



Bedfordshire's Local Nature Recovery Strategy

Central Bedfordshire



BEDFORD
BOROUGH COUNCIL

Luton



Bedfordshire
Local Nature
Partnership

Bedfordshire's Local Nature Recovery Strategy



Foreword

Bedfordshire's diverse landscape of rolling chalk hills in the Chilterns, the sandy soils of the Greensand Ridge, the Great Ouse River Valley and the ancient woodlands in the north of the county are home to a fantastic range of habitats and species. Bedfordshire is one of the smallest counties in England but is home to heathland, wetlands, peatlands and chalk habitats along with rare species such as adders, dormice and Duke of Burgundy butterfly.

The natural environment is vital for the health and wellbeing of people and communities and for environmentally sustainable economic growth. Protecting and enhancing existing biodiversity and creating new habitats is as much for people as it is for its own intrinsic value. People rely on clean water and air, insects that pollinate and habitats and land management practices that reduce the impacts of a changing climate. But the natural environment is under considerable pressure with the population of many species declining.

The UK is one of the most nature-deprived countries in the world and within it, Bedfordshire is one of the most nature-deprived counties. The natural environment within Bedfordshire needs to be restored, protected and enhanced with new wildlife-rich areas created.

Local Nature Recovery Strategies are one part of the Government's Environment Improvement Plan seeking to improve the natural environment. They aim to connect and enhance the most important sites for nature by making them bigger, better and more joined up. This will help species connect across landscapes to become more resilient to the challenges of climate change and development.

The Bedfordshire Local Nature Recovery Strategy focusses on nature recovery priorities identified by local stakeholders. Many stakeholders have had an input into the development of the strategy.

It is importantly a strategy for all Bedfordshire, led by Central Bedfordshire Council in conjunction with Bedford Borough Council and Luton Borough Council. The Bedfordshire Local Nature Partnership, in addition to supporting its development, comprised the steering group for the work.

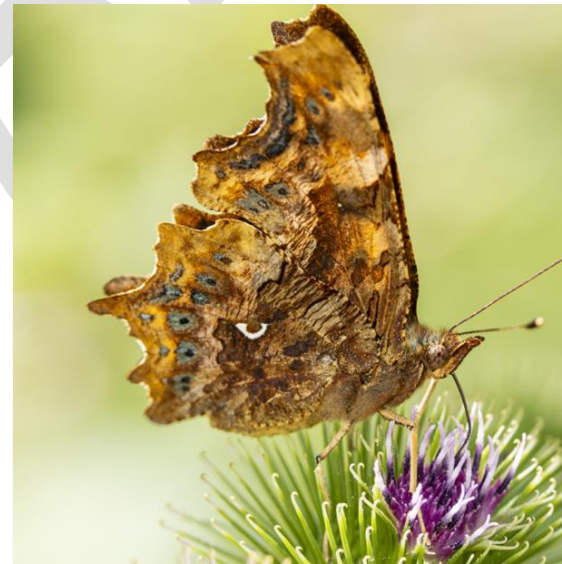
This strategy could not have been developed without the knowledge and input of dedicated land managers, farmers, environmental organisations and communities who have already delivered vital work for nature. But collectively more needs to be done.

Dr Paul Leinster CBE

Chair Bedfordshire Local Nature Partnership

Vision

A county where nature is thriving, connected and resilient - benefiting people, and our economy. We want nature recovery to be at the heart of how we plan, build, farm and live.



Executive Summary

Bedfordshire's natural environment is one of its greatest strengths. It provides natural resources that are important for health and wellbeing, helps build strong communities, and supports the local economy. However, the environment is facing more pressure from development, warming climate and many other challenges. Bedfordshire is in the middle of a biodiversity and climate crisis, and these two issues are closely connected and action is needed now.

Nature is essential for tackling climate change, improving health and supporting economies, so there is a need to focus on restoring and protecting nature. It is urgent that action is taken quickly and in new ways if we are to stand any chance of recovering nature.

Local Nature Recovery Strategies (LNRS) are new plans that are a key part of the government's Environmental Improvement Plan. These plans aim to create a bigger, better and connected network of wildlife habitats across England.

LNRS focus on the most important actions needed to protect nature in Bedfordshire and help meet national goals for nature recovery. The document explains what the natural environment of Bedfordshire is like, how it has been shaped by both people and wildlife over time, and the challenges it faces. It also highlights the value of nature in Bedfordshire for local communities and the economy. A healthy environment helps reduce flood risks, provides clean air, pollination, and spaces for people to enjoy, which benefits both physical and mental health.

The strategy includes opportunities for nature recovery and how to restore some of Bedfordshire's most valuable habitats and species. Bedfordshire has a variety of habitats, including heathland, grasslands, ancient woodlands, and chalk streams.

The strategy has two main parts: a **Statement of Biodiversity Priorities** and a **Local Habitat Map**. The statement explains what the strategy aims to achieve, based on input from local stakeholders and other plans. It also details how to make these goals happen with real actions on the ground. The Local Habitat Map shows where the actions and goals can be put into practice.

The success of the strategy depends on the involvement of many different groups, including farmers, landowners, conservation organizations, local authorities, and communities. These groups will work together to decide how and where nature recovery should happen and how to make the most of national funding programs.



Contents

1	Introduction to Local Nature Recovery Strategies (LNRS)	6	4.1	Nature based solutions	30
1.1	Why nature matters	6	4.2	Natural Capital	30
1.2	State of nature in the UK	6	4.3	Ecosystem Services	31
1.3	Purpose of Local Nature Recovery Strategies	6	4.4	Managing and restoring habitats	32
1.4	Strategy area and local authority boundaries	7	5	Statement of Biodiversity Priorities	34
1.5	Nature Recovery Network	8	5.1	National Environmental Objectives (NEO)	34
1.6	How to use the strategy	9	5.2	Structure of the Statement of Biodiversity Priorities	35
1.7	Key Audiences	9	5.3	Local Wildlife Sites	36
1.8	Local Habitat Map	10	5.4	Woodlands and Trees	37
2	Area Description – Nature, People and Landscape	14	5.5	Farmland and Hedgerows	44
2.1	Overview	14	5.6	Neutral and Calcareous Grassland	49
2.2	Protected Areas	14	5.7	Lowland Heathland and Acid Grassland	53
2.3	Land use change over time	16	5.8	Rivers, wetlands and ponds	56
2.4	Character Areas	16	5.9	Built up areas and developed land	65
2.5	North Bedfordshire Wolds	17	5.10	Priority species	69
2.6	Great Ouse Valley	17	5.11	Species Assemblages	69
2.7	Marston Vale	19	5.12	Individual priority species	73
2.8	Greensand Ridge	20	6	Delivering and monitoring the strategy's outcomes	85
2.9	Clay Hills, Valleys and Vales	22	6.1	Legally Based Uses of LNRSs	85
2.10	South Bedfordshire Chalk	23	6.2	Other Uses of LNRSs	85
3	Pressures on nature in Bedfordshire	26	6.3	Surveying and Monitoring	87
3.1	Pressures on the natural environment	26	7	References	88
3.2	The impacts of Climate Change	28	8	APPENDICES	91
4	Working with nature	30			



Introduction to Local Nature Recovery Strategies



Bedfordshire's Local Nature Recovery Strategy



1 Introduction to Local Nature Recovery Strategies (LNRS)

1.1 Why nature matters

Nature underpins people's existence. It provides the clean water, fresh air and healthy soils everyone needs. By working with natural processes, the risks of flooding can be reduced, carbon captured, and agricultural pests reduced. Everyone can benefit from being more connected with nature, and spending time in the natural environment is good for people's mental and physical health (Lamont & Hinson, 2024).

However, the natural world is under increasing pressure and action is needed now to enable its recovery. There is a climate and biodiversity emergency. These two are inextricably linked and the impacts can be seen all around. Increasing global temperatures are impacting on the UK environment causing more flooding, wildfires and droughts. At the same time, the nature relied on to mitigate many of these impacts is being lost.

As a result, many of the familiar and rarer species and habitats are disappearing from the landscape. Over half of the UK's species are now declining. England is now one of the most nature-depleted countries in the world (NHM, 2021) and within this context Bedfordshire is one of the most impacted areas.

1.2 State of nature in the UK

The 2023 State of Nature Report - the product of a collaboration of environmental organisations, academic institutions and government agencies – highlights the serious decline in the UK's wildlife over recent

decades. It provides a comprehensive overview of species trends throughout the UK. In England, wildlife has declined in abundance by 32% on average since 1970. More than half of plant species assessed have seen decreases in distribution. Of the 8,840 species in England that have been assessed using International Union for the Conservation of Nature (IUCN Regional Red List criteria)¹, 13% have been classified as threatened with extinction from Great Britain. (State of Nature, 2023)

1.2.1 What has caused the decline in nature

Evidence has shown that the main causes of biodiversity decline over the last 50 years are significant changes in land management and climate change (State of Nature, 2023). These are having the greatest impacts on England's wildlife with additional impacts from water pollution, invasive non-native species and development. But this decline in nature can be stopped, and with the necessary support, recovered.

1.3 Purpose of Local Nature Recovery Strategies

The Government has set out its aims for nature recovery within the 25 Year Environment Plan published in 2018, revised in the subsequent Environment Improvement Plan (EIP)². These plans and the accompanying Environment Act 2021 legislation set out the requirements for Local Nature Recovery Strategies.

For many years, safeguarding the most important sites has been the cornerstone of nature conservation in England. LNRS aim to actively restore and revitalise natural systems, allowing nature to flourish outside of these areas too. LNRS bring together a wide range of stakeholders to set priorities for local nature recovery and identify the best locations to deliver actions on the ground.

¹ IUCN Red List of Threatened Species <https://www.iucnredlist.org/en>

² The EIP is being reviewed by the incoming Labour government 2024.

There will be 48 LNRS across England, creating a network of habitats across the country going beyond administrative borders. Each LNRS should look within its county but also beyond its borders to contribute to the ambition of a Nature Recovery Network. This Nature Recovery Network expands and joins up the most valuable terrestrial and freshwater sites for wildlife conservation.

These strategies are an important driver for delivering change for nature. They will guide and work alongside other mechanisms such as the Environmental Land Management Scheme (ELMS), Biodiversity Net Gain (BNG), River Basin Management Plans (RBMP) and Local Development Plans. The government is committed to reviewing Local Nature Recovery Strategies 3-10 years after they are completed.

1.3.1 What it includes and how it has been produced

The government have appointed Responsible Authorities to lead on the development of each county's LNRS – 48 in total across England. Central Bedfordshire Council is the Responsible Authority for Bedfordshire, working with the Supporting Authorities of Luton Borough Council, Bedford Borough Council and Natural England and alongside a wide range of other stakeholders, including the Bedfordshire Local Nature Partnership which constitutes the steering group for the LNRS, land managers and farmers and local town and parish councils.

Responsible Authorities must follow the regulations set out in the Environment (Local Nature Recovery Strategies) (Procedure) Regulations 2023. These strategies must include:

- An area description – describing the important natural and landscape features of the county and opportunities for recovery.
- A Statement of Biodiversity Priorities – what the strategy is seeking to achieve and how these could be delivered.
- A Local Habitat Map - including the most valuable existing sites for nature and opportunity areas where habitats can be created and expanded.

1.4 Strategy area and local authority boundaries

Bedfordshire covers an area of 1,235 km² and has a population of approximate 710,000. There are 3 unitary authorities within Bedfordshire (*figure 1*). Central Bedfordshire has a population of 294,300, Bedford Borough 189,900 and Luton Borough 225,300 (Office for National Statistic, 2021).

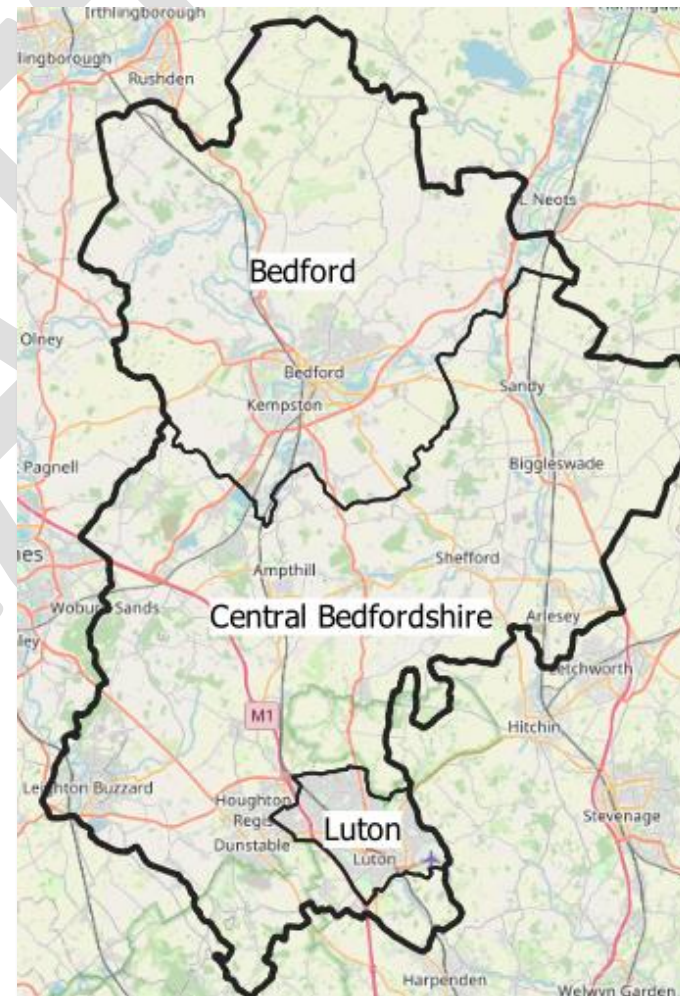


Figure 1– map showing the three local authorities within Bedfordshire

1.5 Nature Recovery Network

The focus of LNRS is to identify actions and locations that provide the greatest benefit for nature and the wider environment. They seek to identify where habitats can be created, restored and linked – following the principles of more, bigger, better and more joined up, as set out in the Lawton review (Lawton, et al., 2010) to help species recovery. This is represented in *figure 2* below.

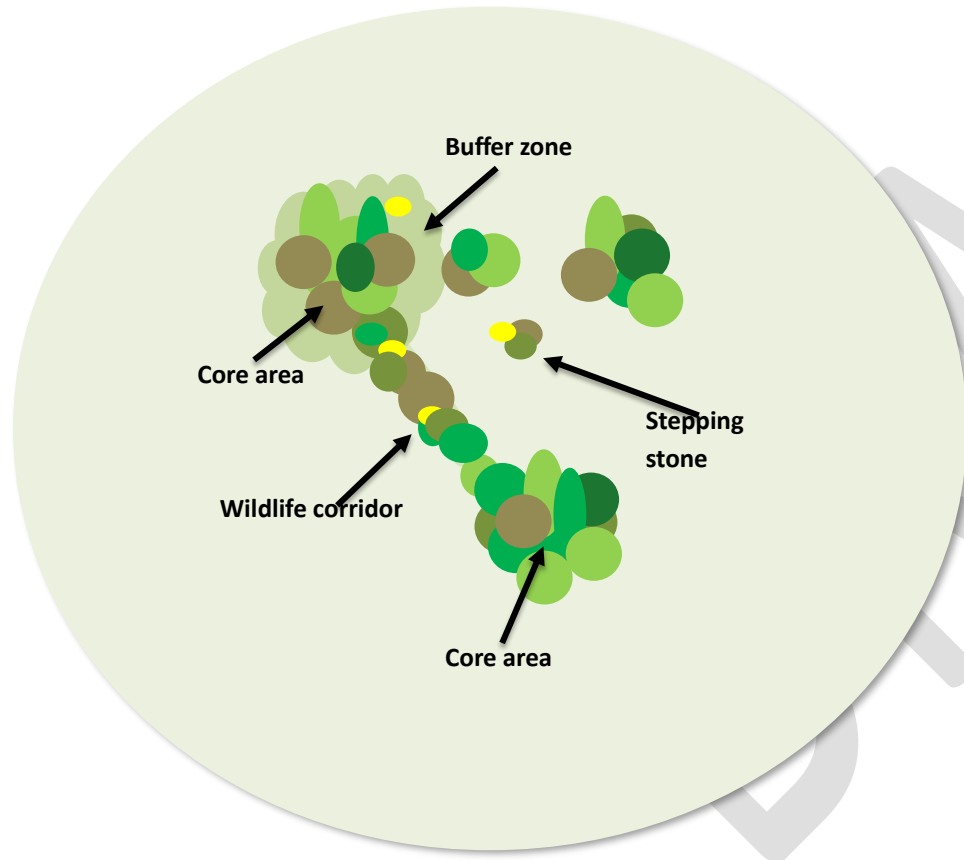


Figure 2 - The components of ecological networks (Lawton, et al., 2010)

Habitat creation through the LNRS seeks to improve, expand and link up these existing important sites for nature. This includes existing protected sites, areas of priority habitat and any locations where nature recovery can be delivered.

1.5.1 Steps in developing the strategy³

The Government published statutory guidance to direct responsible authorities in the development of each strategy. This guidance sets out 5 steps to follow. These are set out below in *Figure 3*. Step 2 in this guidance is not required as part of the development of this initial LNRS but will be part of the review process for future LNRS.

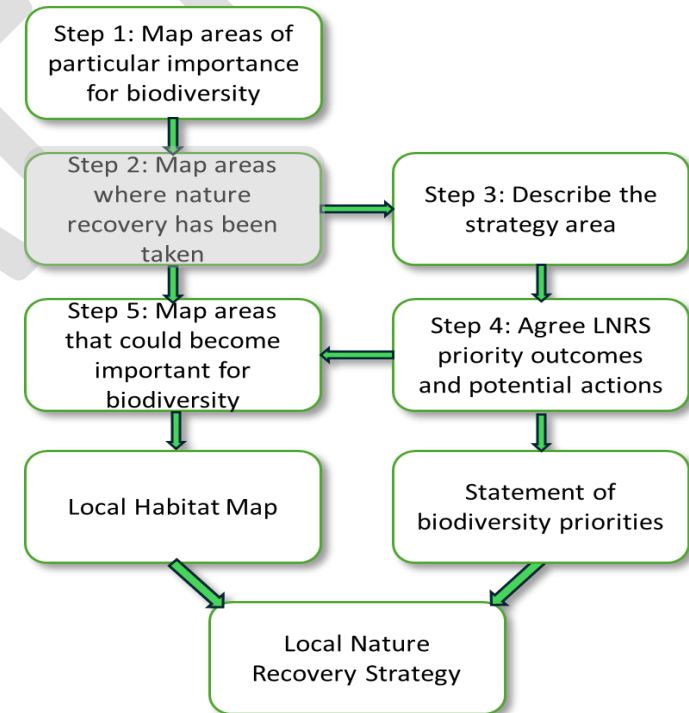


Figure 3– Defra statutory guidance on the proposed method of production.

³ Government published statutory guidance for Responsible Authorities in Spring 2023. [Local nature recovery strategy: what to include - GOV.UK](https://www.gov.uk/government/publications/local-nature-recovery-strategy-what-to-include)

1.6 How to use the strategy

This strategy is for anyone with an interest in or opportunity to support nature's recovery in Bedfordshire. It sets out a range of measures that will help nature recover and where to carry them out. This strategy provides a guide to protect and enhance species and habitats and enables collaboration with others to deliver more for nature.

Figure 4 sets out the steps those using the strategy could follow to identify the priority nature recovery measures and locations to deliver them. Linking the most important measures for local nature recovery with the locations where they are best delivered is central to the LNRS.

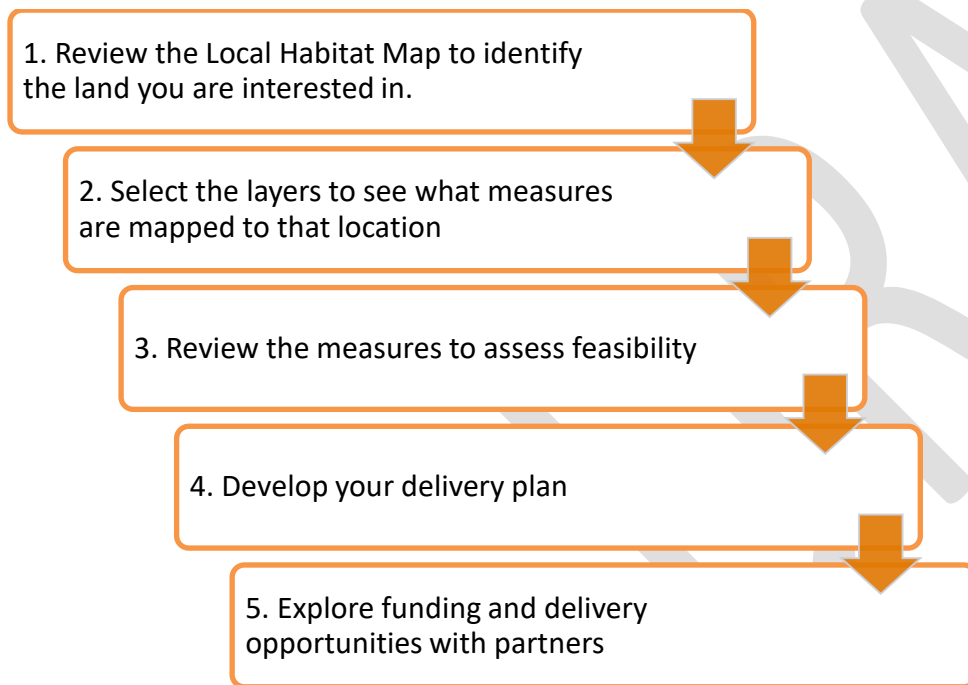


Figure 4– step by step process in getting the most from the strategy

1.7 Key Audiences

1.7.1 Farmers, land managers and land agents

Approximately 65% of Bedfordshire is farmed in some way. Many farmers and land managers are already delivering actions for wildlife on their land. This strategy aims to build on this work by guiding decision making with nature in mind.

The LNRS itself will not dictate what is done on their land. It is a strategy to help inform future nature recovery. The opportunity areas for nature recovery aid decision making by identifying what actions will deliver the most for nature in different parts of Bedfordshire. Working with nature provides a range of benefits from pollination to soil quality. Farmers and land managers are therefore encouraged to engage with and use the LNRS.

1.7.2 Conservation organisations

Conservation organisations including the Bedfordshire, Cambridgeshire and Northamptonshire Wildlife Trust (WTBCN), the Forest of Marston Vale Trust, the Greensand Trust, National Trust and Woodland Trust have extensive knowledge of the needs of wildlife and how nature recovery can be delivered. This has helped to develop the strategy. Bringing this information together provides a strategic view of how land could be managed for nature. Several of these organisations own and/or manage land for nature conservation in Bedfordshire and are driven by strategies that include nature recovery-related objectives. As managers of many of Bedfordshire's most important sites for nature, the LNRS can help expand and link these habitats making them more resilient.

1.7.3 Local authorities and government agencies

Local authorities and government agencies have a vital role in helping nature recover as policy makers, planning authorities and land managers. In England, all local authorities must consider what they can do to

conserve and enhance biodiversity. This is the ‘biodiversity duty’ that the Environment Act 2021 introduces.

Local authorities must take account of Local Nature Recovery Strategies when developing local policies, plans and investment and making planning decisions. They must consider how these strategies may affect local authority owned or managed land, or actions they could take to conserve and enhance biodiversity.

Government agencies are also landowners. Forestry England and Natural England both manage sites within Bedfordshire.

1.7.4 Local communities and town and parish councils

Everyone can make a difference for nature and provide places for wildlife, whether in urban or rural locations. Local communities are some of the most passionate advocates for supporting wildlife locally and stewarding their land for nature.

This strategy aims to provide guidance on what opportunities may be available on the land they manage. In particular, practical on the ground actions that could contribute to nature’s recovery.

1.8 Local Habitat Map

The Local Habitat Map represents the mapping part of the LNRS and should be viewed in conjunction with this document. It consists of three main elements.

- Areas of particular importance for biodiversity (APIB)
- Mapped measures
- Areas that could become important for biodiversity (ACB)

1.8.1 Areas of Particular Importance for Biodiversity

The first element is the “Areas of Particular Importance for Biodiversity” (APIB). The APIB are sites that either receive statutory protection including

Sites of Special Scientific Interest (SSSI) and National and Local Nature Reserves or are locally important sites such as Local Wildlife Sites and irreplaceable habitat.

Local Wildlife Sites (LWS) are currently included within the online mapping platform but will only appear at 1:150000 scale or above. This is due to licencing issues. They are considered an APIB and are included in the APIB Map in *figure 5* below. For full details of Local Wildlife Sites including locations, contact the Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC) brmc@bedsbionet.org.uk - 01234 362777

1.8.2 Mapped Measures and Areas that could become important for biodiversity (ACB)

The second and third elements show locations that provide the best opportunity to deliver the measures set out in *Section 5 Statement of Biodiversity Priorities*. These measures are practical actions that would contribute towards nature recovery. They focus on both maintaining and improving existing habitat and creating new places for nature to thrive. ACBs (shown in *figure 6*) are areas where measures are mapped outside of APIBs.

Not all priority outcomes and measures have been mapped due to either a lack of data, the datasets are too broad or there are concerns that the mapping may misrepresent the on-the-ground management.

To view the Local Habitat Map visit

<https://bedslocalnaturerecoverystrategy.commonplace.is/>

1.8.3 Local knowledge and ground-truthing

Local knowledge is paramount to ensuring successful delivery. The strategy provides an overview of the potential actions for nature and opportunity areas to deliver them based on the best information available. It provides guidance for farmers, land managers, local authorities and communities to make informed decisions and consider how these might work on the land

they care for. It is important that any proposal is ground-truthed using qualified specialists along with local knowledge from those who know the land best. This is crucial for the subsequent detailed planning required to put the measures in place.

1.8.4 What it means if land is mapped in the Local Habitat Map

The mapped measures shown in the Local Habitat Map have been developed from a range of sources including existing habitat, soil types and stakeholder input (*see appendix C – Bedfordshire LNRS Mapping Methodology*). The LNRS does not impose any requirements on the land that has been identified or compel land managers to deliver the measures. They have been developed to help inform land management choices for nature recovery.

Areas within the map do not receive any additional statutory protection and will still require any relevant permits or planning permission and must meet any other requirements such as landscape character and protected historic sites.

The LNRS also aims to direct habitat creation required through Biodiversity Net Gain (BNG)⁴. Where developers are required to deliver BNG then they will receive an ‘uplift’ if they deliver this in areas where measures have been mapped.

1.8.5 Locations with more than one mapped measure

There are areas within the map where different measures cross over. These measures are complimentary and can be delivered together. For example, in parkland this could include managing mature trees as part of wood pasture measures along with managing neutral grassland to maintain the open areas.

1.8.6 Areas of Bedfordshire without measures – ‘white space’

While the Local Habitat Map provides focused areas, many of the mapped or unmapped measures could be delivered outside these areas and would still contribute significantly to nature recovery. Therefore, it is important action is taken wherever there is an opportunity to do so. For example, hedgerow planting or management could link together woodlands in rural areas or border green spaces in urban locations.

⁴ BNG is an approach to development. It makes sure that habitats for wildlife are left in a measurably better state than they were before the development. Developers must deliver a BNG of 10%. This means a development will result in more or better-quality natural habitat than there was before development. www.gov.uk/guidance/biodiversity-net-gain

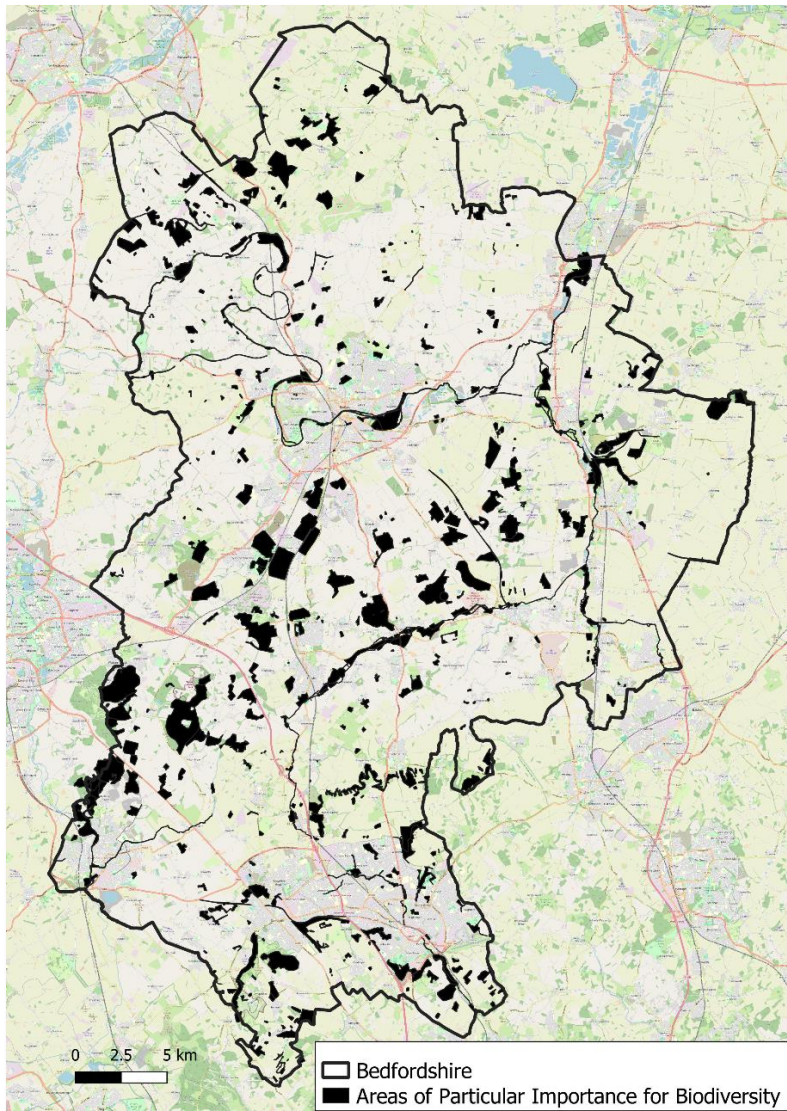


Figure 5 - Map showing the Areas of Particular Importance in black with the Bedfordshire Boundary. ©Crown Copyright and database rights 2023. Ordnance Survey AC0000806481 Bedford Borough Council and AC0000851074 Central Bedfordshire Council and AC0000808846 Luton Borough Council. Contains public section information under the Open Government Licence v3.0

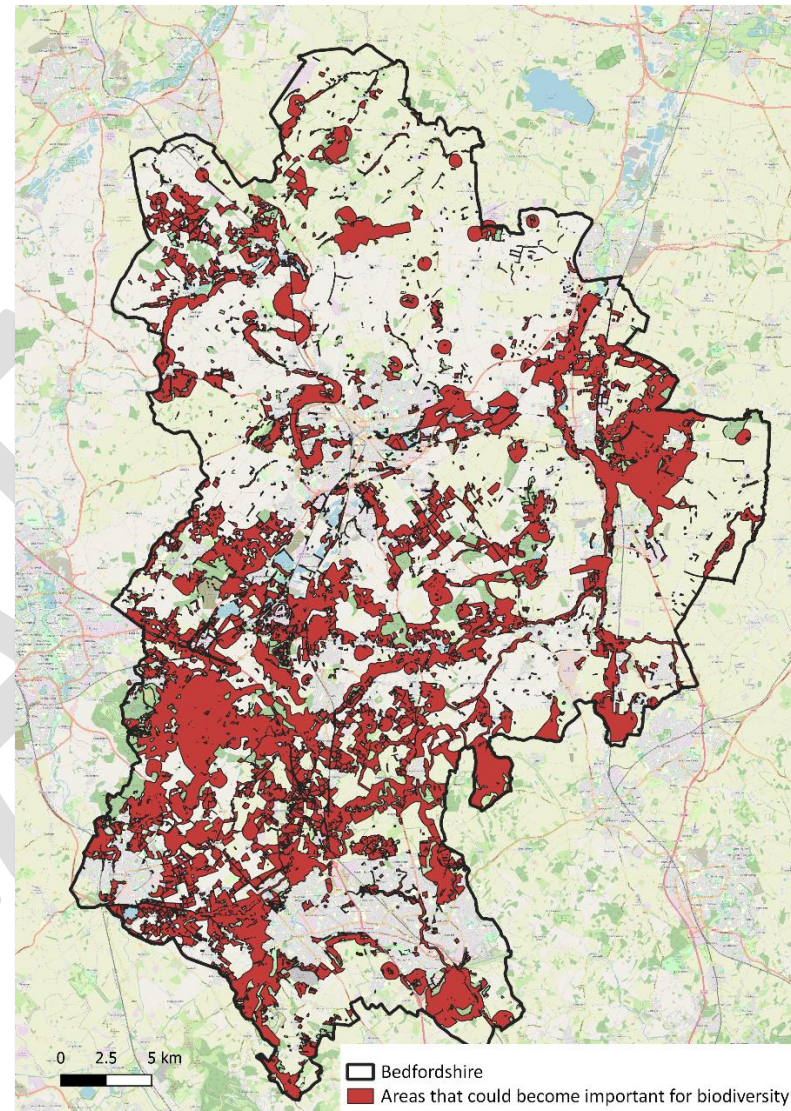


Figure 6 - Map showing the Areas that could become important for biodiversity in red. ©Crown Copyright and database rights 2023. Ordnance Survey AC0000806481 Bedford Borough Council and AC0000851074 Central Bedfordshire Council and AC0000808846 Luton Borough Council. Contains public section information under the Open Government Licence v3.0



**Area Description Nature,
People and Landscape**



2 Area Description – Nature, People and Landscape

2.1 Overview

Located in the East of England region, Bedfordshire is one of the country's smallest counties, covering an area of approximately 1,235km². Bedfordshire's diverse nature and landscape is influenced heavily by the underlying geology as well as having been shaped by man's interaction with the landscape in both the past and present.

The habitats in Bedfordshire have changed significantly over recent decades. Habitat loss, agricultural intensification, industrial usage, housing, infrastructure and water, air and light pollution have resulted in a very fragmented network of remaining sites. The wildlife rich areas, particularly in the Greensand Ridge and the Chilterns, also suffer from significant recreational pressure (Beds LNP, 2015).

There are significant heritage sites and evidence of historic land management, linked to many of Bedfordshire's habitats. Tools dating back to the Palaeolithic era have been found in the county (Bedfordshire Archives, n.d.). The combination of geology and heritage shape the habitats and species found in Bedfordshire today.

The county is divided into the 3 administrative areas of Bedford Borough Council, Luton Borough Council and Central Bedfordshire Council, with major infrastructure such as Luton Airport, M1 motorway and major roads such as the A1. In addition, attractions including Centre Parcs, Whipsnade Zoo and Woburn Safari Park draw in millions of visitors a year but also provide benefits for wildlife. Bedfordshire is home to over 700,000 people and many more commuters and visitors.

2.2 Protected Areas

The UK has many different types of statutory and non-statutory protected areas. This includes international, European, UK and locally designated areas with different levels of protection.⁵

Bedfordshire has one of the lowest proportions of nationally protected habitat in England as shown in *figure 7*. Around 346 ha are designated as Local Nature Reserves in Bedfordshire (0.28% of the total land area). A further 173 ha (0.14%) of land designated as National Nature Reserves and 1,374 ha (1.11%) designated as Sites of Special Scientific Interest (SSSI). This is well below the national average for SSSI coverage (8.1%) (England, Natural England Standards, 2015).

In contrast, Bedfordshire has a high number and coverage of Local Wildlife Sites. These sites do not receive statutory protection but can be some of the best for wildlife in the county. There are 415 County Wildlife Sites (also known as Local Wildlife Sites) covering around 7% of the county. More than the national average (5% coverage) in England as a whole (The Wildlife Trust, 2016) and 35 Roadside Nature Reserves. 56% are in positive conservation management (Defra, 2024).

Some of these designations overlap but the total amount of land receiving some level of protection amounts to 7,490 ha, or 6.06% of the total area of Bedfordshire (Bedfordshire Recording and Monitoring Centre, 2024).

In addition, 6,365 ha (5.15%) of the Chilterns National Landscape falls within Bedfordshire.

⁵ Further information about the status of protected sites is available from the Wildlife Trust [Protected areas | The Wildlife Trusts](#)

National statutory protected sites		
	Bedfordshire	England
SSSI	42 (1.11%)	4100 (8.1%)
NNR	3 (0.14%)	221 (0.8%)
Local statutory protected sites		
LNR	20 (0.28%)	1720 (0.3%)
Local non-statutory sites		
Local Wildlife Site (County Wildlife Sites)	415 (7%)	43,000 (5%)

Figure 7 - Number of protected sites in Bedfordshire compared to England as a whole. (x%) indicates percentage of land cover from designation.

In addition, the condition of these protected sites is assessed. Just over half of the units⁶ within the nationally important SSSIs are in favourable condition as shown in figure 8 below.

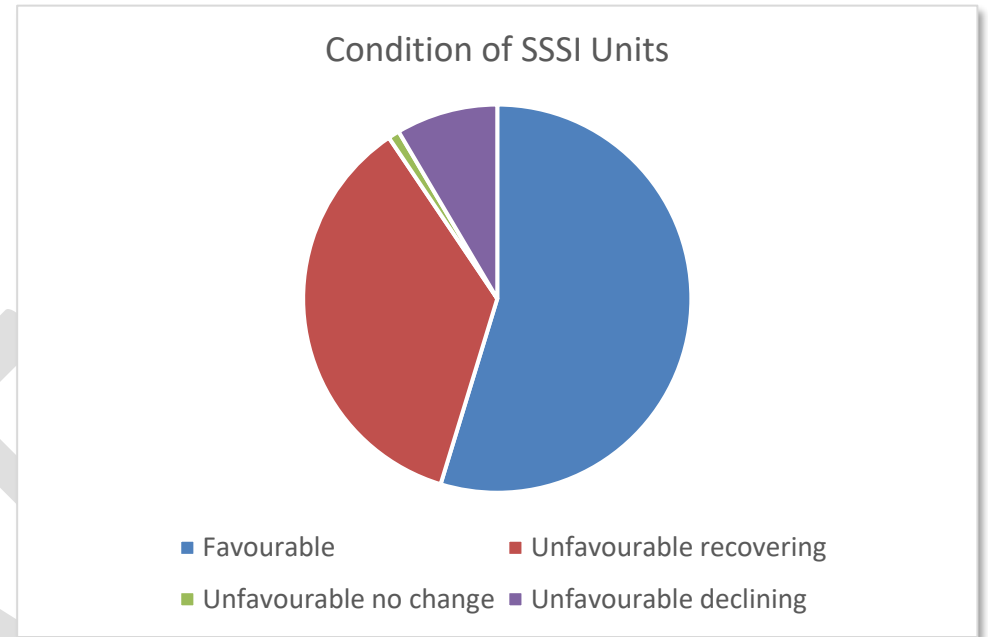


Figure 8 - chart showing the condition of units within Bedfordshire's SSSI. Condition assessment surveys carried out between 2008 and 2024.

These protected sites are the core of Bedfordshire wildlife. As described in the Local Habitat Map, they are the Areas of Particular Importance for Biodiversity. Keeping these sites in good condition and then buffering, expanding and connecting through habitat creation is central to this strategy.

⁶ Each SSSI is made up of different units which are assessed for their condition. These range from favourable to unfavourable declining.

2.3 Land use change over time

Bedfordshire, like many counties, has experienced significant land use change over the last 100 years. This has had an impact on the diversity of wildlife within the county. As shown in *Figure 9* there has been a significant decrease in the amount of semi-natural grassland with an increase in arable, improved grassland and built-up areas. The area of woodland has also increased due in part to conifer plantations which have limited wildlife value. As a result of these significant changes in land use, the biodiversity crisis is very much impacting Bedfordshire. However, significant initiatives are already underway, in the Marston Vale, the Chilterns and the Greensand Ridge.

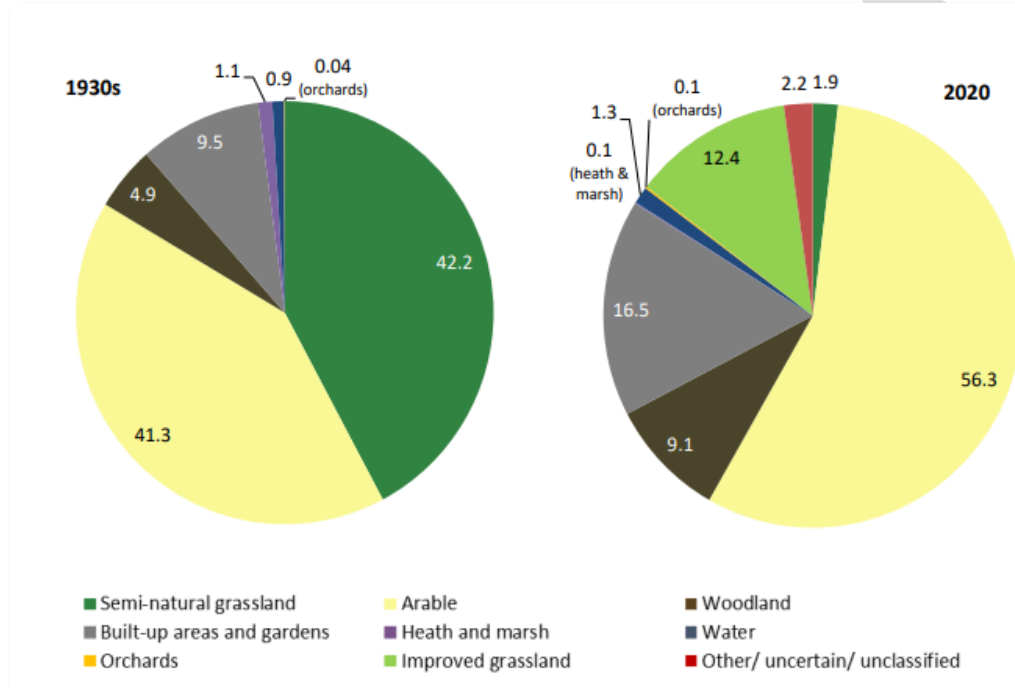


Figure 9 - Comparison in habitat type in Bedfordshire between 1930s and 2020 (Dr Jim Rouquette, 2021)

2.4 Character Areas

Bedfordshire has a diverse range of landscapes for a small county. Areas broadly represented by National Character Areas and Landscape Character Assessments have been used to provide an overview of landscape, habitats and towns within the county shown in *figure 10* below.



Figure 10 - Character areas in Bedfordshire based on National Character Areas and Landscape Character Assessments

2.5 North Bedfordshire Wolds

Across the north of the county is a broad, low and gently undulating limestone plateau which rises above the lower lying clay areas of the Great Ouse Valley to the south and the Nene Valley to the north. There are also deposits of clay, left behind by glaciers during the last ice age.

Throughout much of this area is a network of trees and woodlands, including ancient and lowland mixed deciduous woodland, wood pasture and parkland, hedgerows, veteran trees and lowland meadow.

This falls largely within the Yardley and Whittlewood Ridge National Character Area (England, National Character Area Profiles, 2015) Only around 7755 hectares of the ridge sit within Bedfordshire, but of that just under 10% is woodland or scrub. Santa Pod raceway and Colworth Science Park are both located within the ridge in Bedfordshire.

2.5.1 Important sites for nature include:

Odell Great Wood SSSI is a privately owned wood. It is an ash-maple woodland, typical of those that develop on clay in central England. Around 86 hectares is protected as a Site of Special Scientific Interest, and this is complemented by a network of other woods and grasslands. This makes the site one of the largest remaining ancient woodlands in the county.

West Wood LWS is only slightly smaller (84Ha) than the nearby Odell Great Wood. An oak / ash woodland, with an understory with a high proportion of hazel, the site has been restored significantly through the removal of conifers. The site is managed by Forestry England, who intend to manage the rides to maintain significant open space, which should favour some invertebrates.

Strawberry Hill LWS was taken out of farming in the early 1980s, Strawberry Hill was allowed to scrub up through natural succession. A complex pattern of primarily blackthorn and hawthorn scrub, with oak and

ash in sections, has developed. The site currently maintains significant populations of blackcap, turtle dove, many warblers, and more than 30 territories of breeding nightingales. The WTBCN has secured the future of the site to allow management, and unmanaged reversion to be compared for their wildlife value, and carbon storage, which is less understood in scrub habitats.

Yelden Meadows SSSI is a small site designated for its variety of grassland flora. Management with a hay cut in summer, and then aftermath grazing, has maintained the site in favourable condition with a flower community typical of old meadows. Species include meadow brome field wood-rush cuckoo-flower, pignut, dropwort, yellow rattle, pepper saxifrage and lady's bedstraw.

Yelnow New Wood was planted on former arable land in 1991. The 39 hectares are a mix of deciduous and conifer woodland on heavy clay soils.

2.6 Great Ouse Valley

The majority of Bedfordshire is within the River Great Ouse catchment as shown in *figure 11*. Small parts of the Lee, Colne and Nene make up the rest of Bedfordshire's catchments. The Great Ouse itself runs through the centre of the county town of Bedford.

The Bedfordshire section of the Great Ouse management catchment, Upper Bedford Ouse, is made up of 4 operational catchments: Bedford Ouse, Lower Ouse, Ivel and the Ouzel and Milton Keynes catchments.

The Great Ouse is a major feature in Bedfordshire. The Ouse along with its tributaries add considerably to the diversity of wildlife.

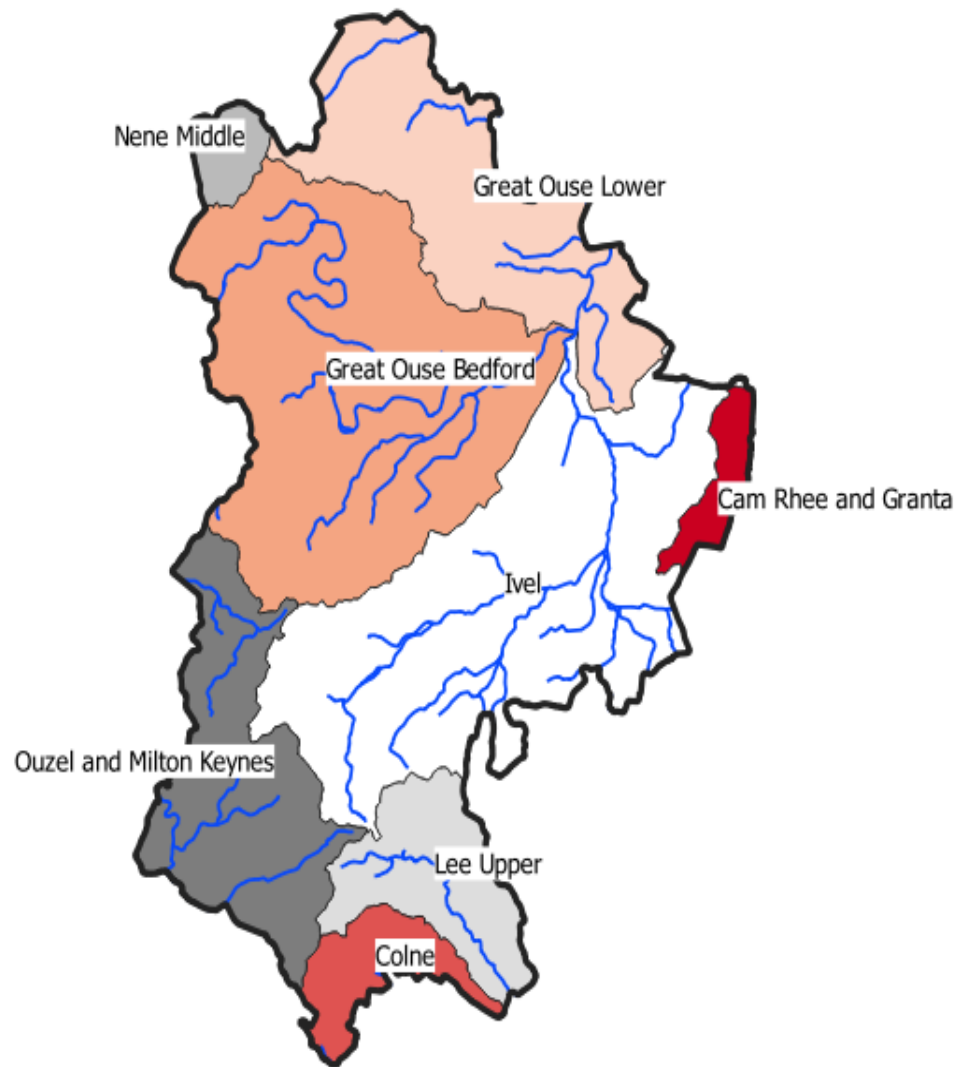


Figure 11 - Water Framework Directive Management catchments in Bedfordshire.

Clay is the predominant underlying geology with much of this area falling within the Bedfordshire and Cambridgeshire Claylands. Limestone is also exposed as the river erodes down. Restoration of sand and gravel workings

has left a series of flooded and restored waterbodies within the river valleys. (England, National Character Area Profiles, 2015)



River Ouse through Bedford Embankment – Ben Woodhouse

Arable farming is the dominant land use with less than 5% of the area identified as priority habitat by Natural England. More than half of that is deciduous woodland. There is a range of habitats found in this area including woodlands, grasslands, wetlands and rivers.

2.6.1 Important sites for nature include:

Felmersham Gravel Pits SSSI was created towards the end of the second world war, when gravel was extracted, possibly for the creation of nearby airfield runways, these gravel pits are fed from groundwater which has remained very low in nutrients, being isolated from fertiliser runoff which goes into the river. The pits support a range of plants which are unusual in the county, including bladderwort and whorled-water milfoil, and at least 18 species of dragon and damselfly. The site was 'enhanced' by a well-meaning local with the addition of a number of plants including Water Soldier, which now dominates parts of the lakes. There is concern this will affect the natural plant and insect communities, but the Norfolk hawk

dragonfly, which is expanding into the county, may benefit as it uses the plant to lay its eggs.

Harrold Odell Country Park LNR is a good example of wildlife management integrated with high visitor numbers. The site has over 160 species of bird recorded, and the nature reserve areas supports marsh and bee orchids (the county flower of Bedfordshire). As otters returned to the Ouse, this was one of the earlier sites where it was possible to have regular views, and a family is often spotted crossing the river. When the rare clouded fusehorn sawfly was declared extinct in the UK in 2022, it was immediately discovered on willow at the country park.

Priory Country Park LWS along with the connected Priory Park Railway and River Great Ouse LWS and Fenlake Meadows LNR is one of the key sites for natural greenspace within Bedford itself. A larger lake supports wildfowl that are used to the high levels of public use and sailing on the water. The finger lakes provide a more secluded habitat. The park is enclosed by the Great Ouse on three sides, and the New Cut of the river to the north which is a byproduct of the creation of an embankment for the railway in the 1840s

Stevington Marshes SSSI are located near the River Great Ouse, about 9 km northwest of Bedford. They formed naturally where underground springs meet different layers of rock and are a rare feature in Bedfordshire. The area is special because it supports wetland habitats, which are now quite rare both locally and across the UK. Surrounding the marshes are grasslands growing on Jurassic Limestone—another uncommon habitat in eastern England.

2.7 Marston Vale

The Forest of Marston Vale stretches across much of central and western Bedfordshire. It is a distinct area of Bedfordshire that was designated in 1991 as one of England's Community Forests, national priority areas for environmentally-led regeneration using tree planting and woodland creation. Historic brickfields throughout the Marston Vale have created a distinctive post-industrial landscape with man-made waterbodies and now restored major landfill sites. It has been one of the most nature depleted parts of Bedfordshire.

At the time of designation, tree cover within the Marston Vale was approximately 3%, well below the national average. By 2025, over 2 million trees had been planted to transform the landscape and help create the Forest of Marston Vale, increasing tree cover to approximately 17% against the long-term Government target of 30%. Creation of the Forest of Marston Vale is guided by the Forest Plan, an approved strategic and long-term framework. Both Bedford Borough Council and Central Bedfordshire Council have adopted policies supporting the creation of the Forest, including for all new development within the Forest of Marston Vale area to deliver 30% tree canopy cover.

The substantial increase in tree and woodland cover has yielded an emerging 'Forest' landscape, richer in young woodland and other semi-natural habitat. Although young, these habitats support enhanced wildlife communities very rapidly, stimulating local nature recovery (Forest of Marston Vale, 2018). Alongside these, and a handful of remnant ancient woodlands, the mix of historic brick pits provides other areas of wildlife-rich habitat, formed of mosaics of shrubs, open ground and grassland, with extensive areas of water. As well as providing a home of significant populations of great crested newt, a species which while thriving here has

declined significantly across Europe, these areas are important for their communities of invertebrates and birds.

2.7.1 Important sites for nature include:

Hanger Wood SSSI lies roughly one kilometre east of the village of Stagsden, in west Bedfordshire. This ancient woodland stretches along a gentle north-west facing slope of a narrow ridge. Hanger Wood stands out as one of the finest remaining examples of wet ash-maple woodland in the region, showcasing a plant community typical of heavy, slightly alkaline clay soils.

Kings Wood and Glebe Meadows SSSI is an ancient semi-natural woodland, characteristic of the heavy Oxford and Boulder Clays with views across the Marston Vale and next to Glebe Meadows, a series of ancient meadows managed by grazing and hay cutting and alive with colourful wildflowers in mid-summer. Both are of huge importance to wildlife including plants such as dogs mercury and bluebells.

Marston Thrift SSSI and LNR is the remnant of a much larger area of woodland which has existed since the time of the Domesday Book. The 56-hectare woodland has traditionally been managed by coppicing, which continues on a smaller scale today. The wood is important for wildlife, attracting a variety of butterflies including the rare Black Hairstreak.

Holcott Wood LWS found north of Brogborough is predominantly composed of native broadleaf trees such as oak, ash, and maple, creating a diverse and rich habitat for a variety of plant and animal species.

Rookery Clay Pits LWS is a former brick pit created following the extraction of clay required for the brick-making industry. The Rookery Clay Pit is home to important invertebrate and aquatic plant communities, as well as a large population of great crested newts.

Millennium Country Park is at the heart of the Forest of Marston Vale, and comprises 225 hectares of wetland, woodland and meadows. Created in

1999/2000, the site is an award-winning and popular visitor attraction. It encompasses Stewartby Lake LWS and Millbrook Pilling LWS, expanding upon these to create a strategic wildlife site which hosts turtle doves, nightingale, cuckoo, marsh harrier and Bedfordshire's first recorded breeding bitterns.

2.8 Greensand Ridge

The Greensand Ridge is almost entirely within Bedfordshire with its south-west extent into Buckinghamshire, and north-east into Cambridgeshire. Rising above the surrounding clay vales, the ridge lies on the Woburn Sand, creating relatively low nutrient, free draining soils. The Rivers Ouzel and Ivel cut through the ridge, running in a northward's direction, while the River Flit flows eastwards through the southern edge (having originated from the chalk) towards its confluence with the Ivel, becoming more significantly influenced by its acidic geology. Along the Flit valley there are areas of peat, which although relatively small compared to the Fens much further to the east, are highly important deep peat formations, providing a key habitat for wildlife and storing carbon. The scarp slope, to the northwest, overlooks the Marston Vale and provides an attractive wooded skyline.

The acidic soils are less productive than the surrounding clay, and although agriculture is still the predominant use of the land, a higher proportion of the land retains significant wildlife value, with just under 16% of the landcover identified as priority habitat, compared with just under 5% of the Great Ouse Valley.

In 2013 the Ridge was formally recognised as a 'Nature Improvement Area' (NIA) by Bedfordshire, Cambridgeshire and Northamptonshire and created by Greensand Trust, RSPB, BCNWT, Central Bedfordshire Council because of this existing value, and the potential to restore and connect ecological networks at the landscape scale. Historically the ridge supported extensive

heathland areas. These are now much reduced, but important heathlands remain along the Ridge. The Ridge is relatively well wooded for central England, with around 10% cover, however a significant amount of this is coniferous plantation.

Large but isolated areas of ancient woodland remain, especially where boulder clay deposits made clearance for agriculture use less attractive. Coniferous forestry is beginning to be re-planted as broadleaved or mixed woodland in places.

The Greensand Ridge has been heavily influenced, in many ways, by large country estates and their associated parkland. It contains the highest proportion of parkland of any National Character Area. Some remain managed as farms, forestry and parkland, such as the Southill Estate, others such as Woburn have developed as major tourist centres. The Lodge at Sandy has become the headquarters of the RSPB and has a significant habitat creation focus on the land adjacent.

2.8.1 Important sites for nature include:

Kings and Bakers Woods SSSI has a good mix of habitat. The sessile oak woodland is more typical of western England and is rare in the east. The once more dominant small leaved lime remains in the understory. Drier, sandy areas support heather and bilberry. The ownership of this complex of woodland, acid grassland and heath is complicated, due to the sale of the site in small lots several decades ago. Areas with public access have been designated as a National Nature Reserve, reflecting the quality of the habitat.

Rushmere Country Park covers over 160ha of woodland, heathland, grassland and lakes including an area designated as an LWS. Ongoing heathland restoration is taking place on areas planted with conifers, along with broadleaved woodland restoration. The site is a popular Country Park, with over 300,000 visits per annum. Access is managed through a zoning system to provide areas where nature recovery is the priority. Rushmere

CP is adjacent to Rammamere Heath SSSI, which is largely in Buckinghamshire, and significant areas are included within the Kings Wood and Rushmere NNR.

Aspley Heath and Woods are a complex of woodland, heathland and acid grassland, surrounding the village of Woburn. This includes the Wavendon Heath Pond SSSI designated for its acidic mire and supporting plant communities, uncommon throughout eastern England, two meadows of unimproved and semi-improved acid grassland, and an area of damp birch woodland. Significant areas of ancient woodland have been replanted with conifers, but there are also large areas of, mostly plantation, deciduous woodland.

The Flit Valley includes Flitwick Moor SSSI, Cainhoe Lakes LWS and Flitton Moor LNR. Woodlands of oak and birch and dense stands of bracken occur on the drier areas. Alder carr has developed in the wetter areas, and acidic springs contrast with alkaline areas. Wetland habitat extends alongside the Flit down the valley, through Clophill Lakes Nature Reserve, which was recently opened by the Greensand Trust, on an area of former Fullers earth quarry, and is managed for nature conservation with informal recreational access.

Cooper's Hill SSSI Coopers Hill has large areas of open heath, historically grazed, but now managed mechanically by the WTBCN. A damp area is the only remaining location for marsh violet in the county.

Southill Lake and Wood SSSI are part of the Southill Estate near Sandy. Southill Park House and its formal landscape include widespread planted broadleaved woodlands. Elsewhere on the estate there are large remnant ancient woodlands which, like many others on the Greensand Ridge, have been replanted in part with conifers. Dry grasslands survive around Warden Abbey, and the nature reserve at Old Warden Tunnel lies on a cutting that exposes the chalk found further south in the county. Recently, it has developed wetland habitats and welcomed newt ponds established by

the Newt Conservation Partnership for NatureSpace Partnership's district licensing scheme as part of a Biodiversity Improvement Project.

Sandy Warren SSSI and Lodge Nature Reserve. The removal of forestry plantation around the RSPB's headquarters near Sandy has created the largest area of heathland and acid grasslands in Bedfordshire (approx 40ha). This restoration led to one breeding attempt by rare nightjar. Natterjack toads have been reintroduced to the site. Along with Sandy Warren SSSI, the RSPB are working with Tarmac to restore the nearby Sandy Heath Quarry to create 80ha of wildlife rich grassland as quarry progresses.

Maulden Wood owned by Forest England contains Maulden Heath SSSI, managed on a long-term lease by the Greensand Trust and containing heathland and grassland habitats. There are large areas of broadleaved woodland, along with more open areas where conifer planting has taken place. These woodland areas are interlaced with dry grassland and heathland, and the mosaic habitat is important for a range of invertebrates. The nearby Chicksands Wood supports stands of goat and grey willow, which in turn provide the habitat for the purple emperor butterfly.

Amphill Park consists largely of dry acid grassland (the largest single area of acid grassland in Bedfordshire), with fringes of woodland and areas of acidic flushes.

2.9 Clay Hills, Valleys and Vales

The Clay Hills, Valleys and Vales⁷ form a distinctive part of the local countryside, each offering unique features that contribute to the area's character, biodiversity, and heritage.

Clay Vales are broad, flat landscapes that stretch across low-lying areas. They offer wide, open views and are bordered by higher ground such as the Greensand Ridge and South Bedfordshire Chalk, which help define and contain the landscape. The land is mainly used for agriculture, with large fields growing crops and some areas divided into horse paddocks. Field boundaries vary, including hedgerows, scrub margins, and drainage channels. Several rivers and streams, including the Ivel, Flit, and Ouzel, cross the vales, supporting wildlife and recreation.

Clay Hills rise gently from the vales, forming rounded, undulating terrain with a clear sense of elevation. Villages are often located on hilltops, surrounded by trees, with churches acting as prominent landmarks. The hills are mostly used for arable farming, with some pasture and a strong pattern of hedgerows and trees that give the area a wooded feel. Views from the hills extend across the surrounding landscapes. Springs emerging from the hills feed important marshes.

The area includes valleys shaped by the Rivers Ivel and Flit, which flow through shallow, wide valleys. These valleys sit on layers of clay, sand, and gravel, which have built up over time.

⁷ Area broadly based on area covered by the area of Central Bedfordshire Council's landscape character assessments Clay Hills, Clay Valleys and Clay Vales, south of the Greensand Ridge.

This is a low-lying area, with most of the land sitting between 30 and 40 metres above sea level. Because the land is generally flat and open, there are clear views across the countryside.

The land is mainly used for farming, with a mix of crop fields and grassland for grazing. Fields are typically medium in size, giving the area a patchwork feel that reflects its rural character.

Together, these landscapes shape the rural identity of the area and offer opportunities for farming, nature conservation, and community enjoyment.

2.9.1 Important sites for nature include:

Potton Wood SSSI lays just outside the Greensand Ridge. This ancient woodland demonstrates the impact of the clay soil, with its wet ash-maple community typical of heavier soils in central England. The site supports the only oxlips plants in Bedfordshire, which hybridise with primroses.

Fancott Woods and Meadows SSSI is a remnant of the species-rich grassland which would have been much more prevalent throughout the clay soils which dominate much of Bedfordshire. The meadows are on an ancient ridge and furrow site and are surrounded by a band of woodland which shelters the site. One of few sites in Bedfordshire to retain green winged orchids, other species found here which would once have been characteristic of the countryside in the county, but are now very restricted, include pepper saxifrage, saw-wort dropwort and adder's-tongue fern plants.

Wrest Park Grounds LWS was designed, at least in part, by 'Capability' Brown, the landscaped gardens have a monument to the famous landscaper. Now owned by English Heritage, the site retains some

parkland, and the formal gardens boundary is largely canalised which provide freshwater habitat.

Rushymeade is an ancient meadow on the south-eastern slopes of Pulloxhill. Rushymeade is owned by the Pulloxhill Parish Council for the enjoyment of the village. It is just over 6.5 hectares of open meadow land, boggy ground and shrubby areas where a wide variety of wildlife and birds can be seen. A further 1.6 hectares of private grassland, with permissive access, makes up the whole area.

2.10 South Bedfordshire Chalk

South Bedfordshire sits on top of a seam of chalk which runs from the Wash in Norfolk to Salisbury Plain in Wiltshire. The area has some significant sites for nature including many rare plants and invertebrates. This area is covered by 2 National Character Areas (NCA), the Chilterns and East Anglia Chalk. It is home to chalk streams, flower-rich grasslands and varied deciduous ancient woodlands. This area is also covered by the Chilterns National Landscape⁸.

Historic downland preserves prehistoric archaeology and supports high numbers of rare and scarce chalk grassland plants, mosses and liverworts amongst the mosaic of chalk grassland, scrub and woodland. The chalk bedrock is home to specialist animals and plants such as the pasqueflower, Chiltern gentian, juniper, chalkhill blue butterfly and native box. Red kites are easily seen throughout the area in large numbers following reintroductions in Oxfordshire in the 1990s.

There are a Chalk streams which emerge from the aquifers include the rivers Hiz and Ivel. These rivers support a small network of wildlife rich sites, with quarried sites providing the other wildlife interest in the area. Historic modifications include historic mills, watercress beds, culverts and

⁸ We're a national charity which works to make sure the UK's most outstanding landscapes are beautiful, thriving places that everyone can feel part of.

habitat enhancement which have all impacted on wildlife over the years. (Natural England, 2013).

2.10.1 Important sites for nature include:

Knocking Hoe SSSI is also a National Nature Reserve near Hexton close to the Hertfordshire border. It is home to five rare plant species: moon carrot, spotted catsear, field fleawort, burnt-tip orchid, and pasqueflower. The chalk grassland bursts into colour during the warmer months, with wildflowers such as horseshoe vetch, small scabious, rock rose, and clustered bellflower carpeting the slopes.

One of the reserve's botanical highlights is the autumn lady's-tresses orchid, which has been the subject of continuous study here for over 50 years. Summer also brings a variety of downland butterflies, including the common blue, chalkhill blue, and brown argus, making Knocking Hoe a vibrant haven for wildlife enthusiasts and researchers alike.

Dallow Downs and Winsdon Hill SSSI is located on a north-facing chalk scarp on the western edge of Luton. It features a diverse mix of unimproved and semi-improved calcareous and neutral grasslands, interwoven with extensive areas of mixed scrub, secondary woodland, and pockets of ancient woodland. This site supports the largest known population of great pignut in Great Britain. Surrounded on three sides by urban development and bordered to the west by the M1 motorway, the site nonetheless supports a remarkable mosaic of habitats.

Sundon Chalk Quarry SSSI Sundon Chalk Quarries are part of a large disused complex of chalk pits just to the west of Upper Sundon in Bedfordshire. Within the quarries is found a range of habitats including small areas of fen, lakes, chalk grassland, species-rich scrub and developing woodland. Twenty-one species of butterfly, along with 16 breeding species of dragonfly and damselfly, Chilterns gentian flower and great crested newts are some of the highlights.

Cottage Bottom LNR is 15-hectare local nature reserve lies on the chalk escarpment. Along with neighbouring Blow's Downs, it is a haven for wildlife with chalk downland species and migratory birds. Management aims to restore the chalk grassland to its former glory and scrub is cleared each winter to allow wildflowers and grasses to thrive.

Tottenhoe Knolls, Tottenhoe Stone Pit and Tottenhoe Chalk Quarry SSSIs sites make up a chain neighbouring sites to the west of Dunstable. These sites support a range of key habitats, but primarily chalk grassland and scarp slope woodlands and streams along with geological and fossil interest. Including deposits of sharks' teeth. These sites include former quarries have sites support very varied habitats, linked by their low nutrient status. The open ground element is very important for invertebrates and rare plants.



Pressures on nature in Bedfordshire



3 Pressures on nature in Bedfordshire

Nature faces a wide range of pressures and like many counties, this has had a significant impact on wildlife in Bedfordshire. For most species, it is a combination of pressures from a changing climate, pollution, habitat loss, fragmentation and quality and invasive species that have had an impact. Addressing these pressures relies on a wide range of stakeholders. While the LNRS can be a key strategy for addressing habitat loss and fragmentation, other pressures may be best addressed through other plans and policies either locally, nationally or internationally.

3.1 Pressures on the natural environment

Development in Bedfordshire has put pressure on the natural environment. Removing habitat, particularly the less abundant types, takes away the food, shelter and breeding sites of some of our most threatened species. This has resulted in habitat loss and fragmentation, where habitats are separated by roads, buildings or other structures.

For example, the M1 runs through both Chilterns and Greensand Ridge, creating a significant barrier. Although some sizable networks of woodland and grassland remain, some of the key sites are small and isolated. These isolated fragments can be vulnerable to climate change, disease and invasive species. Species losses from these sites cannot be balanced by recruitment from nearby sites, and ongoing declines in species diversity are likely to continue slowly but inexorably.

Biodiversity net gain (BNG) has been introduced to ensure nature is left in a better state than it was before development took place. Developments that enhance nature can benefit both people and wildlife.

Recreational pressure can be an issue for nature within Bedfordshire, particularly around towns. This can be direct through disturbance of wildlife, trampling, littering, but also through the prevention of grazing management on sites where that is necessary for habitat maintenance. It is a particular issue for heathland and grassland such as those in the Greensand Ridge and Chilterns respectively. These sites are impacted by disturbance from people and nutrient enrichment.

Lack of habitat management has led to the loss of some key species in the area. Many species require woodland management such as coppicing to create more open areas where light can reach the woodland floor and promote understory growth. Encroachment of heathland and grassland by bracken and birch and oak scrub is difficult to manage, particularly in areas where grazing is not possible. Scrub encroachment is valuable in certain areas but management to ensure it is not impacting on priority habitats is essential.

Water abstraction commercial, agricultural and domestic use particularly affects the chalk streams and other groundwater-fed watercourses by reducing flow, which impacts river ecology particularly during dry summers but also in winter in some watercourses. This can also impact wetlands and ground water. Although some abstraction reductions have taken place.

Water quality is negatively impacted by nutrients washed off fields, runoff from roads and urban areas and discharges from sewage treatment works and combined sewer overflows. High nutrient levels (predominantly phosphate and nitrates) reduce biodiversity and restrict opportunities to create and enhance wetland habitats through floodplain re-connection. In Bedfordshire, two waterbodies are classified as being in Bad ecological status, 6 poor, 45 moderate and 7 in good ecological condition based on the Water Framework Directive⁹ criteria.

⁹ The Water Framework Directive is an EU directive that aims to establish a framework for the protection of all water bodies. It has subsequently been made UK law as The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

Soil erosion can be a significant factor, particularly on steep slopes within the Chilterns or Greensand Ridge, where the soft chalk and sandy soils can be washed away. Erosion can also occur because of activities such as mountain biking. Increasing rainfall because of climate change will add to this pressure.

Deer numbers are higher than ever before with native roe and red deer as well as introduced fallow, muntjac and Chinese water deer all present in Bedfordshire. Muntjac and Chinese water deer were introduced to Britain in Bedfordshire. Without natural predators to maintain sustainable populations, the impacts of deer to both biodiversity and the economy are significant.

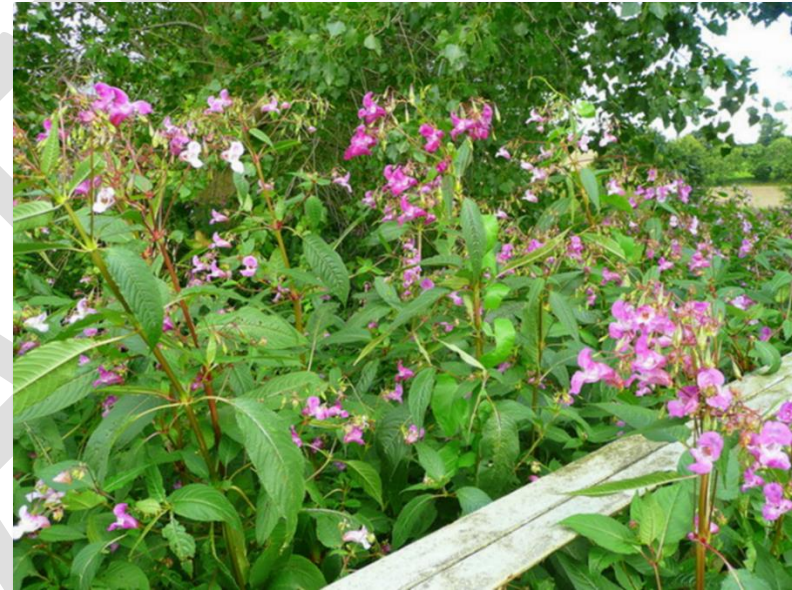
Deer damage crops and native plants by browsing and damage through activities such as fraying (stripping bark from young trees to mark territory). This can impact grasslands and woodlands by reducing the variety and number of plants, simplifying structure, which has a knock-on effect on other species such as butterflies and dormice, for example.

Tree pests and diseases such as ash dieback have had a significant impact on the make-up of the woodlands, some of which have ash as a significant component of their canopy. Ash dieback is having an impact on hedgerows too, as large trees in hedges provide an important ecological niche, and ash is one of the most common feature trees. This is exacerbated by climate change and the emergence of novel diseases.

Restored quarry lack of management can lead to loss of open mosaic and early successional habitats and missed opportunities to create new and link up existing habitats.

Invasive Non-Native Species are a significant problem, with Himalayan balsam, skunk cabbage and along the Flit Valley, and Piri Piri Burr now being found adjacent to Coopers Hill. Giant hogweed and Japanese knotweed are widespread across much of England.

Grey squirrel, introduced from North America, have now entirely replaced native red squirrels in almost all of England, including Bedfordshire. Larger and less specialised than red squirrel and, like deer, with few wild predators in England, they can cause significant damage to trees by browsing young shoots and buds and by stripping bark. Grey squirrels also eat wild birds' eggs and young. (NNSS, 2024).



Himalayan Balsam: Credit Jonathan Billinger

3.2 The impacts of Climate Change

Human induced climate change is having an impact on nature and people in Bedfordshire. Temperatures have increased over recent decades as shown by *Figure 12*.

The stripes below show how the temperature in Bedfordshire has changed between 1884 and 2023. Each stripe represents a year and shows whether it was hotter (red) or colder (blue) than the average over the period 1981-2000.

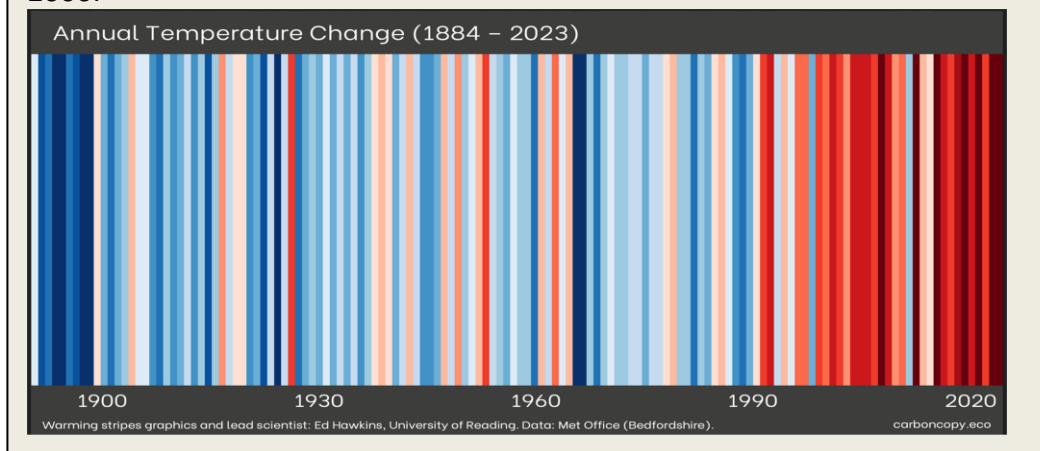


Figure 12 - A chart showing climate stripes. Stripes indicating whether temperature in Bedfordshire between 1884 and 2023 was above (red) or below (blue) the average over the period 1981-2000 (Ed Hawkins, 2024)

We are likely to experience warmer, wetter winters, hotter drier summers and more intense weather events. These changes will impact on wildlife by altering habitats and benefiting certain species behaviour. Nature recovery should be delivered with climate adaption and mitigation in mind to increase the resilience of people and wildlife.

Some of the likely impacts of the changing climate within Bedfordshire are:

- A reduced refilling of the underground aquifer, with reduced summer rain, and increased rainfall in winter being largely lost in run off
- Shifts in land management practices such as keeping livestock off the downland areas in summer, exacerbating changes in plant communities.
- More frequent drought periods altering the species composition of woodlands and grassland, favouring tolerant species, and increase susceptibility to pests and diseases.
- Negative impacts on food chains causing them to become unsynchronised. For example, caterpillars may emerge too early for birds to be able to feed them to their young.
- Warmer winters may result in increased bracken invasion of grasslands and heathland, and the variety and amount of native tree species in woodlands may decline due to the increase in hotter and drier summers.
- Changing rainfall patterns, with more frequent, intense rainfall events, are already increasing flooding and soil erosion.



Working with nature



Bedfordshire's Local Nature Recovery Strategy



4 Working with nature

4.1 Nature based solutions

The International Union for Conservation and Natural Resources (IUCN) define nature-based solutions as actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human wellbeing and biodiversity benefits.

In other words, working with nature to mitigate the impacts of climate change and other challenges facing society including flooding, drought and removing carbon from the atmosphere. The government's Environment Improvement Plan acknowledges the importance of nature-based solutions. It sets out targets to develop a comprehensive suite of investment standards, learning from existing practices and innovations, to support investment across the full range of Nature-based Solutions (Government, 2023)

The LNRS therefore has a key role in promoting actions that will provide other environmental benefits as well as helping species and habitats in Bedfordshire recover¹⁰.

Natural Flood Management (NFM) for example, is a way to reduce the flow of water over land by restoring some of the natural processes within a river catchment. This could include installing 'leaky' dams, creating and improving woodland, restoring soil health and recreating river meanders. These measures would not only slow the flow of water but would also improve biodiversity and water quality, store carbon and provide public

amenity, particularly if carried out in or near urban areas. For example, the ResilienTogether project has installed monitors on the River Pix to see how different intervention such as leaky dams and Sustainable Urban Drainage Systems (SuDS) can reduce flood risk and improve water quality.

4.2 Natural Capital

Natural Capital describes the natural assets in the world around us that have value to society, such as woodland, rivers, biodiversity, land and minerals. Natural Capital includes both the living and non-living aspects of ecosystems services¹¹. The Office for National Statistics estimates that the stock of natural assets in the UK is worth £1.8 trillion to the economy. This is the value of wood, fresh water, clean air and green spaces.¹²

This strategy has utilised the *Bedfordshire Natural Capital Assessment* (Dr Jim Rouquette, 2021) and *Bedfordshire LNRS through a Blue Lens LNRS* (Alison Holt, 2024) which mapped opportunities to deliver wider environmental benefits in Bedfordshire. Opportunities for water flow regulation are present over much of Bedfordshire, with the majority of opportunities relating to areas of arable fields on sloping land. In contrast, the vast majority of opportunities to improve water quality by reducing soil erosion are located adjacent to watercourses.

The best opportunities to ameliorate air pollution were located in and around urban areas and along the main road network and a similar pattern was revealed when considering opportunities to reduce noise pollution. Opportunities to regulate local climate (reduce urban heat) tended to fall on the outer fringes of urban areas, due to the large number of constraints in urban centres.

¹⁰ Further information about the ecosystem services within each habitat in Bedfordshire can be found within Natural England's Bedfordshire Natural Capital Atlas 2021 [Natural Capital Atlases: Mapping Indicators for County and City Regions - NECR318 \(naturalengland.org.uk\)](https://www.naturalengland.org.uk/natural-capital/natural-capital-atlases/mapping-indicators-for-county-and-city-regions-NECR318).

¹¹ THE GREEN BOOK CENTRAL GOVERNMENT GUIDANCE ON APPRAISAL AND EVALUATION

https://assets.publishing.service.gov.uk/media/6645c709bd01f5ed32793cbc/Green_Book_2022__updated_links_.pdf

¹² UK Natural Capital Accounts <https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapitalaccounts/2024>




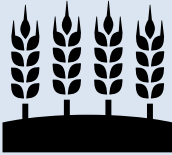
4.3 Ecosystem Services

Ecosystem services are services provided by natural assets that benefit people. They include food and fuel and the cultural services that provide benefits to people through recreation and cultural appreciation of nature. Other services provided by ecosystems are not so well known. These include the regulation of the climate, purification of air and water, flood protection, soil formation and nutrient cycling.

Ecosystem services can be classified in different ways, but they are often split into groups including *Provisioning*, *Regulating*, *Supporting* and *Cultural* depending on the type of service ecosystems provide. In most cases, different habitats will provide multiple benefits. The main ecosystem services that each habitat provides are highlighted in the *Statement of Biodiversity Priorities*.




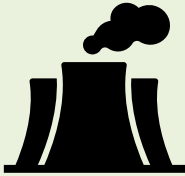




4.3.1 Provisioning

These are tangible goods that people can harvest from the environment such as food, wood and fibre, water and fuel. Bedfordshire is approximately 65% farmland which provides vital resources for people.

			
Livestock Reared animals and their products for human consumption. Including dairy products and honey	Water Supply Water taken from rivers and aquifers for domestic and commercial use such as irrigation and water for cattle	Timber and other materials Materials from plants and algae such as wood, hay and paper	Cultivated Crops Food such as cereals, fruit and vegetables grown for human consumption

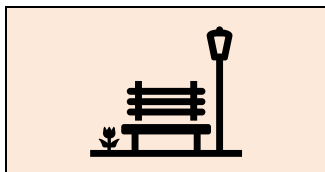
4.3.2 Regulating

Regulating services provide benefits such as climate regulation, flood management, and water filtration. For example, where air quality may be lower such as along major roads, trees and other vegetation can help absorb pollutants.

			
Water quality Clean water for drinking water, leisure and wildlife benefits	Biodiversity Important in its own right and underpins all other services from food production to tourism	Pollination Pollination of crops from cultivated crops to hay and silage.	Air quality Absorption of pollutants by vegetation benefits people and wildlife
			
Climate regulation Mitigation of extreme weather events, reducing temperatures	Erosion control Stabilising soils benefitting farmland, infrastructure and reduces water pollution	Flood protection Reduced flood risk through slowing the flow of water over land and in rivers	Noise regulation Reduced noise impacts from natural barriers such as hedges

4.3.3 Cultural

These include ways in which nature impacts people's health and wellbeing through recreational and education benefits as well as improving mental health and building spiritual connections.

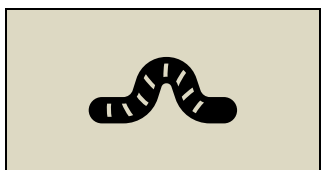


Cultural services

Physical and mental health and wellbeing, through access to green and blue space

4.3.4 Supporting

Supporting services underpin other ecosystem services. They are vital for other ecosystem services to exist. For example, provisioning ecosystem services such as crops would be poor without healthy soil.



Healthy soils

Essential for the health of ecosystems and food production

4.4 Managing and restoring habitats

One of the most significant pressures on nature is the lack of habitat management. Working with nature to restore natural processes is vital. However, many of these processes now require intervention to replicate natural functions that no longer occur.

For example, if left, grassland would be taken over by scrub and eventually woodland. As habitats change through succession then the species they support also change. Management to keep a mix of habitat types is important to maximise the benefits for wildlife.

In addition, some habitats have been replaced by other land uses. Woodland for commercial purposes have been planted on heathland and wetland drained for agricultural purposes. Therefore, core to many of the measures outlined within this strategy is the requirement to implement suitable management, ensuring a diverse range of habitats. Management can include doing more or less of a particular practice such as grazing, removing trees and scrub or replanting wildflowers. It could include leaving areas to regenerate naturally or through planting. Certain species such as beavers can provide a valuable service by altering habitats, creating wetland, retaining water and reducing downstream flood risk.



Statement of Biodiversity Priorities



Bedfordshire's Local Nature Recovery Strategy



5 Statement of Biodiversity Priorities

The Statement of Biodiversity Priorities (Step 4 in the statutory guidance *figure 3*) identifies the priority outcomes (what the strategy is trying to achieve) and the measures (practical actions that would deliver the outcomes).

Many of the most important habitats have become fragmented, degraded or lost entirely. The LNRS is a core part of developing a Nature Recovery Network¹³ by adopting the Lawton Principles of more, bigger, better and more joined up approach to conservation. by seeking to protect the best sites, improving those that need it and connecting them together so wildlife can move between habitats. This strategy also highlights the main ecosystem services these habitats provide which communities rely on.

The priorities have been developed through engagement with a range of stakeholders via in-person and online events, actions set out in other strategies and plans and a prioritisation working group. Initially, potential priorities were captured to form a longlist of approximately 60 possible outcomes. Further engagement was carried out to review and consolidate this list to produce a shortlist. This list of outcomes has been further revised with expert input using criteria (*see Appendix D*) and public views and matched with potential measures. Many of these measures are mapped within the Local Habitat Map to highlight the places they could be implemented to maximise their potential. However, other areas outside of those that are mapped can also be suitable for many of the measures.

The aim of the selected priorities is to provide an indicative guide for efforts to create, enhance and protect biodiversity, support sustainable land management, and contribute to the overall resilience of nature and people. The aim for the strategy is to ensure that habitats and the

population of key species are maintained or improved and new habitat is created, and that nature recovery delivers other environmental benefits.

5.1 National Environmental Objectives (NEO)

While LNRS have a local focus, nature recovery is a national challenge. Therefore, LNRS have an important role in addressing national objectives on nature recovery.

The UK Government sets NEOs to address biodiversity, climate, and social pressures through national and international targets. These are set out in the Environment Act 2021 and commitments in the Environment Improvement Plan. These objectives are shown below.

Environment Act 2021 objectives

- Restore or create more than 500,000 hectares of a range of wildlife-rich habitat outside protected sites by 2042, compared to 2022 levels
- 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
- Reduce the risk of species' extinction by 2042, when compared to the risk of species' extinction in 2022
- Increase total tree and woodland cover from 14.5% of land area now to 16.5% by 2050
- 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.

¹³ The Nature Recovery Network is a growing national network of wildlife-rich places, stretching from our cities to countryside, mountains to coast. It is supported by green and blue spaces that buffer and connect these wildlife-rich sites. [The Nature Recovery Network - GOV.UK](https://www.gov.uk/government/consultations/the-nature-recovery-network)

Environmental Improvement Plan commitments

- Work to ensure that everyone in England lives within 15 minutes' walk of a green or blue space
- Restore approximately 280,000 hectares of peatland in England by 2050
- Restore 75% of our water bodies to good ecological status
- Protect 30% of land and of sea in the UK for nature's recovery by 2030
- Support farmers to create or restore 30,000 miles of hedgerows by 2037 and 45,000 miles of hedgerows by 2050
- Manage our woodlands for biodiversity, climate and sustainable forestry
- 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.
- Ensure delivery & management of actions & policies that contribute towards our 25YEP goals are suitable & adaptive to a changing climate
- Make sure LNRs include proposals for Nature-based Solutions which improve flood risk management where appropriate
- Achieve Good Environmental Status for our seas
- Reduce emissions of nitrogen oxides by 73% and ammonia by 16% by 2030 relative to 2005 levels
- Reducing the rates of introduction and establishment of invasive nonnative species by at least 50%, by 2030

The priorities within this strategy have an important role in contributing to these objectives. *Appendix D* shows which outcomes contribute to the different NEOs.

5.2 Structure of the Statement of Biodiversity Priorities

The priority outcomes and measures are shown within broad habitat groups.

The broad habitats are:

- Woodland and trees
- Farmland and hedgerows
- Neutral and calcareous grassland
- Heathland and acid grassland
- Rivers, wetlands and ponds
- Built up areas and previously developed land

In addition:

- Local Wildlife Sites – Local Wildlife Sites cover a range of habitats so are a separate priority group.

Within each broad habitat section are the following subsections:

- **Overview of the habitat in Bedfordshire**
Background information on the presence of this habitat in Bedfordshire. Including some of the key areas.
- **Priority habitats**
Bedfordshire has a range of important and iconic habitats. The woodlands, farmland, urban, heathland, grasslands and wetland areas include a variety of different habitat types classed as 'Priority Habitats'. These are habitat types that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (JNCC, UK Biodiversity Action Plan, 1994). A

brief description of the priority habitats found in Bedfordshire to various extents is provided in this section ¹⁴

- **Ecosystem services provided**

An overview of some of the ecosystem services each broad habitat type provides to people. These have been identified through the Natural England's 'Natural Capital Atlas: Mapping Indicators 2021' (Natural England, 2021) and stakeholder feedback.

- **Opportunities for recovery**

The potential opportunities for recovery based on existing projects, initiatives and previous work.

- **Priority outcomes and associated measures**

A core part of the strategy setting out the main outcomes the strategy is trying to achieve and the on the ground actions that would help to deliver those outcomes. These are set out in boxes below, with each box showing the priority outcome at the top, with the supporting measures beneath and which of these measures have been mapped in the Local Habitat Map

- **To view the Local Habitat Map** visit

<https://bedslocalnaturecoverystrategy.commonplace.is/>

- **Linked priority species**

In addition to the priority outcomes and associated measures, the LNRS priority species in section 5.10 show which species would benefit from additional bespoke measures within that habitat.

- **Further information and guidance**

Highlighting some of the further guidance available from a range of sources to deliver the measures.

5.3 Local Wildlife Sites

Bedfordshire's Local Wildlife Sites (also known as County 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. They are or have the potential to be some of Bedfordshire's most important places for nature. They are a non-statutory designation meaning they do not receive legal protection or right of access. Although they may have policy protection in a statutory Local plan. For any significant change of land use the planning authorities will expect the wildlife interest to be considered alongside other normal planning consideration that recognises high quality wildlife habitats.

Based on 2023/24 annual assessment, 56% of LWS in Bedfordshire are thought to be in positive conservation management. However, this figure is based on an incomplete knowledge of the status of all these sites.

Highlighting the need for baselining and monitoring.

B1 - Identify, conserve and bring into positive management all Local Wildlife Sites in Bedfordshire.

Measures

B1a – Local Wildlife Sites

Conserve, enhance and restore Local Wildlife Sites and bring them into positive and sustainable management to safeguard species they support. Survey, provide landowner advice, and facilitate habitat improvements on priority potential wildlife sites.

Mapped - no

¹⁴ This section provides a brief description of each priority habitat in Bedfordshire. For a full description visit the JNCC Priority habitats webpage <https://jncc.gov.uk/our-work/uk-bap-priority-habitats/>

5.4 Woodlands and Trees

Few habitats change throughout the year as much as woodlands. From bright spring greens and birdsong of spring and summer to the emerging fungi and multi-colours of autumn and the atmospheric beauty in winter. Trees provide a home for wildlife in parks and gardens and traditional orchards can be community hubs providing food for people and nature.

Woodlands, trees, scrub and orchards provide a vital home for many threatened species of wildlife such as hazel dormice, nightingales, bats and black hairstreak butterflies and so much more. They also provide a wide range of ecosystem services that support local communities, helping to regulate climate change impacts by reducing flood risk, improving air quality and helping regulate temperatures within the urban built environment.

Woodland cover across Bedfordshire is approximately 8% making it one of the least wooded areas in the country (England 10%) (Forest Research, 2024). Where sizeable woods remain, conifer plantations¹⁵ and lack of traditional management affect the retention of wildlife communities. The most significant change has been driven by the designation in the early 1990s of around 16,000 ha to the south and southwest of Bedford, from Brogborough in the west to Willington in the east, as the Forest of Marston Vale Community Forest. New woodland planting is a significant feature here.

Odell Great Wood (86ha) and West Wood (84ha) in the north of Bedfordshire both support significant invertebrate and wildflower communities. White admiral butterflies can still be seen in rides (pathways through the wood where sunlight reaches the floor), as can occasional purple emperor butterflies. Although the ride system, particularly in Odell Great Wood, is still well managed, wider rides here and in surrounding

smaller woods may be required to maintain insect populations including species of butterflies.

A complex of smaller woodlands exists throughout the area, with a concentration of small, linked sites around the Colworth Science Park.

Since the 1980s, nearly 150ha of scrub and young woodland has been created through natural regeneration at Strawberry Hill Farm near Knotting Green in north Bedfordshire, now owned by the Bedfordshire, Cambridgeshire and Northamptonshire Wildlife Trust (WTBCN). This has significantly increased the area of woodland in the Bedfordshire part of the Yardley and Whittlewood Ridge NCA, and it is now one of the largest areas of this habitat in central England. Yelow New Wood is a 45-year-old plantation of mixed deciduous and conifer woodland covering 39ha, created and managed by Bedford Borough Council, near Odell Great Wood.

Ancient woodlands are found on the boulder clay within the Greensand Ridge are sessile oak woodlands, with significant birch components, and an understory that includes naturally occurring holly, rowan and small-leaved lime. These contrast with the heavier clay soil woodlands, with pedunculate oak, ash and field maple as key components. At Flitwick Moor there are large areas of alder carr.

Ancient woodlands have been extensively replanted with timber trees, with sweet chestnut and conifer plantations dominating the acid soils. Remaining ancient semi natural woodland sites are mainly confined to where boulder clay was deposited on top of the greensand by glaciers during the last ice age.

¹⁵ Conifer plantations are normally densely planted, regularly distributed woodlands grown for timber production.

There are extensive areas of more recent woodlands particularly between Sundon and Hexton, and including Sharpenhoe, and around Luton Hoo. Some of these areas are associated with cover for game birds.

In Bedfordshire, agricultural census data show a decline in the orchard area of 95% since the peak decade of the 1950s (Brown 2008) and they now cover just 0.1% of the county¹⁶. Those that remain, including a significant cluster of orchards around Eaton Bray, provide an important habitat for invertebrates such as the stag beetle which are associated with traditional orchards where their young depend on the dead and decaying wood in trees.

The woodland cover of the Chilterns has remained relatively stable in recent decades - currently approximately 17%. However, woodland management declined as the local furniture industry disappeared. The long-running Chilterns Woodland Project did provide some additional input for many years and more recently demand for wood fuel has generated some increased management.

Across Bedfordshire, wild deer numbers have increased, as the limiting factors of population growth, winter mortality and lack of spring forage, have been negated by climate change and autumn sowing respectively. Deer grazing and browsing affect the ability of woodlands to regenerate naturally and can have a large impact on the understorey and ground flora.

5.4.1 Priority woodland and tree 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 usually occurs on sites with well-defined boundaries, at relatively low altitudes, although altitude is not a defining

feature. Many are ancient woods. They are found throughout much of Bedfordshire but particularly along the Greensand Ridge and through the north of Bedfordshire and its border with Northamptonshire. The largest of which is the Odell Great Wood.

Wood-pasture and parkland - Wood-pasture and parkland are mosaic habitats valued for their trees, especially veteran and ancient trees, and the plants and animals that they support. Grazing animals are important to managing this type of habitat. Specialised and varied habitats within wood pasture and parkland from ancient trees, dead wood and grassland provide a home for a wide range of species, many of which occur only in these habitats, particularly insects, lichens and fungi which depend on dead and decaying wood. Wood-pasture and parkland is found throughout Bedfordshire but in particular along the Greensand Ridge. Woburn Park, Wrest Park and Luton Hoo are examples.

Traditional Orchards - Traditional orchards consist of groups of fruit and nut trees planted at low densities in permanent grassland and managed in a low intensity way. Small areas of orchards can be found throughout Bedfordshire such as Park Wood LNR in Bedford.

Wet woodland - Wet woodland on a range of poorly drained or seasonally wet soils, usually with alder, birch and willows as the predominant tree species, but in drier riparian areas, can also include oak, ash, pine and beech. It is found on floodplains, as successional habitat on fens, mires and bogs, along streams and hill-side flushes, and in peaty hollows. They can provide particularly valuable ecosystem services by reducing water pollution and providing natural flood management. It is one of the rarest habitats in the county and includes Flitwick Moor SSSI.

Lowland beech and yew - Lowland beech and yew woodland spans a variety of distinctive vegetation types reflecting differences in soil and

¹⁶ Based on Natural England Priority Habitat Inventory data

topographical conditions. Beech can grow on both acidic and calcareous soils, although its association with yew tends to be most abundant on the calcareous sites. These woods have been managed historically as high forest (a system where trees are grown to maturity and then felled, either individually, in discrete groups or whole sections of the wood) coppice, coppice with standards, wood-pasture and minimum intervention. They are often found as intricate mosaics with other woodland communities.

Urban trees - Urban trees can be found in gardens, parks, schools or lining streets. They provide homes for urban wildlife such as birds, insects and bats and link up habitats through towns and villages into the wider countryside. They can be an effective measure in addressing air pollution and climate change. Green spaces also provide people with a connection to nature, benefitting mental health and wellbeing.

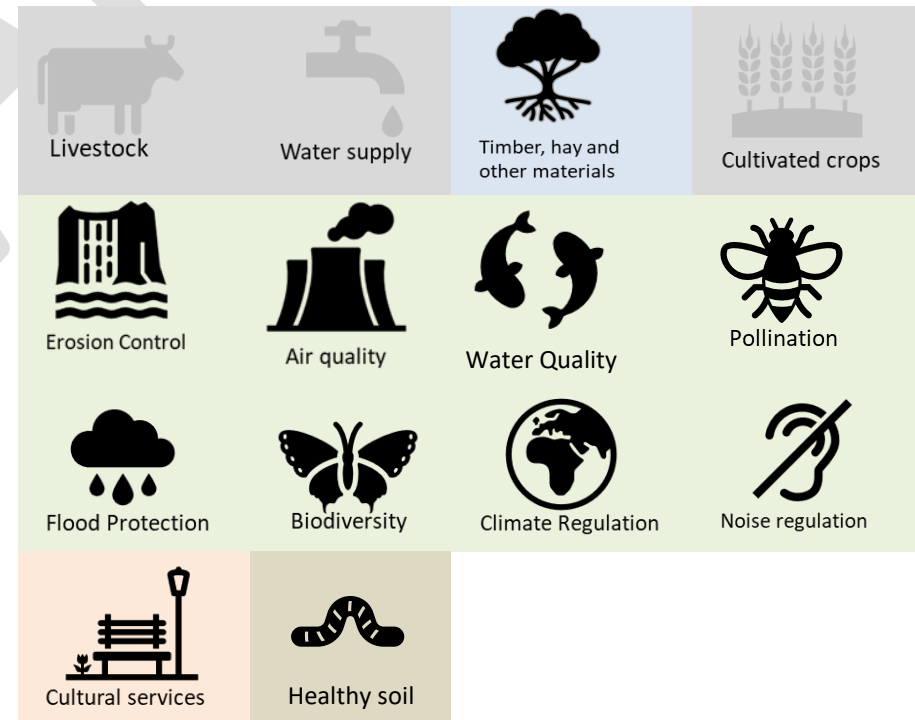
Scrub

Scrub grows in open areas where grazing or cutting is absent. It usually consists of plants such as hawthorn, bramble, blackthorn and elder. It would eventually become woodland so management is required. Scrub habitats are beneficial for diverse wildlife, offering a consistent supply of nectar, fruits, seeds, and essential shelter. They also provide crucial breeding and roosting sites. Scrub is important for species such as nightingale, a range of warblers such as willow warblers and whitethroat along with invertebrates.



Photo of bluebells in woodland. Credit: Brenda Newbury

5.4.2 Key ecosystem services provided by woodlands and trees



5.4.3 Opportunities for recovery

- **Restoration of plantations on ancient woodland sites (PAWS).**

PAWS are sites that have a long history of woodland cover: they are ancient semi-natural woodlands on which the original, “natural” woodland was cleared, and replaced by a plantation of either native or exotic species for commercial purposes. These sites offer an opportunity to restore back to a more natural woodland.

- **Link and extend the woodlands across north Bedfordshire, the Marston Vale and the Greensand Ridge**

Woodlands throughout these areas provide a strong sense of place and history. They reduce soil erosion and flood risk, improve water quality, benefit biodiversity, support timber and biomass production and aid in climate regulation. Planting trees to extend and link existing woodland sites through more woodland creation will provide a greater benefit for wildlife and people - ensuring they maintain the landscape character.

- **Manage all woodland features to benefit biodiversity**

Considering the needs of woodland species including butterflies, birds, and deadwood invertebrates. Veteranisation, where trees are intentionally damaged to accelerate microhabitats, can be beneficial where there is a lack of older trees and standing deadwood. Planting or encouraging fruiting shrubs and larval food plants within open areas and woodland edge habitats creates a diverse range of habitats.

- **Create and enhance field boundaries, connecting hedgerows and small woodlands.**

Hedgerows, field boundaries and small wooded areas allow wildlife to travel between woodlands. They are part of a diverse habitat mosaic where there is poor connectivity. Managing large, species-rich woodlands, as core areas in the ecological network. Focus

particularly on conservation of ancient, hedged boundaries and ancient woodlands to secure their high species richness.

Plant hedgerows where there is poor connectivity, and where creation of woodland corridors is not feasible particularly where this will also restore historic boundaries.

- **Traditional orchards**

Orchards provide valuable sites for wildlife and communities to engage with nature and fruit-growing. Maintaining existing areas of orchard and creating new would help to link existing areas providing more sites for communities to enjoy.

5.4.4 Woodland and Trees Priorities

Woodlands, trees, orchard and scrub are all home to threatened wildlife in Bedfordshire. This includes hazel dormice, nightingales and black hairstreak butterfly. Good woodland and tree management promotes a diverse woodland structure, providing a home for a range of wildlife. Increasing the area of woodland and trees and connecting these with hedgerows, scrub and individual trees helps species spread and be more resilient to climate change. Woodlands also provide an important place for people to connect with nature. The Woodland and Tree Priority outcomes and actions set out below, show how woodland and tree habitats can be created, maintained and improved.

W1 - There is an increase in the overall tree canopy cover across Bedfordshire by expanding and connecting existing sites and creating new woodland.

Measures

W1a - Woodland creation

Expand and connect core woodland sites through natural regeneration or by planting new mixed species woodlands. Include areas of dense scrub and open spaces. Use a diversity of genetic types to help increase resilience to diseases and impacts from a changing climate. Protect new trees from livestock and wild animals such as deer.

Mapped: Yes

W1b - Trees outside woodland

Create new and expand existing spinneys, tree avenues, small woodlands, scrub and hedgerows to create links or stepping stones between existing woodlands. This can be achieved through planting or natural regeneration using locally sourced certified plant healthy stock. Where appropriate, plant a diverse mix of native species that will support local wildlife and build resilience to climate change impacts, disease and other pressures and threats.

Mapped: No

W1c - Wet woodland opportunity

Create new wet woodland to maximise water retention and seasonal flushes benefiting species such as woodcock. Reduce the impacts of over-grazing within wet woodlands (both livestock and deer) to allow more natural regeneration of the woodland habitat.

Mapped: Yes

Linked priority species

[Black hairstreak](#)

[Turtle Dove](#)

[Hazel Dormouse](#)

[Bat assemblage](#)

[Nightingale](#)



Wild Garlic in Woodland Credit: Richard James

W2 - All unmanaged woods are in positive management to UKFS as a minimum.

Measures

W2a – Unmanaged woodland

Improve existing woodland biodiversity by appropriate management to UK Forestry Standards, creating a varied structure, with trees of different ages and heights through actions such as thinning, coppicing and creation of rides and glades (particularly where they join other habitats such as areas of grassland or heathland) and retaining standing and fallen deadwood. Remove invasive plant species such as rhododendron to allow light to the woodland floor, providing suitable conditions for native flora.

Mapped: Yes

W2b – PAWS

Restore Plantations on Ancient Woodland Sites (PAWS) to UKFS standards for biodiversity, climate and other environmental and economic benefits by the gradual and systematic removal of commercially planted conifers, whilst carefully maintaining remnant ancient woodland features.

Mapped: Yes

W2c - Woodland buffers

Protect and buffer existing woodland by allowing scrub and wildflower fringes to develop to benefit invertebrates such as moths and butterflies and birds such as warblers.

Mapped: No

W2d - Deer management

Manage deer and grey squirrel numbers to a sustainable level to reduce impacts on woodland regeneration, structure and diversity benefitting species such as nightingale.

Mapped: No

Linked priority species

[Black hairstreak](#)

[Turtle Dove](#)

[Hazel Dormouse](#)

[Bat assemblage](#)

[Nightingale](#)

W3 - Trees outside of woodland including parklands, orchards, lone, ancient, veteran and near-veteran trees are conserved and enhanced

Measures

W3a - Wood pasture and parkland

Manage and protect ancient trees, including their root systems, for their biodiversity and heritage value. Identify existing or plant new trees that are suitable as eventual replacements for mature or ancient and veteran trees on adjacent sites. Aim to maintain genetic continuity where possible by nurturing cuttings or seedlings from existing trees. Plant and protect newly planted trees (or patches of natural regeneration) so they are spaced wide enough to be able to adequately grow an open crown. Within parklands maintain the grassland and tree mosaic habitat by cutting or grazing.

Mapped: Yes

W3b – Orchards

Maintain traditional orchards by planting and protecting new trees from grazing animals. Maintain existing trees by pruning where required. Manage surrounding grassland by grazing or hay cutting. Keep standing deadwood and some deadwood on living trees to provide habitat and feeding opportunities for invertebrates and birds. Avoid using pesticides as this can impact invertebrates including some rare dead wood beetles. This includes noble chafers which are associated with old decaying orchard trees with heartwood decay and therefore reliant on continuity of traditional orchards and new generation of trees.

Mapped: Yes

W4 - Expand the area of trees outside of woodland including parklands, orchards, lone and ancient and veteran trees

Measures

W4a - Wood Pasture, Parkland and Orchard opportunity

Plant new trees that are appropriate to the historic parkland or orchard design and resilient to local climate change on adjacent sites. Choose varieties that provide the same ecological wood decay conditions as mature or veteran trees already in the area. Keep areas of dead wood for invertebrates.

Mapped: Yes

BE5: Creation of traditional orchards - GOV.UK

WD2: Woodland improvement - GOV.UK

WS1: Deer control and management - GOV.UK

WD4: Management of lowland wood pasture and parkland - GOV.UK

WD5: Restoration of lowland wood pasture and parkland - GOV.UK

5.4.5 Further information and guidance

Forestry Commission

Managing ancient and native woodland in England

Woodland Trust

Managing your new woodland

Greensand Country

Habitat Resource Pack: Woodland

Tree Council

Woodland creation guide

Ancient and veteran trees. An assessment guide.

Natural England

Climate change adaptation manual

Countryside Stewardship

Plantations on Ancient Woodland Sites (PAWS) – restoration and maintenance

TE13: Creation of dead wood habitat on trees

SP4: Control of invasive plant species supplement

WD1: Woodland creation - maintenance payments - GOV.UK

BE4: Management of traditional orchards - GOV.UK

5.5 Farmland and Hedgerows

Farming is the predominant land use in Bedfordshire with approximately 65% of the land classified as agriculture (Department of Levelling Up, 2022). Cereal farming is the main type of farm in the county but there are also livestock and horticulture farms too. The farming types across Bedfordshire are shown in *Figure 13* below.



Fieldfare on a branch Credit: Jon Pauling

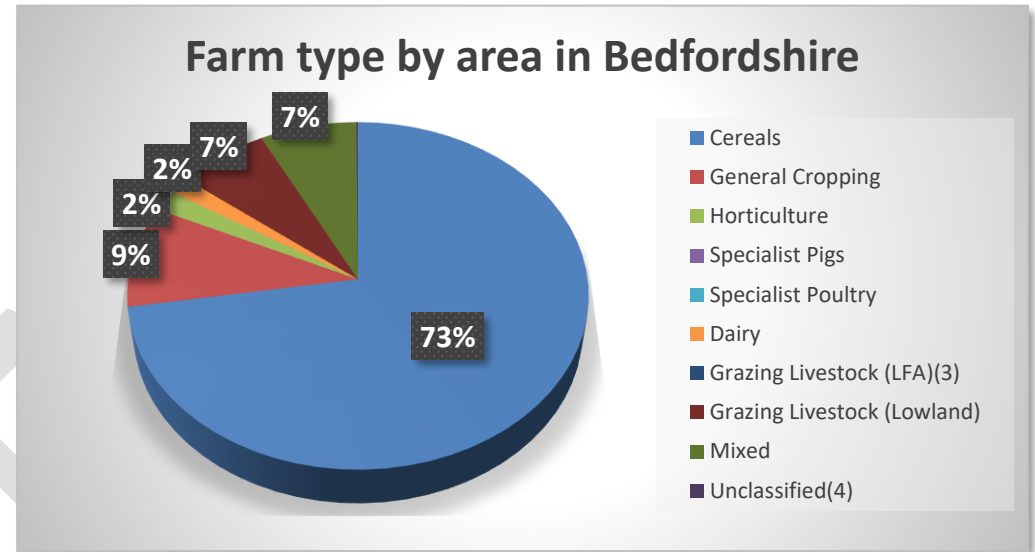


Figure 13 – Percentage of different farm types across agricultural land in Bedfordshire by area. (Department of Levelling Up, 2022)

The policies determining how this land is managed have a significant impact on Bedfordshire's wildlife. Sadly, many species that rely on farmed areas have declined significantly since the 1950s (Defra, 2023). The introduction of policies post-Second World War to encourage intensive farming such as the removal of hedgerows, increased use of pesticides and more efficient harvesting techniques has resulted in decline of a variety of species.

Many farmers and land managers are delivering fantastic action for nature as well as running a successful farming business. Working with nature, protecting the soil and managing water can deliver a range of benefits for farmers, communities and wildlife. Producing food and nature recovery can be delivered together.

The government's Environment Improvement Plan includes targets to support nature friendly farming. They aim to pay farmers and land

managers to take care of the natural countryside environment, alongside food and other production, so that collectively:

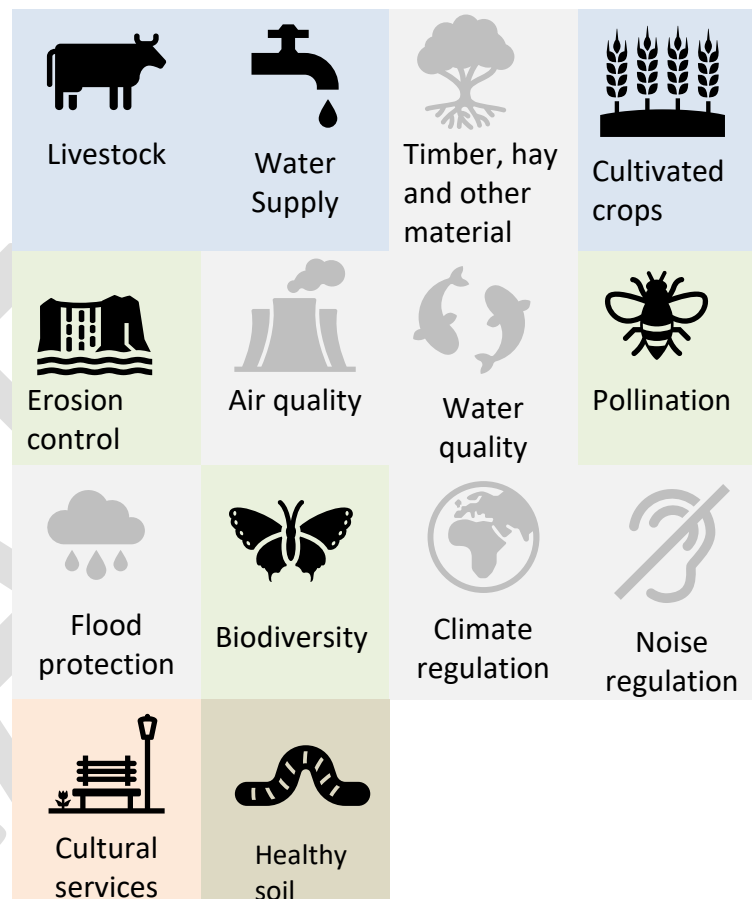
- 65 to 80% of land managers and farmers will adopt nature friendly farming on at least 10-15% of their land by 2030.
- Expand the Sustainable Farming Incentive¹⁷ to pay farmers to adopt more sustainable farming approaches

5.5.1 Priority habitats

Arable field margins - Arable field margins are herbaceous strips or blocks around arable fields that are managed specifically to provide benefits for wildlife. The arable field must be in a crop rotation which includes an arable crop, even if in certain years the field is in temporary grass or fallow. Arable field margins are usually sited on the outer 2–12m margin of the arable field, although when planted as blocks they occasionally extend further into the field centre.

Hedgerows - A hedgerow is defined as any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less than 20m wide (Bickmore, 2002). Any bank, wall, ditch or tree within 2m of the centre of the hedgerow is considered part of the hedgerow habitat, as is the herbaceous vegetation within 2m of the centre of the hedgerow. All hedgerows consisting predominantly (i.e. 80% or more cover) of at least one woody UK native species.

5.5.2 Ecosystem services provided by farmland



¹⁷ The Sustainable Farming Incentive (SFI) pays farmers and land managers to take up or maintain sustainable farming and land management practices that; protect and benefit the environment, support food production and improve productivity. <https://www.gov.uk/government/publications/sustainable-farming-incentive-scheme-expanded-offer-for-2024/sfi-scheme-information-expanded-offer-for-2024>

5.5.3 Opportunities for recovery

- **Further support for nature friendly farming**

Further expansion of government agri-environment schemes, which pay farmers and land managers to take up or maintain sustainable farming and land management practices. These protect and benefit the environment, support food production and improve productivity.

- **Catchment sensitive farming**

Manage agricultural practices and strengthen semi-natural habitats along watercourses, to protect and improve soil quality, reduce erosion, regulate water flow and improve water quality. Work to reduce surface and groundwater pollution at a catchment scale by managing farmland under the principles established by the Catchment Sensitive Farming Programme.

- **Soil management**

Enhance the semi-natural vegetation cover where suitable, particularly on the steeper slopes such as areas where the Great Ouse Valley intersect with the Greensand Ridge and South Bedfordshire Chalk areas. Focus on planting more trees, woodland, creating grasslands, and buffering hedgerows in suitable locations. This approach will boost soil organic matter, minimize run-off and erosion, support biodiversity, and improve water quality and flow regulation.

- **Working together**

Create farming clusters to deliver landscape scale conservation across landholdings.

- **Unproductive land**

Identify areas where unproductive land and farm margins could

provide important new habitat opportunities, linking in with current and future environmental stewardship funding.

- **Agroforestry**

Agroforestry is the integration of trees into the farming system, while maintaining or enhancing the farm's main agricultural output. Agroforestry helps protect soil, rivers and biodiversity, capturing and storing carbon, as well as providing cleaner air and water. Trees can shelter livestock and crops from extreme weather conditions and bring extra income streams, from wood-based products or fruit and nut produce.



Field margin in Barton le Clay Credit: Melanie Douglas

5.5.4 Farmland and hedgerow outcomes and measures

Arable farming is the main land use in Bedfordshire and has played a vital role in Bedfordshire's landscape and communities for centuries and is key to nature recovery. It provides a range of opportunities to work with nature, protect soils, improve water quality and maintain agricultural productivity. The outcomes and measures for farmland and hedgerows set out in tables F1 to F4 below, highlight these opportunities for species

which can thrive where land is sensitively managed. This can include plant species such as wild candytuft and broad-fruited corn salad and birds including yellow wagtail and turtle dove.

F1 - There is an increase in farmland biodiversity including birds, invertebrates and arable plants through nature friendly farming

Measures

F1a - Nature friendly farming

Implement nature-friendly land management techniques to benefit farmland wildlife such as farmland birds, invertebrates and arable plants. Retain overwinter stubble, cover crops, fallow plots and beetle banks to provide food and shelter. Implement integrated pest management

Mapped: No

Linked Priority Species:

[Arable Margins assemblage](#)

[Turtle Dove](#)

F2 - The network of hedgerows and trees is maintained, improved and expanded to provide food, shelter and connectivity

Measures

F2a - Farmland hedgerows and trees

Establish well-structured, species-rich hedgerows, lone trees and wooded areas across farmed landscapes to provide ecological links between existing woodlands and other hedgerows. Manage these areas to maximise their wildlife benefits by leaving strips of uncultivated land adjacent. Include specimen trees within hedgerows to provide nest sites and shelter while filling any gaps where possible.

Mapped: No

Linked Priority Species

[Turtle Dove](#)

[Bat Assemblage](#)

[Hedgehog](#)

F3 - There are better linked nature friendly habitats at the farm and landscape scale

Measures

F3a - Farmland wetlands

Restore and create wetland habitats such as ponds and scrapes for aquatic wildlife including great crested newts and snipe to slow the flow of surface water to support reduced flood risk and water pollution.

Mapped: No

F3b - Arable flowers

Maintain, improve and create cultivated and permanent field margins where a mix of arable plants can thrive. This will provide food, shelter and habitat corridors for wildlife such as farmland birds. Allow natural regeneration where possible to allow local seeds to establish. Utilise cultivation regimes under nature friendly farming practices for cultivated margins.

Mapped: No

Linked Priority Species

[Arable Margins Assemblage](#)

F4 - There is an increase in the area of farmland under soil-friendly management

Measures

F4a - Soil health

Implement sustainable farming practices to improve soil health and reduce erosion along susceptible areas. Create vegetated areas on steeper slopes to improve soil health and reduce the impact of erosion on nearby watercourses. Consider directly drilling and minimum tillage to reduce the amount of carbon released in peat rich soils in the Flit Valley. Reduce compaction from heavy machinery by adopting Controlled Traffic Farming practices in the Chilterns in particular, to allow water to infiltrate the aquifers. Keep soil covered using catch and cover crops to improve soil structure and fix nutrients for following crops.

Mapped: No

Linked Priority Species

[Arable Margins Assemblage](#)

Rural grants and payments

Funding for farmers, growers and land managers -

Rural Payments Agency

How to do the SFI actions for soils - GOV.UK

Nature Friendly Farming Network

Slow the Flow: Farming for flood management | Nature Friendly Farming Network, NFFN website

Hedgelink

Hedgerow Management Advice | Hedgelink

People Trust for Endangered Species (PTES)

Hedgerows information sheet

FarmWildlife

Seed-rich habitats guidance

Plantlife

Threatened-arable-plants-identification-guide-Plantlife.pdf

5.5.5 Further information and guidance

Bedfordshire Local Nature Partnership/BRMC

Habitat Action Plan: Arable Margins

National Farmers Union

How farmers can improve soil health

Countryside Stewardship

Flower rich margins and plots

Management of hedgerows

Planting new hedges

Management of species rich grassland

Nectar flower mix

Cultivated areas for arable plants

4m to 6m buffer strip on cultivated land

5.6 Neutral and Calcareous Grassland

Bedfordshire has some very important and diverse areas of grassland. The soil type, either acid, alkaline or neutral has a bearing on what species can be found there. Our seasonally wet grasslands such as those around the county's rivers and wetlands also add to the diversity. They provide spectacular views across rolling hills and multi-coloured meadows.

In the south of Bedfordshire, the Chilterns stretch from Berkshire and Oxfordshire to areas such as the Dunstable Downs. A distinctive feature of the Chilterns is their alkaline chalk grassland which provides a home to an array of rare species.

Chalk grasslands form a nationally important complex and, for example, are the only locations in Eastern England for the burnt orchid. Man and Musk Orchids also have significant populations in the area. Great Pignut is largely confined to the Chilterns in the UK, and Bedfordshire sites remain a stronghold for the species. The Chilterns is recognised as an Important Plant Area (IPA) by Plantlife, largely because of its retention of a range of arable plants.

Exposed chalk within wider chalk landscapes provides an exceptional microhabitat for rarer species. These could be exposed chalk in small quarries, along sunny areas and on the ramparts of ancient earthworks.

Species-rich grasslands have continued to decline in both extent and condition, largely through agricultural intensification. The connectivity of sites has varied, but direct habitat losses have combined with management issues, particularly a reduction in grazing pressure, to affect the quality of some species rich grasslands. Lack of active management means scrub can spread across the grassland, which makes the area unsuitable to the specialist grassland species. A balanced grazing regime will benefit floral diversity.

Historic features such as ridge and furrow farming, which date back to medieval times, often benefit from sensitive management for nature, through grazing or scrub clearance. Insufficient grazing means that scrub will eventually encroach onto grassland, affecting suitability for grassland species and damaging historic features (Historic England, 2023)

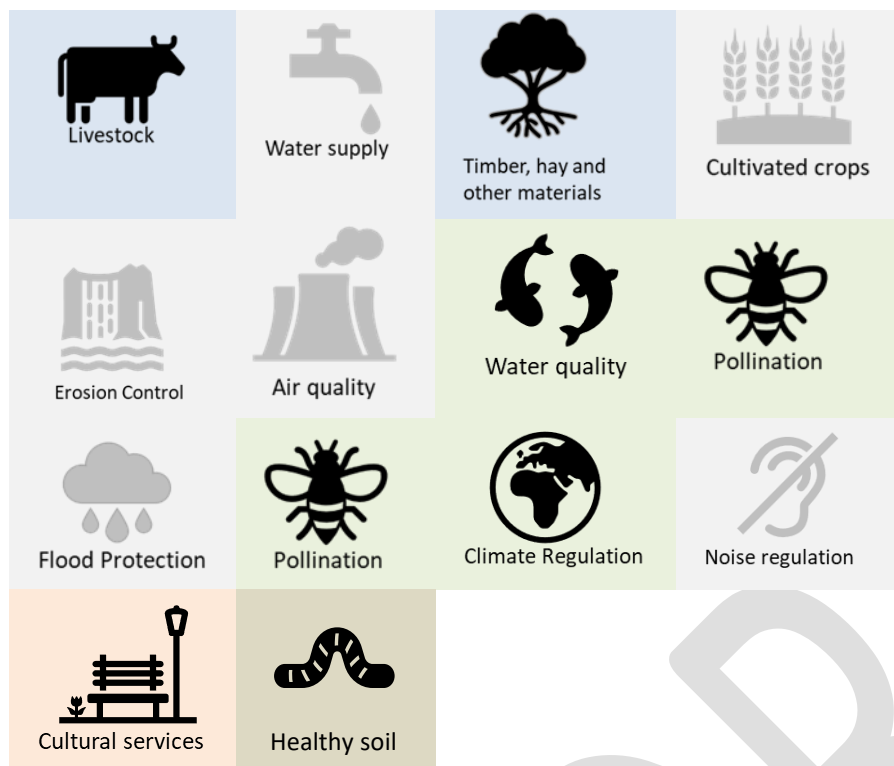
5.6.1 Priority habitats

Lowland calcareous grassland - Lowland calcareous grasslands are developed on shallow well-drained chalk soils. These grasslands are now largely found on distinct topographic features such as escarpments or dry valley slopes and sometimes on ancient earthworks in landscapes strongly influenced by the underlying geology. Within Bedfordshire, this is found within the chalk landscape of the Chilterns.

Floodplain grazing marsh - Grazing marsh is defined as periodically inundated pasture, or meadow with ditches which maintain the water levels, containing standing brackish or fresh water. The ditches are especially rich in plants and invertebrates. Almost all areas are grazed, and some are cut for hay or silage. This habitat is mainly found along the Ouse, Flit and Ivel.

Lowland meadows - Lowland neutral meadows and pastures consist of a rich mixture of native grasses and broad-leaved herbs. They occur throughout lowland UK, often on shallow slopes or level ground with relatively deep soils that are neither strongly acidic nor lime-rich. The meadows may be managed for hay cropping, usually with grazing of the aftermath (vegetation that re-grows following cutting), or by grazing as permanent pasture (Natural England, 2015). They are found in small areas across Bedfordshire.

5.6.2 Key ecosystem services provided by calcareous grassland



5.6.3 Opportunities for recovery

- **Work with landowners to connect chalk grassland protected sites**

There are several SSSI and LWS between Knocking Hoe in the east of the county, through the Hexton Estate, crossing the Bedfordshire/ Hertfordshire border through to Sundon quarry. The acquisition of the Hexton Estate by Natural England near Barton le Clay by Natural England, provides a key opportunity for the near future with habitat linkage, and linked management of sites over a

larger area.

- **Field margins**
Expanding and connecting the assemblage of semi-natural grasslands, for example by sensitive management of buffer strips along field margins to benefit wildlife, soil and water quality.
- **Roadside verges**
Promoting and enhancing management of road verges for high-quality grassland habitat. These would provide linear connectivity, linking up other habitats such as woodlands, grassland and heathland.
- **Restore diverse meadows on arable land**
Utilise less profitable areas for cultivation, for example steeper, wetter or more remote land to establish diverse grassland. Establishing yellow rattle *Rhinanthus minor* can be very beneficial to restoring diverse meadows. Keeping s
- **Buglife's B-Lines¹⁸**
The B-Lines are a series of 'insect pathways' running through our countryside and towns, along which we are restoring and creating a series of wildflower-rich habitat stepping stones. These lines can be viewed on the Buglife website.

5.6.4 Grassland priorities and measures

Bedfordshire has a diverse mix of grassland depending on the soil type. They are home to species such as green-winged orchid, pasqueflower and Duke of Burgundy butterfly. However, many of the measures benefit calcareous, neutral and acidic grassland such as managing scrub

¹⁸ B-Lines are an imaginative and beautiful solution to the problem of the loss of flowers and pollinators www.buglife.org.uk/our-work/b-lines/

encroachment and maintaining low soil fertility which would otherwise promote non-target species and reduce biodiversity.

G1 - New wildlife rich calcareous and neutral grassland has been created to connect existing sites

Measures

G1a - Calcareous grassland opportunity

Create new areas of calcareous grassland including along roadside verges by introducing suitable grazing or cutting to manage sward diversity. Where there is little chance of success through natural regeneration, plant or sow suitable and locally native calcareous grassland species (seek expert advice from WTBCN for example). Provide scrubby areas and hedgerow boundaries for diversity. Create new areas of bare 'sterile' chalk substrate as found in chalk pits, along the edges of old hollow-ways associated with steep earthworks. Create new features of this type so that this microhabitat is available more widely through the chalk downland landscape. This may require machinery to scrape out old features to reveal underlying subsoil or bedrock.

Mapped: Yes

Linked Priority Species

[Duke of Burgundy](#)

[Small Blue](#)

[Ground Pine](#)

[Musk Orchid](#)

G1b - Neutral grassland opportunity

Create new areas of neutral grassland including along roadside verges by introducing suitable grazing or cutting to manage sward diversity. Where there is little chance of success through natural regeneration, plant or sow suitable and local native neutral grassland species. Create areas of scrub and hedgerow boundaries for transition between habitats. Create small areas of bare ground to promote new growth and provide habitat

for invertebrates such as ground beetles. Aim to prevent nutrient levels from building by restricting the application of fertiliser or manure. Limit herbicides to targeted usage.

Mapped: Yes

G2 - All existing semi-natural calcareous and neutral grassland will be conserved, expanded and linked

Measures

G2a - Existing calcareous grassland

Maintain appropriate calcareous grassland grazing or cutting regimes that creates swards with varied height and structure. If grazing is not possible, cut in late summer removing the cuttings to reduce nutrient input. Further prevent nutrient levels from building by restricting the application of fertiliser or manure. Limit herbicides to targeted usage. Maintain and enhance scrub patches and hedges around fields to provide connectivity between habitats. Manage roadside verges to promote diverse grassland habitats and create connectivity by appropriate management.

Mapped: Yes

Linked Priority Species

[Long established chalk grassland assemblage](#)

[Duke of Burgundy](#)

[Small Blue](#)

[Ground Pine](#)

[Musk Orchid](#)

G2b - Existing Neutral Grassland

Maintain appropriate neutral grassland grazing or cutting regimes that creates swards with varied height and structure. Further prevent nutrient levels from building by restricting the application of fertiliser or manure. Limit herbicides to targeted usage. Maintain and enhance hedges around fields to provide connectivity between habitats. Manage

roadside verges to promote diverse grassland habitats and create connectivity by appropriate management. Species that may benefit include green-winged orchid, brown hare, skylark and kestrel.

Mapped: Yes

5.6.5 Further information and guidance

Defra

Create and restore species-rich grassland – Farming

Countryside Stewardship

Management of successional areas and scrub

Management of species-rich grassland

Restoration towards species-rich grassland

Creation of species-rich grassland

Bedfordshire Local Nature Partnership

Bedfordshire and Luton Habitat Action Plan

Lowland Calcareous Grassland

Lowland Meadows

Natural England

Illustrated guide to lowland chalk and limestone grassland

Climate change adaptation manual

Buglife

Lowland calcareous grassland – Buglife

Plantlife

Managing grassland road verges

Managing Meadows

Chilterns National Landscape

The Management Plan for the Chilterns National Landscape

Kent Wildlife Trust

Land Mgt Advice Sheet 2 - Mgt of neutral grassland



Common spotted orchid Credit: Richard James

5.7 Lowland Heathland and Acid Grassland

The more acidic, sandy soils of the Greensand Ridge are home to Bedfordshire's areas of lowland heathland and closely associated acid grassland. Lowland heathland is one of the most threatened habitats in England and is internationally important. The vivid purple colours of heather flowers provide a late summer spectacle along with a diverse range of plant and invertebrate species.

The Greensand Trust have restored areas of heathland within Rushmere Country Park (and have worked with Tarmac to restore heathland at Rammamere Heath, just over the Buckinghamshire border), all of which is now within an extended "Kings Wood and Rushmere National Nature Reserve (NNR)". Other restoration and creation projects include Maulden Heath, Coopers Heath SSSI at Ampthill and a smaller area at Centre Parcs. It is thought that heathland now covers approximately 170ha in the county.

Encroachment of trees onto heathland is a perennial problem, particularly for those heaths that cannot be grazed. Mechanical management can also be problematic, and the BCN Wildlife Trust has been successfully trialling turf stripping at Cooper's Hill to create early successional habitat.

Bedfordshire's heathlands are fragmented making them vulnerable to climate change and development and the lack of connectivity prevents many heathland species from dispersing.

5.7.1 Priority habitats

Lowland heathland - lowland heathland is usually an open landscape on acidic and shallow peat soil. It is characterised by the presence of plants such as heathers and gorses. It is generally found below 300m in altitude in the UK. Lowland heath is found along the Greensand Ridge between Leighton Buzzard and Woburn, Ampthill and Maulden and at Sandy.

Acid grassland - Lowland dry acid grassland typically occurs on nutrient-poor, generally free-draining soils with a pH ranging from 4 to 5.5, overlying acid rocks or superficial deposits such as sands and gravels, at heights below about 300m. It often occurs as an integral part of lowland heath landscapes, in parklands and within woodland mosaics. It is normally managed as pasture.



Heathland at Coppers Hill Credit: Laura Taylor

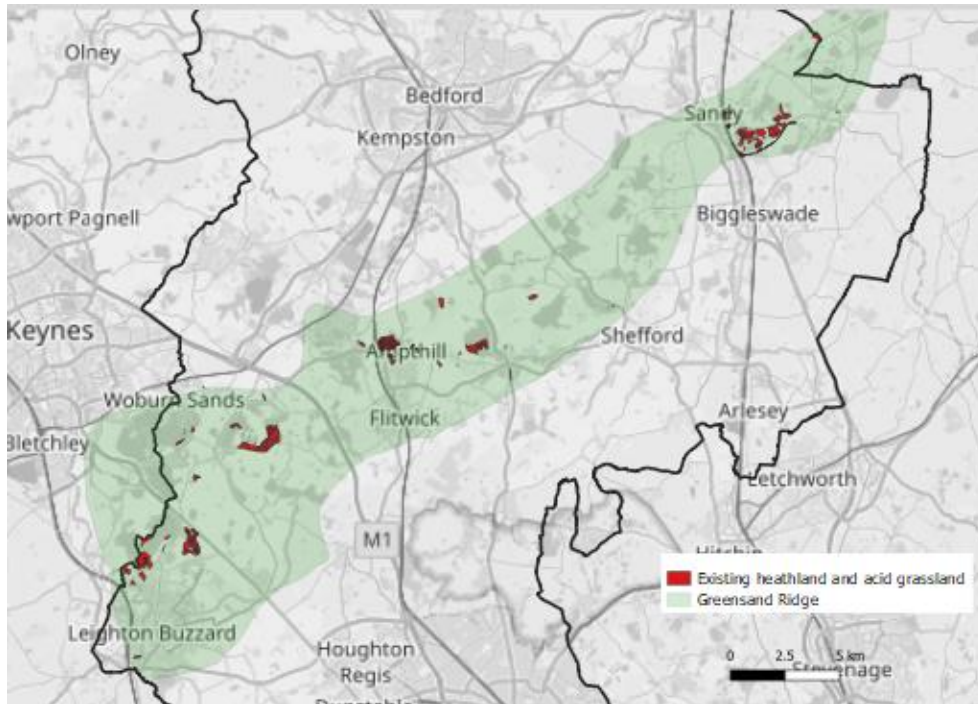
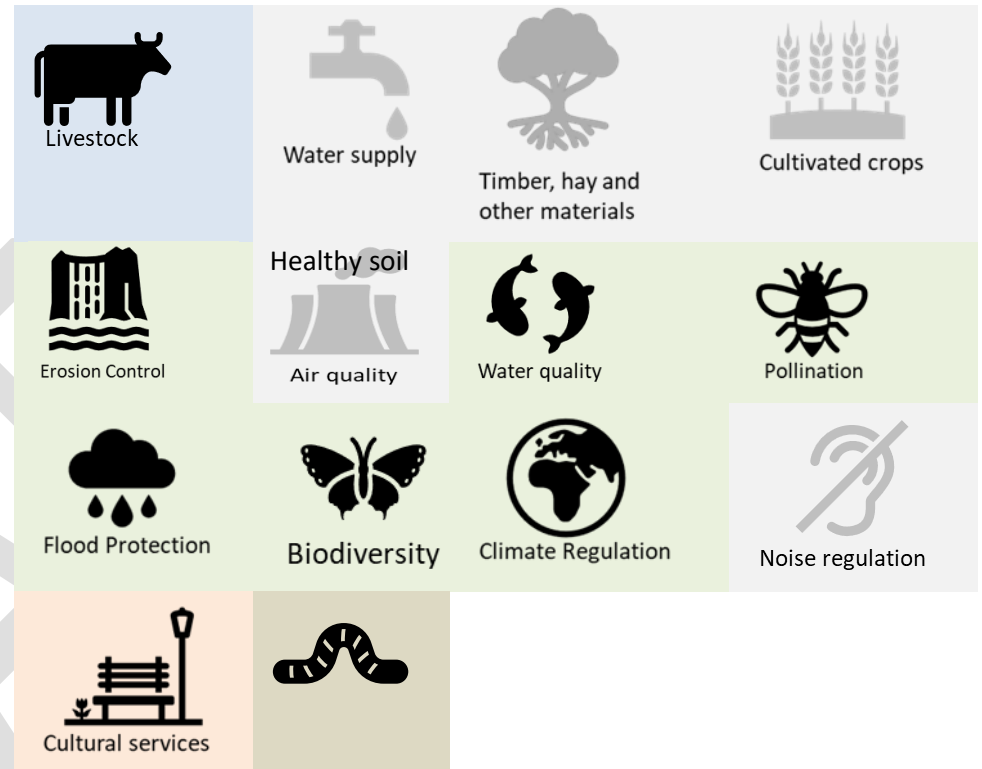


Figure 14 - Map showing Bedfordshire's existing lowland heathland along the Greensand Ridge

5.7.2 Key ecosystem services provided by heathland habitats



5.7.3 Opportunities for recovery

- Heathland and acid grassland creation**
 There are opportunities to create and reinstate areas of heathland habitat along the Greensand Ridge through appropriate land management methods including clearance of coniferous woodland and scrub on poorer soils and scarification followed by seeding if required.

- **In particular**, heathland restoration and creation projects at Aspley Heathland at the RSPB Lodge reserve in Sandy provide good opportunities for expansion.
- **Restoring heathland on woodland plantation**
Restoring historic heathland in areas of woodland plantation, where commercial woodland has been planted. Areas that were most recently heathland will offer the best opportunity to restore heather. Rides within these woodlands to promote heathland are also beneficial.
- **Restoring quarries**
Quarries in suitable locations for heathland and acid grassland could be restored to a mix of heathland and acid grassland to create stepping stones between currently isolated areas. Avoid replacing the nutrient rich topsoil.

5.7.4 Heathland priorities and measures

Bedfordshire, like many counties has lost significant areas of heathland. All Bedfordshire's heathland is found along the Greensand Ridge. Lack of management is considered the main cause of heathland loss and decline (Bedford Local Nature Partnership, 2015). The heathland outcomes and measures seek to restore good heathland management to support species such as adders and small heath butterfly.

H1 - New wildlife rich heathland and acid grassland has been created to buffer, link and provide stepping stones between existing sites

Measures

H1a - Heath and Acid Grassland opportunity

Create new areas of heathland and acid grassland mosaics to link existing habitat areas. Prioritise recently lost areas of heathland. Encourage colonisation by using heather seed (directly or in brush or capsules) or cuttings, preferably from a donor site nearby, where there is little chance of success through natural regeneration through the seed bank. Graze or cut the colonising heathland vegetation at set times to maintain diverse maturity of plants. Provide areas of bare ground for invertebrates. Species that may benefit include nightjar and small heath butterflies.

Mapped: Yes

Linked Priority Species

[Adder](#)

H2 - Existing heathland and acid grassland sites and those with traces of heathland remaining are restored and managed

Measures

H2a - Heath and Acid Grassland existing

Manage existing heathland and acid grassland mosaics through appropriate hydrological management to ensure wet heath/acidic mire areas are maintained. Maintain a diverse vegetation structure including patches of scrub and gorse to provide a range of habitat niches including lichen and moss dominated area. Create areas of bare ground for invertebrates such as solitary wasps and bees and feeding sites for birds. Integrate firebreaks and ponds to improve climate resilience and mitigate pressures from wildfire. Maintain rides to encourage heather growth

Mapped: Yes

Linked Priority Species

[Adder](#)

5.7.5 Further information and guidance

Countryside Stewardship

LH1: Management of lowland heathland - GOV.UK

LH2: Restoration of forestry and woodland to lowland heathland - GOV.UK

LH3: Creation of heathland from arable or improved grassland - GOV.UK

Greensand Country

Habitat Resource Pack: Lowland Heathland

Buglife

Lowland Heathland Guidance

Natural England

Climate change adaptation manual

FarmWildlife

Lowland Heathland Guidance

5.8 Rivers, wetlands and ponds



Great crested grebe on lake. Credit: Ben Woodfine

Many of Bedfordshire's Towns and villages are built around or next to rivers, wetlands, lakes and ponds. Bedfordshire's two largest towns, Luton and Bedford have rivers through the centre. These rivers provide vital functions for people and wildlife including a connection to nature and wellbeing benefits.

Lakes such as Lidlington and Stewartby on the former brickworks at Stewartby to the south of Bedford are a noticeable feature on the A421. This area also supports reedbeds and fen, while Felmersham Gravel Pits is a designated SSSI due to its abundance of dragonflies, aquatic plants and birds.

The River Great Ouse catchment dominates Bedfordshire's river network with several chalk streams starting their journeys in Bedfordshire. Spined loach can be found mainly on the Ouse with Eels and brown trout on the fringes of Bedfordshire. Otters can also be found within the wider catchment.

The chalk streams tend to be small stretches within the county, feeding mostly into Hertfordshire, however the escarpment streams with 'chalky' characteristics are important but under-recognised. The River Lea (or Lee) in Luton was historically a key feature but was largely culverted through the town centre. A small section has now been reinstated, demonstrating the potential for further river restoration. The marl lakes at Houghton Regis quarry also creates unique habitats for birds and invertebrates.

Small sections of the Gade and Ver chalk streams rise in Bedfordshire, before running into Hertfordshire, and are in poor and moderate condition respectively, with pollution and water availability being the key concerns. There are also a number of waterbodies with chalk stream characteristics rising from the north facing escarpment and flowing north such as Barton Brook rising at Barton Springs. These have been affected by modification and shading as well as reduced flows and increased nutrients.

The Lea flows from Leagrave Common being joined by the Lewsey Brook, which rises in Lewsey Park and is itself first joined by the Houghton Brook from Houghton Regis. At Limbury the Lea is joined by the Cats Brook or Catch Brook, which rises in a garden in Icknield Way. Finally it is met by the Riddy Brook from Cowslip Meadow which joins the Lea under the A6 at Austin Road.

The Lea flows through the Grade II listed landscape of Wardown Park (through an online lake), The Moor Common and Manor Road Park as well as a recently created pocket park – Hat Gardens. It then leaves Luton, flowing into the Luton Hoo Estate, into London and then the Thames. Sections of the river are culverted, although a small section was de-culverted in central Luton in 2020 as part of the Luton Town Centre masterplan. This section of the Lea is classified as being in 'Poor' condition (an improvement from bad in 2019) under the Water Framework Directive criteria (Environment Agency, 2022).

Ponds, including those in gardens and parks, are important homes for species such as amphibians and reptiles.

5.8.1 Bedfordshire LNRS through a Blue Lens¹⁹

The Bedfordshire Local Nature Partnership led on this project to ensure that considerations around the water environment could be brought into the LNRS process in Bedfordshire. It ran alongside the early stages of the LNRS. It specifically aimed, using a variety of GIS approaches, to identify a series of opportunities that would enhance the freshwater environment both in terms of its contribution to nature recovery, and through providing wider environmental benefits.

Several water challenges exist in Bedfordshire. Some of the most significant include the extent of modification of the Upper and Bedford Ouse Catchments (90% are classed as heavily modified), diffuse nutrient pollution from agriculture, issues of flooding but also low flows, wetland loss and peat degradation. In response to this a prioritised list of water related needs: improved geomorphology and in channel habitat connectivity, reducing nutrient pollution (ammonia and phosphate), high and low flow regulation and reversing wetland and peat degradation in Bedfordshire was established by a range of stakeholders via a Bedfordshire LNRS workshop in October 2023. (Alison Holt, 2024)

5.8.2 Priority habitats

Rivers - This includes a very wide range of waterbody types, encompassing all natural and near-natural running waters in the UK (i.e. with features and processes that resemble those in 'natural' systems). Only small sections exist in Bedfordshire that meet the criteria. This includes the Riseley Brook, the channels of the Ouse above Bedford where the spined loach (*Cobitis taenia*), an Annex II Habitats Directive species, occurs.

¹⁹ Bedfordshire LNRS Blue Lens: opportunities for enhancing the water environment [Bedfordshire-LNRS-Blue-Lens Final.pdf \(bedfordshirenaturally.com\)](https://www.bedfordshirenaturally.com/Bedfordshire-LNRS-Blue-Lens-Final.pdf)

There are only around 200 chalk streams globally, with the UK home to 85% of them. There are also other important streams flowing north into Bedfordshire, from the Chilterns escarpment, which have chalk stream characteristics including streams such as the Barton Brook which flows from springs at the foot of the North Chilterns escarpment at Barton Hills NNR.

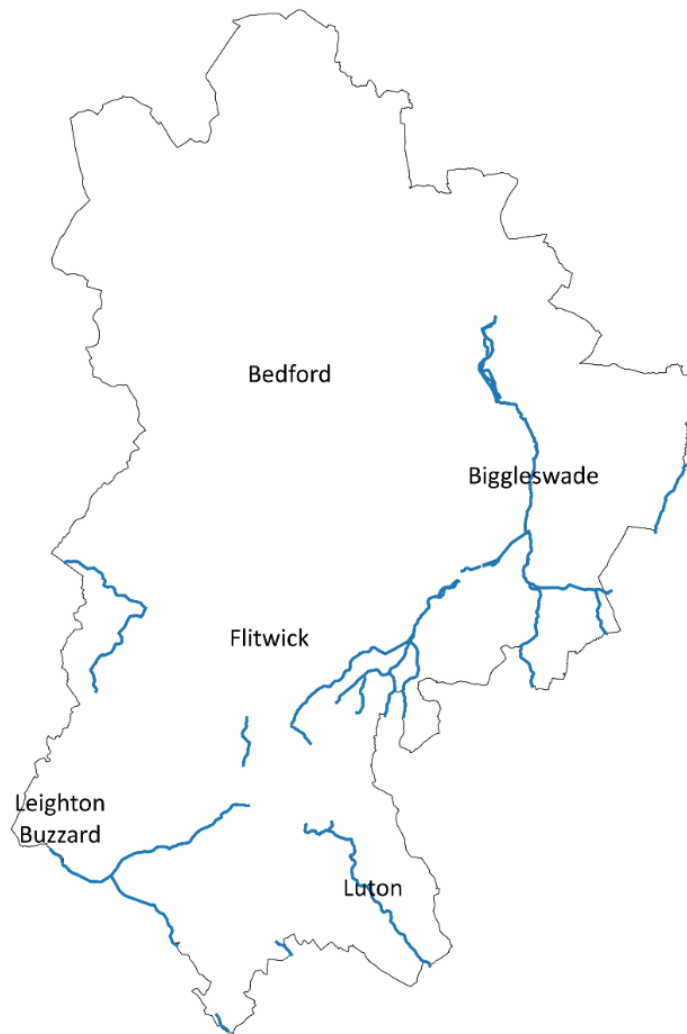


Figure 15 – Chalk streams within Bedfordshire. Source: Natural England

Ponds – Ponds are permanent (holding water all year round) or seasonal (dry during summer) standing water bodies up to 2ha in extent, which support good numbers of invertebrates, amphibians and plants. There are thought to be around 3,700 ponds in Bedfordshire (Bedfordshire Local Nature Partnership, 2015).

Purple moor-grass and rush pastures - Purple moor grass and rush pastures occur on poorly drained, usually acidic soils in lowland areas of high rainfall. Small pockets of purple moor-grass and rush pastures can be found near Flitwick and Woburn.

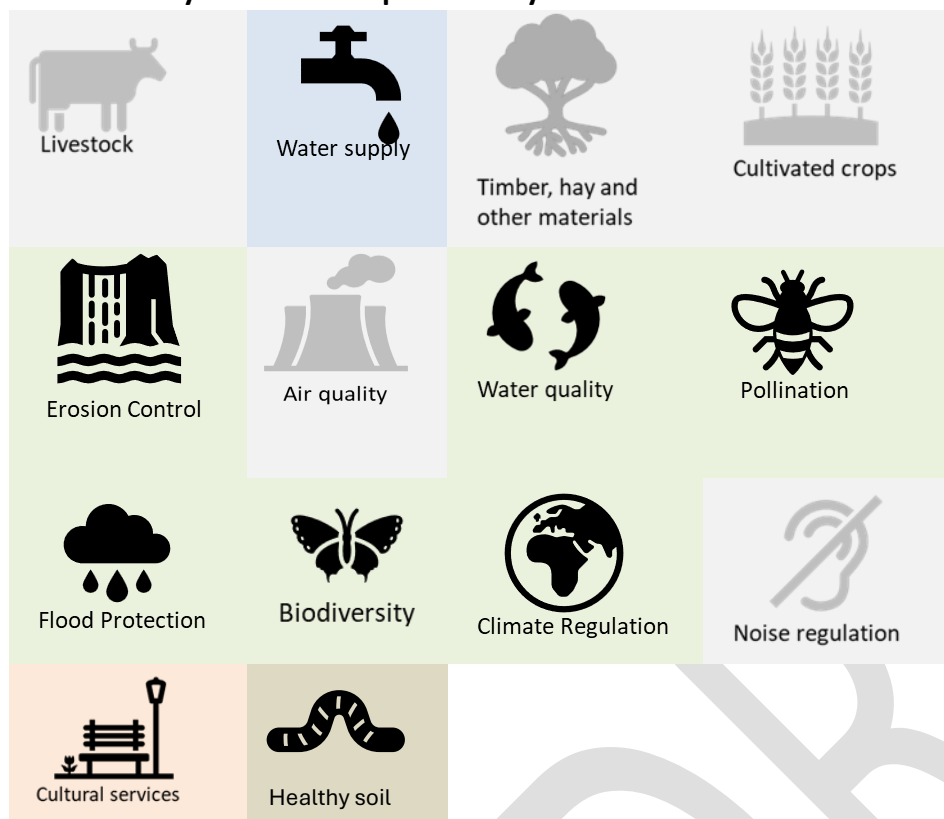
Lowland fens - The UK is thought to host a large proportion of lowland fen in Europe (Joint Nature Conservancy Council, 2024). Fen vegetation has declined dramatically in the past century. Fens predominantly receive water laterally via mires, springs and flushes. But water also moves vertically from within peat and soil.

Reedbeds - Reedbeds represent a type of wetland ecosystem primarily composed of the common reed, *Phragmites australis*. These areas typically maintain a water table that remains at or above the surface throughout most of the year. The most notable reedbed site at Marston Vale Country Park is a potential site to see or hear rare bitterns along with a range of other species.

In addition to Priority habitats – Small areas of **peat** can be found through the River Ivel and Flit valleys. These areas are generally waterlogged, acidic and deficient in plant nutrients providing home to specialised plant assemblages with cottongrass, mosses and marsh pennywort. It is important for amphibians.

There are **lakes** and other larger bodies of water including Brogborough and Stewartby Lakes. They are important for birds such as wintering wildfowl, dragonflies and aquatic plants. Restored quarries such as Broom Lakes CWS, Cainhoe Lakes at Clophill Lakes Nature Reserve and Willington Gravel Pits are also great places for nature.

5.8.3 Ecosystem services provided by rivers and wetlands



5.8.4 Opportunities for recovery

- **Clophill Lakes Nature Reserve**

The creation of a nature reserve at Clophill Lakes by the Greensand Ridge near Shefford is creating wetland and grassland habitat which could connect to additional sites.

- **Bedford River Valley Park**

The Bedford River Valley Park (BRVP)²⁰ is a major new green space being promoted by a coalition of landowners, businesses, local people and the statutory bodies. The park will cover 868 hectares (2,145 acres) largely in the floodplain of the River Great Ouse to the east of Bedford, linking the existing Priory Country Park in the town to the wider countryside around the village of Willington. This provides the opportunity for nature recovery and public access to green and blue infrastructure.

- **Bedford and Milton Keynes Waterway**

This proposal seeks to create a new waterbody linking Bedford and Milton Keynes. It provides an opportunity to increase biodiversity through the creation of new wetlands and parkland and public amenity through cycle and walking routes ²¹.

- **Sustainability reductions**

Reducing the amount of water taken from rivers, particularly chalk streams for domestic and commercial use can improve water flows benefiting wildlife.

- **Manage river catchments**

Maintaining and restoring semi-natural habitats such as wetlands and woodlands can slow the flow of water over land. This helps reduce high flows in rivers and can improve water quality infiltrate surface water down into the aquifers, providing flow regulation and nutrient reduction benefits.

²⁰ Further information on Bedford River Valley Park <https://www.bedfordrivervalley.org.uk/>

²¹ Further information on Bedford and Milton Keynes <https://www.bmkwaterway.org/>

- **Restore 'ghost' ponds**

Ghost ponds are locations where ponds existed before being infilled. These sites can often be located by reviewing historic OS maps or through changes in the topography via Lidar mapping. Following excavation, aquatic plant seeds that have been dormant in the soil can then flourish.

- **Protecting peat**

Bedfordshire has a small amount of peatland in the Flit valley, and in the Ivel Valley (Potton Brook catchment) although the extent and condition of the latter is not well-known. Peat soils not only contribute to the development of rare and special habitats, they also store significant amounts of carbon – several times that stored by other habitats.

Knowledge of the Flit Valley peat is now improved following the Greensand Trust's "Putting Peat on the Map" project which has surveyed significant areas within the zones identified as being historically important for peat. The project aims to protecting and restoring this where possible, as part of a joined-up approach to water level management with land managers. It has also provided an opportunity to raise awareness of this habitat.

- **Restore river channels**

Where possible, restore natural channels to allow natural river processes to take place and re-connect them with their floodplains, in line with the Upper Bedford Ouse Catchment Partnership Strategic River Restoration Plan and Blue Lens work. Seek to extend and connect fragments of semi-natural habitat in the floodplain and nearby.

- **Sewage treatment works**

To reduce nutrient input from smaller/rural sewage treatment works.

- **Grand Union Canal**

A small part of the Grand Union Canal runs through southwest Bedfordshire and through Leighton Buzzard. This follows the course of the Rivel Ouzel up to Milton Keynes and beyond. Opportunities to improve the canal for biodiversity could benefit connecting waterbodies.

5.8.5 River, wetland and pond priorities and measures

The River Great Ouse catchment dominates Bedfordshire's river network with several chalk streams starting their journeys in Bedfordshire. Spined loach can be found mainly on the Ouse with Eels and brown trout on the fringes of Bedfordshire. Otters can also be found within the wider catchment.

Significant lakes including Priory Country Park and Stewartby are home to fish and wildfowl, particularly in winter. There are also areas of wetlands, pond, reedbeds and floodplain grazing marsh which are home to great crested newts, waders such as lapwings and a small number of bitterns. The Rivers, Wetlands and Ponds measures seek to improve the water quality and natural functioning of our riparian and wetland habitats and provide better connectivity.

R1 - The biological health of rivers, streams, ponds, lakes and groundwaters has improved, many more are in good condition, and the levels of chemicals within them has been reduced.

Measures

R1a - Sewage treatment works

Target treatment works improvements where they are currently having the greatest impact. This includes improvements to processes and the creation of treatment wetlands. This should include the targeting of improvements at smaller works (including Descriptive Treatment Works serving less than 250 people) at locations where the receiving waterbody is most likely to be significantly impacted by nutrient inputs from treated effluent (due to low volume receiving flows), and also those locations where storm overflows have the greatest impact on water quality.

Mapped: No

R1b - River water quality

Reduce soil erosion and the impacts of run-off by implementing sensitive land management techniques, protecting soils and reducing nutrient input. Create woodland, hedgerow and wetland features, buffers (of between 5 and 50m depending on watercourse size), swales or bunds. Reduce impact of poaching by livestock by reducing access to the riverbank.

Mapped: Yes

Linked Priority Species

[Brown Trout](#)

[Eel](#)

R2 - River flows and water dependent habitats and species are more resilient and are able to adapt to climate change

Measures

R2a - River Restoration

Restore rivers to their natural course by realignment to create more natural diverse flows, benefitting aquatic species. Reprofile and lower banks to restore connectivity between the river and floodplain. Where connection to floodplain is not possible, install in-channel features such as berms to create meanders and roughness. Reduce impact of poaching by livestock by reducing access to the riverbank.

Mapped: Yes

R2b - River obstacles

Remove redundant weirs and other obstacles to restore more natural flow and facilitate movement of fish and invertebrates. Where this is not possible, bypass these structures, and if this is not possible install fish ladders and other modifications to aid passage.

Mapped: Yes

R2c – Natural Flood Management (NFM)

Implement natural flood management measures such as leaky dams, bunds, swales or buffers within the catchment that promote water retention, reduced flood risk and prevent soil erosion, which impacts on water quality. Create wetland or wet woodland habitats in key target areas as identified through the Blue Lens LNRS report.

Mapped: Yes

Linked Priority Species

[Brown Trout](#)

[Eel](#)

[Water Vole](#)

R3 - The condition and health of chalk streams and other spring-fed waterbodies have improved, and they receive greater recognition and protection as valuable habitats.

Measures

R3a - Chalk streams

Restore chalk streams and other spring-fed waterbodies to a more natural state to improve resilience to changes in flow and help with over-heating of water (e.g. by providing a balance of light and shade). Use restoration techniques such as re-meandering and reducing channel width where over-widened, to create more sinuous watercourses with natural diverse flows. Manage invasive species such as floating pennywort and Himalayan balsam where possible throughout the catchment.

Introduce gravels to river channels to provide suitable spawning sites.

Prioritise habitat creation that benefits infiltration rates into aquifers where these are under greatest pressure from abstraction

Mapped: Yes

R3b - Chalk stream assessment

Identify potential chalk streams arising from the Chilterns escarpment by assessing characteristics. And formally recognise those as chalk streams with Natural England

Mapped: No

Linked Priority Species

[Brown Trout](#)

[Eel](#)

[Water Vole](#)

R4 - Existing areas of floodplain grazing marsh, fens and reedbeds are maintained and enhanced and new areas are created to improve wetland connectivity

Measures

R4a – Wetlands

Create new and restore existing wetland areas by managing vegetation and restoring natural hydrological processes. Implement measures such as blocking drains, creating bunds, or re-wetting areas to raise water levels. Allow marginal vegetation to develop including hedgerows while preventing encroachment from scrub. Implement appropriate extensive grazing regimes or cut and remove techniques to create a diverse sward height and structure. Create in-field wetland scrapes and swales in drier areas to store and slow the flow of water, extending the wet habitat area.

For reedbeds, manage water levels to create shallow areas of water year-round and introduce reed (Phragmites) through planting or bringing in material from existing reedbeds. Manage scrub and opportunistic species to assist reedbed establishment and maintain open water features. Benefitting aquatic plants, amphibians and dragonflies.

Mapped: Yes

Linked Priority Species

[Water Vole](#)

R5 - New ponds have been created, and existing ones protected, maintained and enhanced

Measures

R5a – Ponds

Restore and manage existing ponds by managing vegetation and creating buffer zones to benefit aquatic wildlife and retain water. Control scrub and invasive non-native plants to maintain open water while retaining small areas of overhanging trees, bushes and deadwood for dragonflies and other invertebrates.

When creating ponds in intensively managed landscapes, such as arable or urban areas, prioritise creation/restoration on 'Zombie ponds' (those that exist in a sub-optimal state) and 'Ghost ponds' (locations where ponds no longer exist but field signs indicate they have done in the past) and where the ponds can be well buffered by rough grassland or low scrub. Where possible, ponds should be a minimum of 25m².

Mapped: Yes

R6 - The condition of peat resources and habitats has improved and now receive better recognition as valuable habitats and carbon stores.

Measures

R6a – Peatlands

Maintain and protect areas of peat and associated habitats through hydrological regulation and protecting water quality. Following restoration of the hydrology, re-vegetate areas of bare peat using best practice restoration techniques and appropriate plant species mixes. Initially, this should help to prevent or reduce further peat loss, but in the longer term will help to restore active peat formation.

Where sites may have recently dried out, or been colonised or planted with trees, remove up to 95% of native trees, and all invasive non-native species in line with Forestry Commission guidance. Keep water levels raised to reduce re-colonisation.

Mapped: Yes

R6b – Peatland Buffers

Review the hydrology of land surrounding the site to identify off-site drainage impacts, and also consider pressures such as abstraction, pollution and nutrient enrichment. Take action to reduce adverse impacts, for example through the creation of wetland to buffer the core area, or by diverting drains.

Mapped: Yes

5.8.6 Further information and guidance

Defra

Farming rules to protect watercourses policy paper

Rules for farmers and land managers to prevent water pollution

Get consent to convert woodland to open habitats

When to convert woods and forests to open habitat in England

Countryside Stewardship

WT4: Pond management (less than 100 square metres) GOV.UK

WT5: Pond management (more than 100 square metres) GOV.UK

WT6: Management of reedbed GOV.UK

WT7: Creation of reedbed GOV.UK

WT8: Management of fen GOV.UK

WT9: Creation of fen GOV.UK

WT10: Management of lowland raised bog GOV.UK

SW12: Making space for water GOV.UK

Freshwater Habitats Trust/UCL

Guide to the restorations, creation and management of ponds

Pond creation toolkit

Natural England

Natural England Access to Evidence Wetlands

Climate change adaptation manual

Environment Agency

Anglian River Basin District | Catchment Data Explorer

EA Pollution Prevention Rules for Farmers booklet.pdf

River Restoration Centre

what is river restoration final.pdf

Catchment Based Approach

Wide range of advice including Chalk Stream Strategy

Norfolk Wildlife Trust

Restoring Norfolk's Ponds Guidance booklet

5.9 Built up areas and developed land

Bedfordshire's towns and villages are home to approximately 700,000 people. Luton and the county town of Bedford are the two largest urban centres with Dunstable, Leighton Buzzard and Biggleswade other larger urban areas. Urban areas can provide vital homes for nature and Bedfordshire is no different. Nature in urban areas provides significant benefits including cleaner air, reduced flood risk and connection with nature which is proved to have benefits for mental and physical health. However, expanding urban areas and related infrastructure can put pressure on natural spaces. Major roads such as the A1 and M1 can provide significant barriers to wildlife, breaking up the connection between habitats.

Rivers form an important part of many of the towns and villages along with parks, woodland, gardens and in some cases roof spaces. Buildings have become vital nesting sites for swifts – a threatened bird species that visits the UK in the summer to breed. They nest in gaps in roofs which can also be home to other threatened species such as house sparrows and bats.

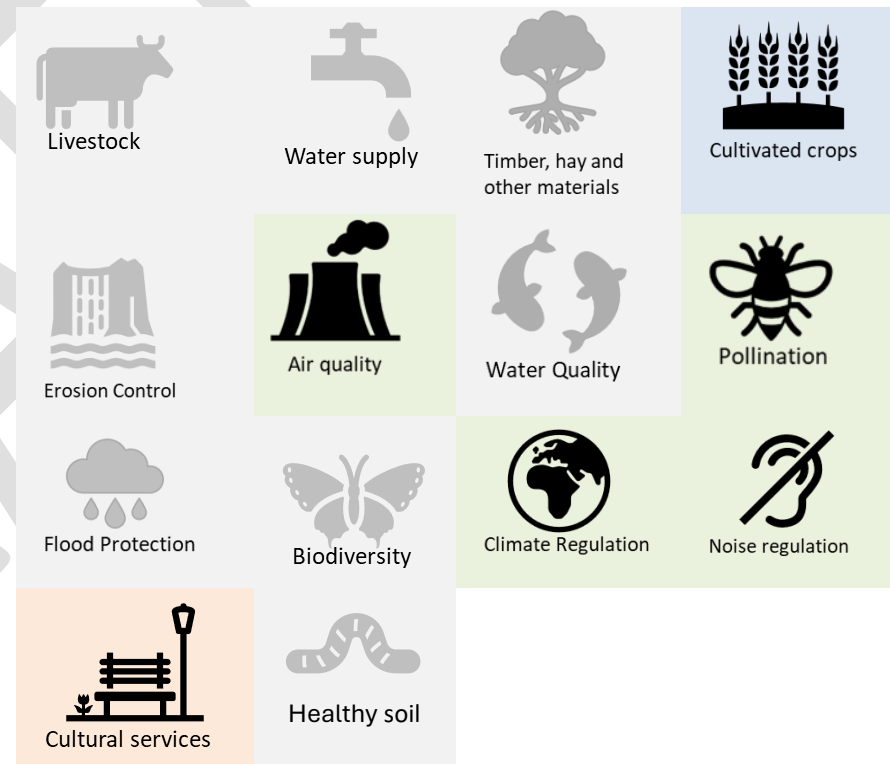
Bedfordshire's parks and gardens can provide habitats for a range of plants, animals and fungi. Garden ponds can be important for local populations of amphibians and insects, by providing them with a place to breed. Hedgerows bordering gardens and parks help provide connectivity to the wider countryside and lawns and wildflowers are vital for pollinators.

Previously developed land can be particularly important for some plant and invertebrate species. Between 12% and 15% of all nationally rare and nationally scarce insects are recorded from brownfield sites (JNCC). Quarry sites can also be important sites for wildlife. In Bedfordshire, former quarries such as Felmersham gravel pits and Sundon Chalk Quarry are designated as a Site of Special Scientific Interest.

5.9.1 Priority habitats

Open mosaic habitats on previously developed land – this habitat is generally made up of bare ground, short, patchy areas of grassland within areas previously build on or excavated. They can have high value for biodiversity.

5.9.2 Ecosystem services provided by nature in built up areas and previously developed land



5.9.3 Opportunities for recovery

- **Making use of built structures**

Barns, homes or other structures can benefit species such as barn owls, swifts and several bat species which may nest in them.

- **Sustainable drainage systems (SUDS)**

Targeting the development of sustainable drainage systems, road run-off attenuation and greenspace within urban centres to filter pollutants. This will be increasingly important as building continues to expand the commuter villages and towns.

- **Green and blue infrastructure**

Parks, gardens, cemeteries and the edges of sports fields provide an opportunity for nature friendly grassland management, tree and hedge planting or pond creation. This provides a variety of benefits from access to nature to improved air quality and storing water.

- **Restore quarries**

Restoration of former quarry sites to priority habitats can provide vital places for nature. Applying the 'Nature after Minerals' approach²².

- **Nature crossings**

Installing 'green crossing' to allow wildlife to cross major road and rail infrastructure, linking up important habitats.

5.9.4 Built up areas and previously developed land priorities and measures

Urban areas have expanded significantly in recent decades putting pressure on wildlife. The measures set out below seek to create and enhance habitats through towns and villages, connect nature across the

county and provide benefits to people and communities. Access to green space is important for wellbeing and mitigating the impacts of climate change such as warmer temperatures and flooding.

U1 - There are more healthy urban watercourses that are better connected, providing benefits for aquatic wildlife as well as enhanced accessibility, health benefits and amenity for people.

Measures

U1a - Constructed wetlands

Create constructed wetlands where possible, to reduce diffuse pollution, provide habitat for aquatic wildlife, improve water quality and provide public amenity.

Mapped: No

U1b - Re-naturalise rivers

Identify opportunities to de-culvert or re-naturalise river channels to allow daylight to reach the water and provide opportunities for wildlife and benefitting communities.

Mapped: No

U1c - Lea Linear Park

Restore sections of the River Lea in Luton by creating a linear park along the river and rerouting the Lea through Power Court as part of its redevelopment - providing amenity for local communities and suitable riparian habitat for wildlife

Mapped: Yes

Linked Priority Species

[Water Vole](#)

²² Nature after Minerals is a partnership resource for everyone with an interest in quarry restoration and minerals planning for biodiversity gain [Home - Nature After Minerals](#).

U2 - There are more nature rich areas in urban green spaces for communities to enjoy

Measures

U2a - Urban green space

Create nature friendly areas within built-up and previously developed land to provide access to nature for people. Allow areas of grass to grow through the spring and early summer to promote plant and invertebrate diversity. If necessary, seed with suitable native plants. Plant hedgerows around borders to support species such as house sparrows and log piles and compost for species such as slowworms. Use 'Green Wheels' approach to improve accessibility to green spaces via sustainable transport. Enhance habitat along connecting access routes.

Mapped: Yes

Linked Priority Species

[Bat Assemblage](#)

[Hedgehog](#)

[Swift](#)

U3 - There is an increase in biodiversity within built up and previously developed land, with better protection for nature rich areas

Measures

U3a - urban connectivity

Sensitively manage areas of green and blue infrastructure to promote biodiversity. Create wildlife corridors and screening features such as hedgerows, tree or scrub to screen areas from light pollution to protect sensitive species such as nocturnal invertebrates and bats. Plant hedges with hawthorn, blackthorn, ivy and holly.

Mapped: No

U3b - Restore Quarries

Restore mineral extraction sites to benefit biodiversity by implementing suitable management techniques. Create and connect important local habitat such as grassland, heathland or wetlands. While maintaining suitable existing soils on site. Species that may benefit include bitterns and sand martins

Mapped: Yes

U3c – Nature Crossings

Identify opportunities to create green crossing across major road and rail infrastructure to improve connectivity between habitats.

Mapped: Yes

U3d - Roadside NR

Manage and enhance roadside nature reserves through appropriate site management, to promote target habitat types such as grassland or heathland and by linking gaps where possible to increase connectivity with similar neighbouring habitat

Mapped: Yes

U3e – Churchyards and Cemeteries

Enhance churchyards and cemeteries by avoiding cleaning or renewing of hard surfaces wherever possible and ensure areas where lichens and mosses are present are not overgrown or shaded by ivy or tall vegetation. Reduce the use of chemicals such as pesticides in built up areas, utilising natural pest management.

Mapped: No

U3f - Private gardens

Enhance private gardens by reducing non-porous surfaces such as paving and concrete, artificial grass and other hard surfaces, increasing green space. Allow gardens to become more 'wild' in places, retain deadwood, avoid scrubbing hard surfaces where not necessary, to allow mosses and

lichens to grow, leave some areas of grass unmown. Create and maintain garden ponds.

Mapped: No

Linked Priority Species

[Bat Assemblage](#)

[Hedgehog](#)

U4 - Communities are better adapted to the impacts of climate change through nature-based solutions

Measures

U4a - Urban drainage

Create Sustainable Drainage (SUDs) in suitable locations to slow urban runoff and reduce flood risk

Mapped: No

U4b - river management

Ensure riparian management plans are in place through local authorities and community engagement to maintain river flows and biodiversity.

Mapped: No

U4c - urban trees

Plant diverse tree species and scrub to create community woods, lone trees and orchards in urban areas and close to settlements to provide shading from increasing temperatures and reduction in flooding impacts.

Mapped: No

Linked Priority Species

[Bat Assemblage](#)

[Hedgehog](#)

5.9.5 Further information and guidance

Bedfordshire Rural Communities Charity

Green Wheels guidance²³

Natural England

Climate change adaptation manual

Forest Research

Urban Tree Manual Forest Research

Enfield Council

Enfield SuDS Design and Evaluation

RSPB

Our guide to a beautiful, wildlife friendly garden

Local Government Association

Sustainable drainage systems

Buglife

managing urban areas for pollinators_0.pdf

Bat Conservation Trust

Artificial Lighting Guidance Buildings, planning and development

²³ Green Wheels are multi-user access routes around communities which pass through corridors of landscape, habitat and heritage interest. Coordinated by the Bedfordshire Rural Communities Charity

5.10 Priority species

Many of the threatened species in Bedfordshire require more, bigger, better and more joined up habitats and would benefit from the measures set out in the sections 5.3-5.9. However, some species require additional or bespoke measures to aid their recovery. This strategy identifies locally significant species relevant to Bedfordshire and which of these species should be prioritised for recovery in the LNRS. The designation of priority species helps focus conservation efforts and resources on those species that the LNRS is the best mechanism to support. The selection of priority species does not negate the need for action on other species but focusses on local actions best supported through the LNRS. The process for identifying priority species is explained in *Appendix D*.

5.10.1 Reintroduction and translocations

Addressing the cause of a species' decline such as increasing and connecting habitat, removing threats from invasive non-native species, or pollution will often allow threatened species to recover naturally. The measures set out within this LNRS focus on managing and increasing habitat and reducing the impact of threats to boost species populations and increase their resilience and range.

In some cases, natural dispersal may be unlikely. This could be due to habitat fragmentation and certain species ability to disperse over larger distances. In these cases, reintroductions and translocations²⁴ - where species are released in a suitable area – can be a valuable tool to aid recovery if the cause of its disappearance has been addressed. This approach may help boost a vulnerable population or bring a species back into an area where they were lost. The successful reintroduction of red

kites in England is a good example of bringing a species back from extinction to an area it may not have naturally recovered²⁵

Further understanding of potential species reintroduction and translocation opportunities within Bedfordshire will be carried out as part of the LNRS process. Reintroduction and translocation must be considered in line with Defra guidance '*Reintroductions and other conservation translocations: code and guidance for England*'. This will assess whether reintroduction or translocation is appropriate for a particular species.

5.11 Species Assemblages

5.11.1 Arable Margins Assemblage

The margins of arable fields can be important for a range of species. Not only do they provide buffers for woodlands, hedges and watercourses they are also home to rare species including several plants and invertebrates. The regular maintenance and disturbance from farming practices combined with low nutrient levels and low herbicide use provide a suitable habitat for this assemblage.

Species

- Wild Candytuft *Iberis amara*
- Broad-fruited Cornsalad *Valerianella rimosa*
- Narrow fruited Cornsalad *Valerianella dentata*
- Basil Thyme *Clinopodium acinos*
- Few-flowered Fumitory *Fumaria vaillantii*
- Red Hemp Nettle *Galeopsis angustifolia*
- Corn Buttercup *Ranunculus arvensis*
- Field Gromwell *Buglossoides arvensis*
- Striped Lychnis *Cucullia lychnitis*

²⁴ Reintroduction refers to moving fauna and flora back to areas where they were once present. Translocation is a broader term for moving fauna and flora to a new location,

²⁵ The Red Kite was persecuted almost to extinction in Britain in the 1800s. They were absent from England, with a small population in Wales. In the late 20th century red kites were reintroduced to several locations in England and Scotland, including the Chilterns and Northamptonshire and there are now approximately 5000.

Measures

Spring cultivation

- Create fallow cultivated margins or plots for rare arable plants such as Fine-leaved Fumitory, Basil Thyme and Red Hemp-nettle. Cultivate every 1-3 years depending on species present and their needs and the needs of associated species.
- Cultivate in February-April for Autumn germinating species. Limit/avoid spray drift onto these areas.
- Create sacrificial cropped areas of reduced cereal density for rare arable plants to grow amongst. Only use targeted herbicides which will not damage target species if problematic species thrive. Seek agronomic advice if needed.

Autumn Cultivation

- Create fallow cultivated margins or plots for rare arable plants such as Corn Buttercup and Spreading Hedge-parsley. Cultivate every 1-3 years depending on species present and their needs and the needs of associated species (e.g. cultivate Dark Mullein areas every 3 years to benefit Striped Lychnis moth).
- Cultivate in October-November for Spring germinating species. Limit/avoid spray drift onto these areas.
- Create sacrificial cropped areas of reduced cereal density for rare arable plants to grow amongst. Only use targeted herbicides which will not damage target species, such as Corn Buttercup and Spreading Hedge-parsley, if problematic species thrive. Seek agronomic advice if needed.

Further information

FarmWildlife – Flower rich habitats
Plantlife – Managing Arable Land

5.11.2 Long Established Calcareous Grassland

Some species need specific management of long-established calcareous grassland to prosper. The habitats where they are found are often composed of thin, skeletal grasslands that develop over time and often retain a rich, short vegetation. This supports exceptional biodiversity and often remains open and suitable for such species over centuries. This assemblage highlights some of the key species in Bedfordshire requiring short, well managed calcareous grassland.

Species

- Purple milk vetch *Astragalus danicus*
- Field Fleawort *Tephrosia integrifolia* subsp. *Integrifolia*
- Pasqueflower *Pulsatilla vulgaris*
- Frog Orchid *Coeloglossum viride*
- Spotted Cat's-ear *Hypochaeris maculata*
- Burnt Orchid *Neotinea ustulata*
- Fly Orchid *Ophrys insectifera*
- Moon Carrot *Seseli libanotis*
- Autumn Lady's-tresses *Spiranthes spiralis*

Measures

- Prevent flowering from being consumed while maintaining the short sward and preventing the accumulation of grass thatch.
- Allow light trampling to breaking down leaf litter and providing bare patches for seed germination and some invertebrates
- Allow mixed grazing outside of the flowering season (after July) to maintain suitable sward and avoid livestock, particularly sheep, incidentally, eat the flowering spikes if turned out too early.

Further information

Plantlife – Managing Meadows

5.11.3 Bats Assemblage

There are 18 species of bats in the UK with 12 of these species found in Bedfordshire (Cornes, 2020). Many species have declined due to a range of factors including habitat loss, development and disease. These species would benefit from a range of measures including those set out below.

Species

- Brown Long-eared Bat *Plecotus auritus*
- Western Barbastelle *Barbastella barbastellus*
- Lesser Noctule/Leisler's Bat *Nyctalus leisleri*
- Soprano Pipistrelle *Pipistrellus pygmaeus*
- Nathusius's Pipistrelle *Pipistrellus nathusii*
- Serotine *Eptesicus serotinus*
- Noctule Bat *Nyctalus noctula*
- Common Pipistrelle *Pipistrellus pipistrellus*
- Brandt's Bat *Myotis brandtii*
- Natterer's Bat *Myotis nattereri*
- Daubenton's Bat *Myotis daubentonii*
- Whiskered Bat *Myotis mystacinus*.

Measures

- Improve hedgerow linkages
- Improve woodland structure and microclimate by having “non-intervention” areas which are allowed to build up dense structure.
- Improve woodland roosting opportunities by leaving standing dead wood and damaged tree features and veteran trees
- Reduced ivermectin use for cattle and horses.
- Reduce/minimise light pollution, particularly over water bodies.

Further information

Bat Conservation Trust Advice - Bat Conservation Trust
Bedfordshire Bat Group - Bats in Bedfordshire | Bedfordshire Bat Group

5.11.4 Waders Assemblage

Wetlands and grassland are important places for waders. They nest on the ground and feed on invertebrates in the soil. Curlew, lapwing, redshank and snipe are all present in Bedfordshire in varying numbers. They are all of conservation concern due to significant declines across England.

Species

- Lapwing *Vanellus vanellus*
- Curlew *Numenius arquata*
- Snipe *Gallinago Gallinago*
- Redshank *Tringa tetanus*

Measures

- Create wet areas by blocking drains and small ditches in suitable areas
- Create scrapes or shallow open water for feeding
- Use appropriate levels of grazing to maintain create a variable sward, providing both nesting and feeding sites. If possible, avoid grazing or graze lightly when the birds are nesting as this is when the birds are most vulnerable to disturbance from stock (e.g. trampling).
- Avoid planting trees or hedges in areas used or potentially used for nesting as these species prefer open spaces
- Use appropriate measures to reduce the impact of predation, such as fencing or other legal methods, where it is limiting breeding success

Further information

RSPB Helping bird species - <http://www.rspb.org.uk/helping-nature/what-we-do/influence-government-and-business/farming/advice-for-farmers-helping-bird-species>

5.11.5 Farmland Birds

Nature friendly farmland is an important home for a wide range of species. The mix of hedgerows, woodland, grassland and wetland create ideal nesting and feeding sites. However, intensive farming practices have caused some species with a close association with farmland to decline. A range of changes to the way land is managed can significantly benefit these species.

Species

- Corn Bunting *Emberiza calandra*
- Yellowhammer *Emberiza citrinella*
- Linnet *Linaria cannabina*
- Tree sparrow *Passer montanus*
- Yellow wagtail *Motacilla flava*
- Grey partridge *Perdix perdix*
- Skylark *Alauda arvensis*

Measures

- Provide and maintain seed sources, especially during late winter by directly providing seed or by allowing plants to go to seed in suitable areas.
- Increase invertebrates by maintaining diverse habitats and unfarmed margins and wild corners. Reducing chemical inputs (insecticides) can be particularly beneficial to birds who feed on invertebrates.
- Reduce, delay or avoid ploughing after harvest to increase winter stubble cover and green cover crops.
- On more intensively farmed arable land, the cropped area provides valuable nesting and foraging habitats and wildflower, grass and nectar rich margins or plots are essential to help boost insect populations and provide summer food resources for breeding birds.
- Manage hedgerows to provide dense structure for nesting and consider placing nesting boxes specific to the species such as tree

sparrows. Provide an open sward both close to cover and in open areas for species such as yellow wagtail and skylark to nest.

- Provide accessible water sources throughout the year.

Further information

RSPB Helping bird species

5.12 Individual priority species

Several species were identified as needing specific action that did not fit into one of the assemblages. These individual priority species are shown below. This strategy sets out measures which could be delivered to aid the recovery of these species and further advice.

5.12.1 Juniper *Juniperus communis*

Juniper bushes grow on calcareous grassland. It is an evergreen plant with small yellow flowers and fleshy cones called 'berries' due to their resemblance. The 'berries' are traditionally used for making gin. The only known site in Bedfordshire is at Kensworth quarry near Dunstable.

Measures

- Where juniper bushes are surrounded by scrub or young woodland, selectively clear surrounding area to reduce shading and prolong life span.
- Create seedling habitat by scraping away turf and topsoil, or by long-cycle rotational grazing.
- Protect new or vulnerable juniper plants by erecting bespoke seed shelters, which exclude herbivores whilst allowing berries to reach the ground. These should be either sited under female bushes or installed in the open and sown with cleaned seed from the berries of nearby bushes.
- take seeds or cuttings from existing populations and grow on and plant out in new suitable areas to expand population.

Further Information

Plantlife - www.plantlife.org.uk/



Juniper Credit: Richard James

5.12.2 Musk Orchid *Herminium monorchis*

These small orchids have tiny yellow flowers and are found on chalk and limestone. In Bedfordshire, they are found in the South Bedfordshire Chalk area. Usually less than 15cm tall. They have a very limited distribution in Bedfordshire and this represents the northern most location for this species in the UK.

Measures

- Produce a short sward whilst allowing musk orchid and other threatened plants to flower and set seed throughout the spring and summer months.
- Graze with hardy breeds of sheep and/or cattle from early autumn through to early spring to achieve an average sward height of <10cm.
- Remove grazing animals during flowering period and/or protect plants by installing temporary cages/fencing around individuals or clumps of species to prevent them from being eaten.
- Control invasive plants such as Tor grass, clematis and bramble to prevent them overshadowing and outcompeting this species and other threatened species.
- Create small bare patches within suitable areas in proximity to existing populations to allow seed germination. This would involve scraping back the vegetation to expose bare chalk. Invasive plants may also appear in these patches and they would need to be controlled to give musk orchid and other threatened plants a chance to flower and set seed and expand colony.
- Check that plants have successfully seeded each year.

Further Information

Botanical Society of Britain and Ireland - <https://bsbi.org/>

5.12.3 Ground-pine *Ajuga chamaepitys*

Ground-pine resembles a small pine tree seedling but is a member of the mint and dead-nettle family about 5-20 cm tall. Ground-pine is an annual or a short-lived perennial, which flowers from May to October. This species grows on chalky, drought-prone soil which is slow to be colonised by plants. In Bedfordshire, this species is mainly found in the Pegsdon and Barton parts of the South Bedfordshire Chalk area. It requires occasional disturbance to expose soil and buried seed. Habitats can include bare tracks, arable field margins and open chalk downland. In Bedfordshire it occurs on chalky soils mixed in with gravel deposits. It is thought that ground-pine seeds can lay dormant for up to 50 years, germinating when the soil is disturbed. Seed dispersal is limited, with seeds falling close to the adult plant and this species does not expand readily or colonise new sites often.

Measures

- Carry out regular soil disturbance and scrub clearance to maintain Ground-pine populations in grassland habitats – avoiding disturbance in flowering and seeding period (May to October)
- In grassland habitats, use grazing with cattle or ponies to provide bare ground for germination. Rabbit activity at the field edges can achieve this locally.
- In arable habitats, cultivated but uncropped margins and plots provide suitable habitat as well as unsprayed headlands. In Bedfordshire it has been found in the cultivated margins of fields which are most likely to have retained some seed bank and be less sprayed and fertilised, avoid schemes that encourage grass margins to arable fields where ground pine has been recorded. These habitats are best managed by cultivation through light ploughing or harrowing but this management should penetrate down into the soil, at least, 10 cm to be effective. Ground-pine seeds are vulnerable to frost so cultivation is best carried out in spring once the majority of frosts have finished.

- Occasional cultivation in autumn is beneficial as it will bury seeds and add to the seed bank.

Further Information

Arable Plants Species Action Plan - bedscape.org.uk
Back from the brink factsheet - naturebftb.co.uk

5.12.4 Black poplar *Populus nigra betulifolia*

Black poplar is one of Britain's rarest trees. There are thought to be less than one hundred clones and some 7000 individuals in England, Wales and the Republic of Ireland of which only 600 are females. A survey of the Bedfordshire section of the Ouzel Valley in the mid-1990'S identified about 30 native black poplars, and a survey in 2006 along the entire length of the Flit Valley and along the Steppingley and Tingrith Brooks identified about 20 black poplars.

Measures

- Establish and identify existing mature native black poplar trees
- Commence a programme of black poplar pollarding and other management along river corridors as part of routine watercourse maintenance
- Propagate cuttings of black poplar from existing trees in order to incorporate locally derived black poplar in bank side planting schemes.

Further information

www.wildlifetrusts.org/wildlife-explorer/trees-and-shrubs/black-poplar

5.12.5 Great pignut *Bunium bulbocastanum*

Great pignut is an erect perennial herb with stems up to about 50 cm. Flowering occurs between June and July. The plant requires winter frosts for effective germination and the seeds are thought to lie dormant in the seedbed for some time in adverse conditions.

This species prefers light soils, particularly occurring in grassland where cultivation has ceased and on areas of more established chalk downland, which may have been cultivated in the past. It requires open soil for seedling establishment, but mature plants can thrive in closed swards and the tubers survive shallow-ploughing.

Nationally, this species has a localised distribution in the chalk region across Hertfordshire, Buckinghamshire, Bedfordshire and Cambridgeshire with small populations in Cheshire and Orkney. Luton provides a stronghold for this species nationally within this chalk band. Bedfordshire remains the stronghold for great pignut in the UK with all the known sites located in and around Luton. Great pignut is associated with a single rust species in Britain, great pignut rust (*Puccinia bulbocastani*), which is considered a threatened/priority fungus within Bedfordshire.

Measures

- Habitat management through grazing or hay cutting (cuttings removed) in areas where great pignut is important should be delayed until later in the growing season (August onwards) to allow for flowering and seed production during June and July. Great pignut tends to be found in slightly taller areas of the sward and therefore any grazing undertaken in spring should be done at a low grazing pressure.
- Restore connections between existing populations in and around Luton, for example along road verges and field margins. This may involve sowing locally sourced and native great pignut seeds or plugs. Restore populations in locations/sites that have historical records of this species.
- Future research project to ascertain how long lived the seeds are to gain a better understanding of the ability of this species to disperse and germinate naturally when the right condition arises.

Further information

<https://plantatlas2020.org/>

5.12.6 Field cow-wheat *Melampyrum arvense*

A hemi-parasitic member of the Figwort family, occurring in open tussocky grasslands in field boundaries. Its bright pink flowers used to grow in abundance in crops and was known as a 'poverty weed' due to its seeds reducing the market value of corn. It was thought to be parasitic on the dicotyledonous plants growing among crops. It has now completely vanished from arable habitats and survives in a handful of sites where open soil conditions are managed for.

Nowadays in the UK it tends to fair better on calcareous grassland sites, where it has a wide array of plants to parasitise on, and in theory is less likely to be outcompeted by dense swards of vegetation. The plant produces a large seed packed in with an elaiosome - a gland containing oils and sugars which encourages ants to collect the seeds and carry them back to their nests, and its thought that this has accounted for the spread of plants at some sites. It is only known to occur in 4 sites in the south of England. One of these sites is in Bedfordshire near Brogborough.

Measures

- Maintain surviving populations of field cow-wheat at the Brogborough site through a combination of monitoring and appropriate site management by:
- Annual vegetation clearance to remove scrub and competing vegetation and create bare ground areas for seeds to drop and receive sunlight in order to germinate the following spring.
- Maintain and encourage healthy invertebrate populations through surrounding species rich swards to sustain them.
- Translocate seeds to new suitable locations, at least one, in Bedfordshire that meet the habitat requirements described above. Focus on sites in the North Chilterns area in the south of the county.
- Longer term management: as the population spreads in Bedfordshire, look to manage sites through a hay cut or grazing with livestock. Aim for an annual late hay cut with cuttings

removed in September, just after the seeds have ripened and dropped to the ground. If grazing is the management tool available, livestock should graze the area during late summer/early autumn to help create gaps and reduce competition. Grazing in early spring may also be necessary. Avoid grazing during plant establishment and flowering and seeding time (May to end of August).

Further information

<https://www.speciesrecoverytrust.org.uk/field-cow-wheat>

5.12.7 Crested cow-wheat *Melampyrum cristatum*

Similar in appearance to the field cow-wheat, this species favours nutrient-poor calcareous or neutral soils and thrives in sunny, well-drained grasslands, hedgerows, and roadside verges. It is often a sign of ancient, undisturbed habitats, making its presence a valuable ecological indicator. It is mainly found in East Anglia. It occurs in newly cut coppices, road verges and by fields on drier chalk soils.

Measures

- Occurs in newly cut coppices, road verges and by fields on drier soils over chalk.
- Manage and create woodland habitat. Implement good woodland management including coppicing, maintaining open rides and glades. Control competing vegetation during glade establishment (e.g. bracken, bramble).
- Expand existing woodland to reconnect sites and increase suitable habitat, including implementing suitable management regimes.
- Manage road verges by cutting and removing cuttings.
- Prevent spray drift onto arable margins in the vicinity of existing populations.

Further information

<https://plantatlas2020.org/>

5.12.8 Swift *Apus apus*

Swifts migrate to the UK in late April or May before returning to Africa in August. They nest almost exclusively in building roofs where holes in the eaves provide access. They can be found throughout Bedfordshire where buildings are accessible, and food supplies are available, including significant colonies in urban areas such as Bedford and Luton. Old buildings are often more accessible; however access can be provided in newer builds.

For example, around 20 years ago, a project was undertaken by a local housing association [Bedford Pilgrim Housing Association] to upgrade around 700 houses in the Fenlake Estate area of Bedford. Over 200 holes were cut into new plastic soffits of the renovated houses at an estimated cost of just £3/hole. Despite the new PVC soffits blocking access to the original nest cavities in the eaves of the properties, the creation of so many new nest sites helped to save this site as a key location for Swifts and the estate is now home to one of Bedford's largest swift colonies of around 60 nesting pairs. They feed on the wing on small airborne insects over fields and open water.

Measures

- Maintain existing nest sites with buildings by allowing access and avoiding disturbance.
- Create new nest sites in roof spaces using swift boxes or bricks (to British Standard BS42021) or creating holes in soffits to provide suitable nesting opportunities.
- Create corridors within urban spaces to allow access to foraging sites, create foraging sites within and around urban spaces and water courses by increasing invert population/promote wildflowers and species rich grasslands.

Further Information

Swift Conservation - <https://swift-conservation.org/>

5.12.9 Turtle Dove *Streptopelia turtur*

Turtle doves are one of the UK's fastest declining bird species. This is due to factors such as habitat loss, changes in farming techniques and shooting of migrating doves as they move from Africa to Europe. They are most commonly found on arable and mixed farmland, with their preferred food of wildflower seeds and farmed crop grains. They nest and roost in open woodland edges, hedgerows and scrub areas near to feeding areas. They are predominantly found in Dunton, Tempsford, Marston Vale and around Knotting Green.

Measures

- Provide nesting areas of scrub or dense thorny hedgerow species of 3m tall and 4m wide. Allow room for hedges to expand if necessary.
- Encourage and keep native climbing plants such as Dog Rose, Honeysuckle, Clematis (Old Man's Beard) or Ivy in hedgerows and woodland edges.
- Maintain the dense, scrubby structure that Turtle Doves prefer, areas may need to be coppiced in sections on a long-term rotation.
- Provide accessible water such as ponds with a gently sloping side within 300m of suitable nesting habitat. Or provide access to available water resources via overhanging branches for example.
- Allow natural regeneration of wildflowers or provide a suitable seed mix to provide food. Provide 30-60% bare ground, low vegetation or access via edge-effects to denser growth for foraging.
- Provide supplementary food to further boost feeding opportunities.

Further Information

Operation Turtle Dove - <https://www.operationturtledove.org/>

5.12.10 Nightingale *Luscinia megarhynchos*

Nightingales are one of the best known, but least often seen birds in England. They return to England each spring to breed – overwintering in West Africa. They nest in dense scrub or woodland coppice which protects them from predation while breeding and singing. The nightingale population has declined by 42% decrease between 1995 and 2022. There is evidence that grazing and browsing by deer is a significant factor in their decline – reducing suitable scrub habitat (BTO, 2015). Strawberry Hill in North Bedfordshire and the Forest of Marston Vale are key remaining areas for nightingale.

Measures

- Create woodland-scrub mosaics for Nightingale breeding habitat.
- Maximise the area of scrub at the vigorous thicket stage, typically involving rotational cutting on a 10–15-year cycle, preferably using reasonable sized blocks to create a coarse mosaic of larger patches instead of many small and widely dispersed patches of different ages.
- Manage problematic species including invasive non-native species, pests and disease.
- Protect thickets and woodland transitional / edge habitat from deer.

Further information

British Trust for Ornithology – Managing Scrub for Nightingales

5.12.11 Black Hairstreak *Satyrion pruni*

Black hairstreak butterflies are mainly found around woodlands on heavy clay soils in central parts of Bedfordshire. The caterpillars feed almost exclusively on blackthorn *Prunus spinosa* while the adults feed within tree canopies or dense scrub where they feed on honeydew secreted by aphids.

Measures

- Manage existing blackthorn within woodlands and hedgerows by cutting on rotation to provide a diverse age. Allowing existing blackthorn to spread by sucker growth or plant new blackthorn within woodlands and hedgerows to provide foodplant for caterpillars.
- Include Blackthorn stands in any new woodland plantings within the Black Hairstreak's range. Select south-facing, sheltered locations, unshaded by trees.

Further Information

Butterfly Conservation - <https://butterfly-conservation.org/>

5.12.12 Duke of Burgundy *Hamearis Lucina*

Duke of Burgundy are small black and orange butterflies found mainly within chalk and limestone grassland. They are found in the southwest of the county within South Bedfordshire Chalk. The eggs are laid on cowslips. The adults prefer scrubby grassland and sunny woodland clearings.

Measures

- Promote cowslips at varying heights and ages to provide continuous supply of food plants, with scrub edges or patches comprising up to 20% of the grassland area.
- Support and manage scrubby grassland with higher turf which is generally not as species rich.
- Maintaining deep valley features, preventing scrub from completely dominating, could also help the adults.
- Plant locally sourced and native cowslips where they are in decline or absent in suitable areas that meet the habitat requirements above to help this species to spread. Seek expert advice.

Further Information

Butterfly Conservation - <https://butterfly-conservation.org/>

5.12.13 White-spotted pinion *Cosmia diffinis*

This eye-catching, medium-sized moth gets its English name from the bright white spots that decorate the front edge of its forewings. Once common across much of England and Wales, its numbers fell sharply—most likely due to the devastating impact of Dutch Elm Disease, which wiped out many of the elm trees it depends on. Today, the moth is mainly spotted in Cambridgeshire, Huntingdonshire, Bedfordshire, and Essex. It seems to be slowly making a comeback in these areas. However, most recent sightings are of just one moth at a time, suggesting that it's still hanging on at low numbers.

Measures

- Retain healthy elm trees wherever possible. Mature elm stands, hedgerows or even single mature trees are of very high conservation importance. u If elm trees are suspected to be infected with Dutch Elm Disease (first signs are leaf browning) seek expert advice.
- In positive cases the trees should be felled and debarked to prevent the spread of elm bark beetle, which carries the disease.
- Where possible allow re-growth from tree stumps if infected trees have been cut down, and take any necessary action to avoid re-infection

Further information

<https://butterfly-conservation.org/moths/white-spotted-pinion>

5.12.14 Small Blue *Cupido minimus*

The small blue is the smallest resident butterfly in the UK. In Bedfordshire, the species prefers calcareous grassland and are mainly found within the chalk areas surrounding Luton and Dunstable in smallish colonies, but one large colony is known to exist in the Totternhoe area. There is a small meta population recorded in the Marston Vale area, this population requires further investigation. The sole foodplant is kidney vetch *Anthyllis vulneraria* where the larvae live only in the flower heads where they feed on developing anthers and seed. Kidney vetch tends to grow in early successional calcareous grassland or disturbed calcareous habitats where the foodplant is able to persist with less competition. The biggest colony in Bedfordshire is found along a chalk escarpment where competition for space for the foodplant is less. This species' flight period between mid-May to late June.

Measures

- Maintain a mosaic of short and tall vegetation with a high density of flowering Kidney Vetch with small areas of open ground.
- Restore connections between colonies, for example along disused railway lines, chalk escarpments, on derelict sites and quarries, on new road verges and along field margins. This may involve planting or sowing native and locally sourced kidney vetch into the gaps.
- Periodic and/or patchy disturbance, especially on slopes, with a tractor and flail or hand tools can help maintain suitable breeding habitat.
- Depending on the terrain, maintain open areas within the grassland habitat, grazing by livestock can help to create/maintain broken bare ground providing suitable germination sites for the foodplant, kidney vetch. Avoid livestock grazing during the flight and breeding period.
- Future research project to ascertain how long lived the foodplant seeds are to gain a better understanding of the ability of kidney vetch to disperse naturally when the right condition arises.

Further Information

Butterfly Conservation - <https://butterfly-conservation.org>



Female small blue butterfly. Credit: Melanie Douglas

5.12.15 Hazel Dormouse *Muscardinus avellanarius*

Hazel dormice are nocturnal mammals that live in the tree and shrub canopy. They are particularly associated with hazel coppice. They are active between late April and late October, hibernating over winter. They build nests in tree holes, old bird nests, dense scrub and nest boxes. They feed on insects, flowers, nuts, seeds and berries. In Bedfordshire the status of the native population in the south of the county is uncertain; in recent years records have only come from the Studham area. The only other known population in the county is that re-introduced to Maulden Wood in 2001.

Measures

- Establish current extent and status of population remaining in south of the county.
- Selective felling, coppicing and ride management to increase the extent, diversity and connectivity of understorey in woodlands.
- Maintain and improve woodland rides and woodland edges by opening the canopy to limit over-shading.
- Manage deer populations which can inhibit understorey development due to browsing.
- Increase habitat and connectivity in dormouse areas by planting diverse well-managed woodlands, encouraging mixed scrub habitat and planting and managing hedgerows.

Further Information

People's Trust for Endangered Species - <https://ptes.org/>

5.12.16 European Water Vole *Arvicola amphibius*

Water voles are the largest vole in Britain with short, furry tails and small ears in comparison to rats. They dig burrows in vegetated banks of rivers, wetlands and ditches where they breed and shelter. Water voles declined dramatically in England during the 20th century, being lost from 94% of their former sites including most of Bedfordshire's rivers and streams. Recent records come from only a handful of sites in the north and east of the county. American mink, which were released from captivity, have had a significant impact on their population.

Measures

- Implement well-planned, sustained and co-ordinated approaches to achieve total eradication of mink from large landscapes and river catchments, with landowners working co-operatively.
- Once mink eradication complete, consider reintroduction to suitable riparian habitat if remaining native populations do not re-colonise.
- Control the number of trees and scrub along waterways to ensure they do not dominate the banks or shade out other vegetation which water voles rely on for food and shelter.
- Encourage grassy buffer strips along watercourses, ditches and in-field ponds. Buffer strips of 4-6m wide should be planted along intensive grassland or cultivated fields.
- Remove redundant artificial bank revetments to allow water voles to build burrows and for vegetation to grow.

Further Information

People's Trust for Endangered Species - <https://ptes.org/>

Waterlife Recovery Trust - <https://www.waterliferecoverytrust.org.uk/>

5.12.17 Hedgehog *Erinaceus europaeus*

Once common and widespread, hedgehog numbers are thought to have declined significantly in recent decades. Habitat loss, being killed on roads and pesticides are thought to be contributing to this. They can still be found throughout Bedfordshire including urban areas. Creating good habitat connectivity through hedgerows will aid their distribution.

Measures

- Increase area and connectedness of hedgerow and scrub habitat. Encourage beneficial hedgerow management and regenerative farming practices.
- Encourage hedgehog friendly practices in gardens and parks – hedgehog highways through fences, reduced use of slug pellets and pesticides, piles of leaves under hedgerows.
- Raise awareness of hazards including injury from landscaping equipment, drowning in ponds, entanglement in sports netting and litter. Install small mammal road signs at key roadkill hotspots.

Further Information

People's Trust for Endangered Species - <https://ptes.org/>

5.12.18 Adder *Vipera berus*

Adders are normally associated with open habitats such as heathland and woodland edges. They usually remain hidden in the undergrowth although use open sunny gaps for basking. They feed on small mammals and reptiles and occasionally ground nesting birds' eggs. In central England adder populations are now very isolated due to habitat loss and fragmentation; disturbance is another major threat. In Bedfordshire recent records are only from the re-introduced population at Maulden. There is a strong population immediately adjacent to the county boundary within Buckinghamshire near Heath and Reach.

Measures

- Provide herbaceous and shrubby vegetation to provide shelter with unshaded short vegetation or bare ground for basking.
- On heathland, create a mosaic of heather, bracken, gorse and scrub to create hunting and sheltering sites.
- In wooded areas, tree canopy should not exceed 60%. Permanent glades and interconnecting rides should be maintained to aid local dispersal.
- Manage recreational access to reduce disturbance to areas adders are present.
- Create/restore areas of habitat suitable for adders adjacent to known adder populations.

Further Information

Species Action Plan - <https://www.bedscape.org.uk>

5.12.19 European Eel *Anguilla Anguilla*

Young eels migrate from the Sargasso Sea, across the Atlantic Ocean and then enter the river system in the UK and elsewhere. Globally, they are critically endangered with issues such as river barriers and pollution thought to be the cause. In Bedfordshire, eel passes have been put onto structures to help their migration. Connecting eel populations in the wider Great Ouse catchment, particularly in the east of the county provides the best opportunity for recover in Bedfordshire.

Measures

- Reconnect migratory pathways along rivers to all eels to complete full lifecycle in marine and riparian habitats.
- Where barrier removal is not possible, install eel passes to help eel climb up weirs and other obstacles.

Further Information

Zoological Society of London - <https://www.zsl.org/>

5.12.20 Brown trout *Salmo trutta*

Brown trout prefer fast-flowing, stony and gravelly rivers with good water quality. They lay their eggs amongst the gravel on the riverbed. Barriers to fish movement such as weirs are also a problem for eel. While brown trout are present in a number of waterbodies across the Hertfordshire border, and are not considered to be at risk, the situation in Bedfordshire is different with the species only known to be breeding in the River Hiz. This population provides a basis from which the population could spread further downstream, if obstacle removal and appropriate habitat restoration are carried out.

Measures

- Remove barriers on the upper Ivel and Hiz, and on the lower Flit/Ivel navigation and Hit/Campton Brook. Where removal is not possible then appropriate bypass channels and lastly fish passes should be installed to facilitate connectivity along these watercourses.
- Plant riparian trees to provide shade, cover and food supply. Manage existing trees sensitively, allowing branches to hang close to/touch the surface of the water
- Introduce gravels to river channel to provide suitable spawning sites for trout.
- Protect and enhance riverbanks to reduce erosion.

Further Information

Wild Trout Trust - <https://www.wildtrout.org/>



Delivering and monitoring the strategy's outcomes



Bedfordshire's Local Nature Recovery Strategy



6 Delivering and monitoring the strategy's outcomes

This strategy sets out an approach to nature recovery for Bedfordshire by identifying outcomes and measures that could contribute to nature recovery. The delivery of these outcomes and measures will rely on policies and plans from a range of national and local stakeholders.

The primary goal of Local Nature Recovery Strategies (LNRSs) is to establish priorities for nature's recovery, identify the most valuable existing areas, and outline specific proposals for creating or improving habitats. The Government plans to use LNRSs to drive actions for nature recovery and nature-based solutions. Some of these applications are well-established, while others are still being developed.

6.1 Legally Based Uses of LNRSs

6.1.1 Targeting BNG

LNRSs will identify where habitat creation or enhancement for BNG will be of 'high strategic significance.' Where habitats are created or enhanced to generate biodiversity units for BNG, they receive a 15% uplift in the biodiversity metric if they align with the LNRS. The LNRS provides a strategic approach to biodiversity net gain delivery and connections to existing habitats.

6.1.2 Duty on public authorities to conserve and enhance the environment

All public authorities in England have a legal duty to conserve and enhance biodiversity. This duty applies to a wide range of national and local government organizations, as well as some private utilities like water companies. Public authorities must consider how they manage land they

are responsible for in ways that support LNRS proposals or using LNRSs to inform regulatory decisions.

6.1.3 Planning

The Levelling Up and Regeneration Act 2023 requires local planning authorities to take account of the LNRS. This includes Local Plan development. Local planning authorities should be aware of areas mapped and identified in the relevant LNRS and the measures proposed in them, considering how these should be reflected in their local plans. They should consider appropriate safeguarding to enable the proposed actions, potentially targeting stronger safeguarding in areas of greater importance. This will help local planning authorities support the best opportunities to create or improve habitats to conserve and enhance biodiversity, including enabling development in other locations.

For planning decisions: The LNRS is an evidence base that may be a 'material consideration' in the planning system, especially where development plan documents pre-date LNRS publication. Decision-makers must determine what is a relevant material consideration based on individual case circumstances.

6.2 Other Uses of LNRSs

LNRSs will also be used to:

- Provide information to farmers and land managers to help them choose appropriate Countryside Stewardship and Sustainable Farming Incentive options.
- Help groups of farmers and land managers shape nature recovery priorities for their area and encourage collaboration across holdings and landscapes.

- Assist the Government in considering applications for funding specific nature recovery activities by acting as criteria in applications.
- Help local delivery partners including the Local Nature Partnership leverage and target funding for environmental projects to areas where they could have the most impact for nature and the wider environment.
- Inform how Defra arms-length bodies carry out existing functions to better support nature recovery, such as providing land management advice to farmers or selecting locations for nature-based solutions like natural flood management and tree planting.
- Inform the development and implementation of Protected Landscape management plans by identifying locations and measures that will drive delivery of agreed targets and outcomes.

6.2.1 Potential future uses of LNRS

The Government is keen to expand the uses of LNRSs to further support the delivery of proposed actions. Potential future uses include:

- Identifying where funding could be made available to encourage farmers and land managers to carry out the most environmentally impactful actions.
- Serving as required criteria in future government nature recovery funding schemes, making actions proposed in the LNRS eligible for funding.
- Informing the identification of areas that could contribute to the Government's 30by30 commitment following appropriate nature recovery actions.

- Guiding private companies in providing corporate donations for habitat creation or enhancement projects that deliver LNRS proposals.
- Directing private finance investments in nature and carbon markets, such as targeting tree-planting actions as part of the UK Emissions Trading Scheme.

6.2.2 How LNRSs will not be used

LNRSs are not intended to be prescriptive. They are tools to drive action for nature recovery. Defra has stated that LNRSs will not be used to:

- Require landowners or managers to make specific land use changes—this will remain their choice.
- Place new restrictions on developing land—LNRSs will be one source of evidence used to inform plan preparation processes, which have their own consultation and engagement requirements.
- Identify areas for legal nature protections that create restrictions on land use or management—LNRSs do not propose new nature reserves or other legal designations.
- Prevent nature conservation work in areas not prioritized by the LNRS (e.g., by restricting funding in areas not mapped).
- Determine regulatory decisions, such as the results of Environmental Impact Assessments—LNRSs can inform decision-making but determinations must be based on relevant legislation and statutory guidance.

6.3 Surveying and Monitoring

This initial LNRS has been developed using the best data available. Further surveying is needed to improve the understanding of habitats and species in Bedfordshire, creating a baseline to monitor future progress.

Ensuring resources are available to monitor changes in wildlife is essential to understand how the environment and wildlife is changing in response to climate change and other pressures, but also positive actions such as habitat creation. There are existing programmes which are part of monitoring nature recovery.

National

The Environment Act and the Environment Improvement Plan serve as a national framework for monitoring and reporting, demonstrating progress on key priorities such as tree planting, Biodiversity Net Gain, the condition of protected nature sites, and river health. The Protected Landscape Target and Outcome Framework align with these priorities to set specific targets for our National Landscapes.

Government agencies such as the Environment Agency carry out monitoring of rivers and Forestry Commission's Sustainably Managed Woodland England Key Performance Indicator.

A large proportion of data is captured through the dedication of volunteers. This is a vital component of understanding any changes both nationally and locally. There are numerous national species and habitat surveys carried out by volunteers as part of citizen science projects. This includes the Breeding Bird Survey, National Bat Monitoring Programme and UK Pollinator Monitoring Scheme.

Local

Organisations such as the Bedfordshire Local Nature Partnership and local volunteers, including county recorders from the Bedfordshire Natural History Society (BNHS), carry out partnership coordination, facilitation and local monitoring.

The BNHS are specialists in a range of species who monitor local wildlife and create reports into trends and changes.

They support wider local initiative such as the Rare Species Guardian organised by the WTBCN, Greensand Trust, BNHS Flora Group and Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC). In this initiative, Local experts have identified a list of plant species at high risk, most of which only occur in a few locations in Bedfordshire, which would benefit from local guardians monitoring them.

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8 Table of figures

Figure 1– map showing the three local authorities within Bedfordshire	7
Figure 2 - The components of ecological networks (Lawton, et al., 2010)	8
Figure 3– Defra statutory guidance on the proposed method of production.	8
Figure 4– step by step process in getting the most from the strategy.....	9
Figure 5 - Map showing the Areas of Particular Importance in black with the Bedfordshire Boundary.	12
Figure 6 - Number of protected sites in Bedfordshire compared to England as a whole. (x%) indicates percentage of land cover from designation.	15
Figure 7 - chart showing the condition of units within Bedfordshire's SSSI. Condition assessment surveys carried out between 2008 and 2024.	15
Figure 8 - Comparison in habitat type in Bedfordshire between 1930s and 2020 (Dr Jim Rouquette, 2021)	16
Figure 9 - Character areas in Bedfordshire based on National Character Areas and Landscape Character Assessments.....	16
Figure 10 - Water Framework Directive Management catchments in Bedfordshire.	18
Figure 11 - A chart showing climate stripes. Stripes indicating whether temperature in Bedfordshire between 1884 and 2023 was above (red) or below (blue) the average over the period 1981-2000 (Ed Hawkins, 2024).....	28
Figure 12 – Percentage of different farm types across agricultural land in Bedfordshire by area. (Department of Levelling Up, 2022)	44
Figure 13 - Map showing Bedfordshire's existing lowland heathland along the Greensand Ridge.....	54
Figure 14 – Chalk streams within Bedfordshire. Source: Natural England.....	58

8 APPENDICES

- Appendix C – Mapping Methodology
- Appendix D – Prioritisation Methodology
- Appendix E – Approach to Engagement