Forward to 2030:
Biodiversity Action Plan

More, Bigger, Better and More Joined-up across Buckinghamshire and Milton Keynes

The Buckinghamshire & Milton Keynes Natural Environment Partnership

Foreword

This Biodiversity Action Plan has been produced by the Buckinghamshire and Milton Keynes Natural Environment Partnership (the NEP), the Local Nature Partnership for Buckinghamshire and Milton Keynes, working in collaboration with, and with support and input from, statutory conservation agencies, non-government organisations, local government, landowner/ manager representatives, naturalist groups and individual wildlife, landscape and conservation experts.

The Plan serves as the interim Biodiversity Strategy, with a focus on nature's recovery, until such time as formal Local Nature Recovery Strategies are finalised to cover Buckinghamshire and Milton Keynes.

My particular thanks go to those organisations and individuals who were able to contribute via representation on our working group, convened to update this Biodiversity Action Plan:

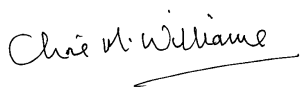
Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT)
Buckinghamshire Council
Chilterns Conservation Board
Environment Agency
Milton Keynes Council
Natural England
Parks Trust
River Thame Conservation Trust
The Late and Great Alan Holmes, NEP Delivery Group Chair (Independent Expert & Advisor)
RSPB

We know that the only way to secure nature's recovery in the face of a biodiversity crisis is to apply four key principles to our ecological networks: more, bigger, better and joined up (Natural Environment White Paper 2011). Our ambition is to restore, create and connect habitats across Buckinghamshire and Milton Keynes and into our surrounding areas, at the landscape-scale, making our wildlife populations more resilient and allowing wildlife to adapt to climate change and other pressures.

Achieving this ambition will require understanding of the scale of the problems, of the reliance we all have on nature and a response from beyond the local nature conservation sector. Our economy and society depend on us having a healthy environment and naturally functioning ecosystems. Organisations from all sectors, businesses and farmers, families and individuals all have so much to gain from our natural heritage, but they also have much to contribute.

This Plan describes the amazing biodiversity and habitats we have in Buckinghamshire and Milton Keynes and highlights the need for collective action to address threats to them such as rapid development and climate change. Importantly, it identifies how the NEP is committed to working collectively with our partners and the public to take action to deliver the overarching objectives.

I urge everyone in Buckinghamshire and Milton Keynes to consider how they can help achieve our shared goals outlined within this Plan.



Chris M Williams
Buckinghamshire & Milton Keynes Natural Environment Partnership Chair

Statement of Commitment: Delivering Biodiversity Priorities

Commitments from the NEP and its Partners in delivering the BAP 2030

The organisations involved in producing the BAP 2030 (see the Foreword) for Buckinghamshire and Milton Keynes commit to the following, in working to bring the BAP 2030 aim, objectives and principles into fruition.

The organisations agree to:

1. Work collaboratively with the NEP and its partners towards achieving the overall aim and objectives of the BAP 2030;

2. Uphold the principles set out in the BAP 2030 in delivering the actions identified;

3. Work together, alongside the NEP's partners and others, to explore, identify and deliver appropriate area-wide actions, as identified in Chapter 4 of the Action Plan;

4. Work alongside organisations with interests in particular National Character Areas (NCA) in Buckinghamshire and Milton Keynes, to explore, identify and deliver appropriate actions identified for those areas within the BAP 2030 at Chapter 4;

5. Commit officer time to an ongoing Nature Recovery Working Group, run by the NEP, and which would report to the NEP's Delivery Group, to focus on specific aspects of BAP delivery, including reviewing, improving and working on, at least, in the first few years of delivery:

    i) Data availability for (and further strengthening of) monitoring progress with achieving BAP 2030;

    ii) Engaging and working with landowners to encourage sustainable land management;

    iii) Habitat delivery: identifying what, when and how, coordinating delivery and funding input;

    iv) Engaging people with nature;

    v) Assist the NEP, wherever possible, in reviewing progress in delivering the Action Plan, including provision of appropriate data, analysis and participation in NEP Nature Recovery Working Group meetings.

Forward to 2030:
Biodiversity Action Plan

More, Bigger, Better & More Joined-up across Buckinghamshire & Milton Keynes

Cover: View across the Chilterns (photo: Phil Simpkin).

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Executive Summary

The "Forward to 2030" Biodiversity Action Plan for Buckinghamshire and Milton Keynes

Biodiversity is intrinsically valuable and underpins the prosperity of our society and economy – but faces significant pressures

1 **Biodiversity is the key to life.** Not only is the diversity of our wildlife and habitats valuable in its own right, but we rely on biodiversity for food, clean air and water, productive soil, flood protection, control of diseases, and space for recreation. It is crucial to tackling climate change as well as to our entire private, commercial and public infrastructure.[1] A sustainable local economy will require our land resource to be more ecologically robust on a landscape-scale and be one which can provide the fullest spectrum of ecosystem services.

2 **Our natural environment is the foundation of our health, prosperity, identity, and heritage.** It boasts varied landscapes: from the low-lying farmland of Aylesbury Vale, the floodplain grasslands of the Upper Ray Valley, the ancient woodland, chalk grasslands and internationally important chalk streams of the Chiltern Hills, to the streams and rivers that feed the River Thames.

3 **However, globally, we are in the middle of a mass extinction event.** Internationally, there has been a 68% decline in global wildlife populations since 1970. In the UK, 41% of species have declined in recent decades and a quarter of the UK's mammals face extinction.[2] In Buckinghamshire, none of our chalk streams have reached "good" ecological status. The pressures on nature come from and operate at international sources, national and local scales.

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

5 **These pressures exacerbate the potentially catastrophic loss of species and habitats across the globe**, and can act individually, in combination, consecutively and /or cumulatively. Our responses should therefore be multi-faceted, address biodiversity loss at multiple scales, while seeking to safeguard and improve the provision of nature's services that we all benefit from.

6 **Given its importance in underpinning society and economic prosperity, the loss of biodiversity is a concern and threat to all of us.** As a result, there has been a recent flurry of international, national and local policy responses, as outlined at Figure 1, below:

[1] This conclusion was also recently recognised by the UK Government following the **Dasgupta Review**, looking at the economics of Biodiversity. Available here: **www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review**

[2] State of Nature Report, 2019. This is a health-check on how the UK's wildlife is fairing, using wildlife data from 50 conservation organisations. Available here: **nbn.org.uk/stateofnature2019/reports/**

Figure 1: Recent International, National and Local Policy Responses to the global biodiversity emergency

30% by 2030 – United Nations Pledge

In September 2020, the UK Prime Minister signed up to the United Nations' "Leaders Pledge for Nature" – committing to put nature and biodiversity on a road to recovery by 2030. In doing so, the Prime Minister committed to protect 30% of the UK's land by 2030 – an additional 400,000 hectares, alongside the existing 26% protected through National Park status, Areas of Outstanding Natural Beauty and other protected areas. One year on, the five statuatory nature conservation bodies of the UK have now come together to identify, in Nature Positive 2030, how the UK can achieve these commitments and ensure nature recovery plays its role in achieving net zero.

The UK's National 25 Year Environment Plan and The Environment Act

Nationally, the current UK Government published the 25 Year Environment Plan in 2018, which committed to, "within a generation", leaving the natural environment in a better condition than when it was inherited, and which set out strategies including for plants and wildlife and connecting people with nature. The Dasgupta Review published by HM Treasury in February 2021 was the first independent, global review of the economics of biodiversity and set out a framework for incorporating nature into economics and decision-making – and highlighted that significant declines in biodiversity are undermining the productivity, resilience and adaptability of nature. The recognition that nature and biodiversity sustains our economies, livelihoods and well-being is a hugely important step to galvanising support for more urgent and drastic action.

The Environment Act makes net biodiversity gains from new development mandatory, and commits to a nature recovery network at the National scale, with priorities being set locally with broad stakeholder input involved. These Local Nature Recovery Strategies aim to integrate environmental and planning policy and help direct investment to priority areas for biodiversity.

Locally

Locally, the Buckinghamshire & Milton Keynes NEP partners are putting forward this revised Biodiversity Action Plan (BAP), the latest in a series stemming back to commitments made at the 1992 Rio Earth Summit.

7 **Biodiversity can benefit from a change in approach in our thinking and application.** For example, recreating areas of permanent woodland and grassland provide important re-connected habitats for a range of specialist species and they can also provide natural buffers to flood events which erode soils, lower water quality, flood our homes and damage our economy.

8 Our *Forward to 2030* Biodiversity Action Plan is not the first BAP for the area. Previous BAPs have developed both nationally and locally, since the Rio Earth Summit in 1992 (see Figure 3, page 86 for details.)

How the Buckinghamshire and Milton Keynes Natural Environment Partnership's new Biodiversity Action Plan differs from previous BAPs

9 **This new BAP reviews, updates and refreshes the previous BAP and includes a robust set of targets and actions that we can work together to achieve, over the course of the next decade.**

10 **For example, this new BAP includes a broader set of objectives**, still including priority habitat targets—as in previous BAPs—but also now gives more prominence to recognising the importance of creating, enhancing, improving, connecting and managing other habitats too. It sets a series of broader objectives, from ensuring biodiversity objectives and practice are being met in new developments and in urban areas to connecting people with nature.

11 **The new BAP also identifies actions to be taken at two scales: those that are relevant across the whole NEP area (Buckinghamshire and Milton Keynes); as well as those relevant to a more local level**, taking Natural England's National Character Areas as the basis. The BAP also provides detailed examples of practical activities of each suggested action.

12 **Delivery of these actions spatially is encouraged not just within the most important areas for biodiversity action—the "Biodiversity Opportunity Areas" (BOAs, see footnote 19, page 36)—but also in buffering around them and connecting within and between them** into a local ecological network, helping to build resilience to external pressures.

13 **So, compared with our previous** *Forward to 2020* Biodiversity Action Plan,[3] our new, updated BAP:

- **Extends the Priority Habitats biodiversity targets**, set out in our *Forward to 2020* Biodiversity Action Plan,[4] to 2030.
- **Retains a focus on Biodiversity Opportunity Areas** for the Plan's spatial delivery.
- **Includes a series of broader, but connected and supporting objectives and principles,** which together encourage the creation, improvement and connection of a broader range of habitats to achieve the Lawton principles of "more, bigger, better and more joined-up".[5]
- **Provides tailored example actions** needed to achieve the aim and objectives and follow the principles within specific landscape character areas within Buckinghamshire and Milton Keynes, using Natural England's National Character Areas as a guide, as well as across the area as a whole.

[3] NEP, "Forward to 2020: Biodiversity Action Plan" (2015). Available here: **bucksmknep.co.uk/projects/forward-to-2020-biodiversity-action/**

[4] *ibid.*

[5] "**Making Space for Nature**" was an independent review published in 2010 by Professor Sir John Lawton, which reviewed England's wildlife sites and connections between them, and assessed whether they were capable of responding and adapting to the growing challenges of climate change and other demands on the land, and how to address the loss of biodiversity. The review concluded that England's wildlife sites were generally too small and too isolated, leading to species decline. He called for more space for nature, actions across whole landscapes to reverse the effects of fragmentation and degradation, and the importance of establishing strong, connected "coherent and more resilient" ecological networks – suites of high quality wildlife sites with connections between them enabling species to move. This landscape-scale approach is guided by 4 principles: "more, bigger, better and joined". The Government responded within its Natural Environment White Paper in 2011, "**The Natural Choice: Securing the Value of Nature**" which set a vision for the natural environment for the forthcoming 50 years, encouraging partnership-working (and committing to Local Nature Partnerships) across landscape-scales and aiming to leave the environment in a better condition than was inherited. Available here: **www.gov.uk/government/publications/the-natural-choice-securing-the-value-of-nature**

14 **Our new BAP also identifies the current and future pressures and threats to our area's biodiversity, and sets out how we intend to work collaboratively to achieve and deliver the BAP's aim, objectives and principles**, particularly in partnership with farmers, land-owners and land managers. The BAP sets out the responsibilities and accountabilities of different organisations and individuals to help collect data, monitor and report on progress and effectiveness, and deliver the BAP. We also highlight where there are gaps in data or deliverability and set out how these should be addressed.

Looking ahead to Local Nature Recovery Strategies

15 The NEP's current BAP is referred to, endorsed and supported in a number of the area's Local Plans, and sets the expert-led view of biodiversity priorities for the next decade. In collaboration with partners working on the NEP's BAP Working Group, who represent mainly conservation, wildlife and landscape-based organisations, the BAP Working Group's thinking in revising the BAP were fed into and supported the Buckinghamshire pilot Local Nature Recovery Strategy (LNRS) process (completed in May 2021).[6] The LNRSs aim to set biodiversity priorities whilst achieving broader environmental outcomes and taking into account a wide range of stakeholder opinions.

16 **This BAP will serve as the interim biodiversity strategy for nature's recovery until such time as finalised LNRSs are in place across Buckinghamshire and Milton Keynes.** The NEP's partners intend for this new BAP 2030 to set the direction and priorities for biodiversity and nature's recovery in the area until then. The NEP is committed to taking the thinking and learning of the BAP through to the next stages of forming the upcoming Local Nature Recovery Strategies covering the NEP's area.

The Aim and Objectives of the new BAP

17 **For biodiversity in Buckinghamshire and Milton Keynes to be supported sustainably**, its needs must be **meaningfully integrated into land management beyond protected sites and sites managed for wildlife.** It is not sufficient to rely upon small, fragmented and disconnected wildlife-rich sites such as protected sites and nature reserves.

18 **In response to significant and ongoing pressures to our biodiversity** internationally, nationally, and across Buckinghamshire and Milton Keynes, **the Buckinghamshire and Milton Keynes Natural Environment Partnership has set out, in its new *Forward to 2030* Biodiversity Action Plan**, a strategic aim to reverse biodiversity decline, whilst at the same time to create more, bigger and a better quality of connected and resilient habitats by 2030.

Forward to 2030: Strategic Aim

The Forward to 2030 Biodiversity Action Plan aims to reverse biodiversity decline by working together to create **more, bigger, better and more joined-up habitats** across Buckinghamshire and Milton Keynes by 2030.

[6] Outputs from the pilot Buckinghamshire Local Nature Recovery Strategy are available on the NEP website: **bucksmknep.co.uk/nature-strategy/outputs**

19 **The objectives set by the BAP to achieve the strategic aim are as follows** (for further details of the objectives and principles of the BAP, see Chapter 1):

1. **Retain, enhance, expand and create priority habitats everywhere**, with a focus on BOAs and strategically-identified areas
2. **Increase the overall land area of wildlife-important habitats** and of land positively managed for wildlife and high nature value habitats
3. **Enhance existing habitats and improve habitat condition**
4. **Create and manage buffers** around existing and new areas of priority habitat and other core and high-quality biodiversity and habitat sites following best practice guidelines
5. **Connect quality habitats across the landscape** to enable species movement across larger areas to improve habitat and species resilience to external pressures, with a focus on connectivity within and between BOAs as well as into the wider landscape
6. **Improve people's connectedness with nature,** so that communities across Buckinghamshire and Milton Keynes value and understand the role of nature in mental and physical wellbeing
7. **Ensure biodiversity is a key factor in the design of the urban environment** and of new developments

Area-wide actions to achieve the new BAP objectives: a summary

20 **Below is a summary of area-wide Actions linked to each of the seven objectives in the new BAP** (see Chapter 4 for further details of area-wide and NCA-specific action plans). These are grouped into actions according to Lawton's principles to improve habitats and connectivity (per Paragraph 13 and footnote 5):

More and bigger

1 Retain, enhance, expand and create priority habitats everywhere, with a focus on Biodiversity Opportunity Areas and strategically-identified areas

Actions:

- **Create or enhance priority habitat so as to increase the area of each priority habitat** within Buckinghamshire and Milton Keynes per Table 1, page 21
- **Seek stronger protection for priority habitats**

2 Increase the overall land area of wildlife-important habitats and of land positively managed for wildlife and high nature value habitats…[7]

…both via designated nature conservation sites (expansion of existing sites and creation of new ones) and elsewhere, to achieve at least a "doubling of nature" (land in positive management for wildlife) by 2030.

Actions:

- **Promote the uptake of land management schemes** so that more hectares are in positive management for wildlife
- **Promote and support landowner and farmer-led initiatives**
- **Restore, enhance, expand or create, and manage habitats,** such as:
  - Species-rich grassland (including wet grassland)
  - Native, semi-natural woodland
  - Scrub and edge habitats, and scrubby grassland (e.g. road verges, hedgerows)
  - Wildflower-rich meadows and wildflower verges
- **Manage public open space to be 10% more wild by 2030**
- **Increase investment in identifying, creating, expanding, extending and managing the area of core and high quality biodiversity sites,** including:
  - Local Wildlife Sites
  - Sites of Special Scientific Interest
  - Nature Reserves

Better

3 Enhance existing habitats and improve habitat condition

Actions:

- **Follow best practice for wildlife on farmland** to improve biodiversity
- **Support catchment-based principles and management plans for improving water** quality and flows
- **Engage the public in managing land for wildlife** (particularly in urban areas)
- **Engage other sectors in caring for biodiversity**
- **Facilitate Natural Flood Management Schemes** in the areas shown in Figure 4, page 95
- **Incorporate well-designed green infrastructure** in both existing and within new development

[7] This is in the context of the collective Local Nature Partnerships' ambition for the Growth Arc, which calls for a "doubling of nature" (available here: **bucksmknep.co.uk/projects/doubling-nature/**), and which has become one of the agreed Environmental Principles (Principle 2a) of the OxCam Growth Arc (available here: **www.semlep.com/modules/downloads/download.php?file_name=2306**).

4 Create and manage buffers around existing and new areas of priority habitat and other core and high-quality biodiversity and habitat sites following best practice guidelines…

…to improve resilience and enhance the visual characteristics of the landscape.

Actions:

- **Create and manage buffers** and/or improve land surrounding existing and new areas of priority habitat as well as around other core and high quality biodiversity and habitat sites.

More joined-up

5 Connect quality habitats across the landscape to enable species movement across larger areas to improve habitat and species resilience to external pressures, with a focus on connectivity within and between BOAs as well as into the wider landscape

Actions are needed to both reduce the risk of biodiversity loss and to provide opportunities for biodiversity to migrate and adapt to changing circumstances. Improved connectivity can provide important re-connected habitats for a range of specialist species and they can also provide natural buffers to flood events which erode soils, lower water quality, flood our homes and damage our economy.

Actions:

- **Improve habitat connectivity within and between the Biodiversity Opportunity Areas** (Map 10, page 113; also see paragraph 5.4, page 112), **by improving and linking existing habitats as well as creating new habitats**
- Ensure new habitats improve **landscape connectivity**
- **Create habitat mosaics** of good quality, diverse habitats throughout the landscape to enhance connectivity for a range of species
- **Promote cooperative land management across wider areas** to support larger and better-integrated resources for wildlife and a sense of connectivity
- **Work with neighbouring authorities or organisations to link habitats across borders** and work at the landscape-scale towards a cohesive ecological network.

6 Improve people's connectedness with nature so that communities across Buckinghamshire and Milton Keynes value and understand the role of nature in mental and physical wellbeing…
…also to increase and improve accessibility of nature-rich spaces, while maintaining and enhancing their biodiversity value.

Actions:

- **Work towards achieving the NEP's Green Infrastructure (GI) "Vision and principles for the Improvement of GI across Buckinghamshire and Milton Keynes"**[8] which aims to provide, connect, improve and protect GI assets, including blue infrastructure, and their benefits, into the long-term
- **Engage the public in managing land for wildlife,** e.g. gardens, community spaces
- **Use nature-based solutions** to support wildlife and adaptation to climate change, i.e. to reduce resource-use, reduce the risk of biodiversity loss as a result of climate change, and to provide opportunities for biodiversity to adapt to changing circumstances

7 Ensure biodiversity is a key factor in the design of the urban environment and of new developments

Actions:

- **Maintain existing green spaces and create new, connected green spaces as part of new development** schemes which incorporate features for biodiversity
- **Ensure that spatial planning and design for urban development and infrastructure aim to reduce surface water run-off, protect and restore habitats, improve the quality of rivers and groundwater,** and so protect drinking water supplies

Delivering the Plan – the NEP's new Nature Recovery Working Group

21 As set out on page 2, the NEP's Partners involved in setting the BAP have committed in this plan to forming a **Nature Recovery Working Group**. This group will work together to produce a prioritised delivery plan and be at the heart of driving forward the actions set out in the BAP to deliver its aim and objectives.

22 Dependent on data availability, the NEP will report on progress towards achieving the BAP aims and objectives over the course of the period to 2030.

[8] Available here: **bucksmknep.co.uk/projects/vision-and-principles-for-the-improvement-of-green-infrastructure/**.

Structure of the BAP

23 Our BAP is set out as follows:

Chapter 1: Introduction (page 15)

This section sets out **the importance of biodiversity, its national and international decline, and the overarching strategic aim and objectives for the Forward to 2030 Action Plan,** alongside a series of principles by which we intend to work to achieve them. The **priority habitat targets** are also set out here.

Chapter 2: Context: The Biodiversity of Buckinghamshire and Milton Keynes (page 22)

This Chapter provides the background on the **biodiversity of the area**: the habitats, landscape, our water environment, species of importance and designated areas of protection. Maps are provided showing the **broad habitats and Tables showing the percentage coverage** of each in Buckinghamshire and Milton Keynes. The various protections and designations are also described. Background to the **river landscape and urban landscape** of the area is also provided. This section also includes information about the area's **natural capital**, with summaries of the broader benefits, or "ecosystem services", provided by it. Finally, the section also includes a background description of the biodiversity features of the **National Character Areas** (NCAs) that are used in the Action Plan.

Chapter 3: Ecosystems under pressure (page 59)

This Chapter identifies the **significant pressures on biodiversity and ecosystems** across Buckinghamshire and Milton Keynes and their impacts on the quality, quantity and resilience of our habitats and wildlife. The impacts are set out in Table 6, and include climate change, development land management, over-abstraction of water, pollution and non-native species, diseases and pests, as well as the impact of policy changes. The section also highlights **specific pressures relevant to each of the 4 grouped NCA areas**.

Chapter 4: Biodiversity Action Plans for Buckinghamshire and Milton Keynes (page 83)

In response, this Chapter sets out the **details of the new Buckinghamshire & Milton Keynes Biodiversity Action Plan—what is needed and where—to meet the overall BAP aim and objectives.**

The Chapter provides both action plans as well as examples of how to deliver them, **at two scales**: those applicable across **the whole of Buckinghamshire and Milton Keynes**; and more local actions applicable to specific **National Character Areas**.

The actions set out are those that the NEP advocates should be taken to protect, enhance, improve and connect biodiversity across Buckinghamshire and Milton Keynes.

Chapters 5 and 6: Delivery: where? (page 110) **and Delivery: Who, How and When?** (page 118)

These Chapters look at where to **prioritise action to achieve the BAP's strategic aim and series of objectives**, and **who will be responsible for taking it, how and when**. More specifically:

Chapter 5 sets out how **Biodiversity Opportunity Areas** (BOAs) are still considered to be the **most important areas for biodiversity action in the area**, in terms of restoring nature. Action taken within BOAs to restore, improve and connect biodiversity, particularly priority habitats, is the highest priority. Actions to create other habitats outside BOAs but informed by other NEP work (e.g. natural capital habitats creation opportunity mapping, green infrastructure opportunity mapping, biodiversity net gain priority offset location mapping), is considered the next priority, with the lowest priority actions, although which can be very beneficial, related to actions anywhere else across the area and not informed by, or which adhere to, the NEP's mapping work.

Chapter 6 sets out the importance of the NEP's new **Nature Recovery Working Group**, working alongside other partners and sectors, to the **Governance and delivery of the BAP**. It also emphasises the importance of data, monitoring, reporting, and engagement with landowners, farmers, and land managers. We also cover the **need for sufficient resources** to support all of these actions and outline the **responsibilities of different stakeholders** and how they can help to support achieving the aim and objectives.

Chapter 1. Introduction

Wildflower meadow, Buckinghamshire. Photo courtesy of BMERC.

The Importance of Biodiversity

1.1 **Biodiversity is all around us**; in our woodlands and hedgerows, our fields and rivers, and our gardens. Countless species of birds, plants, insects and other animals live in a complex interconnected natural system. This is biodiversity: the rich variety of life on earth. **Biodiversity needs to be at the heart of everything we do**; it is integral to tackling and adapting to climate change, as well as safeguarding our vital life-giving ecosystem services, from water and soil protection, to food and energy security.

1.2 **We have a unique responsibility as a species**, because we have the power to affect entire ecosystems, and the populations they support, through our own actions. All living things and the physical environment (the geology, soil, air and water etc.) which support them, are part of the stock of natural capital. This natural capital underpins essential ecosystem services such as crop pollination, flood defence and water and air quality upon which our civilization's health and prosperity depends. There is a clear moral, social and economic imperative to ensure that we protect, look after and enhance the prospects for biodiversity now and in the future, for its sake and ours.

1.3 **We have many species of plants and animals in Buckinghamshire and Milton Keynes which are amongst the rarest and most important in the country.** They may be important because they are nationally uncommon, but relatively abundant locally, such as the Chiltern Gentian (*Gentianella germanica*), a flower that is found on lowland chalk grassland. They may have a small population, which is sensitive to changes in the way their habitat is managed, such as Water Vole (*Arvicola amphibious*). There are also many species which, though once common, are now in steep local and national decline, for example the Skylark (*Alauda arvensis*). We have a responsibility to ensure that these species have a sustainable future. This Biodiversity Action Plan describes how we can meet that responsibility in Buckinghamshire and Milton Keynes.

Forward to 2030: Strategic Aim, Objectives and Principles

Forward to 2030: Strategic Aim

The NEP's *Forward to 2030* Biodiversity Action Plan (BAP), in line with the Government's 25 Year Environment Plan, aims to reverse biodiversity decline and contribute to nature's recovery by working together to create **more, bigger, better and more joined-up habitats** across Buckinghamshire and Milton Keynes by 2030.

1.4 ***Forward to 2030*** is the result of the NEP's work with its partners in 2019-21 to review and revise the *Forward to 2020* BAP for Buckinghamshire and Milton Keynes. Based on the finding and principles derived from the Lawton Review, the Buckinghamshire and Milton Keynes Biodiversity Action Plan: Forward to 2030, **sets an overarching aim to create more, bigger, better and more joined-up (connected) habitats. To achieve this aim, the NEP and its partners plan to work towards a series of objectives and follow a set of principles**, as set out below:

Objectives

More and Bigger

1 **Retain, enhance, expand and create priority habitats everywhere – but with a focus on Biodiversity Opportunity Areas (BOAs) and strategically-identified areas** as providing the greatest opportunities. **Specific Priority Habitat targets** are set out in Table 1 (page 21) as a proxy for species, and also at 1.5-1.10 (page 19). BOAs are explained at 5.4 (page 112) and also footnote 19 (page 36).

2 **Increase the overall land area of wildlife-important habitats and of land positively managed for wildlife and high nature value habitats:** both via designated nature conservation sites (expansion of existing sites and creation of new ones), and elsewhere within Buckinghamshire and Milton Keynes, to achieve at least a "doubling of nature," land in positive management for wildlife.

3 **Create and manage buffers around existing and new areas of priority habitat and around other core and high quality biodiversity and habitat sites,** following best practice guidelines.

Better

4 **Enhance existing habitats and improve habitat condition:** to achieve more hectares in positive management for wildlife and increase the use of nature-based solutions for climate change adaption. This includes a focus on public spaces, the urban environment, farming and land-management.

More joined-up

5 **Connect quality habitats across the landscape** to enable species movement across larger areas **to improve resilience to external pressures – with a focus on connectivity within and between BOAs as well as into the wider landscape.**

6 **Improve people's connectedness with nature, so that communities across Buckinghamshire and Milton Keynes value and understand the role of nature in mental and physical wellbeing.** Also to increase and improve accessibility of nature-rich spaces, while maintaining and enhancing their biodiversity value, e.g. aiming to manage public open space to be 10% more wild by 2030.

7 **Ensure Biodiversity is a key factor in the design of the urban environment and of new developments.**

Principles

In delivering actions to achieve the strategic aim and objectives, we will follow these Principles:

1 **Seek to deliver multiple benefits where possible,** alongside biodiversity and wildlife, for example to help absorb carbon, purify our water and reduce run-off and help to mitigate climate change, and/or provide health & wellbeing benefits to people, alongside improved access to nature. However, where biodiversity and delivering multiple benefits conflict, the priority will be to retain and enhance biodiversity.

2 **Contribute an expert-led, technical view of biodiversity priorities, and a framework for delivering the actions required to achieve them, applicable to the development of Local Nature Recovery Strategies in Buckinghamshire and Milton Keynes.**

3 **Raise awareness and understanding of the value and role of nature in mental and physical wellbeing and engage more people with nature and in improving biodiversity**. This may include, for example:

i. Working with farmers, landowners and local authorities to encourage educational initiatives (such as open farms, improved access and interpretation) that promote engagement with the local environment and develop cultural identity and awareness
ii. Through delivering the actions in the BAP, where appropriate, support and encourage recreation, access to and engagement with nature
iii. Including extensions to public right-of-way networks and cycle routes where this provides opportunities for strategic habitat links between assets, and creating short amenity routes or improved access to wilder green spaces.

4 **Ensure appropriate and well-managed habitat creation: right species, right habitat, right place.** For example, when planning to create new habitats (notably trees but with application to all habitats), consideration should be given to:

i. Historic and existing land uses and soil profile: is new planting the right proposal?;
ii. Where it is in relation to other habitats and landscape features, expert advice should be sought, to ensure the right habitats and planting, in the right places;
iii. Habitats/planting must be:
    - strategically-planned
    - support broader goals to buffer, link and create habitat mosaics
    - sympathetic to the environment (e.g. for trees, the preference is for native trees and shrubs)
    - appropriately planted, following best practice
    - supported locally
    - with funded, ongoing management planned into the long-term to succeed, according to expert advice

5 **Use nature-based solutions to reduce resource-use, improve biodiversity and adapt to climate change:** e.g. by default, integrate biodiversity and green infrastructure features into new development; natural flood management, wetland management for water purification, urban trees for cooling and shade for people. For example:

i. Encourage sensitive soil management to limit loss and degradation, chemical particulate runoff and loss of underpinning soil biota
ii. Promote sensitive water usage in both urban and rural environments
iii. More sympathetic management: more driven and led by natural processes
iv. Reduce runoff from hard surfaces (see Action Plan 3, page 93; Figure 4, page 95)

Specific Targets for Priority Habitats in Buckinghamshire and Milton Keynes

1.5 Alongside the recent policy developments outlined at Figure 1, page 6, remains the Government's "Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services" (2011).[9] This includes national targets for the condition and extent of **priority habitats and protected species** by 2020: to achieve an increase in overall extent of priority habitats by at least 200,000 ha; and 90% of priority habitats in favourable or recovering condition.

1.6 The Strategy's priority habitats are embedded in law through Section 41 of the Natural Environment and Rural Communities (NERC) (2006) Act. This lists **56 priority habitats of principal importance for conservation in England**; the same as those that have historically been addressed by UK Biodiversity Action Plan work.

1.7 In terms of extent and proportion of the area, according to the latest Natural England Priority Habitat data available, Buckinghamshire and Milton Keynes combined had less priority habitat than the average English county at nearly 11% of the land area, compared to 14% (2016 data) of England as a whole. However, more fine-grained local habitat mapping data held by Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) suggests the latest Priority Habitat land area in Buckinghamshire and Milton Keynes is, in fact, around 3%.

1.8 Despite this, the area has above average extent of traditional orchards, lowland dry acid grassland and lowland meadows; lowland mixed deciduous woodland is the single most extensive priority habitat in the county (1,682 ha) followed by Beech and Yew Woodland (1,191 ha) and lowland wood pasture and parkland (536 ha).[10]

1.9 Priority Habitats and local sites occur throughout the area (as shown in Map 1, below) although woodlands and conservation organisation ownership of land is mainly in the south of the county in the Chilterns Area of Outstanding Natural Beauty (AONB). There are also a number of national sites, particularly throughout the southern half of the county, and along the western edge of the northern part of Buckinghamshire.

1.10 **The NEP's BAP 2030 aims to retain, create and improve Priority Habitats and sets targets for 14 of the English Priority Habitats, as a proxy for species, to achieve an overall 20% increase in the area of Priority Habitat.** The targets are set out at Table 1, below.

Actions required to deliver the Aims and Objectives

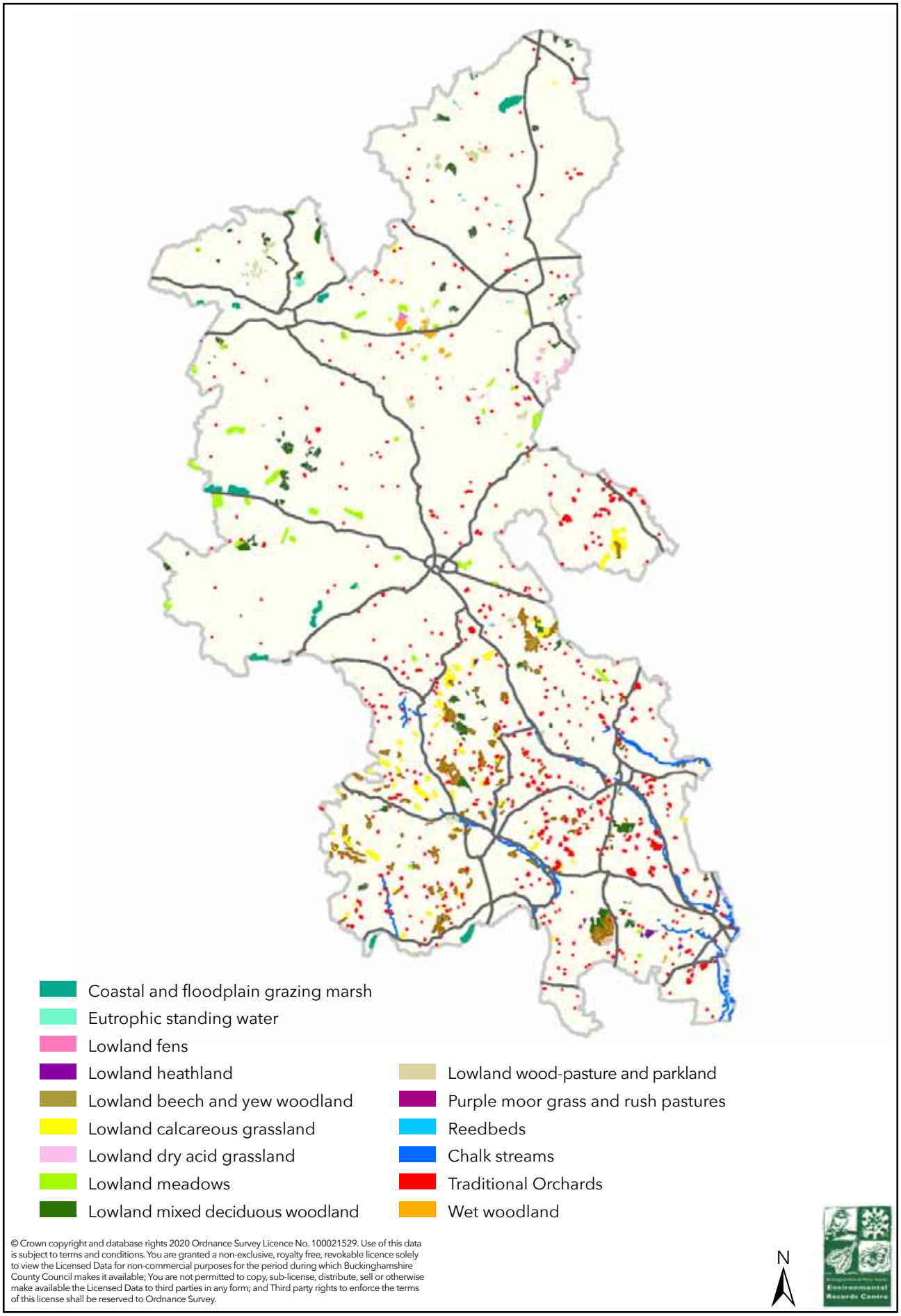
1.11 The detailed Actions required to deliver the Aims and Objectives, while following the Principles, are set out in the BAP at Chapter 4. The BAP identifies actions that are:

i. required across the entire area; and
ii. more specific actions that apply to the particular NCAs of Buckinghamshire and Milton Keynes.

[9] Available here: **assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf**.

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

Map 1: Priority Habitats in Buckinghamshire and Milton Keynes



Based on information supplied by the Buckinghamshire and Milton Keynes Environmental Records Centre.

Table 1: BAP 2030 Priority Habitat Targets[11]

Broad Habitat Type	Priority Habitat	2010 / current habitat area (hectares)	2030 Target for priority habitat creation and restoration (hectares) (and % increase on existing habitat in brackets)	
Woodland	Native woodland: i) Lowland Mixed Deciduous Woodland	1682 ha	Native woodland altogether: 400 (14%)	Per year: 40
	ii) Lowland Beech and Yew Woodland	1191 ha		
	iii) Wet Woodland	33 ha		
	Wood-Pasture and Parkland	536 ha	100 ha (19%)	10
	Traditional Orchards	361 ha	50 ha (14%)	5
Grassland	Lowland Dry Acid Grassland	317 ha	50 ha (16%)	5
	Lowland Calcareous Grassland	344 ha	100 (29%)	10
	Lowland Meadows	382 ha	125 ha (33%)	12.5
	Coastal and Floodplain Grazing Marsh	337 ha	200 ha (59%)	20
Heathlands	Lowland Heathland	77 ha	20 ha (26%)	2
Fen, Marsh and Swamp	Lowland Fens	67 ha	5 (7%)	0.5
	Purple Moor Grass and Rush Pastures	18 ha	5 (28%)	0.5
	Reedbed	25 ha	15 (60%)	1.5
Standing open waters and canals	Eutrophic Standing Waters (lakes, pools and man-made waters)	tbc	Aim to collate info to assess extent and condition; aim to improve	
	Ponds (assuming average size of 0.05 ha; and up to 2 ha)	tbc	Aim to assess number/extent; aim to improve; possible target: create 500 ponds	50 ponds
	Canals (6 across Bucks & MK)	tbc	Aim to collate information and measure improved ecological status[12]	
	Rivers and streams (including chalk rivers)	WFD (ecological) status	Improved WFD ecological status: at least half at "good" ecological status and all chalk streams by 2030[13]	
Boundary and Linear Features	Hedgerows (at least 2m wide)	unknown	100km and under better management	10km
Other	Open Mosaic Habitats on Previously Developed Land	unknown	Aim to measure extent; and aim for overall 20% increase	
TOTAL	All UK BAP priority habitats (excluding unknowns, WFD status habitats, hedgerows and ponds)	**5,374 ha** (2.9% of land area)[14]	**1,070 ha (20%)** (0.5% of land area)	**100**

Notes to Table 1:

i. Current habitat area from BMERC 2012 Core and Local Output Indicators for Biodiversity report, and bespoke updates

ii. Broad habitat types and priority habitat categories are taken from JNCC guidance

[11] BRIG, 2011. UK Biodiversity Action Plan; Priority Habitat Descriptions. JNCC. Available here: **data.jncc.gov.uk/data/2728792c-c8c6-4b8c-9ccd-a908cb0f1432/UKBAP-PriorityHabitatDescriptions-Rev-2011.pdf**.

[12] Canals: currently, there are 6 designated WFD canal waterbodies in Bucks and 1 in MK; in Bucks, 2 are good and 3 are moderate ecological status per Environment Agency 2019 data.

[13] Water Framework Directive ecological quality assessments to be used as a general river habitat status indication; although this does not necessarily indicate the status of BAP species dependent on those habitats, or about riparian/semi-aquatic species. Ideally, a separate focus on key species is needed; or River Corridor Surveys, River Habitat Surveys and fluvial audits or condition assessments would be needed for accurate baseline and progress measures. WFD target is 100% by 2027; but given that we currently have only 1 river in Bucks at good status, the estimated target is for half to be classified as "good" ecological status and for all the chalk streams too.

[14] Bucks assumed to be: c.187,400ha (1,874km^2); MK assumed to be: 8,900ha (89km^2); total = 196,300ha

Chapter 2. Context

The Biodiversity of Buckinghamshire & Milton Keynes

Photo: Nicola Thomas.

Chapter Summary

Buckinghamshire and Milton Keynes have a varied landscape. To the far north are remnants of royal hunting forests with ancient trees supporting rare species such as hazel dormice and black hairstreak butterflies. The woodlands quickly give way southwards to a landscape dominated by low-lying farmland and floodplains of the Thame valley into the Aylesbury Vale. The Upper Ray Valley is known for its concentration of floodplain grasslands and importance for wading birds with the nearby area around Bernwood, famous for ancient woodland.

The Chiltern Hills, south of the clay vale, are dramatically more diverse, containing numerous areas of ancient woodland, chalk grasslands and internationally important chalk streams. This is where many of the sites designated for nature conservation are found, along with several rare species such as the Chiltern Gentian and Chalkhill Blue butterfly. To the south of the Chiltern Hills lies the Thames Valley which features streams and rivers feeding into the River Thames on the southern county boundary. Open water bodies associated with gravel extraction sites are frequent and large areas of parkland can also be found here.

Cultivated land, and area under improvement (generally, farmland) makes up 63% of Buckinghamshire and 55% of Milton Keynes, less than surrounding counties. In Buckinghamshire, around 13% of the county contains high-quality habitats but only 5.5% of the county receives some level of formal designated site protection. In Milton Keynes, high-quality habitats cover 7.8% of the area, but only 2.3% is protected.

Rivers, lakes and groundwater in Buckinghamshire and Milton Keynes are protected under the Water Framework Directive. The precious chalk streams have fish communities dominated by brown trout and other minor fish species. The Thames has the greatest diversity of fish species. The Buckinghamshire part of the Ray has an impoverished fish fauna, due to its inherent low summer baseflow, historic river engineering and loss of habitat. Otters are now found throughout the county's rivers, following their substantive recovery in the last few decades, whereas water voles are currently restricted to populations on the Great Ouse, Chess and Misbourne.

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

The Chapter also outlines the natural capital and ecosystem services provided across Buckinghamshire and Milton Keynes, such as clean air, water, flood resilience, access to nature, agricultural production with maps of supply and, where available, demand – outlining how the discrepancy between the two can be reduced.

The important features of National Character Areas are then described, setting the geographical basis for the Biodiversity Action Plans that follow at Chapter 4.

Our important and valued landscapes, habitats and species

2.1 The varied geology and topography of Buckinghamshire and Milton Keynes gives rise to a countryside rich in landscape and wildlife value. Many of the habitats and associated species in Buckinghamshire and Milton Keynes are of national or even international importance.

2.2 Whilst landscapes, habitats and species do not stop or adhere to administrative borders, the following gives a pictorial description of the habitats, landscapes and wildlife of the area travelling from north to south.

Ancient Chalk Grassland, Yoesden Bank. Photo: John Morris

2.3 In the very north of the area, wide, meandering alluvial floodplains lie interspersed with harder limestone outcrops. The remains of **historic hunting forests, networks of hedgerows, flood meadows and wet pastures along river corridors and the enigmatic patterns of ancient ridge and furrow**, combine to provide a variety of important and wildlife-rich natural habitats. Brown and Black Hairstreak butterflies, Barn Owls and Green-winged Orchids may be found where suitable conditions persist.

2.4 In the Brickhills area on the Bedfordshire border, the acidic soils of the greensands, with its many springs, relics of **heathland vegetation** and pockets of marshy ground, support unusual species such as Marsh Fern and Bog Bush Cricket.

2.5 The clay vales immediately to the north of the Chilterns are characterised by **pasture**, the damper grasslands being occasionally carpeted with Great Burnet, Meadow Sweet and Ragged Robin. Slow flowing brooks are lined with Willow pollards and **Black Poplars**, the latter being found in greater numbers in Buckinghamshire than anywhere else in the UK. Regular winter flooding provides good feeding grounds for wetland birds such as Snipe and Curlew.

2.6 Rising from the vale is the chalky backbone of Buckinghamshire, the **Chiltern Hills**. The past actions of ice and melt-waters, combined with the geology, soils and climate, and generations of human influence in the Central Chilterns give rise to distinctive, beautiful and varied habitats rich in wildlife and historical value.

2.7 **Lowland chalk (i.e. calcareous) grassland** is an attractive, specialised and fragile habitat. It results from centuries of grazing on nutrient-poor chalk soils, producing a short turf (or 'sward') that can be rich in herbs, flowers and grasses. Many chalk grassland plants do not live in other habitats. The Chilterns have nationally-important concentrations of such chalk grassland, particularly along the slopes of the steep scarps and dry valleys.

2.8 Here, the now-familiar Red Kites soar above the steep scarp and valleys. In many areas, the scarp is cloaked by species-rich chalk grassland where Chalkhill Blue butterflies, Glow-worms and Roman Snails are found amongst aromatic swards of Thyme and Marjoram. Luxuriant stands of orchids and other specialities such as the Chiltern Gentian are a vital component of the distinctiveness of this part of the county. Many of the insects found here rely on chalk-grassland plants.

2.9 Low trees and bushes, or 'scrub', are often found in managed grassland habitats, and provide important shelter and niches for other species. As it grows quickly, scrub needs to be managed to allow chalk grassland species to thrive. Three valleys in the hills at Ellesborough are covered in rare Box woodland. Elsewhere along the escarpment, stands of Juniper still remain. Cathedral-like Beech hangers, heathy wooded commons and the more elusive chalk heaths are a feature of the clay-capped hills with fast flowing chalk streams running through the valleys below.

2.10 **Chalk streams** are a characteristic and attractive feature of the Chilterns landscape. Flowing from chalk groundwater, they rise as springs or largely flow over a chalk geology. An internationally-rare and special habitat, more than 85% of all the chalk streams in the world are found in England, and many lie in the Chilterns, where there are eight major chalk rivers in the Chilterns flowing generally in two major river catchments, with a total length of approximately 150km. Chalk streams and rivers are beautiful and important habitats for wildlife and support a huge range of plants such as rare Starworts growing midstream and Watercress at the edges. They also support animals such as Britain's fastest-declining mammal, the Water Vole, and fish including Brown Trout. The Chilterns escarpment is also home to many sources, or headwaters, of the Chilterns chalk streams, such as the Wye headwaters in the beautiful Radnage Valley.

From top: Curlew, photo: David Richardson, courtesy of BBOWT. Ivinghoe Beacon, photo: Rhiannon Flemming. Chalkhill Blue butterfly, photo: Colin Williams, courtesy of BBOWT. River Chess, photo: Allen Beechey.

Hedgerows. Photo: Julia Carey, courtesy of BMERC.

2.11 Agriculture has taken place over thousands of years in the Chilterns. Arable farming is especially suited to the gentler slopes of the plateau where there are thicker soils than on the steep scarp slopes. Natural England and Plantlife surveys have revealed that the Chilterns is particularly rich in plants that grow in arable fields and margins, including some rare and threatened species. Arable field margins, if managed appropriately, can create beneficial conditions for key farmland species. Cornfield annuals, poppies and knapweed, which have suffered national declines in distribution and abundance, can find a home there. **Arable field margins** are also important nesting and feeding sites for game birds and songbirds including the Skylark and Corn Bunting. Butterflies, grasshoppers and invertebrates may breed or spend the winter in the grassy banks between crops and hedges.

2.12 **Hedgerows** have been grubbed out to make way for large-scale agriculture in much of the country, but tracts of species-rich hedgerows remain among the arable landscape and rural areas of the Central Chilterns. They are home to native woody species such as Hawthorn, Beech, Ash, Oak, Hazel, Field Maple, Dogwood, Spindle and Blackthorn. Hedgerows are essential corridors for wildlife movement and provide habitats, food and shelter for insect pollinators including butterflies such as the Brown Hairstreak butterfly and moths, as well as for farmland birds, bats and dormice. Occasional standard trees along the hedge-line are home to tree-nesting birds. Hedgerows have been part of our landscape for centuries and provide a direct cultural link to our past; they still bear the marks of traditional hedgerow management and help to uncover human activity in the area. The Black Hedge, at Monks Risborough, is known to have marked the parish boundary since AD 903 and is thought to be England's oldest hedge.

2.13 The Central Chilterns has been well-wooded for hundreds of years. Although Ash, Cherry and Oak are widespread, the area's famous Beech woods, such as at the Bradenham Estate, are the jewel in the crown. Sapphire carpets of Bluebells and bright emerald leaves in spring give way to the rich golden hues of autumn. The richest woodlands lie on the scarp slope of the chalky ridge where the nutrient poor, calcareous soils also support many rare orchid species.

2.14 **Ancient woodland** is a nationally important and threatened, irreplaceable habitat, where tree cover has been continuous since at least AD 1600, and ecological and historical features survive. In addition to ground flora, ancient woodlands often support protected species such as bats and dormice, as well as woodland birds and butterflies. There are particular concentrations in the Central Chilterns. Most of the ancient woods are found on the clay with flint soils which cap the chalk hilltops, such as at Wendover Woods. Penn Wood, one of the largest ancient woodlands in the Chilterns, was once part of Wycombe Heath common, and part of it is still grazed and managed as traditional wood-pasture.

2.15 **Traditional orchards** are low-intensity managed landscapes. They are hotspots for biodiversity and contain layers of habitats similar to wood-pasture and parkland. Below the trees is an understorey of scrub and hedgerows, and the orchard floor includes fallen dead wood. The variety of different fruit trees leads to extended periods of flowering and fruiting, benefiting insects, birds and mammals. Traditional orchards in the Central Chilterns produce varieties of fruit including dessert, cooking and dual-purpose apples, and cherries such as the Prestwood Black. The majority of traditional orchards lie south of the Chilterns Ridge, including around High Wycombe and Beaconsfield, such as at Little Kingshill and Seer Green.

2.16 To the south, the chalky dip slope gives way to the acid drift gravels, where the largest extent of **heathlands** are found. These heathlands frequently include **pockets of acid grassland, bare ground and Birch woodland**, which offer valuable niches to invertebrates and reptiles. Notable bird species of our heathlands include Nightjar, Woodlark and Hobby. The wetter areas are home to some of our more unusual plants, like the insectivorous Bladderwort and Sundews, whilst in tiny bog pools and ditches, patches of Sphagnum mosses are found. These bodies of standing water are also readily utilised by resident populations of darting bejewelled dragonflies and beetles. Scattered clumps of hilltop and valley-side woodland may host wild service tree, Early Purple Orchid and White Admiral butterfly.

Bluebells in a Buckinghamshire wood. Photo: Fiona Everingham, courtesy of BMERC.

Cows grazing at Burnham Beeches. Photo: Jeremy Young, City of London.

2.17 Burnham Beeches, a tract of **ancient wood-pasture** and a Site of Special Scientific Interest, National Nature Reserve and a Special Area of Conservation, lies in the south of the county, where majestic pollards stand and support a wide variety of fungi and insects. They are found within a diverse area of habitats and species, including woodland, grassland, heath, bog, ponds and ditches. Notable species include Marsh Violet and the Black Darter dragonfly. Over 60 Red Data Book species (rare or under threat nationally) have been recorded for Burnham Beeches, most of which are rare flies and beetles.

2.18 Maps 2 and 3, below, show the broad habitat types of Buckinghamshire and Milton Keynes, as recently mapped by Natural Capital Solutions.[15] Area and percentage cover of these habitat types are shown below in Tables 2 and 3.

[15] Rouquette (2020) *Mapping natural capital, ecosystem services and opportunities for habitat creation in Buckinghamshire.* Report for Buckinghamshire Council; and, Rouquette & Ashby (2021) *Mapping natural capital, ecosystem services and opportunities for habitat creation in Buckinghamshire.* Report for Buckinghamshire and Milton Keynes NEP. Both reports are available here: **bucksmknep.co.uk/projects/natural-capital-mapping/**.

Buckinghamshire

Table 2: Area and percentage cover of broad habitat types across Buckinghamshire

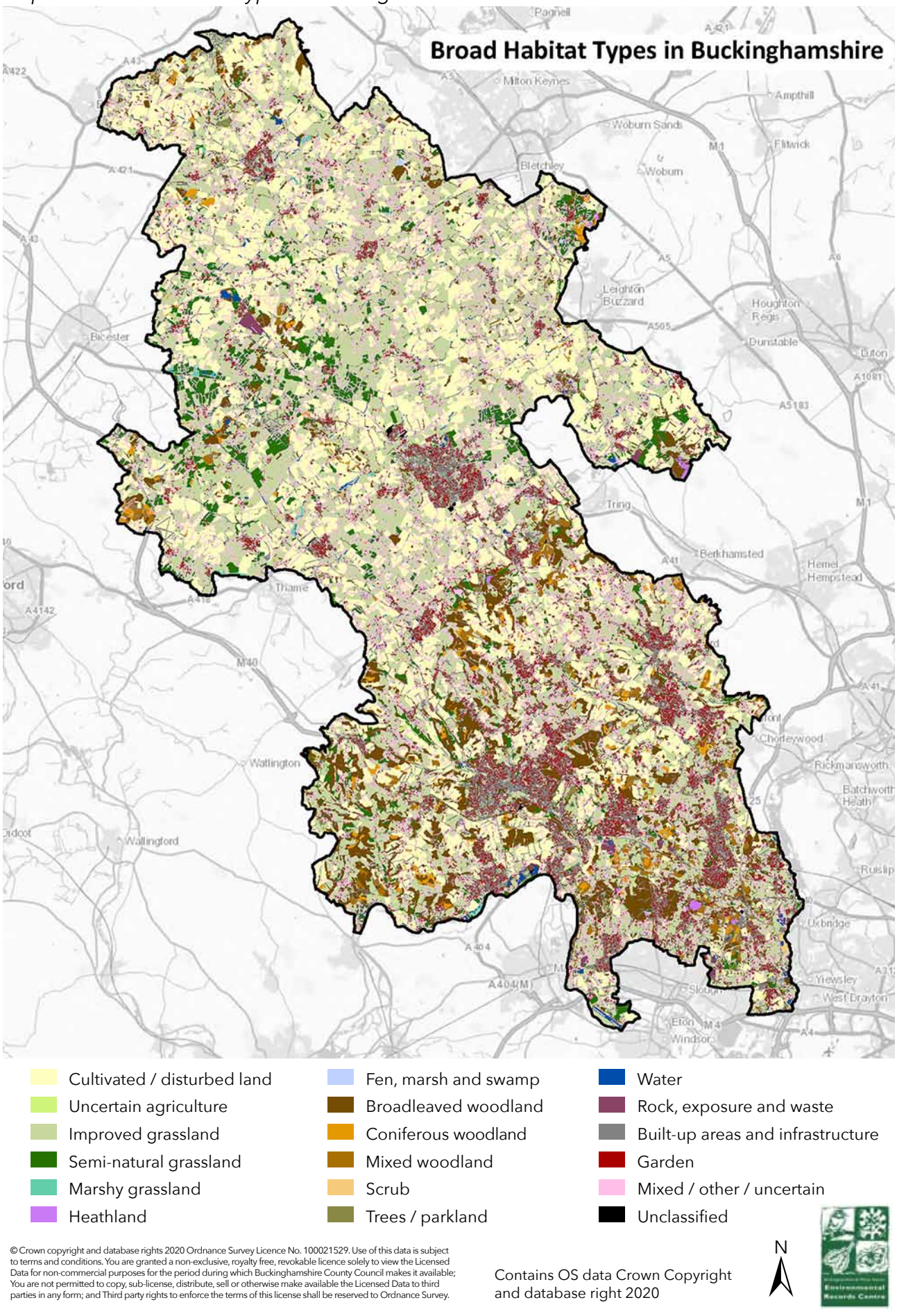
Broad Habitat	Area (Ha)	% Cover
Cultivated/ disturbed land	47,828	30.56
Uncertain agriculture	886	0.57
Improved grassland	50,519	32.28
Amenity grassland	5,165	3.30
Semi-natural grassland	8,454	5.4
Marshy grassland	267	0.17
Heathland	164	0.10
Fen, marsh, and swamp	81	0.05
Scrub	348	0.22
Trees/ Parkland	1,613	1.03
Broadleaved woodland	14,365	9.18
Coniferous woodland	1,788	1.14
Mixed woodland	2,265	1.45
Hedgerows	928	0.59
Water	1,222	0.78
Built-up areas	5,416	3.46
Infrastructure	4,235	2.17
Garden	9,429	6.03
Rock, exposure, and waste	425	0.27
Unclassified	176	0.11
Mixed/ other/ uncertain	916	0.59

Extracted from "Mapping Natural Capital, Ecosystem Services and Opportunities for Habitat Creation in Buckinghamshire" Natural Capital Solutions, 2020.

2.19 This table shows that Buckinghamshire is dominated by cultivated land and improved grassland, making up 63% of the area (98,000 ha), although this is less than surrounding counties. The combined cover of all woodland, scrub and tree habitat types make up 13.0% of the area (20,400 ha), considerably higher than surrounding counties. Semi-natural and marshy grasslands make up 5.6%, while water (surface water features, not groundwater: i.e. rivers, canals, streams, ditches, ponds, lakes, etc) makes up just 0.8%. Built-up areas, and infrastructure (roads, railways, pavements and paths) make up 6.2% of the land area, with gardens comprising 6.0%.

2.20 Most of the area's semi-natural grassland (i.e. grasslands that are not intensely cultivated or fertilised, including meadows and pasture) is found in the northern part of Buckinghamshire, particularly the north-west and north-east tips; whereas most of the existing broadleaved woodland is found in the south.

Map 2: The broad habitat types in Buckinghamshire



Supplied by BMERC and based on analysis by Natural Capital Solutions, 2020.

Milton Keynes

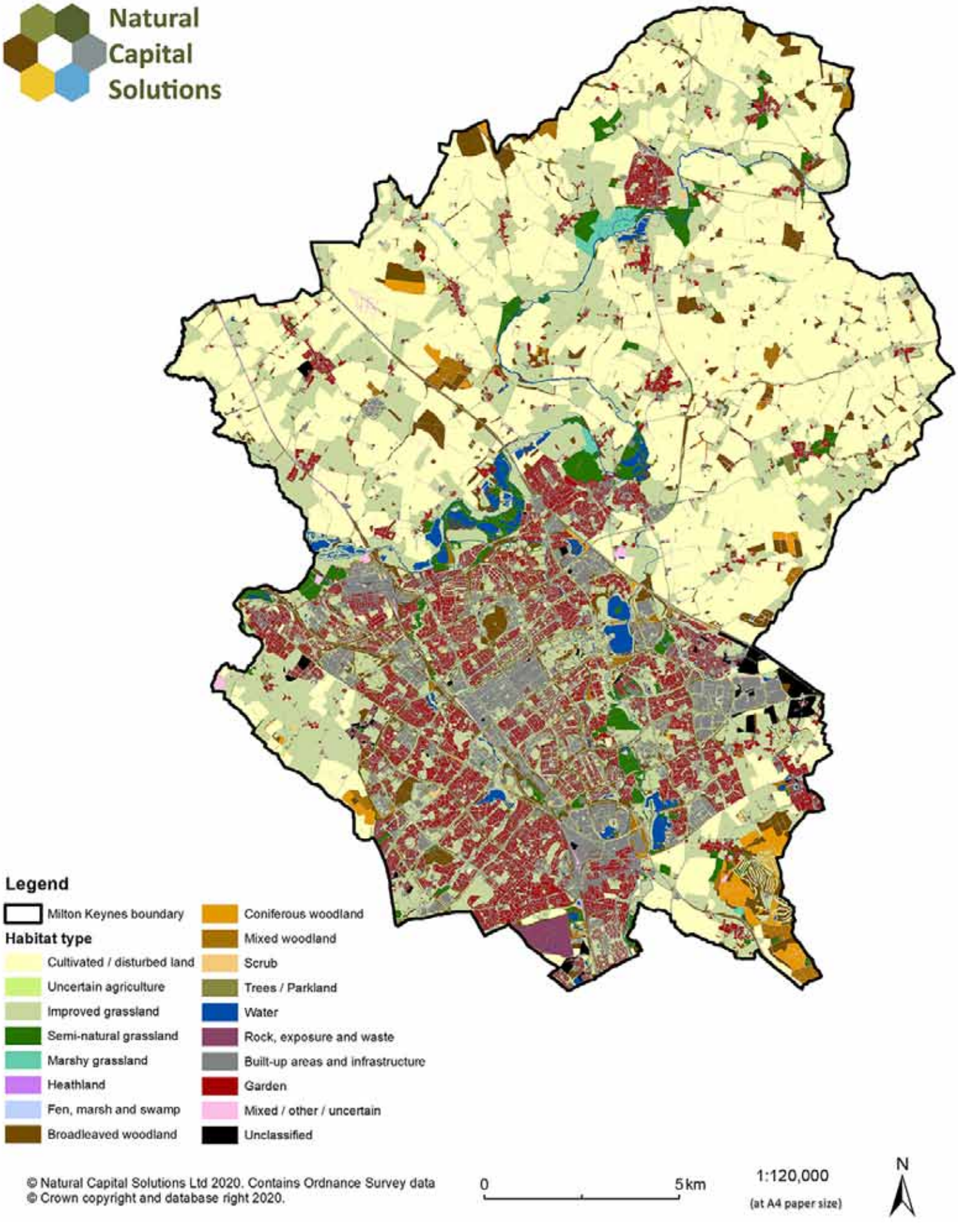
Table 3: Area and percentage cover of broad habitat types across Milton Keynes

Broad Habitat	Area (Ha)	% Cover
Cultivated/ disturbed land	12,027	39.0
Uncertain agriculture	38	0.1
Improved grassland	4,979	16.1
Amenity grassland	2,850	9.2
Semi-natural grassland	735	2.4
Marshy grassland	90	0.3
Heathland	-	-
Fen, marsh, and swamp	14	0.05
Scrub	82	0.3
Trees/ Parkland	465	1.5
Broadleaved woodland	1,608	5.2
Coniferous woodland	300	1.0
Mixed woodland	293	0.9
Hedgerows	132	0.4
Water	608	2.0
Built-up areas	2,261	7.3
Infrastructure	1,787	5.8
Garden	2,112	6.8
Rock, exposure, and waste	100	0.3
Unclassified (land currently under development)	207	0.7
Mixed/ other/ uncertain	169	0.5
TOTAL	**30,858**	**100.0**

Extracted from "Mapping Natural Capital, Ecosystem Services and Opportunities for Habitat Creation in Milton Keynes" Natural Capital Solutions Ltd, 2021.

2.21 Although the Milton Keynes (MK) local authority area is dominated by the town of MK, built-up areas and infrastructure (roads, railways, pavements) make up only 13.1% of the total land area, with gardens comprising another 6.8% and amenity grassland 9.2%. The dominant habitats by area are cultivated land and improved grassland, together making up 55% of the area (14,900 ha), although this is less than surrounding counties. Woodland and scrub habitats take up 8.9% (2,750 ha), semi-natural and marshy grasslands make up 2.7%, while water makes up 2.0% of the area.

Map 3: The broad habitat types in Milton Keynes



Protection and designation

2.22 In terms of land area, 63% of Buckinghamshire's land area and 55% of Milton Keynes is cultivated land and improved grassland. The highest quality semi-natural habitats in Buckinghamshire and Milton Keynes, identified from the habitats base-maps (Map 2 and 3), are shown in Maps 4 and 5, below; although note that these are based on habitat type and not on condition.

2.23 In total 20,274 ha, which represents **13.0% of Buckinghamshire, contain these high-quality semi-natural habitats**. The greatest amounts are 14,365 ha of broadleaved woodland, 2,265 ha of mixed woodland and 2,297 ha of neutral grassland. However, this includes all broadleaved and mixed woodland, some of which will not have been high quality. There are also 658 ha of calcareous grassland, 109 ha of acid grassland, and 267 ha of floodplain grazing marsh and marshy grassland.[16] **However, only 5.5% of the county by land area receives some level of formal designated site protection.**

2.24 In total 2,411 ha, which represents **7.8% of Milton Keynes, contain these high-quality habitats**. The greatest amounts are 1,608 ha of broadleaved woodland, 293 ha of mixed woodland and 371 ha of neutral grassland. However, this include all broadleaved and mixed woodland, some of which will not have been high quality. There are also 30 ha of calcareous grassland, 90 ha of floodplain grazing marsh and marshy grassland, and 14 ha of fen and swamp.[17] **The total amount of land receiving some level of protection amounts to 711 ha, or 2.3% of the total area of Milton Keynes.** Such designations are described below.

Sites of Special Scientific Interest (SSSIs) and Special Areas of Conservation (SACs)

2.25 A sample of the best sites for biodiversity or geology are protected under the Countryside and Rights of Way Act 2000 and are classified as Sites of Special Scientific Interest (SSSIs). In some instances, sites are designated for their international importance, such as Burnham Beeches which is a Special Area of Conservation (SAC). Such sites are protected under the European Habitats Directive.

Local Designated Sites

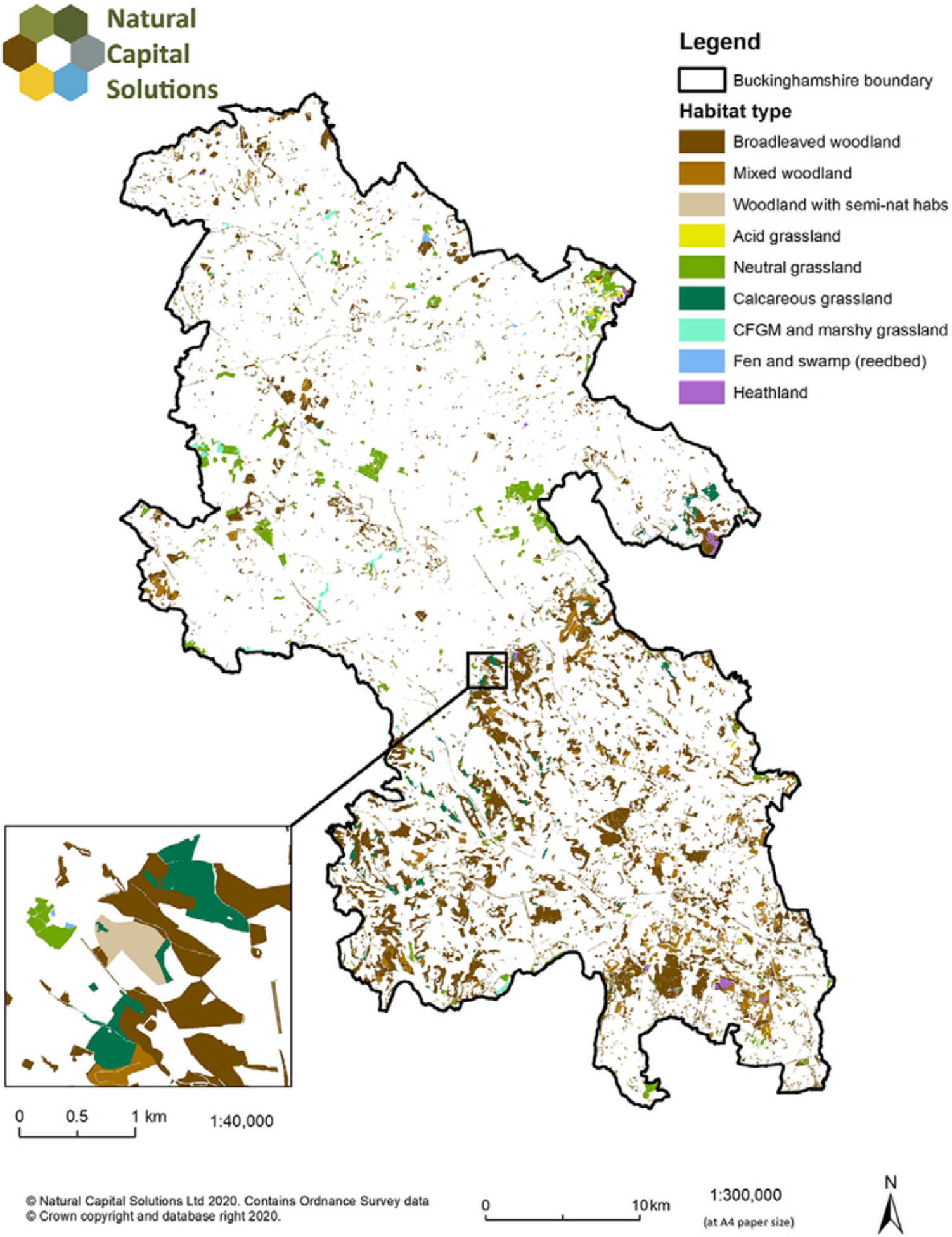
2.26 It is important to recognise that there are hundreds of other sites which can be equally important as our SSSIs or SACs, but which do not have the same level of protection in conservation or planning terms. Many of these sites have been identified in the NEP area and are classified as **Local Wildlife Sites** (LWS). Other potentially important non-statutory schemes, used to show sites of local biological interest have also been listed as **Biological Notification Sites** (BNS), which are awaiting assessment to see if they qualify as a LWS, and **Roadside Verge Nature Reserves**, which were established in recognition of the importance of roadside verges for wildlife.

2.27 **Local Sites (Wildlife and Geological) are non-statutory areas of local importance** for nature conservation that complement nationally and internationally designated geological and wildlife sites. With appropriate management, Local Wildlife Sites are able to make an enormous contribution to ensuring more, bigger, better, and more connected spaces for wildlife in Buckinghamshire and Milton Keynes, and in helping ensure greater resilience in the face of the many pressures on our natural environment.

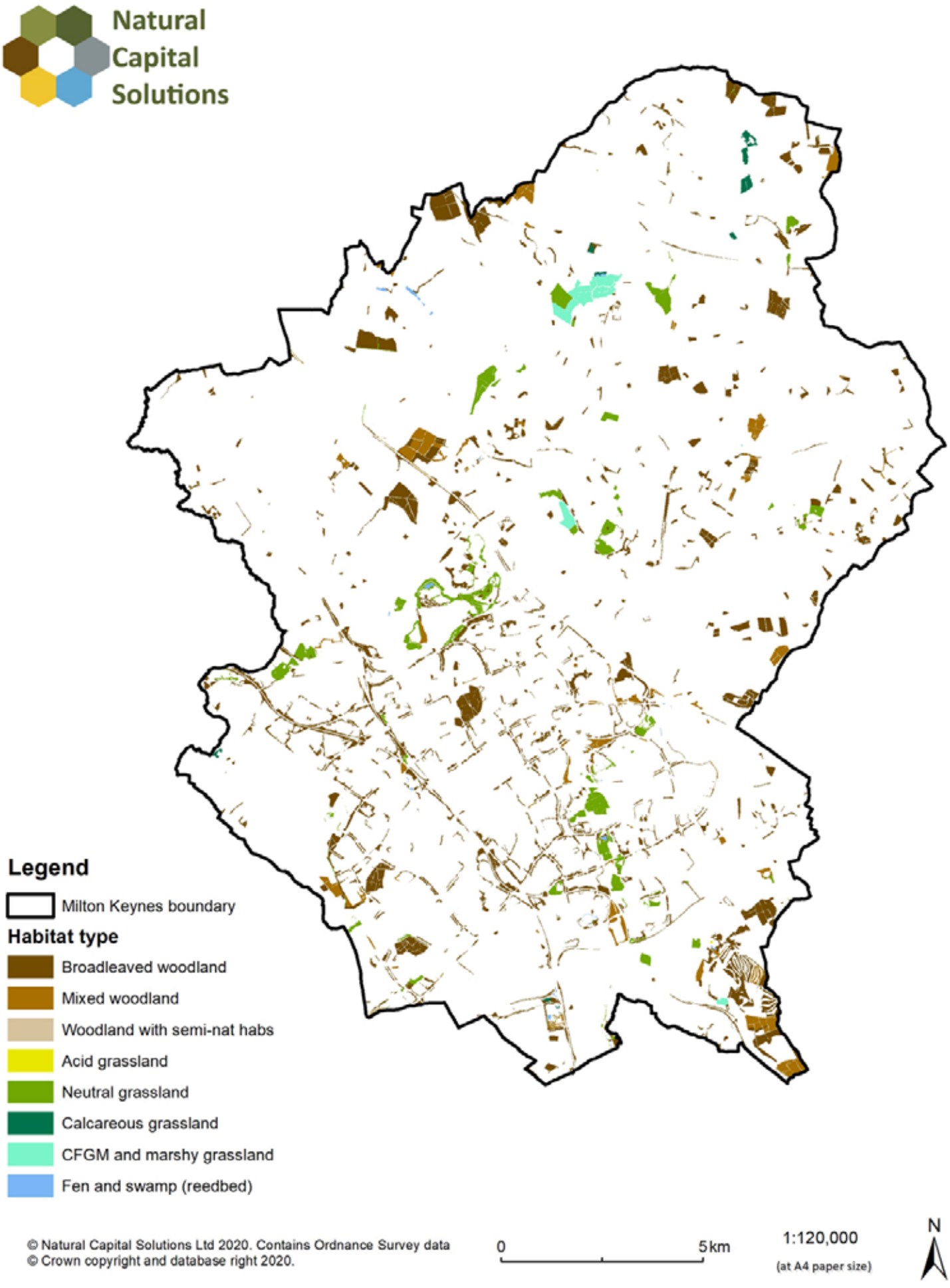
[16] Note that it was not possible to distinguish high-quality parkland from any areas containing scattered trees, or higher quality rivers, streams and standing water, hence these habitat types have not been included on this map. Mixed habitats were also not included as although some of these areas are likely to be high-quality habitat, not all such areas will be.

[17] See note above.

Map 4: High quality habitats in Buckinghamshire



Map 5: High quality habitats in Milton Keynes



2.28 Local Wildlife Sites (LWS) have been selected by a panel including the local authorities, BBOWT and other local wildlife conservation groups. They support both locally and nationally threatened wildlife, and many sites will contain habitats and species that are priorities under the UK or Buckinghamshire and Milton Keynes BAP. Biological Notification Sites (BNS) are sites with the potential to meet the criteria to be designated as a LWS. The identification of LWSs is an on-going process including monitoring and review. Both LWS and BNS are considered with equal weight during the planning process. Across Buckinghamshire and Milton Keynes, at the time of writing, there are 466 sites meeting Local Wildlife Site criteria and 402 BNSs awaiting assessment. There are also 38 Roadside Verge Nature Reserves.

2.29 More land is designated as a Local Wildlife Site than as a SSSI or SAC. All the SACs are also designated as SSSIs, and there is a little overlap in the other designations. **The total amount of land receiving some level of protection amounts to 8,577 ha, or 5.48% of the total area of Buckinghamshire, and 2.3% of Milton Keynes.**

Area of Outstanding Natural Beauty – The Chilterns

2.30 In addition to the SSSIs, SACs and LWSs, Buckinghamshire is also home to the **Chilterns Area of Outstanding Natural Beauty** (AONB). An AONB is a designation for an area of land that is of national importance for its natural beauty. The origins of AONBs are in the National Parks and Access to the Countryside Act of 1949. In June 2000, the government confirmed that AONBs have the same level of landscape quality and share the same level of protection as National Parks. The single purpose of AONB designation is 'to conserve and enhance the natural beauty of the area'. All public bodies have a legal duty to 'have regard' to the purpose of conserving and enhancing the natural beauty of an AONB.

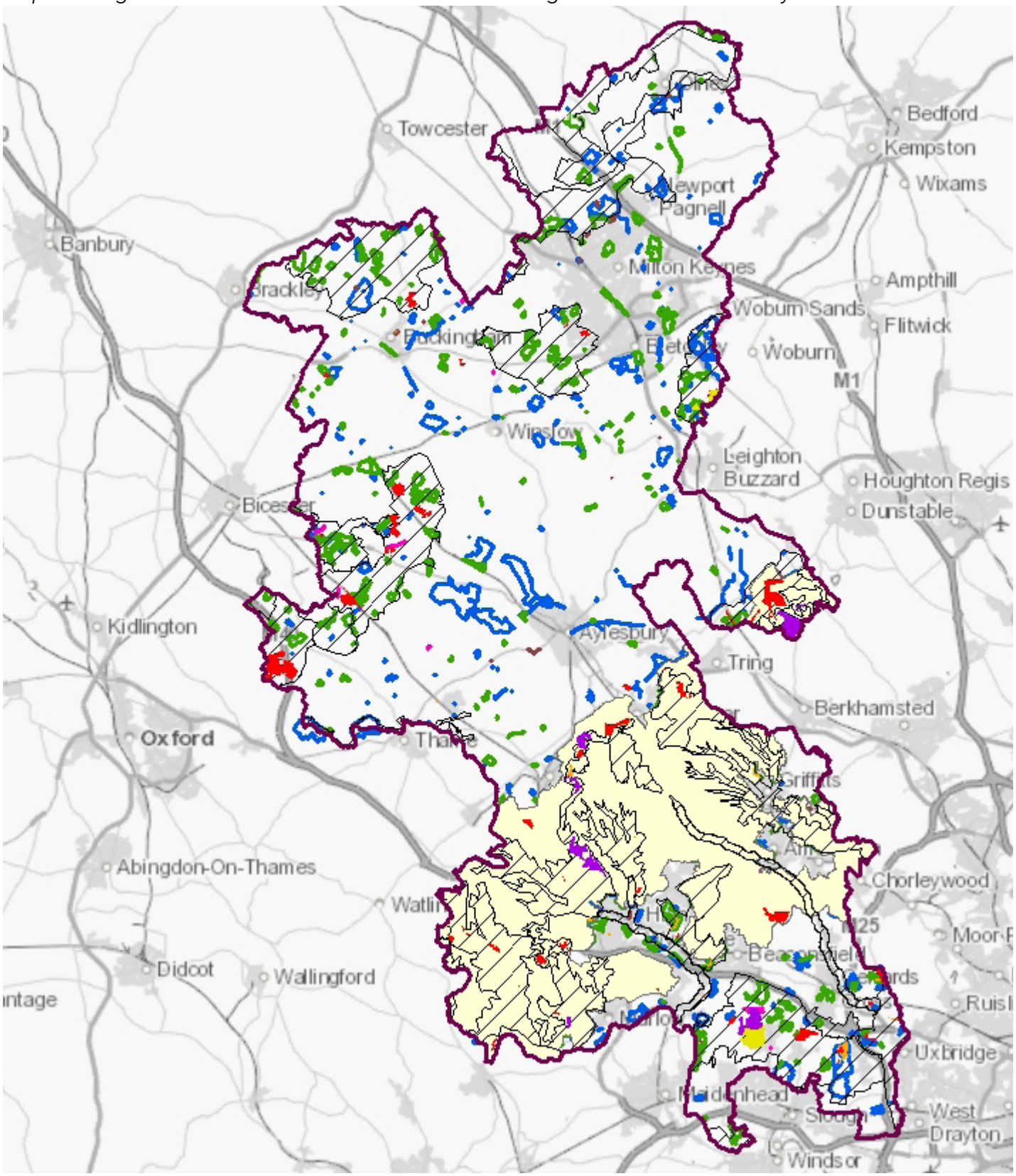
2.31 The term 'natural beauty' is enshrined in the 1949 National Parks and Access to the Countryside Act. Legislation has made it clear that natural beauty is not just the look of the landscape since, but includes the landform and geology, the plants and animals, the landscape features and the rich history of human settlement over the centuries. In 2006, legislation clarified that land is not prevented from being treated as of natural beauty by the fact that it is used for agriculture, woodlands or as a park; or because its physiographical features are partly the product of human intervention in the landscape.[18]

2.32 The locations of the NEP area's designated sites (SACs, SSSIs, LWS, BOAs[19] and the Chilterns AONB) are shown in Map 6, below. Key sites include the Chilterns Beechwoods, Burnham Beeches and Aston Rowant, which are considered to be of international importance for their woodland assemblages and have been designated as Special Areas of Conservation (SACs) and SSSIs.

[18] Natural Environment and Rural Communities Act 2006.

[19] Biodiversity Opportunity Areas (BOAs) depict regional priority areas for the restoration and creation of Biodiversity Action Plan priority habitats and show areas of opportunity. They were developed by members of the South East England Biodiversity Forum and were identified as the basis for an ecological network and the most important areas for biodiversity in the area. Further explanation and information available on the NEP website: **bucksmknep.co.uk/biodiversity-opportunity-areas**

Map 6: Designated sites and the Chilterns AONB – Buckinghamshire and Milton Keynes



Key

- National Nature Reserves
- Special Areas of Conservation
- Sites of Special Scientific Interest
- Local Nature Reserves
- Biodiversity Opportunity Areas
- Chilterns AONB
- Local Wildlife Sites
- Local Geology Sites
- Biological Notification Sites
- Road Verge Nature Reserve

1:375,000 at A4

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River Chess at Latimer. Photo: Allen Beechey

The river landscape

2.33 The contemporary river landscapes of Buckinghamshire and Milton Keynes are a function of geology, post-glacial processes, direct human intervention and trends in land management. Broadly, there are two major river catchments represented in the area: the central and southern part contains parts of several tributaries of the Thames; and the northern area contains parts of the upper Great Ouse catchment, with the waters of these two rivers heading in their separate directions to enter the North Sea at the Thames estuary and at The Wash respectively. The southern fringes of Buckinghamshire also abut the left (north) bank of the Thames, with the county boundary running down the centre of the river for about 30km from near Fawley Court, downstream of Henley, to Boveney, between Slough and Windsor. The upper reaches of the Jubilee River, a Thames-sized flood channel built in the 1990s, is also within the county.

2.34 The area's watercourses are predominantly of a gentle gradient, reflecting the predominantly broad alluvial and clay vales that they occupy, but the Chiltern Hills provide an important contrast, with a number of chalk streams draining the dip slope south-eastwards either direct to the Thames or to one its major tributaries, the Colne, which in places forms the eastern boundary of the county. There are also a number of short chalk spring-fed streams issuing from the base of the Chiltern scarp and flowing onto the clays of the Aylesbury Vale. The Thames itself meanders gently along the southern boundary of the county with the Chiltern Hills as an attractive backdrop, at its most dramatic at the steep slopes of Cliveden.

Protection for water bodies

2.35 Rivers, lakes and groundwater in Buckinghamshire and Milton Keynes are protected under the Water Framework Directive (WFD). WFD requires that all EU member states work to have their waterbodies in 'good ecological status' (or 'good ecological potential' for heavily modified waterbodies) with full compliance by 2027 if not possible by 2015. This was transposed into UK law as a member of the EU. In addition to improving the status, there must be no deterioration.

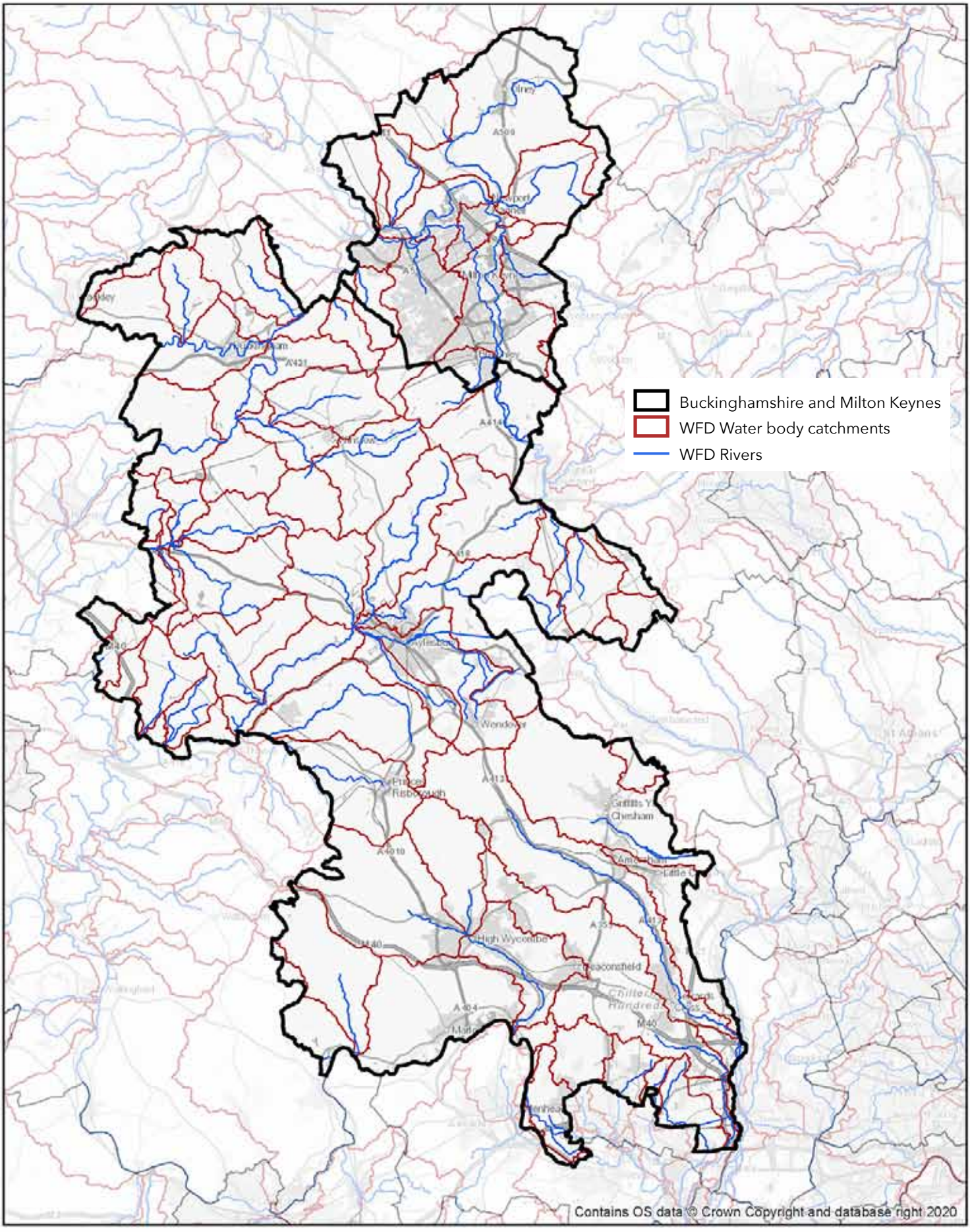
Biodiversity of the rivers in Buckinghamshire and Milton Keynes

2.36 The chalk streams in the county have fish communities dominated by Brown Trout along with 'minor' fish species such as Bullhead, Brook Lamprey and Gudgeon, whereas the Thame and Great Ouse have a greater representation of coarse fish species such as Dace, Chub and Roach, although Brown Trout are found in the upper Great Ouse and one or two of the Thame tributaries as well. The Thames has the greatest diversity of fish species and provides relatively stable conditions in deep and generally slow-flowing water. The Buckinghamshire part of the Ray has an impoverished fish fauna in part due to its inherent low summer baseflow as well as due to historic river engineering and loss of habitat. Otters are now found throughout the county's rivers, following their substantive recovery in the last few decades, whereas Water Voles are currently restricted to populations on the Great Ouse, Chess and Misbourne. There is still possibly one isolated population of White-clawed Crayfish just hanging on in the upper Thame catchment. Kingfishers are generally widespread, and Great Crested Grebe nest on the main Thames. Invasive Signal Crayfish are widespread in the county, and can be particularly abundant on the Ouse, Thame and Thames. Old and mature pollard willows are a characteristic feature of many of the county's watercourses.

2.37 The area's main river catchments, north to south throughout Buckinghamshire and Milton Keynes, are shown in Map 7, below. Specific details about the river environment are provided at Appendix 1 (page 129).

*Kingfisher (*Alcedo atthis*).*
Photo: Michael Lane.

Map 7: Water Body Catchments in Buckinghamshire and Milton Keynes



August 2021

Caldecotte, Milton Keynes. Photo: Dragos Iancu.

The urban landscape

2.38 The urban landscape plays an important role in biodiversity, both positively and negatively. With the NEP area being central to the Oxford to Cambridge Growth Arc, and likely to be under further intense development pressure, it is essential that opportunities for biodiversity with development are sought.

2.39 Most urban areas have developed over a long period; therefore, their form and function are an outcome of the changes in knowledge and policy and display a heterogeneity in character. Urban environments have a disproportionately important role in providing benefits for physical health and mental wellbeing arising from an improved and biodiverse environment. For example:

- Public land (e.g. road verges, school grounds, parks, cemeteries) and corporate estates all have the potential to provide for wildlife if managed sensitively.
- Simply changing grass and hedgerow cutting regimes can have significant positive effects for a range of species.
- On an individual level, even small gardens can support wildlife–rich habitats such as ponds.
- Gardens can be significant for pollinating insects.

2.40 Open Mosaic Habitats can be found mainly in urban and former industrial areas and can have high biodiversity value, supporting rare plants, mosses, lichens and a large number of rare invertebrates, especially bees, wasps and beetles. This habitat was identified as a UK BAP Priority Habitat in 2007. Such sites can be threatened by redevelopment (due to their status as brownfield sites), inappropriate 'restoration', inappropriate management or natural succession.

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

Examples of the importance of our urban landscapes and opportunities for them in Buckinghamshire and Milton Keynes

Milton Keynes Urban Area

Milton Keynes was the last of the new towns, laid over older settlements and built to a flexible master plan. The unifying grid layout sought to combine existing habitats such as woodland, hedgerows and ponds into the fabric of the city. Through planning and management these discreet units are connected through a series of linear parks along the water corridors, the Ouzel, Loughton Brook and Grand Union canal. Other wildlife corridors were created or recognised along the broad grid roads, railway tracks and ancient rights of way.

The network of greenspaces in Milton Keynes has provided many "ecosystem services" to the city, such as improved air quality, carbon sequestration or shade, long before this term was coined more broadly. Whilst wildlife benefits from the matrix of habitats and linkages, the format crucially also allows nature to be locally-available and part of the human experience, which is vital if we are to halt its decline and work towards its recovery.

Designated Sites and Biodiversity Opportunity Areas

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

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

Habitats and species of importance

Milton Keynes has retained a diverse range of habitats and species of importance, such as lowland mixed deciduous woodland, ancient and veteran trees, orchards and unimproved meadows.

Riparian and wetland habitats provide valuable habitat connectivity within the landscape and support populations of breeding and overwintering birds, Otter and Great Crested Newt.

Specific Challenges faced

Alongside the generic pressures such as climate change and pests and diseases, Milton Keynes faces high development pressure, with associated land use change and possible habitat fragmentation as a result of the expected growth well as possible infrastructure related to the Oxford-Cambridge Growth Arc.

Objectives, priorities and area-based actions needed to achieve them

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

- **Engage the whole community**, increase knowledge and encourage participation to enhance biodiversity;
- **Challenge the norms of landscape maintenance** to create more biodiverse spaces, both in the public and private realm;
- **Encourage green development and access to nature.** Meet access to Natural Greenspace Targets and integrate biodiversity features within proposed developments. Extend the linear park system into new developments; and
- **Maintain and enhance ponds and hedgerows, conserve veteran trees, hedgerows and woods.** Ensure a diversity of new trees are planted and correct species for the location chosen.

Other major urban areas in the NEP area

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

For example, Peregrine Falcons are now taking advantage of the large buildings across Buckinghamshire, as they act as artificial cliff faces. Many of the towns in the Chilterns have grown around the internationally important chalk rivers and streams and, as a result, these water courses have been heavily altered through historic use for powering mills and other industry.

Aylesbury has the advantage of having been designated "Garden Town" status, and lies in the Vale, historically-famous for its Black Poplar and Aylesbury Prune; and the NEP continues to work with the Garden Town project to factor in at all possible stages appropriate measures to make the most for wildlife and nature of expanding development.

Kingsbrook is a nationally-recognised exemplar urban residential development of 2,450 homes, to the east of Aylesbury, and is principally a collaboration between Barratt Homes, the local council, the RSPB and local partners. The development aims to incorporate nature and access on the doorstep and build in wildlife-friendly features. Further information on Kingsbrook can be **downloaded from the RSPB website**.

The challenge in urban ecosystems

2.42 Alongside the Environment Act's mandatory 10% net biodiversity gain requirements for new development, all new developments should seek to provide for wildlife in other ways and at all scales wherever possible, and in a sympathetic manner with existing habitats, linear features, and the water environment. Long-term management should also be secured for the lifetime of the development (not just for the short term via a short-term management company following completion).

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

2.44 To achieve a holistic approach in urban biodiversity management will require the coordination of local governmental the various stakeholders, including planners, ecologists, wildlife charities and community groups. It is hoped that the BAP and the actions coordinated by the NEP that follow will achieve this.

Urban areas in the NEP's Biodiversity Action Plan

2.45 Chapter 4 sets out the area-wide actions needed to achieve the NEP's strategic aim and objectives, including those to ensure that biodiversity should be a key principle in the design of the urban environment and of new developments. The section notes the area-applicable objectives for urban greening, incorporating biodiversity and green infrastructure into development, and taking advantage of opportunities for nature-based provision of multiple benefits and natural, connected greenspaces for biodiversity, wildlife, our communities and our economy. Such objectives are applicable to all urban areas and new developments across Buckinghamshire and Milton Keynes.

The Natural Capital of Buckinghamshire and Milton Keynes

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

2.47 In 2020 and 2021, Buckinghamshire Council and the NEP commissioned natural capital work by Natural Capital Solutions to cover Buckinghamshire and Milton Keynes respectively. The reports produced maps across the NEP's area, based on the best available information, to identify:

1. **Natural assets** (baseline broad habitats) across Buckinghamshire and Milton Keynes, see Maps 2 and 3 (above, pages 30 and 32).

2. **Ecosystem services**: showing the multiple benefits produced by those assets - e.g. benefits to air and water quality, reduced flood risk, provision for pollinators, access to nature, carbon storage etc. The maps quantify the benefits and show the hotspots and coldspots of ecosystem services delivered by the natural assets, and spatial patterns of demand for different ecosystem services.

3. **Opportunity maps:**

    a. building on the information from 1 and 2, and looking at where demand for the ecosystem services is greatest, **ecosystem services opportunity maps** were produced to identify where best to create nature-based solutions (i.e. new habitats – broadly, woodland, wetlands and grassland) across the area to provide those services.

    b. **Combined "habitat" opportunity maps** were produced too, which show, for the broad habitat types, where best to locate habitats of different types for biodiversity purposes, while also providing other ecosystem services.

2.48 The full reports, including all the detailed baseline, benefits and opportunity mapping (available both at the precise, modelled scale, and at the field-scale), and descriptions of the methodology and scoring used is available on the NEP website to incorporate into future decision-making and plan-making.[20]

2.49 As further background about the habitats of our area, a summary of the results for the 10 ecosystem services assessed in the Natural Capital data capture, modelling and reports, is provided below.

Carbon storage

2.50 Carbon can be stored naturally in soils and vegetation. **Natural carbon storage, and managing land to improve it, has a major role to play in reducing net carbon emissions.** In Buckinghamshire and Milton Keynes, carbon is stored predominantly in woodland,

[20] Rouquette (2020) *Mapping natural capital, ecosystem services and opportunities for habitat creation in Buckinghamshire*. Report for Buckinghamshire Council; and, Rouquette & Ashby (2021) *Mapping natural capital, ecosystem services and opportunities for habitat creation in Buckinghamshire*. Report for Buckinghamshire and Milton Keynes NEP. Both reports available here: **bucksmknep.co.uk/projects/natural-capital-mapping/**.

which is more abundant in the southern half of Buckinghamshire and which are dispersed across the Milton Keynes area. However, carbon is also stored in undisturbed soils of other natural habitats such as meadows, and in most green spaces. So lower carbon storage levels are noticeable in the urban centres dominated by buildings and sealed surfaces.

Carbon sequestration

2.51 Vegetation and growing plants can sequester carbon from the atmosphere. **Woodland is the most efficient habitat at carbon sequestration**, and so the southern half of Buckinghamshire has the highest capacity for this service. In the Milton Keynes area, woodland areas are dispersed, although areas of high to moderate carbon sequestration are seen with the broadleaved woodland to the south east of the area towards Woburn, as well as in areas of coniferous woodland (often sequesters at a faster rate, but which is often managed for timber involving thinning, so reducing carbon accumulation).

2.52 **Certain plants are effective at trapping airborne pollutants and reducing air pollution**[21] such as small particulates, ozone, SO_2 and NO_X. Trees, particularly conifers (which do not shed their leaves during winter and where the needles create a large surface area), are often more effective than grasses or herbaceous plants but it varies by species.

Air purification

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

2.54 The demand for air purification is highest in urban centres, where there are higher air pollution levels and higher populations that would benefit from better air quality. The main road network is also a major pollution source.

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

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

[21] According to the Public Health England, air pollution is the biggest environmental threat to health in the UK, with between 28,000 and 36,000 deaths a year attributed to long-term exposure, with the greatest threats from particulate matter (PM2.5) and nitrous oxides (NO_X). Even small changes can make a big difference, just a 1µg/m^3 reduction in PM2.5 concentrations could prevent 50,000 new cases of coronary heart disease and 9,000 new cases of asthma by 2035. Air pollution also contributes to climate change, reduces crop yields, and damages habitats and biodiversity.

Noise regulation

2.57 Vegetation can diffuse and absorb noise pollution such as that from major roads, railways and airports. Noise can impact on health, wellbeing, productivity and the natural environment and the World Health Organisation (WHO) has identified environmental noise as the second largest environmental health risk in Western Europe (after air pollution). It is estimated that the annual social cost of urban road noise in England is £7 to £10 billion.[22]

2.58 Vegetation can screen and reduce the effects of noise. Complex vegetation such as woodland, trees and scrub is considered most effective, but any vegetation is more effective than artificial sealed surfaces, and the wider the vegetation the better. The supply of noise regulation follows a similar distribution as for air purification, as woodland habitats are most effective at absorbing noise. Therefore, noise regulation capacity is relatively low in urban areas and highest in forested areas, with variable patches throughout the other areas, although noise regulation is higher (better) mainly in clusters around green spaces and woodlands.

2.59 Demand for noise regulation is greatest in urban areas close to major roads, as these contain larger populations, with potentially poor health scores, that would benefit from noise abatement from the main roads. There is the greatest demand in Aylesbury, High Wycombe and Chesham, and along the A5 through Milton Keynes, with existing capacity being relatively low in urban areas.

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

Local climate regulation

2.61 Urban areas tend to be warmer than surrounding rural land because urban hard surfaces absorb more heat, which is then released back into the environment, coupled with energy released by human activity such as lighting, heating, vehicles and industry.

2.62 Our changing climate is predicted to make the overheating of urban areas a major health and economic issue as well as an environmental one. Natural vegetation, particularly trees, woodland and water bodies, have a moderating, or regulating, effect on the local climate, making nearby areas cooler in summer and warmer in winter.

2.63 The greatest capacity for climate regulation is in the south of Buckinghamshire with demand clustered around urban centres. Where large woodland areas are located adjacent to towns in the south of the county, they are particularly beneficial at moderating heat. In Milton Keynes, large bodies of water, such as Willen lake and Caldecotte Lake, and larger areas of woodland such as Linford Woods and those in the Woburn area, provide the highest local climate regulation capacity. These benefits can extend into adjacent built-up areas. In much of the remaining region, away from woodland and water bodies, capacity is significantly lower.

2.64 Demand for climate regulation is highest in and around urban areas, focussed on the larger, more densely populated communities. So demand is centred in the built-up areas of Milton Keynes, especially around Bletchley, Newport Pagnell, Stony Stratford and Wolverton, and is effectively zero away from these areas. In Buckinghamshire, Aylesbury

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

and High Wycombe are particularly large areas of high demand, as are a number of other towns, particularly in the south of Buckinghamshire. The large areas of woodlands adjacent to towns in the south of Bucks, particularly where they extend into urban areas, are particularly beneficial, bringing moderating conditions to the urban centres.

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

Water flow regulation

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

2.67 **One of the best locations for slowing water runoff are areas of woodland on gently sloping surfaces.** In Buckinghamshire, the steeper slopes of the Chilterns may be less effective for this service but areas around Penn Wood, Naphill Common, Dropmore and Farnham Common have woodland on gentle slopes and have excellent water flow regulation capacity. Some of the worst-performing areas for slowing water runoff are impermeable surfaces and slopes; for example in Milton Keynes, such areas are centred in built-up areas and at a landfill site south of Bletchley in particular.

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

Water quality regulation

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

2.70 Water quality regulation is generally lower within arable fields, especially those parts on slopes and close to watercourses, adding to contamination potential, e.g. in the north of Buckinghamshire and north-east of the Milton Keynes area.

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

2.72 **Further measures to ameliorate the impact of agriculture on water quality, including establishing riparian buffers, use of cover crops, building up soil structure and reducing cattle poaching of river banks**, are required if we are to meet water quality targets under the Water Environment Regulations.

Agricultural production

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

2.74 Farming is the dominant land-use in Milton Keynes, with a 70:30 split between arable and grassland for livestock. These land covers provide the largest proportion of food, although food is also produced from a range of other habitats, albeit to a lesser extent. The ability of a range of broad habitat types to provide food was mapped and weighted according to Agricultural Land Classification[23] to identify food production capacity.

2.75 Food production is low in the urban centre of Milton Keynes. Urban areas have a very low production capacity, reflecting the limited production resulting from gardens (clearly, this can be high in some cases). In contrast, food production is medium to high in the northern part of the Milton Keynes area, where arable and improved grassland dominate. This is due to the predominant Agricultural Land Classification for the region being Grade 3, along with significant areas of Grade 2 (higher quality).

2.76 In Buckinghamshire, farming is also the dominant land-use, although with a roughly equal split between arable and pasture for livestock. The majority of Buckinghamshire has a medium to low food production capacity. This is due to the predominant Agricultural Land Classification for the region being Grade 3, along with significant areas of Grade 4. Smaller areas of higher-grade land are found in the centre of the county to the west and south of Aylesbury.

Timber production

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

2.78 There are patches of high timber and wood fuel production capacity scattered throughout the south of Buckinghamshire and some in the west. Coniferous woodland provides the highest yield, but Buckinghamshire has predominantly broadleaved woods producing medium levels of timber/woodfuel.

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

Accessible nature

2.80 Access to greenspace is being increasingly recognised for the multiple benefits that it can provide to people including a variety of mental and physical health and wellbeing benefits. Natural England and others have published guidelines that promote the enhancement of access, naturalness and connectivity of greenspaces. The two key components of the modelled accessible nature capacity are public access and the perceived naturalness of the space – modelled by mapping the availability of natural areas of scoring them by perceived levels of "naturalness".

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

2.81 The greatest demand for accessible nature is strongly related to where people live – especially so for sites close to people's homes and in walking distance.

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

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

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

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

2.86 Numerous researchers (e.g. MENE, the Monitor of Engagement with the Natural Environment[24]) have shown that people travel most frequently to greenspaces very close to their homes, particularly within walking distance. Natural England recommends, in its Accessible Natural green Space Standards (ANGSt),[25] that everyone should have access to at least some greenspace within 300m (5 minutes' walk) and larger sites within 2 km. Furthermore, surveys have shown that most people will typically travel less than 3.2 km to visit greenspace.

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

2.88 There is also now a vast amount of evidence showing the benefits of greenspace, particularly in built-up areas. Furthermore, research has shown that people gain greater well-being from visiting sites that they perceive to be more natural and richer in biodiversity. This shows that **as well as providing access to greenspace, it is important that the greenspace is of as high quality and as natural as possible.**

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

[25] Natural England (2010) Nature Nearby – Accessible Natural Greenspace Guidance. Available here: **webarchive.nationalarchives.gov.uk/ukgwa/20150902180000/http://publications.naturalengland.org.uk/publication/40004**

National Character Areas of Buckinghamshire and Milton Keynes

2.89 The actions set out in this Buckinghamshire and Milton Keynes BAP, at Chapter 4, have been identified and grouped into those applicable i) across the entire area, and ii) others that are more local, largely centred around Natural England's National Character Areas (NCAs).[26]

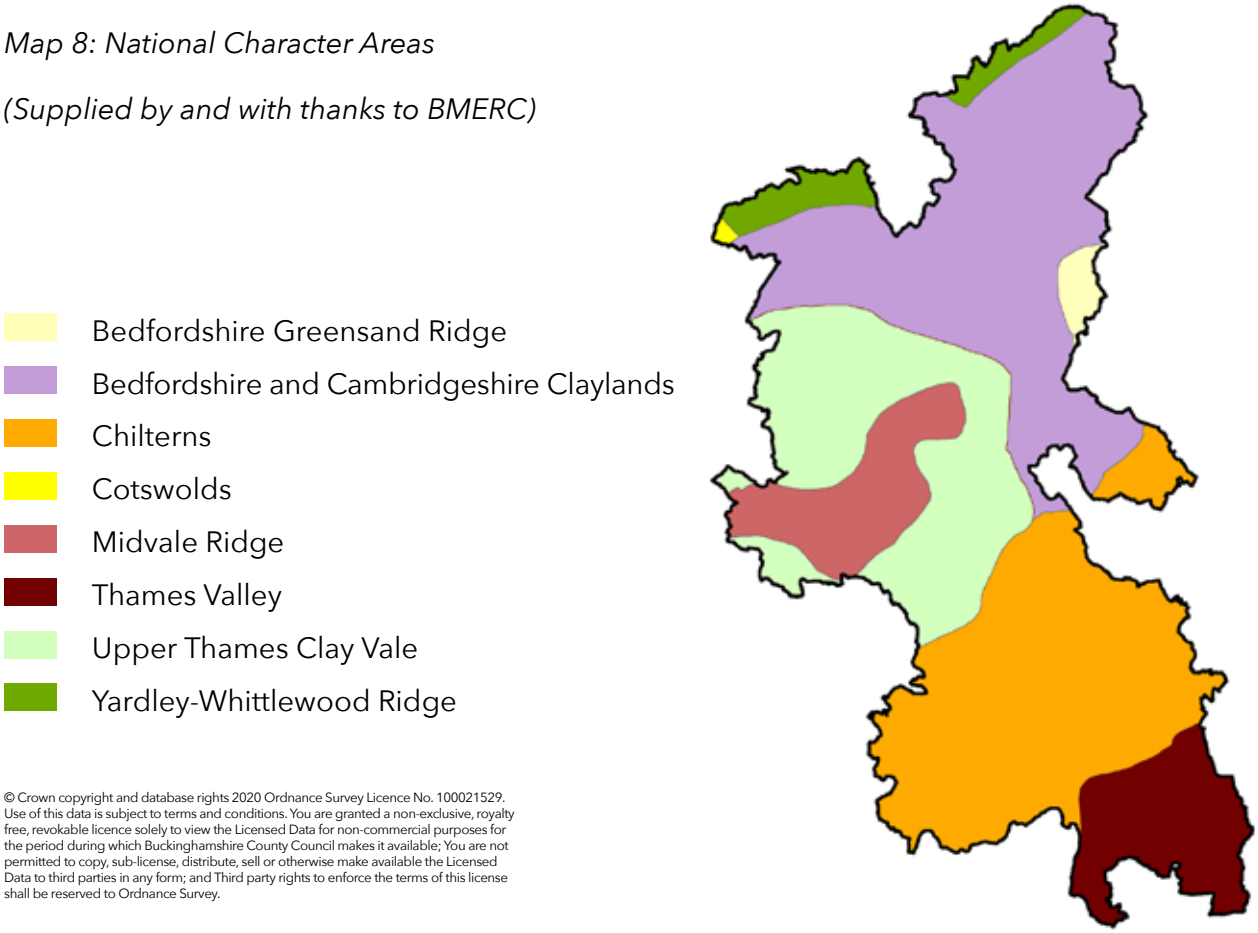
2.90 The NCAs in Buckinghamshire and Milton Keynes are listed below and are illustrated at Map 8, below:

- **The Upper Thames Clay Vales**
- **Midvale Ridge**
- **Chilterns**
- **Thames Valley**
- **Bedfordshire and Cambridgeshire Claylands** with **Bedfordshire Greensand Ridge** and **Yardley Whittlewood Ridge**.

2.91 Each of these areas is defined by its landscape and a distinctive and characteristic mosaic of habitats and species that sets them apart from others. As such, National Character Areas follow natural subdivisions, rather than administrative ones, with the purpose of forming a good decision-making framework for the natural environment. NCA profiles are working documents and are available for each NCA.

Map 8: National Character Areas

(Supplied by and with thanks to BMERC)



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

2.92 **The relevant biodiversity characteristics of the NCAs applicable to the Buckinghamshire and Milton Keynes area are summarised in the text below** are used to inform the localised biodiversity actions planned for each area, set out at Chapter 4. For the purposes of the BAP, the dominant NCAs across the NEP area have been grouped into four broad spatial areas:

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

i. Milton Keynes area and North Bucks

Description

2.93 The **Bedfordshire and Cambridgeshire Claylands**[27] is a broad, gently undulating, lowland plateau dissected by shallow river valleys that gradually widen as they approach The Fens NCA in the east. Within it, but distinct from it, is the **Bedfordshire Greensand Ridge**, a contrasting narrow and elevated outcrop of Greensand, with its associated habitats on acidic soils such as grassland, heathland and woodland. Views of the Bedfordshire and Cambridgeshire Claylands NCA and its large-scale arable farmland can be seen in most directions, from the elevated ground of the **Yardley Whittlewood Ridge**, **Bedfordshire Greensand Ridge**, East Anglian Chalk and **Chilterns** NCAs. The NCA contains the Forest of Marston Vale—one of 12 Community Forests in England—and to the south, around Luton, a small proportion of the Chilterns Area of Outstanding Natural Beauty (AONB).

2.94 While predominantly an arable and commercially farmed landscape, a wide diversity of seminatural habitats are also present here, including a number of internationally important and designated sites that support a range of species—some rare and scarce—and offer opportunities for people to have contact with the natural environment. The River Great Ouse and its tributaries meander slowly and gently across the landscape, with the source just north of Brackley (just within the adjacent Yardley Whittlewood Ridge NCA). Flowing in an easterly direction, the Great Ouse meanders gently in characteristic broad loops through Buckinghamshire, around the northern edge of Milton Keynes through an enclosed landscape of water meadows and attractive limestone villages towards Bedford and on into Cambridgeshire.

2.95 The **Bedfordshire Greensand Ridge**[28] is a narrow ridge running north-east, south-west, rising out of—and entirely surrounded by—the Bedfordshire and Cambridgeshire Claylands NCA. It is a distinctive ridge with a north-west-facing scarp slope, formed by the underlying sandstone geology which has shaped the landscape and industry of the Ridge. Its historic landscapes, including the farmland, parklands and historic architecture, combined with small settlements, greenbelt and woodlands ancient and modern, give parts of the NCA a more timeless feel than the Bedfordshire and Cambridgeshire Claylands which surround it. There is a patchwork of semi-natural habitats throughout the NCA, including flood plain grazing marshes, lowland heathland and meadows and mixed deciduous woodland.

[27] Natural England (2014): **publications.naturalengland.org.uk/publication/5091147672190976**; NCA profile available at the same link.
[28] Natural England (2014): **publications.naturalengland.org.uk/publication/6667269664931840**; NCA profile 90 (NE481) available at the same link.

River Great Ouse. Photo: Fiona Everingham, courtesy of BMERC.

2.96 Only the very south-western part of the ridge falls into the Buckinghamshire and Milton Keynes area, to the south-east of Milton Keynes. The north-west facing scarp has a mix of coniferous and deciduous woodland, pasture, arable and heathland, overlooking Milton Keynes.

2.97 The **Yardley Whittlewood Ridge**[29] NCA is a low and gently undulating limestone plateau commonly referred to locally as the Ridge. It runs in a south-west to north-east direction in between the nearby towns of Northampton and Milton Keynes and the elevated topography creates a physical boundary between the catchments of the River Nene to the north and River Great Ouse to the south. The Ridge is more distinctly elevated in the south-west where it rises from the adjacent low-lying claylands. From the top, the land slopes away gently in most directions, giving long views over the surrounding countryside.

2.98 The Ridge contains a variety of semi-natural habitats, including ancient woodland, wood pasture and parkland, mature, species-rich hedgerows, lowland meadow and flood plain grazing marsh, fens and reedbeds. It is a well-wooded landscape with a historic feel stemming from the former Royal Hunting Forests of the 13th century around Yardley Chase, Salcey and Whittlewood forests. The Ridge retains a high proportion of ancient woodland of national importance designated as Sites of Special Scientific Interest and supports a wide range of species, particularly scarce species of butterfly such as the white admiral and wood white. The planting of conifers has formed dense plantations in some areas, but a sense of history is maintained by the still extensive ancient semi-natural broadleaved woodland, which has networks of rides and occasional open grasslands ('forest lawns'), containing typical species such as oak, ash and field maple, with birch and aspen present locally.

[29] Natural England (2014): **publications.naturalengland.org.uk/publication/6441192149483520**; NCA profile 91 (NE501) available at the same link.

Designated Sites and Biodiversity Opportunity Areas

2.99 Despite being close to Northampton, Milton Keynes and Towcester, the Ridge retains a rural character due to its sparse population and lack of major settlements but with a large number of historic houses and designed parkland landscapes, which along with the woodlands, provide opportunities for recreation and visitors.

2.100 The Milton Keynes area and north Bucks area contains several designated sites and the following Biodiversity Opportunity Areas:

- Whittlewood Forest BOA
- Whaddon Chase BOA
- Ouse Valley BOA
- Yardley Chase BOA
- Greensand Ridge BOA

Changes over time

2.101 Changes in farming practice since 1945 has seen a decline in a number of groups including farmland birds and arable weed species. Many kilometres of hedgerows have been removed to enlarge fields or left unmanaged leading to their gradual loss or reduced value through poorer structure or connectivity.

2.102 East West Rail will destroy the habitats and species that had established along the long disused track and other nearby areas. High levels of growth, particularly west of Milton Keynes will displace farmland species and increase demand for resources. Historic land drainage in the area, along with the disconnection of rivers from their floodplains has led to wetland habitats declining.

Habitats and species of importance

2.103 The northern part of Buckinghamshire and Milton Keynes contains a diverse range of habitats and species of importance, such as lowland mixed deciduous woodland, wood pasture and parkland with ancient and veteran trees; and species often associated with the remnant ancient woodland, including butterflies such as the Purple and Black Hairstreaks and White Admiral butterflies; and the nationally-rare Barbistelle and Bechstein bats, as well as other locally-rare species.

2.104 Riparian and wetland habitats provide valuable habitat connectivity within the landscape and support populations of breeding and overwintering birds, Water Vole, Otter, Great Crested Newt and species of Stonewort. The farm-scape supports farmland birds such as Skylark and Grey Partridge, and Brown Hare.

2.105 Within the Greensand Ridge, there is a patchwork of semi-natural habitats, including flood plain grazing marshes, lowland heathland and meadows and mixed deciduous woodland. On the acidic soils, numerous rare species of fungi are found. The Ridge is important for species including Adders, Woodlarks, Natterjack toads and specialised mere plants. The scarp and upper ridge have poor quality acidic soils. Here, there are important heath habitats, some of significant wildlife value. The Grand Union Canal cuts through the very south-west. Ancient, semi-natural woodland is found on a mix of soil types ranging from heavy, poorly drained clays to acid well drained soils associated with the Lower Greensand.

2.106 The lowland heathland, typified by heather and wavy hair grass, supports a characteristic mix of species, which along the Ridge include notables such as the Natterjack toad, Nightjar, Adder and Proliferous Pink. Open sandy areas provide excellent conditions for a range of specialised invertebrates, especially bees, wasps and spiders. Lowland acid grassland is characterised by fine-leaved grasses such as fescues and bents, with a range of plants such as Tormentil, Heath Bedstraw, Shepherd's Cress and clovers. Bryophytes, rare and/or scarce macro-fungi and lichens are a special feature. Common Blue and Small Copper butterflies can be abundant and there are records for bugs such as the Bishop's Mitre Shieldbug.

2.107 The variety of semi-natural habitats of the Yardley-Whittlewood Ridge support a range of rare species of butterflies including White Admiral and Wood White, as well as Dormouse, Barbastelle and Noctule bats, and numerous scarce moths and specialist beetles.

ii. Aylesbury Vale

Description

2.108 The **Upper Thames Clay Vales**[30] is a broad belt of open, gently undulating lowland farmland on predominantly Jurassic and Cretaceous clays. The area encircles the Midvale Ridge and covers an extensive area of low-lying land extending to Aylesbury in the east. The area is dominated by watercourses, including the River Thame and Upper Ray, and there are also lakes associated with mineral extraction areas. Ponds are commonly found in grazed fields. There is little woodland cover except for the Bernwood Forest complex to the east. Hedgerows and mature field and hedgerow trees are a feature, and many watercourses are fringed with willow or poplar. There are several major transport routes, the large town of Aylesbury and patches of intensive industrial influence.

Aylesbury Vale. Photo: Paul Maguire.

2.109 The **Midvale Ridge**[31] is a band of low-lying limestone hills stretching east–west from the Vale of Aylesbury. It is a predominantly agricultural area with a mixed arable/pastoral farming landscape, cereals being the most important arable crop. The unusual geology gives rise to habitats that are uncommon in the south of England, such as calcareous flushes and grassland. The ridge is notably more wooded in character than the surrounding Upper Thames Clay Vales with about 9% woodland coverage. To the north-west lies Shabbington Wood, the largest remnant of the former Royal Forest of Bernwood, and about a third of the woodland in the area is designated as ancient woodland.

[30] Natural England (2014): **publications.naturalengland.org.uk/publication/5865554770395136**. NCA profile 908 (NE570) available at the same link.
[31] Natural England (2014): **publications.naturalengland.org.uk/publication/5431100**. NCA profile 109 (NE417) available at the same link.

Designated Sites and Biodiversity Opportunity Areas

2.110 The Vale of Aylesbury contains several designated sites and the following Biodiversity Opportunity Areas, including:

- Bernwood BOA
- Upper Ray BOA
- Brill and Muswell Hill BOA
- Thame Valley BOA

Changes over time

2.111 This area has seen high development pressure and expanding urban areas particularly around Aylesbury town. The Oxford to Cambridge growth arc concept will lead to high future development pressure in this area. High Speed Rail 2 (HS2) also cuts through this area and has recently led to the loss of a number of sites of high value to wildlife, including ancient woodlands. Similarly, East West Rail will have a big impact on areas of habitat along the disused rail-line as it is reinstated. Historic land drainage has impacted watercourse ecology and reduced floodplain connectivity in this area.

Habitats and species of importance

2.112 Habitats and species of importanceThe 'Upper Thames Clay Vales' river valley meadows and pastures are regionally important for **wading birds**, including small breeding numbers of Lapwing, Snipe, Curlew and Redshank, and large wintering numbers of Lapwing and Golden Plover. Nationally important numbers of breeding and wintering wildfowl are associated with water-filled gravel pits and reservoirs. Nationally significant populations of **native Black Poplar** occur in the area.

2.113 The Midvale Ridge's calcareous flushes and grassland support a variety of rare plants and invertebrates. The woodlands support important populations of **Bechstein's bat**, as well as uncommon and rare butterflies including the nationally rare **Black Hairstreak butterfly**. The **Brown Hairstreak butterfly,** a priority species, is also found in the area. The arable land supports nationally important assemblages of farmland birds. Arable weed communities are also favoured by the light soils and many rapidly declining plants are present.

Specific challenges faced

2.114 Alongside the generic pressures such as climate change and pests and diseases, this area faces high development pressure, with associated land use change and possible further habitat fragmentation as a result of the expected growth of urban areas as well as possible infrastructure related to the Oxford-Cambridge Arc.

iii. Chilterns

Description

2.115 The **Chilterns**[32] is an extensively wooded and farmed landscape which is designated as an Area of Outstanding Natural Beauty (AONB). This designation has helped preserve the landscape and associated habitats. It is underlain by chalk bedrock that rises up as a dip slope from the London Basin to form a steep north-west facing escarpment offering long views over the adjacent Upper Thames Clay vales to the Mid Vale Ridge and beyond. The dip slope is divided by valleys which descend south-east towards the River Thames.

[32] Informed by the NCA profile 110: Chilterns (Natural England, 2013), the AONB Management Plan for the Chilterns and a review by Chilterns Conservation Board.

Although many of the valleys are dry, some contain internationally-rare chalk streams and rivers and the north-west facing scarp foot also contains several small streams.

Changes over time

2.116 Poor management of woodlands has led to a decline in the condition of some of the woodland habitats, reducing the number of species found in them. In recent years Ash dieback has had a dramatic effect on Ash trees which are now having to be removed from the countryside. Continued urbanisation of some areas has displaced farmland birds with intensification of agricultural practices further reducing the area they have available. None of the Chilterns' chalk streams currently achieve 'good' ecological status under the Water Framework Directive; a result of over abstraction, diffuse and point source pollution and channel modification over a number of years. Infrastructure projects including HS2 have had a dramatic impact on the landscape, clearing miles of vegetation and creating a barrier to species movement.

Habitats of importance

2.117 The Chilterns is home to a wonderful variety of wildlife including many protected and notable species. The AONB is particularly important for its chalk grassland, chalk streams, ancient woodlands (especially Beech) and habitats provided by arable farmland. Species-rich ancient hedgerows and hedgerow trees provide important wildlife habitat. Fine-grained variations in soils, topography and past management have given rise over millennia to rich habitat mosaics. These include Box woodland and Juniper scrub, scarp slope and dip slope chalk streams, wayside verges and disused quarries. Wood pasture and veteran trees, heathland and acid grassland (habitats often associated with common land), plus traditional orchards and parkland add to the mix.

2.118 The habitats associated with the Chilterns are often a by-product of traditional management (grazing, woodland management and quarrying) over many millennia by farmers, woodland owners and other land managers. Its chalk escarpment provides a crucial stepping stone for species moving through the landscape, often in response to climate change and other pressures.

Woodlands

2.119 The Chilterns is one of the most wooded areas of the country, famous for its extensive Beech woods and ancient woodland.

2.120 Much of the woodland in the Chilterns is found where agriculture would be more difficult on steeper slopes and poorer soils. Priority habitats include Lowland Beech and Yew Woodland, mixed deciduous woodland and wood pasture and parkland. The Chilterns has a rich heritage of parkland, wood pasture and common land, with high concentrations of veteran trees, associated deadwood invertebrates and fungi.

2.121 Ancient woodland contributes greatly to the biodiversity resource of the Chilterns supporting species such as Red Helleborine, Coralroot and Wood Barley. Ancient woodland makes up around 13% of the Chilterns AONB; this compares to 2% of England as a whole.

2.122 Small areas of rare Box wood are also found at the Kimble and Ellesborough Warrens. Some of the best examples of Lowland Beech and Yew Woodland are protected by SSSI and SAC status with many others being identified as Local Wildlife Sites. Traditional

orchards, particularly cherry, were once important in the Chilterns, and the mix of old trees and grassland are valuable for wildlife.

Farmland habitats

2.123 Farmland is the main land use in the Chilterns, covering over 60% of the Chilterns AONB and providing a wide range of wildlife habitats. There has been a history of mixed farming in the Chilterns AONB however, arable systems now predominate. Farming has created a mosaic of arable and grassland habitats, stitched together by hedgerows and interspersed with woodland, commons and downland. Much of the wildlife interest in arable areas is limited to the field margins and hedgerow network.

2.124 Some plant species that were once considered problem weeds (e.g. Field Cow Wheat and Shepherd's Needle) are now amongst Britain's rarest plants. Field margins can also provide habitats for declining bird species, such as Corn Bunting and Grey Partridge, plus numerous invertebrates and small mammals.

2.125 Arable fields provide attractive nesting sites for Skylarks and Lapwing, while winter stubble provides a valuable food supply for seed eating birds such as the Corn Bunting and Yellowhammer.

2.126 Farmland contains most of the hedgerows within the AONB. Hedges and hedgerow trees provide important cover and nesting habitat for birds and form important linear habitats. Many of the hedgerows which remain in the Chilterns are of a great age, containing a diverse mix of species.

Chalk grassland

2.127 The Chilterns supports important concentrations of species-rich chalk grassland, found mainly along the escarpment and steep valley sides. Most of the chalk grassland in the county is in the Chilterns, and it has developed over centuries of grazing on nutrient-poor chalk soils.

2.128 Chalk grassland and scrub mosaics have a high conservation value and are home to populations of chalk specialist species including Wild Candytuft, Pasque Flower, Silver-spotted Skipper and Glow-worm.

Chalk streams

2.129 Chalk streams are an internationally rare landscape feature and habitat, found mainly in England and North West Europe. There are 224 chalk streams in England,[33] which represents approximately 80% of the global resource. As such the UK has a special duty to conserve these habitats.

2.130 Chalk streams are a key feature of the Chilterns AONB landscape. They are important habitats for wildlife and support a massive range of plants and animals, including some of the AONB's most threatened species such as Otter, Water Vole and Brown Trout.

2.131 The most significant of these found in the Buckinghamshire Chilterns are: The Hambleden Brook, The River Wye, The Hughenden Stream, The River Misbourne, and The River Chess.

[33] See WWF (2014) The State of England's Chalk Streams. Available here: **assets.wwf.org.uk/downloads/wwf_chalkstreamreport_final_lr.pdf**

Species of importance

2.132 The extent of woodland in the Chilterns means that bats are a common protected group of species. The Hazel Dormouse is still recorded at a small number of sites, but it has been in continuous decline over recent decades. A range of fungi and saproxylic invertebrates are of particular importance.

2.133 The Lowland Calcareous Grassland (chalk grassland) areas support plant and moth and butterfly species, including rare species such as the Chiltern Gentian, Juniper, Striped Lychnis moth and Chalkhill Blue butterfly.

2.134 The Chalk streams and rivers are associated with plant species such as Water-crowfoot, fish such as Brown Trout and Bullhead, birds such as Kingfisher, and specific communities of Water Vole; Otter may be starting to re-establish a presence.

2.135 The Chilterns also contains a number of farmland bird and arable flora hotspots, although many of these species are declining.

Designated Sites and Biodiversity Opportunity Areas

2.136 The Chiltern contains several designated sites and the following Biodiversity Opportunity Areas, including:

- Ashridge & Ivinghoe Beacon BOA
- Wendover Woodlands BOA
- Dunsmore woods BOA
- Chiltern Escarpment BOA
- Central Chiltern Chalk Rivers BOA
- Hambleden and Wormsley Valleys BOA
- Medmenham BOA
- South Western Commons BOA
- Radnage Valley BOA
- Gomm Valley BOA
- Upper Hughenden Valley BOA
- Chess Valley BOA

From top: Yellowhammer, photo: Kostya Pazyuk. Water-crowfoot, photo: Jonathan Billinger (CC BY-SA 2.0). Striped Lychnis moth caterpillar, photo: Rhiannon Flemming. Water Vole, photo: Dave Hunt.

iii. Thames Valley

Description

2.137 The **Thames Valley**[34] stretches from Reading to the Colne Valley in south-east Buckinghamshire. The catchment of the Thames and its tributaries drains from surrounding areas and provide ecological links to them, for example with rivers feeding in from south and north-east, as well as from the Chilterns, including chalk streams, to the north. The Thames area plays a key part in the flood defence strategy for London. The Colne Valley Regional Park, in the south-east corner of Bucks, is a mosaic of farmland, woodland and water with rivers, canals and lakes. The River Colne provides a valuable route for species movement between the Thames and Hertfordshire. To the west of the Colne Valley Regional Park is the area of South Bucks Heathland and Parkland, which has high biodiversity value and includes a number or protected areas, including acid grasslands and heaths and ancient woodlands.

Designated Sites and Biodiversity Opportunity Areas

2.138 The Thames Valley contains several designated sites and the following Biodiversity Opportunity Areas, including:

- South Bucks Heaths and Parkland BOA
- Colne Valley BOA

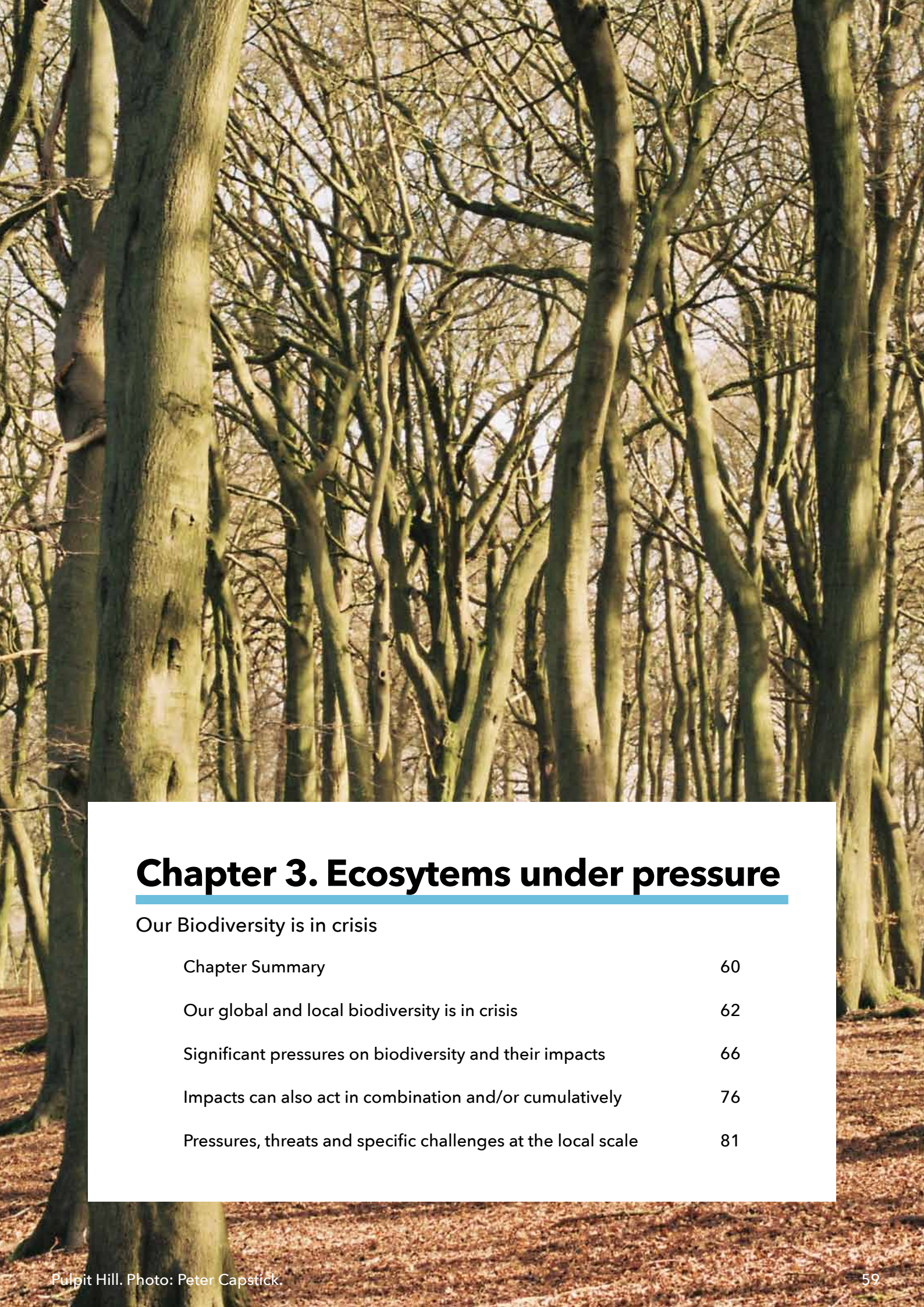
Changes over time

2.139 Urbanisation of nearby areas has increased the recreational pressure on a number of important sites for nature conservation, including Burnham Beeches Special Area for Conservation (SAC). This has led to a deterioration in the condition of the habitats which is now starting to be addressed via the provision of alternative natural greenspaces and contributions towards habitat management. The changing climate has resulted in wetland habitats deteriorating. Land use has also changed in this area with land increasingly used for leisure purposes such as for equestrian and golf courses which typically are areas of limited biodiversity value. The close urban population causes issues such as fly tipping and air pollution.

Habitats and species of importance

2.140 Across the area there are many notable habitats including reedbeds, wet woodlands, lowland meadows (for example around Stoke Poges and Wexham), river valley pastures important for breeding birds, acid and calcareous grasslands, fens (at Burnham Beeches and Black Park), orchards (for example, potential BAP-quality traditional orchards around Langley) and hedgerows. There are BAP-quality woodland and ponds in Littleworth Common and Burnham Beeches, and potential BAP-quality ponds across the area. Temporary ponds on heathlands are important for Starfruit. Burnham Beeches SAC contains wood pasture with large number of ancient pollards. There are also many parkland sites including Black Park, Langley Park, Dorney, Cliveden and Dropmore.

[34] Text and information taken from the Thames Valley National Character Area Profile (115), Natural England. Available here: **publications.naturalengland.org.uk/publication/3865943**.



Chapter 3. Ecosytems under pressure

Our Biodiversity is in crisis

Pulpit Hill. Photo: Peter Capstick.

Chapter Summary

Our Biodiversity is in crisis - Internationally, nationally, regionally and locally

Globally, we are in the middle of a mass extinction event. In the UK, 41% of species have declined in recent decades, and a quarter of the UK's mammals face extinction.

Our nature is highly fragile, and while the countryside of Buckinghamshire and Milton Keynes may look green and pleasant, it disguises dramatic declines in species diversity and abundance. Compared to other English counties, we have a:

- **Lower SSSI area percentage coverage** (just over 1%) than nationally (average 8%)
- **Lower priority habitat percentage coverage** than average (between 3-10%, compared with 14% nationally)
- **Higher extinction rates in plant species** than most English counties
- **Less than 5% of surface waterbodies** (rivers, lakes and canals) in Buckinghamshire and Milton Keynes **are in "good" ecological status**, compared to around 16% nationally
- **None of our chalk streams are in "good" ecological status**, compared with 23% nationally
- **Lots of potential with Local Wildlife Sites, but a lack of funding** and recognition for proper management

Key pressures

The pressures on our biodiversity and nature come from, and operate at, international sources, national and local scales, and can act alone, in combination, and/or cumulatively, and be direct and/or indirect. Each differently impacts on habitats across our area and beyond and include:

- **Climate change:** hotter, drier summers and warmer, wetter winters bring associated changes in seasonal patterns, temperatures and rainfall and higher risks of extreme weather events; wetland habitats are particularly sensitive, as are species that cannot adapt quickly enough
- **Development:** housing, infrastructure; with differential species impacts, for example specialist farmland birds may be displaced, whereas those more about to exploit gardens may benefit
- Associated increases **demand for resources**: over-abstraction of water supplies being a particular risk in particular for chalk streams
- **Increase in waste** and risks of **pollution**: e.g. waste, dust, sound and light differentially affect habitats
- **Flood risk management:** historic modification of water courses and land drainage activities have caused long-lasing harm to the river environment
- **Insensitive land management:** risks biodiversity / habitat loss and possible fragmentation: e.g. inappropriate woodland, grassland and heathland or riparian management, and certain farming practices (e.g. removal of hedgerows, management of field margins and more subtle management changes such as changes to grazing regimes can all have impacts).
- **Increases in non-native diseases and pests:** e.g. tree diseases such as ash die-back
- **Policy uncertainty, the need for cross-sector mutually reinforcing policies, and resources to pursue them**

Introduction

3.1 **The habitats and wild spaces of Buckinghamshire are not just valuable for nature or for their beauty; they also provide people and communities with vital benefits that we all rely on**, but often take for granted. These include providing us with cleaner air, for example, with trees absorbing air pollutants, and with shade in warmer town centres. Careful planting of vegetation can improve water quality, slow the flow of water and reduce the risk of flooding. Nature also provides habitats and refuge for pollinating insects, which is essential for crop production; and we all benefit directly from local and natural green spaces for our recreation, for our physical and mental health and wellbeing. Our nature and wildlife also provide economic opportunities, such as education, tourism and green jobs.

3.2 However, despite the value of habitats, species and natural spaces to us all, and in common with other parts of the country, and particularly the developed south-east, **Buckinghamshire and Milton Keynes has severely damaged ecosystems** as a result of a combination of various pressures, including climate change, population growth and development, changes in land use and land management, pollution and pests and diseases. These many external pressures are threatening or changing our habitats, and therefore are threatening or changing their ability to provide those benefits.

3.3 **The pressures on nature come from and operate at international sources, national and local scales.** These include climate change, with its associated changes in seasonal patterns, temperatures and rainfall; increases in pests and diseases; and the growth in development (housing and infrastructure, and population). Development pressures can, for example, cause direct impacts on habitats, as well as increase demand for natural resources such as water and green space for recreation and wellbeing, and resulting growing waste and pollution, whether that is air, water, light or noise pollution. The way we manage our land is also important to how our wildlife and habitats survive and adapt to such threats. For example, habitats that are fragmented, or separated, perhaps as a result of changing land ownership or development, mean a less connected network of habitats which reduces the resilience of wildlife; a connected network of habitats is shown to be more beneficial. And how we manage our water courses, river channels and land bordering them is also important. Changes to the natural pattern of water flow, meandering, deposition and the linkage between rivers and floodplains will affect the survival of habitats and species including wetlands, wet grassland and wading birds.

3.4 **Pressures on biodiversity can also act in combination,** so that any one habitat or species could be affected by multiples pressures. For example, the effects of river pollution or poor water quality can be heightened by historic river engineering and poor watercourse management. Where watercourses have been artificially straightened, this can result in bed or bank instability, loss of habitat diversity and increased flood risk downstream.

3.5 **The current status of our biodiversity across Buckinghamshire and Milton Keynes is outlined below,** before we identify the pressures and their impacts, including the impact of combined, or cumulative pressures. **The Chapter concludes with a summary of how we can and must respond,** providing the context for the actions required to address them and to enhance and improve our biodiversity, habitats and their connectivity, as set out in Section 5in the NEP's Biodiversity Action Plan.

Our global and local biodiversity is in crisis

3.6 **Globally, we are in the middle of a mass extinction event.** Internationally, there has been a 68% decline in global wildlife populations since 1970. In the UK, 41% of species have declined in recent decades since the 1970s, including some of our best-known wildlife such as skylarks, yellowhammers, water voles, hares, hedgehogs, frogs, and toads. A quarter of the UK's mammals face extinction.[35] In Buckinghamshire, none of our chalk streams have reached "good" ecological status.

Designated SSSIs

Lower percentage coverage than average

3.7 Much of Buckinghamshire and Milton Keynes may look green and pleasant, but compared with other English counties the area is not well served in terms of its biodiversity resources. There is in fact a very low percentage area of land designated as SSSI. SSSIs only account for 1.1%[36] of Buckinghamshire and Milton Keynes, compared to a national figure of around 8% in England. Even Greater London has a higher proportion of land designated as SSSI at 2.4%6.

3.8 However, a greater proportion of the SSSI units in Buckinghamshire are in better condition than nationally. Of the SSSI units in Buckinghamshire and Milton Keynes, 65.1% are assessed as being in favourable condition, compared to 38.4% in favourable condition across England at November 2020. A further 30.7% SSSIs in Bucks are in unfavourable recovering condition. This compares to 53.2% nationally.[37]

Priority habitats

Lower percentage coverage than average

3.9 In terms of extent and proportion of the area, the NEP area has significantly less priority habitat (nationally identified as habitats as valuable for biological diversity) than the average English county. Natural England's national habitat inventory maps show 14% of England as BAP priority habitat, but only 9.7% of Buckinghamshire and Milton Keynes is designated as priority habitat. (More fine-grained, local habitat mapping data held by the local records centre suggests the Priority Habitat area in Buckinghamshire and Milton Keynes is in fact just below 3%). Despite this, Buckinghamshire has above average extent of traditional orchards, lowland dry acid grassland and lowland meadows; lowland mixed deciduous woodland is the single most extensive priority habitat in the county (1,682 ha) followed by Beech and Yew Woodland (1,191 ha) and lowland wood pasture and parkland (536 ha).[38]

Priority habitat condition is unclear

3.10 As set out in the NEP's 2016 State of the Environment report[39], the Government's "Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services" (2011)

[35] State of Nature Report, 2019. This is a health-check on how the UK's wildlife is fairing, using wildlife data from 50 conservation organisations. Available here: **nbn.org.uk/stateofnature2019/reports/**

[36] Based on information received from Natural England, October 2020: 115 SSSIs covering 2,137.3 ha; and the area of Buckinghamshire (ceremonial county including Milton Keynes) assumed to be: 1,874 km^2 (187,400 ha).

[37] Natural England, data supplied October 2020; and, NE website accessed November 2020, SSSI condition summary, whole of England. Available here: **designatedsites.naturalengland.org.uk/ReportConditionSummary.aspx?SiteType=ALL**

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

[39] *ibid.*

includes national targets for the condition and extent of priority habitats and protected species by 2020: to achieve an increase in overall extent of priority habitats by at least 200,000 ha; and 90% of priority habitats in favourable or recovering condition.

3.11 The Strategy's priority habitats are embedded in law through Section 41 of the Natural Environment and Rural Communities (NERC) (2006) Act. This lists 56 priority habitats of principal importance for conservation in England; the same as those that have historically been addressed by UK Biodiversity Action Plan work.

3.12 The NEP's *Forward to 2020: Buckinghamshire & Milton Keynes Biodiversity Action Plan*, published in 2015, set out restoration and creation targets for 14 of the English priority habitats to achieve a 20% increase in the area of priority habitat in the county by 2020.

3.13 However, currently we do not have complete, reliable or recent data on status or progress, which needs to be addressed, and we hope resources can be made available to ensure this happens during the next BAP period. There is no meaningful trend data on the extent or condition of priority habitat locally, in part because the methodology for national habitat inventories has been substantially changed; and, updated surveys in Buckinghamshire and Milton Keynes are due on most of the 2010 local priority habitat mapping.

3.14 What we do know, is that **much, but not all, of the priority habitat within Buckinghamshire and Milton Keynes lies within a site designated for its nature conservation interest.** Further work is needed to ensure accurate, up-to-date mapping of priority habitat and assessment of its condition.

Local Wildlife Sites

Lots of potential but lack of funding and recognition for proper management

3.15 Local Wildlife Sites do not enjoy the same level of protection in planning as SSSIs and are more vulnerable to inappropriate management, neglect and being impacted by development. When last assessed (2011–12), 51% of Local Wildlife Sites in Bucks were assessed as in positive conservation management;[40] the current estimate is around 54%.

Plant species data

Higher extinction rate than average

3.16 A 2013 national report by Plantlife, entitled *Our Vanishing Flora*, ranked Buckinghamshire and Milton Keynes 39th out of 52 English counties in terms of the rate of plant extinctions. Buckinghamshire and Milton Keynes are losing plant species at an extinction rate of 0.59 species per year: a loss of a plant species every 1-2 years. If that rate continued, then by the year of writing this BAP, in 2020-21, there would be 4 fewer plant species living in Buckinghamshire and Milton Keynes now than when the 2013 report was produced.

Waterbodies in "good" ecological status

Lower percentage than average; and no chalk streams in "good" ecological status

3.17 In terms of waterbodies reaching Water Framework Directive "good" status, a number of changes have been made to the way the WFD has been implemented across England in the last 10 years. In addition to the change in number of overall WFD waterbodies (due to some being merged and others divided), the frequency of monitoring of the different elements which are used to determine the status of each waterbody has reduced, as has the number of survey sites. Furthermore, in 2019, the overall WFD classifications were updated to include the chemical status of each waterbody.

[40] BMERC, Buckinghamshire & Milton Keynes – Single Data List 160 Report 2011-2012.

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

3.19 As of 2019, there are 197 WFD waterbodies within Buckinghamshire and Milton Keynes: 152 rivers, 28 groundwater, 12 canals, 4 lakes and 1 water transfer (a reach of the Jubilee River). Due to the changes mentioned above, it is not possible to directly compare data from 2009 and 2019.

3.20 However, in 2019, **less than 5% of surface waterbodies** (rivers, lakes and canals) in Buckinghamshire and Milton Keynes **were in "good" ecological status**, compared to around 16% nationally (with another 1% nationally classified as "high" status). None of the chalk streams in Buckinghamshire achieved "good" status (WFD) compared to around 23% nationally.[41]

3.21 A summary of the ecological status of water framework waterbodies in Buckinghamshire and Milton Keynes is below. This is illustrated at a high level in Map 9, below, showing the distribution of the rivers of differing status.

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

Table 4: A summary of the ecological status of water framework waterbodies in Buckinghamshire and Milton Keynes (NB: there is no ecological status measured for groundwater)

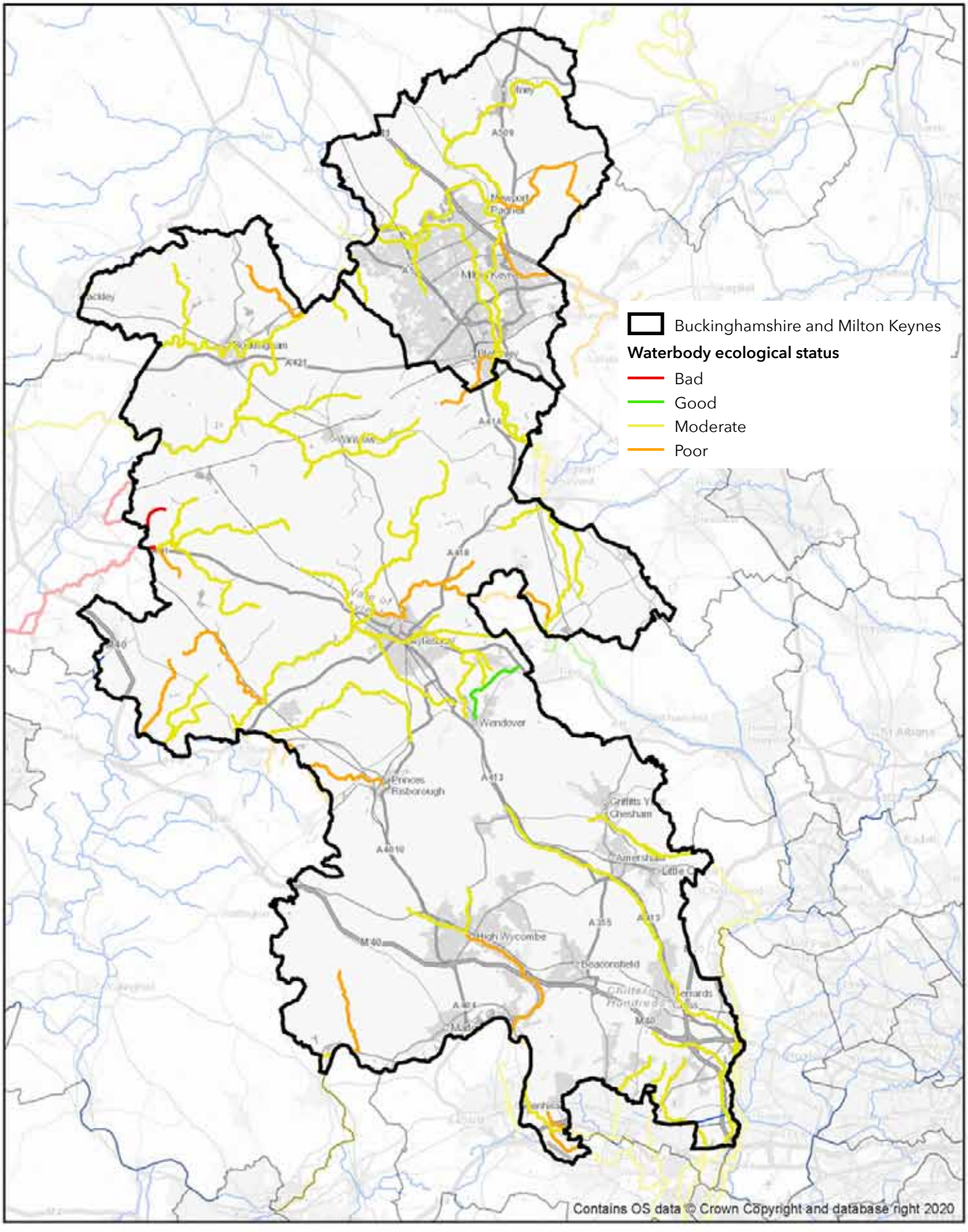
	Ecological status (2019)					
		High	Good	Moderate	Poor	Bad
Waterbody type	River	0	3	113	32	4
	Groundwater	0	18	0	10	0
	Canal	0	4	8	0	0
	Lake	0	2	2	0	0
	Water transfer	0	0	1	0	0

3.23 The main reason for waterbodies not reaching 'good ecological status' under the Water Framework Directive[42] (WFD) has been identified as high phosphate levels and the legacy of historic river engineering and land drainage, affecting habitat quality, including barriers to fish passage, e.g. by weirs.

[41] Data source: WWF-UK and Waterlife, *The State of England's Chalk Streams*, Report 2014. Available here: **waterlife.org.uk/wp-content/uploads/2016/04/Chalk_stream_data_summary_April2016.pdf**; and the NEP's (2016) *State of the Environment Report*. Available here: **bucksmknep.co.uk/projects/state-of-the-environment-report/**

[42] The latest Water Framework Directive legislation applicable to the UK is available here: **www.legislation.gov.uk/uksi/2017/407/contents**

Map 9: 2019 WFD Ecological Classification of rivers in Buckinghamshire and Milton Keynes



3.24 The effects of pollution can be heightened when combined with poor watercourse habitat quality; where watercourses have been over-dredged or artificially straightened, this results in loss of habitat diversity, good quality gravels and natural processes of erosion and deposition. Damage as a result of historic dredging can also increase the risk of downstream flooding due to the increase in conveyance.

3.25 Additional pressure points within Buckinghamshire include urban areas through surface water runoff, with particular hotspots at High Wycombe, Chesham, Aylesbury, Buckingham, Marlow and Amersham Old Town.

Significant pressures on biodiversity in Buckinghamshire and Milton Keynes and their impacts

Pressures facing our Natural Environment

3.26 There are many pressures facing the natural environment in Buckinghamshire and Milton Keynes, which, if left unchecked, will have dramatic impacts on our wildlife and habitats in the future. Table 6, below, summaries the key pressures and threats facing biodiversity in Buckinghamshire and Milton Keynes, the main impacts and the habitats types affected. These are considered to be:

- Climate Change, which can exacerbate many of the other pressures and become a threat to species unable to adapt quickly enough
- Development and associated Habitat loss, change and/or fragmentation
- Flood risk management, land drainage and river/riparian management, including historic river channel engineering, leading to change habitat and species composition
- Over-abstraction
- Land Management, including land use change, intensification, changes in farming practices
- Pollution: waste, polluted runoff, soil erosion, sound, light, noise, chemicals and particulates
- Non-native species, diseases and pests
- Policy: changes, ability to influence, resourcing

3.27 Many of the threats facing our biodiversity and habitats result from a changing climate, directly or indirectly. Other pressures and threats to our ecosystems in Buckinghamshire are also human-led.

A note on climate change

3.28 In particular respect of climate change and what this means for our area, the State of Nature report (2019) found that climate change was the second greatest cause of change, positive and negative, in wildlife, and that only agricultural management was greater.[43] The Met Office published its latest projections of climate in the UK in 2018 (UKCP18). The key messages are that the UK will experience:

- **Hotter, drier summers,** with the greatest increase in southern England
- **Milder, wetter winters**

3.29 We are already locked into some extent of these changes: they are inevitable for many decades because of the greenhouse gas emissions that have already happened.

[43] Other causes identified were urbanisation, pollution, woodland management, fisheries, invasive species and freshwater management. The State of Nature Report is a health-check on how the UK's wildlife is faring. It is put together using wildlife data from a group of 50 conservation organisations. Available here: **www.rspb.org.uk/our-work/state-of-nature-report/**

However, the extent of future change, particularly beyond 2050, will depend on how successful the world is at reducing atmospheric greenhouse gas concentrations from 2020 onwards. While there is uncertainty around the predicted impacts, it is important to aid the ability for habitats and species to cope with climate change and the predicted profound changes to wildlife; climate change tend to increase the stress on our priority habitats and ecosystems from direct local impacts, and will continue to do so. Figure 1, below, outlines the likely changes for our area, based on available predictions for the Thames River Basin.

Figure 2: UK Climate Predictions (Met Office) – Thames River Basin

The Thames river basin is the closest standard geographical area from UKCP18, and is chosen as a good indication of climate change projections for Buckinghamshire and Milton Keynes (Table 5, below).

- Climate change has already increased the chance of seeing a summer as hot as 2018 to between 12-25%. With future warming, hot summers by mid-century could become even more common, near to 50% (UKCP18 Headline Findings, September 2019, Version 2, paragraph 3.1.2).
- The frequency of hot spells (maximum daytime temperatures exceeding 30 °C for two or more consecutive days) is projected to increase further. Rising from an average of 0.25 occurrences per year in the present-day to 4.3 by 2070 (UKCP18 HF 3.1.6).
- Thames river basin precipitation amounts by 2080, in the high emission scenario, are expected (10%-90% likelihood) to be between -68% to -34% in summer, and -3% to +23% in winter (where a negative change indicates less accumulated precipitation and a positive change indicates more accumulated precipitation) (UKCP18 HF 3.2.2).
- Despite overall summer drying trends in the future, the intensity of heavy summer rainfall events is projected to increase (UKCP18 HF 3.2.4).
- Significant increases in heavy hourly rainfall intensity in the autumn are expected (UKCP18 HF 3.2.4).
- A decrease in UK soil moisture during summers is projected, consistent with the reduction in summer rainfall.

Table 5: UK Climate Projections 2018 for the Thames river basin. Mean temperature and precipitation for winter and summer 2070-2089 relative to 1981-2000. Available here: www.metoffice.gov.uk/research/approach/collaboration/ukcp/key-results

Variable	Time Horizon	Emissions Scenario	10th percentile change	50th percentile change	90th percentile change
mean winter temperature (°C)	2070-89	Low	0	1.2	2.4
mean winter temperature (°C)	2070-89	High	1.2	3.0	4.9
mean summer temperature (°C)	2070-89	Low	0.8	2.0	3.3
mean summer temperature (°C)	2070-89	High	2.3	4.8	7.3
mean winter precipitation (%)	2070-89	Low	-6	10	26
mean winter precipitation (%)	2070-89	High	-3	23	52
mean summer precipitation (%)	2070-89	Low	-39	-18	5
mean summer precipitation (%)	2070-89	High	-68	-34	0

Table 6: Pressures and threats facing biodiversity in Buckinghamshire and Milton Keynes

Pressure on the environment	Impacts	Habitats / species negatively affected
Climate change - Hotter, drier summers; warmer, wetter winters; - increased number of extreme weather events, e.g. rainfall, drought, storms; - changes in seasonal timings	**Increase in pests, invasive species and diseases** which are adapted to the new conditions **Changes to composition and location of ecological communities.** If native species cannot adapt quickly enough to the changing climate, the resulting change to the composition and location of ecological communities can affect habitat quality and the services habitats can provide to society, e.g. the ability of vegetation to absorb air pollutants, provide shade, slow the flow of surface runoff that poses flood and water quality risks. **Climate change intensifies other human pressures on the environment**, particularly during droughts, e.g. frequency and intensity of flooding; urban heat island effect.	All Habitats in the river valleys are at particular risk, with wetland habitats drying out and lower river flows changing the aquatic ecology. Threat to species that cannot quickly adapt, e.g. some pollinators.
Development - Urbanisation - New development: housing, infrastructure growth	**Direct impacts of development:** - Loss of habitats, species and biodiversity where they become development sites and loss of ecosystem services they provided (e.g development in the Aylesbury Vale); local air quality, water quality, carbon sequestration, habitats for wildlife, etc - Fragmentation/loss of connectivity of habitats and the ecological network e.g. due to development disconnecting habitats, or where buffers around development are not sufficient to keep habitats connected - Some positive impacts if new green infra-structure replaces wildlife-depleted land.	All, depending on development location Differential species impacts, e.g. specialist farmland birds are often displaced; also rarer species of bats and invertebrates that rely on certain food or habitats; whereas bird species more able to exploit gardens may benefit. This is a particular concern in the Aylesbury Vale area where urban growth is replacing farmland. Loss of ancient woodland (e.g. HS2)

Pressure on the environment	Impacts	Habitats / species negatively affected
Development,cont.	**Indirect impacts of development:** Development causes multiple pressures and risks on nearby habitats, sites, species and wildlife, leading to their deterioration. E.g. poorly-planned development could result in: - loss of habitat connectivity, - increased recreational pressures, - changes to hydrology for development, with impacts on flood risk and water quality: e.g. to river channel structures or runoff rates and patterns due to hard surfaces - increased demand on water supplies: e.g. unsustainable abstraction from the chalk aquifer affects chalk streams and their river ecology and habitats - Pollution: e.g. increased loading from sewage treatment works; light, sound - Obstacles to species dispersal - Cats and dogs can predate native species, - Changes in balance of animal and plant diversity with human activity. - New species and pests can change the function of surrounding habitats. **Well-planned development** includes features to balance run-off to avoid increased flood risk downstream, clean up run-off water and provide green corridors and features for wildlife to thrive and move through the urban landscape.	Development pressure is highest around existing urban areas, particularly in north Buckinghamshire around Milton Keynes, around Aylesbury town and in the south of the county where overspill from neighbouring authorities is anticipated at some point.
Over-abstraction	Chalk streams have been subject to a range of threats in recent years. The pumping of water and over-abstraction from the chalk aquifer in combination with a changing climate has resulted in large lengths drying out with the death of fauna and flora. The presence of weirs and culverts stops the movement of species up and down stream and reduces the ability of upper reaches being recolonised. Although there has been some good progress in addressing abstraction pressures on some chalk streams (for example the River Wye) and removing or bypassing some barriers to allow recovery of fish populations following droughts, much further progress is required.	Chalk streams and associated species

Pressure on the environment	Impacts	Habitats / species negatively affected
Flood risk management, land drainage and river/riparian management e.g. creating land drains, dredging channels, straightening and raising bank height Flooding can of course be a result of natural phenomena too, e.g. large rainfall events and high groundwater recharge. Climate change and historic engineering could exacerbate the risk.	**Historic flood risk management and land drainage activities have caused long-lasting harm to the river environment**, including the dredging, straightening and embanking of river channels and the extensive under-drainage of floodplain land, particularly in the flashy clay catchments. Damage to river structure and river habitats causes loss of biodiversity. **Modified watercourses no longer flow and flood naturally** and don't contain the variety of micro-habitats many species require: - Straightened rivers with stronger flows convey flood waters more quickly to downstream areas, potentially to areas of flood risk, rather than allowing the floodplain to act as effectively as possible in attenuating flood flows. - Rivers disconnected from flood plains by historic engineering can lead to the drying of some habitats and change in water regime for others - Less meandering, loss of form and diversity in river channel affects structure, deposition and substrate – and the aquatic habitats that rely on channel structure diversity. - In-river structures can be barriers to fish migration and have negative impacts on upstream habitat and sediment dynamics. - Engineering and straightening of rivers and intensive bank management can also increase bank instability and lead to proposals of hard bank protection – which fragments natural bank and nearby habitats **Damaged river morphology is one of the biggest causes of failure of ecological objectives under the Water Framework Directive.**	Decline of, and changes in habitats and species that rely on seasonal water inundation in the floodplain, e.g: - Loss of natural areas of wetland and reedbed - Lowland wet meadows - Characteristic plants and animals Loss of habitats and species relying on natural channel form, meandering and deposition regime and different flow characteristics Changes in species composition on the floodplains, e.g. loss of wetlands and wet grassland has led to a decline in wading birds. Fluvial flood risk, e.g. Marlow (now more protected with a scheme), Buckingham, Denham, Bourne End, Medmenham. Groundwater flood risk, especially Chesham, Chalfonts, Amersham old town, valleys leading into Wycombe–Hughenden, Saunderton/Bradenham and Hambleden

Pressure on the environment	Impacts	Habitats / species negatively affected
Land management There are many pressures on our land with land managers carrying the burden to maximise food production at ever reduced costs.	Loss of biodiversity, habitats and possible fragmentation. Where this results in intensive farming it can have devastating consequences for our wildlife and natural environment, with knock on effects to our society and economy. For example, the overuse of pesticides and reduction in habitat can wipe out pollinators, which are necessary to pollinate many of our crops. Creating large areas of land with few natural habitats prevents species from moving through the landscape to find food and shelter, isolating populations. Even more subtle management changes can have negative effects, such as changes to grazing regimes of meadow grasslands which can cause them to scrub over or produce a species poor sward, decreasing the biodiversity and overall resilience of the ecosystem. More sustainable, less resource-intensive land management will be critical to nature's recovery along with landscape-scale land-use change and much improved connectivity between areas of high biodiversity value. **Farming practices, e.g:** - Hedgerow removal to enlarge fields (loss of habitats for e.g. pollinators and other species; can affect local air quality for plant health) - Reduced hedgerow management - Hedgerow and field margin management – can negatively affect biodiversity value if too frequent, or seasonally inappropriate	Pollinators affected by pesticides These negative changes are particularly evident in the Thame Valley where golf courses and equine uses are becoming more popular. Loss of hedgerows loss of structure, connectivity and therefore ecological value of hedgerows Reduction in farmland birds and arable weed species

Pressure on the environment	Impacts	Habitats / species negatively affected
Land management, cont.	**Grassland and heathland** - changes of use (e.g. cattle to horses) - under grazing: scrubbing over of habitats - overgrazing and tightly grazed sheep pasture produces a uniform grass (sward) - changes in biodiversity and habitats – impacts in species structure – e.g. pollinators **Riparian management** Intensive vegetation management alongside watercourses can increase sediment and other pollutants reaching water Inappropriate valley slope land management can increase soil loss with associated nutrients and negatively impact watercourses Mowing: timing and sensitivity - timing v bird breeding season - affects habitat structure - food and shelter needs of invertebrates Grazing: timing and intensity can impact on grassland habitat quality and damage riparian habitat structure Historic river channel engineering or development on the floodplain – can lead to rivers disconnected from the floodplain, pollution levels in water, drying of floodplain habitats. **Woodland** Loss of larger predators controlling deer or creating open spaces, dams and influencing rivers and wetlands (e.g. beavers) Changes and decline in woodland management. Subdivision into smaller plots (especially in the Chilterns)	Grassland and heathland Scrubbing over reduces ecological value Overgrazing and tight grazing degrades habitat for invertebrates Riparian habitats Changes in habitat structure Birds and invertebrates: - Grazing and mowing can interrupt bird breeding season and destroy nests - Food and shelter needs of invertebrates Woodland Changing ecology of woodlands Introduced species and diseases

Pressure on the environment	Impacts	Habitats / species negatively affected
Pollution Loss of biodiversity and habitats Generated by human activities, including roads, railways, airports, construction, industrial areas, etc.	**Waste, diffuse pollution and point source pollution** can have direct impacts on watercourses and connected habitats. This pollution arises from isolated incidents, agricultural runoff (often high in phosphates), soil erosion, poor water treatment. (unconsented sewage discharges often due to aging equipment higher demand as a result of increased development) and runoff from roads Direct impacts on watercourses and connected habitats, which can spread many kms downstream, include: - sedimentation of river gravels - eutrophication - reduction in water quality resulting in loss of in-channel plant and invertebrate diversity **Waste, diffuse pollution and point source pollution** can have direct impacts on watercourses and connected habitats. This pollution arises from isolated incidents, agricultural runoff (often high in phosphates), soil erosion, poor water treatment (unconsented sewage discharges often due to aging equipment higher demand as a result of increased development) and runoff from roads. Direct impacts on watercourses and connected habitats, which can spread many kms downstream, include: - sedimentation of river gravels - eutrophication - reduction in water quality resulting in loss of in-channel plant and invertebrate diversity - in extreme cases, acute pollution can result in fish kills The effects of water pollution can be heightened when combined with poor watercourse management; where watercourses have been artificially straightened this results in erosion and deposition in the wrong places. Alongside dredging, this is also a cause of downstream flooding.	**Waste** Damage to in-channel and riparian habitats Loss of in-channel plant species diversity Flood meadows: competitive advantage to coarse grasses and other plans can displace a more diverse flora Fish development can be impaired by sedimented gravels Particular pressure points within Buckinghamshire include urban areas through surface water runoff with particular hotspots at High Wycombe, Chesham, Aylesbury, Marlow and Amersham Old Town.

Pressure on the environment	Impacts	Habitats / species negatively affected
Pollution, cont.	**Dust and particulates** Particulates are emitted from vehicles and road surfaces with dust emitted from construction and quarrying. Dust can drift and land on nearby vegetation weakening or killing it. Particulates can affect the soil chemistry and alter species composition.	**Dust and particulates** Road verges: changes in species composition, e.g. course grasses can out-compete native meadow flowers, affecting bees, butterflies and other pollinators; reduced food and resourced to invertebrates; cumulative impacts on birds and mammals. **Sound** affects species according to their different tolerances. E.g. noise affects bats – hunting via echolocation. **Night light** is particularly bright in Aylesbury and High Wycombe as well as along the M40 corridor. Some bat species avoid well-lit areas.
Non-native species, diseases and "pests" Invasive species can outcompete native wildlife or destroy whole ecosystems often causing other costly impacts in the process	Loss of ("native") biodiversity and habitats—on land and in rivers—and therefore the benefits provided: e.g. can affect tree health, and therefore local air quality, flood risk and water quality, pollination ability, etc. Now over 3,000 species of non-native plant and animals established in the wild in Britain, e.g. grey squirrels and Muntjac deer. These can establish in a way that poses threats to native wildlife.	Specific tree species suffering specific diseases, (e.g. Ash die-back, Oak Processionary moth and Box moth blight) which threaten to remove entire tree species from the landscape and with it the associated specialist lichens, fungi and invertebrates. Many more tree and other diseases present and more expected, e.g. fungal diseases in Juniper. Canopy gaps affect woodland ecosystems. Ecosystems also affected by expanding range of Edible Dormice.

Pressure on the environment	Impacts	Habitats / species negatively affected
Non-native species, diseases and "pests", cont.		Water environment: - Native White-clawed Crayfish, freshwater invertebrates and fish populations affected by the invasive Signal Crayfish, now present throughout the watercourses in the area - Water Voles decimated by American Mink - Freshwater ecosystems also affected by New Zealand Pygmyweed
Policy: uncertainty, the need for mutually-reinforcing multiple policy direction and lack of resources to pursue policy goals; ability to influence	Policy uncertainty threatens managing the land sustainably for biodiversity, habitats and wildlife. For example: - Uncertainty with England's alignment of future environmental policy in England with EU - Impacts of new Environment Bill / Act, including the new Environmental Land Management System, e.g. stewardship: there has been a recent trend in landowners not renewing or taking up stewardship, or waiting until the policy uncertainty surrounding ELM is resolved. - Planning Policy changes and impacts on environmental protection and sustainable development, and the need for these policies to be mutually reinforcing - Lack of ecologists in local authorities: less equipped to identify possible impacts and factor in the natural environment into decision-making. - Resource pressure: affects ability to act, monitor and report progress	All

Impacts can also act in combination and/or cumulatively

3.30 The impacts of individual pressures on our habitats and wildlife are highlighted above. However, many of these pressures act in combination, or cumulatively, with further consequences that could be detrimental to our natural environment, the wildlife that live in it and the services it provides our communities. Actions that might be suitable to help combat them can equally be multiple, and act in combination against multiple and/or cumulative pressures.

Multiple impacts acting collectively

3.31 A non-exhaustive but illustrative list of such multiple impacts are highlighted in Table 7, below:

Table 7: Illustration of the multiple impacts acting on our biodiversity, habitats and ecosystems

Qualities of nature under threat (e.g. habitat, habitat qualities or species)	**Multiple and cumulative causes / pressures**
Loss of biodiversity	Climate change, which can exacerbate many of the other pressures and become a threat to species unable to adapt quick enough Pests, invasive species, diseases Land use change / intensification Development and infrastructure projects Changes in land management: e.g. change of use, under- or over-grazing, changes in farming practices (e.g. hedgerows and field margins) Historic river channel engineering, leading to change habitat and species composition Pollution: waste, polluted runoff, soil erosion, sound, light, noise, chemicals and particulates Habitat loss / change / fragmentation Changes in policy Disconnect between people and nature: lack of awareness can threaten protection and sensitive management
Local air quality: for plant growth and human health	Climate change Land use change / intensification Development and infrastructure projects Pests and diseases e.g. affecting tree health

Qualities of nature under threat (e.g. habitat, habitat qualities or species)	**Multiple and cumulative causes / pressures**
Loss of habitat connectivity and increased fragmentation	Land use change / intensification - Remaining habitats become fragmented/isolated from areas of similar habitat; less able to adapt to external pressures. Development and infrastructure projects - Direct and indirect impacts / loss of habitats - Insufficient buffers around development connecting habitats - Obstacles to species dispersal - Fragmentation and loss of connectivity of habitats, reduces species dispersal ability and resilience to change - Increased demand for water and increased sewerage needs Changes in land management, such as: - Habitat loss: removal of hedgerows, corners and wooded copses for larger fields - Subdivision of habitat parcel (e.g. woodland) into smaller plots – creates more isolated ecological communities increasingly isolated from each other and less resilient to e.g. climate change or pollution. E.g. sub-lotting woodland management becomes inconsistent at scale Historic river channel engineering and/or development on the floodplain leads to: - Rivers disconnected from floodplain - Drying of some habitats (e.g. wetland and reedbed, lowland wet meadows) and change in water regime for others - Change in characteristic plants and animals, such as a decline in wading birds.
Local climate: urban heat island effect	Urban hard surfaces absorb more heat – released into environment Energy released by human activity, e.g. lighting, heating, vehicles, industry Climate change likely to exacerbate this effect
Flooding risk	Development and infrastructure projects - changes to river channel structure and capacity; hard and/or impermeable surfaces increasing surface runoff Climate change likely to exacerbate frequency and intensify impacts

Qualities of nature under threat (e.g. habitat, habitat qualities or species)	**Multiple and cumulative causes / pressures**
River channels and hydrology, water quality and water-centred habitats; natural connection between river and the floodplain	Land use change / intensification - Affects connectivity of rivers with flood plain, channel structures, runoff rates, levels of pollution, water usage, non-natural erosion and deposition, loss of habitat Development and infrastructure projects (e.g. unsustainable abstraction from the chalk aquifer to low flows, poorer quality and shorter river habitats in precious chalk streams, and associated loss of river ecology and habitats) Historic river channel engineering Pollution: diffuse and non-diffuse, including eutrophication Changes in land management, including riparian management beside river channels Affects, for example, the following: - Channel structure - Sediment loads from surrounding land - Water quality - Bank stability - Channel habitats - Diversity and structure of habitats Non-native invasive species
Pollinators: bees, hoverflies, beetles, butterflies, moths, etc.	Climate change Land use change / intensification Habitat loss (e.g. hedgerow removal or under-management, loss of woodland) Habitat fragmentation Pests and diseases Non-native invasive species
Pollution: light, sound, air quality, water source, etc.	Generated by human activities, including roads, railways, airports, construction, industrial areas

Cumulative impacts–illustrative examples

3.32 Some examples of cumulative impacts of the various pressures on three particular qualities of our biodiversity and habitats (habitat connectivity, pollination and decline in pollinators, river channels and hydrology) are provided for illustration at Table 8, below:

Table 8: Illustration of the cumulative impacts acting on our biodiversity, habitats and ecosystems for different environmental qualities under pressure

Importance and impacts	Examples of cumulative pressures
Habitat connectivity	
Fragmentation is the division of a single habitat parcel into multiple smaller fragments, creating more isolated ecological communities that are increasingly disconnected from each other and less resilient to deterministic processes like climate change or events such as pollution.	**Land use changes** Land use changes (e.g. due to multiple developments and population growth or changes in land management) continue over time to further fragment our natural and semi-natural habitats. Examples include: - agricultural fields being made larger and squarer by removing hedgerows; - grassland corners and wooded copses; - and the subdivision of woodland into smaller plots, making woodland-management at scale and consistently, difficult. Changes to habitats (e.g. woodlands, hedgerows, etc) can affect, for example, the availability of pollinators, or the local air quality–not just for humans, but for wildlife, as well as habitat connectivity and overall resilience. Development Major, as well as minor, developments and infrastructure projects threaten to compound habitat fragmentation within Buckinghamshire by causing habitat loss and becoming obstacles to successful species dispersal.
Pollination and decline in pollinators	
The transfer of pollen from one flower to another is essential for plant sexual reproduction. A number of crop species (e.g. oilseed rape) rely on insect pollination (some are wind-pollinated), as do many wild plants, which in turn support a complex network of animal and plant life. Honeybees, bumblebees and solitary bees are key pollinators. The process is also carried out by hoverflies, beetles, butterflies and moths during their feeding activities.	Pests, disease, invasive species Land-use intensification Changes to habitats and habitat loss (e.g. hedgerow removal) and fragmentation Climate change

Importance and impacts	Examples of cumulative pressures
Pollination and decline in pollinators, *cont.*	
Pollinating insects face a multitude of threats and in the last 40 years, we have seen a significant decline in insect abundance (most estimates for the decline of honeybees are above 50%). The National Pollinator Strategy (DEFRA 2014) recognises the critical importance of the enhancement of urban biodiversity in supporting pollinators and sets out a strategy to address pollinator declines.[44]	
River channels and hydrology	
Multiple pressures impacting on water hydrology, flow and quality	**Population growth and development** Increased water demand and abstraction rates due to population growth and development affects river flows. In the Chilterns, unsustainable levels abstraction from the chalk aquifer leads to chronic low flows and shortening of river habitats. This is likely to lead to a decline in water quality, degradation of chalk streams, and drying up of rivers and streams, failure to reach WFD status, a loss of key landscape features and impacts on ecology and the loss of associated wildlife. Development and its location can lead to more hard surfaces which increase runoff rates Changes in land use, and river channel structure - can affect river channel structures - connectivity of rivers with their flood plain - levels of pollution and run-off rates - erosion and deposition in the wrong places - losses of habitat In riparian zones, poor understanding and maintenance, as well as the quality of vegetation management and maintenance, can affect: - habitat bank stability - the diversity and structure of habitats - availability of food and shelter for invertebrates and breeding birds - the extent to which sediments are caught before they reach water courses - soil erosion leading to poorer soils and excess sediment through drainage systems to rivers Pollution: diffuse and non-diffuse Losses or changes in management of surrounding habitats can affect channel structure and water quality

[44] National Pollinator Strategy, 2014-2024, Defra (2014); and the Implementation Plan are both available here: **www.gov.uk/government/publications/national-pollinator-strategy-2014-to-2024-implementation-plan**

Pressures, threats and specific challenges at the local scale

3.33 Alongside the generic pressures such as climate change and pests and diseases, different areas of Bucks are faced with specific localised pressures, or impacts of them, for protecting the character and biodiversity of the areas:

Milton Keynes Area and Northern Buckinghamshire

- High levels of future growth and associated increases in leisure and recreation
- Increasing demand for resources, particularly water
- Managing water resources, including impacts downstream
- Land use change
- Development and infrastructure improvements

Aylesbury Vale Area

- High development pressure, e.g. urban areas and possible infrastructure related to the Oxford-Cambridge Arc
- Associated land use change
- Possible further habitat fragmentation as a result of the expected growth

Chilterns

- **Poorer management of woodlands:**
  - Woodlands have been facing a variety of threats for many years. The decline in the furniture industry and the value of timber has meant that management of woodlands has in some instances stopped, reduced or changed. Areas which would have been managed in coppice rotation has disappeared and woodland flowers, butterflies and Hazel Dormice have declined.
  - Conifer woodlands: light management regimes has changed the type of humus accumulating and affected conditions needed for native species.
- **Ash die-back:** where Ash has grown up in gaps made by the storms of 1989 and 1991, these stands are now being devastated by Ash dieback.
- **Invasive species, and non-native invasive species:** non-native Grey squirrel, Edible Dormice and deer are well established to detriment of some native fauna and flora. Non-native species such as Signal Crayfish has spread in the area's waterways and has led to the likely local extinction of the White-clawed Crayfish. Other invasive species include Japanese Knotweed and Himalayan Balsam.
- **Reduction in livestock farming and grazing to retain grassland landscapes:** the remaining Lowland Calcareous grassland is on steep slopes with thin soils which is less suitable to agricultural intensification. These areas have been historically maintained through livestock grazing, however with a reduction of livestock farming in some areas, a succession towards scrub and then woodland takes place.

- **Over-abstraction and channel modification threaten chalk streams:** chalk streams have been subject to a range of threats in recent years. The pumping of water and over-abstraction from the chalk aquifer in combination with a changing climate has resulted in large lengths drying out with the death of fauna and flora. The presence of weirs and culverts stops the movement of species up and down stream and reduces the ability of upper reaches being recolonised.

- **Lack of buffers with development:** In more urban areas, development has often not respected the need to maintain a buffer to protect watercourses and in rural areas nitrate and phosphate levels are sometimes increased through agricultural runoff.

Thames Valley

- **Climate change:** drier summers and increasing temperatures could lead to deterioration in the area's semi-natural wetland habitats, including ancient wet meadows and could also lead to lower river flows and increased demand for water resources; the area's woodlands, particularly its highly characteristic and ecologically important veteran trees may be affected by increased storminess, periods of drought and the prevalence of pests and diseases, with the loss of shallow-rooting Beech and previously-pollarded ancient trees to wind and drought-stress.

- **Development pressures:** including major roads, lighting and signage, expansion of urban areas and airport development, much unrelated to the surrounding area and contributing to the overall fragmentation of the landscape and threats via declines in air quality and pollution.

- **Incipient pressure from non-farming use of small-sized holdings:** notably horse grazing and land held for "hope value". Also pressure from recreational uses, particularly golf course development, often at the expense of commons and heathland.

- **Designed parkland features at risk from changing agricultural activities, development pressure and lack of management for individual trees.**

- **Fly-tipping, casual illegal use such as motorbike scrambling and incursion by travellers are common.**

Chapter 4. Biodiversity Action Plans

for Buckinghamshire & Milton Keynes

Wildflower boundary. Photo: Julia Carey, courtesy of BMERC.

Chapter Summary

To reverse biodiversity and habitat loss and work towards the area's nature recovery network, the NEP's BAP "Forward to 2030 "aims to provide more, bigger, better and more joined habitats across the area to improve resilience to pressures on the environment and species through a combination of working towards the Priority habitat creation targets, protecting, restoring, creating and enhancing other habitats, designing biodiversity and GI into development, encouraging and providing support for more, wilder and accessible local green spaces and more sustainable land management across the area – with a focus on BOAs, buffers and linkages.

This Biodiversity Action Plan sets collaboratively-agreed, expert-led targets and actions at two spatial scales, to meet the objectives set out at Chapter 1 (page 17) that should be taken forward improve biodiversity:

i. **Those applicable across the whole Buckinghamshire and Milton Keynes area (area-wide actions):** to protect, enhance and connect landscapes and habitats, encourage larger-scale, more joined-up and more sensitive land management and better incorporation of biodiversity into development; and

ii. **Those applicable to specific national character areas:** based on the individual characteristics, opportunities and threats within each national character area within the Buckinghamshire and Milton Keynes area. Here, the area-wide actions also apply.

Action Plans to meet each of the BAP's objectives are set out at each scale below, along with specific examples of how to deliver them.

While the focus of the BAP is on action to be taken for habitats, as a proxy for species, **a note on species-specific work** is included at the end of the chapter.

Introduction

4.1 Our nature around us is precious, and provides benefits to all, but is under threat from multiple and cumulative sources – and therefore deserves proper attention and acknowledgement in decision-making, such as planning and funding decisions, so we can work to conserve it appropriately and enhance it, and safeguard the benefits that nature provides for our collective futures.

4.2 To aid the ability of habitats and species to cope with climate change and other pressures, actions are needed to both reduce the risk of biodiversity loss and to provide opportunities for biodiversity to adapt to changing circumstances.

4.3 To reverse biodiversity and habitat loss and work towards the area's nature recovery network, the NEP's BAP "Forward to 2030 "aims to provide more, bigger, better and more joined habitats across the area to improve resilience to pressures on the environment and species through a combination of working towards the Priority habitat creation targets, protecting, restoring, creating and enhancing other habitats, designing biodiversity and green infrastructure into development, encouraging and providing support for more, wilder and accessible local green spaces and more sustainable land management across the area – with a focus on BOAs, buffers and linkages.

4.4 This is not the first Biodiversity Action Plan for the area, as illustrated in Figure 3, below. This sets out the development of both national (in blue) and local (in green) BAPs, including reference to the Rio Earth Summit in 1992, through to forthcoming Local Nature Recovery Strategies noted in the Environment Bill (soon to become the Environment Act).

4.5 **This Biodiversity Action Plan sets collaboratively-agreed, expert-led targets and actions at two spatial scales, to meet the objectives set out at Chapter 1 (page 17) that should be taken forward improve biodiversity:**

i **Those applicable across the whole Buckinghamshire and Milton Keynes area (area-wide actions):** to protect, enhance and connect landscapes and habitats, encourage larger-scale, more joined-up and more sensitive land management and better incorporation of biodiversity into development; and

ii **Those applicable to specific national character areas:** based on the individual characteristics, opportunities and threats within each national character area within the Buckinghamshire and Milton Keynes area. Here, the area-wide actions also apply.[45]

4.6 **In setting out the actions to be taken to meet the objectives, the BAP also serves to:**

i **Identify appropriate responses** to the multiple challenges faced by biodiversity

ii Set out a framework for working together to explore, identify and deliver appropriate area-wide actions and NCA-based actions identified in the Plan;

iii **Coordinate agreed priorities, targets and efforts** to improve biodiversity;

iv **Look for efficiencies and collaborative opportunities** to deliver biodiversity improvements on the ground;

v Focus on delivery through specific organisational c**ommitment to an ongoing working group to share practice, identify priorities and join-up working** towards achieving the aim, objectives and upholding the principles in delivery as set out in this BAP (see the Statement of Commitment, page 2) and to review progress;

vi Act as a reference for funding bids that support the aim, objectives and principles of the BAP, or contribute towards the actions identified.

[45] See Chapter 2: Context.

Figure 3: National and local Biodiversity Action Plans–policy development timeline

1992 UK Government signed the Convention on Biodiversity at the Earth Summit in Rio. This was an agreement between countries about how to protect the diversity of species and habitats in the world. Virtually all the world leaders signed up to this Convention which required the drawing up of a National Action Plan.

1993 In December, Buckinghamshire County Council, in consultation with 60 organisations produced a Nature Conservation Strategy for Buckinghamshire.

1994 The UK's first Action Plan was published in January, with the expectation that regional and local Biodiversity Action Plans (BAPs) would be produced.

Buckinghamshire Nature Conservation Forum (BNCF) which was established.

One of the policies within the Bucks Nature Conservation Strategy was to deliver effective communication and collaboration between all organisations involved in nature conservation. One of the main ways of delivering the Nature Conservation Strategy for Buckinghamshire.

1997 A BAP Working Group was set up under the BNCF to further the production of the county BAP.

2006 Buckinghamshire & Milton Keynes Biodiversity Partnership was formed. This enabled the creation of the post of Biodiversity Project Officer to take forward the delivery of the BAP.

In 2006/7 the Habitat Action Plan (HAP) targets were reviewed and revised in consultation with the organisations that had been involved in the BNCF along with other relevant partner organisations.

2011 The UK Government produced Biodiversity 2020: a strategy for England's wildlife and ecosystem services, its new strategy for biodiversity in England, which followed EU Member State endorsement of the 2011 EU Biodiversity Strategy. Biodiversity 2020 also built on The Natural Choice white paper of 2011, which shifted the emphasis from piecemeal conservation action towards a more integrated landscape-scape approach.

Biodiversity 2020 replaced the previous Biodiversity Action Plan (BAP) led approach. Priority habitats and species are identified in Biodiversity 2020, but references to BAP priority habitats and species, and previous national targets were removed. More information about Biodiversity 2020 is **available here.**

2013 The NEP was formed for Buckinghamshire and Milton Keynes as the area's Local Nature Partnership (LNP). The NEP took on the brief of the Buckinghamshire & Milton Keynes Biodiversity Partnership. In December 2013, a BAP Task and Finish group was established under the authority of the NEP, to revisit BAP work in the county and produce a way forward in line with local aspirations and national targets.

2020-1 The NEP's own BAP, *Forward to 2020*, is reviewed, revised and its scope extended, reflecting that Biodiversity Action Plans remain a useful source of guidance and information, and an opportunity for NEP Partners to identify collaboratively the priorities for landscape-wide action, for habitats alongside priority habitats, the agreed spatial approach and priority actions – both for the whole area as well as for landscape areas within it. The *Forward to 2030 BAP* is likely to inform forthcoming anticipated policies at the time of writing, including the Local Nature Recovery Strategies, the approach to locating offsets resulting from biodiversity net gains, ELM and other initiatives resulting from national policy or local developments in trying to locate biodiversity improvements where they are needed and will have the most effect.

4.7 As a proxy for species, the NEP's BAP 2030 aims to retain, enhance and improve habitats (both priority habitats and other habitats) and to buffer and link them to improve wildlife's resilience to external pressures. At the area-wide scale, we also look to increase the amount of land in positive management for wildlife and use nature-based solutions to reduce resource-use, improve biodiversity and adapt to climate change.

4.8 For biodiversity in Buckinghamshire to be supported sustainably, its needs must be meaningfully integrated into land management beyond protected sites and sites managed for wildlife. It is no longer sufficient to rely upon small, fragmented and disconnected wildlife-rich sites such as protected sites and nature reserves.

4.9 For example, at the Oxford to Cambridge Growth Arc Scale, the NEP is one of a number of Local Nature Partnerships calling for a "doubling of nature", i.e. a doubling of the land positively managed for wildlife and using nature-based solutions, and the NEP's BAP supports this objective.

Area-wide action plans to achieve the BAP Aims and Objectives across Buckinghamshire and Milton Keynes

More and bigger

1. ACTION PLAN TO:

Retain, enhance, expand and create priority habitats everywhere – with a focus on BOAs and strategically-identified areas

ACTION	EXAMPLES OF HOW TO DELIVER
Create or enhance priority habitat so as to increase the area of each priority habitat within Buckinghamshire and Milton Keynes per Table 1, page 21	**Work in Partnership to achieve the priority habitat targets** – improvement, creation and linkage of priority habitats across Buckinghamshire and Milton Keynes, **with a geographical focus in the BOAs and priority water catchments**
Seek stronger protection for priority habitats ...	... through planning and financial support for strategic management and creation. Increase investment in identifying and managing (using best-practice guidelines) Local Wildlife Sites, SSSIs and Nature Reserves.

2. ACTION PLAN TO:

Increase the overall land area of wildlife-important habitats and of land positively managed for wildlife and high nature value habitats…[46]

… both via designated nature conservation sites (expansion of existing sites and creation of new ones) and elsewhere; to achieve at least a doubling of nature," land in positive management for wildlife, by 2030.

ACTION	EXAMPLES OF HOW TO DELIVER
Promote the uptake of land management schemes so that more hectares are in positive management for wildlife	Such as: - Natural England's Environmental Land Management Scheme - Forestry Commission's Woodland Grant Scheme Awareness-raising of good land management practices and impacts/consequences of poor land management and impacts on watercourses.
Promote and support landowner and farmer-led initiatives	Initiatives that: - prioritise nature - deliver wildlife conservation, aquifer and groundwater recharge, soil health and carbon storage at a landscape/catchment scale - include landowner/farmer and land manager collaborations - improve access to support to help farmers and landowners lead the way with restoring and enhancing wildlife habitats - encourage uptake of agri-environment schemes / land management for nature schemes - are soil-sensitive - promote sensitive resource use (e.g. water – flood attenuation and water quality measures: such as building up the organic content of damaged soils, cross-slope woody vegetation, attenuation features such as field corner storage ponds, establish riparian buffers, use cover crops, reduce cattle poaching of river banks, vegetation/planting schemes in upper catchment areas as part of natural flood management to "slow the flow", etc) - follow pollution-prevention guidance The NEP could provide a sign-posting service to farmers and landowners through its website to encourage and enable those in search of advice to find it where it is available, e.g. to best practice such as those listed at Action Plan 1, above).

[46] This is in the context of the collective Local Nature Partnerships' ambition for the Growth Arc, which calls for a "doubling of nature," available here: **bucksmknep.co.uk/projects/doubling-nature/**; and which has become one of the agreed Environmental Principles (Principle 2a) of the OxCam Growth Arc, available here: **www.semlep.com/modules/downloads/download.php?file_name=2306**

2. ACTION PLAN TO:

Increase the overall land area of wildlife-important habitats and of land positively managed for wildlife and high nature value habitats…

… both via designated nature conservation sites (expansion of existing sites and creation of new ones) and elsewhere; to achieve at least a doubling of nature," land in positive management for wildlife, by 2030.

ACTION	EXAMPLES OF HOW TO DELIVER
Restore, enhance, expand or create, and manage, habitats, such as: - Species-rich grassland (including wet grassland) - Native, semi-natural woodland - Scrub and edge habitats and scrubby grassland (e.g. road verges, hedgerows for nesting birds and invertebrates) – improve habitats for pollinators, link for species movement and create new such habitats - Wildflower-rich meadows and wildflower verges	Wildlife habitats can be created anywhere, but there should be a focus on creating them in areas where they best contribute to nature's recovery, including in strategic areas for nature conservation, at a landscape scale, and to achieve multiple benefits for nature and the environment. Work in partnership with the NEP to deliver these objectives, e.g. to identify: - Appropriate areas of land - Funding via e.g. biodiversity net gain, ELM, other - Management and monitoring plans to improve condition, create, connect habitats Seek to boost connectivity (see objective 5) Ensure more sites achieve the Lawton principles of "better, bigger and more connected" – so that species can move and adapt more easily to external pressures including climate change. Many examples of measures and actions include: - Hedgerows: more, improved and managed - Secure long-term protection and management of existing heathland and grassland areas to improve quality, connectivity and resilience; and plan and manage new grassland and heathland areas - Many of the other Action Plans apply here too
Manage public open space to be 10% more wild by 2030	Aim for all public green space to have at least 10% of the area set aside for wildlife; for example, as an area of wildflower meadow, a pond, or a native woodland. Planting for carbon sequestration, e.g. broadleaved woodland
Increase investment in identifying, creating, expanding, extending and managing the area of core and high quality biodiversity sites, including: Local Wildlife Sites, Sites of Special Scientific Interest, Nature Reserves	Work with partners to ensure: - SSSIs managed to be in favourable condition - Survey LWSs - Offer management advice

Better

3. ACTION PLAN TO: **Enhance existing habitats and improve habitat condition**	
ACTION	**EXAMPLES OF HOW TO DELIVER**
Follow best practice for wildlife on farmland to improve biodiversity	e.g. soil management (contour-ploughing, no tillage, following NFU guidelines, reduce pollution, farming near watercourses, showcase case-studies). Examples of guidelines: - **RSPB techniques to help wildlife** - Campaign for the Farmed Environment: **Conservation management advice for your arable business** - Various links from the **Nature Friendly Farming Network** - Guidance and case studies from the **NFU Environment Forum** - **Agricology**; - **Buglife Farming Hub** - **BugLife Habitat Hub** - Habitat-specific practical conservation guidance from Defra related to Land Management: **Sustainable Farming Incentive pilot: summary of advice** Species-rich grassland maintenance: guidance **Using grazing to keep habitats in good condition for wildlife** **Maintaining dead wood to benefit wildlife** **Managing scrub and scrub mosaics for wildlife**
Support catchment-based principles and management plans for improving water quality and flows; good riparian management	e.g. catchment-sensitive land soil-sensitive land management and well-connected riparian habitat management to buffer water courses from intensive land-use and connect habitats at a landscape scale; consider appropriateness of valley slope land management mowing timing and sensitivity; and the timing and intensity of grazing. Restoration and creation of good quality and well-connected riparian habitat, sustainably managed in the long-term, to buffer watercourses from intensive land-use and provide connectivity at a landscape scale; management plans for improving water quality and flows. See guidance, for example - **The Rivers Trust Pinpoint project** - **Environment Agency toolbox** for examples of Natural Flood Management in action

3. ACTION PLAN TO: **Enhance existing habitats and improve habitat condition**	
ACTION	**EXAMPLES OF HOW TO DELIVER**
Engage the public in managing land for wildlife (particularly in urban areas)	For example, via community groups, parish councils or educational events and their positive promotion (see also Action Plan 6). - Awareness-raising of good land management practices and impacts / consequences of poor land management - Voluntary programmes, e.g. management and monitoring of tree health The NEP can champion positive individual behaviours which will help support, or at least reduce harm, to the prospects of our biodiversity. Many impacts upon our biodiversity are caused by mechanisms and collective decisions which are far removed from the effect. For example: - changes in demand from consumers towards organic produce, will have a direct positive impact on water quality by reducing the phosphate levels in our water courses. - Public perceptions about key biodiversity issues (e.g. the need to control deer) can be positively challenged by the NEP through its communication channels and its champions on the NEP Board and Delivery groups. - The NEP can act as a reference point to help anyone achieve effective and sustainable results within the context of Biodiversity Opportunity Areas and our BAP targets. The NEP could reward the positive actions by individuals, groups and organisations through specific projects (for example, Bucks Buzzing), celebrations and awards.
Engage other sectors in caring for biodiversity	For example, businesses could be encouraged to participate via: - sponsorship of a habitat or species / targeted land management, such as creating orchards which could help a bespoke business and or public amenity space. - funding a conservation project - creating and managing wildlife areas on their land - taking part at grass roots level, through voluntary conservation work.

3. ACTION PLAN TO: **Enhance existing habitats and improve habitat condition**	
ACTION	**EXAMPLES OF HOW TO DELIVER**

Engage other sectors in caring for biodiversity, *cont.*	- Considering the effects of its activities on biodiversity, perhaps by undertaking an environmental audit, seeking to reduce any harmful impacts and encourage and funding sustainable practices. Simple activities like recycling all the office paper, using recycled products where possible, efficient energy use and wise-use of water will make a difference by reducing pressure on the environment and could save a business money.
	  - sponsoring targeted land management that would help a specific habitat or species, e.g. creating orchards which could help a bespoke business and/ or public amenity space.
	  - funding a conservation project
	  - creating and managing wildlife areas on their land
	  - taking part at grass roots level, through voluntary conservation work
	
	The NEP could support the channelling of corporate responsibility programmes into helping community groups or environmental sustainable start-up businesses; or encourage a "payment for ecosystems services" approach, whereby private companies contribute towards good land management to sustain the ecosystem services their company or production relies on, or which support risk reduction, for example, from flooding or climate change.
	
	In respect of the health sector:
	- green prescribing (provides conservation and related activities for GPs to "prescribe" to patients who would benefit for their mental and/or physical health and wellbeing)
	- through direct land management and provision of a natural health recovery resource and support a wide range of plants and animals
	- improve access to conservation volunteering opportunities
	- audience-targeting: use trusted sources in new communities to build contacts and networks to attract volunteers into conservation
	
	In education:
	- biodiversity and habitats provide a great learning resource to help educate new generations to care for their environment
	- raise awareness of pollution prevention guidance for industrial estates

3. ACTION PLAN TO: **Enhance existing habitats and improve habitat condition**	
ACTION	**EXAMPLES OF HOW TO DELIVER**
Facilitate Natural Flood Management Schemes in the areas shown in Figure 4 (page 95)	Natural Flood management: reinstate natural processes to reduce downstream flood risk and "slow the flow" – retain water in upper catchments for as long as possible. Re-naturalise river channels and water-centred habitats; to reconnect rivers to their floodplains, for example via: - Better management of vegetation in upper catchments; increase vegetation in upper catchments to help "slow the flow" - Plant natural vegetation in urban areas: reduces impermeable sealed surfaces - Water conservation measures - SUDs - Buffer-zones to watercourses - Soil-sensitive land management Restoration of river channels and removal of barriers to fish migration; reconnection of rivers with floodplains. Management plans for improving water quality and flows, e.g. improving low flows or ensuring high / increased flows where appropriate
Incorporate well-designed green infrastructure in both existing and within new development	**Work towards achieving the NEP's *Vision and principles for the Improvement of Green Infrastructure across Buckinghamshire and Milton Keynes***[47] (which includes "blue" infrastructure), striving to provide, connect, improve and protect green infrastructure assets for their many benefits into the long-term. (See also Action Plan 7, incorporating biodiversity into development.) Better and more sustainable management of existing areas of benefit to pollinators and insects. E.g. manage verges for wildlife; create and maintain vegetation for pollinators: field verges, road verges, etc - e.g. Plantlife (2019) **Managing grassland road verges – a best practice guide** Long-term and appropriate management secured for trees and woodlands, e.g. - Wildlife Trusts, **How to manage a woodland for wildlife** - Woodland Trust, **How to care for your trees** - Forestry Commission and Natural England (2018), **Manage and protect woodland trees**

[47] NEP, *Vision and Principles for the Improvement of Green Infrastructure in Buckinghamshire and Milton Keynes* (2016), available here: **bucksmknep.co.uk/projects/vision-and-principles-for-the-improvement-of-green-infrastructure**. See also the NEP's accompanying Green Infrastructure Opportunities mapping, available here: **bucksmknep.co.uk/projects/gi-opportunities-mapping**.

3. ACTION PLAN TO: **Enhance existing habitats and improve habitat condition**	
ACTION	**EXAMPLES OF HOW TO DELIVER**
Incorporate well-designed green infrastructure in both existing and within new development, *cont.*	Planting of vegetation buffers to improve air quality, e.g. close to main roads and other pollution sources (urban woodlands, street trees, etc.) See, for example: - Forestry Commission and Natural England advice (updated 2018): Ancient woodland, ancient trees and veteran trees: protecting them from development - Woodland Trust guidelines (2019) requiring a semi-natural buffer of a minimum of 50m for ancient woodland Planners manual for ancient woodland **Urban greening** (see also Action Plan 7): NEP to work with partners for more, wilder and connected habitats in our built-up areas to improve biodiversity at the same time as providing other benefits, such as improved air quality, water flow, access and recreation opportunities and improved health and wellbeing for those who live and work there. Support use of best practice standards for incorporating biodiversity and connected green infrastructure in development. See for example: - NEP best practice document: **incorporating Biodiversity and Green Infrastructure into Development** - **BBOWT Biodiversity and Planning in Buckinghamshire** document - Natural England: guidance on planning and the natural environment available here: **www.gov.uk/guidance/natural-environment** - RTPI: **Biodiversity in Planning** (obligations and opportunities) (2019) Build requirements into Local Planning and related policies, e.g. direct development into areas of lowest biodiversity opportunities so as not to compromise the objectives of a Local Nature Recovery Strategy and to assist with incorporating features as set out in Action Plan 7.

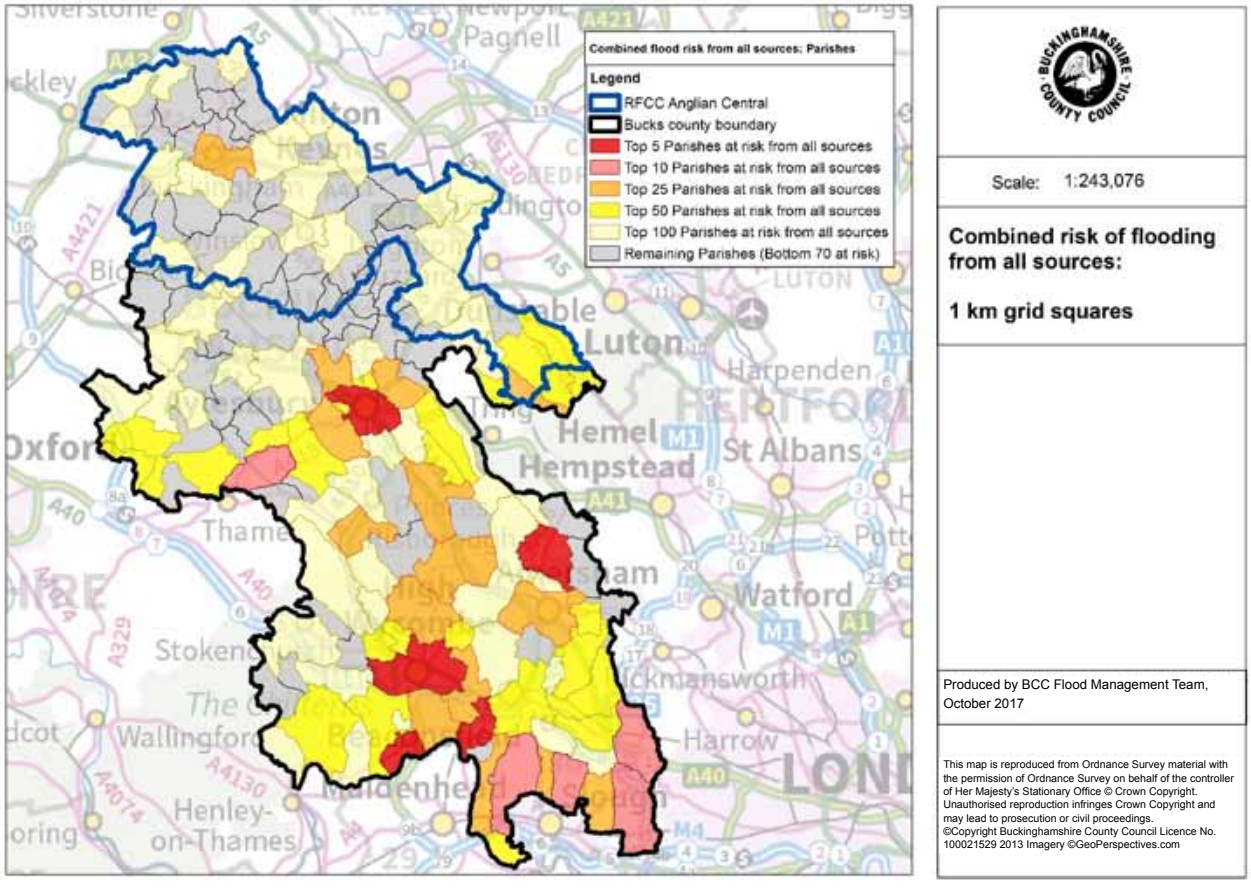
Figure 4: Opportunities for Natural Flood Management (NFM)

Areas already being explored or implemented for NFM

- River Leck catchment
- Catchments upstream of the EWR line from Calvert across to Milton Keynes (Great Ouse catchment) and around Waddesdon and Oving (Thame catchment)
- Catchments to the west of Buckingham (Great Ouse catchment)
- Sub-catchment upstream of Buckingham: RTCT NFM Project

Potential locations for NFM and river restoration

- North of Chesham along Vale Road
- Upstream of Great Missenden: Rignall road and to the west of Great Missenden town centre
- High Wycombe: dry catchments to the north of Sands and to the west of Coates Lane, Hughenden.
- Upstream of Fulmer (Alderbourne catchment)
- Streams and catchments upstream of Haddenham and Long Crendon (Thame catchment)
- Newt Ditch through Spade Oak area between Marlow and Bourne End



4. ACTION PLAN TO: **Create and manage buffers around existing and new areas of priority habitat and other core and high quality biodiversity and habitat sites following best practice guidelines…** *…to improve resilience and enhance the visual characteristics of the landscape.*	
ACTION	**EXAMPLES OF HOW TO DELIVER**
Create and manage buffers/ improve land surrounding existing and new areas of priority habitat as well as around other core and high quality biodiversity and habitat sites	Follow best-practice guidelines, e.g. - Forestry Commission and Natural England advice (updated 2018): **Ancient woodland, ancient trees and veteran trees: protecting them from development** - Woodland Trust guidelines (2019) requiring a semi-natural buffer of a minimum of 50m for ancient woodland: **Planners manual for ancient woodland** Ensure buffers are sufficient to keep habitats and species connected.

More joined-up

5. ACTION PLAN TO: **Connect quality habitats across the landscape to enable species movement across larger areas to improve habitat and species resilience to external pressures, with a focus on connectivity within and between BOAs as well as into the wider landscape.** *Actions are needed to both reduce the risk of biodiversity loss and provide opportunities for biodiversity to migrate and adapt to changing circumstances e.g. climate change. Improved connectivity can provide important re-connected habitats for a range of specialist species and they can also provide natural buffers to flood events which erode soils, lower water quality, flood our homes and damage our economy.*	
ACTION	**EXAMPLES OF HOW TO DELIVER**
Improve habitat connectivity within and between the Biodiversity Opportunity Areas (Map 10)	**Creation of large, more joined up habitat networks,** through protecting, enhancing and reconnecting surviving pockets of habitat and working at landscape scale. Can include continuous linkages or stepping stones.
Ensure new habitats improve landscape connectivity	Seek habitat linkages when creating new habitats New habitat or enhancement projects should be prioritised to areas which will improve connectivity within the Nature Recovery Network to best direct resources. Consider future-proofing plant / species choices for anticipated climate change Restoration and management of native **hedgerows and hedgerow trees** to enhance connectivity

5. ACTION PLAN TO:

Connect quality habitats across the landscape to enable species movement across larger areas to improve habitat and species resilience to external pressures, with a focus on connectivity within and between BOAs as well as into the wider landscape.

Actions are needed to both reduce the risk of biodiversity loss and provide opportunities for biodiversity to migrate and adapt to changing circumstances e.g. climate change. Improved connectivity can provide important re-connected habitats for a range of specialist species and they can also provide natural buffers to flood events which erode soils, lower water quality, flood our homes and damage our economy.

ACTION	EXAMPLES OF HOW TO DELIVER
Create habitat mosaics of good quality, diverse habitats throughout the landscape to enhance connectivity for a range of species	Including planning for their long-term management
Promote cooperative land management across wider areas to support larger and better-integrated resources for wildlife and a sense of connectivity	Promote and raise awareness of cooperative management across wider areas to support larger and better-integrated resources for wildlife and a sense of connectivity: e.g. through provision of resources for biodiversity, support for landowners and managers, woodland management area-wide across multiple landowners to avoid fragmentation; access to integrated support and resources is needed Farmer clusters to improve nature provision on farms and more sustainable land management practices: includes encouraging larger-scale, more joined-up and more sensitive land management; provide support and inspiration for farmers to lead the way to restore and enhance wildlife habitats and positively manage for wildlife and adaptation to climate change, leading nature's recovery Recognise and promote good practice Working with farmers, landowners and local authorities to encourage educational initiatives (such as open farms, improved access and interpretation) that promote engagement with the local environment and develop cultural identity and awareness
Work with neighbouring authorities or organisations to link habitats across the borders and work at the landscape-scale towards a cohesive ecological network	Link habitats and action planning across administrative borders

6. ACTION PLAN TO:

Improve people's connectedness with nature – so that communities across Buckinghamshire and Milton Keynes value and understand the role of nature in mental and physical wellbeing.

Also to increase and improve accessibility of nature-rich species, while maintaining and enhancing their biodiversity value.

ACTION	EXAMPLES OF HOW TO DELIVER
Work towards achieving the NEP's *Vision and Principles for the Improvement of Green Infrastructure across Buckinghamshire and Milton Keynes*, which aims to provide, connect, improve and protect GI assets, including blue infrastructure, and their benefits, into the long-term	Work to increase and improve accessibility of nature-rich species, while maintaining and enhancing their biodiversity value (with wider benefits, e.g. to air quality, pollinators, climate change, water use and quality, etc), e.g. - Better access to greenspace (physical and cultural) and nature on the doorstep - Raise awareness of the importance of the environment to health and wellbeing - Retrospective planting in built areas - Create more, wilder, local green spaces - Community projects: orchards, gardens, managing community trees, pollinator-friendly gardening, wilder edge habitats (e.g. field margins, road verges, wilder areas in parks and gardens, etc) Ensure Natural England's Access to Natural Greenspace standards, and (once available) Green Infrastructure Standards, are maximised for existing housing and delivered for future developments. See Natural England (2010) **"Nature Nearby" – Accessible Natural Greenspace Guidance**
Engage the public in managing land for wildlife, e.g. gardens and community spaces	**To raise awareness of, and strengthen the connection of people to, the local and wider environment:** Raise awareness and understanding of broader benefits of environmental management, e.g. air quality, climate change, pollinator provision, water, etc.; also of the impacts/consequences of poor land management Engage the whole community to increase knowledge and participation. Needs coordination of the various stakeholders, including planners, ecologists, wildlife charities and community groups. Through the various activities, initiatives and projects, where appropriate, support and encourage recreation, access to and engagement with nature.

6. ACTION PLAN TO:

Improve people's connectedness with nature – so that communities across Buckinghamshire and Milton Keynes value and understand the role of nature in mental and physical wellbeing.

Also to increase and improve accessibility of nature-rich species, while maintaining and enhancing their biodiversity value.

ACTION	EXAMPLES OF HOW TO DELIVER
Engage the public in managing land for wildlife, *cont.*	Possible areas of collaboration include: - Improve availability of conservation volunteering opportunities and projects, e.g. involvement of communities in better monitoring and management of existing local green spaces for access and wildlife, or tree health, etc. - Create more, wilder accessible local green spaces - Green prescribing for health and wellbeing - Audience-targeting: use trusted sources in new communities to build contacts and networks. - Encourage behavioural change: use of resources (e.g. water), planting for shade, sequestration as well as biodiversity, etc. - Local "Friends of…" groups and parish councils can be encouraged to take more ownership of green spaces by learning more about site management plans. - Encourage younger participation - Positively promote information and projects encouraging careful resources usage - Support community initiatives to encourage better understanding, appreciation and valuing of local green spaces and wildlife; and actions to create wilder local spaces - Support the need for access every day to wildlife (e.g. Access to Natural Greenspace Targets, ANGSt[48] principles) to enhance mental and physical health and wellbeing with local, accessible nature on the doorstep

[48] ANGSt was developed in the early 1990s and was based on research into minimum distances people would travel to the natural environment. Natural England reviewed the standard in 2008 and concluded that it was still useful but that further guidance was required to explain how it should be applied. The 2010 **Nature Nearby** report provides this additional clarity and recommends that everyone should have accessible natural greenspace of varying sizes at varying distances from where they live. Using the ANGSt standard in assessment and planning for provision aims to improve access to greenspaces, improve the "naturalness" of greenspaces and improve the connectivity of greenspaces. Taken from, and for more information, see: Accessible Natural Greenspace Standards (ANGSt), Natural England: **webarchive.nationalarchives.gov.uk/20140605111422/http://www.naturalengland.org.uk/regions/east_of_england/ourwork/gi/accessiblenaturalgreenspacestandardangst.aspx**

6. ACTION PLAN TO:

Improve people's connectedness with nature – so that communities across Buckinghamshire and Milton Keynes value and understand the role of nature in mental and physical wellbeing.

Also to increase and improve accessibility of nature-rich species, while maintaining and enhancing their biodiversity value.

ACTION	EXAMPLES OF HOW TO DELIVER
Use nature-based solutions to support wildlife and adaptation to climate change, i.e. to reduce resource-use, reduce the risk of biodiversity loss as a result of climate change, and **to provide opportunities for biodiversity to adapt to changing circumstances**	Integrate biodiversity and green infrastructure features into new development. Natural flood management. Wetland management for water purification. Street and urban trees for cooling and shade for people. Encourage sensitive soil management to limit loss and degradation, chemical particulate runoff and loss of underpinning soil biota. More sympathetic management – more driven and led by natural processes. Reduce runoff from hard surfaces (See Figure 4: Opportunities for Natural Flood Management, page 95). Retain and manage urban trees and extend fringe woodlands and natural areas of greenspace into urban areas (benefits for carbon storage, air quality, noise regulation and water quality and flood attenuation as well as for access and recreation, health and wellbeing). Ensure more sites achieve the Lawton principles of "better, bigger and more connected" so that species can move and adapt more easily to external pressures including climate change. Develop further adaptation plans to tackle the risks climate change brings (see Natural England and RSPB, 2014. Climate Change Adaptation Manual). For example, areas of cooler/shadier/drier/damper habitat, such as north-facing slopes, could be created within habitats, to give species places to survive as they learn to adapt. These are sometimes called "microclimatic refugia."

7. ACTION PLAN TO: **Ensure biodiversity is a key factor in the design of the urban environment and of new developments.** *(See also "Urban Greening" in Action Plan 3.)*	
ACTION	**EXAMPLES OF HOW TO DELIVER**
Maintain existing green spaces and create new, connected green spaces as part of new development schemes which incorporate features for biodiversity – with broader benefits, e.g. future-proofing for climate change impacts	Follow good practice in design of new developments[49] to: - Direct development to areas of lowest biodiversity interest and potential - Incorporate biodiversity and green infrastructure features and buffers into development: provide more local and connected green spaces, including protecting and restoring existing habitats, providing street trees, hedgerows and appropriate cutting regimes for species-rich road verges - Secure ongoing and long-term management - Take cues from existing wildlife, habitats and landscape, e.g. maintain and enhance ponds and hedgerows; conserve veteran trees, hedgerows and woods; seek habitat linkages when creating new habitats - Target sources of e.g. noise, air and light pollution: line streets with vegetation (e.g. wilder verges, trees); careful lighting planning (e.g. timers, sensors, type and positioning of lighting); planning where air pollution levels are high - Design to factor in the need to reduce surface water runoff, protect and restore habitats, improve river and groundwater quality, e.g. widespread uses of SUDs, water conservation measures - Protect existing green spaces; create new, and wilder, greenspaces, seeking linkages and secure long-term management - Ensure a diversity of new trees are planted and the correct species for the location is chosen; e.g urban woodland can assist with local air and noise quality - Connect green infrastructure and link development to natural recreation areas; provide high-quality greenspace on-site, accessible where possible and as natural as possible - Provide multiple benefits, e.g. reduce noise and air pollution, buffer noise, reduce the impact of urban fringe development, benefit climate regulation, reduce soil erosion, improve water quality, enhance perceptions of tranquillity and reduce flooding issues, reduce pollution and improve air quality: e.g. design-into development vegetation buffers and urban woodland

[49] For example, see the NEP's recent work and good practice document related to development Incorporating Biodiversity and Green Infrastructure into Development (NEP), especially slides 8-9. Available here: **bucksmknep.co.uk/projects/best-practice**. This advocates the use of existing features to guide the design of new development; and for features to be incorporated at all scales from plot to street to development scales and beyond: for example, hedgehog holes, swift bricks, bird boxes, bat bricks or boxes, fruit trees, boundary treatments to allow movement of wildlife, street trees, pocket parks, grassland road verges, butterfly boulevards, wildlife-rich green infrastructure networks; and include "non-intervention" green space.

7. ACTION PLAN TO: **Ensure biodiversity is a key factor in the design of the urban environment and of new developments.** *(See also "Urban Greening" in Action Plan 3.)*	
ACTION	**EXAMPLES OF HOW TO DELIVER**

Maintain existing green spaces and create new, connected green spaces as part of new development *cont.*	- Create areas of cooler, shadier, drier, damper habitat created within habitats
	- Consider different and future-proof planting mixes
	- Extend woodland into urban areas where possible;
	- Install water features and tree planting close to/within built-up areas to:
	  - reduce noise pollution
	  - absorb particulates to improve air quality,
	  - provide shade
	  - reduce water surface runoff and improve river water quality
	  - adapt to climate change and its risks
	- Engage the community (see also Action Plan 6)
	- Provide more, and wilder, nature-rich local green spaces
	- Increase nature-rich greenspaces in the places and communities where it is most lacking
	- Incorporate more permeable surfaces
	- Secure long-term management
	- Widespread adoption of SUDs and more permeable surfaces to slow runoff
	
	Ensure Natural England's Access to Natural Greenspace standards, and (once available) Green Infrastructure Standards, are maximised for existing housing and delivered for future developments
	
	Vegetation cover built into existing and new urban and major road design close to sources to screen and reduce effects of pollution, especially dense mix of woodland, trees and scrub: any vegetation is more effective than artificial sealed surfaces

Ensure that spatial planning and design for urban development and infrastructure aim to reduce surface water run-off, protect and restore habitats, improve the quality of rivers and groundwater, and so protect drinking water supplies	Ensure development only takes place where and when there are: - adequate and sustainable water supplies- adequate facility for treatment of waste water - adequate capacity for watercourses to receive effluent without ecological deterioration E.g. through the use of - sustainable urban drainage systems to reduce flood risk - water conservation measures to support, using vegetation - water resources and manage demand

Action Plans Specific to National Character Area zones to achieve the BAP aims and objectives

4.10 Alongside the area-wide actions, we have identified below more locally-specific actions also needed, within four zones across Buckinghamshire and Milton Keynes, grouping together National Character Areas, based on a summary of that area's biodiversity and wildlife and the challenges faced. This ensures that the BAP is locally-applicable and that actions can be tailored to specific needs and threats. (For pressures faced by the particular NCA areas, see also Chapter 3.33, page 81).

Milton Keynes & North Bucks NCAs[50]		
ACTION	**EXAMPLES OF HOW TO DELIVER**	**ACHIEVES OBJECTIVE No.**
1. Promote sustainable and water-friendly agricultural practices *Aim is to maintain and manage a sustainable and productive claylands arable landscape, while managing, expanding and linking woodlands, hedgerows and other semi-natural habitats to benefit biodiversity, improve soil and water quality, and ameliorate climate change by promoting good agricultural practice.*	This is likely to include: - working with local farmers, landowners and managers to promote best practice - including reducing herbicide and pesticide use to minimise runoff containing chemicals, buffering field margins, woodland edges and water courses, linking areas of semi-natural habitat, reducing soil compaction, managing vegetation to bind the soil, using local water sources sustainably and improve water quality for aquatic biodiversity, and managing soils to keep them on the field and to sequester CO2, preparing, implementing plans to control new pests and diseases, retaining Winter stubble to support farmland birds and pollinators and promoting woodland management. - work to reduce surface and groundwater pollution under the principles established by Catchment Sensitive Farming.[51]	**1**

[50] See Statements of Environmental Opportunities available for the NCAs described; Natural England website, NCA profiles 88, 90 and 91.

[51] Catchment Sensitive Farming is a partnership between Defra, Environment Agency and Natural England. It works with farmers and a range of other partners to improve water and air quality in high priority areas. CSF offers farmers free training, advice and support for grant applications. Further information available here: **www.gov.uk/guidance/catchment-sensitive-farming-reduce-agricultural-water-pollution**

Milton Keynes & North Bucks NCAs		
ACTION	**EXAMPLES OF HOW TO DELIVER**	**ACHIEVES OBJECTIVE No.**
2. Protect aquifers and enhance the quality, state and structure of the River Great Ouse: its valley and tributaries, habitats, waterbodies and flood plain *(by seeking to enhance their ecological and recreational importance while taking into account their contribution to sense of place and regulating water flow, quality and availability)*	This is likely to involve: - Encouraging sustainable land management in farming areas and along water courses - Use of sustainable urban drainage systems such as permeable surfacing within urban areas to help reduce run-off Actions may also include: - Reinstating flood meadow pasture to allow for seasonal high water levels and summer grazing, and to support its associated species and assemblages - Enhancing and expanding suitable conditions for wetland species including natterjack toad, sedges, lower plants including liverworts, and fungi - Enhancing river corridors by planting wet woodland, including native willow, poplar and alder - Preventing the introduction and spread of non-native invasive species (plants and animals) that have an adverse impact on river life biodiversity and ecological status.	**1**
3. Manage, enhance, extend, link and encourage native woodland	e.g. through - the conservation and management of existing woodlands - replacing introduced species with native species, such as indigenous broadleaves - new tree and woodland planting to link existing sites and ancient and veteran trees, to enhance biodiversity	**1,6**
4. Encourage the appropriate management and expansion of traditional orchards	Bringing them back into active management to conserve their genetic diversity, biodiversity value and cultural heritage. Promoting and encouraging local markets for locally grown orchard produce.	**1**

Milton Keynes & North Bucks NCAs		
ACTION	**EXAMPLES OF HOW TO DELIVER**	**ACHIEVES OBJECTIVE No.**
5. Management, extension and linkage of semi-natural habitats and green infrastructure *Plan and create high-quality green infrastructure to help accommodate growth and expansion, linking and enhancing existing semi-natural habitats and helping to improve biodiversity, with positive impacts on soil and water quality, climate regulation and recreation*	This could include through: - targeted environmental enhancements, including ponds, hedgerows, hedgerow trees including conserving and planning for the replacement of ancient and veteran trees, and species-rich grasslands (such as areas found along road verges, green lanes and field margins) as well as conserving, strengthening, restoring and creating links between native woodlands, hedgerows, orchards and historic parkland to support biodiversity.	**6**
6. Regenerate towns and major urban areas and build biodiversity into planning *to improve and create new opportunities for biodiversity, recreation, timber and biomass provision while strengthening sense of place, tranquillity, resilience to climate change, and people's health and wellbeing*	Actions could include: - creating new woodland on urban fringes, - managing sites experiencing visitor pressure, - conserving and managing traditional orchards, hedgerows, parkland, ancient and veteran trees from inappropriate development and land use. Actions should be in line with the NEP's ***Vision and Principles for the Improvement of Green Infrastructure in Buckinghamshire & Milton Keynes***[52], including designing green infrastructure early and strategically.	**7**

Aylesbury Vale		
ACTION	**EXAMPLES OF HOW TO DELIVER**	**ACHIEVES OBJECTIVE No.**
1. Restore and create wetland habitats	As hydrological conditions sustainably allow, provide for a range of wildlife and contribute positively to the wider mosaic of habitats in the landscape including wet grassland, ponds and fens. Conserve wetland habitat in the flood plains which support breeding birds including waders.	**2**

[52] NEP, *Vision and Principles for the Improvement of Green Infrastructure in Buckinghamshire and Milton Keynes* (2016), available here: **bucksmknep.co.uk/projects/vision-and-principles-for-the-improvement-of-green-infrastructure**. See also the NEP's accompanying Green Infrastructure Opportunities mapping, available here: **bucksmknep.co.uk/projects/gi-opportunities-mapping**.

Aylesbury Vale		
ACTION	EXAMPLES OF HOW TO DELIVER	ACHIEVES OBJECTIVE No.
2. Maintain and enhance hedgerows and field/ hedgerow trees	Conserve veteran trees in fields, hedgerows and woods. Ensure there are successor trees and retain deadwood where possible. Maintain characteristic native black poplars in the Aylesbury Vale. Increase hedgerow planting within the landscape.	**2**
3. Protect and manage complex of calcareous (chalk) habitats	Promote awareness of and provide advice to landowners on managing these calcareous habitats of biodiversity interest. Increase the connectivity of fragmented calcareous grassland and flushes, and where possible seek to link and extend them to strengthen their resilience.	**2**
4. Encourage and restore diverse arable habitats	Encourage management of arable land for farmland bird communities by less intensive management and active restoration where necessary. Promote awareness amongst landowners of the location of particularly important uncommon arable weed communities and their management requirements.	**2**
5. Restore and connect ancient and semi-natural woodlands	Restore coppice management and conifer Plantations on Ancient Woodland Sites (PAWS) back to native broad-leaved woodlands where appropriate. Develop a co-ordinated approach to deer management with landowners. Encourage the restoration of hedgerows where these will link patches of woodland. Encourage management and landscape planting for Bechstein's Bat and black hairstreak butterflies.	**2**
6. Encourage green development and access to nature	Meet access to Natural Greenspace Targets and integrate biodiversity features within proposed developments. Opportunity for creation of new traditional orchards using varieties of local provenance.	**7**

Chilterns		
ACTION	**EXAMPLES OF HOW TO DELIVER**	**ACHIEVES OBJECTIVE No.**
1. Improve the condition and connectivity of existing wildlife habitats	Including chalk grassland, ancient woodland, beech woodland, chalk streams and riparian habitats, arable field margins, hedgerows and traditional orchards. **NEP and others to support the work of the Chilterns Area of Outstanding Natural Beauty (AONB)** to conserve and enhance the landscape and special qualities of the AONB.	**1**
2. Manage woodlands to create habitat mosaics and increase diversity of species mix and age	Restore plantations on ancient woodland sites through a mix of natural regeneration and appropriate planting.	**1**
3. Encourage livestock grazing of chalk grassland and the creation of habitat mosaics	Including small areas of scrub and longer grassland as well as short turf. Planting must not be done on areas which might be more suitable to enhance other important habitats.	**2**
4. Create large, more joined up habitat networks	Reconnect surviving pockets of habitat and working at landscape scale.	**6**
5. Restore and manage native hedgerows and hedgerow trees to enhance connectivity	**Initiatives to maintain and increase woodland cover whist supplementing with native hedgerows to enhance connectivity** and across the landscape.	**6**
6. End environmentally unsustainable abstraction from Chilterns chalk streams		**1**
7. Promote opportunities to restore natural processes	For example: - introduction of natural flood management, extensive grazing or reintroduction of key species such as pine marten to help the Chilterns achieve better ecological balance. NEP and others to support the **preservation of the chalk aquifer as a vital resource** supporting the biodiversity of chalk streams and rivers rather than as drinking water.	**7**

Chilterns		
ACTION	EXAMPLES OF HOW TO DELIVER	ACHIEVES OBJECTIVE No.
8. Promote and support landowner and farmer-led initiatives	That prioritise nature and deliver wildlife conservation, aquifer recharge, soil health and carbon storage at a landscape/ catchment scale. NEP and others, working with farmers, landowners and local authorities to encourage educational initiatives (such as open farms, improved access and interpretation) that promote engagement with the local environment and develop cultural identity and awareness.	**3, 5**

Thames Valley		
ACTION	EXAMPLES OF HOW TO DELIVER	ACHIEVES OBJECTIVE No.
1. Protect and manage the area's historic parklands, (including veteran trees), **wood pastures, ancient woodland, commons, orchards and distinctive ancient pollards and restore and increase hedgerows**	e.g. for carbon sequestration, noise and pollution reduction, woodfuel and protection from soil erosion, while also enhancing biodiversity.	**1**
2. Enhance the area's rivers	Restoring their natural geomorphology to bring benefits to biodiversity, for example by: - re-establishing and reconnecting to their flood plains and wetland habitats - or providing compensatory flood plains, aiding the regulation of water flow, improving water quality and benefitting biodiversity. This should include improving the maintenance of rivers and watercourses feeding into the Thames.	**1**
3. Maintain and restore woodland and scrub	Maintenance and restoration.	**1**
4. Restore other areas for biodiversity	e.g. Colne Valley Gravel Pits and Reservoirs.	**2**

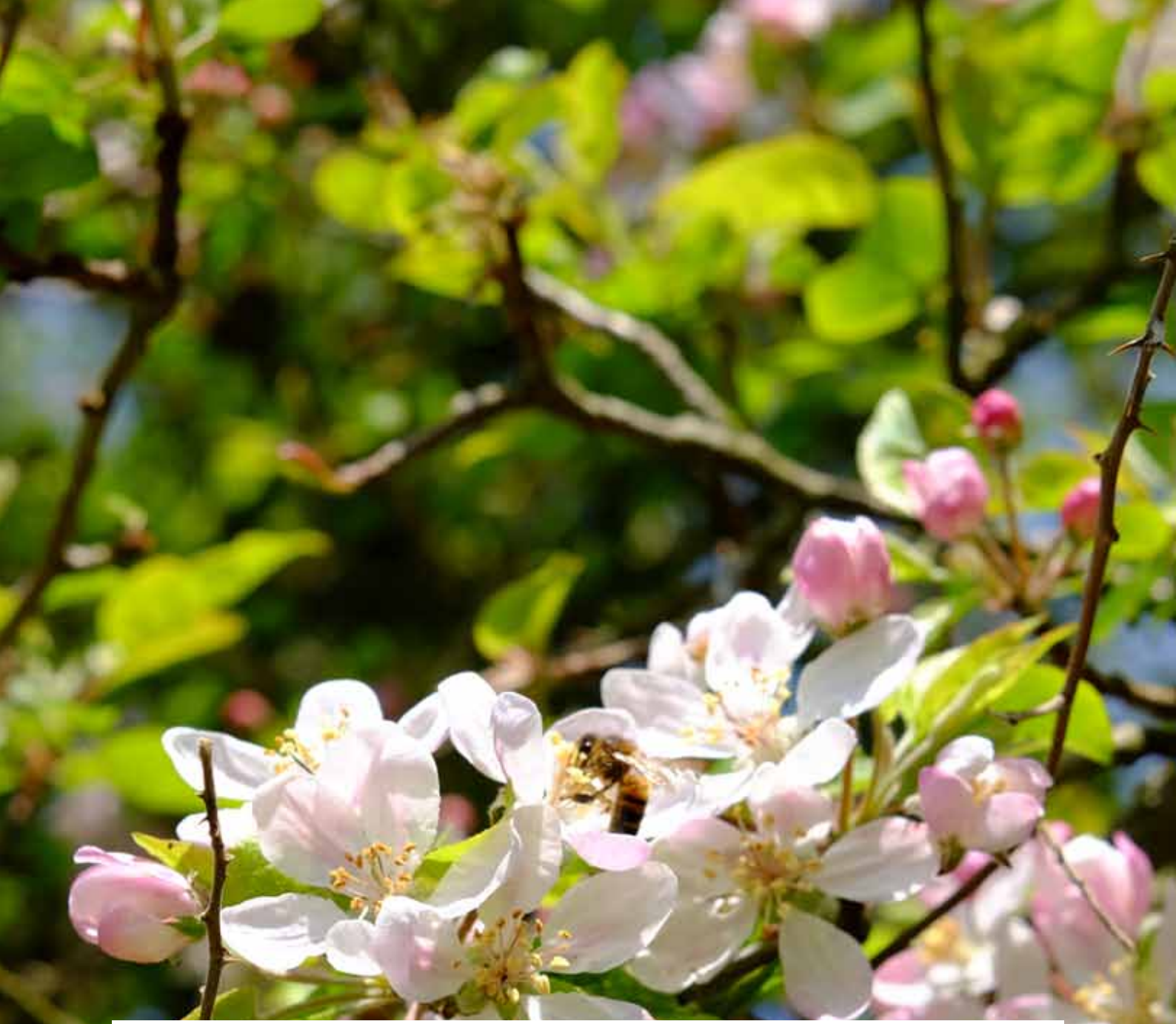
Thames Valley		
ACTION	EXAMPLES OF HOW TO DELIVER	ACHIEVES OBJECTIVE No.
5. **Encourage sensitivity in development, particularly along the river**	to avoid causing any detriment to the character of the historic features and landscape.	**2**
6. **Form ecological corridors along restored rivers to link sites that benefit wildlife**		**6**
7. **Ensure that access** to the ancient woodland, veteran trees and other environmentally sensitive sites **provides equality of opportunity and a connection** with nature and history, **without causing damage or degradation** to these unique assets.	e.g. encourage the dispersal of visitor pressures. Investment in high-quality infrastructure designed to meet the different needs and levels of use of all visitors, including local communities, recreational day-trippers and tourists.	**7**

Specific-species work

4.11 We believe that taking a spatial and habitat approach to nature conservation will bring the best results over time. There are species that occur in Buckinghamshire and Milton Keynes which deserve special attention due to their protected status or rarity (locally, nationally or internationally).

4.12 **The Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) keeps an update list of priority, protected and other "notable" species** in Buckinghamshire and Milton Keynes, which is available on request.

4.13 As part of delivering this Plan, **the NEP shall organise a working group to identify a small number of "Tracker species"** that it will ask volunteers and community groups, via its partners, to help track over the next 10 years to give indications about the underlying status of the habitats across Buckinghamshire and Milton Keynes.



Chapter 5. Delivery

Where?

Fruit tree, College Lake. Photo: Peter Capstick.

Chapter Summary

This section of the BAP highlights the key areas of work that have already been completed that together contribute to identifying priority areas for biodiversity improvement across the NEP area. The work takes into account both existing and potential areas of priority for biodiversity protection, improvement, restoration, linkage and extension across Buckinghamshire and Milton Keynes.

Biodiversity Opportunity Areas (BOAs) are considered to be the most important areas for biodiversity in the area, and in terms of restoring nature, action taken within BOAs to restore, improve and connect biodiversity is the highest priority.

The NEP's Nature Recovery Working Group will work collaboratively to determine and action a prioritised programme of work.

The NEP has concluded that the following should act as a guide to prioritising action (restoring, improving, reconnecting, creating, etc) for biodiversity, until such time as Local Nature Recovery Strategies are finalised and in place:

1) **Highest priority:** Priority Habitat (new or improved) **within BOAs**

2) **Next highest priority:** Other habitats **within BOAs**

3) **Medium priority:** Creation of other habitats **outside BOAs, but informed** by other available NEP work (see below and Appendix)

4) **Lower priority but still helpful:** Action outside these areas, anywhere else.

In determining where the specific practical measures and projects to improve biodiversity should be prioritised, the NEP's Nature Recovery Working Group will take into account other work completed recently, which together are building the picture of where the priorities should be – work that will be concluded with a finalised Local Nature Recovery Strategy. This recent NEP work includes:

- Ecosystem Services maps
- Natural capital opportunity maps, showing where both biodiversity and such services can be maximised
- The NEP's mapping analysis to show broad priority areas for locating biodiversity offsets
- The NEP's green infrastructure (GI) opportunity zones showing GI priorities across Buckinghamshire and Milton Keynes
- Strategic-scale environmental opportunities mapped for the OxCam Growth Arc scale
- Stakeholder views, processed from the pilot LNRS process (Buckinghamshire only)

Spatial approach

5.1 As a rule, the NEP's **Nature Recovery Working Group** will take a spatial approach to achieving the BAP's objectives, and, where possible, adopt a landscape-scale approach to the work. We will therefore target our efforts in meeting both area-wide objectives and NCA-specific objectives in the areas already identified as being of high value for biodiversity.

5.2 Such a spatial, or landscape-scale, approach is widely accepted across the UK and supported by government policy. The "Lawton Report" or "Making Space for Nature" provided clear support for such an approach and was subsequently quoted in the Natural Environment White Paper:[53]

> *2.12 Making Space for Nature set out a practical vision for addressing the fragmentation of our natural environment by restoring ecological networks across the country. The approach is based on five components, to be implemented at a landscape scale working with existing land uses and economic activities: core areas of high nature conservation value…; corridors and 'stepping stones'…; restoration areas…; buffer zones….; and sustainable use areas.*

5.3 **In Buckinghamshire and Milton Keynes, the Biodiversity Opportunity Areas (see below) are the key focus areas for the creation of such ecological networks,** and they are present in all the NCA-based areas within Buckinghamshire and Milton Keynes.

Biodiversity Opportunity Areas

5.4 **Biodiversity Opportunity Areas (BOAs) are the most important areas for biodiversity in the area.** BOAs represent a targeted landscape-scale approach to conserving biodiversity **and the basis for an ecological network**.

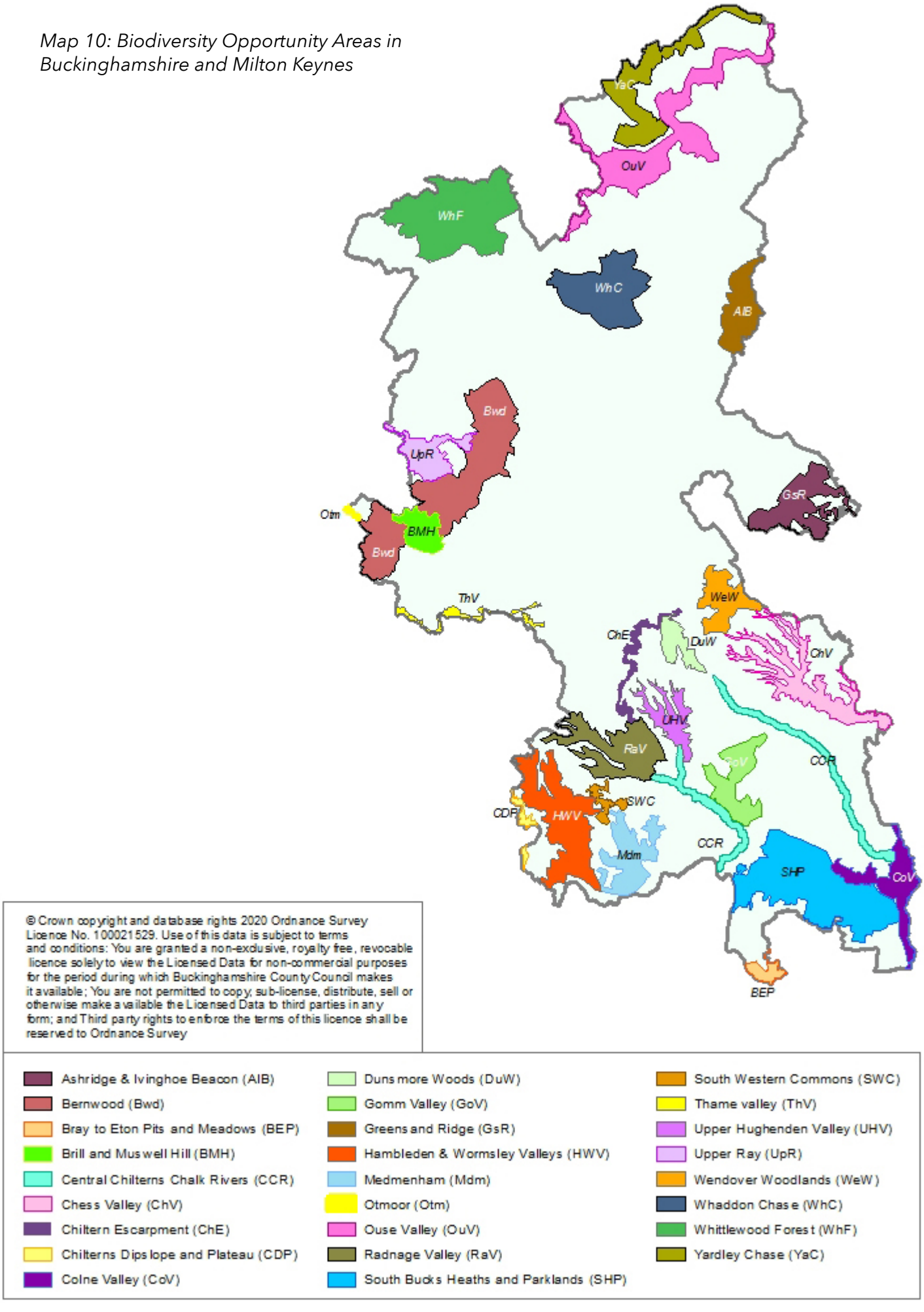
5.5 The identification of the Buckinghamshire and Milton Keynes BOAs was a detailed assessment process. It took into account existing concentrations of UK BAP habitat (priority habitats), important areas for UK BAP and other rare species, land with potential for habitat restoration and several other factors (including geology, topography and hydrology). Many of the areas identified are well known in the area for their nature conservation importance and they all contain priority habitats (see Map 10, below). BOAs have been identified throughout the South East of England.

5.6 **BOAs therefore identify where the greatest opportunities for habitat creation lie,** enabling the efficient focusing of resources to where they will have the greatest positive conservation impact. Recent research in 2020 by BMERC showed that of the **c. 5,000 ha of priority habitat across Buckinghamshire and Milton Keynes, around 78% lies in the BOAs.** Of the priority habitat occurring outside the BOAs, much of the mixed broadleaved woodland is managed by the Forestry Commission and already has some level of protection and security. There is an intention to survey the traditional fens that lie outside BOAs (mostly in the Aylesbury Vale in small areas) in the next 5 years. And there are many traditional orchards outside BOAs, which are subject to an ongoing current BMERC survey project.

5.7 To be most effective, the NEP considers that effort should be focused on, but not exclusive to, **Biodiversity Opportunity Areas and priority water catchments** – both in improving and creating priority habitats, but also other habitats within BOAs. Details of the BOAs in Buckinghamshire and Milton Keynes, including a brief description of their biodiversity and associated targets, are available on the NEP's website.[54]

[53] Available here: **www.gov.uk/government/publications/the-natural-choice-securing-the-value-of-nature**
[54] Available here: **bucksmknep.co.uk/biodiversity-opportunity-areas/**

Map 10: Biodiversity Opportunity Areas in Buckinghamshire and Milton Keynes



Supplied by, and with thanks to: Buckinghamshire and Milton Keynes Environmental Records Centre.

Habitat creation, enhancement and connectivity outside the BOAs

5.8 **There are many opportunities to create priority and other high-quality habitat in areas that fall outside the BOAs.** These will largely occur through agri-environment schemes (e.g. Environmental Land Management, "ELM"), the planning process e.g. on-site mitigation or off-site compensation for habitat lost to development (e.g. biodiversity net gain requirements), and through using legislation to drive specific projects e.g. Water Framework Directive objectives; individual landowners and smaller-scale actions are also important:

- **Requirements for Biodiversity Net Gain and Local Nature Recovery Strategies will help to focus activity to areas regarded locally as priorities for biodiversity and habitats.** Local planning authorities will need to work towards adopting at least current best practice regarding planning and habitat creation, including local planning policy realising the opportunities for biodiversity enhancement and wildlife corridor development as set out in the National Planning Policy Framework.

- **Opportunities must also be sought to ensure large-scale developments provide for biodiversity as much as possible,** such as from High Speed Two, residential and commercial development, and from increasing the habitat quality of sustainable drainage schemes, highway verges and public open spaces including parks and recreation areas that will need to be managed appropriately.

- **Many landowners, managers and communities wish to enhance their land for wildlife as part of a farming system**, or as an end in itself. Good quality advice and guidance will need to be available so that individual actions will be able to contribute to wider landscape habitat and wildlife corridor creation in the most beneficial way.

- **Habitat creation should also include small-scale actions** that can be specific to a single species, such as the placement of swift boxes on buildings, thereby providing greater nesting opportunities.

Where to prioritise action for biodiversity

5.9 In producing the BAP, the NEP concluded that the following should act as a spatial guide to prioritising action (restoring, improving, reconnecting, creating, etc) for biodiversity, until such time as final Local Nature Recovery Strategies are in place:

1) **Highest priority:** Priority Habitat (new or improved) **within BOAs**

2) **Next highest priority:** Other habitats **within BOAs**

3) **Medium priority:** Creation of other habitats **outside BOAs, but informed** by other available NEP work (see below and Appendix 2)

4) **Lower priority but still helpful:** Action outside these areas, anywhere else.

5.10 The NEP will ensure that the thinking behind this BAP feeds into the Local Nature Recovery Strategies covering the area and therefore into the creation of a national Nature Recovery Network.

5.11 **In determining where the specific practical measures and projects to improve biodiversity should be prioritised** in working together towards achieving the goals of the BAP, the NEP's **Nature Recovery Working Group will take into account a number of factors,** evidence, previous expert-thinking, mapping and stakeholder inputs **that are together building the picture of where other specific priorities should be.** (NB: the Appendix includes the various opportunity mapping mentioned and referred to here). These include:

- **Detailed area Baseline mapping**, e.g. habitats, species, high-value habitats, designated sites (national and local), relevant boundaries (e.g. AONB, NCAs, conservation organisations management, water catchments), geology and soil-type, which can affect what action is possible and where;

- **Maps showing the benefits (ecosystem services) provided by our natural assets**, the pressures they face and possible nature-based solutions, i.e. Tables 6, 7 and 8 at Chapter 3 (pages 68, 76 and 79);

- **Opportunity mapping**,data and mapping, based on expert input, to determine priority areas for biodiversity creation and improvement, including:

  - **Biodiversity Opportunity Areas** (see Map 14, page 113)

  - **The NEP's broad priority areas for locating biodiversity offsets resulting from biodiversity net gain requirements**, based on prioritising Biodiversity Opportunity Areas, buffers around them and linkages between them. The linkage areas were identified based on coverage of woodland and grassland, important freshwater areas and other high value sites (see Appendix 2, Map 11, page 136)

  - **Natural capital opportunity maps** that identify areas of opportunity for woodland, grassland and wetland creation **to maximise biodiversity opportunity whilst also providing multiple benefits** (see Appendix 2, Maps 12a–14b, pages138-143)

  - **The NEP's GI Opportunity areas map:** an area-wide strategic vision for improving green infrastructure networks in Buckinghamshire and Milton Keynes, based on expert input and consideration of underlying data on biodiversity coverage, water coverage, the PROW network and data including constraints, areas of growth and indices of multiple deprivation (see Appendix 2, Map 15, page 145)

  - **Mapping relevant to identifying opportunities and priorities** (from various sources and drawn on in much of the other mapping work), including:
    i. Constraints and features (e.g. allocated development, planned infrastructure, gas pipelines, etc);
    ii. Broad habitats types
    iii. Underlying geology (soils to come)
    iv. Estimated habitat condition (to come)
    v. Broad scale estimate of habitats (type and scale) due to be affected by allocated development (analysis to come)

- The NEP identified key **strategic environmental opportunity areas** that were fed into the joint Local Nature Partnerships' Oxford-to-Cambridge **Growth Arc** environmental opportunity mapping (both shown at Appendix 2, Maps 16 and 17, page 146 and 147)

- **Stakeholder views and values, e.g. considering LNRS pilot data as far as possible factors including:**
  - Ecosystem services across Bucks, and how this influences the opportunity mapping for biodiversity: what's valued and what is most valued
  - Desired outcomes: e.g. habitats, species, landscape-scale etc.
  - Biggest risks to the environment
  - Biggest opportunities for habitats and species

- **Practicalities regarding delivery: what's possible where.**

5.12 It is anticipated that the forthcoming Local Nature Recovery Strategy (LNRS) will be able to identify so-called "strategic" and "non-strategic" area for the purposes of biodiversity net gains. Until an LNRS is finalised for each of Buckinghamshire and Milton Keynes, the priorities listed above and the importance of the BOAs illustrate the information available that the NEP group has to work towards answering that question and help to prioritise action with its partnership.

Chapter 6. Delivery

Who, how and when?

Volunteers checking bottle traps, Steart Farm. Photo: Claudia Bernardini, courtesy of BMERC.

Chapter Summary

Our biodiversity benefits all of us; so it is the responsibility of everyone to help protect, repair and manage it for the future.

In terms of galvanising cross-sector action across Buckinghamshire and Milton Keynes, **the NEP will lead the governance of the delivery of the BAP,** with the support and input of its partners and other organisations.

The new **Nature Recovery Working Group** will collectively agree on which projects, actions, tasks and locations should be prioritised, identify key opportunities for collaborative working and help to coordinate action, **taking into account the framework to help prioritise action as well as the recent opportunity mapping, outlined at Chapter 5.**

In addition, we recognise that, during the delivery phase, **more work will be needed to improve data availability and monitoring and reporting on progress with the BAP, and that engaging** and working with landowners, other sectors and the public is vital to the BAP's success. We will also signpost and share case studies and good practice to ensure learning is distributed.

Examples of how the NEP partners aim to further champion, encourage and facilitate actions to improve biodiversity are given in this Chapter, as are examples of actions that the NEP will encourage other sectors to take – including how farming, conservation, health, education, the public sector and local communities can work to work together to support the overall BAP objectives.

i. Who will be involved in delivering the BAP?

6.1 **Governance of the delivery of the BAP will be led by the NEP** as follows, with the support and input of its partners and other organisations to take forward delivery.

The Buckinghamshire and Milton Keynes Natural Environment Partnership

6.2 **The NEP brings together and provides a forum for collaboration and partnership between organisations from various sectors covering health, education, conservation, public, private and academia in Buckinghamshire and Milton Keynes.**

The NEP's new "Nature Recovery Working Group"

6.3 To deliver the biodiversity priorities of the Buckinghamshire and Milton Keynes area, the NEP will:

1) **Convene and coordinate, across Buckinghamshire and Milton Keynes, a Nature Recovery Working Group, reporting to the NEP's Delivery Group,** formed of the NEP's partners and other organisations with similar interests in the area, to focus on delivery for biodiversity. In particular, the NEP will lead the group to:

    - **Identify and coordinate activity** to achieve the area-wide aim, objectives and actions; and the NCA-specific actions; and through its work adhere to the relevant principles.
    - **Draw up and agree on the what, who, how and when – and coordinate activities and priorities** for delivery, as well as seek common ground between partners and geographically to deliver them.
    - Identify **the resources needed and funding input** required; and work collectively with partners to seek it, including from Biodiversity Net Gains and ELM in the main, as well as other sources.
    - **Focus on delivery** of the strategic direction set within the BAP 2030, as the interim biodiversity strategy, and anticipates continuing to assist with delivery of finalised and agreed LNRSs for the area.

2) **Ensure appropriate Membership of the group—to include all those organisations involved in writing this document**, as stated in the Commitment on Page 3—or otherwise already involved in the NEP's Biodiversity Group and other appropriate organisations and representatives as determined by the Group to help or support delivery of the area's biodiversity objectives;

3) Ensure the **Nature Recovery Working Group** reviews, explores and agrees actions needed to strengthen at least the following themes during the BAP delivery phase:
    i. **Data availability for monitoring**: to drive forward improved baseline and monitoring data with achieving biodiversity priorities for the area;
    ii. **Reviewing trends and progress**: with a view to producing reports on progress as appropriate, for example including input to any future NEP State of the Environment report;
    iii. **Engaging and working with landowners**: sustainable land management;
    iv. **Engaging and working with other sectors**: e.g. education, health, business; and
    v. **Engaging people with nature;**

4) **Signpost and share good practice**, advice, support and funding for priority biodiversity work at local level; also to develop and share **case studies**, for example: work in BOAs and buffers; priority habitat creation or improvement; linking different areas, e.g. at Parish level;

5) **Manage the NEP website** to include up-to-date BAP and biodiversity information;

6) **Provide a seasonal e-newsletter** including BAP and biodiversity issues;

7) **Organise an annual event** to celebrate achievements and stimulate further action for biodiversity; and

8) **Enable work with other sectors** (e.g. business, health, schools etc.) by linking into the NEP's Delivery Group and Board structure and beyond.

9) **The NEP Board's role** is to, where it can, help remove barriers to progress and help provide the resources needed to fulfil the joint biodiversity objectives in Buckinghamshire and Milton Keynes.

6.4 **The NEP will also commit to doing its best to champion, encourage and facilitate actions which will maximise biodiversity and ecosystems services benefits.** For example:

i. Local "friends of…" groups and parish councils can be encouraged to take more **ownership of green spaces** by learning more about site management plans.

ii. **The NEP can act as a reference point** to help anyone achieve effective and sustainable results within the context of Biodiversity Opportunity Areas and our BAP targets. The NEP could reward the positive actions by individuals, groups and organisations through **specific projects (for example, such as Bucks Buzzing), celebrations and awards.**

iii. **The NEP can champion positive individual behaviours** which will help support, or at least reduce harm, to the prospects of our biodiversity. Many impacts upon our biodiversity are caused by mechanisms and collective decisions which are far removed from the effect. For example, changes in demand from consumers towards organic produce, will have a direct positive impact on water quality by reducing the phosphate levels in our water courses.

iv. **Public perceptions about key biodiversity issues** (e.g. the need to control deer) can be positively challenged by the NEP through its communication channels and its champions on the NEP Board and Delivery groups. Some areas the NEP may wish to say more on include:
    - **Preservation of the chalk aquifer** as a vital resource supporting the biodiversity of chalk streams and rivers rather than as drinking water.
    - **Seek stronger protection for priority habitats** through planning and financial support for strategic management and creation.
    - **Support the work of the Chilterns Area of Outstanding Natural Beauty (AONB)** to conserve and enhance the landscape and special qualities of the AONB.
    - **Working with farmers, landowners and local authorities** to encourage educational initiatives (such as open farms, improved access and interpretation) **that promote engagement with the local environment** and develop cultural identity and awareness.

v. **The NEP, in working as a partnership, can also connect and support collaborative action taken towards common goals across the BAP area, for example:**
    - **Landowner and farmer-led initiatives that prioritise nature and deliver wildlife conservation.** There is a need for direct advice and support available for farmers and landowners. **The NEP could provide a sign-posting service** through its website to encourage and enable those in search of advice to find it where it is available (e.g. where there are active landscape schemes and projects)
        - Support the need for access every day to wildlife (e.g. Access to Natural Greenspace Targets principles[55]) to enhance mental and physical health and wellbeing with local, accessible nature on the doorstep
        - Support community initiatives to encourage better understanding, appreciation and valuing of local green spaces and wildlife; and actions to create wilder local spaces
        - Encourage younger participation
        - Positively promote information and projects encouraging careful resources usage
    - **Urban greening: working with partners for more, wilder and connected habitats in our built-up areas to improve biodiversity at the same time as providing other benefits**, such as improved air quality, water flow, access and recreation opportunities and improved health and wellbeing for those who live and work there.
    - **Best practice standards for incorporating biodiversity and connected green infrastructure in development.**
    - **Opportunities to restore natural processes**: for example, introduction of natural flood management, extensive grazing or reintroduction of key species such as Pine Marten to help the Chilterns achieve better ecological balance.
    - **The management of woodlands to create habitat mosaics and increase diversity of species mix and age**; and the restoration of plantations on ancient woodland sites through a mix of natural regeneration and appropriate planting.
    - **Initiatives to maintain and increase woodland cover whist supplementing with native hedgerows to enhance connectivity** and across the landscape. Planting must not be done on areas which might be more suitable to enhance other important habitats.
    - **Creation of large, more joined up habitat networks**, through protecting, enhancing and reconnecting surviving pockets of habitat and working at landscape scale.
    - **Restoration and management of native hedgerows and hedgerow trees to enhance connectivity.**
    - Through the various activities, initiatives and projects, where appropriate, **support and encourage recreation, access to and engagement with nature.**

[55] Accessible Natural Greenspace Standards (ANGSt) was developed in the early 1990s and was based on research into minimum distances people would travel to the natural environment. Natural England reviewed the standard in 2008 and concluded that it was still useful but that further guidance was required to explain how it should be applied. The 2010 **Nature Nearby** report provides this additional clarity and recommends that everyone should have accessible natural greenspace of varying sizes at varying distances from where they live. Using ANGSt in assessment and planning for provision aims to improve access to greenspaces, improve the "naturalness" of greenspaces and improve the connectivity of greenspaces. Taken from, and for more information, see: Accessible Natural Greenspace Standards (ANGSt), Natural England: **webarchive.nationalarchives.gov.uk/20140605111422/http://www.naturalengland.org.uk/regions/east_of_england/ourwork/gi/accessiblenaturalgreenspacestandardangst.aspx**

Strengthening Partnerships: Who else should be involved in supporting delivery of the Action Plan?

6.5 **Delivery of this Action Plan for Biodiversity requires many organisations, individuals and actions to work collaboratively to achieve the common goals** set out in this BAP. Examples of the organisations, sectors and initiatives that the NEP will engage with, alongside, as well as within, the Nature Recovery Working Group are provided below:

- **Non-Governmental Organisations**
  Conservation charities often own or manage areas of high biodiversity value and can influence large numbers of local people through their membership, educational outreach work and volunteering opportunities. They can also have significant political influence and will often actively lobby government on issues relevant to BAP work, e.g. farming payments for conservation, or relevant planning legislation. Local conservation groups, sometimes part of or affiliated to one of the Conservation Charities, can have a key role in the implementation of the Plan, and can have an influence on the decisions taken by those in positions of authority.

- **Local Conservation and community Groups**
  Local conservation and community groups, sometimes part of or affiliated to one of the Conservation Charities, can have a key role in the implementation of the Plan, and can have an influence on the decisions taken by those in positions of authority.

- **Local Authorities and local councils**
  Local authorities have multiple roles and influences on biodiversity:

  - Set policies, including planning policies, relating to biodiversity and nature conservation that adhere to national policy objectives. For example: the NEP-designed biodiversity net gains system soon to be on offer to developers via the Local Planning Authority is specifically designed to locate offsets, where required, according to local priority biodiversity objectives in the most effective way and according to local ecological, biodiversity, wildlife and landscape expertise. No other local scheme offers this strategic and prioritised approach.

  - All levels of local authorities, whether county or unitary councils, or parish councils have a statutory duty to consider biodiversity while undertaking all of their functions. This duty is set out in Section 40 of the Natural Environment and Rural Communities Act (NERC) 2006 and states: 'Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, in the purpose of conserving biodiversity'.

  - As landowners, local authorities should also seek to manage their land in a sustainable way, with biodiversity given priority where appropriate.

  - Support initiatives directly to conserve or raise awareness of biodiversity through their own projects and support for the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC).

  - They also have a major role to play in integrating biodiversity issues into formal education.

- Parish and Neighbourhood councils have a role in promoting awareness and encouraging local people to participate in local community initiatives, and are often involved in Neighbourhood Planning, which can be influential in defining the detail of how policy works on the ground.

- **Planning authorities**
  The National Planning Policy Framework (NPPF) provides a lead for local planning authorities to recognise the wider benefits of ecosystems services, provide net gains for biodiversity and to establish coherent ecological networks.

  Local planning authorities have the opportunity therefore to embrace a range of actions, from whole-area wildlife corridor protection and enhancements to simple gains in built development aimed at a single or family of species such as the provision of swift and bat boxes.

  Local guidance is available in the form of the Biodiversity and Planning in Buckinghamshire document[56] produced by several NEP partner organisations, or more comprehensively via consultation with the NEP and its partners.

- **Statutory Agencies**
  These have national responsibilities regarding biodiversity, including advising on national policies, designating and managing land which is of national importance for its biodiversity, research, regulatory work and protecting species and habitats, as well as being involved locally in supporting biodiversity initiatives through specific projects and partnerships, and through their day to day functions.

  Statutory Agencies are also important sources of agri-environmental schemes which can provide funding to ensure many habitats and species are protected and managed appropriately.

- **Farmers, Landowners and land managers**
  Those owning or managing land have a vital part to play in the implementation of the Plan. The land they own or manage may support important habitats and species, support aquifer recharge, soil health and carbon storage at a landscape/catchment scale. The stewardship such people provide to biodiversity benefits us all. Farmers and landowners can apply for funding through agri-environment schemes.

  Easy access to information, advice and support is essential in order to encourage sensitive stewardship. Landowners can be encouraged to consider the impacts of their activities upon wildlife and habitats.

- **Business and industry**
  Business and industry can play a major part in delivering the Plan, for example, through sponsorship or funding of conservation projects, in how they manage their own land, supporting voluntary work and via corporate responsibility programmes, through conducting their own environmental audit and reducing waste and resource-use, or via paying for ecosystem services or sponsoring targeted land management for a specific habitat or species, e.g. creating orchards for a bespoke business or public amenity.

[56] Available at: **buckinghamshirepartnership.gov.uk/media/1022528/Bucks_planning_online_FINAL.pdf**

- **Health Sector**
  Various studies show that access to wildlife-rich green space can have a positive effect on the physical and mental wellbeing of local communities. Engaging directly in conservation management can also help individuals gain exercise and connection with nature which may be beneficial to their health.

  Health professionals therefore have a direct role to play to support the objectives of this Plan and to shape its implementation within their sphere of influence. For example, through green prescribing (provides conservation and related activities for GPs to "prescribe" to patients who would benefit for their mental and/or physical health and wellbeing); or through direct land management and provision of a natural health recovery resource and support a wide range of plants and animals.

- **Education sector**
  Educational establishments manage large areas of land which, if managed well, can provide a great learning resource (e.g. a pond for dipping) and support a wide range of plants and animals. Nurseries, Schools, Colleges and Universities can help people of all ages gain a greater appreciation of, and understanding of, our natural world - which will be increasingly vital if biodiversity is to prosper in decades to come.

- **Communities and individuals**
  Whether biodiversity continues to decline depends largely on the actions and commitment of each individual within our community. Decisions taken by those in positions of authority are key to the future of biodiversity, but the community is a powerful force in influencing these decisions. In addition, community-led initiatives – for example, community growing projects (e.g. orchards, food projects) or wildlife garden projects can provide for biodiversity as well as multiple benefits to local people and engage more people, actively, with nature. Supporting and promoting communities initiatives and projects can encourage further uptake of good practice.

ii. How will the Plan be delivered?

Funding and resourcing

6.6 This Plan does not come with allocated funding; this will need to be sourced to deliver the BAP's priorities.

6.7 Alongside opportunities to raise funds to support delivery of various aspects of the BAP, initiatives such as biodiversity net gains and the forthcoming "Environmental Land Management" (ELM) Scheme could also provide the means for habitat creation in strategic areas.

6.8 The Natural Environment Partnership (NEP) has several roles to play in working with its partners to help secure funding to deliver the Plan:

- The NEP has designed a biodiversity net gains scheme for the local planning authorities - specifically to make a significant contribution to local biodiversity priorities.

- The NEP is already seeking funding (at the time of writing) to deliver its biodiversity net gains scheme, an essential part of the delivery of this Plan;

- The NEP will also seek to pool expertise and coordinate funding and bid efforts to secure resources to deliver biodiversity priorities across the area;
- The NEP will encourage its partners to produce investment plans to ensure projects are worked-up and ready to submit to appropriate local, regional and national funding that becomes available;
- The NEP can also help create and broker a positive and informed dialogue between the respective funding parties - which could make a significant difference for the prospects of our biodiversity.

Data and monitoring

6.9 The new Action Plan is committed to working collaboratively towards improving data availability and monitoring over the next 10 years, as well as to working better together towards achieving the goals and targets.

6.10 In terms of priority habitats, currently we do not have good data on progress, which needs to be addressed. There is no meaningful trend data on the extent or condition of priority habitats locally, in part because the methodology for national habitat inventories has been substantially changed; and updates are due from the 2010 local habitat mapping.[57]

Buckinghamshire and Milton Keynes Environmental Records Centre

6.11 **In Buckinghamshire & Milton Keynes, we rely upon the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC)** to hold up to date records of our biological resource. These records not only provide vital data to help inform decisions such as development proposals or **where to allocate development to have the least impact, they provide a historic thread enabling us to identify trends and thereby inform decision making about management of sites.**

6.12 It is vital that the NEP and its partners, in coordinating the delivery of this Plan, **seek to capture and record relevant data to enable regular monitoring of progress**. This should include seeking funding for regular condition assessments, for example of priority habitats, local wildlife sites and other important areas for biodiversity. Collaborative efforts will also be required to ensure that information is captured and reported on in respect of adhering to the principles of delivery, for example: volunteer hours, to support recording the engagement of people with nature.

6.13 As part of this, the NEP's Biodiversity Group will seek to define a **shortlist of key and indicator species** relevant to Buckinghamshire & Milton Keynes and involving people in helping to monitor them through coordinating with local recording groups and community groups across the area. This way we can collectively track changes in key species and monitor trends.

6.14 **There is considerable work to be done in Buckinghamshire and Milton Keynes regarding its Local Wildlife Sites (LWSs) and Biological Notification Sites (BNSs)**. A very recent expansions of the BMERC team has increased available resources for potential LWS site surveying, and reinstated wider activity for landowner and manager support

[57] Our Environment (2016), Buckinghamshire & Milton Keynes Natural Environment Partnership (2016), State of the Environment Report. Available here: **bucksmknep.co.uk/projects/state-of-the-environment-report/**

across the whole of Buckinghamshire and Milton Keynes. However, more resources will need to be found to ensure the process is as robust as possible to support these key sites' sensitive management and ongoing importance for biodiversity.

6.15 We expect that the process of constructing Local Nature Recovery Strategies and further data being made available nationally may enable a deeper and improved environmental data baseline to be constructed for the area.

Reporting process

6.16 Monitoring and reporting is vital to help understand the changing health of our natural environment. The NEP will coordinate data input from partners to monitor progress with the Plan. The exact format and types of data to be collected, and their frequency, will be a priority agreement for the Nature Recovery Working Group. This is likely to be based on: the objectives of the BAP, existing data availability, including from third parties,[58] BMERC, the biodiversity net gain system, and the NEP's partners and supporting organisations; and, from highlighting gaps and how to resolve them.

6.17 The NEP will also, in collaboration with its partners, seek agreement on the format, channels and audience for communications of the progress reports.

iii. When will the biodiversity priorities be delivered?

6.18 The Nature Recovery Working Group will work together to identify collectively the short-term and longer-term projects, with clear goals, to deliver the objectives of the plan. This will require an understanding of what is already being delivered in the area and the need to work together collaboratively and ambitiously to collectively deliver more, bigger, better and in a more joined up fashion and meet the needs of the global biodiversity crisis.

[58] Examples of third party data collection could include: the Anglers' Riverfly Monitoring Initiative (ARMI), which gathers riverfly trend data that can be used to capture water quality information on some watercourses (more information: **www.riverflies.org/rp-riverfly-monitoring-initiative**); the Modular River Physical Survey (MoRPh) is another citizen science data collection project, during which volunteers record physical habitat/features along reaches of rivers (more information: **modularriversurvey.org**).