected to some degree in law[22].

60. There are 21 types of priority habitat found in Buckinghamshire and Milton Keynes, which cover specific types of native woodland, grasslands, heathlands, fen, marsh and swamp and

[22] Under Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006, public bodies, including local authorities, must "have regard" to the conservation and enhancement of biodiversity in England when carrying out their normal functions, which includes both priority habitats and priority species

standing open waters and canals, as well as wide hedgerows and mosaic habitats on previously developed land[23].

61. *Figure 23* shows the distribution of 15 of the priority habitats in the LNRS area (excluding hedgerows, open mosaics and individual lakes, ponds, and areas too small to map). This illustrates how some priority habitats are found throughout Buckinghamshire and Milton Keynes (such as traditional orchards, although more are recorded in the south of the area), whereas geology, topography and soil type support other priority habitats in more specific locations (e.g. chalk grasslands and chalk streams in the Chilterns; lowland meadows and wet woodland in the northern half of the LNRS area and lowland Beech and Yew woodland in the south; with lowland dry acid grasslands on the greensand ridge in the north-east)

62. Complete data does not exist currently for the condition of these priority habitats – but many are thought not to be in favourable management.

63. The Buckinghamshire and Milton Keynes area as a whole has an above average extent of traditional orchards, lowland dry acid grassland and lowland meadows. Lowland mixed deciduous woodland is the single most extensive priority habitat in the counties (1,682 ha) followed by Beech and Yew woodland (1,191 ha) and lowland wood pasture and parkland (536 ha)[24].

64. Data on the extent of priority habitat in Buckinghamshire and Milton Keynes is insufficient, but in terms of extent and proportion of the area, Buckinghamshire and Milton Keynes together has significantly **less priority habitat than the average English county** - covering between 3% and 9.7% of land in the area compared with around 14% nationally. [25].

65. In its latest Biodiversity Action Plan, "Forward to 2030"[26](*Appendix J*), the NEP sets out **specific targets for priority habitats** across Buckinghamshire and Milton Keynes, alongside six other key objectives to create more, bigger, better and more joined up habitats in the area. Together, these objectives aim to reverse biodiversity decline and contribute to nature recovery, setting an average target of a 20% increase in the area of Priority Habitat, as a proxy for species, by 2030.

66. More information about priority habitats can be found in *Appendix E, Priority habitats and BOAs – technical details and how used in LNRS mapping.*

[23] For details of the area's priority habitats, see Page 21, Priority Habitat Targets, Forward to 2030, The Biodiversity Action Plan for Buckinghamshire and Milton Keynes (NEP, 2021). Available at: https://bucksmknep.co.uk/forward-to-2030/

[24] Forward to 2030: Biodiversity Action Plan (NEP, 2021) Page 19-21. Available at: "Forward to 2030 – Buckinghamshire & Milton Keynes Natural Environment Partnership

[25] NEP's State of the Environment Report, 2016. Available at: https://bucksmknep.co.uk/projects/state-of-the-environment-report/

[26] Forward to 2030, The Biodiversity Action Plan for Buckinghamshire and Milton Keynes (NEP, 2021). Available at: https://bucksmknep.co.uk/forward-to-2030/

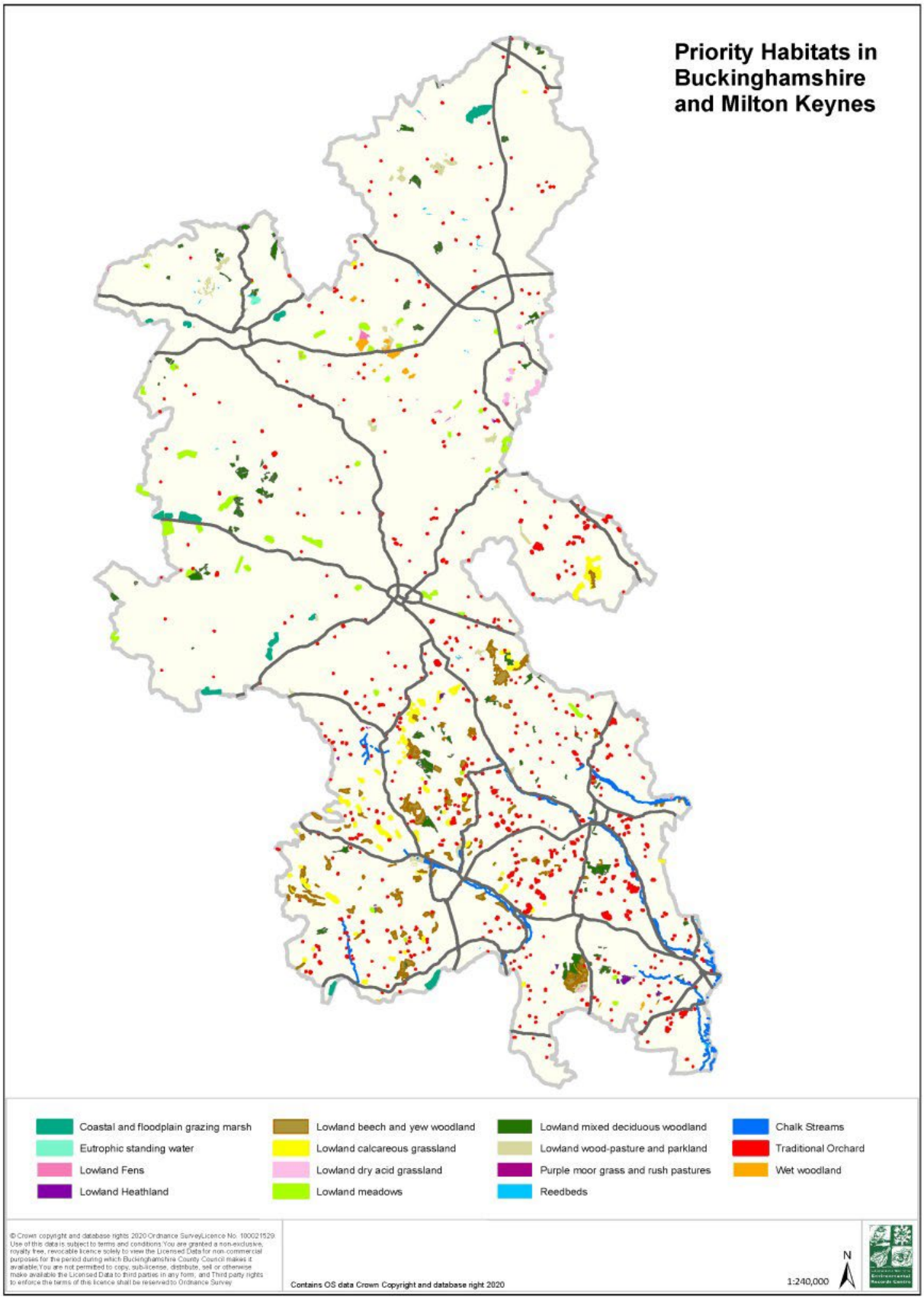
"Irreplaceable" habitats

67. Every habitat, with its unique web of connections established between animals, plants, the soil and various microorganisms, could be considered irreplaceable. However, in legal and planning terms, the Government has defined what irreplaceable habitats are, which mainly relate to their age, uniqueness, species diversity and rarity, and therefore the increased difficulty of being able to replace such habitats if they are lost, for example to development or other pressures.

68. The Government has defined irreplaceable habitats both in the National Planning Policy Framework, and more recently, in Biodiversity Net Gain (BNG) policy. For the purposes of the Local Nature Recovery Strategy, we must use the BNG policy definition to determine which of our local habitats are irreplaceable, which include some of England's most ecologically valuable habitats – for example ancient woodland, ancient and veteran trees and lowland fens. The definition and full list of irreplaceable habitats can be found here: Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024.

69. Locally, however, our experts consider many of the other priority habitats in the area should be considered irreplaceable – for example including our precious chalk streams.

Figure 18. *Priority habitats in Buckinghamshire and Milton Keynes [Supplied by BMERC].*



Protected sites and core habitats

70. Certain areas receive a level of protection, including in the planning system, due to their importance for biodiversity. The types of sites with these protections relevant to the LNRS area are defined at *Figure 24*, below.

***Figure** 19. Types of protected sites in the LNRS Area.*

Types of protected site in Buckinghamshire and Milton Keynes

Special Areas of Conservation – SACs are protected sites designated under the EU 'Habitats Directive' (habitats and species) to conserve habitats and species other than birds that are important in their own right.

Special Protection Area (SPA) – SPAs are special sites designated under the EU 'Birds Directive' to protect rare, vulnerable and migratory wild birds and their habitats.

Sites of Special Scientific Interest (SSSIs) – The statutory nature conservation agencies have a duty under the Wildlife and Countryside Act 1981, as amended, to notify any area of land which in their opinion is 'of special interest by reason of any of its flora, fauna, or geological or physiographical features'. Such areas are known as Sites of Special Scientific Interest (SSSIs).

National Nature Reserves (NNRs) – are designated under the National Parks and Access to the Countryside Act 1949 and were established to protect important habitats, species and geology, and to provide 'outdoor laboratories' for research.

Local Wildlife Sites – are areas selected locally for their nature conservation value based on important, distinctive and threatened habitats and species within a national, regional and local context. It is a non-statutory designation that recognises high quality wildlife habitats.

Local Nature Reserves – a statutory designation made by principal local authorities to places with wildlife or geological features of special interest locally.

71. According to analysis in 2020 and 2021[27] , only 5.5% of Buckinghamshire land, and less than half this, at 2.3%, of the total area of Milton Keynes, receive some level of formal designated site protection. The Government has a target of protecting 30% of the land for nature by

[27] "Mapping natural capital, ecosystem services and opportunities for habitat creation in Buckinghamshire", Natural Capital Solutions (2020) and "Mapping natural capital, ecosystem services and opportunities for habitat creation in Milton Keynes", Available at: https://bucksmknep.co.uk/projects/natural-capital-mapping/ Accessed November 2023.

2030. Across the whole LNRS area, this means just under 5%[28] of the land area currently receives protection by the planning system.

A note of caution – a protected site does not mean it is in good condition

72. However, just because an area or biodiversity site is protected, it does not mean it is in good condition. An accurate assessment of condition requires detailed site assessments, and, due to a shortage of resources, accurate and complete data is often not available.

73. In Buckinghamshire (not available for Milton Keynes), a recent indicative assessment of condition of all habitats at the landscape-scale has been undertaken which concluded that most of the county's habitat (72%) was in poor condition, mainly because of its use as either arable land or improved or amenity grassland and gardens. Around 7% was built or artificial surfaces. Only 3.6% of Buckinghamshire habitat was assessed as fairly good or good – scattered across the region but more concentrated in the south of Buckinghamshire. Areas of most notable size include Burnham Beeches, Shabbington Woods to the south east of Oakley, Ashridge Common and Woods adjacent to Ashridge Golf Course and Ashridge House, and Great Wood to the west of Marlow[29]. Nearly **17% of Buckinghamshire was of moderate condition**, scattered throughout the county. Much of this is woodland e.g. Penn Wood to the east of High Wycombe.

Areas of particular importance for biodiversity in Buckinghamshire and Milton Keynes

74. As part of the LNRS process, we have constructed a baseline map of the LNRS area showing the "areas of particular importance for Biodiversity" in Buckinghamshire and Milton Keynes – known for the LNRS process as the "APIBs". This baseline map forms part of the Local Habitat Map output for the LNRS and is replicated at *Figure 25*, below.

[28] Based on statutory designations: 711 Ha in MK and 8,577 Ha in Bucks as SSSIs, SACs, LWS or LNRs

[29] Buckinghamshire Biodiversity Assessment, Natural Capital Solutions (2023). This uses existing data, inferences based on national datasets for woodlands outside conservation sites, water bodies and quarries / mineral sites, expert consultation and volunteer appraisals of site condition. These processes assigned a condition score to over 93% of Buckinghamshire; the remaining 7% was assigned a moderate condition score, where no data was available to guide the assessment. NB the assigned condition score included data on SSSIs covering 1.6% of Buckinghamshire, and volunteers' condition information for 152 local sites, including some Local Wildlife Sites, using interactive maps and surveys to assess habitats, management practices and overall site condition. NB the study looked at conditions from an ecological viewpoint only and not whether land was in good condition relative to its current purpose or use.

75. However, our local experts considered many of our other priority habitats to also be considered irreplaceable – for example, our area's internationally-rare chalk streams. All priority habitats are represented in the final mapping or opportunities for targeting nature recovery, as our final priorities and measures include M35, "**Create more and better habitats within and between Biodiversity Opportunity Areas (BOAs)** with a focus on priority habitats in BOAs first; then non-priority habitats in BOAs; then linking between BOAs. "

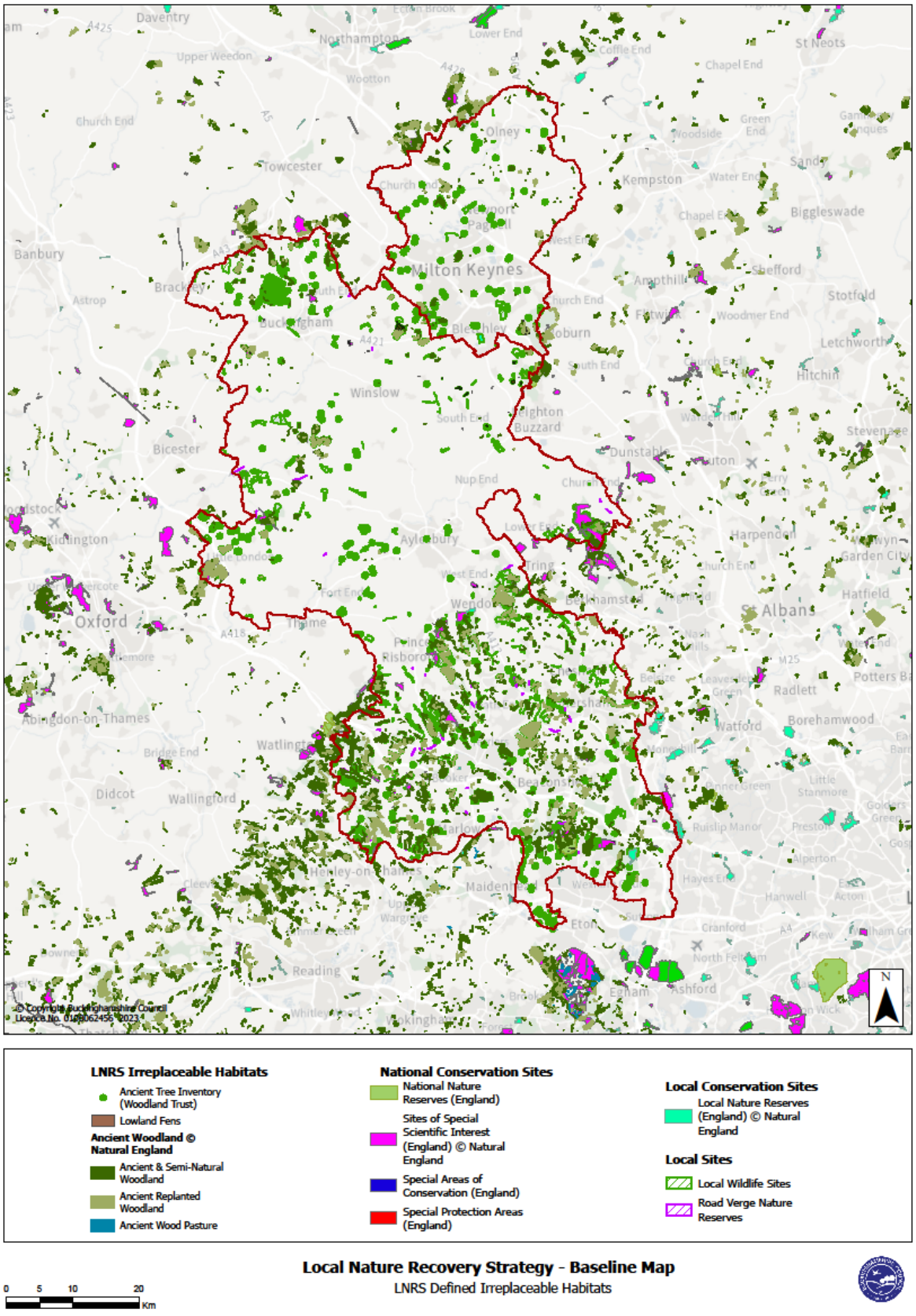
76. As the LNRS baseline map shows, many of the area's Local Wildlife Sites are found in the north of the area, and more of the road verge nature reserves and local nature reserves are found in central and south Buckinghamshire. Key sites include the Chilterns Beechwoods[30], Burnham Beeches and Aston Rowant, which are considered to be of international importance for their woodland assemblages, are National Nature Reserves and have been designated as Special Areas of Conservation (SACs) and SSSIs.

77. For a full explanation of how the required LNRS APIB map was constructed, see our APIB map methodology statement, available via *Appendix I, Methodology statements*.

[30] The Chiltern Beechwoods Special Area of Conservation includes 9 separate sites in the Chiltern Hills and spreads across 3 counties. The Special Area of Conservation (SAC) is an internationally recognised designation with habitats and species of significant ecological importance. The relevant sites to Buckinghamshire are:

- the Ashridge Commons and Woods Sites of Special Scientific Interest
- the Tring Woodlands Site of Special Scientific Interest

Figure 20. *The LNRS Baseline map for Buckinghamshire and Milton Keynes showing "Areas of Particular Importance for Biodiversity" as specified in the LNRS guidance*[31]



31

4) How our habitats have changed over time

Section summary

Locally, new historic analysis based on available mapping analysis, illustrates how nature in Buckinghamshire and Milton Keynes has changed over the last 90 years. The vast majority of our semi-natural habitats have been replaced since the 1930s, mainly by arable farming or improved (modified) grassland. Heathland has also decreased significantly. Elsewhere, there has been an increase in built-up areas and gardens and an expansion of woodlands, mainly in plantation forestry, over the same period. Woodland expansion followed a previous period of decline.

The "state of nature" in Buckinghamshire and Milton Keynes

78. Our area's green landscapes disguise dramatic recent declines in species diversity and abundance. According to the latest Biodiversity Action Plan for the area[32], compared to other English counties, Buckinghamshire and Milton Keynes together has:

- **Lower SSSI area percentage coverage** (just over 1%) than nationally (average 8%)
- **Lower priority habitat percentage coverage** than average (between 3-10%, compared with 14% nationally)
- **Higher extinction rates in plant species** than most English counties
- **Water Framework Directive (WFD) classification in 2022 showed that 5% of surface waterbodies** (rivers, lakes and canals) in Buckinghamshire and Milton Keynes **were at good ecological status**, compared to 16% nationally. **Only one chalk stream (10%) in Buckinghamshire and Milton Keynes was at 'good' ecological status (**the Eaton Bray Brook in the Ouzel and Milton Keynes catchment), compared with 17% nationally.

[32] Chapter 3, Forward to 2030 – Buckinghamshire & Milton Keynes Natural Environment Partnership (bucksmknep.co.uk) Buckinghamshire and Milton Keynes Natural Environment Partnership, 2021

- **Lots of potential with Local Wildlife Sites, but a lack of funding** and recognition for proper management. **Only just over half of our Local Wildlife Sites were assessed as in positive conservation management.**

Habitat change over past decades

79. **As part of the LNRS work, Natural Capital Solutions was commissioned to review and identify the changes in habitat distribution and extent across Buckinghamshire and Milton Keynes over the last 90 years.**

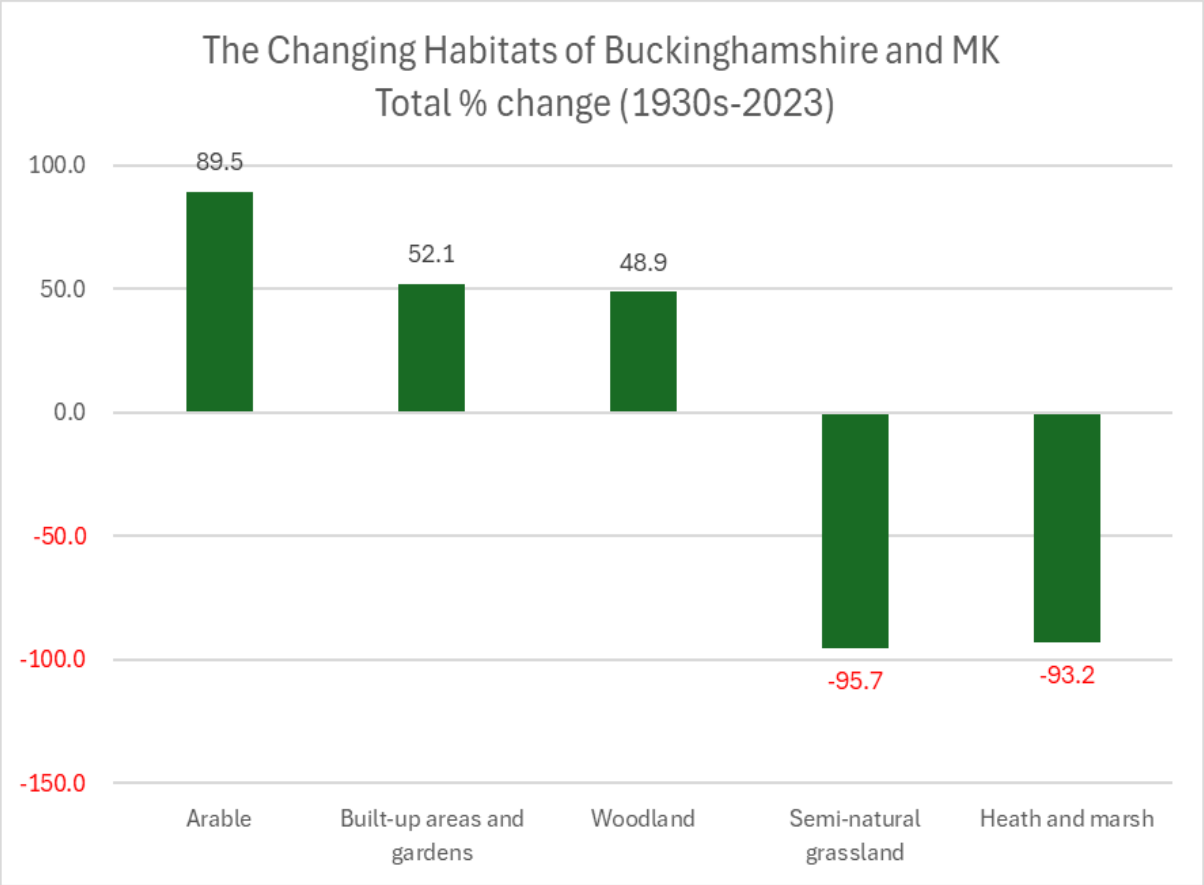
80. The land-use and habitats of Buckinghamshire and Milton Keynes were mapped using data from the 1930s and compared to 1990 and the current situation (2023). The primary aims were to establish how land-use has changed, and the magnitude of change across different habitats and in different parts of Buckinghamshire and Milton Keynes. Using the so-called "Dudley Stamp Maps", named after the instigator of the Land Utilisation Survey of Great Britain in 1933-49, along with regular habitat mapping from 1990, and a present-day map based on OS Mastermap topography and additional datasets, and categorising habitat types based on original definitions matched as closely as possible to the modern basemap using nine categories of habitat, a time series was produced to summarise the changes.

81. Three maps were created, shown below, representing the 1930s, 1990s and 2023, clipped to the study area boundary. Data on the cover of each habitat in each time period was extracted and change in area calculated.

Summary of change in habitats over the last 90 years

82. The maps and data paint a picture of profound habitat change over the last 90 years which is summarised at *Figure 26*, below:

Figure 21. *Based on information from: Historical analysis of changing habitats across Buckinghamshire and MK, 1930s – 2023* (Natural Capital Solutions).*



83. Overall, the analysis shows that the vast majority of semi-natural habitats have been lost, replaced predominantly by arable and improved grassland.

Losses 1930s – 2023

- The vast majority of semi-natural habitats have been lost, replaced predominantly by arable and improved grassland. Semi-natural grassland has experienced the largest habitat reduction. Although its coverage has increased since 1990, it is still less than 5% of the 1930s cover.

- Heathland also decreased significantly, by 93%, in line with UK trends since the 1930s. There has been a slight increase from 1990-2023.

- Arable land cover has increased by nearly 90% since the 1930s[33]

[33] (The orchards figure, that also suggests nearly a doubling of cover since the 1930s, is likely inaccurate as many orchards are likely to have been classified as woodland or garden in the 1930s basemap).

Gains 1930s – 2023

- Built-up areas and gardens have increased by approximately half, mainly since 1990; they were broadly the same from 1930s – 1990.

- There has also been an expansion of woodland, by almost half, since the 1930s, particularly of plantation forestry in the 1950-60s, but also signs of more recent woodland planting.

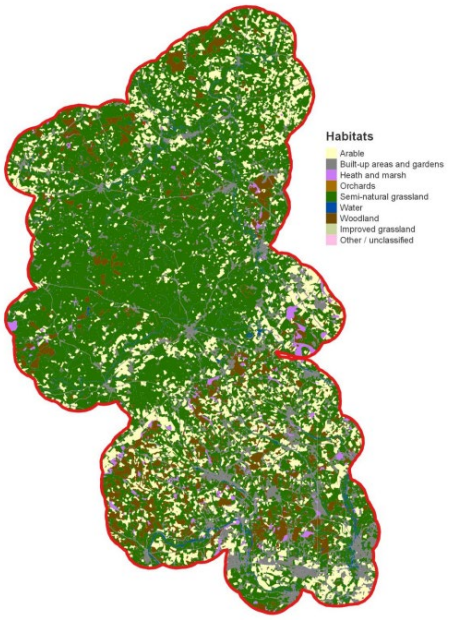
84. Similar changes have been seen throughout the UK. Nationally, it has been estimated that 97% of enclosed semi-natural grasslands in England and Wales were lost between 1930 and 1984, whereas woodland in the UK increased by almost 100% over similar periods, figures that are not dissimilar to the change seen here where semi-natural grassland has declined by 96% and woodland has increased by 49%.

85. **The present-day habitat composition remains relatively similar to the 1990 composition**. Improved grassland and arable land have decreased since 1990, and most other habitats have increased slightly, including semi-natural grassland and woodland. The changes shown between 1990 and the present day broadly follow the same trend as the rest of the UK, where enclosed farmland has decreased by 5%, woodland has increased by 29%, and urban areas have increased by 30%[34].

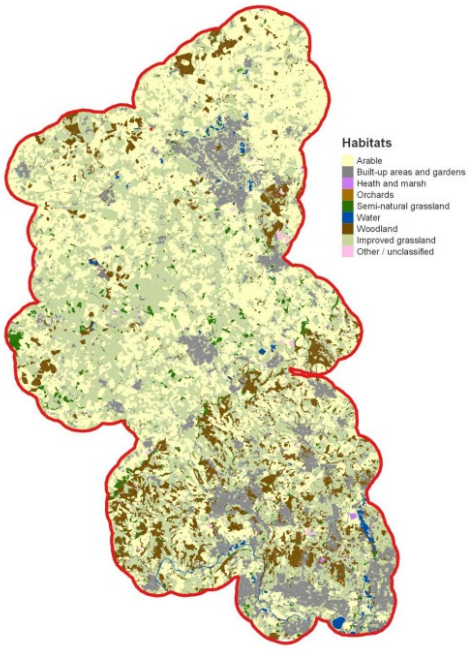
86. The full historic analysis, including gains and losses in the four LNRS zones (described at Section 6, (*Our four "LNRS zones" in Buckinghamshire and Milton Keynes: habitats, species, pressures and opportunities*) can be found at ***Appendix** G, Historic Analysis*.

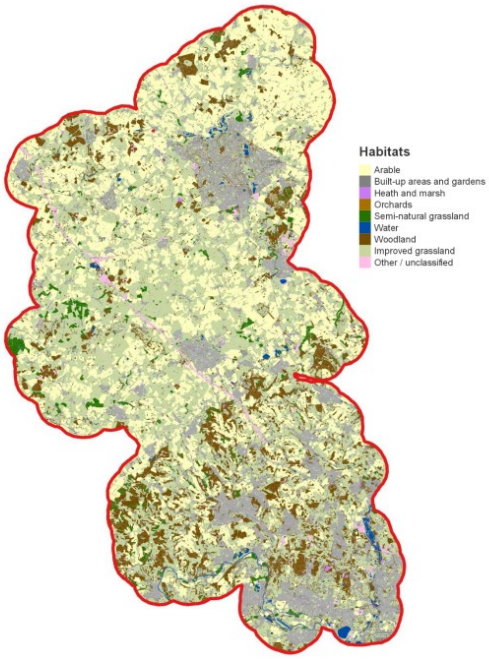
[34] Note that a number of the smaller changes will be due to errors or changes in classifying and mapping habitats, particularly in the Land Cover Map 1990, rather than real changes. The changes from the 1930s – 2023 are likely to be more accurate than those involving the 1990s map, with some caveats. While there are some errors due to the data and assumptions, the overall picture of change is accurate.

1: Land-use and habitats in the 1930s, derived from the “Dudley Stamp” maps.



2: Land-use and habitats in 1990, derived from LCM 1990 UKCEH maps, but with categories matched as closely as possible to the “Dudley Stamp” maps.





3. Land-use and habitats in 2023, derived from the LNRS Natural Capital basemap, but with categories matched as closely as possible to the “Dudley Stamp” maps.

Our rivers – change in ecological status over time

87. Our rivers, lakes and groundwater are protected and monitored as part of the Water Framework Directive (WFD), which requires all EU member states to have their waterbodies in "good ecological status" (or "good ecological potential" for heavily modified waterbodies) by 2027 at the latest. In addition to improving the status, there must be no deterioration. This was transposed into UK law as a member of the EU. Full WFD reclassifications are repeated every 6 years. The last full reclassification was 2019 and a partial reclassification (where data available) was in 2022. Wherever possible below, 2022 data has been used, but in some cases older data has had to be used.

88. All surface waterbodies in Buckinghamshire and Milton Keynes have been found to fail for the chemical components of the classification and this has impacted on overall WFD status. It is, however, possible to identify the ecological status of each waterbody by removing the chemical status data and reviewing the ecological elements.

89. There are 89 Water Framework Directive waterbodies in the area: 66 rivers (including 10 chalk stream waterbodies), 14 groundwater, 6 canals, 2 lakes and 1 water transfer (a reach of the Jubilee River).

90. The table below summarises the latest WFD classifications of the 66 rivers in Buckinghamshire and Milton Keynes.

Ecological Status/Potential	No. of rivers in classification	% of rivers in classification
High	0	0
Good	1	2
Moderate	48	73
Poor	14	21
Bad	3	5
TOTAL	66	100% (with rounding)

91. Figure 27, below, shows the 2019 ecological status of WFD water bodies throughout Buckinghamshire and Milton Keynes. The 2019 data is presented in the map as this is the most recent complete reclassification of WFD data. The next full WFD reclassification is due in 2025.

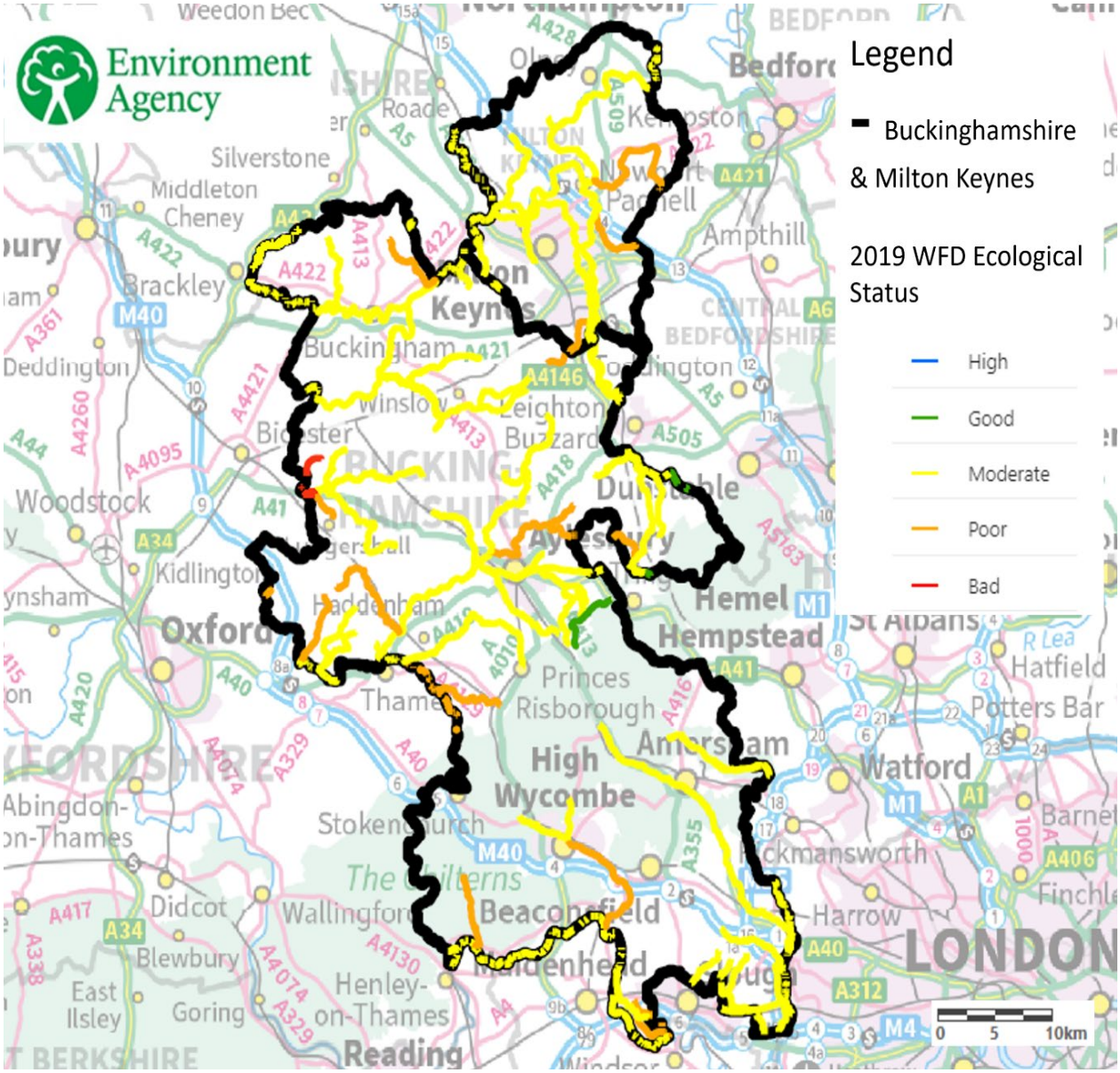
92. The latest WFD classification (2022) showed that 4 (5%) of all the surface waterbodies (rivers, lakes and canals only) in Buckinghamshire and Milton Keynes are at Good Ecological Status/Potential, compared with 16% nationally. Only 1 (10%) of the chalk stream waterbodies in the area (Eaton Bray Brook in the headwaters of the Ouzel catchment) is at Good Ecological Status, compared with 17% nationally.

93. One of the main contributory factors for the lack of good ecological status in the Strategy Area is pollution from sewage (continuous final effluent sewage discharge accounts for 24% of failures and intermittent storm discharge accounts for 6% of failures). Farming practices also have an impact, with poor nutrient management (including high phosphate levels) accounting for 17% of failures, poor livestock management causing 6% of failures, arable land use causing 3% of failures and poor soil management causing 2% of failures.

94. Activities impacting on river morphology have also had an effect, with physical modification and historic river engineering accounting for 8% of failures and land drainage causing 3%. For example, weirs create barriers to fish passage, and artificial straightening results in loss of habitat diversity, erosion of gravel beds and altered erosion and deposition. Historic dredging can also increase the risk of downstream flooding, and the impacts of pollution can be heightened when combined with poor watercourse habitats quality. There are such surface water runoff pressure points at High Wycombe, Chesham, Aylesbury, Marlow and Amersham Old Town. Other reasons for the lack of good ecological status include urban development, drought and transport drainage.

95. Whilst the headlines are not particularly promising, the WFD status of the waterbodies is based on the worst performing measure and many parameters are at good or high status; therefore, this should not in any way detract from the hard work which is going on in the catchments to address the failures and improve aquatic and semi-aquatic habitats. There is no single action which can reverse the decline, but steps are being taken to improve all aspects of the water environment which will contribute towards their overall improvement.

Figure 22. *2019 ecological status of WFD water bodies throughout Buckinghamshire and Milton Keynes Source: © Environment Agency. All rights reserved.*



5) Important Species

SECTION SUMMARY

Local Nature Recovery Strategies (LNRS) must describe opportunities, set priorities, and propose potential measures for the recovery and enhancement of species. These species, or groups of species (assemblages) should be:-

- Native,
- Rare, threatened or have special significance in the strategy area.
- Need local action to reverse their decline
- The measures (actions) to recover the species or group of species are not covered within the habitat measures.

For the LNRS we have created:-

- A shortlist of species with actions needed to support their recovery;
- Outlined any very specialist habitat niches they require;
- Defined the most important places where action is needed. Currently each Target Area for Important Species may cover a range of species.

We are testing a way of mapping action for individual species, and currently have 2 species and one assemblage mapped. Through consultation we aim to extend the number of species and assemblages that are mapped.

A copy of the documents are available at the consultation portal.

To view the mapping, please see the interactive LNRS mapping tool.

- The Target Areas for important species can be viewed by selecting Theme 9, Priority 22 and then M115.
- The layers for individual species/assemblages can be viewed by selecting Theme 9, Priority 22, and Measures 117 to 119.

96. The State of Nature Report 2023 disclosed that nearly 1 in 6 species are threatened with extinction from Great Britain. Half of flowering plants and a sixth of invertebrates are found in fewer places.

97. Evidence suggests that we are well on our way to a 6th global mass extinction event and that action must be taken quickly to reverse the decline of species abundance and distribution. The UK Government has signed an international agreement to halt species loss by 2030 and has set interim targets to ensure overall species abundance is increasing by 2030, and increasing by 10 percent by 2042, compared with 2030.

98. To support the reversal of the decline in species abundance and distribution, Local Nature Recovery Strategies (LNRS) must describe opportunities, set priorities, and propose potential measures (actions) for the recovery and enhancement of species.

99. The national LNRS guidance states that each LNRS must contain a shortlist of species that require direct action, over and above standard management practice for a habitat and where action for that species can be delivered through the implementation of the LNRS.

Criteria considered to identify the area's priority species

100. National LNRS guidance provides a set of criteria to consider in LNRSs to help identify priority species and actions to support their recovery in the local area. The first stage involves identifying threatened and other locally significant species relevant to the strategy area. The second stage involves determining which of these species are best supported through targeted local action beyond the measures for restoring, creating and joining up habitats across the LNRS area.

101. The species prioritisation work was led by Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC).

Stakeholder Engagement

102. Throughout the process of creating and refining the longlist, and resultant shortlist of species, target areas for action, and key ecological niches, partners were invited into the process. Many generously provided support, data, guidance and technical expertise at various stages. Participants comprised representatives from across the landscape of conservation organisations and individuals.

Creating a longlist of threatened species in the LNRS Area

103. Data was collated from a range of sources for species present in the LNRS area that are considered threatened and appear on Great Britain and England's International Union for Conservation of Nature (IUCN) Red Lists, namely:

- Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC)
- National recording schemes (such a Butterfly Recording Scheme, Breeding Bird Survey, National Plant Monitoring Scheme, Spider Recording Scheme, Fungal Records Database of Britain and Ireland etc)
- iRecord

- National Biodiversity Network Atlas referenced records
- County recorders
- Local and regional experts

104. The following criteria were used to determine which species to include on the local species longlist:

- Species that were considered threatened on GB and England IUCN Red Lists
- For invertebrates, species highlighted within the Centre for Ecology and Hydrology's Pantheon system were used also to reflect updates in knowledge on that species, its rarity and level of threat. Pantheons concept of Species Quality Indices was used as an additional source of data, higher SQI species were added to the longlist, if they had not already been flagged for inclusion under the RDB status sifts.
- There were recent records within Buckinghamshire and Milton Keynes
- There were recent records close to the border with Buckinghamshire and Milton Keynes
- Records that are verified sources

105. Through a range of stakeholder activities, the list was sense-checked to remove records that local experts considered questionable (e.g. were single records of likely vagrants, accidental releases, likely incorrectly identified, the record was too old and / or the species likely extinct). Species were added where it was considered Buckinghamshire and Milton Keynes held a significant proportion of the national population or was of other local significance, or where climate change is altering the range of a species, and it is likely that it will appear in the LNRS area in the next 5 years.

Refining the longlist to create the species shortlist

106. In line with the **guidance, species were not included in the shortlist if:**

- Their needs could be covered by more, bigger, better and connected habitat, as these needs aim to be met through the habitat related measures within the LNRS
- It is unclear what is causing their decline or on-the-ground action is not a priority
- The factors constraining their recovery lie outside of England
- The species records held were considered as passing vagrants/occasional visitors

Additionally,

- Species that were found only in single sites, or the needs of the species is not well known.

Stakeholder Engagement Activities to refine the longlist

107. Movement from the longlist to a more focussed shortlist, and creation of specific "Target Areas for Important Species", was managed through stakeholder engagement activities, in various forms, to encourage inclusion from across the biological recording and expert community. These ranged from one-to-one conversations to small group reviews and ultimately workshops. Two workshops (in Milton Keynes and Chesham) were held in Spring 2024 to garner wider and additional input.

108. Workshop sessions focussed around the earlier promoted themes of:-

- Species - which ones should or should not be shortlisted
- Natural assemblages of species, and how they might be organised with others of similar needs for shortlisting purposes
- Niches – particularly describing key niches in the LNRS area not already under consideration via the earlier phases of the LNRS work

And a new spatial element for consideration

- Target Areas for Important Species – where specific action is needed as a priority for key habitats, niches, species or assemblages identified from all the above works

109. The species shortlist is available on the consultation portal.

Target Areas for Important Species – an expert-led, data-supported approach

110. Data was gathered by a wide number of organisations and dedicated volunteers on where individual species occur across Buckinghamshire and Milton Keynes, and fed into a variety of databases, both locally and nationally. This data can tell us a huge amount about certain species, their population trends and general distribution. However, for the purposes of the LNRS – defining place-based measures (actions) for individual species across the LNRS area - the coverage of data is inevitably incomplete and imperfect. Some groups of species are well recorded, others less so. The reasons for this are varied, for example, access to private land may be difficult to obtain, some species require extremely specialist knowledge that may not be held locally or by so few people that coverage of the area may not be possible. Certain species can only be recorded by either damaging the habitat they inhabit or the species themselves. Records of species can be skewed around locations where recorders operate.

111. For these reasons, an expert led, data supported approach was taken to create a map to Target Areas for Important Species.

112. Experts from across the range of species specialisms (such as spiders; dragon and damselflies; beetles; butterflies and moths; other invertebrates; fungi; vascular plants; mosses; lichens; mammals; amphibians and reptiles; birds; and fish) were invited to the workshops, to use the best-available data and pool their expert knowledge in order to highlight the key areas for species across the LNRS area. These Target Areas for Important Species were identified by the experts on maps, noting which groups of species they were important for. Species-specific expansion buffers were added, and areas were linked where biogeography suggested it.

113. Within the final LNRS map, the Target Areas can be selected to provide details of the species they are important for, and then linked through to the document that provides information on the target area and the measures or actions that would best be taken to support those species. Our mapping tool is available here. Our species Target Areas table is available on the consultation portal.

Niches

114. Many species that are threatened today have very specific habitat requirements, which cannot be met by the other measures (actions) in the LNRS. These very specific habitat requirements (niches) have been captured in the species shortlist. An introduction to how niches differ from Habitats of Principle Importance, and description of the niches highlighted for Buckinghamshire and Milton Keynes is available on the consultation portal.

6) Our four "LNRS zones" in Buckinghamshire and Milton Keynes: habitats, species, pressures and opportunities

Summary:
Nature, pressures and opportunities in our four LNRS zones

During the LNRS process, for example during stakeholder engagement, we split Buckinghamshire and Milton Keynes into four geographic zones that are based on underlying areas of similar topography, geology and ecology.

This section describes each of the 4 zones – its geology, and landscapes, key habitats and species, changes over recent decades, and the anticipated pressures specific to that LNRS zone. Opportunities for nature recovery (for recovering or enhancing biodiversity, in terms of habitats and species) are also highlighted for each zone

To note: The area-wide pressures on nature and opportunities for nature recovery still apply across all zones; listed in this section are the pressures and opportunities of particular relevance to the zone described.

115. For the purpose of developing the Local Nature Recovery Strategy, we divided the LNRS area into four broad areas, or "LNRS zones", based on underlying natural character as defined by Natural England's 'National Character Areas' (NCAs). NCAs are areas of similar geology, topography, history and ecology, and follow natural subdivisions rather than administrative ones, with the purpose of forming a good decision-making framework for the natural environment.[35]

116. *Figure 28,* below, shows the locations of the four zones being used for the LNRS process: Milton Keynes and North Buckinghamshire, Aylesbury Vale, Chilterns and South

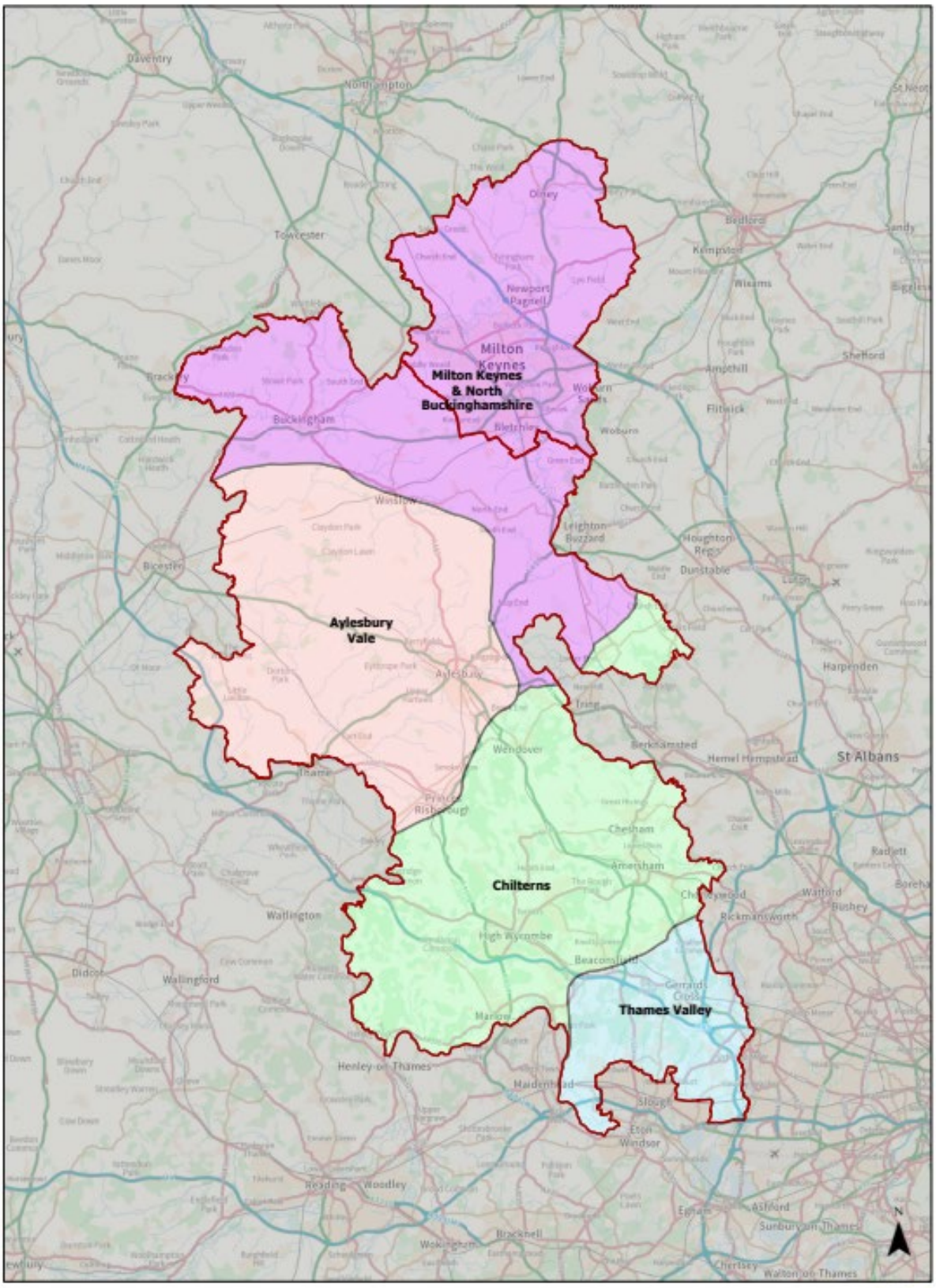
[35] According to Natural England, "There are 159 Character Areas, each of which is distinctive with a unique 'sense of place'. These broad divisions of landscape form the basic units of cohesive countryside character, on which strategies for both ecological and landscape issues can be based. The Character Area framework is used to describe and shape objectives for the countryside, its planning and management." (Statement from: https://data.gov.uk/dataset/21104eeb-4a53-4e41-8ada-d2d442e416e0/national-character-areas-england)

Buckinghamshire. It also shows the underlying NCAs that were used to identify the four LNRS zones, which are:

i. Milton Keynes and North Buckinghamshire: the Bedfordshire and Cambridgeshire Claylands, Bedfordshire Greensand Ridge and the Yardley-Littlewood Ridge
ii. Aylesbury Vale: the Upper Thames Clay Vales and the Midvale Ridge
iii. Chilterns: the Chilterns
iv. South Buckinghamshire: the Thames Valley

117. This section describes, for each of the four LNRS zones, the key habitats and species present, and zone-specific pressures faced and opportunities for nature recovery. For each zone, these pressures and opportunities act alongside, and are additional to, the generic pressures described at Section [6], above and the opportunities for nature across the whole of Buckinghamshire and Milton Keynes.

Figure 23. *The four 'LNRS Zones' in Buckinghamshire and Milton Keynes, based on groups of underlying National Character Areas, used for producing the LNRS (Source: BMERC).*



Milton Keynes and North Buckinghamshire

Geology

118. The Milton Keynes and North Buckinghamshire area spans the Yardley Whittlewood Ridge[36] in the north - a gently undulating limestone plateau which creates a physical boundary between the catchments of the River Nene and River Great Ouse; the lowland plateau of arable farmland in the Bedfordshire and Cambridgeshire Claylands[37] with an underlying clay geology in the central portion of Milton Keynes; and tip of The Bedfordshire Greensand Ridge[38] – a contrasting narrow and elevated outcrop of Greensand along the southern edge of Milton Keynes and the far north-east of Buckinghamshire.

Milton Keynes

The city

119. The urban settlement of Milton Keynes was laid out according to the new town plan during the 1970s through to the 1990s. The designated area of the new town, the largest in the UK, encompassed the existing villages and towns in the west of the borough and absorbed existing landscape features, such as ponds, woodlands and hedgerows. The provision of green infrastructure (as we would now call it) was regarded as just as essential in the establishment of the new town as other forms of urban infrastructure. A series of linear parks of relatively generous proportion were created along the main river valleys along with large water-balancing lakes – such as the Ouse, Ouzel, Loughton and Broughton valley parks. These form part of a network of green and blue spaces, which play an important role in providing benefits for wildlife as well as physical health and mental wellbeing for people within the city. Other wildlife corridors along roads and rail connect the generous green spaces. Improved environments, from road verges and parks through to individual gardens, can be significant for wildlife, for example with ponds or planting for pollinators.

120. The city continues to grow at a fast pace. New expansion areas have been added on the east, west and southeast sides of the original new town area. The city's objective is to extend its linear parks, acting as wildlife corridors, as this growth occurs.

[36] Natural England (2013): http://publications.naturalengland.org.uk/publication/6441192149483520; NCA profile available at the same link.
[37] Natural England (2014): http://publications.naturalengland.org.uk/publication/5091147672190976; NCA profile available at the same link.
[38] Natural England (2014): http://publications.naturalengland.org.uk/publication/5091147672190976; NCA profile available at the same link.

Landscapes beyond the city

121. To the north-east of the city of Milton Keynes, the rural area is primarily farmland, with small stands of woodland. The Yardley Whittlewood Ridge retains a rural character and has remnants of the 13th century hunting forests around Yardley Chase, Salcey and Whittlewood forests. It is well wooded with **ancient woodland, wood pasture and parkland and mature hedgerows**. There are a number of ancient woodlands of national importance designated as Sites of Special Scientific Interest. The Bedfordshire and Cambridgeshire Claylands form a gently undulating, lowland plateau dissected by **shallow river valleys**, dominated by **large-scale arable farmland.**

Figure 24. *Ancient woodland at the Ashridge Estate. Photo: Nicola Thomas (NEP).*

122. The upper Great Ouse flows and meanders gently through the landscape easterly from Buckinghamshire, around the northern edge of Milton Keynes through an enclosed landscape of water meadows, and in characteristic broad loops through mainly arable planned and regular fields, bounded by open ditches and trimmed hedgerows.

123. The Bedfordshire Greensand Ridge contains a patchwork of semi-natural habitats on acidic soils, including **flood plain grazing marshes, lowland heathland and meadows** and **mixed deciduous woodland**. The Grand Union Canal cuts through the very south-west of the ridge.

Key Habitats

124. The parks and other green and blue spaces in Milton Keynes city contain important areas of wildlife habitats, including **ancient woodlands, species-rich floodplain meadows** and **wetland reserves,** as well as **old hedgerows, veteran trees, grazing** and **valley pastures and hay meadows, scrubland, ponds, lakes, rivers and streams**. The city's **linear park**s provide important interconnected ecological corridors although some sites of conservation value are more isolated and lack sufficient buffer-space between them and surrounding development. The city's green spaces, including the landscaped corridors along the main 'grid' roads, were heavily planted under the new town establishment – these **plantations** are now maturing and providing important **urban wildlife habitat**.

125. Beyond the city, the Milton Keynes area has retained a diverse range of habitats and species of importance such as **lowland mixed deciduous woodland, orchards** and **unimproved meadows**.

Figure 25. *Hazel dormouse in the hand. Photo: Clare Gray, Gwent Wildlife Trust.*

126. While predominantly a farmed landscape, there are several semi-natural habitats present, including **lowland mixed deciduous woodland**, **wood pasture and parkland** with **ancient and veteran trees**, and the Great Ouse river corridor. The planting of conifers has formed dense plantations in some areas, but a sense of history is maintained by the still extensive **ancient semi-natural broadleaved woodland**, which has networks of **rides and occasional open grassland**s ('forest lawns'). The Bedfordshire Greensand Ridge in the east has a higher concentration of semi-natural habitat including **lowland heathland and acid grassland**.

Key Species [39]

127. In the city of Milton Keynes, many species of **butterflies,** including rare and threatened species such as the **black hairstreak** are present at specific sites, as well as **great crested newts**, **noctule bats** and **badgers** that thrive in the green spaces, with **barn owls**, and **hobbies** seen across the grasslands hunting for prey. Riparian and wetland habitats provide valuable connectivity within the landscape and support populations of **breeding and overwintering birds**, with **kingfishers**, **Daubenton's bats** and **otter** found around the waterways.

128. The variety of semi-natural habitats beyond the city of Milton Keynes support a range of species – some notably rare and scarce – including sites designated for species associated with ancient woodland, wetland sites (important for **birds, great crested newt and species of stonewort**), **traditional orchards** and **unimproved grassland** supporting a rich diversity of **wildflowers**.

129. The ancient woodlands, wood pasture and parkland of the Yardley-Whittlewood Ridge support **butterflies,** including **white admiral**, **wood white**, **purple hairstreak** and **black hairstreak**, rare mammals such as **hazel dormice** and the nationally-rare **Barbastelle and noctule bats** along with numerous scarce moths, specialist beetles and **saprophytic (dead wood) invertebrates**.

130. The agricultural areas support **farmland birds** including Skylark, Grey Partridge and the Brown Hare, with **meadow grasslands** hosting **rare plants** such as **green-winged orchids**. **Water voles** are present on the **Great Ouse.** Riparian and wetland habitats also provide connectivity and support **breeding and overwintering birds, otter, great crested newts** and species of **Stonewort.**

131. The Greensand Ridge and **lowland heathland**, with its **heather** and **wavy hair grass**, is important for species including **Adders, Woodlarks, Nightjar, Natterjack toads** and **specialised mire (waterlogged) plants**. Numerous rare species of **fungi and lichens** are found on the acidic soils, as are **specialised invertebrates** including bees, wasps and spiders. Lowland acid grassland is characterised by fine-leaved grasses such as **fescues and bents**, with a range of plants such as **tormentil, heath bedstraw, shepherd's cress and clovers**. Bryophytes, rare and/or scarce macro-fungi and lichens are a special feature. **Common blue and small copper butterflies** can be abundant and there are records for bugs such as the **bishop's mitre shield bug**.

[39] NB – the species highlighted throughout this description are those considered representative or important in the LNRS area described. The examples used therefore do not all match to the shortlist of important species that resulted from the species shortlisting work – see *Appendix N, Species Shortlist and niches* and *Section 5* for further details.

Changes over recent decades

132. Changes in farming practice since 1945 has seen a decline in a number of species groups including **farmland birds** and **arable weed species**. Many kilometres of **hedgerows** have been removed to enlarge fields, or left unmanaged, leading to their gradual loss or reduced value through poorer structure or connectivity. Historic land drainage in the area, along with the disconnection of rivers from their floodplains, and land drainage, has led to **wetland habitats declining.**

133. According to the Natural Capital Solutions Historic data analysis[40], in the 1930s, the Milton Keynes and North Buckinghamshire zone consisted of around 72% semi-natural grassland, with most of the rest covered by arable land (14.1%) and built-up areas and gardens (7.3%). **By 1990, semi-natural grassland had been reduced to only 0.9%,** built-up areas and gardens to 9.5% as a result of the building of Milton Keynes, and arable land had become the largest habitat by type (48%), followed by improved grassland (36.5%). The present-day basemap shows a further increase in built-up area with the expansion of Milton Keynes, and a decline in arable and improved grassland, and a small increase of semi-natural habitats such as semi-natural grassland, woodland and water.

Looking ahead – anticipated pressures

134. Looking ahead, **East West Rail** threatens habitats and species that had established along the long disused track and other nearby areas. High levels of **growth and development**, particularly west of Milton Keynes and in several large expansion areas around the edge of the city, as well as between Oxford and Cambridge, threaten to displace farmland species and increase demand for resources, including for leisure and recreation, for water, and risk higher pollution levels that can affect air and water quality. Associated changes in land management regimes and potential fragmentation of habitats also pose threats.

Opportunities for nature recovery in Milton Keynes and North Buckinghamshire

135. As well as the LNRS area-wide opportunities for nature recovery and to help combat the pressures on the environment, there are overall opportunities for nature recovery of habitats and species specific to the zone.

- **Expand and link woodland, hedgerows and other semi-natural habitats**

[40] The changing habitats of Buckinghamshire and Milton Keynes: A historic perspective over 90 years, Natural Capital Solutions (2024) Page 13-14. Available here: Changing habitats over time in Bucks and MK – Buckinghamshire & Milton Keynes Natural Environment Partnership

- **Support farmland birds and pollinators** in the farmed landscape
- **Restore the river corridor to improve habitat quality and fluvial connectivity to floodplains**
- **Improve connectivity between isolated wildlife-rich sites within the valley**
- **Manage, enhance, extend and link up native woodland**
- **Create or restore fens, hedgerows, heathland lowland meadows, woodlands, wood pasture & parkland and ponds (plus eutrophic standing water, reedbeds)**
  Suitable for: The Whaddon Chase area; *The Greensand Ridge*
- **Improve opportunities for wildlife within the urban areas**
- **Encourage appropriate management and expansion of traditional orchards**
- **Build biodiversity into planning -** manage, extend and link semi-natural habitats and green infrastructure in development
- **More sustainable and water-friendly agricultural practices** – to maintain and manage a sustainable and productive claylands arable landscape, while managing, expending and linking woodlands, hedgerows and other semi-natural habitats, improve soil and water quality and lessen the impact of climate change by promoting good agricultural practice. Protect aquifers and enhance the quality, status and structure of the River Great Ouse, its valley and tributaries, habitats, waterbodies and flood plain.

Aylesbury Vale

Geology

136. The Upper Thames Clay Vales[41] comprises predominantly Jurassic and Cretaceous clays and encircles the Midvale Ridge[42]which is a band of low-lying limestone hills.

[41] Natural England (2014); http://publications.naturalengland.org.uk/publication/5865554770395136; NCA profile available at the same link.
[42] Natural England (2013); http://publications.naturalengland.org.uk/publication/5431100; NCA profile available at the same link

Landscape

137. The Vale is a predominantly low-lying agricultural area with mixed arable/pastoral farming. The River Thame and River Ray are dominant features of the landscape, with broad floodplain meadows and pastures, and are predominantly clay rivers although several small tributaries of the Thame are fed by chalk springs at the foot of the Chiltern scarp. There are also a number of lakes associated with mineral extraction. The Brill and Muswell Hills consist of steeply sloping hills. The town of Aylesbury lies to the south and is the only major settlement. The area includes a remnant of the former Royal Forest of Bernwood. The Thame Valley crosses this area and is gently undulating. The Midvale Ridge is a band of low-lying limestones hills stretching east-west from the Vale of Aylesbury, and is predominantly agricultural with a mixed arable-pastoral farming landscape and is more wooded than the surrounding Upper Thames Clay Vales.

Figure 26. *Agricultural land near Ivinghoe Beacon. Photo: Nicola Thomas (NEP).*

Key Habitats

138. **Hedgerows and mature field and hedgerow trees** are a feature of the farmland. The rivers and associated **riparian habitats** are of interest here, especially the Upper Ray Valley which is known for its **floodplain habitats** including areas of nationally-important **flood meadow grassland**. **Pond**s are commonly found in grazed fields. There are numerous **ancient**

woodlands in the Bernwood area. The distinct geology of the Midvale Ridge gives rise to habitats uncommon in the south of England such as **calcareous flushes and grassland**.

Key Species[43]

139. The river valleys are regionally important for **wading birds** including small breeding numbers of **lapwing, redshank and curlew**. Nationally important numbers of **breeding and wintering wildfowl** are associated with the extensive floodplains, water-filled gravel pits and reservoirs. Nationally significant populations of **native black poplar** occur in the area. Many of the watercourses are fringed with **willow** or **poplar**.

140. The neutral and calcareous grasslands support **rare plants and invertebrates**. The ancient woodlands support important populations of **Bechstein's Bat**, as well as uncommon and rare butterflies including the nationally rare **black hairstreak** and **brown hairstreak butterflies**. Arable land supports nationally important assemblages of **farmland birds and arable** weeds along with **mature field and hedgerow trees**.

Changes over recent decades

141. This area has seen high **development** pressure and expanding urban areas particularly around Aylesbury town. **Historic land drainage** for agricultural improvements has affected the clay rivers, the hydrology of the floodplain meadows and watercourse ecology. This has resulted in moderately to highly modified river channels and associated loss of floodplain wetland habitat. The historic deepening of rivers has reduced the connectivity of rivers to the floodplain in this area.

142. According to the Natural Capital Solutions Historic data analysis[44], there is again a huge decline in semi-natural grasslands from the 1930s to the present day. In the 1930s, this covered nearly 80% of the land, with some arable (9%) and built-up areas and gardens (6.7%). This had changed to over half the area covered with improved grassland by 1990, and c.38% arable land, and further changes to 2023.

[43] NB – the species highlighted throughout this description are those considered representative or important in the LNRS area described. The examples used therefore do not all match to the shortlist of important species that resulted from the species shortlisting work – see *Appendix M*, *Appendix N* and *Section 5* for further details.

[44] The changing habitats of Buckinghamshire and Milton Keynes: A historic perspective over 90 years, Natural Capital Solutions (2024) Page 13-14.. Available at Changing habitats over time in Bucks and MK – Buckinghamshire & Milton Keynes Natural Environment Partnership

Looking ahead – anticipated pressures

143. As well as generic pressures on our environment including and exacerbated by climate change, invasive non-native species, pests and diseases, **major infrastructure** also threatens the area – for example, High Speed Rail 2 also cuts through this area and has recently led to the loss of a number of sites of high value to wildlife, including ancient woodlands. The **Oxford to Cambridge growth area** is expected to lead to high future **development pressure** in this area, with anticipated **land use changes** and habitat fragmentation resulting from urban growth. Similarly, **East West Rail** will have a big impact on areas of habitat along the disused rail-line as it is reinstated.

Opportunities for nature recovery

144. As well as the area-wide opportunities for nature recovery and to help combat the pressures on the environment, there are overall opportunities for nature recovery of habitats and species specific to the Aylesbury Vale zone, namely:

- **Restore and connect woodland, including ancient and semi-natural woodland, wood pasture & parkland**
- **Trees- plant, manage, protect**
- **Maintain and enhance hedgerows and field & hedgerow trees**
- **Protect, create and restore and manage chalk habitats and acid grasslands**
- **Create, restore and manage lowland meadows, ponds and hedgerows**
- **Encourage and restore diverse arable habitats**
- **Restore rivers and streams and associated floodplain wetland habitats**
- **Encourage green development and access to nature**
- **Restore and create wetland habitats** (e.g. wet grassland, ponds and fens and wetland habitats in the flood plains)

Chilterns

145. The Chilterns[45] is underlain by chalk bedrock that rises up as a dip slope from the London Basin to form a steep north-west facing escarpment known as the Chiltern's Ridge. Clay soils cap the chalk hilltops in places such as Wendover Woods and Penn Wood. To the south the dip slope gives way to acid drift gravels.

Landscape

146. The Chilterns Ridge is a north-west facing escarpment offering long views over the adjacent Upper Thames Clay Vales to the Mid Vale Ridge and beyond. The ridge is divided by valleys which descend south-east towards the River Thames. The Chilterns is designated as a National Landscape with habitats associated with traditional land management over many millennia.

Figure 27. *Weston Turville Reservoir. Photo: BBOWT / Jim Asher.*

Key Habitats

147. The Chilterns is one of the most wooded areas of the country and much is found where agriculture would be more difficult on steeper slopes and poorer soils. **Ancient Woodland** makes up 13% of the Chilterns AONB, compared with 2% of England as a whole, and is particularly concentrated in the central Chilterns. This includes the **Chilterns Beechwoods** which are designated as a Special Area of Conservation (SAC).

[45] Natural England (2013); http://publications.naturalengland.org.uk/publication/4977697; NCA profile available at the same link.

148. Priority habitats include **Lowland Beech and Yew Woodland**, mixed deciduous woodland and wood pasture and parkland. The Chilterns has a rich heritage of parkland, wood pasture and common land. The woodlands are often interspersed with grassland, heaths, bogs and ponds. **Ancient Box woodland** can still be found in the Kimble / Ellesborough area in the centre of the county.

149. Chalk **streams** are an internationally rare habitat, with 85% in the UK, and many in the Chilterns. The Chilterns area within Buckinghamshire has 10 main chalk rivers totalling around 90km. **Lowland calcareous (chalk) grassland** can be found along the slopes of the steep scarps and dry valleys, and is home to a high number of rare plants and insects. The grassland is often as part of a mosaic with scrub.

***Figure 28**. Remnant downland. Photo: Chilterns National Landscape.*

150. Where the land is farmed, **ancient hedgerows and veteran trees** can be found. **Traditional Orchards**, particularly cherry, are most numerous south of the Chilterns Ridge. In the southern Chilterns, **heathland** can be found on the acid gravels amongst pockets of **acid grassland and birch woodland**. **Box woodland** can also still be found here.

Key Species[46]

151. The chalk grasslands support species of **rare plants** including many species of **orchids** and specialists such as the **Chiltern Gentian**. The grasslands also support invertebrates such

[46] NB – the species highlighted throughout this description are those considered representative or important in the LNRS area described. The examples used therefore do not all match to the shortlist of important species that resulted from the species shortlisting work. See *Appendix M, Appendix N* and *Section 5* for further details.

as **Chalkhill Blue and Duke of Burgundy butterflies**, **glow worms** and **Roman snails**. **Juniper** scrub can be found on the escarpments. The chalk streams support a huge range of **aquatic plants**, such as **rare starworts, water crowfoot and watercress**. They also support animals such the **water vole**, fish including **brown trout** and a broad range of **aquatic invertebrates**.

Figure 29. *Water crowfoot (closeup). Photo: Chilterns National Landscape.*

152. The woodlands and traditional orchards support numerous specialist species including a wide variety of **plants, fungi and invertebrates**, for example **marsh violet** and **red helleborine**. The parklands, wood pasture and common land support high concentrations of **veteran trees, associated deadwood invertebrates and fungi**. Farmland hosts **rare arable weeds** and farmland birds such as **Corn Bunting and Yellowhammer**.

Figure 30. *Bee Orchids. Photo: Chilterns National Landscape.* **Figure 31**. *Chilterns Gentian. Photo: BMERC.*

Changes over recent decades

153. Looking across the Chilterns there are a number of changes over recent decades to habitats and land cover, including:

- Poor management of woodlands has led to a decline in the condition of some of the woodland habitats, reducing the number of species found in them. As previous coppicing for the furniture industry has disappeared, woodland flowers, butterflies and hazel dormice have declined.
- Conifer woodlands have changed the soil conditions for native species.
- Diseases such as ash dieback have reduced certain tree species. Ash dieback has had a dramatic impact, and many ash trees have been lost.
- Invasive, and non-native invasive species – e.g. grey squirrels, edible dormice and deer are well established to the detriment of some native fauna and flora. Non-native species such as the Signal Crayfish have spread in the area's waterways led to the likely local extinction of the White-clawed crayfish. Other invasive species include Japanese Knotweed and Himalayan Balsam.
- Reduction in livestock farming and grazing needed to retain grassland landscapes e.g. chalk grassland.
- Intensification of arable farming.
- Over-abstraction and channel modification pose threats to chalk streams. None of our chalk streams currently achieve 'good' ecological status under the Water Framework

Directive; a result of **over abstraction,** diffuse and point source **pollution,** and historic **channel modification**

- Lack of buffers between watercourses and development.

154. According to the Natural Capital Solutions Historic data analysis[47], the Chilterns had the highest percentage coverage of arable land of the four zones in the 1930s (at ~23% of the Chilterns area), although the largest habitat type in the Chilterns was still semi-natural grassland (43.2%). Both woodland and built-up areas and gardens also covered a fairly significant area (at 15.6% and 13.8% respectively). This zone in the 1930s also had the highest heath and marsh coverage of the four zones (3.2%).

155. Over time, **arable land coverage has stayed relatively stable** in the Chilterns since the 1930s. However, there has been a **dramatic decline in semi-natural grassland from 42% to just over 4% today (up from just 1.7% in 1990) and a third of the area is now improved grassland, now the largest single habitat in the zone**. Similar to surrounding areas, there has been a small increase in the amount of woodland (around a quarter) since the 1930s to 21% coverage, and built-up areas and gardens have increase by 4% since the 1930s, although now representing around 18% of the land area.

Looking ahead – anticipated pressures

156. **The Intensification of farming practices is likely to** further reduce farmland bird populations and will likely be exacerbated by continued **urbanisation** which will also displace them. Where new development design lacks buffer zones with watercourses or surrounding land, this can isolate species and habitats. **Infrastructure projects including HS2** have had a dramatic impact on the landscape, clearing miles of vegetation, and also creating a barrier to species movement.

Opportunities for enhancing or recovering biodiversity

157. As well as the area-wide opportunities for nature recovery and to help combat the pressures on the environment, there are overall opportunities for nature recovery of habitats and species specific to the Chilterns zone, namely:

- **Improve condition and connectivity of existing wildlife habitats -** including chalk grassland, ancient woodland, beech woodland, chalk streams and riparian habitats, arable field margins, hedgerows and traditional orchards.

[47] The changing habitats of Buckinghamshire and Milton Keynes: A historic perspective over 90 years, Natural Capital Solutions (2024) Page 13-14 . Available at: Changing habitats over time in Bucks and MK – Buckinghamshire & Milton Keynes Natural Environment Partnership

- **Manage woodland to create habitat mosaics and diversity of species and age.** Woodland management is also likely to require effective control of invasive non-native species such as deer.

- **Restore and create more calcareous grassland,** and reinstate effective grazing regimes to maintain them.

- **Restore and create more arable field margins and woodland.**

- **Encourage livestock grazing on chalk grassland** and the creation of **habitat mosaics.**

- **Restore and manage native hedgerows** and hedgerow trees to enhance connectivity.

- **Restore chalk rivers and streams**, including reducing water abstraction.

- **Restore natural processes** – e.g. introduce natural flood management, extensive grazing or preservation of the chalk aquifer as a vital resource supporting the biodiversity of chalk streams and rivers; and removing weirs and hard engineering to enable natural river function.

- **Promote and support farmer-led initiatives to deliver wildlife conservation**, aquifer recharges, soil health and carbon storage at landscape or catchment scale.

South Buckinghamshire

Geology

158. The Thames Valley area[48] is dominated by London Clay which is overlain by river-lain sands and gravels over much of the area.

Landscape

159. A dominant feature of the landscape is the **River Thames** (along the southern Buckinghamshire border) and its **tributaries,** including its main tributary the River Colne, along with **streams, lakes, canals and open waterbodies** resulting from mineral extractions in the area. The Thames itself is highly modified for navigation. The **Colne Valley Regional Park**, in the south-east corner of Buckinghamshire, is a mosaic of **farmland, woodland and water with rivers, canals and lakes**.

[48] Text and information taken from the Thames Valley National Character Area Profile (115), Natural England, Available at: http://publications.naturalengland.org.uk/publication/3865943 Accessed 24th August 2020.

Key Habitats

160. There are many notable habitats across the area, including **acid grasslands, fens, heaths, orchards, ponds and ancient woodlands**. Burnham Beeches is a designated SAC containing **wood pasture and many ancient pollards.** There are several good **pond habitats** particularly around Littleworth Common and within the designated areas. **Parkland** features in the area at sites including Black Park, Langley Park, Dorney, Cliveden and Dropmore, with some including remnants of **acid grassland**.

Figure 32. *Burnham Beeches. Photo Jamie Smith.*

Key Species[49]

161. The grassland associated with the river valley is important for **breeding birds** and several **nationally-important plants**. Temporary ponds on heathlands are important for **starfruit**. The ancient trees and woodlands support many species of **fungi, rare plants, invertebrates and birds**. This area is particularly important for woodland birds including the **Lesser Spotted Woodpecker**; also for **lichens** and **saproxylic invertebrates** (species that depend on deadwood or decaying wood – such as beetles) not found in other areas.

[49] NB – the species highlighted throughout this description are those considered representative or important in the LNRS area described. The examples used therefore do not all match to the shortlist of important species that resulted from the species shortlisting work – see *Section 1.5, Section 5* and Appendices *M* and *N* for further details.

Changes over recent decades

162. **Urbanisation** of nearby areas has increased the recreational pressure on a number of important sites for nature conservation, including Burnham Beeches SAC. This has led to a deterioration in the condition of the habitats which is now starting to be addressed via the provision of alternative natural greenspaces and contributions towards habitat management.

163. **The changing climate** has resulted in deteriorating woodland, wetland habitats and river flows. Climate change has also influenced the presence and spread of invasive, non-native species and pests that threaten existing species and habitats.

164. Land use has also changed in this area with **land increasingly used for leisure purposes** such as for equestrian and golf courses which typically are areas of limited biodiversity value.

165. According to the Natural Capital Solutions Historic data analysis[50], in the 1930s basemap, this area had the highest percentage of built-up areas and gardens (18.7%) of the whole Buckinghamshire and Milton Keynes strategy area. This includes suburbs from Slough, and Gerrards Cross. It also had the largest woodland percentage in the area (18.3%). Semi-natural grassland was again the largest single habitat type (44.2%).

166. In line with other parts of the strategy area, by 1990, improved grassland had become the single largest habitat type (44.2%), and semi-natural grassland had been reduced to almost nothing (0.9%). Woodland had increased slightly to 21.3%.

167. The present day basemap shows a slight decrease in arable and improved grassland, an increase in built-up areas and an increase in semi-natural grassland and woodland compared to 1990. Orchards have also increased to cover 0.4% of the area. As is the case in the other areas, arable, improved grassland and built-up areas and gardens have increased and seminatural grassland has decreased hugely since the 1930s.

Looking ahead – anticipated pressures

168. As well as generic continued pressures including and exacerbated by climate change, **invasive non-native species, pests and diseases**, **development and increased pollution** from **roads, urban and airport expansion** threaten the landscape and biodiversity of the area. (For example, the red swamp crayfish has been found at the confluence of the Rivers Colne and Misbourne). **Land use change** (e.g. to golf courses or for horse grazing) is likely to continue to reduce the area of commons and heaths. The close urban population also brings with it issues such as **fly tipping** and air pollution.

[50] The changing habitats of Buckinghamshire and Milton Keynes: A historic perspective over 90 years, Natural Capital Solutions (2024) Page 13-14. Available at: Changing habitats over time in Bucks and MK – Buckinghamshire & Milton Keynes Natural Environment Partnership

Opportunities for enhancing or recovering biodiversity

169. As well as the area-wide opportunities for nature recovery and to help combat the pressures on the environment, there are overall opportunities for nature recovery of habitats and species specific to the area, namely:

- **Manage, protect and restore important landscapes**
  - Historic parklands and their veteran trees
  - Wood pastures
  - Ancient woodland
  - Commons
  - Heathlands
  - Orchards
  - Distinctive ancient pollards
  - Hedgerows
  - Woodland and scrub

- **River restoration, reconnection with floodplains, and creating new lakes and wetland habitats - including**
  - forming ecological corridors along restored rivers to link sites and benefit wildlife
  - re-naturalising channels
  - reconnecting or providing compensatory floodplains
  - encouraging sensitive development, particularly along the rivers

- **Ensure sensitive sites balance access with protection**, avoidance of damage or degradation

7)Natural Capital – a summary of the area's nature benefits to people, nature and the economy

170. A Natural Capital approach considers the benefits that nature provides for people and the economy. These benefits are termed "ecosystem services" as they are derived from a healthy ecosystem or natural environment to people, society and the economy—ranging from improved air and water quality, reduced flood risk, carbon storage and sequestration, noise regulation, food provision and various health and wellbeing benefits.

171. In 2020 and 2021, Buckinghamshire Council and the NEP commissioned natural capital work by Natural Capital Solutions to cover Buckinghamshire and Milton Keynes respectively. The reports produced maps across the LNRS area, based on the best available information to quantify and map the ecosystem services that are being provided in Buckinghamshire and look at where demand for these services is greatest to identify where there may be opportunities to use nature-based solutions (e.g. creating new habitats) to provide these services whilst also benefitting wildlife.

172. A summary of the results for the 10 services assessed for Buckinghamshire and Milton Keynes is provided in the sections below. The full reports are available on the NEP website[51].

Carbon storage

173. Carbon can be stored naturally in soils and vegetation. Natural carbon storage has a major role to play in reducing net carbon emissions. In Buckinghamshire and Milton Keynes, carbon is stored predominantly in woodland, which is more abundant in the southern half of Buckinghamshire and which are dispersed across the Milton Keynes area. However, carbon is also stored in undisturbed soils of other natural habitats such as meadows, and in most green spaces. So lower carbon storage levels are noticeable in the urban centres dominated by buildings and sealed surfaces.

[51] Rouquette (2020) Mapping natural capital, ecosystem services and opportunities for habitat creation in Buckinghamshire. Report for Buckinghamshire Council. And Rouquette (2021) Mapping natural capital, ecosystem services and opportunities for habitat creation in Milton Keynes. Report for Buckinghamshire and Milton Keynes NEP. Both available at: https://bucksmknep.co.uk/projects/natural-capital-mapping

Carbon sequestration

174. **Growing vegetation** can sequester carbon from the atmosphere. Woodland is the most efficient habitat at carbon sequestration and so the southern half of Buckinghamshire has the highest capacity for this service. In the Milton Keynes area, woodland areas are dispersed, although areas of high to moderate carbon sequestration are seen with the broadleaved woodland to the south east of the area towards Woburn, as well as in areas of coniferous woodland[52].

Air purification

175. Certain plants are effective at trapping airborne pollutants and reducing air pollution. Trees, particularly conifers (which do not shed their leaves during winter), are often more effective than grasses or herbaceous plants but it varies by species.

176. The air purification capacity of the natural environment is greatest in the south of Buckinghamshire with isolated areas of high capacity in Aylesbury Vale. In the Milton Keynes area, the densely forested areas of high air purification capacity are apparent throughout, mirroring patches of woodland. Low capacity is again noticeable in the urban areas.

177. However, the demand for air purification is highest in urban centres and along the main road network, particularly in Aylesbury and High Wycombe but also in Buckingham and towns in the Chilterns and South Buckinghamshire areas. In Milton Keynes, the areas of highest demand are centred on a number of neighbourhoods within Milton Keynes and Bletchley and the road network passing through them. The urban pattern of demand is clear, with large greenspace corridors and distinct neighbourhoods. Outside the main urban conurbation, demand is relatively low across the rest of the MK area.

178. There is therefore a significant spatial disparity in air purification capacity and demand.

179. **Urban woodland** would be particularly effective in balancing supply and demand for air purification services, as it has high capacity to absorb pollution and is located where there is likely to be a high demand for the service.

Noise regulation

180. Vegetation can diffuse and absorb noise pollution – for example from major roads, railways and airports. Noise can impact on health, wellbeing, productivity and the natural environment and the World Health Organisation (WHO) has identified environmental noise

[52] If harvested timber goes towards long-term use such as furniture or construction, that carbon continues to be stored. Harvesting allows new trees to grow, sequestering new carbon. Because of this. productive woodlands are able to sequester more carbon but may not store it within the habitat.

as the second largest environmental health risk in Western Europe (after air pollution). It is estimated that the annual social cost of urban road noise in England is £7 to £10 billion[53].

181. Vegetation can screen and reduce the effects of noise. Complex vegetation, such as woodland, trees and scrub, is considered most effective, but any vegetation is more effective than artificial sealed surfaces, and the wider the vegetation the better.

182. With woodland being the most effective habitat at absorbing noise, noise regulation capacity is relatively low in urban areas and highest in forested areas, with variable patches throughout the other areas, although noise regulation is higher (better) mainly in clusters around green spaces and woodlands.

183. Demand for noise regulation is greatest in urban areas close to major roads, as these contain larger populations, with potentially poor health scores. So, demand is highest in Aylesbury, High Wycombe and Chesham, and along the A5 through Milton Keynes, with existing capacity being relatively low in urban areas.

184. As for air purification, **urban woodlands** would again be particularly important, as demand is centred in urban areas and along roads and railways. **Thick tree belts along main roads** and other noise sources would also be most effective.

Local climate regulation

185. Urban areas tend to be warmer than surrounding rural land because urban hard surfaces absorb more heat, which is then released back into the environment, coupled with energy released by human activity such as lighting, heating, vehicles and industry. Our changing climate is predicted to make the overheating of urban areas a major health and economic issue, as well as an environmental one.

186. Natural vegetation, particularly tees, woodland and water bodies have a moderating effect on the local climate, making nearby areas cooler in summer and sheltered and warmer in winter.

187. So, the demand for climate regulation is highest in and around urban areas, focussed on the larger, more densely populated communities. For example, demand would be centred in the built-up areas of Milton Keynes, especially around Bletchley, Newport Pagnell, Stony Stratford and Wolverton, and is effectively zero away from these areas. In Buckinghamshire, Aylesbury and High Wycombe are particularly large areas of high demand, as are a number of other towns, particularly in the south of Buckinghamshire.

188. The greatest capacity for climate regulation in Buckinghamshire is in the south of the county with demand clustered around urban centres. The large areas of woodlands adjacent to

[53] Defra (2013) Noise pollution: economic analysis. Crown Copyright.

towns in the south of Buckinghamshire, particularly where they extend into urban areas, are particularly beneficial, bringing moderating conditions to the urban centres.

189. In Milton Keynes, large bodies of water, such as Willen lake and Caldecotte Lake, and larger areas of woodland such as Linford Woods and those in the Woburn area, provide the highest local climate regulation capacity. These benefits can extend into adjacent built-up areas. In much of the remaining region, away from woodland and water bodies, capacity is significantly lower.

190. Interventions looking to reduce the disparity between areas of high demand and areas of high supply/capacity would benefit heavily from investing in capacity in urban areas to meet the concentrated demand, e.g. **planting vegetation, including woodland and trees,** and **creating water bodies and water features close** to or within built-up areas.

Water flow regulation

191. Water flow regulation describes the capacity of the land to slow water runoff and thereby reduce flood risk downstream. Flood events are predicted to become more frequent over the coming years as a result of climate change and there is a growing demand for using natural processes to reduce flood risk and "slow the flow" to retain water in upper catchments for as long as possible.

192. The best locations for slowing water runoff, are areas of woodland on gently sloping surfaces. In Buckinghamshire, the steeper slopes of the Chilterns may be less effective in providing this service but areas around Penn Wood, Naphill Common, Dropmore and Farnham Common have woodland on gentle slopes and have excellent water flow regulation capacity.

193. Some of the worst-performing areas for slowing water runoff are impermeable surfaces and slopes; for example, in Milton Keynes, such areas are centred in built-up areas and at a landfill site south of Bletchley in particular.

194. Building up the organic content of damaged soils, cross-slope woody vegetation, and attenuation features such as field corner storage ponds are examples of **measure**s which improve and restore the flow regulation capacity of heavily managed landscapes.

Water quality regulation

195. Water quality regulation maps show the risk of surface runoff becoming contaminated with high pollutant and sediment loads before entering a watercourse. The natural capital modelling captures sedimentation risk from agricultural land more than from diffuse urban pollution.

196. The ability of the landscape to regulate water quality is generally lower (i.e. the risk of sedimentation is higher) within arable fields, especially those parts on slopes and close to watercourses, adding to contamination potential – e.g. in the north of Buckinghamshire and north-east of the Milton Keynes area.

197. Water quality regulation is generally higher away from watercourses in areas of woodland – i.e. the south of Buckinghamshire, and especially in areas where less intensive land use such as pasture, hay meadows and woodland provide a buffer to watercourses, although diffuse pollution from agriculture and urban areas is still a significant pressure.

198. Further **measures to ameliorate the impact of agriculture on water quality, including establishing riparian buffers, use of cover crops, building up soil structure and reducing cattle poaching of river banks,** are required if we are to meet water quality targets under the Water Environment Regulations. "Interception woodlands" are another measure. These can be further set back in the landscape than buffer zones to intercept pollutants before reaching the vicinity of the water body.

Agricultural production

199. Agricultural production refers to the capacity of the land to produce food under current farming practices.

200. **Farming is the dominant land-use in Milton Keynes**, with a 70:30 split between arable and grassland for livestock. These land covers provide the largest proportion of food, although food is also produced from a range of other habitats, albeit to a lesser extent. The ability of a range of broad habitat types to provide food was mapped and weighted according to Agricultural Land Classification[54] to identify food production capacity.

201. **Food production is low in the urban centre** of Milton Keynes. Urban areas have a very low production capacity, reflecting the limited production resulting from gardens (clearly, this can be high in some cases).

202. **In** contrast**, food production is medium to high in the northern part of the Milton Keynes area**, where arable and improved grassland dominate. This is due to the predominant Agricultural Land Classification for the region being Grade 3, along with significant areas of Grade 2 (higher quality).

203. In Buckinghamshire, farming is also the dominant land-use, although with a roughly equal split between arable and pasture for livestock.

[54] A system used in England and Wales to grade the quality of land for agricultural use, with grade 1 being excellent quality agricultural land with only minor limitations, to grade 5, very poor quality with very severe limitations.

204. **The majority of Buckinghamshire has a medium to low food production capacity**. This is due to the predominant Agricultural Land Classification for the region being Grade 3, along with significant areas of Grade 4. **Smaller areas of higher-grade land** are found in the centre of the county to the west and south of Aylesbury.

Figure 38. *Gallow Bridge Farm. Photo: BBOWT.*

Timber production

205. Forestry remains an important component of the rural economy and many areas of woodland are still valued primarily on their timber value. The average yield of timber per hectare per year was mapped based on species mix and yield class.

206. **There are patches of high timber and wood fuel production capacity scattered throughout the south of Buckinghamshire and some in the west**. Coniferous woodland provides the highest yield, but Buckinghamshire has predominantly broadleaved woods.

207. **There are patches of medium to high timber and woodfuel production capacity scattered throughout the Milton Keynes area**. Broadleaved woodland is the dominant woodland cover type in Milton Keynes, although patches of coniferous woodland are scattered throughout the area, with large standings around Woburn being particularly prominent.

Accessible nature

208. Access to greenspace is being increasingly recognised for the multiple benefits that it can provide to people including a variety of health and wellbeing benefits. The two key components are **public access and** the **perceived naturalness** of the space.

209. **In Buckinghamshire, accessible nature *capacity* is highest in Burnham Beeches, Penn Wood, Ashridge Estate and Bernwood Forest**. Hotspots also occur around other large accessible sites, especially in the south. Accessible nature capacity is moderate around the outskirts of major urban centres, especially High Wycombe, which has a number of accessible greenspaces nearby. Access is lowest in more rural areas in the northern half of the county, where public footpaths provide the only access in predominantly agricultural areas.

210. But the ***demand* for accessible nature is focussed around where people live**, hence Aylesbury and High Wycombe provide the largest demand across Buckinghamshire. There is also significant demand from the numerous other urban areas in the south of the county, with lowest demand in the north-west.

211. **In Milton Keynes, the accessible nature *capacity* for publicly-accessible land is highest in the parks in and around Milton Keynes town**, such as Willen Lake, Ouzel Valley Park, Woughton Park, Caldecote Lake, Bury Field and a number of the other linear parks spread across the urban area. A few **hotspots occur in the northern and more rural parts** of the Milton Keynes area, away from the urban area (the primary northern hotspot being Emberton Country Park).

212. **Most of the demand for accessible green space is in the urban part of Milton Keynes** itself and adjoining urban areas, and is reduced in the more rural northern half; but is still apparent in some of the larger settlements.

213. Numerous researchers (e.g. MENE – the Monitor of Engagement with the Natural Environment[55]) have shown that people travel most frequently to greenspaces very close to their homes, particularly within walking distance. Natural England recommends, in its Accessible Natural Green Space Standards (ANGSt),[56] that everyone should have access to at least some greenspace within 300m (5 minutes' walk) and larger sites within 2 km. Furthermore, surveys have shown that most people will typically travel less than 3.2 km to visit greenspace.

214. **Any new accessible greenspace being created should therefore be close to housing areas.** New housing areas will also create increased demand for accessible greenspace, so this demand must be met on-site.

215. There is also now a vast amount of evidence showing the benefits of greenspace, particularly in built-up areas. Furthermore, research has shown that people gain greater

[55] Further information is available from Natural England regarding MENE at: https://www.gov.uk/government/collections/monitor-of-engagement-with-the-natural-environment-survey-purpose-and-results

[56] Natural England (2010) Nature Nearby – Accessible Natural Greenspace Guidance. Available at: https://webarchive.nationalarchives.gov.uk/ukgwa/20140605145320/http://publications.naturalengland.org.uk/publication/40004?category=47004

well-being from visiting sites that they perceive to be more natural and richer in biodiversity. This shows that **as well as providing access to greenspace, it is important that the greenspace is as high quality and as natural as possible.**

Opportunities for the area based on an analysis of Natural Capital: Nature-Based Solutions

216. Based on an understanding of the natural capital and ecosystem services of the area, there are several opportunities for nature recovery that have been highlighted across Buckinghamshire and Milton Keynes, which are summarised below in relation to the nature-benefit provided:

- **Provide high quality and natural areas of greenspace close to housing areas**, e.g. in gardens and community spaces, or on-site for new development, for mental and physical health and wellbeing and to engage the public in managing land for wildlife.

- **Create more woodland and grow other vegetation – to sequester carbon** from the atmosphere and help mitigate climate change.

- **Plant vegetation including woodland and trees and create water bodies and water features** – to help provide shade and cooling **to adapt to climate change** – particularly close to, or in, built-up areas.

- **Create woodlands and thick tree belts** – **to absorb pollution and reduce noise**, particularly in urban areas and along main roads to match where the demand is greatest.

- **Reduce flood risk and pollution to water courses using natural features** – to slow water flow, and thereby reduce the risk of pollution from runoff and of flooding risk: build up the organic content of soil, include attenuation features like corner storage ponds, add cross-slope woody vegetation in heavily managed landscapes.

- **To improve water quality, establish riparian buffers, use of cover crops and building up soil structure and reduce grazing** / cattle poaching of river banks to enhance water quality.

8) Our Shortlisted Priorities and Potential Measures – and their links to pressures on nature and opportunities for nature recovery

How our shortlisted priorities and measures relate to the pressures on nature and opportunities for nature recovery in our area

217. Appendix 0 *[Our Shortlisted Priorities and Measures]* lists our shortlisted LNRS Priorities and Potential Measures that result from our extensive stakeholder engagement, review of existing plans and strategies, scoping, shortlisting and simplification process. You can read about how we processed ideas into a shortlist in the methodology statement contained within the combined methodology statement document which is available on the consultation portal.

218. Our LNRS priorities, grouped into nine themes, and our underlying measures, together support the opportunities for nature recovery and tackle the main pressures on nature in our area. This is shown below.

219. *Figure 39*, below lists the pressures on nature and opportunities for its recovery that were outlined in the description of the LNRS area [see Sections 1, *Why we need a Local Nature Recovery Strategy* and Section 2, *Opportunities for Nature Recovery*], alongside the themes that our shortlist of priorities highlighted. The central column shows the themes arising from our shortlisting review of priorities and measures.

220. *Figure 40*, below, shows the priorities within each of the themes, providing more detail:

Figure 33. *Themes arising from the LNRS Priorities shortlisting process (middle column) compared with the opportunities (left column) and pressures on nature (right column) as identified in the Description of the LNRS Strategy Area.*

Themes compared with Pressures and Opportunities - from the Description of strategy area (LNRS Step 3) analysis

Opportunities for nature recovery (step 3 analysis) *Lawton: more, bigger, better, joined*	**THEMES** arising from Priorities shortlisting	**Pressures on nature (step 3 analysis)**
		Climate change
	THEME 1: Conserve, create, enhance and restore **land-based habitats**	**Major development including infrastructure** (habitat loss, recreational pressure on nature, fragmented habitats, more waste)
More and restored **Priority Habitats**	**THEME 2: Improve rivers, their floodplains and the quality of their waters.**	**Over-abstraction** of water (public demand and agriculture)
More land for nature (including wildlife-important habitats and biodiversity into development)	THEME 3: Conserve, create, enhance and maintain **wetland habitats.**	**Invasive, non-native pests and diseases** - e.g. ash dieback; or increased deer populations affecting woodlands
Improve existing habitats - condition - land management to encourage wildlife including important species	THEME 4: More Farmers and rural land managers to adopt **wildlife-friendly land management** practices and take action to **improve soil health**	**Inappropriate land management** - e.g. poor management of woodlands
Connect quality habitats across the landscape	THEME 5: **Improve biodiversity in built-up areas.**	**Changes in farming practices** since 1945 (intensification)
Re-naturalise river channels and **reconnect rivers with their floodplains**	THEME 6: **Create connections** between high quality areas for wildlife and habitats to flourish	**Increased flood risk from historic land drainage and river channel modification**
	THEME 7: Manage the effects of a **changing climate and improve air quality**	In-water structures such as weirs affecting river flow and fish migration
	THEME 8: **Tackle non-native invasive species, pests & diseases**	**Pollution**
	THEME 9: Improve the environment for **important species**	**Habitat fragmentation** (e.g. due to division of land ownership)

Themes and priorities in the Buckinghamshire and Milton Keynes LNRS		
THEMES arising from shortlisting of priorities	**Priority number**	**PRIORITY description**
THEME 1: **Conserve, create enhance and restore land-based habitats**	1	Conserve, create, enhance and restore trees and woodland habitats
	2	Conserve, create, enhance and restore hedgerows and field margins
	3	Conserve, create, enahhnce and restore species-rich grasslands
	4	Conserve, create, enhance and restore heathlands
	5	Conserve, create, restore and connect chalk and limestone (lowland calcareous) grasslands
	6	Conserve, create and enhance traditional orchards, open mosaic habitats and other important sites
	7	Strategic enhancement, expansion and linking of our existing high value sites and areas
	8	Reduce recreational pressure on irreplaceable, priority and other important habitats
THEME 2: **Improve rivers, their floodplains and the quality of their waters**	9	Renaturalise river habitats using appropriate habitat restoration techniques and enhance the ecological value of river corridors and their floodplains
	10	Improve river water quality
	11	Conserve, enhance and restore chalk streams
THEME 3: **Conserve, create, enhance and maintain wetland habitats**	12	Conserve, create, enhance, restore and connect exising ponds, rivers, lakes and lagoons to create a diversity of wetlands and pond sizes and depths to maximise and increase biodiversity
THEME 4: More Farmers and rural land managers to adopt **wildlife-friendly land management** practices and take action to **improve soil health**	13	Farm businesses and rural landholdings enhance and create connected and diverse wildlife-rich habitats across the landscape as an integral part of their businesses, recognising the importance of wildlife for pollination, crop and soil and water health.
	14	Improve soil health by increasing micro-organisms, animals and plants living within the soil, improve soil structure and increase organic matter. This will increase soil fertility, water retention, lock up carbon, and reduce the need for chemical fertilisers and pesticides.
THEME 5: **Improve biodiversity in built-up areas**	15	Manage existing green and blue spaces in built-up areas better for wildlife
	16	Create more space for nature when designing new development
	17	Provide habitats for nature along and around transport infrastructure
THEME 6: **Create connections between high quality areas for wildlife and habitats to flourish**	18	Connect habitats to make wildlife corridors and stepping stones at landscape scale
THEME 7: **Manage the effects of a changing climate and improve air quality**	19	Use nature to capture carbon and weaken climate change
	20	Adopt nature-based solutions to address climate change impacts, water management and improve air quality
THEME 8: **Tackle non-native invasive species, pests and diseases**	21	Reduce and prevent the spread of non-native invasive species, pests and diseases which can occur in high densities to the detriment of a broader range of wildlife
THEME 9: **Improve the environment for important species**	22	Conserve, create, enhance, restore and connect specific areas that are important for the area's important species

Figure 34 *Summary of the LNRS Nine Themes and 22 Priorities for Nature Recovery.*

221. Overall, the Figures above show that the pressures on nature and opportunities for its recovery, [as explained at *Sections 1 and 2* above], are addressed through the themes and priorities that have been shortlisted as part of the LNRS process for Buckinghamshire and Milton Keynes.

222. To show this more clearly, the Table at *Figure 41,* below, shows the specific linkages between the identified pressures on, and opportunities for, nature, and the LNRS themes and shortlisted priorities.

***Figure 35**. Links between the identified pressures on, and opportunities for, nature, and the LNRS themes and shortlisted priorities.*

Pressure on nature or opportunity for nature recovery as identified in the description of the strategy area	**Theme** (and priority where not clear from the theme) **arising from LNRS shortlist that can address pressures and opportunities**
Pressures on nature in Buckinghamshire and Milton Keynes	
Climate change	THEME 1: Conserve, create, enhance and restore land-based habitats THEME 7: Manage the effects of a changing climate and improve air quality
Major development including infrastructure	THEME 5: Improve biodiversity in built-up areas.
Over-abstraction of water	THEME 2: Improve rivers, their floodplains and the quality of their waters. Priority 10: Improve river water quality Priority 11: Protect, enhance and restore Chalk Streams
Invasive, non-native pests and diseases	THEME 8: Tackle non-native species, pests & diseases
Inappropriate or poor land management	THEME 4: More Farmers and rural land managers to adopt wildlife-friendly land management practices and take action to improve soil health
Changes in farming practices since 1945 (intensification)	THEME 4: More Farmers and rural land managers to adopt wildlife-friendly land management practices and take action to improve soil health
Increased flood risk from historic land drainage and river channel modification	THEME 2: Improve rivers, their floodplains and the quality of their waters. Priority 9: Re-naturalise river habitats using appropriate habitat restoration techniques and enhance the ecological value of river corridors and their floodplains

In-water structures affecting river flow and fish migration	THEME 2: Improve rivers, their floodplains and the quality of their waters. Priority 9: Re-naturalise river habitats using appropriate habitat restoration techniques and enhance the ecological value of river corridors and their floodplains
Pollution	THEME 7: Manage the effects of a changing climate and improve air quality Priority 19: Use nature to capture carbon and weaken climate change Priority 20: Adopt nature-based solutions to address climate change impacts, water management and improve air quality THEME 4: More Farmers and rural land managers to adopt wildlife-friendly land management practices and take action to improve soil health Priority 14: Improve soil health by increasing micro-organisms, animals and plants living within the soil, improve soil structure and increase organic matter. This will increase soil fertility, water retention, lock up carbon, and reduce the need for chemical fertilisers and pesticides.
Habitat fragmentation	THEME 6: Create connections between high quality areas for wildlife and habitats to flourish Priority 18: Connect habitats to make wildlife corridors and stepping stones at landscape scale
Opportunities for nature recovery	
More and restored priority habitats	THEME 1: Conserve, create, enhance and restore land-based habitats THEME 3: Conserve, create, enhance and maintain wetland habitats.
More land for nature, including wildlife-important habitats and biodiversity into development	THEME 1: Conserve, create, enhance and restore land-based habitats THEME 3: Conserve, create, enhance and maintain wetland habitats.
Improve existing habitats (condition and land management to encourage wildlife including important species)	THEME 1: Conserve, create, enhance and restore land-based habitats THEME 3: Conserve, create, enhance and maintain wetland habitats. THEME 9: Improve the environment for important species
Connect quality habitats across the landscape	THEME 6: Create connections between high quality areas for wildlife and habitats to flourish

Re-naturalise river channels and reconnect rivers with their floodplains	THEME 2: Improve rivers, their floodplains and the quality of their waters. Priority 9: Re-naturalise river habitats using appropriate habitat restoration techniques and enhance the ecological value of river corridors and their floodplains

Our stakeholders were concerned more about some pressures on nature than others, and valued some of nature's benefits more than others.

223. When we talked to stakeholders at workshops, they told us about the pressures on nature that they were most concerned about, and identified the order of benefits that nature provides that they most value. Their responses are summarised below.

Figure 36. *Ranked order of pressure on nature that our stakeholders were most concerned about, from sector-specific workshops.*

Pressure on nature	**Overall rank** (weighted by number of attendees by sector) **1 is most important**
Growth in new housing and infrastructure	1
Inappropriate land management	2
Pollution	3
Climate change	4
Inappropriate river catchment management	5
Non-native species, pests and diseases	6
Growing demand for water	7

224. Having an LNRS in place can help address these challenges (or pressures) on nature. For example:

- **Climate change** - the LNRS can help us tackle climate change, by mapping the target locations for areas where nature sites can be restored. If action is taken in line with the opportunities proposed, this will help nature mitigate and adapt to climate change and improve nature's resilience. Climate change is also driving how best to

action the other measures suggested in the LNRS too. For example, in making sure the right species is planted in the right place, climate change is influencing which species to source, where to plant them, which habitat will work best in the future and for which species that habitat recovery will support.

- **New housing and infrastructure** – the LNRS identifies a suite of measures in the "built environment" theme that will help to enhance nature through new development areas.
- **Land management** – the LNRS provides specific opportunities for how we can manage the land and take action for nature, and identifies the locations that suggest the best outcomes.

Figure 37. *Ranked order of benefits from nature that our stakeholders most valued, from sector-specific workshops.*

Nature Benefit	**Overall rank** 1 = top, 11 = lowest ranked
	Weighted av rank
Provides habitats for wildlife and biodiversity	1
Clean water	2
Healthy soil	3
Reducing flood risk	4
Carbon capture	5
Pollination	6
Health and well-being / access to nature	7
Local climate regulation	8
Clean air	9
Pest and disease control	10
Noise reduction	11

225. These responses tell us which environmental benefits were most valued to stakeholders. They therefore indicate which of nature's benefits may be most valued as a result of LNRS delivery. They could therefore be used to help appeal to stakeholders to support LNRS delivery. As each of these benefits are included in the priorities and measures shortlist in the LNRS, the LNRS will help to encourage nature recovery action to safeguard and enhance them. (See Figure 41, *Links between the identified pressures on, and opportunities for, nature, and the LNRS themes and shortlisted priorities*).

226. The results also show that:

- **All the pressures on nature that our stakeholders were most concerned about, and the benefits from nature that they most value, are addressed in the LNRS shortlis**t of priorities and measures.

- **Some of nature's benefits that stakeholders valued related more to people**, than to habitats, wildlife or wider environmental benefits. Ideas for the LNRS shortlist of priorities and measures, such **co-benefits** (notably health and wellbeing and access to nature) were scoped out of the shortlisting process as required by the LNRS guidance process. [57]
- **The top concern among stakeholders was the growth in new housing and infrastructure.** Buckinghamshire and Milton Keynes are set to be major growth areas in the coming LNRS period.
- **Providing habitats for wildlife and biodiversity is the most valued benefit from nature** across Buckinghamshire and Milton Keynes. This is the main focus of LNRS priorities and measures.
- Stakeholders identified **noise reduction as the least valued benefit** from nature.

227. Finally, our stakeholders also told us via our Summer 2024 survey, how they would rank our (then) emerging themes in order of importance. The same top 3 themes were most valued across the four LNRS zones and overall, although they appear in a different order across the LNRS geography. These were (in no particular order):

    1. Water quality (theme 2)
    2. Connectivity (theme 6)
    3. Rivers and floodplains (theme 2)

228. As there was no significant difference between the themes ranked more highly for any of the four LNRS zones, this information did not influence the final mapping. And all of these themes are included in the final priorities and measures shortlist.

229. Respondents were also asked in our 2024 survey to describe what they wanted for nature in the future. The following word cloud at *Figure 42* was generated from the total survey responses. It shows the range of values placed on nature and its benefits, which includes habitats, wildlife, management, green and diverse areas - and therefore the various ways in which the LNRS will need to appeal, to encourage action for its delivery.

[57] The co-benefits that were raised by stakeholders but then scoped at shortlisting were logged, and were:
- **Nature as an education resource**- to encourage reconnection to nature / to manage the environment / about food choices, soil health
- **Nature to improve mental and physical health and wellbeing** - better access to nature
- **Nature to help build professional skills** - e.g. via citizen science and helping to monitor nature

Figure 38. *Word cloud based on responses from the whole LNRS area in the online survey to the question "Thinking about the area(s) of Buckinghamshire and Milton Keynes you are familiar with, what would you like nature to look like in the area(s) in the next five years?".*

LNRS OUTPUT 2
LOCAL HABITAT MAP

9) Buckinghamshire and Milton Keynes Local Habitat Mapping

230. ***Click on this link to view our mapping work***. The online map includes the following required map elements of the LNRS:

- Areas that *Are* of Particular Importance for Biodiversity (APIB)
- Areas that *Could Become* of Particular Importance for Biodiversity (ACB). This is our nature recovery target map.

231. **Notes on the map:**

- The habitat opportunity mapping that was done to create various layers / aspects of this map, was created using **a 3km buffer around Buckinghamshire / Milton Keynes county borders** – this was done to identify opportunity for habitat connectivity, as well as to identify habitat opportunities based on soil typology, geology and other factors across the county.

- **Green Belt:** The LNRS statutory guidance requires LNRS Responsible Authorities to actively seek to target areas that could become of particular importance inside the Green Belt. Our mapping modelling work ensured that green belt land was available for nature recovery in the same way as all other land in the Buckinghamshire and Milton Keynes LNRS area. As most of the southern part of Buckinghamshire is Green Belt, treating it differently for the purposes of targeting specific areas for nature recovery would not have resulted in a more targeted map.

- To view layers, select the Theme box and then the Priority box, followed by whichever Measure you wish to view.

10) TECHNICAL APPENDICES

A OUR RIVERS

1. Our water environment supports a wide range of aquatic plants and animals as well as providing us with water supplies and space for recreation. In addition to supporting a range of habitats for specialist species, the water environment provides us with essential ecosystem services, from drinking water (predominantly from groundwater in the LNRS area) to flood attenuation and receiving and 'polishing' treated waste. For example, bacteria and fungi break down harmful toxins and nutrients; variations in flow characteristics can sort and store sediments but at the same time disperse and dilute contaminants; and water courses can retain and transport nutrients and nourish whole ecosystems during flood events, providing important habitats for native plants and animals. Wetlands and terrestrial land around rivers can play an important role acting as filter systems to remove pollutants and fertilisers from runoff before it reaches rivers.

Geography

2. Our water landscapes across Buckinghamshire and Milton Keynes are varied – a function of geology, post-glacial processes, direct human intervention and trends in land management.

3. Broadly, there are **two major river catchments** in our area. The northern part of the LNRS area contains parts of the **upper Great Ouse** catchment, including tributaries such as the Padbury Brook, Claydon Brook and part of the River Ouzel. The central and southern part of our area contains parts of several tributaries of the **Thames.** The Thame catchment, a major tributary of the Thames, includes the River Ray, rising in the broad clay vales of the low-lying landscape, and then flowing south of Aylesbury in a more defined valley near to the market town of Thame. The southern fringes of Buckinghamshire also abut the left (north) bank of the Thames, with the county boundary running down the centre of the river for about 30km from near Fawley Court, downstream of Henley, to Boveney, between Slough and Windsor. The upper reaches of the Jubilee River, a Thames-sized flood channel built in the 1990s, is also within Buckinghamshire.

4. The waters of these two main rivers head in their separate directions to enter the North Sea at the Thames estuary and at The Wash respectively. The total length of rivers in Buckinghamshire and Milton Keynes is 559km, of which approximately 90km are chalk streams rising from the Chilterns in Buckinghamshire.

5. The area's watercourses are mostly of a gentle gradient, reflecting the predominantly broad alluvial and clay vales that they occupy. The Chiltern Hills provide an important contrast, with a number of **chalk streams** draining the dip slope south-eastwards either direct to the Thames or to one its major tributaries, the Colne, which in places forms the eastern

boundary of Buckinghamshire. There are also multiple short chalk spring-fed streams issuing from the base of the Chiltern scarp and flowing onto the clays of the Aylesbury Vale. While the dip-slope chalk streams are covered by assessments relating to their quality /ecological condition under Water Framework Directive requirements, less is known about the scarp slope streams and their condition.

6. Chalk streams flow from chalk groundwater and are a precious and internationally-rare habitat. The UK has by far the greatest proportion (85%) of the global resource and many are in the Chilterns – our area's ten major chalk streams flow generally in two catchments with a total length of around 90km.

River Chess at Latimer. Photo credit: Allen Beechey.

7. The precious **chalk streams** of the Chilterns have fish communities characterised by **brown trout** and other salmonid fish species, such as grayling, alongside rich invertebrate life. The Thames has a greater diversity of fish species occupying a range of ecological niches. **Otters** are now found throughout the county's rivers, following their substantive recovery in the last few decades, whereas **water voles** are currently restricted to populations on the Great Ouse, Chess and Misbourne. **Invasive signal crayfish** are widespread. The LNRS area's main chalk streams (those which flow at least in part over chalk, even if they go on to flow over other geology) are described in the box below.

Our area's major chalk streams

The whole 17km of the **River Wye** lies within the county from its source near West Wycombe to its confluence with the Thames at Bourne End. As with most chalk streams, the upper reaches of the Wye and its tributary the Hughenden Stream are subject to seasonal downstream migration of the source as groundwater levels drop in the summer.

To the west of the Wye, a much smaller chalk stream flows out of the Chiltern slopes to the Thames, the **Hamble Brook**, which flows for its roughly 6km southward through an iconic Chiltern landscape to the Thames at Mill End.

Several chalk stream or chalk-influenced tributaries of the Colne rise from the Chilterns in the county, including the Chess, Misbourne and Alderbourne. The Chess isa classic winterbourne rising near Chesham, with about half of its 20km length in the county before flowing into Hertfordshire to join the Colne at Rickmansworth. An upper tributary of the Chess, the **Vale Brook**, is entirely culverted under Chesham.

The River **Misbourne** is a groundwater fed chalk stream that rises at the northern edge of the village of Great Missenden. It flows in a south-easterly direction within a shallow, rural valley in its upper sections and becomes more influenced by suburban settlements in its lower reaches, including Old Amersham, Chalfont St Giles, Chalfont St Peter, Gerrard's Cross, Higher Denham and Denham. The catchment has been influenced by a history of milling, fisheries, watercress production, groundwater abstraction and urban development. There are also a series of large, on-line, artificial landscaped lakes along the river, for example at Denham Place. The River Misbourne is stable and channel narrowing is the dominant process along the lower reaches of the stream. Much of it is wider and deeper than would be expected for a natural chalk stream.

Although the **Alderbourne** rises from the Chiltern chalk just above Fulmar village, it then flows over alluvium and clay from below the village for approximately 8km across a gentle gradient to join the Colne Brook at Elk Meadows. Much of the catchment lies within London's Green Belt with agriculture and deciduous woodland the dominant land use. Finally, these chalk tributaries flow into the Colne, part of which runs along the eastern edge of the Buckinghamshire.

The **River Colne** follows the Buckinghamshire-Greater London border from Harefield flowing south to Thorney. Many of the Colne tributaries rise in the Chiltern chalk, and the River Colne remains in connection with the chalk until it reaches Denham. Here the geology changes from the clay, silt and sand of the Lambeth group to the London Clay that takes it to join the Thames at Staines.

8. The Ouse, Ray and Thame catchment all flow through predominantly broad clay vales in a low-lying landscape, with the Thame south of Aylesbury flowing through a more defined valley (towards the market town of Thame in Oxfordshire). The southern fringes of Buckinghamshire also abut the left (north) bank of the Thames, with the county boundary running down the centre of the river for about 30km from near Fawley Court, downstream of Henley, to Boveney, between Slough and Windsor. The upper reaches of the Jubilee River, a Thames-sized flood channel built in the 1990s, is also within Buckinghamshire.

River Thames at Marlow.Photo: Chris Smith.

The Great Ouse in the north

9. In the north, the area contains some of the headwaters of the **Great Ouse**, including tributaries such as the Padbury Brook, Claydon Brook and part of the River Ouzel. The upper Great Ouse has headwaters just in Northamptonshire but soon flows into Buckinghamshire, passing through a clay-based catchment with much of the river corridor running through a rural landscape which is largely agricultural. Much of the riparian land use consists of improved grassland that is used for grazing livestock. The main urban area found on the upper river is Buckingham. From Buckinghamshire, the Great Ouse enters Milton Keynes Authority area, where it forms an important wildlife corridor and green space. This is recognised by the Great Ouse through the Milton Keynes Authority area, being designated a Local Wildlife Site (LWS).

10. To the north of Milton Keynes, the **river Tove** joins the Great Ouse at the village of Cosgrove. With its headwaters in Northamptonshire, the Tove flows in a generally south westerly direction before joining the Great Ouse and providing additional connected river habitat. Beyond Newport Pagnell, the river corridor landscape returns to a generally rural character where riparian land use is mainly under agricultural management. The only other large urban area the river flows through in the Authority area is the market town of Olney.

Padbury Brook and the River Ouzel

11. A short distance below Buckingham is the confluence where the **Padbury Brook** joins the Great Ouse. In common with the Great Ouse, the Padbury Brook and its main tributary, the Claydon Brook, are clay catchments that flow through a predominantly rural agricultural landscape. The riparian land use along the river corridor consists predominantly of improved grassland used for grazing livestock. The **River Ouzel** is another tributary of the Great Ouse that flows through the eastern part of Buckinghamshire. The Ouzel flows in a generally northerly direction through a clay catchment, flowing into Milton Keynes Unitary Authority area near Bletchley before joining the Great Ouse at Newport Pagnell.

Rivers Ray and Thame

12. The river environment in the central swathe of the county is dominated by the broad clay vales at the upper reaches of the **River Ray** (which joins the Cherwell in Oxfordshire), rising in an extensively low-lying landscape, as well as the headwaters and the upper half of the Thame catchment, a major tributary of the Thames which it joins in Dorchester, also in Oxfordshire. The **Thame** south of Aylesbury flows through a more defined valley landscape to the county boundary near the market town of Thame, in Oxfordshire.

Chilterns Chalk Streams

13. Chalk streams are precious and **internationally-rare** habitats, with the UK having by far the greatest proportion of the global resource. A number of chalks streams rise on the south-east facing dip slope of the Chilterns, running either directly to the Thames or to one of its larger tributaries at the eastern edge of the county, the River Colne. Flowing from chalk groundwater, they rise as springs or largely flow over a chalk geology. Our area's **ten major chalk rivers**[58] flow generally in two catchments, with a total length of around 90km.

[58] The area's ten chalk stream waterbodies are (although they are not all chalk for the whole of their length): Alderbourne, Colne (confluence with Chess to River Thames), Hamble Brook, Wye (High Wycombe fire station to Thames), Wye (source to High Wycombe fire station), Hughenden Stream, Misbourne, Chess, Kingsey Cuttle Brook and tributaries at Thame, Eaton Bray Brook. (*Source: Environment Agency).*

The Thames

14. The River Thames meanders gently along, and forms the southern boundary of the county from just downstream of Henley, with the Chiltern Hills as its backdrop, and at its most dramatic at the steep slopes of Cliveden. The Thames has been highly modified for navigation, an impounded river flowing on a gentle gradient between a series of lock and weir complexes, eight of which are found on the county boundary from Hambleden Lock to Boveney Lock. This is a much larger river than all the other watercourses in the area and is a highly modified channel. The **Jubilee River** leaves the Thames at Taplow and flows out of the county at Dorney just upstream of the main wetland complex there; designed to take flood flows under high flow events, under normal conditions the Jubilee provides a quieter refuge from the powered navigation on the main Thames.

Key habitats and species

Great Ouse and its tributaries

15. Much of the upper Great Ouse riparian land use consists of **improved grassland** that is used for grazing livestock. The main urban area found on the upper river is Buckingham. From Buckinghamshire, the Great Ouse enters Milton Keynes Authority area, where it forms an important **wildlife corridor and green space**. This is recognised by the Great Ouse through MK Authority area being designated a Local Wildlife Site (LWS).

16. In the Great Ouse, upstream of Buckingham, the river supports important populations of **wild brown trout**. Some habitat improvements have taken place in this area with further habitat enhancement works under consideration for the future. A population of **water voles** is also believed to be present in this area of the river, whilst **otters** are present throughout the upper Great Ouse catchment. Below Buckingham, **fish populations consist of mixed coarse species** typical of those found in lowland rivers, including perch, chub, dace and roach. **Mature riparian willows** are relatively common along the Great Ouse and its tributaries in the upper catchment, in the upstream areas of river near Milton Keynes. These trees provide important habitat features along the river corridor, particularly in areas along the Padbury Brook where some are still actively managed as pollards, retaining their ecological value. Further downstream, beyond the city limits, riparian habitats are of a more open aspect, with **occasional tree-lined reaches**.

17. To the north of Milton Keynes, Manor Farm LWS overlaps the Great Ouse LWS, where **diverse habitats** provide floodplain connectivity, areas of **permanent open water and floodplain forest**. A short distance downstream, the Great Ouse LWS incorporates additional mature floodplain gravel pits that provide additional **open water habitats** along the river corridor. There is public access to areas of the river corridor around Milton Keynes and Newport Pagnell, providing recreational opportunities and access to green spaces close to the town.

18. The character of the Ouzel is similar to the Great Ouse and other tributaries, being a typical lowland river that has historically been modified. **Mature riparian willows** are present along the river, some of which are still actively managed as pollards, retaining their ecological value. In the Milton Keynes / Bletchley section of the Ouzel, the river supports populations of **coarse fish species** typical of lowland rivers, whilst **otters** are present along the river.

Rivers Ray and Thame

19. Despite substantial land drainage improvement works in the past, both rivers still flood their predominantly rural floodplains quite readily after heavy rain, although only the upper Ray has retained a reasonable extent of **high quality floodplain and alluvial grassland**. The

Buckinghamshire Ray provides one of the last refuges for the **True Fox Sedge** in the Thames catchment. The Ray has one of the lowest gradients of any tributary of the Thames, with the area around Marsh Gibbon prone to frequent flooding and containing **valuable remnant floodplain habitat for breeding waders**; a small number of **curlew** also breed in the Thame catchment. The Thame river corridor and floodplain is still predominantly dominated by **pasture**, other than the considerable urban development at Aylesbury.

Chilterns Chalk Streams

20. Chalk streams and rivers are beautiful and important habitats for wildlife and support a huge range of plants such as **rare starworts** growing midstream and **watercress** at the edges. They also support animals such as Britain's fastest-declining mammal, the **water vole**, and fish including **brown trout**. The Chilterns escarpment is also home to many sources, or headwaters, of the Chilterns chalk streams, such as the Wye headwaters in the beautiful Radnage Valley.

Examples of where these species and habitats occur include:

- River Wye – although much of the Wye's course is highly urbanised through High Wycombe and Wooburn Green, with many impoundments including at one time over 30 mills, it retains some very good quality **gravel bed habitat**, in part due to its relatively steep gradient, ideal for **brown trout.**

- The Chess - still maintains a valuable population of **water voles.** The rare **Winterbourne Stonefly** has been recently found in the headwaters of the Chess. **Floodplain meadows** can be found at Frogmore Meadows SSSI.

- The Misbourne - has interesting geology which results in the frequent drying of the middle reaches. Water voles are restricted to the lower reaches due to this**.** **Old Rectory Meadows SSSI** sits next to the Misbourne and **meadow flowers** grow on its floodplain.

- The Alder Bourne rises in Fulmer and flows beneath the M25 and passes next to Kingcup Meadows and Oldhouse Wood SSSI, designated for its **mosaic of wet and dry habitats** adjacent to the river, including fen and wet grassland. It cuts down through the clay and chalk with London Clay underlying the upper slopes and Upper Chalk forming the middle section.

River Colne

- The Colne runs along the county boundary for some of its length, and as well as being fed by a number of Chiltern chalk streams it also runs over chalk geology until it reaches Denham. The River Colne runs through the Mid Colne Valley SSSI, important for huge numbers of water birds. Extraction of sand and gravel from the

Colne Valley has had a profound effect on this landscape, with many pits creating reservoirs. Others have been landfilled and reclaimed; many of these back to agriculture.

- The Colne Brook (a distributary of the River Colne) corridor - is well shaded by **deciduous woodland** at its upstream end, flowing through agricultural land and becoming less covered through old mineral workings and several golf courses before leaving Buckinghamshire at Thorney. A major tributary of the Colne Brook is the Horton Brook, which rises at Alder Carr within Black Park SSSI.

The Thames

21. Being a highly-modified channel the more important flow-dependent habitats in the Thames are restricted to weir streams and some side-channels, with the main Thames providing a degree of contemporary stability and depth quite unlike the shallower, multi-thread channel that would have existed before human influence. The Thames therefore provides habitat **for a range of species which benefit from stable water levels and generally benign flow rates.**

River habitat - changes over recent decades

Great Ouse

22. In common with many lowland rivers, the Great Ouse has historically been extensively **re-profiled** resulting in a uniform, widened and deepened channel. This has also resulted in the river having **limited connectivity with its floodplain**. There are a number of **weirs and obstructions** present in the upper catchment that affect river flow patterns as well as being barriers to migration for fish and wildlife.

23. In common with further upstream areas in Buckinghamshire, the river through Milton Keynes Authority area has historically been **realigned and re-sectioned**. This has resulted in a generally over-widened, deepened and straightened channel, limiting floodplain connectivity and habitat diversity. There are also a number of large weirs along the river, interrupting river flows and limiting longitudinal connectivity and migration opportunities for fish and wildlife.

Padbury Brook and the River Ouzel

24. The Padbury Brook catchment has also **historically been engineered**, resulting in the channel often being over widened, deepened and with **reduced floodplain connectivity**. The River Ouzel has also been modified historically.

Rivers Ray and Thame

25. These two predominantly clay catchments have been subject to **substantial land drainage improvement** works in the past, not least in part due their innate flashiness, with the River Ray having been subject to some of the most extensive interventions. The main stems of these two rivers have been subject to considerable re-sectioning (widening and/or deepening) works.

26. Some of the smaller tributaries to the Ray and Thame have been equally subject to **land drainage improvements**. The Hardwick Brook, a tributary of the Thame which it joins at Quarrendon near Aylesbury, is however notable for the amount of reasonably good quality **semi-natural gravel-bedded habitat** which has been retained. Another tributary of the Thame, the Bear Brook, fed by chalk-influenced streams in its very upper reaches, also has **some remnant good quality habitat**.

27. There are several other short lengths of chalk stream tributaries flowing from the base of the Chiltern scarp with some semi-natural morphology, feeding into the larger tributary of the Scotsgrove Brook, which runs across the floor of the Aylesbury Vale to join the Thame just north of Thame town, just inside the county. Few of the Ray tributaries in Buckinghamshire have survived with much if any of their post-glacial hard gravel beds intact.

28. **River channel and floodplain habitat enhancement works** have been undertaken at a few locations on the Thame in Buckinghamshire, between Aylesbury and the county boundary near Thame, as well as the provision of **fish bypass channels**, but there is still much more that can be done to improve the quality of habitat here and on the Ray, and to promote floodplain wetland creation.

Chilterns Chalk Streams

29. The various chalk streams in the Chilterns have been differentially affected by **development, historic milling, dredging and physical modifications, abstraction, pollution, invasive non-native species and agricultural and other riparian management practices**. Due to the various pressures on chalk streams and their catchments, floodplain grazing marsh has been largely replaced with improved pasture and arable cropping. The various pressures have acted to **reduce connectivity** with floodplains, reduce **habitat diversity** and so **species diversity**, and affect **water flow, and water quality**.

30. In the Colne, **historic gravel and mineral workings** characterise much of the land adjacent to the river on the Buckinghamshire border. These have been redeveloped to form lakes and wetlands used for both angling, watersports and as local nature reserves for example, the

Mid Colne Valley local wildlife site includes 3 SSSIs, a stronghold for both water vole and otter in the catchment.

31. Elsewhere, there are **some improvements to channel habitat and fish passage, secured through development and collaborative projects**, that are helping sections of our area's chalk streams to recover from the worst of channel modification and mis-management – e.g. on the River Wye, secured through development, and the River Chess, where the Thames Water-led "Smarter Water Catchment" project works collaboratively on projects to improve the river, its flow, quality and habitats in the catchment. There are also some examples of reductions in abstraction pressure by the closure or reductions of groundwater abstractions, for example again on the Wye and on the Chess and Misbourne catchments.

The Thames

32. Being such a large, modified river channel, the Thames is the main focus for informal waterside recreation in the county, as well as for pleasure boating, although the river carries huge volumes of water during flood events. The nature of the river as an impounded navigation channel has meant that habitat and connectivity improvements have been largely limited to the provision of fish passes and the principle of retaining marginal habitat and woody vegetation where they do not interfere with the navigation. In the late 1990s, the Jubilee River flood channel was created, essentially a new section of the Thames designed to convey flood water in a less damaging route, which begins its course at Taplow on the Buckinghamshire side of the river before flowing out of the county into Berkshire; the constraints of its function as a flood channel reduced the opportunity to create a wholly naturalistic watercourse.

Ecological status – change over time

33. Our rivers, lakes and groundwater are protected and monitored as part of the Water Framework Directive (WFD), which requires all EU member state to have their waterbodies in "good ecological status" (or "good ecological potential" for heavily modified waterbodies) by 2027 at the latest. In addition to improving the status, there must be no deterioration. This was transposed into UK law as a member of the EU. Full WFD reclassifications are repeated every 6 years. The last full reclassification was 2019 and a partial reclassification (where data available) was in 2022. Wherever possible 2022 data has been used but in some cases older data has had to be used.

34. All surface waterbodies in Buckinghamshire and Milton Keynes have been found to fail for the chemical components of the classification and this has impacted on overall WFD status. It is, however, possible to identify the ecological status of each waterbody by removing the chemical status data and reviewing the ecological elements.

35. There are 89 Water Framework Directive surface waterbodies in the area (including 10 chalk stream waterbodies): 66 rivers, 14 groundwater, 6 canals, 2 lakes and 1 water transfer (a reach of the Jubilee River).

36. The table below summarises the WFD classifications of the 66 rivers in Buckinghamshire and Milton Keynes:

Ecological Status/Potential	**No. of rivers in classification**	**% of rivers in classification**
High	0	0
Good	1	2
Moderate	48	73
Poor	14	21
Bad	3	5
TOTAL	66	100% (with rounding)

37. Figure 27 below, shows the 2019 ecological status of all WFD water bodies throughout Buckinghamshire and Milton Keynes. The 2019 data is presented in the map as this is the most recent complete reclassification of WFD data. The next full WFD reclassification is due in 2025.

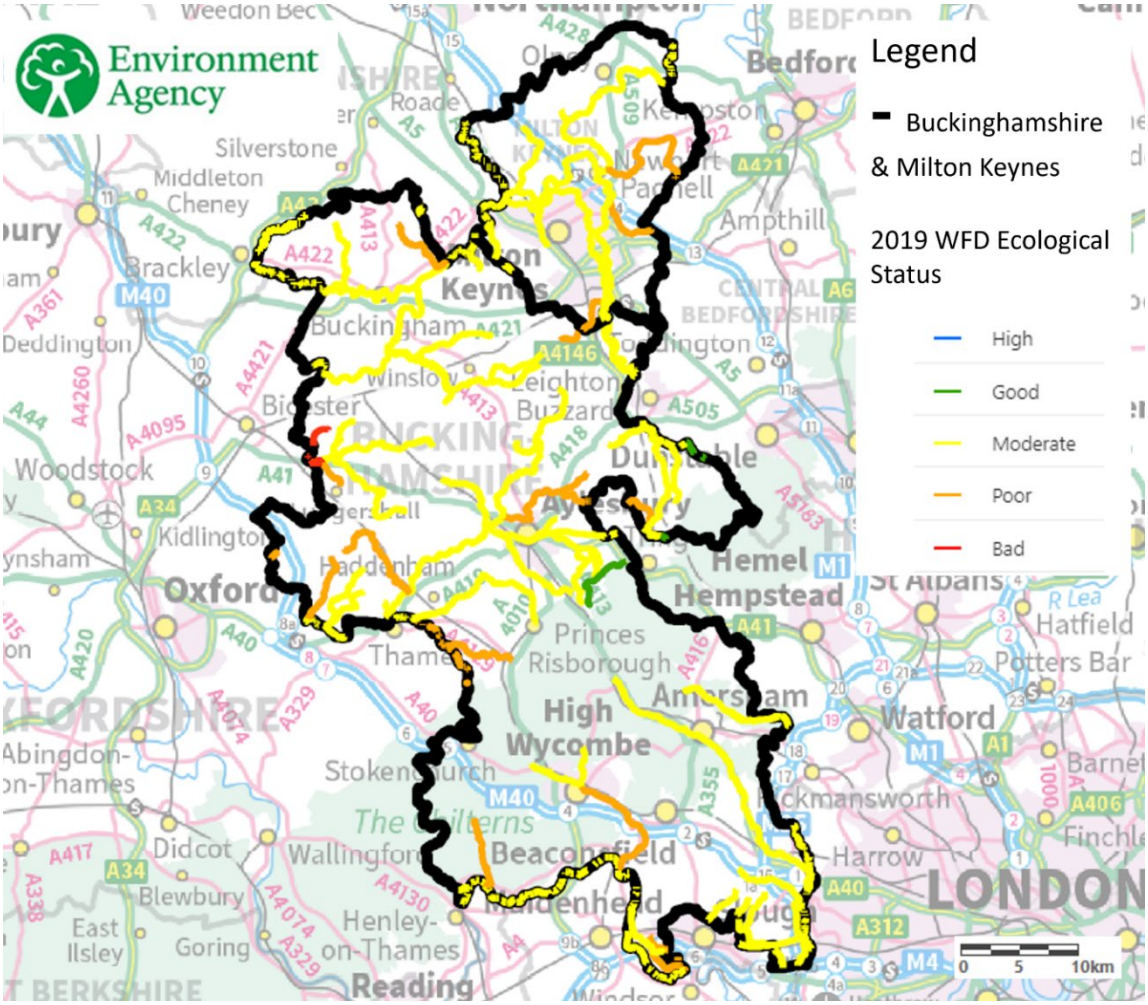
38. The latest WFD classification (2022) showed that 4 (5%) of the surface waterbodies (rivers, lakes and canals only) in Buckinghamshire and Milton Keynes were at Good Ecological Status/Potential or higher, compared with 16% nationally. Only 1 (10%) of the chalk stream waterbodies in the area (Eaton Bray Brook in the headwaters of the Ouzel catchment) is at Good Ecological Status, compared with 17% nationally. [59]

39. One of the main contributory factors for the lack of good ecological status in the Strategy Area is pollution from sewage (continuous final effluent sewage discharge accounts for 24% of failures and intermittent storm discharge accounts for 6% of failures). Farming practices also have an impact, with poor nutrient management accounting for 17% of failures, poor livestock management causing 6% of failures, arable land use causing 3% of failures and poor soil management causing 2% of failures.
40. Activities impacting on river morphology have also had an effect, with physical modification accounting for 8% of failures and land drainage causing 3%. For example, weirs create barriers to fish passage, and artificial straightening results in loss of habitat diversity, erosion

of gravel beds and altered erosion and deposition. Historic dredging can also increase the risk of downstream flooding, and the impacts of pollution can be heightened when combined with poor watercourse habitat quality. There are such surface water runoff pressure points at High Wycombe, Chesham, Aylesbury, Marlow and Amersham Old Town. Other reasons including urban development, drought and transport drainage are the remaining causes for failure.

41. Whilst the headlines are not particularly promising, the WFD status of the waterbodies is based on the worst performing measure and many parameters are at good or high status; therefore, this should not in any way detract from the hard work which is going on in the catchments to address the failures and improve aquatic and semi-aquatic habitats. There is no single action which can reverse the decline, but steps are being taken to improve all aspects of the water environment which will contribute towards their overall improvement.

Figure 27. *2019 ecological status of WFD water bodies throughout Buckinghamshire and Milton Keynes Source: © Environment Agency. All rights reserved*.



Pressures on our water environment and other challenges

42. There are several over-arching **pressures on the water environment** presenting challenges for nature.

- **Climate change** is affecting (or likely to affect) water flow and quality, and associated species and habitats in our water environments due to increasingly warmer, wetter winters, hotter, drier summers and more frequent and intense storms.
- **Pests and diseases** and **invasive, non-native species** threaten instream and surrounding habitats. (e.g. the presence of invasive non-native signal crayfish which are widespread on most of the rivers in the LNRS area; elsewhere, such as along the Alderbourne, American skunk cabbage has become widespread. Red swamp crayfish has recently been found on the Grand Union Canal at New Denham, and is the dominant species locally. It is pollution-tolerant and a prolific burrower - so nearby watercourses are at risk, such as Misbourne and also the wider Colne catchment.)
- The degree of **historic channel engineering** adds a substantial challenge to restoring natural functioning and diversity to watercourses and can affect overall flooding risks. Weir structures and culverts affect fish populations by restricting their ability to migrate, breed and escape pollution.
- Levels of **abstraction affect available water** resources.
- **Pollution from poorly treated** sewage outflows and untreated storm tank discharges, urban and road runoff, and agricultural runoff affect water quality. Phosphate pollution can cause eutrophication, resulting in lack of oxygen for river flora and fauna.
- Such stresses are often intensified by **development pressure** (e.g. in the Aylesbury area).
- The impacts of agricultural, intensive and other riparian **land management on habitat,** e.g. intensive grazing and livestock poaching.
- Land management approaches can sometimes differ across the landscape, making it more challenging to adopt a landscape-wide approach to habitat protection.

43. Many of these pressures can act together, or cumulatively, and exacerbate or intensify the impact of other pressures. For example, high water abstraction levels can exacerbate the impact of pollution on water quality (due to low baseflow, resulting in a lack of clean water to dilute point source pollution); and climate change and development together exacerbate other existing pressures.

44. There is a similar set of well-recognised ecological **challenges affecting rivers, in particular our area's precious chalk streams**:

- **Over-abstraction** – groundwater abstraction from the aquifer in the chalk catchment, in combination with a changing climate, can significantly affect water

flows, e.g. in the River Misbourne, sometimes limiting natural geomorphological processes; long lengths of river can dry out causing death of fauna and flora.

- **Riparian management** – losses or changes in management of surrounding habitats can affect channel structure and water quality e.g. intensive grazing leads to highly ephemeral flows in the Hamble Brook; poor vegetation management can affect bank stability, the diversity and structure of habitats, availability of food, sediment loads and soil erosion.
- **Pollution** – diffuse and point source, e.g. from road runoff, agricultural runoff, sewage discharge and urban areas - with phosphate pollution causing eutrophication pressures.
- **Invasive species** – for example there are significant amounts of Floating Pennywort, Himalayan Balsam and Japanese Knotweed in the Colne Brook.
- **Channel modification, including historic channel dredging and milling** – where physical modifications such as weir structures and culverts affects fish populations by restricting their ability to migrate, breed and escape pollution.
- **Livestock poaching** - causes erosion of river banks and widening of the channel. It also introduces sediment into the river which can smother river bed gravels and impact fish spawning habitat.
- **Cumulative pressures** from the above, which can substantially increase the risk and longevity of drying – for example in the upper reaches of the Chess.
- **Lack of buffers with development** – in more urban areas, development has often not respected the need to maintain a buffer to protect water courses and in rural areas, nitrate and phosphate levels are sometimes increased through agricultural runoff.

Opportunities for our water environment

45. There are particular opportunities for our various watercourses across Buckinghamshire and Milton Keynes to restore natural process and so nature recovery – to:

- **Restore habitat quality** through physical restoration of modified river channels (such as bed-raising, narrowing and re-instating old paleochannels on realigned sections of river)
- **Remove barriers to fish passage and provide fish bypass channels**
- **Reconnect rivers with their floodplains** through channel habitat restoration and removal of flood banks and levees
- **Promote floodplain wetland creation**
- **Restore water flow where impacted by abstraction**
- **Improve water quality by addressing pressures from point and diffuse sources**
- **Encourage better riparian land management and sensitive resource use** – taking into account habitat types, vegetation management, the need for buffer areas

around water environments, the timing and intensity of grazing and flood attenuation and water quality measures – e.g.

- catchment-sensitive and soil-sensitive land management;
- valley slope land management timing;
- well-connected riparian habitat management to buffer water courses from intensive land-use and connect habitats at a landscape scale; or
- vegetation / planting schemes in upper catchment areas as part of natural flood management to “slow the flow”.

- **Implement Natural Flood Management schemes** to reinstate natural processes, “slow the flow” particularly in upper catchments and urban areas, re-naturalise river channels and reconnect rivers to their floodplain. This has multiple benefits including reduction of downstream flood risk and habitat creation.

B – OUR URBAN ENVIRONMENT

1. Despite covering only 12% and 20% of our land area in Buckinghamshire and Milton Keynes respectively, our urban areas, such as the city of Milton Keynes, Aylesbury and High Wycombe, play a disproportionately important role for biodiversity and in providing benefits for physical health and mental wellbeing.

Park in Milton Keynes. Photo: David Bailey.

Key Habitats and species

2. Most urban areas have developed over a long period; therefore, their form and function are an outcome of the changes in knowledge and policy and display a heterogeneity in character.

3. **Open Mosaic Habitats** can be found mainly in urban and former industrial areas and can have high biodiversity value, supporting rare plants, mosses, lichens and a large number of rare invertebrates, especially bees, wasps and beetles. This habitat was identified as a UK BAP Priority Habitat in 2007.

4. Bio-diverse areas are often rich in landscape features such as **ponds, woods and textural pasturelands**. House values are directly affected by the perceived quality of the surrounding **green spaces**. It is therefore in the interest of developers to factor-in features which will support a wider range of wildlife.

New housing estate in Pitstone Photo: Nicola Thomas (NEP).

Changes in recent decades

5. Our recent historic analysis of land use and habitat changes between the 1930s, 1990 and 2023 showed the coverage of land area in Buckinghamshire and Milton Keynes by built-up areas stayed approximately the same, at around 9.5%, from 1930 to 1990, but then increased by nearly 58% from 1990 to 2023. Looking ahead, there is expected increasing pressure for housing development in particular across Buckinghamshire and Milton Keynes[60].

Looking ahead - pressures in urban ecosystems

6. Open mosaic sites can be threatened by **redevelopment** (due to their status as brownfield sites), inappropriate 'restoration', **inappropriate management** or natural succession;

7. A key challenge in urban ecosystems is **how best to harness the cumulative management activities of multiple land managers in a coordinated way**. For example, private gardens have the potential to significantly improve the wider landscape mosaic through a heterogeneity of habitat patches and in turn empower individuals and communities.

Opportunities for urban areas

8. There are a number of opportunities **applicable** to all urban areas as well as new developments across Buckinghamshire and Milton Keynes:

[60] For the latest information about housing requirements and the 5-year housing supply in Buckinghamshire, see Housing and land supply Buckinghamshire For the Milton Keynes Five year housing land supply strategy, see Milton Keynes Five year housing land supply strategy. For more information about housing supply and delivery nationally, see GOV.UK National Housing Supply and Delivery guidance

- **Land management opportunities** in different areas with nature In mind can support nature recovery at many scales – for example:
    - **Public land** (e.g. road verges, school grounds, parks, cemeteries) and corporate estates all have the potential to provide for wildlife if managed sensitively.
    - Simply changing **grass and hedgerow** cutting regimes can have significant positive effects for a range of species.
    - On an individual level, even small gardens can support wildlife–rich habitats such as ponds. **Gardens** can also be significant for pollinating insects.
- **New development**: With the Buckinghamshire and Milton Keynes area likely to be under further intense development pressure, it is essential that opportunities for biodiversity *with* development are sought.
    - alongside the mandatory **10% net biodiversity gain** requirements for new development, all new developments could seek to **provide for wildlife** in other ways and at all scales wherever possible;
    - **New developments could take existing natural features as design cues** (e.g. designing in sympathy with tree-scapes, hedgerows, natural water courses) – **to retain vital soil structures, carbon and landscapes** built up over time;
    - **Long-term management** of green areas, secured for the lifetime of the development rather than via a short-term management company following completion, will help secure biodiversity and nature benefits for all into the long term.

- **Urban greening** into existing urban areas– e.g. street trees, landscaping, urban forestry, green or living walls and roofs and other vertical greening;
- **Make biodiversity and green infrastructure a key principle in the design** of the urban environment, as well as in new developments;
    - Taking advantage of opportunities for **nature-based solutions** to protect, manage or restore ecosystems, with benefits to communities as well as biodiversity. E.g.
        - *Reduce flooding risk* – with planting, and managing into the long-term, appropriate vegetation upstream; or
        - *Provide shade, cooling and a carbon sink* – with appropriate planting in urban areas to adapt to and mitigate climate change;
        - *Reconnect people to the environment* – with river restoration using more natural processes in urban water courses, also to improve flood management;

- **Connect and reconnect greenspaces -** for biodiversity, wildlife, our communities and our economy;
- **Create more biodiverse spaces** – for example introduce natural areas into existing urban parks and green spaces
- **Manage into the long-term –** plan and fund to maintain and enhance existing green spaces into the long term – e.g. ponds, hedgerows, veteran trees, woodland
- Ensure a **diversity of new trees and planting** are provided – with correct species for the location chosen ("right tree, right place").

Case study: The Milton Keynes Urban Area

Milton Keynes was the last of the new towns, and its urban core was designed in the 1960s and 1970s, to overlay the existing towns and villages in the west of the borough and build into a flexible master plan. The unifying grid layout sought to absorb existing habitats such as woodland, hedgerows and ponds into the fabric of the city.

Through planning and management these discreet units were connected through a series of **linear parks** with large water-balancing lakes along the **water corridors** - the Ouzel, Loughton Brook and Grand Union canal. These form part of a network of green and blue spaces, which play an important role in providing benefits for wildlife as well as improving mental and physical health and wellbeing for people. Other wildlife corridors were created or recognised along the broad grid roads, railway tracks and ancient rights of way, which connect the generous green spaces.

The network of greenspaces in Milton Keynes has provided many "ecosystem services" to the city, such as improved air quality, carbon sequestration or shade. Wildlife benefits from the **matrix of habitats and linkages** and the format crucially also allows nature to be locally-available to people. Improved environments, from road verges and parks through to individual gardens, can be significant for wildlife, for example with ponds or planting for pollinators.

Designated Sites and Biodiversity Opportunity Areas

Milton Keynes contains several designated sites and the following Biodiversity Opportunity Areas:

- Greensand Ridge BOA
- Howe Park Wood SSSI
- Oxley Mead SSSI
- Blue Lagoon Local Nature Reserve

Habitats and species of importance

The parks and other green and blue spaces in Milton Keynes city contain important areas of wildlife habitats, including **lowland mixed deciduous woodland** and **ancient and veteran trees, species-rich floodplain meadows** and **wetland reserves,** as well as **old hedgerows, orchards, grazing** and **valley pastures and hay meadows, scrubland, ponds, lakes, rivers and streams**. The city's **linear park**s provide important interconnected ecological corridors although some sites of conservation value are more isolated and lack sufficient buffer-space between them and surrounding development. The city's green spaces, including the landscaped corridors along the main 'grid' roads, were heavily planted under the new town establishment – these **plantations** are now maturing and providing important **urban wildlife habitat.**

Tattenhoe Valley Linear Park Photo: Milton Keynes Parks Trust.

Riparian and wetland habitats provide valuable habitat connectivity within the landscape and support populations of **breeding and overwintering birds, otter and great crested newt**, with kingfishers, Daubenton's bats and otter seen around the waterways. Many species of **butterflies,** including rare and threatened species such as the **black hairstreak** are present at specific sites, as well as **noctule bats** and **badgers** that thrive in the green spaces, with **barn owls**, and **hobbies** seen across the grasslands hunting for prey.

Specific Challenges and pressures

Alongside the generic pressures such as climate change and pests and diseases, Milton Keynes faces high **development** pressure, with associated land use change and possible **habitat fragmentation and increasing demand for resources, increasing leisure and recreation pressure** on existing green spaces and **increasing pollution** as a result of the expected growth, as well as possible infrastructure related to East-West Rails and the Oxford-Cambridge Growth Area.

Opportunities for nature-recovery in MK urban area

Alongside the area-wide actions and objectives identified that apply to the whole of Buckinghamshire & Milton Keynes, the broad opportunities to recover nature in the Milton Keynes urban area include:

- **Encourage green development and access to nature**. Meet "Access to Natural Greenspace" targets and integrate biodiversity features within proposed developments. Extend the linear park system into new developments; and
- **Maintain and enhance ponds and hedgerows, conserve veteran trees, hedgerows and woods**.
- Ensure a **diversity of new trees** are planted and correct species for the location chosen ("right tree, right place").

Measures that may help to achieve these include:

- **Engage the community:** increase knowledge and encourage participation to enhance nature recovery;
- **Challenge the norms of landscape maintenance** to create more biodiverse spaces, both in the public and private realm.

9. To achieve **a holistic approach** in urban biodiversity, management will require the coordination of local governmental the various stakeholders, including planners, ecologists, wildlife charities and community groups. It is hoped that the LNRS and its delivery, including those coordinated by the NEP, will help to achieve this.

Case study: Other major urban areas in the LNRS area

Similar challenges, arising from the pressure of more development, and the nature-based possible solutions, to design-in with development opportunities for wildlife, habitat linkages and multiple benefits for those who live or work nearby and visit natural greenspaces, are faced in the other urban areas in the NEP area: for example, to name a few in Buckinghamshire:

- Aylesbury
- High Wycombe
- Buckingham
- Chesham.

For example, **Peregrine Falcons** are now taking advantage of the large buildings cross Buckinghamshire, as they act as artificial cliff faces.

Many of the towns in the Chilterns have grown around the internationally important **chalk rivers** and streams and, as a result, these water courses have been heavily altered through historic use for powering mills and other industry.

Aylesbury has the advantage of having been designated "Garden Town" status, and lies in the Vale, historically-famous for its **Black Poplar and Aylesbury Prune**.
Kingsbrook is a nationally-recognised exemplar urban residential development of 2,450 homes, to the east of Aylesbury, and is principally a collaboration between Barratt Homes, the local council, the RSPB and local partners. The development aims to incorporate nature and access on the doorstep and build in wildlife-friendly features. Further information can be found at : https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/nature-home-kingsbrook.pdf

Orchard Green, Kingsbrook, Aylesbury. Photo: Barratt Homes.

C Landcover by habitat data

The following data was provided by Natural Capital Solutions as part of the LNRS mapping baselining work undertaken in 2024.

Habitat	Bucks LA area		MK LA area		Bucks & MK LNRS	
	Area (ha)	% cover	Area (ha)	% cover	Area (ha)	% cover
Arable	43,016	27.5	11,262	36.5	54,278	29.0
Improved grassland	52,701	33.7	4,989	16.2	57,690	30.8
Amenity grassland	6,745	4.3	3,053	9.9	9,799	5.2
Semi-natural grassland	8,894	5.7	865	2.8	9,759	5.2
Marshy grassland	357	0.2	105	0.3	462	0.2
Heathland	83	0.1	1	0.0	83	0.0
Fen, marsh and swamp	85	0.1	17	0.1	103	0.1
Broadleaved woodland	15,964	10.2	2,201	7.1	18,165	9.7
Coniferous woodland	2,624	1.7	408	1.3	3,033	1.6
Mixed woodland	1,060	0.7	118	0.4	1,179	0.6
Scrub	363	0.2	94	0.3	456	0.2
Trees / Parkland	1,050	0.7	171	0.6	1,220	0.7
Water	1,261	0.8	613	2.0	1,874	1.0
Built-up areas and infrastructure	10,430	6.7	4,374	14.2	14,804	7.9
Garden	9,569	6.1	2,188	7.1	11,757	6.3
Rock, exposure and waste	286	0.2	60	0.2	346	0.2
Mixed / other / uncertain	813	0.5	147	0.5	959	0.5
Unclassified (under development)	1,194	0.8	194	0.6	1,388	0.7
Total	**156,492**		**30,862**		**187,355**	

Landcover by habitat data: Natural Capital Solutions, 2024.

D Protected and designated sites and landscapes

1. Certain areas receive protection in the planning system due to their importance for biodiversity. According to analysis in 2020 and 2021[61], only 5.5% of Buckinghamshire land, and less than half this, at 2.3%, of the total area of Milton Keynes, receive some level of formal designated site protection. The Government has a target of protecting 30% of the land for nature by 2030.

2. The LNRS process is required to produce a baseline map showing protected and designated sites and landscapes. The following types of sites, that are protected and designated for planning purposes, must be mapped. These are explained in the Glossary(Appendix P):

National conservation sites

- Special Areas of Conservation
- Sites of Special Scientific Interest
- National Nature Reserves
- Local Nature Reserves

Other areas of particular importance

- Local wildlife sites
- Irreplaceable habitats

[61] "Mapping natural capital, ecosystem services and opportunities for habitat creation in Buckinghamshire", Natural Capital Solutions (2020) and "Mapping natural capital, ecosystem services and opportunities for habitat creation in Milton Keynes", Available at: https://bucksmknep.co.uk/projects/natural-capital-mapping/ Accessed November 2023.

Protected Sites in Buckinghamshire and Milton Keynes

In Buckinghamshire, 932ha are internationally-designated as Special Areas of Conservation (SAC)[1], which is 0.60% of the total land area. The total amount of land nationally-designated as Sites of Special Scientific Interest (SSSI)[1] is 2516 ha, or 1.61% of the total area[1] .

The 447 sites locally-designated as Local Wildlife Sites (LWS)[1] across Buckinghamshire, cover 6,386 ha (4.08%) with a further 18 sites (262 ha 200ha or 0.13%) classified as a Local Nature Reserves (LNR). Designated sites for nature therefore make a small percentage of land in Buckinghamshire overall (5.74%).[1] 10 LWS fully or partially overlap with Local Nature Reserves.

There are no international designations **in Milton Keynes,** such as SACs or SPAs[1] in the area, and only two nationally-designated Sites of Special Scientific Interest (SSSIs) within the local authority boundary (Howe Park Wood and Oxley Mead), totalling 27.6ha. However, there are a number of SSSIs adjacent to the boundary. Approximately 8.5ha of Yardley Chase SSSI is within Milton Keynes.

There are 35 Local Wildlife Sites and one Local Nature Reserve[1] in the Milton Keynes area, together covering 785.3ha, some 2.5% of the total area. (LWS 785.3Ha, LNR 33.1Ha - LNR is also LWS – as of 00/2017).

Alongside protected sites, there are a number of additional non-statutory schemes which are used to show sites of local biological interest, such as Biological Notification Sites.

E Priority habitats and BOAs – technical details and how used in LNRS mapping

"Priority" habitats

1. **Priority habitats are nationally identified as habitats valuable for biological diversity**. The Government produces national targets for "**priority habitats" and priority species** which are protected to some degree in law[62].

2. Data on the extent of priority habitat in Buckinghamshire and Milton Keynes is insufficient, but in terms of extent and proportion of the area, Buckinghamshire and Milton Keynes together has significantly **less priority habitat than the average English county** - covering between 3% and 9.7% of land in the area compared with around 14% nationally.

3. *Figure 21* shows the type and distribution of priority habitats across the LNRS area. The map shows that some priority habitats are found throughout Buckinghamshire and Milton Keynes (such as traditional orchards, although more are recorded in the south of the area), whereas geology, topography and soil type support other priority habitats in more specific locations (e.g. chalk grasslands and chalk streams in the Chilterns; lowland meadows and wet woodland in the northern half of the LNRS area and lowland beech and yew woodland in the south; with lowland dry acid grasslands on the greensand ridge in the north-east).

4. Complete data does not exist currently for the condition of these priority habitats.

5. The Buckinghamshire and Milton Keynes area as a whole has an above average extent of traditional orchards, lowland dry acid grassland and lowland meadows. Lowland mixed deciduous woodland is the single most extensive priority habitat in the county (1,682 ha) followed by Beech and Yew Woodland (1,191 ha) and lowland wood pasture and parkland (536 ha)[63].

6. The Buckinghamshire & Milton Keynes NEP sets out **specific targets for priority habitats** across Buckinghamshire and Milton Keynes, alongside six other key objectives to create more, bigger, better and more joined up habitats in the area, in its latest Biodiversity Action Plan, "Forward to 2030" (The "NEP's "BAP"), (See *Appendix J The area's current Biodiversity Action Plan (BAP)*[64]). Together, the BAP's objectives aim to reverse biodiversity decline and contribute to nature recovery in line with the Government's 25 Year Environment Plan.

[62] Natural Environment and Rural Communities (NERC) (2006) Act.
[63] NEP's State of the Environment Report, 2016. Available at: https://bucksmknep.co.uk/projects/state-of-the-environment-report/ Accessed Oct 2023.
[64] Available on the NEP's website here: Forward to 2030 – Buckinghamshire & Milton Keynes Natural Environment Partnership (bucksmknep.co.uk)

7. The NEP's BAP aims to retain, create and improve Priority Habitats and sets **targets for 14 of the English Priority Habitats** (Table 1, page 21 of the BAP), as a proxy for species, to achieve an overall **20% increase in the area of Priority Habitat**. The seven main objectives and opportunities relating to priority habitats in the BAP can be summarised as:
    - **Retain, enhance, expand and create priority habitats** everywhere;
    - In terms of location, the **focus** for *priority habitat* creation and improvement should be in **Biodiversity Opportunity Areas** (BOAs)[65] and other strategically-identified areas, which provide the greatest opportunities.

Biodiversity Opportunity Areas (BOAs)

8. For further information about the area's BOAs is available at Section 2, above: *Biodiversity Opportunity Areas (BOAs) – opportunity areas for recovery of priority habitats*

[65] Biodiversity Opportunity Areas (BOAs) are considered to be the most important areas for biodiversity in the area, and were considered by the experts writing the BAP to be where the greatest opportunities for habitat creation lie, enabling efficient focusing of resources to the greatest conservation impact. Spatially, in terms of where to restore nature, the BAP concludes that action taken within BOAs and priority water catchments to restore, improve and connect biodiversity are the highest priority.

F How large projects in the LNRS area have been used to inform the mapping

1. The draft LNRS mapped measures have been sense checked (in terms of location and measures) against known large strategically-funded nature recovery projects where nature recovery action is and will be taking place.

- **Reconnecting Bernwood Otmoor Ray (RBOR) Programme** - £512k for the development phase (2 years) of a larger £4m total NLHF funded project. Led by BBOWT, the partnership project aims to enable long-term landscape reconnection and recovery in the Bernwood Otmoor Ray project area.
- **River Chess Smarter Water Catchment Project** - Partnership project funded by Thames Water co-hosted by Chilterns National Landscape and Chilterns Chalk Stream project with River Chess Association - protecting landscapes, enhancing habitats and improving water quality and flow within the River Chess Catchment.
- **Ock and Thame Farmers: Freshwaters and Floodplains Restoration Project** – A Defra funded, Landscape Recovery project, led by Freshwater Habitats Trust and River Thame Conservation Trust. The project aims to achieve nature recovery at landscape scale with particular focus on freshwater habitats, using novel financial mechanisms and sources.
- **North Bucks Freshwater Resilience Project** – Led by The Freshwater Habitats Trust - A catchment project across North Buckinghamshire delivering biodiversity net gain through wetland habitat creation, combined with flood risk reduction through the implementation of Natural Flood Management (NFM) measures.

2. In each case, it has been confirmed via the mapping methodology that a reasonable amount of the above project areas are covered by a range of mapped measures that align the respective project objectives. This also ensures that there is reasonable prospect of these measures mapped on the ACB being delivered in these project areas.

G Historic Analysis

The analysis conducted by Natural Capital Solutions in 2024 specifically for the LNRS looking at changing habitats over time is available on the NEP's website here:

Changing habitats over time in Bucks and MK – Buckinghamshire & Milton Keynes Natural Environment Partnership

H Pressures on nature

Pressures and challenges across Buckinghamshire and Milton Keynes - why we need an LNRS

1. **Biodiversity is the key to life.** Not only is the diversity of our wildlife and habitats inherently valuable in its own right, but we rely on biodiversity for food, clean air and water, productive soil, flood protection, control of diseases, space for recreation; it is crucial to tackling climate change as well as to our entire private, commercial and public infrastructure[66]. A sustainable local economy will require our land resource to be more ecologically robust on a **landscape-scale** and be one which can provide the fullest spectrum of ecosystem services.

2. **Buckinghamshire and Milton Keynes's natural environment is the foundation of our health, prosperity, identity, and heritage.** But there are many significant pressures facing the natural environment in the LNRS area across Buckinghamshire and Milton Keynes, which, if unchecked, will have dramatic impacts on our wildlife and habitats in the future.

3. **Globally, we are in the middle of a mass extinction event.** Internationally, there has been a 68% decline in global wildlife populations since 1970. In the UK, 41% of species have declined in recent decades and a quarter of the UK's mammals face extinction.[67] In Buckinghamshire, none of our chalk streams have reached "good" ecological status. The pressures on nature come from and operate at international, national and local scales.

4. **In common with other parts of the country, and particularly the developed south-east, Buckinghamshire & Milton Keynes have severely damaged ecosystems as a result of a combination of various pressures**, including climate change, population growth and development, changes in land use and unsustainable land management, the overuse of resources, generation of waste, pollution and pests and diseases.

5. **These pressures exacerbate the potentially catastrophic loss of species and habitats across the globe,** and can act individually, in combination, consecutively and /or cumulatively. Our responses should therefore be multi-faceted, address biodiversity loss at multiple scales, while seeking to safeguard and improve the provision of nature's services that we all benefit from.

[66] This conclusion was also recently recognised by the UK Government following the Dasgupta Review – looking at the economics of Biodiversity

[67] State of Nature Report, 2019 – this is a health-check on how the UK's wildlife is fairing, using wildlife data from 50 conservation organisations. Available here: https://nbn.org.uk/stateofnature2019/reports/

6. The following is a summary of some of the key pressures acting across the **entire area and the potential impacts** on our natural environment. Although listed separately, many of these pressures can act in combination, or cumulatively, with further consequences detrimental to our nature environment, the wildlife that live in it and the services it provides to our communities. Further detail about these pressures, likely impacts and how they can act in combination and cumulatively, is provided at Chapter 3 of the current Biodiversity Action Plan for the Area[68].

Climate Change

7. **Climate change** will lead to hotter, drier summers and warmer, wetter winters with an increased number of extreme weather events, alongside changes in seasonal timings, patterns, temperatures and rainfall.

8. This is likely to lead to an increase in pests, invasive species and diseases which are adapted to the new conditions and a reduction in native species that cannot adapt quickly enough. The resulting change to the composition and location of ecological communities can affect the habitat quality and the services it can provide society, for example resulting in reduced air quality, increasing urban temperatures or increasing surface runoff.

9. Water-dependent habitats - such as rivers, including groundwater-fed rivers, streams, wet grassland, fens and ponds - are at particular risk, with all being vulnerable to extended dry periods leading to wetland habitats drying out, and groundwater-fed rivers such as chalk streams suffering as a result of low winter rainfall failing to recharge aquifers. Low river flows will also result in less dilution for nutrients and other pollutants. Conversely, the greater risk of extreme heavy rainfall in the summer as a result of warmer temperatures may lead to inundation of floodplain grasslands with impacts on e.g. ground-nesting birds.

10. Any species that cannot adapt quickly enough to the changing climate are also particularly at risk[69]. Adaptation and resilience to climate-change impacts will be much better facilitated by having large-scale, better connected biodiverse habitats which are more likely to provide refugia for species and allow recolonisation and movement through the

[68] "Forward to 2030 – Biodiversity Action Plan for Buckinghamshire and Milton Keynes", Buckinghamshire and Milton Keynes Natural Environment Partnership, 2021.

[69] Further information about how climate change may affect our area is provided in the NEP's Biodiversity Action Plan on page 60, available at: Forward to 2030 – Buckinghamshire & Milton Keynes Natural Environment Partnership (bucksmknep.co.uk) Buckinghamshire and Milton Keynes Natural Environment Partnership, 2021

landscape. [See the NEP's Biodiversity Action Plan (2021), page 66 for more specific information about likely climate change impacts in our area].

Development

11. **Developmen**t can result in the **direct loss** of habitats and species but also the fragmentation and loss of connectivity of the ecological network. **Indirect impacts** include increased demand for resources such as water supplies and demand for recreation and green space – which can put pressure on nearby habitats leading to their deterioration. For example, more visitors to a site could results in trampling of ground flora in woodland, or dog fouling. Any increase in waste and risks of pollution – e.g. waste, dust, sound and light – differentially affect habitats. Ground nesting birds also impacted by increased levels of disturbance caused by recreational activities and in particular the increase in dog numbers.

12. Some species are affected more than others, for example specialist farmland birds are often displaced whereas bird species more easily able to exploit gardens may benefit. This is a particular concern in the Aylesbury Vale area where urban growth is replacing farmland.

13. Poorly planned development can increase flood risk elsewhere or reduce water quality. It can also increase pollution (e.g. sewage, light and sound pollution) and reduce people's access to nature. Well-planned development includes features to balance run-off to avoid increased flood risk downstream, clean up run-off water and provide green corridors and features for wildlife to thrive and move through the urban landscape.

14. Development pressure is highest around existing urban areas, particularly in north Buckinghamshire around Milton Keynes, around Aylesbury town and in the south of the county where overspill from neighbouring authorities is anticipated at some point.

Flood Risk

15. **Historic flood risk management and land drainage activities have caused long-lasting harm to the river environment**, including the dredging, straightening and embanking of river channels and the extensive under-drainage of floodplain land, particularly in the flash-flood prone clay catchments. Modified (and therefore over-sized) watercourses no longer flow and flood naturally or contain the variety of in-channel micro-habitats that many species require; they also convey flood waters more quickly to downstream areas at risk of flooding, rather than allowing the floodplain to act as effectively as possible in attenuating flood flows. Changes in land-use, such as developed land and intensively-managed soils on agricultural land, reduces the capacity of the land to absorb water and can increase run-off, exacerbating downstream flood risk. Changes on the floodplain, for example from semi-

natural grassland to improved grassland and changes in woodland cover, also influence flood risk.

16. Species and habitats that rely on seasonal floodplain inundation, or on natural flows, form and diversity of river channels are particularly affected by the legacy of past river engineering. These changes have resulted in the loss of wetlands, lowland wet meadows and wet grasslands and the associated species found in these habitats, such as wading birds.

17. In-river structures can be barriers to fish migration. The presence of weirs and culverts stops the movement of species up and down stream and reduces the ability of upper reaches being recolonised after drought or pollution events or where the drying up of headwaters is part of the natural seasonal cycle of river flows. Physical modification is one of the biggest causes of failure of ecological objectives under the Water Framework Directive, and much of it has been done to reduce flood risk to property and land and facilitate land drainage. The national chalk stream restoration strategy identifies the need to address river habitat in conjunction with water quantity and quality issues.

18. Fluvial flood risk (i.e. from rivers, as opposed to groundwater flooding) is a particular problem around Marlow (now more protected with a flood risk scheme), Buckingham, Denham, Bourne End and Medmenham. Groundwater flood risk is particularly an issue in Chesham, the Chalfonts, Amersham Old Town, and the valleys leading into Wycombe – Hughenden, Saunderton / Bradenham and Hambleden. Where possible, flood risk solutions should aim to work with natural processes and seek to restore or preserve natural functioning of rivers and floodplains.

Over Abstraction

19. Public water supply and the abstraction of water for agriculture can place a considerable pressure on water resources and the water available for the natural environment. Over-abstraction results in low flows, which causes deterioration in water quality, particularly dissolved oxygen concentrations, critical to health ecosystem in chalk streams supporting salmonids.

20. Within the LNRS area, the most substantive abstractions are from the major chalk aquifer of the Chilterns, and there is very little abstraction affecting some of the clay rivers such as the Thame, Upper Ray and Ouse. Sustainability reductions to groundwater abstractions have significantly reduced abstraction pressure of the River Wye, but where there are currently no alternative sources of supply some of the chalk tributaries to the Colne are significantly affected (such as the Misbourne and Chess). The pumping of water and **over-abstraction** from the chalk aquifer in combination with a changing climate can result in large lengths drying out with the death of fauna and flora.

Land Management

21. **Land management insensitive to harnessing nature risks biodiversity and habitat loss and possible fragmentation of habitats**. For example, inappropriate woodland, grassland and heathland, or riparian management, and certain farming practices (e.g. removal of hedgerows, over-management of field margins and more subtle management changes such as changes to grazing regimes causing overgrazing, or changes in management to equestrian) can all have negative impacts.

22. There are many pressures on our land with land managers carrying the burden to maximise food production at ever reduced costs. Where this results in intensive farming it can have devastating consequences for our wildlife and natural environment with the loss of biodiversity, habitats and possible fragmentation, and with knock-on effects on our society and economy.

23. For example, pesticides have played a crucial role in farming, positive, but also negative. The **overuse of pesticides and reduction in habitat** can severely affect pollinators, which are necessary for crop growth[70]. Also spot-on treatments for pets are a significant and under reported source of pesticide pollution particularly in waterways and ponds.

24. Loss of **hedgerows,** or hedgerow structure and connectivity, or seasonally inappropriate hedgerow and **field margin** management can cause a reduction in farmland birds and arable weed species, also important to pollinators, and can affect local air quality for plant health.

25. Creating large areas of land with few natural habitats prevents species from moving through the landscape to find food and shelter, isolating populations. Even more subtle management changes can have negative effects, such as changes to grazing regimes of meadow grasslands which can cause them to scrub over or produce a species poor sward, decreasing the biodiversity and overall resilience of the ecosystem. These changes are particularly evident in the Thames Valley where, for example, equine uses are becoming more popular.

26. **More sustainable, less resource-intensive land management will be critical to nature's recovery** along with landscape-scale land-use change and much improved connectivity between areas of high biodiversity value. Particular care may be needed to appropriately manage the more biodiverse areas of grassland and heathland, riparian areas,

[70] Pesticides have been criticised for being non-targeted, and so harmful to more wildlife than the target species; for building up in food chains as they can be eaten or drain into water sources; and for being persistent - some stay in the environment for weeks to years. Metaldehyde, a pesticide used to control slugs on farms and in gardens, was banned for outdoor use in Great Britain from 2022. Neonicotinoids are another type of insecticide used in crop protection that have been criticised for affecting a variety of both target and non-target species, including bees. Neonicotinoids are banned in the EU but have been authorised in the UK for sugar beet since 2021.

hedgerows and woodland to prevent adverse changes in ecology and associated impacts on reliant birds, mammals, plants and invertebrate species.

27. **Urban** areas face a number of land management challenges to enhance biodiversity and nature recovery. With multiple land managers and owners, coordinating management activities is a challenge; as is securing the management of green spaces into the long term, and providing space for nature at all scales, including in new developments.

Pollution

28. **Sound pollution** is generated by human activities including from roads, railways, aircraft, construction and factories. It can deter wildlife from living in certain areas and interrupt the communication of some species such as bats.

29. **Light pollution** at night is particularly problematic in Aylesbury, High Wycombe and other urban areas and along the M40. It deters some nocturnal species, particularly bats, from using these areas affecting the available foraging habitat to them.

30. **Waste, diffuse and point source pollution** can have direct impacts on watercourses and connected habitats. These pressures include isolated pollution incidents, agricultural surface water runoff, soil erosion, poor waste-water treatment (for example, septic tanks, sewage pollution due to storm tank overflow during heavy rainfall and when groundwater levels are high in some areas) and storage, and runoff from roads. Impacts include sedimentation of river gravels, eutrophication, reduction in water quality resulting in loss of in-channel plant and invertebrate diversity, and in extreme cases acute pollution can result in fish-kills.

31. **Particulates** are emitted from vehicles and road surfaces with dust emitted from construction and quarrying. Dust can land on nearby vegetation weakening or killing it. Particulates can affect the soil chemistry and alter species composition. Road verges are particularly at risk – where more resilient coarse grasses can out-compete native meadow flowers, affecting bees, butterflies and other pollinators, leading to reduced food and resources for invertebrates – and with cumulative impacts on birds and mammals. Nitrogen and sulphur oxides can damage lichen communities. Elsewhere, atmospheric nitrogen disposition on priority habitats can cause some species to dominate to the detriment of others, e.g. chalk grasslands[71].

[71] e.g. calcareous grassland https://www.apis.ac.uk/node/966

Non-Native Invasive Species, pests and diseases

32. Invasive species can outcompete native wildlife or destroy whole ecosystems often causing other costly impacts in the process. Diseases such as Ash die-back and Box moth blight threaten to remove entire species from the landscape and with it the associated specialist lichens, fungi and invertebrates. Reduced tree health can affect local air quality, flood risk, water quality and pollination, as well as the functioning of woodland ecosystems. There are many more tree and other diseases present and more expected in the coming years – for example, fungal diseases in Juniper.

33. High deer populations affect habitats, particularly woodland flora and tree regeneration. The numbers of non-native Muntjac, Fallow and Chinese water deer are increasing across the county, suggesting the need for landscape scale intervention. The expanding range of Edible Dormice also affects other ecosystems. Water Vole populations have been decimated by American Mink; and freshwater ecosystems have been affected by New Zealand Pygmyweed.

34. The Thames catchment has the highest number of non-native invasive freshwater species than any other part of the UK. The invasive signal crayfish is now present throughout the watercourses in our area, replacing the native white-clawed crayfish. Floating Pennywort grows in shallow margins of slow flowing water courses e.g. the Colne Valley, and forms a dense mat of vegetation. Similarly, Himalayan Balsam is affecting a number of riparian areas.

35. Further information on pressures, including detailed climate predictions for our area, specific habitats and species negatively affected by the pressures acting on nature in Buckinghamshire and Milton Keynes, and examples of how pressures can interact and act cumulatively, is available in the NEP's Biodiversity Action Plan, "Forward to 2030" Chapter 3, from page 60.

I Methodology statements

Methodology statements summarise how we have completed each step of the LNRS process in accordance with the guidance.

Our full combined range of methodology statements is available on the consultation portal, listed according to the LNRS process step.

Step 1 – Baseline Mapping methodology statement

Step 3 - Description of the strategy area and its biodiversity and opportunities for recovery - Methodology Statement

Step 4 – is covered by:

Stakeholder engagement methodology

Data analysis methodology: How we integrated data from the stakeholder engagement activities and surveys, local expert guidance, steering group, neighbouring and responsible authorities and others to shortlist the priorities and potential measures for nature recovery in Buckinghamshire and Milton Keynes.

Species shortlisting methodology: How the Species Technical group developed the species shortlist from the longlist.

Step 5 - Mapping methodology

J The area's current Biodiversity Action Plan (BAP)

The NEP's 2021 Biodiversity Action Plan, Forward to 2030, is a full appendix to the LNRS.

The BAP remains the key source of information relating to the area's priority habitats targets and its focus on action for priority habitats in Biodiversity Opportunity Areas (BOAs), and where that action should be focussed.

The location and objectives for the BOAs have been used to sense-check and inform (respectively) the LNRS local habitat map. BOAs are also included in measures in our shortlisted priorities and potential measures.

BOAs are acknowledged in Local Plans in Buckinghamshire and Milton Keynes, and the NEP oversees the BOA designation and approval process.

For further information about BOAs, see *Biodiversity Opportunity Areas (BOAs) – opportunity areas for recovery of priority habitat*s, above, Appendix *E, Priority habitats and BOAs – technical details and how used in LNRS mapping* and further detail on the NEP's website here: https://bucksmknep.co.uk/biodiversity-opportunity-areas/ .

K Existing Plans and Strategies

Plan / strategy topic area	Type of plan / strategy	Name of plan / strategy	Where captured in			How captured?			
			Description of nature	Priorities and measures	Mapping (if captured	Core group member review of	Expert input to description and priorities	Survey - for inclusion in Ps&Ms	Sought separate input
Water-related	Local flood-risk management plans	Bucks C Local Flood Risk Management Strategy		✓			✓	✓	
		MKCC Local Flood Risk Management Strategy. Available at: https://www.milton-keynes.gov.uk/flood-and-water-management/strategic-flood-risk-documents-0		✓			✓		
		NFM priority mapping (requested by only available for Thame catchment from EA)			✓				✓
		EA's internal catchment habitat restoration strategies (not published)	✓	✓			✓		
	River Basin Management Plans Anglian RBD Part 1 river basin management plan .pdf	https://www.gov.uk/guidance/thames-river-basin-district-river-basin-management-plan-updated-2022	✓	✓			✓	✓	
	Catchment plans	WFD catchment Planning System (EA)		✓			✓	✓	
		Catchment Habitat Restoration Strategies in Thames area Thames RBMP		✓				✓	
		Upper and Bedford Ouse Catchment Plans		✓				✓	
		Various catchment management plans (leads for Thame, ColneCan and Upper Ouse - draft LNRS description and mapping shared early Dec 24)	✓	✓			✓		
	Landscape restoration project (catchment)	Ock and Thame Farmers: Freshwaters and Floodplain Restoration Project https://freshwaterhabitats.org.uk/projects/ock-and-thame-farmers/		✓		✓	✓		
	Water company BAPs	Water Industry National Environment Programme (Anglian Water)		✓				✓	
		Thames Water BAP		✓				✓	
	Internal drainage board BAPs			✓				IDB completed the survey	
	Important Freshwater Areas	Important Freshwater Areas (FHT)			✓				

Plan / strategy topic area	Type of plan / strategy	Name of plan / strategy	Where captured in			How captured?			
			Description of nature	Priorities and measures	Mapping (if captured	Core group member review of	Expert input to description and priorities	Survey - for inclusion in Ps&Ms	Sought separate input from
GI Plans	Bucks GI strategy	Buckinghamshire GI Strategy April 2009		✓		✓			
	NEP's GI Vision and Principles (referred to in local plans)	Vision and Principles for the Imporvement of Green and Blue Infrastructure in Bucks and MK		✓		✓	✓		
Biodiversity	The NEP's BAP	Forward to 2030	✓	✓		✓	✓		
	LPA local ecological networks	- BBOWT Nature Recovery Network - BBOWT Living Landscape plans (unpublished)	✓	✓			✓		
	Species and protected site conservation strategies	Many came up in the survey - e.g. Burnham Beeches management plan (City of London Corporation) The Management Plan for the Chilterns National Landscape Anglian Water Water Industry National Environment Programme (for SSSIs) BBOWT "Wilder Strategic Plan 2021-26" (mentioned SSSIs) Chiltern Society Manifesto for Chilterns Wildlife	✓	✓		✓ (Chiltern Soc Manifesto only)		✓	
	Tree and woodland plans	Forestry Commission Strategy: Keepers of Time and Open Habitats Policy, NEOs, our FC Strategy Thriving for the Future 2023-28 and Forestry England's published woodland management plans including Bernwood's. Also the woodland creation pipeline. City of Trees and Milton Keynes CC Community Trees Milton Keynes The Soil Association (part of agroforestry scheme Bucks Tree Mission (part of its Climate Change and Air Quality Strategy)	✓ (FC)	✓			✓	✓	

Plan / strategy topic area	Type of plan / strategy	Name of plan / strategy	Where captured in			How captured?			
			Description of nature	Priorities and measures	Mapping (if captured	Core group member review of	Expert input to description and priorities	Survey - for inclusion in Ps&Ms	Sought separate input from
Natural Capital	NC reporting	NC report - Bucks and MK (2020 and 2021)	✓	✓		✓			
AONB Management Plan	Chilterns National Landscape	Management Plan for the Chilterns National Landscape	✓	✓			✓		
Local Plans	Local Plans	Plan:MK Vale of Aylesbury local Plan Wycombe Local Plan Chiltern&South Bucks Plans,	✓	✓			✓	✓	
	Minerals and Waste Plans	Buckinghamshire Minerals and Waste Local Plan 2016-36 Milton Keynes Minerals Local Plan 2017		✓		✓			
Climate change		National Trust Climate and Environment Policy Forestry Commission Strategy Chiltern Society Management Plan Bucks C Climate and Air Quality Plan		✓				✓	✓
Infrastructure projects		Green Corridor Prospectus - HS2 Milton Keynes CC City Plan		✓				✓	
Other		Big Chalk https://www.big-chalk.org	✓			✓	✓		

L National Environmental Objectives

The LNRS must ensure its priorities and potential measures contribute to a balanced range of National Environmental Objectives (NEOs). The NEOs that LNRS areas were asked to consider are replicated below.

Relevant national environmental objectives for Responsible Authorities to seek to contribute to when developing their Local Nature Recovery Strategy

Local nature recovery strategy statutory guidance sets out what responsible authorities should include in their local nature recovery strategy. Paragraph 57 of the statutory guidance states that the government will provide more detailed, up-to-date advice on the specific **national environmental objectives** which each local nature recovery strategy should contribute to, to supplement the examples in the statutory guidance. This advice is provided in the tables below.

This document has been developed solely for the purpose of helping responsible authorities prepare local nature recovery strategies. It draws upon the Government's Environmental Improvement Plan, which provides a more comprehensive overview of national environmental objectives. Responsible authorities should refer to the statutory guidance to understand how these national environmental objectives should be used in preparing their strategy.

National targets set under the Environment Act (2021)

Objective	How LNRSs can contribute
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	The purpose of LNRSs is to identify opportunities to create or improve habitat in locations where it would have the greatest benefit to biodiversity and the wider environment.
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 actions proposed in every LNRS should be designed to make a positive contribution to biodiversity, including species abundance, considering their habitat and connectivity requirements.
Biodiversity on land - reduce the risk of species' extinction by 2042, when compared to the risk of species' extinction in 2022	All LNRSs should include targeted habitat creation or improvement to support the recovery of the most threatened and near threatened species which are present.
Woodland cover - Increase total tree and woodland cover from	All LNRSs should seek to identify opportunities for new areas of woodland, expand existing areas of woodland and trees outside of woodland where this

14.5% of land area now to 16.5% by 2050	will benefit biodiversity and other environmental outcomes.
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	All LNRSs should seek to make a positive contribution to the water environment, including by limiting or mitigating nutrient and sediment pollution from agriculture, through the creation or improvement of habitat. For example, through creation of habitat along water courses to reduce the inflow of surface water carrying agricultural pollutants whilst also acting as wildlife corridors.

Key additional relevant commitment from the Environmental Improvement Plan (2023)

Objective	**How LNRSs can contribute**
Work to ensure that everyone in England lives within 15 minutes' walk of a green or blue space	All LNRSs should look for opportunities to contribute to improving public access when proposing actions to enhance biodiversity. This includes actively seeking to target actions and areas for nature recovery in Green Belts and other suitable areas near to people's homes (See paras 56 & 83 of the statutory guidance).
Restore approximately 280,000 hectares of peatland in England by 2050	All LNRSs in suitable upland and lowland parts of England should seek to identify locations for peat restoration and appropriate management.
Restore 75% of our water bodies to good ecological status	All LNRSs should seek to make a positive contribution to the water environment through the creation or improvement of habitat for biodiversity.
Protect 30% of land and of sea in the UK for nature's recovery by 2030	All LNRSs will identify opportunities to create and improve wildlife-rich habitat which could, where protection or agreements for ongoing management are in place, contribute to meeting the 30by30 goal. Responsible authorities should focus on National Parks and AONBs to help increase biodiversity in these existing protected areas.
Support farmers to create or restore 30,000 miles of hedgerows by 2037 and 45,000 miles of hedgerows by 2050	All LNRSs should seek to identify opportunities where the creation, restoration or connection of hedgerows would make a particular contribution to biodiversity or wider environmental outcomes.
Manage our woodlands for biodiversity, climate and sustainable forestry	All LNRSs should seek to identify opportunities to improve the management of existing areas of woodland for biodiversity and 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.	All LNRSs should seek to help improve the condition of SSSIs in their area by identifying opportunities for the creation or improvement of habitat in connected areas outside the SSSI boundary. For example, through action upstream of a wetland site to improve water quality. LNRSs may also propose actions on SSSIs themselves but should not duplicate or conflict with statutory requirements.
Ensure delivery & management of actions & policies that contribute towards our 25YEP goals are suitable & adaptive to a changing climate	All LNRSs should consider the anticipated impacts of climate change throughout their preparation to help biodiversity and the environment in their area adapt to future changes.
Make sure LNRSs include proposals for Nature-based Solutions which improve flood risk management where appropriate	All LNRSs should seek to identify opportunities and suitable locations for undertaking natural flood management through the creation or improvement of habitat for biodiversity
Achieve Good Environmental Status for our seas	Coastal LNRSs should seek opportunities to create or improve habitat at the coast or in the inter-tidal zone that would benefit the marine or coastal environment. For example, through the creation of saltmarsh in suitable areas. Wider actions to improve water quality in rivers will also benefit estuarine and marine habitats downstream.
Reduce emissions of nitrogen oxides by 73% and ammonia by 16% by 2030 relative to 2005 levels	LNRSs should consider opportunities for targeted creation or improvement of nitrogen-tolerant habitats for biodiversity that can buffer or shield more nitrogen sensitive habitats from significant nitrogen sources. For example, planting of tree shelter belts.
Reducing the rates of introduction and establishment of invasive nonnative species by at least 50%, by 2030	Restoration of habitats may sometimes involve the removal of invasive non-native species. Delivery of actions proposed should be mindful of the risks of introducing or enabling the spread of non-native species. For example, by appropriate sourcing of tree saplings.

M Species Mapping including Target Areas

The species mapping target areas table is available on the consultation portal .

N Species Shortlist and niches

The species shortlist is available on the consultation portal.

The species niches document is available on the consultation portal.

O Our Shortlisted Priorities and Measures

Our shortlisted Priorities and Measures document is available on the consultation portal.

There are 9 **Themes**.

Under each Theme is a list of shortlisted **Priorities**. A priority is a key outcome to achieve in Buckinghamshire and Milton Keynes. There are 22 Priorities in total. Underneath each priority, you will see text which details any wider benefits which could be delivered by achieving each relevant priority.

Under each Priority is a set of supporting **Measures** - Measures are the actions that are recommended to be taken to achieve the priorities.

The table highlights which of the measures are **mapped** on our LNRS mapping tool and which are **unmapped**. There is an online tutorial on the mapping tool to guide you through how to turn on mapped measures. It should also be noted that one measure can contribute to multiple priorities.

Measures are shown to be either direct or supporting. **Direct measures** relate to on-the-ground actions for a habitat, species, or wider environmental benefits; **Supporting measures** are indirect actions deemed necessary presented for context - e.g. raising awareness.

The mapping has been produced utilising the latest and best available data, however specific actions will always need sense checking in relation to actual conditions on site i.e. ground, soil and topographical conditions to ensure that the right habitat is being created in the right place.

P Glossary

Ancient trees – a tree that has passed the peak of maturity and is old in comparison with other trees of the same species (Woodland Trust). For further information see: What are ancient trees

Biodiversity – short for biological diversity — is the variety of all living things and their interactions.

Biodiversity Opportunity Areas (BOAs) - The area's Biodiversity Opportunity Areas were identified in the local Biodiversity Action Plan. BOAs are regionally-important area of opportunity for the creation and restoration of priority species – and are the most important areas for biodiversity. They represent the key locations across Buckinghamshire and Milton Keynes where the greatest opportunities for habitat creation and restoration lie, and act as the basis for an ecological network. (See *Appendix E Priority habitats and BOAs – technical details and how used in LNRS mapping*J. Further information about BOAs is available on the NEP's website here: Biodiversity Opportunity Areas – Buckinghamshire & Milton Keynes Natural Environment Partnership

Co-benefits – The positive effects that a measure may have on other objectives, such as health, or public access.

Core Group – Part of the LNRS Governance Structure, this was a group comprising representation from the NEP, both councils and Natural England, to over see the day-to-day running of the LNRS creation process, and which met initially twice per month for most of 2023, and then weekly, to review more detailed progress and take on key tasks as well as finalise decisions based on Steering Group input.

Designated sites – Certain areas receive a level of protection, including in the planning system, due to their importance for biodiversity. The types of sites with these protections relevant to the LNRS area are:

Special Areas of Conservation
SACs are protected sites designated under the EU 'Habitats Directive' (habitats and species) to conserve habitats and species other than birds that are important in their own right.

Special Protection Area (SPA) SPAs are special sites designated under the EU 'Birds Directive' to protect rare, vulnerable and migratory wild birds and their habitats

Sites of Special Scientific Interest (SSSIs) The statutory nature conservation agencies have a duty under the Wildlife and Countryside Act 1981, as amended, to notify any area of land which in their opinion is 'of special interest by reason of any of its flora,

fauna, or geological or physiographical features'. Such areas are known as Sites of Special Scientific Interest (SSSIs)

National Nature Reserves (NNRs) – are designated under the National Parks and Access to the Countryside Act 1949 and were established to protect important habitats, species and geology, and to provide 'outdoor laboratories' for research.

Direct measure (in the LNRS) – Direct measures relate to on-the-ground actions for a habitat, species, or wider environmental benefits.

Green Infrastructure – A network of multi-functional green space and other green features, urban and rural, which can deliver quality of life and environmental benefits for communities (Town and Country Planning Association definition. Available at: What is Green Infrastructure? - Town and Country Planning Association)

Local Nature Recovery Strategy – Local Nature Recovery Strategies are a new, England-wide system of spatial strategies that will establish priorities and map proposals for specific actions to drive nature's recovery and provide wider environmental benefits.

Local Nature Reserves – Local Nature Reserves (LNS) a statutory designation made by principal local authorities to places with wildlife or geological features of special interest locally.

Local Wildlife Sites – Local Wildlife Sites (LWS) are areas selected locally for their nature conservation value based on important, distinctive and threatened habitats and species within a national, regional and local context. It is a non-statutory designation that recognises high quality wildlife habitats.

Lowland mixed deciduous woodland – Lowland mixed deciduous woodland includes woodland growing on the full range of soil conditions, from very acidic to base-rich, and takes in most semi-natural woodland in southern and eastern England. It includes stands of both native and non-native broadleaved tree species, as well as yew.

Measure (in the LNRS) – Measures are the actions that are recommended to achieve the priorities. They may or may not be geographically specific. Potential measures are "specific practical actions to achieve" priorities (LNRS statutory guidance, paragraph 51). These are the suggested activities that, if done properly, would help to deliver the agreed priorities. They can benefit a particular species or habitat or provide wider environmental benefits (nature-based solutions).

Mapped measure (in the LNRS) – Mapped measures are the measures that directly relate to habitats and species and wider environmental benefits, and for which a defined, or targeted, area can be identified, where significant uplift in biodiversity is possible.

Non-mapped measure – Measures that directly relate to habitats and species and wider environmental benefits within the LNRS for which are not targeted at a specific geography

Opportunities – The possibilities for recovering or enhancing habitats and species, including those considered locally or nationally important, to achieve an increase in biodiversity and the provision of ecosystem services that may be of value to those who live and work in the area.

Native species – A species that is within its known natural range, and occurs naturally in a given area or habitat, as opposed to an introduced species or invasive species.

Non-native species – Species that do not occur naturally in an area, but are introduced as the result of deliberate or accidental human activities.

Parkland – Designed landscapes from large estates, traditionally managed through grazing.

Priority Habitat – (For priority habitat descriptions, see UK Biodiversity Action Plan: Priority Habitat Descriptions (Updated December 2011)

Priority (in the LNRS) – Priorities are shortlisted opportunities based on stakeholder feedback. Priorities are "the end results that the strategy is seeking to achieve" (LNRS statutory guidance, paragraph 51).

Responsible Authority – The organisation appointed by the Secretary of State for Environment, Food and Rural Affairs for leading the preparation of its area's Local Nature Recovery Strategy. There are 48 covering England, with no gaps or overlaps.

Sites of Special Scientific Interest (SSSIs) – The statutory nature conservation agencies have a duty under the Wildlife and Countryside Act 1981, as amended, to notify any area of land which in their opinion is 'of special interest by reason of any of its flora, fauna, or geological or physiographical features'. Such areas are known as Sites of Special Scientific Interest (SSSIs).

Special Areas of Conservation (SACs) – SACs are protected sites designated under the EU 'Habitats Directive' (habitats and species) to conserve habitats and species other than birds that are important in their own right.

Special Protection Area (SPA) – SPAs are special sites designated under the EU 'Birds Directive' to protect rare, vulnerable and migratory wild birds and their habitats

Steering Group – Part of the local LNRS governance structure – a group of individuals from representative organisations that agreed a Charter of conduct, and met at least monthly, to oversee progress and provide a steer on key decisions. Steering Group organisations are listed in *the Acknowledgements – from the Responsible Authority, Buckinghamshire Council*

Supporting Authority – Other local planning authorities in the Strategy area (Milton Keynes City Council in the case of this LNRS area) and Natural England.

Supporting measure (in the LNRS) – Supporting measures are indirect actions deemed necessary presented for context -– e.g. raising awareness,

Veteran trees – A tree with habitat features such as wounds or decay. Often used interchangeably with ancient tree, but does not always develop ancient tree features as a result of age, but as a consequence of its life or environment. Ancient veterans are ancient trees; but not all veterans are old enough to be ancient. (Woodland Trust) For further information, see: What are ancient, veteran and other trees of special interest?

Wood pasture – Wood pasture is land that has been managed through grazing. They can be ancient, or of more recent origin. Some started as medieval hunting forests or wooded commons, and others are the designed landscapes from large estates.

Wider Environmental Benefits – Benefits to address wider environmental issues affecting the strategy area which changes in land use or management could help to address – for example improvements to the water environment, flood risk management, or climate mitigation and adaptation.

Q List of Figures

*Figures within the Technical Appendices not listed.