A Nature Conservation Strategy for Central Bedfordshire

January 2015

Prepared by the Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire for Central Bedfordshire Council.

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Chapter 1

Introduction

This document provides a Nature Conservation Strategy for Central Bedfordshire. Nature conservation is just one of many wider environmental issues, for example pollution and climate change. All these issues are related, however, it is beyond the scope of this Strategy to consider all concerns and so a single subject approach has been taken. It does not ignore the wider concerns but focuses on nature conservation.

Purpose and Aims

There are many departments within the Council who contribute towards maintaining and enhancing Central Bedfordshire's environment in various ways, as well as external groups and individuals. The purpose of this Nature Conservation Strategy is to identify the overall aims, objectives and priorities for the conservation of biodiversity in Central Bedfordshire and bring them together within a single document. This will reflect the Council's duties under various Acts of Parliament. The Nature Conservation Strategy will also act as a reference document for anyone working within Central Bedfordshire. This will include those considering the management of green spaces across Central Bedfordshire Council and in the formation of the Development Strategy and other strategic planning documents.

The aims of the Strategy are as follows:

1) To identify and protect species and habitats across Central Bedfordshire and ensure their management is correct.
2) To identify and promote opportunities for enhancing the wildlife resource of existing areas and for the provision of additional wildlife habitat.
3) To protect and enhance the biodiversity network across the urban area including stepping stones and linear habitats.
4) To identify and monitor Central Bedfordshire's natural resources and the policy background to nature conservation in a single subject document and to provide a framework for the activities of the Council, local groups and other organisations
5) To generate interest in biodiversity and the environment and to encourage community involvement in the creation and management of sites. Also, to make areas of wildlife interest accessible to all people within Central Bedfordshire.

This is in part an update to the Nature Conservation Strategy for Bedfordshire which was published in 1994. Since 1994 there have been many changes to the statutory framework regarding nature conservation, most recently with the publication of the National Planning Policy Framework (NPPF). Our knowledge of the biodiversity within Central Bedfordshire and the opportunities for it to be enhanced in the future has also increased.

This Strategy brings together the latest information to provide an up-to-date document to inform the emerging Development Strategy for Central Bedfordshire. It is also aims to

embed the conservation of biodiversity within all areas of the Council's work, including those contracted out to other organisations.

This strategy will help guide planning and strategic decisions by demonstrating the value of linking wildlife areas / corridors, for example the NIA and aspirations within the Forest of Marston Vale. These issues are vital when considering threats to biodiversity, pressures from areas of strategic development and helping protect the fragile connections to relatively isolated sites by directing development to other, less sensitive areas. The strategy will also help direct schemes of habitat creation to areas where this would be of most benefit by linking them up within the biodiversity network.

Background

Central Bedfordshire's geology and surrounding landscape means that there are already many high quality wildlife habitats close to where people live and work, as well as scope for further enhancement. This provides many benefits such as regulating environmental functions like air pollution, to providing a positive 'sense of place' and promoting health and wellbeing.

Central Bedfordshire's wildlife sites provide an important contribution towards the grassland, wetland and woodland habitats across the whole of Bedfordshire. These habitats are declining in quality and quantity nationally and so protection of Central Bedfordshire's sites is of wider significance. It is not just the larger sites, however, which have value for wildlife. Larger sites are dependent on a network of smaller patches of habitat which provide stepping stones and corridors across Central Bedfordshire and prevent them from becoming isolated. The National Planning Policy Framework (NPPF) and Biodiversity 2020 (a strategy for England's wildlife and ecosystem services) encourage planning positively for the creation of such networks (paragraph 117 of the NPPF). The findings from the Lawton Report: "Making Space for Nature" recognises that the step-change for nature that is required is only possible if wildlife is connected at the landscape scale. While nature reserves and other core areas for biodiversity are still vital they cannot conserve wildlife into the future in isolation. Stepping stones and wildlife corridors can include hedgerows, road verges, arable field margins, rivers, strips of woodland and, in urban areas parks and private gardens. When viewed from above the contribution of gardens in the formation of green corridors across urban areas can be fully appreciated. They form green fingers across built up areas which will be used by many species.

In the current era of accelerated climate change it is vital that we manage and use land sustainably, so it allows plants and animals to move and adapt to new conditions for survival as the climate changes. Climate change means that there are complex demands being placed on land for food, wildlife, recreation and development. Wildlife has adapted to climate change in the past but our modern landscapes - full of buildings, transport links and intensively managed farmland and fragmented natural habitats - present a new challenge to species.

Context

When allocating resources and considering the location of developments, it is important to consider these networks and opportunities on a landscape scale in order to help prevent vulnerable sites becoming isolated. For example Cooper's Hill Site of Special Scientific Interest (SSSI) is a fragile heathland site surrounded by an urban landscape (including residential developments, major roads and sports facilities) on three sides and is under pressure from inappropriate use i.e. erosion of paths and disturbance of habitats and wildlife by increasing numbers of visitors.

Figure 1: Erosion from over use and inappropriate use at Cooper's Hill SSSI.

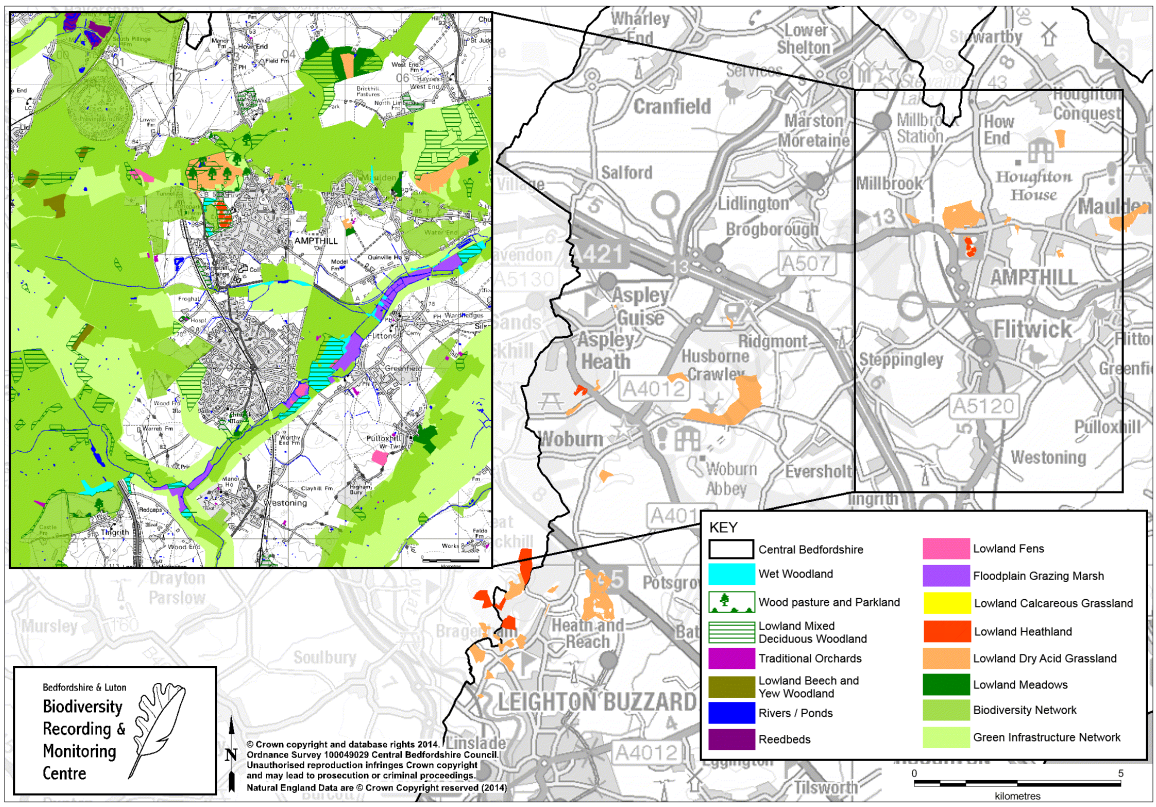

Figure 2: Map showing green connections around Cooper's Hill SSSI and the extent of human impacts on this site. Further information on the Biodiversity Network and The Green Infrastructure Network can be found later in this document)

The Wildlife Trusts have identified a number of areas across the country as **Living Landscapes** for targeting landscape-scale conservation efforts to halt the decline of wildlife and restore the natural environment. There are two Living Landscapes within Central Bedfordshire - the Greensand Ridge and Flit Valley Living Landscape and the North Chilterns Chalk Living Landscape. Further information on this can be found on the Wildlife Trusts' website http://www.wildlifetrusts.org/living-landscape/schemes and more details about the two schemes can be found at http://www.wildlifetrusts.org/living-landscape/schemes/greensand-ridge-and-flit-valley and http://www.wildlifebcn.org/north-chilterns-chalk.

The Royal Society for the Protection of Birds (RSPB) has similarly identified priority areas across the country as **Futurescapes** of which the Greensand Ridge Futurescape is within Central Bedfordshire. Further information can be found at http://www.rspb.org.uk/Images/uk_tcm9-369351.pdf.

The Greensand Ridge has recently been recognised as a **Nature Improvement Area (NIA)** by the Local Nature Partnership and Central Bedfordshire Council. This is almost exclusively within Central Bedfordshire. Nature Improvement Areas have been established by DEFRA as a result of Biodiversity 2020 and the Lawton Report (2010) in order to create joined up and resilient ecological networks at a landscape scale. They are run by partnerships of local authorities, conservation organisations, local communities, landowners and the private sector. The Greensand Ridge is a distinctive 'island' of significantly wooded sands and sandstone that rises prominently above the surrounding clay vales. The varied geology of the Ridge has created a distinctive mosaic of habitats and land uses. Historically considered 'marginal' with its free draining, acidic soils, the area has not been farmed as intensively as surrounding areas. Large, important ancient woodlands such as at Kings Wood, Heath and Reach, Maulden Wood and Chicksands Wood as well as important areas of heathland and acid grassland including Rammamere Heath SSSI, Coopers Hill SSSI and Sandy Warren SSSI are typical of the Ridge. The mosaic character of the area has been eroded over time by changes in agricultural and forestry practices and the impact of people. However, the Greensand Ridge still has many rich wildlife sites with opportunities to expand, buffer and connect them across the landscape. Although core biodiversity hotspots still exist, they have become increasingly smaller and more isolated. Its designation as an NIA means that organisations such as Central Bedfordshire Council, conservation organisations, local volunteer groups such as 'Friends of' and 'P3' and other stakeholders can all focus on making this happen.

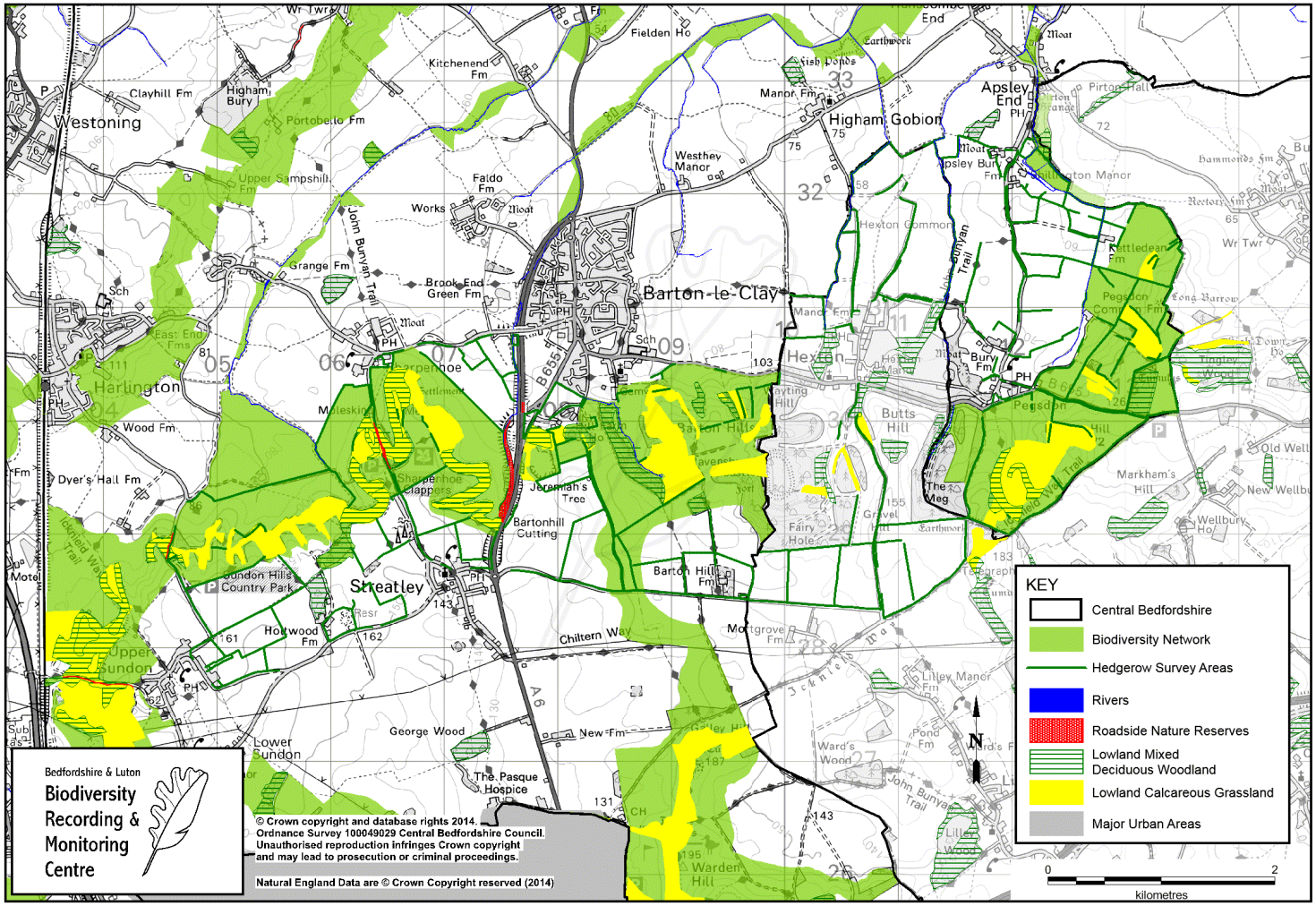

Figure 3: A map showing how different wildlife resources connect within the North Chilterns Chalk Living Landscape, together forming a biodiversity rich network within a local area Enabling previously isolated species and habitats to link up and increase in population size and diversity.

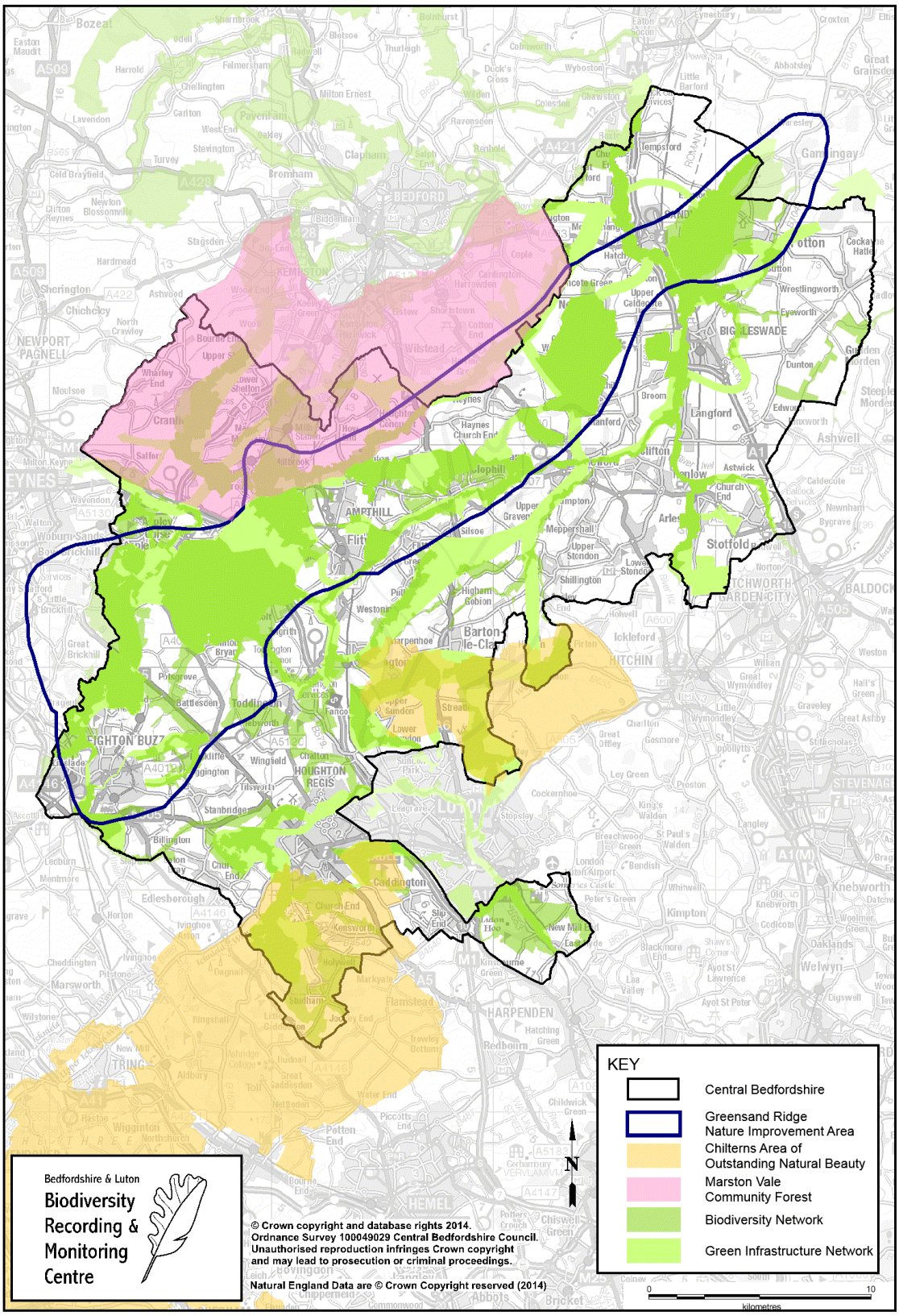

Figure 4: Connectivity of biodiversity networks across Central Bedfordshire

The Council is directly involved in protecting, managing and enhancing Central Bedfordshire's environment through a variety of functions. It manages countryside sites, Rights of Way (RoW), areas of farmland and parks, is responsible for the planning process and the Local Plan, is a major landowner and provides educational and environmental conservation opportunities through schemes such as 'People, Projects, Partnerships' (P3) and 'Friends Groups' helping the Council to manage its sites, RoW and other green spaces. Under Section 40 of the Natural Environment and Rural Communities Act 2006 all public bodies must 'have regard to the purpose of conserving biodiversity' across all of their areas of work. This Duty is extended to all bodies carrying out functions of a public character under a statutory power. There are other bodies and individuals, however, who also have an important role to play either through concern about the environment or through participation in projects or local groups. The Council encourages others to manage with regard to biodiversity and is pleased to work in partnership with them to further nature conservation within Central Bedfordshire.

Economic and Cultural Benefits

Biodiversity and the ecosystems that it makes up are often undervalued by conventional economic analysis and decision making, although they are critically important to our well-being and economic prosperity. Ecosystems provide a vast range of services which enable us to survive, from producing food, controlling water supplies and regulating the climate, to providing opportunities for recreation and contact with nature which research has shown promotes long term health and happiness (Natural England 2012). Figure 5 is taken from the National Ecosystem Assessment and highlights some of the different services provided. This study looked into the range of services provided by different habitats, their value and condition across the UK.

The provision of a better environment through the sympathetic management for biodiversity has direct benefits to the local economy. It creates an image which is attractive to employers and employees who are already in the area and also helps to attract more investment into Central Bedfordshire. It is, therefore, a subject of importance to the promotion of economic development. Nature conservation also helps to enhance Central Bedfordshire's overall "sense of place" and attraction which will help to increase visitor numbers and tourism in general.

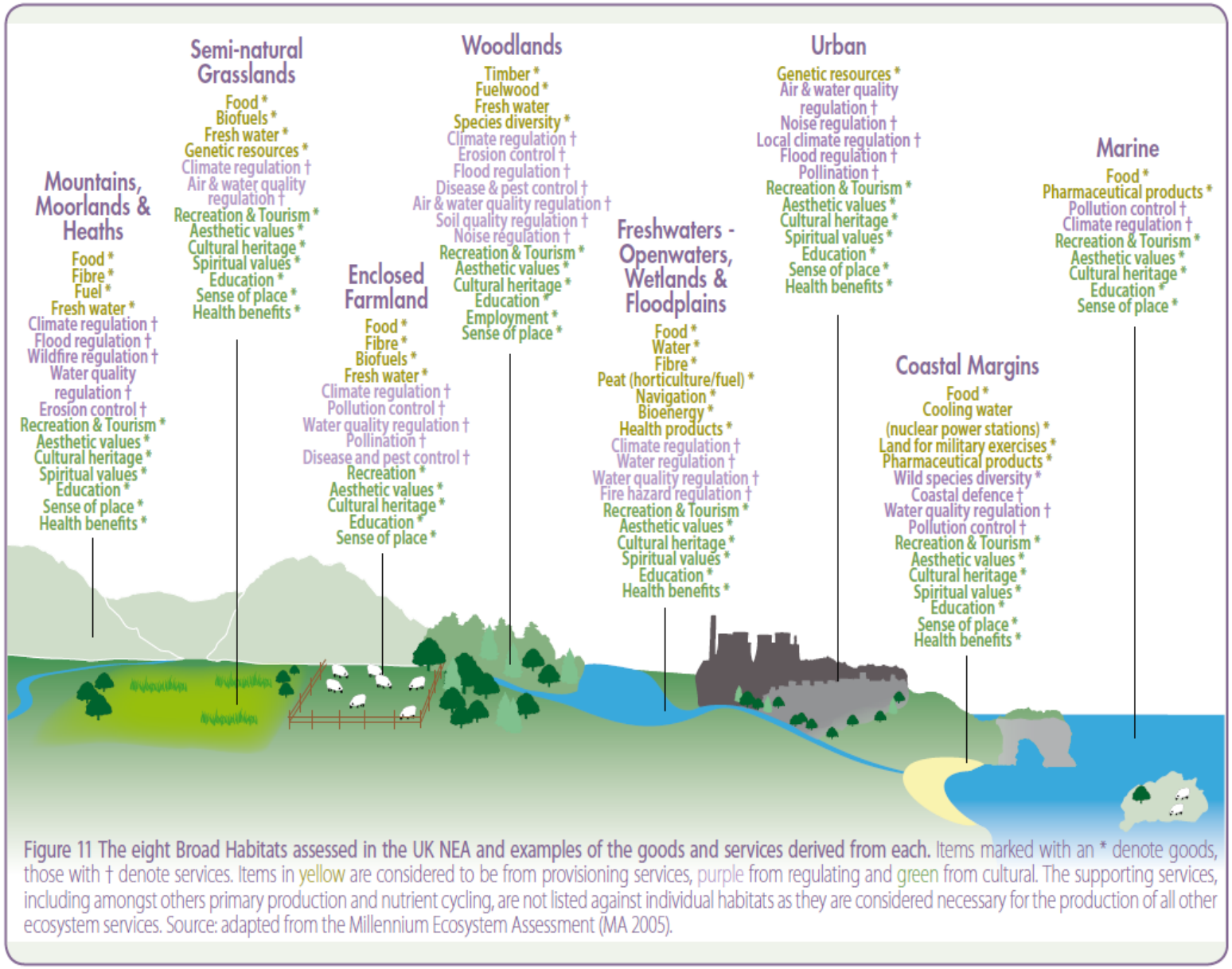

Figure 11 The eight Broad Habitats assessed in the UK NEA and examples of the goods and services derived from each. Items marked with an * denote goods, those with † denote services. Items in yellow are considered to be from provisioning services, purple from regulating and green from cultural. The supporting services, including amongst others primary production and nutrient cycling, are not listed against individual habitats as they are considered necessary for the production of all other ecosystem services. Source: adapted from the Millennium Ecosystem Assessment (MA 2005).

Figure 5: Extract from the National Ecosystem Assessment showing the range of ecosystem services provided by various habitats most of which occur within Central Bedfordshire.

Chapter 2

Policy Framework

National Policy

The United Kingdom is one of 192 governments that signed up to the Aichi Targets during the 10th meeting of the **Convention on Biological Diversity** in Nagoya, Japan during October 2010. These 20 Targets aim to halt the loss in biodiversity worldwide by 2020. Within the targets there are a range of challenges, from protecting our best habitats and rarest species, to restoring the services our natural environment provides and tackling climate change. The UK Post-2010 Biodiversity Framework (July 2012) describes how the Aichi Targets will be implemented across the UK and is underpinned by a Biodiversity Strategy for each Country. In England this is Biodiversity 2020: A strategy for England's wildlife and ecosystem services (August 2011).

Just before England's Biodiversity Strategy was published the Government also produced The Natural Choice – Natural Environment White Paper (June 2011). These two documents together set out the strategic direction for biodiversity policy until 2020. The mission for the Strategy is:

"To halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people."

The Lawton Report, Making Space for Nature, and the National Ecosystem Assessment are part of the evidence base for the Biodiversity Strategy. They emphasised the need to create more, bigger, better and joined up spaces for wildlife; creating a step change in efforts to conserve biodiversity and ecosystem services. To promote this approach **Local Nature Partnerships** and **Nature Improvement Areas** are being established.

The **Bedfordshire Local Nature Partnership** is a partnership of approximately 20 organisations from across the county all with an interest in enhancing our natural environment & ensuring that across Bedfordshire is protect our incredibly diverse landscape. This diverse membership works together to promote the positive management of the local environment and embed its value into local decision making. As part of the **Localism Act 2011** local planning authorities and councils have a "Duty to Co-operate" with the Local Nature Partnership on issues of local significance. Natural England and the Environment Agency also need to be consulted.

The Bedfordshire Local Nature Partnership was formally established in October 2013. Local Nature Partnerships (LNPs) are a key element of the Government's Natural Environment White Paper – "The Natural Choice – Securing the Value of Nature" (June 2011) and have been established across England. There is a legal duty on local planning authorities, County Councils and public bodies to engage with LNPs constructively and have regard to their views on strategic planning matters, recognising LNPs as balanced, strategic and knowledgeable partnerships.

The Bedfordshire Local Nature Partnership covers the geographical area of Bedfordshire, including the local authority administrative areas of Bedford Borough, Central Bedfordshire and Luton Borough. Its purpose is to ensure the natural environment is valued and integral to local decision making to deliver benefits for wildlife, people, landscape, heritage, and the local economy.

The aims of the Bedfordshire Local Nature Partnership are as follows:

- To champion the importance of the natural environment and the benefits it brings within key decision-makers and influencers locally, resulting in the protection, enhancement and positive use of a diverse, high quality green infrastructure network;
- To act as a natural environment advocate and critical friend to local and national government, Local Enterprise Partnerships and businesses;
- To encourage opportunities for people across Bedfordshire to engage with the natural environment, embedding its value within them;
- To ensure the natural environment is prioritised, planned for and delivered in an inclusive way to benefit existing and new communities;
- To ensure that the natural environment is valued and central to decision making and local economic plans;
- To promote the natural environment as a critical factor in underpinning the local economy;
- To promote the natural environment as a means of improving health and well-being within local communities;
- To champion sustainable practices which protect the natural environment and support a water catchment approach to ensuring a high quality water environment;
- To support cross boundary working with SEMLEP and neighbouring LEPs and LNPs
- To develop knowledge and understanding of adaptation to future climatic extremes and the changing needs of the environment, society and the local economy.

In order to help further these aims, the Bedfordshire Local Nature Partnership would expect any development proposals that come forward to:

- Make a net positive contribution to the green infrastructure of Bedfordshire as identified in Green Infrastructure Plans
- Not compromise green infrastructure networks identified in these plans
- Engage developers and planners in positive dialogue about Bedfordshire's natural environment

The **UK Biodiversity Action Plan** (BAP) was created in response to a commitment at the 2002 Convention on Biological Diversity. It summarises the status of the most threatened habitats and species in the UK and then sets out a series of actions to halt their decline and then reverse it. There are National Action Plans for 1150 species and 65 habitats. Although the Aichi Targets are the focus from the most recent Convention on Biological Diversity, the BAP is still a very valuable reference. It has been used to draw up statutory lists in some of the more recent Acts of Parliament which aim to protect and enhance biodiversity. Biodiversity Action Plans have been written for 23 priority habitats and priority species in Bedfordshire. Most of these are being updated in 2014 by members of the Bedfordshire Wildlife Working Group and are available on the BRMC website.

The first statutory recognition of wildlife sites came in the **National Parks and Access to the Countryside Act 1949**, which allowed for the designation of National Parks, Areas of Outstanding Natural Beauty (AONBs), National Nature Reserves, Local Nature Reserves and Sites of Scientific Interest (SSSI). SSSI were recognised for their wildlife or geology value but apart from restricting development received little protection. It was not until the **Wildlife and Countryside Act 1981** that protection for SSSIs was improved through a system of notifications. This Act also makes provision for the protection of some species. Part 1 of the Act provides protection for all wild birds and a number of other wild animals and plants included in its Schedules. For example, water voles and bats receive full protection under the Act, meaning that their places of shelter, as well as the animal itself, are protected; whereas, slow worms and grass snakes are only protected from being killed, injured or sold. Water voles, bats, slow worms and grass snakes can all be found in Central Bedfordshire. More information about the various Schedules included in this Act and the impact they can have on the planning process is set out in ODPM Circular 06/05: Biodiversity and Geological Conservation – Statutory Obligations and Their Impact within the Planning System.

The **Countryside and Rights of Way (CROW) Act 2000** increased the measures available to manage and protect SSSI further and also strengthened wildlife enforcement legislation. It reinforced the BAP process by introducing a statutory duty to take steps to conserve BAP species and habitats, all of which are listed in Section 74 of the Act.

In 2006 the **Natural Environment and Rural Communities Act** (NERC) came into effect, which for the first time placed a statutory duty on public bodies to:

"In exercising their functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity."

This is often referred to as the 'Biodiversity Duty' (Section 40). The aim of the Act is to embed nature conservation within all the relevant policies and decisions that public bodies make. Public bodies include a range of organisations from Central Bedfordshire Council to bodies carrying out functions of a public character under a statutory power. To help with this, the Act also contains Section 41 which is a list of habitats and species which are "of principal importance for the purpose of conserving biodiversity". Section 41 lists all the BAP habitats and species. There is a Guidance Document that accompanies this Act to assist local authorities to implement the Biodiversity Duty.

To consolidate previous legislation on sites and species which have European protection through the EC Habitats Directive the **Conservation of Habitats and Species Regulations 2010** replaced the Conservation Regulations 1994. Although there are no sites within Central Bedfordshire which have European protection (Special Areas of Conservation or Special Protected Areas) some of the 'European protected species' do occur. These include bats, otters and great crested newts.

In addition to those Acts of Parliament already mentioned there are several that concern individual species or habitats. These include **The Hedgerow Regulations 1997**, which protects 'important hedgerows' (as defined by the Regulations), and **The Protection of Badger Act 1992**, which defends badgers and their setts.

In 2014 Natural England and RSPB produced a document entitled “The Climate Change Adaptation Manual - Evidence to support nature conservation in a changing climate” which is a resource to support practical and pragmatic decision-making and focuses on the biodiversity and habitat management. The document is available on the Natural England website http://publications.naturalengland.org.uk/publication/5629923804839936. This emphasises that “climate change adaptation needs to be embedded into decision-making in specific places and circumstances”.

The Living with Environmental Change partnership has recently produced a Report Card on Terrestrial Biodiversity. http://www.lwec.org.uk/resources/report-cards/biodiversity

Headline messages from the UK Terrestrial Biodiversity Climate Change Impacts Report Card

- There is strong evidence that climate change is already affecting UK biodiversity. Impacts are expected to increase as the magnitude of climate change increases.
- Many species are occurring further north and at higher altitudes than in previous decades, including some species which have colonised parts of the UK from continental Europe.
- Recent rates of change in distributions differ between species. Some species, including many plants, are intrinsically slow to disperse and fragmentation of habitat may contribute to some species spreading more slowly than would be expected from climate change alone.
- Warmer springs in recent decades have caused a trend towards many biological events (e.g. flowering, budburst, laying and hatching of eggs) occurring earlier in the year. The rates of change vary among species, which may alter the interactions between species.
- There is evidence of changes in the composition of plant and animal communities, consistent with different responses of different species to rising temperature.
- Species differ in their responses to variation in precipitation. The effects of climate change are less certain for precipitation than for temperature, but potential changes could lead to substantial changes in biodiversity and ecosystems.
- Some habitats are particularly vulnerable to climate change. The risks are clearest for montane habitats (to increased temperature), wetlands (to changes in water availability) and coastal habitats (to sea-level rise).
- Climate change exacerbates the risk that non-native species (including pests and pathogens) may establish and spread.
- We expect there to be regional differences in the impact of climate change on biodiversity, reflecting different species, climate, soils and patterns of land use and management.
- The protected area network, which includes Sites of Special Scientific Interest and National Nature Reserves, will continue to have a valuable role in conservation, although there will be changes in populations, communities and ecosystems at individual sites.
- Climate change will interact with, and may exacerbate, the impact of other continuing pressures on biodiversity, such as land use change and pollution.
- Extreme weather events, such as droughts and floods, have clear impacts on ecosystems and the ecosystem services they provide. Climate change may alter the frequency and severity of such events. Extreme events associated with climate change may have a greater impact on biodiversity and ecosystems than changes in the ‘mean climate’.

Also important is the **Water Framework Directive**. This is a European initiative to improve and protect waterways. To meet its objectives the country has been divided into River Basin Districts, each of which has a programme of measures aimed at achieving 'good ecological status' on all watercourses. Chemical and biological elements are used to assess the status of each water body. If any one element falls below a 'good' level it does not reach the target, even if all the other elements meet the criteria. The **Water Framework Directive** came into effect in 2000 and became UK law in 2003. It recognises that development near water bodies can affect their quality and ecology and it establishes a legal framework for the protection, improvement and sustainable use of the water environment. This includes lakes, streams, rivers, groundwater and dependent ecosystems. It recognises that the causes of poor water quality and poor ecological status include point source pollution such as that from a pipe discharge, diffuse pollution including that from agricultural fertilisers and pesticides, low flows, flooding, modifications to water courses and habitat degradation.

Objectives of the Water Framework Directive include:

- achieving 'good' ecological status for all water bodies and preventing their deterioration overall
- reducing pollution from specified Priority Substances and Priority Hazardous Substances i.e. those that pose a significant risk as set out under the Directive;
- preventing and/or limiting the pollution of groundwater;
- protecting the water environment from pollution from new and existing development including pollution from surface water run-off.
- conserving aquatic ecosystems, habitats and species;
- mitigating the effects on floods and drought from new and existing development
- promoting the sustainable use of water and balancing abstraction and recharge; and
- Protecting flood plains from development including green infrastructure associated with the water environment that would impact on a waterbody / the water environment.

In planning terms the Framework means that developments affecting water bodies will be expected to deliver benefits such as:

- integrating SuDS and green infrastructure into new development;
- de-culverting, restoring or re-profiling rivers and naturalising river banks to promote natural flows and habitat improvements. Naturalistic flood defence solutions should take priority over the provision of hard flood defences in order to mitigate flood risk wherever possible;
- adopting water efficiency measures; and
- cleaning up contaminated land.

River Basin Management Plans (RBMPs) have been drawn up by the Environment Agency for the 10 river basin districts in England and Wales as a requirement of the water framework directive. River basin management plans set out measures to improve water in rivers, lakes, estuaries, coasts and in groundwater. Central Bedfordshire sits mostly within the **Anglian River Basin District.** This covers almost 28,000 km2 from Lincolnshire in the north to Essex in the south, and Northamptonshire in the west to the East Anglian coast. The river basin district is the richest region in the UK for wetland wildlife. Freshwater habitats within the district are very important for wintering wildfowl and our reservoirs and watercourses support important fisheries. The Anglian district river basin management plan (2014) can be found at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/309814/River_Basin_Management_Plan.pdf

This has a series of annexes which cover

- Current state of waters
- Water body status
- Actions to deliver
- Protected area objectives
- Actions appraisal and justifying objectives
- Mechanisms for action
- Pressures and risks
- Adapting to climate change
- Designating artificial and heavily modified water bodies
- Aligning other key processes to river basin management
- Economic analysis of water use

(these are hyperlinked to the documents for ease)

This plan is about the pressures facing the water environment in the Anglian River Basin District and the actions that will address them. It has been prepared under the Water Framework Directive. The first cycle of this plan was published in 2009 and the main aim was that at least 30 per cent of assessed surface waters will be at good or better biological status by 2015. This plan focuses on the protection, improvement and sustainable use of the water environment. Many organisations and individuals help to protect and improve the water environment for the benefit of people and wildlife. River basin management is the approach the Environment Agency is using to ensure combined efforts achieve the improvement needed in the Anglian River Basin District.

More information on catchment planning and river basin districts can be found at http://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/5.

The Anglian district river basin is divided up into 11 Management Catchments (of which Central Bedfordshire is within the Upper and Bedford Ouse Management Catchment http://environment.data.gov.uk/catchment-planning/OperationalCatchment/an-bedford-ouse) and 80 Operational Catchments

Catchment Flood Management Plans have been developed by the Environment Agency to establish flood risk management policies that will deliver sustainable flood risk management for the long term. The Great Ouse Catchment Flood Management Plan Summary Report (2011) can be found at

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/288877/Great_Ouse_Catchment_Flood_Management_Plan.pdf

The UK's National Ecosystem Assessment (2011) found that about 30% of the services that ecosystems provide are in decline and many others are operating in a reduced state. These services include declines in pollinators, which are estimated to be worth hundreds of millions of pounds annually, and the condition of soils. Soils are vital for food production and biodiversity but have suffered from atmospheric deposition and inappropriate management. In urban areas in particular the ability of ecosystems to regulate flooding and reduce atmospheric pollution are very important. Shrubs, trees and other vegetation are known to remove large amounts of pollutants from the atmosphere every year. This is just one function of one aspect of the park. Other aspects which are not always considered are the ethical, spiritual and aesthetic qualities of biodiversity which are more difficult to quantify. Information about ecosystem services will help with the planning of future green spaces to better accommodate biodiversity and ecosystem services as well as suggesting how to upgrade existing sites.

Having a healthy functioning natural environment also has community benefits. It promotes a sense of well-being about an area, particularly when the local community is involved in its management. This can range from commenting on a site's management plan to recording the wildlife that is found in an area or being involved in the practical management of sites alongside others from the local community. All these opportunities are available within Central Bedfordshire. There is an increasing body of evidence which identifies how a healthy natural environment is able to promote the health and wellbeing of local residents. Experiencing nature can help to prevent disease and accelerate recovery from illness, as well as helping to tackle obesity, coronary heart disease and mental health problems (Natural England 2012). The wide range of benefits derived from a healthy natural environment is recognised in England's Biodiversity Strategy: Biodiversity 2020, which places people at the heart of biodiversity policy.

In early 2012 the new **National Planning Policy Framework** (NPPF) came into force which replaced most of the planning guidance that was available previously. This includes Planning Policy Statement 9 (PPS9) which previously covered biodiversity and geological conservation within planning applications. The Circular which accompanied PPS9 (ODPM Circular 06/2005 Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System) has not been replaced or revoked and remains relevant. It provides administrative guidance on how to apply the laws which relate to biodiversity within planning. The Good Practice Guide: Planning for Biodiversity and Geological Conservation is also current and covers how local planning authorities can implement national strategies. The External Review of Government Planning Practice Guidance (2012) recommends that the biodiversity guidance is updated to reflect the NPPF but this is not yet available. The NPPF states that planning needs to be sustainable and has an environmental role that should include net gains for biodiversity (paragraph 9). As with PPS9 before it, the NPPF provides protection within the planning system to designated sites, Areas of Outstanding Natural Beauty (AONB), priority habitats and species, ancient woodlands and veteran trees. More emphasis is placed on the creation of biodiversity

networks within the NPPF than in previous documents. This reflects the findings from the Lawton report and Natural Environment White Paper. Developments are now expected to create networks in addition to maintaining and repairing networks which already exist. To reflect the NPPF Local Plans must identify and include policies to protect and enhance biodiversity.

The NPPF also introduced the **Local Green Space designation** (paragraphs 76 and 77). These are areas which can be included in Local Plans or Neighbourhood Plans to give them protection from development apart from under exceptional circumstances. To be designated as a Local Green Space the area needs to be particularly important to the local community in recognition of a special feature, which could be the diversity of wildlife it contains.

Local Policy

The wildlife within Central Bedfordshire is appreciated by many local residents. The Board of Central Bedfordshire Together is responsible for developing the **Sustainable Community Strategy** 2010-2031. Our residents are particularly proud of our rural communities and open spaces, and consider them to be one of the key benefits of living in Central Bedfordshire. We need to protect, care for and improve our green environment, heritage, arts and culture. By 2020 the Strategy aims to have protected, enhanced and raised awareness of our biodiversity, landscape, historical environment, green spaces and paths.

The Council's Plan **'Delivering your Priorities - Our Plan for Central Bedfordshire 2012-2016'** also includes this priority and has actions for "enhancing your local community – creating jobs, managing growth, protecting our countryside and enabling businesses to grow**:** CBC aims to increase satisfaction with the area as a nice place to live year on year with a continued programme of enhancements to the area".

The Council's Strategic Planning documents are one of the places where biodiversity policies are incorporated to assist with the actions of the Plan for Central Bedfordshire and Sustainable Community Strategy.

Central Bedfordshire's **Development Strategy (2014)** is currently being developed but when adopted will set out the development management policies to protect and enhance the environment within Central Bedfordshire.

The inclusion of such policies is necessary as part of the Council's responsibilities under the NERC Act and NPPF. Paragraph 114 of the NPPF states that local planning authorities should:

> "Set out a strategic approach in their Local Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure."

It also gives more details of how this should be done. Paragraph 117 states that local planning authorities should:

"plan for biodiversity at a landscape-scale across local authority boundaries" and "identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation."

The Development strategy contains policies which relate to biodiversity including Policy 57: Biodiversity and Geodiversity and Policy 59: Woodlands, Trees and Hedgerows. These policies encourage the enhancement and creation of wildlife habitats and geological sites and protect designated sites and habitats.

The strategic planning for minerals and waste sites is carried out separately. The **Minerals and Waste Local Plan: Strategic Sites and Policies** was adopted in 2014. It will be followed by a General and Environmental Policies Development Plan Document in 2015. Until this has been adopted there are several saved policies from the Minerals and Waste Local Plan which concern biodiversity. These are:

- GE7: Protection of Chilterns AONB
- GE10: Protection/Enhancement of Trees and Woodland
- GE11: Protection of Sites of Nature Conservation Importance
- GE12: Designated Sites
- GE13: Species and Habitat Protection and Enhancement

The Minerals and Waste Plans are produced jointly by Luton Borough Council, Central Bedfordshire Council and Bedford Borough Council.

Alongside the National BAP, Bedfordshire has development a **Local BAP** which covers the most threatened habitats and species in the County and sets out Action Plans for how their decline can be reversed. These documents can be found on the Bedfordshire and Luton Biodiversity Recording and Monitoring Centre's website (www.bedsbionet.org). Central Bedfordshire contains about 107 national BAP species of which seven have local Action Plans. There are also 18 local Habitat Action Plans including hedgerows and lowland calcareous grassland. The local BAPs have recently been reviewed and brought up-to-date.

Tree Protection Orders (TPOs) provide another way to protect wildlife within Central Bedfordshire's green spaces and urban areas. These Orders can be made by local authorities to safeguard trees of significant amenity value. New regulations on TPOs came into force during 2012.

Some landscape designations also affect biodiversity features, particularly trees and woodland within the urban area. There are fifty eight **Conservation Areas** in Central Bedfordshire where the character and appearance of the historic and architectural features are to be maintained. Their designation extends beyond listed building to include trees which may be an important feature within their character.

Woburn Abbey Deer Park is one of a number included in English Heritage's list of **Registered Park and Gardens of Special Historic Interest**. Inclusion in this list is a 'material consideration' within the planning system and is designed to recognise the value of historic parkland and its 'designed' landscape promoting its preservation. Many features of these parks are also important for biodiversity alongside their historic value.

Local Resources and Strategies

There is a wealth of information available about Central Bedfordshire's environment and its biodiversity in particular. Below is a summary of useful documents and surveys which underpin the policies and action plan found in the following chapters.

Central Bedfordshire Council's Environmental Enhancement Strategy

Work to plan for an improved natural environment has taken place across Central Bedfordshire through various studies and strategies. This Environmental Enhancement Strategy summarises and brings together existing evidence and identified priorities for environmental enhancement, covering natural environmental enhancement and protection, and sustainable resource management.

Rebuilding Biodiversity in Bedfordshire and Luton

The creation and maintenance of a wildlife rich landscape is reliant on the ability of species to move between sites. This creates larger more connected populations which are more resilient to climate change. Rebuilding Biodiversity brought together all the available information on the biodiversity resource across Bedfordshire and analysed it to produce a biodiversity network. The network picks out existing biodiversity hotspots, where there are existing concentrations of notable species and habitats, and links them together using information on the surrounding geology and landform. The resulting network was also used in the creation of the County's Green Infrastructure Plans. Although this document was written before Biodiversity 2020, it strongly reflects its aim to move towards a more integrated large-scale approach to conservation.

Rebuilding Biodiversity in South Bedfordshire and Luton

This document focused on South Bedfordshire and Luton to produce a more detailed biodiversity network and identified corridors within the urban conurbation. It was created using the same process as the County network. The network within Central Bedfordshire can be seen on Figure 4.

The Bedfordshire and Luton Strategic Green Infrastructure Plan

The Strategic Green Infrastructure Plan brings together information on the County's biodiversity, historic environment, landscape, access routes and accessible green spaces to identify a high level network. The Plan, completed in February 2007, includes details of green infrastructure assets and opportunities. There are eleven green infrastructure networks highlighted within this plan, many of which are in Central Bedfordshire, including the Greensand Ridge, the Flit valley and the Chalk Arc.

The Luton and Southern Bedfordshire Green Infrastructure Plan

Following on from the Strategic Green Infrastructure Plan a more detailed plan for Luton and southern Central Bedfordshire was produced in 2009. It contains a more detailed network with information on the opportunities and priorities for green infrastructure within this area. Both green infrastructure plans can be found on the Green Infrastructure Consortium's website www.bedsandlutongreeninfrastructure.org.

Neighbourhood Plans / Parish Green Infrastructure Plans

15 parishes within Central Bedfordshire have Neighbourhood Plans (this is approximately 19% of parishes) and 37 parishes have Parish Green Infrastructure Plans (some parishes have both). These plans have brought the green infrastructure process down to the community level. The plans are produced via workshops where local residents are provided with maps showing the biodiversity, historic environment, landscape, access and green space assets that already exist in their parish. They are asked to add any additional assets that they are aware of to the maps and then create and/or improve a green infrastructure network across the area.

Further information on Neighbourhood plans in Central Bedfordshire, including details of those plans already written can be found at http://www.centralbedfordshire.gov.uk/planning/strategic-planning/neighbourhood-plans.aspx

Parish Green Infrastructure Plans can be found on the Bedfordshire Rural Communities Charity's website - http://www.bedsrcc.org.uk/greenInfrastucture/greeninfrastructure3.html

Phase I Habitat Surveys

Phase I Habitat Surveys for the whole county were undertaken in 1987-1989. The Phase I habitat survey is a widely used method to relatively quickly record the vegetation types which are found in an area. This county wide phase 1 survey has not been repeated since but a rolling programme of surveys of a small number of sites is ongoing under the umbrella of the Bedfordshire Wildlife Working Group.

The initial surveys resulted in the identification of "Prime Sites of Nature Conservation Importance" (PSNCI) in 1990 which later became known as County Wildlife Sites (CWS)

In the late 1990s guidelines, based on nationally agreed principals, were developed for recognising County Wildlife Sites (CWS). These guidelines consider aspects of the site such as size, diversity, rarity, fragility, typicality and recorded history to select sites which are important for wildlife at a county level.

The Local Sites partnership maintains an overview of the system and also oversees the CWS panel which meets according to need to review CWS selection guidelines designate new sites, alter boundaries of existing sites or deselect sites if they no longer meet the CWS selection guidelines.

All survey information, species records and the boundaries of all CWS in Central Bedfordshire have been digitised for use on a Geographic Information System (GIS) by the Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC).

Further County Wildlife Site Surveys

It is important to keep the information used in the CWS system up-to-date. Since 1990 41 additional CWS have been designated in Central Bedfordshire and there have been modifications to the boundaries of others. Each change has been accompanied by

supporting survey information. Changes to existing CWS or the designation of new sites needs to be agreed by the CWS Panel. The Panel's Terms of Reference and CWS selection guidelines are available on the BRMC's website (www.bedsbionet.org.uk). CWS will be incorporated into the Development Strategy in accordance with the NPPF.

There have also been more specialist surveys conducted to broaden our knowledge about some of the sites, for example, their breeding bird or invertebrate assemblages. The survey information which underpins the CWS system is held for the CWS Panel by the BRMC. In 2013/14 CBC funded a CWS survey update of 38 sites in our area.

Hedgerow Surveys

Diverse, well managed hedgerows can provide wildlife corridors which link together areas of richer habitats and prevent them from becoming isolated.

A survey of hedgerow cover was carried out by Bedfordshire County Council Planning Department in 1978-79, and was published in 1980 as part of the Landscape and Wildlife Landscape Technical Volume. Paper copies of these surveys are held by BRMC. Hedgerow survey information is also available from the 1987-8 Phase I habitat survey. Although this information is fairly basic it does record the location and integrity of hedgerows within Central Bedfordshire.

More detailed surveys have been carried out in Studham (2006), Maulden (2007) and Pegsdon (2009). A desk top survey suing aerial photographs of the
Sundon/Barton area has been undertaken to compare hedgerow cover in 1946, 1968, 1981, 1991, 2002 and to assess how this resource has changed over time.

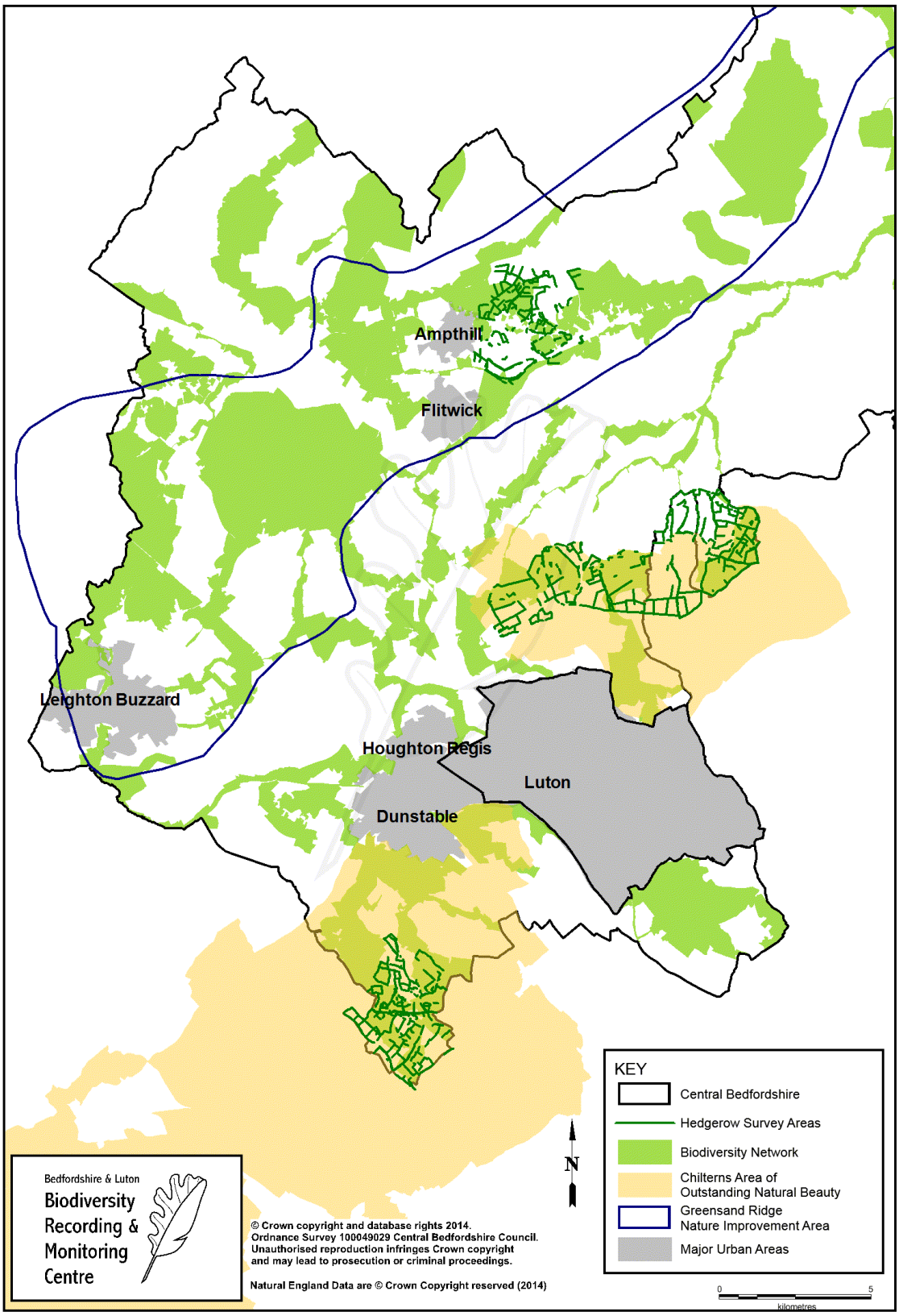

Figure 6: Areas of hedgerow surveys undertaken in Central Bedfordshire between 2006-2009.

Outdoor Access Improvement Plan

This guides green space and access management for Central Bedfordshire for the period 2012 - 2031, updating and replacing the existing Outdoor Access Improvement Plan (OAIP) 2006 - 2011. This plan integrates with the Sustainable Communities Strategy, the Local Development Framework, Local Transport Plan and wider suite of new policies and strategies. The management of green spaces and access to the wider countryside is central to ensuring that Central Bedfordshire is seen as a green and pleasant place to live and work. This plan helps people and communities explore and understand Central Bedfordshire's varied landscapes and become involved in its management, increasing volunteering and generating an increased sense of ownership and pride.

Although this plan doesn't address biodiversity issues directly, many of the spaces identified in the plan have biodiversity interest as well as being valuable recreational spaces. This can have positive benefits if both aspects are managed sensitively. Considering the network of green spaces for people can also form part of the biodiversity network across Central Bedfordshire. In particular the 'Connecting Spaces' may also have benefits for helping connect areas of biodiversity interest and acting as corridors for wildlife.

Landscape Character Assessments

The Landscape Character Assessment process is a useful tool to help define what gives an area its 'sense of place' and how if differs from its surroundings. Part of this assessment includes features, such as street trees, which are valuable for wildlife as well.
There are two separate Landscape Character Assessment reports for Central Bedfordshire which cover the former Mid Bedfordshire (2007) and South Bedfordshire District Council (2009) areas.

Both Landscape Character Assessments, when considered together, provide a characterisation of the whole of Central Bedfordshire and describe eight broad landscape types. These eight landscape types are further subdivided into smaller landscape character areas which each have a distinct and recognisable identity at the local level. These character areas provide a useful and convenient unit for the Landscape Character Assessment and therefore are used as the basis for the detailed description and evaluation.

- Former South Bedfordshire district landscape character assessment (April 2009) - http://www.persona.uk.com/a5dunstable/deposit-docs/DD051-DD075/DD-071.pdf

- Former Mid Bedfordshire district landscape character assessment (August2007) - http://www.centralbedfordshire.gov.uk/Images/Introduction%20and%20methodology_tcm6-26756.pdf

- The Totternhoe Hills and Lanes – a partnership project looking at improving biodiversity, access and linkages across this unique area of green lanes, chalk grassland and disused chalk quarries adjacent to the village of Totternhoe. Projects and initiatives are developed and taken forward by a steering group chaired by Central Bedfordshire Council.

Green Wheels

Biggleswade, Sandy and Etonbury all have Green Wheels which aim to create a wildlife rich setting through attractive landscape corridors. The principal aims of this scheme are to focus on public access and green space forming a circuit around the urban area, to connect people and their environment. These also aim to provide walking and cycling access both around the urban fringe and into and out of the town. The Biggleswade Green Wheel will incorporate the river Ivel, the common and a network of footpaths and bridleways including the Kingfisher Way long distance walk and the Great North Cycleway.

Biggleswade Green Wheel -
http://www.centralbedfordshire.gov.uk/Images/BGW%20masterplan%20250213_tcm6-43375.pdf

Sandy Green Wheel -
http://www.centralbedfordshire.gov.uk/Images/SGW%20Masterplan%20Final%20080814_tcm6-57017.pdf

Etonbury Green Wheel

Local Master Plans

These Master Plans have been developed by Central Bedfordshire Council's Countryside Access Service, in partnership with the National Trust, The Wildlife Trust, Groundwork Luton & Bedfordshire, The Chilterns Conservation Board and the local communities surrounding the area. The Vision for these master plans is to: Provide a structured, informed and shared vision for the future management and development of defined landscape areas.

- Totternhoe countryside area master plan
  http://www.centralbedfordshire.gov.uk/Images/Totternhoe%20Final%20Word%20Doc%20mod3%20-%20web%20version_tcm6-46016.pdf

- Sundon and Streatley Chiltern arc access and green space vision plan (2013)
  http://www.centralbedfordshire.gov.uk/Images/Sundon%20%20Streatley_Vision%20Plan%20Sept%202013-webpdf_tcm6-55288.pdf

Chiltern AONB management plan (2014-2019)

This Management Plan provides a framework to enable stakeholders to, collectively, maximise their effectiveness in managing the Chilterns AONB. It sets out the special qualities of the area, presents a vision of the AONB, identifies the challenges and identifies policies and actions to guide the work of all stakeholders who care for the area from 2014 – 2019.

http://www.chilternsaonb.org/uploads/files/ConservationBoard/ManagementPlan/Management%20Plan%202014-19/chilterns_management_plan_2014-19_final.pdf

The Forest of Marston Vale

The Forest of Marston Vale is a community forest made up of a patchwork of woodlands covering 61 square miles. The aim of the project is to use trees and woodlands to repair a damaged landscape, addressing the effects of the brick making industry, which had flourished for over a hundred years between Bedford and Milton Keynes. These include Kings Wood (LNR), Kempston Wood, Conquest Wood and Folly Wood & Granary Wood. These represent a mix of ancient and newly planted woodlands which are owned and managed by a number of organisations. The headline target is to achieve 30% tree cover by 2031, but trees are just the tool to deliver the aim of environmentally-led regeneration, providing social, economic and environmental benefits both now and into the future.

http://marstonvale.org/

Chapter 3

Central Bedfordshire's Nature Conservation and Biodiversity Resource

Geology

This description of the geology of Central Bedfordshire is taken from the Landscape Character Assessments undertaken in 2007/2009 for the former Mid Bedfordshire and South Bedfordshire districts. These are available in full on the Central Bedfordshire Council's website.

Central Bedfordshire contains almost all the geological formations found within the county creating a very varied landscape character ranging from the edge of the Chiltern's chalk in the south, clay vales and hills and the distinctive Greensand ridge. Although there are a wide variety of rock types within Central Bedfordshire, the rocks outcrop in a simple way, the geological strata generally running diagonally from south-west to north-east. The angle of inclination (dip) is south-easterly.

The prominent land forms produced by the chalk geology are mainly within the southern part of Central Bedfordshire where it forms a strong south-west to northeast running escarpment with heights up to 170m AOD. A small part of the chalk escarpment that forms the Chilterns is found within Central Bedfordshire but this has a considerable influence on the landscape of the area.

There is a belt of Gault Clay (formed during the Lower Cretaceous period - approximately 100 million years ago) which stretches southwest-northeast to the north of the chalk and south of the band of Lower Greensand. This is overlaid in places by Boulder Clay forming a line of low clay hills.

The prominent ridge of Lower Greensand forms the most distinctive landform in Bedfordshire. It extends in a north-easterly direction across the county from Leighton Buzzard to Potton. The light sandy soils of the greensand and underlying boulder clay support substantial areas of ancient woodland and historic woodland clearance resulted in extensive areas of heathland many of which have since been forested. The sands are used in numerous industries and are the subject of significant quarrying activity.

The underlying geology to the north of this is Oxford Clay. This has been extensively quarried around Stewartby and Marston Mortaine leaving a legacy of brick pits and water filled excavations.

River gravels are found along the courses of the main rivers Flit, Ivel and Great Ouse. The wider floodplain of the Ivel and Ouse has been subject to extensive excavation of sands and gravels resulting in numerous flooded

pits creating a landscape now dominated, in places, by open water. These gravel deposits are interspersed with deposits of alluvium.

The River Ivel and River Flit tributaries of the River Great Ouse, these rivers are joined by numerous small watercourses which thread across the vales and through the greensand and clay hills. The rivers have a varied form ranging from the relatively narrow incised valley of the Flit to the wider flat floodplain of the Ivel and Great Ouse, which has been subject to gravel extraction

The River Ouzel flows through Leighton Buzzard and bisects the Greensand Ridge. In addition the chalk is cut by a number of seasonally wet valleys, including the headwaters of the Gade and the Ver. The Lea Valley breaches the escarpment and contains a permanent watercourse. The chalk is an important aquifer and gives rise to a number of springs where the permeable chalk meets the impermeable clay, which forms minor watercourses crossing the vale.

The underlying geology has a large influence on the habitats and species of an area. Within Central Bedfordshire in the Chiltern Hills the most common habitats are calcareous grassland with associated scrub and small patches of woodland. There is also a concentration of important areas for arable plants such as arable field margins. In the clay vale the habitats of principal importance are lowland meadow and wetlands including rivers and streams with gravel pit complexes along Ivel valley and wet woodlands. The Greensand Ridge has an interesting suite of priority habitats including heathland and acid grassland on the thin sandy soils, important ancient woodlands all along the ridge and it also supports areas of parkland environments with some large and ancient trees. Towards the west of the ridge is a complex of working and disused sand quarries many of which are very valuable open mosaic habitats on previously developed land, each with its own differing mosaic of habitats.

Statutory and Non-Statutory Nature Conservation Sites

The **Chilterns Area of Outstanding Natural Beauty (AONB)** covers 838 square kilometers of countryside including 64 square kilometers in the southern part Central Bedfordshire. The AONB was designated in 1965 in recognition of the fact that the Chiltern Hills contain some of the finest landscapes in the country which are worthy of protection at the highest level. More information is available at:
http://www.chilternsaonb.org/about-chilterns.html#sthash.Unrzsg0G.dpuf.

Although there are no sites of European importance within Central Bedfordshire, there are many sites of National Importance.

National Nature Reserves (NNRs) include some of the best examples of England's wildlife and geology, England has 224NNRs. NNRs were established under the National Parks and Access to the Countryside Act 1949, which specified that they were for "preserving flora,

fauna or geological or physiographical features of special interest in the area and/or for providing opportunities for the study of, and research into, those features". The Natural Environment & Rural Communities Act 2006 extended the role of NNRs to include the provision of opportunities for public enjoyment of nature and/or open-air recreation. Further information about NNRs can be found on the Natural England Standard "National Nature Reserves (NNR) Management" - http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCYQFjAA&url=http%3A%2F%2Fpublications.naturalengland.org.uk%2Ffile%2F5754515831652352&ei=yYyRVPDOBo3faPHZgeAF&usg=AFQjCNFhfWa5HAwJmN2l6IMNyxWIB68K2Q&bvm=bv.82001339,d.d2s

There are three National Nature Reserves (NNR) in Central Bedfordshire; Barton Hills NNR, King's Wood, Heath and Reach NNR and Knocking Hoe NNR. Barton Hills is recognised for neutral and calcareous grassland and ancient semi-natural woodland. The site is good for rare species such as pasque flower (*Pulsatilla vulgaris*), woolly thistle (*Cirsium eriophorum*) and field fleawort (Senecio integrifolius), as well as more common chalk grassland species including marjoram, rock rose and field scabious. Many butterflies are recorded on the site including chalk-hill blue, marbled white and dark green fritillary. King's Wood, Heath and Reach is recognised for its ancient semi-natural woodland, neutral grassland and boulder clay grassland. The site is home to rare mosses and fungi and there are recent records of the purple emperor butterfly (*Apatura iris*). Knocking Hoe is an area of species rich calcareous grassland in the north of the Chilterns. The site supports large populations of a number of rare plants including moon carrot (*Seseli libanotis*), field fleawort (*Tephroseris integrifolia*), burnt tip orchid (Orchis ustulata) and pasque flower (*Pulsatilla vulgaris*) and holds a good population of autumn lady's tresses (*Spiranthes spiralis*).

Sites of Special Scientific Interest (SSSI) represent the country's best wildlife and geological sites. These are protected under the National Parks and Access to the Countryside Act 1949, Wildlife and Countryside Act 1981 (as amended) and Countryside and Rights of Way Act 2000. There are 33 Sites within Central Bedfordshire which are designated as SSSI which represent the best wildlife and geological sites in the Country.

Appendix 2 lists Central Bedfordshire's SSSI and the features for which each is recognised. For an up-to-date list of CWS please contact the BRMC.

Two examples of SSSIs in Central Bedfordshire are Cooper's Hill SSSI and Houghton Regis Marl Lakes SSSI. Cooper's Hill SSSI is the best remaining example in Bedfordshire of the once more extensive heathland situated on the thin acidic soils of the Lower Greensand ridge. Lowland heath has a limited distribution in south eastern England where it has declined markedly in recent years. Succession from heath to woodland is taking place but management is being undertaken to control these successional changes and conserve the heathland plant community and the SSSI is in "Favourable" condition. Houghton Regis marl lakes SSSI have developed in a large disused quarry within the Lower Chalk north of Dunstable. The Lakes are an example of habitat type which is the rarest form of standing water in Britain confined to chalk or limestone areas with very few examples in southern England. A mosaic of wetland communities have developed associated both with the open water and water-logged areas surrounding the lakes and include examples of base rich fen. This extensive area supports a range of other species associated with wetland habitats including an outstanding assemblage of dragonfly, as well as being an important

ornithological site in the county. Three quarters of this SSSI is currently in “unfavourable – recovering” condition with the remaining quarter of the site being “unfavourable – declining”. The Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire took over management for this site in 2011 on behalf of the quarrying landowner and are working hard to improve the site after forty years of neglect including large areas of scrub encroachment and clearing decades of fly tipping from the marl lake.

Eleven sites are designated as **Local Nature Reserves (LNR)** - Galley and Warden Hills, Coopers Hill, Marston Thrift, Maulden Church Meadows, Flitwick Wood, Cottage Bottom Fields, Henlow Common and Langford Meadows, Kingswood and Glebe Meadows, Totternhoe Knolls, The Riddy and Flitton Moor.

In the next tier down from SSSI, **County Wildlife Sites (CWS)** are sites which have been selected on a county basis for being important for wildlife when assessed against a set of criteria. These may include sites which are of SSSI standard. These cover a range of habitats and are a very important part of the creation of a network of habitats across the area linking the urban areas to the surrounding countryside.

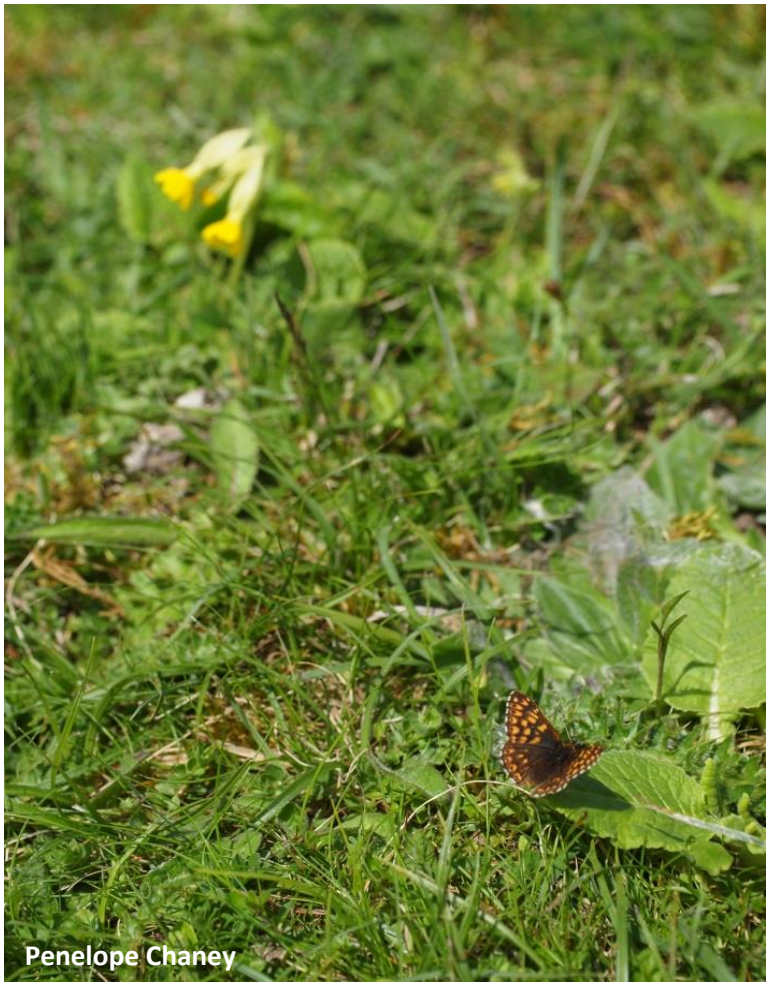

Figure 7: Duke of Burgundy butterfly and cowslip on Totternhow Knolls LNR

As of October 2014 Central Bedfordshire has 259 CWS within its boundary (of which 8 are ‘shared’ with Bedford Borough Council and 5 ‘shared’ with Luton Borough Council) (Figure 8). These sites have been recognised as important for wildlife when assessed against a set of criteria. They cover a range of habitats across Central Bedfordshire and help to form a network of sites through which wildlife can move. Although designation as a CWS does not give the site any legal protection, it does mean that it is recognised in Local Plans and policies which promote the defence and enhancement of CWS.

County Wildlife Sites and Local Geological Sites are covered by the NPPF as follows:

117. To minimise impacts on biodiversity and geodiversity, planning policies should:

- plan for biodiversity at a landscape-scale across local authority boundaries;
- identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation;

Appendix 2 lists Central Bedfordshire's CWS and the features for which each is recognised. For an up-to-date list of CWS please contact the BRMC.

Road verges often contain habitats of principal importance, consisting of grassland, scrub, a ditch system, a hedge and then an arable field margin. This results in a unique and important linear ecosystem. There are 20 **Road Verge Nature Reserves (RNR)** within Central Bedfordshire, of which nine are within or adjacent to a SSSI. The Council has identified areas of roadside verge that have high value of flora and fauna to be maintained appropriately. These are recorded and shown on a GIS overlay and are identified on site by means of marker posts. They are managed specifically for their conservation value though road safety and visibility is maintained at all times.

Road verge nature reserves are selected at sites where it is desirable and possible to protect and manage important wildlife interest. Sites where road safety would be prejudiced by nature conservation management would not normally be selected. Wildlife interest would normally be expected to meet one or more of the following criteria:

- Within or adjacent to a nationally important wildlife site (SSSI)
- All or part of a County Wildlife Site or meeting the criteria for CWS status.
- Supporting species that are rare or protected

These are important wildlife habitats and even for non-designated road verges there are many opportunities to enhance the management of the roadsides to benefit wildlife together with areas of landscaping within commercial sites which would add significantly to the creation of a network of green corridors across the urban area.

Figure 8: Honeydon RNR

Road Verge Nature Reserve	Reason for designation
Fox Corner RNR	Rich flora and invertebrate fauna
Houghton Regis Cutting RNR	Species rich chalk flora
Well Head RNR	Species rich flora
Marston Bypass RNR	Seeded with wildflowers
Cooper's Hill - SSSI RNR	Site of Special Scientific Interest
Flitwick Moor - SSSI RNR	Site of Special Scientific Interest
Ireland RNR	Species rich woodland flora
Pulloxhill Marsh - SSSI RNR	Site of Special Scientific Interest
Shefford - Henlow Bypass RNR	Seeded with wildflowers
Wavendon Heath Ponds SSSI RNR	Site of Special Scientific Interest
Barton Bypass RNR	Seeded with wildflowers
Kings & Bakers Wood SSSI RNR	Site of Special Scientific Interest
Nine Acre Pit SSSI RNR	Site of Special Scientific Interest
Smithcombe, Sharpenhoe & Sundon Quarry SSSI RNR	Site of Special Scientific Interest
Totternhoe Chalk Quarry SSSI RNR	Site of Special Scientific Interest
Totternhoe Knolls SSSI RNR	Site of Special Scientific Interest
Deadman's Hill (Maulden Wood) RNR	Supporting protected or rare species

Disused railways also provide useful wildlife corridors. For example in Central Bedfordshire Old Warden Tunnel is recognised as a County Wildlife Site as a habitat mosaic containing calcareous grassland, neutral grassland, scrub, semi-natural broadleaved woodland, wet woodland, pools, marsh and ruderal vegetation.

Central Bedfordshire also has 20 **Local Geological Sites (LGS)**. These are selected primarily for their scientific and educational importance but may also have considerable aesthetic value, as is the case with the chalk downlands.

Appendix 4 lists Central Bedfordshire's LGS and the features for which each is recognised. For an up-to-date list of LGS please contact the BRMC.

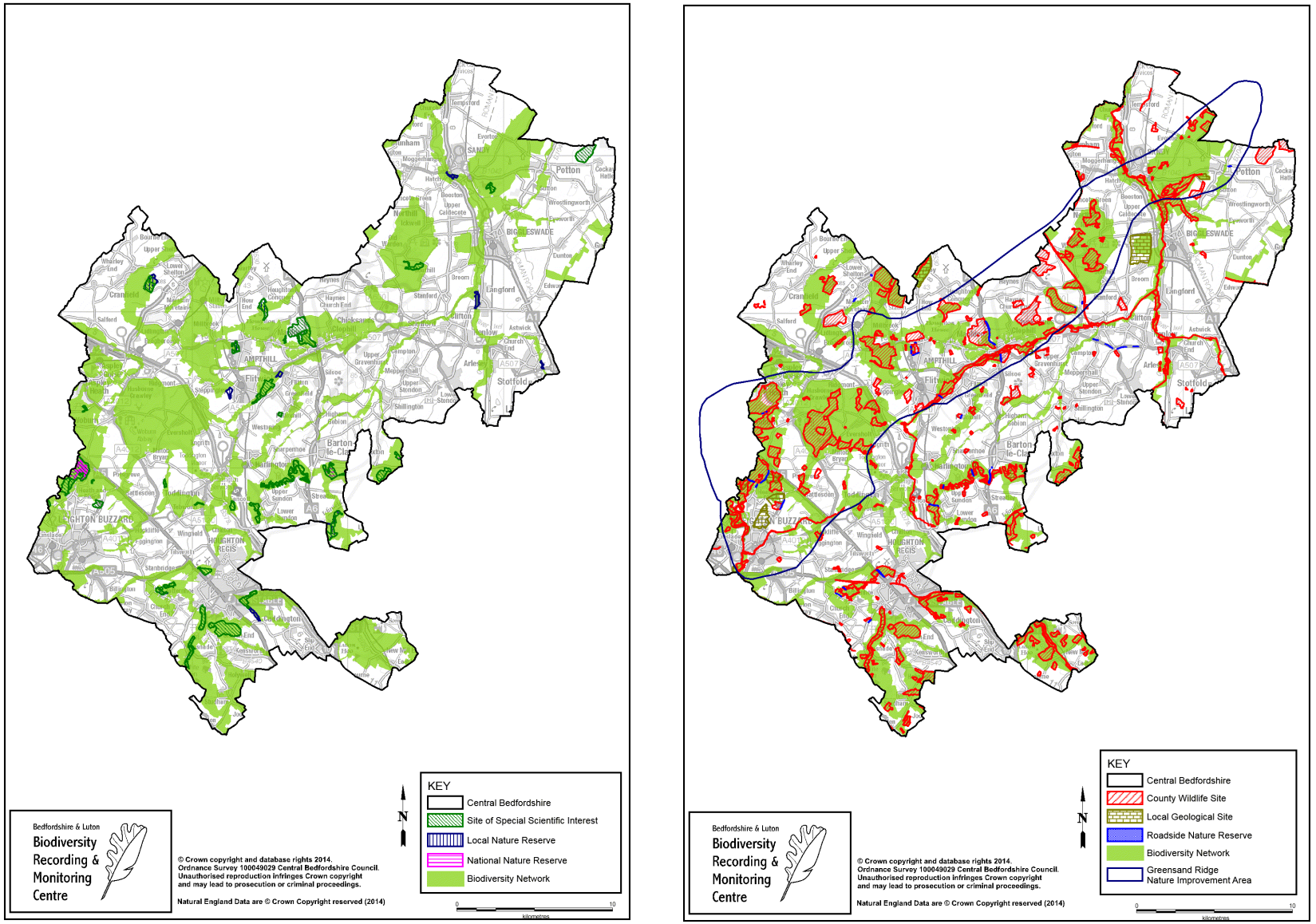

Figure 9: Statutory and Non-Statutory Designated Sites within Central Bedfordshire (October 2014).

Habitats and Species of Principal Importance

Central Bedfordshire contains a variety of habitats and species which are recognised in Section 41 of the NERC Act 2006 as of "principal importance for the purpose of conserving biodiversity". As part of this Act, Local Authorities are expected to contribute towards protecting and enhancing the listed habitats and species as part of their 'Biodiversity Duty'. About 107 species of 'principal importance' have been recorded in Central Bedfordshire. These include:

- Great Crested Newt (*Triturus cristatus*)
- House Sparrow (*Passer domesticus*), Turtle Dove (*Streptopelia turtur*) and Spotted Flycatcher (*Muscicapa striata*) along with a range of other birds
- White Helleborine (*Cephalanthera damasonium*) amongst a few other flowering plants including other orchids such as the Man Orchid (*Aceras anthropophorum*) and Musk Orchid (*Herminium monorchis*)
- Butterflies such as the Small Heath (*Coenonympha pamphilus*), Small Blue (*Cupido minimus*) and Dingy Skipper (*Erynnis tages*)
- Depressed river mussel (*Pseudanodonta complanata*)
- Large Garden Bumble Bee (*Bombus ruderatus*)
- Slow worm (*Anguis fragilis*) and Common Lizard (*Zootoca vivipara*)
- Water vole (*Arvicola amphibius*), Hedgehog (*Erinaceus europaeus*) and Brown Hares (*Lepus europaeus*)

An up-to-date list of Section 41 species which have been found in Central Bedfordshire can be obtained from the BRMC.

The 18 habitats shown in the table below are listed under Section 41 of the NERC Act as of "principal importance for the purpose of conserving biodiversity" and are found in Central Bedfordshire:

Habitat of "Principal Importance for the Purpose of Conserving Biodiversity"
Lowland dry acid grassland
Cereal field margins
Floodplain grazing marsh
Hedgerows
Lowland beech and yew woodland
Lowland calcareous grassland
Lowland fens
Lowland heathland
Lowland meadows
Lowland mixed deciduous woodland
Open mosaic habitats on previously developed land
Ponds
Purple moor grass and rush pastures
Reedbeds
Rivers
Traditional orchards
Wet woodland
Wood-pasture and parkland

As well as being important for biodiversity these habitats are also valued by people. They allow Central Bedfordshire's residents to experience nature within their local landscapes, for example seeing the beauty of flower-rich grasslands in spring or the changing seasons in Central Bedfordshire's woodlands. Research has shown that access to such areas improves people's health and wellbeing (Natural England 2012) adding value to the site beyond its intrinsic worth for biodiversity (as mentioned on p7).

Figure 10: Comma on Bramble

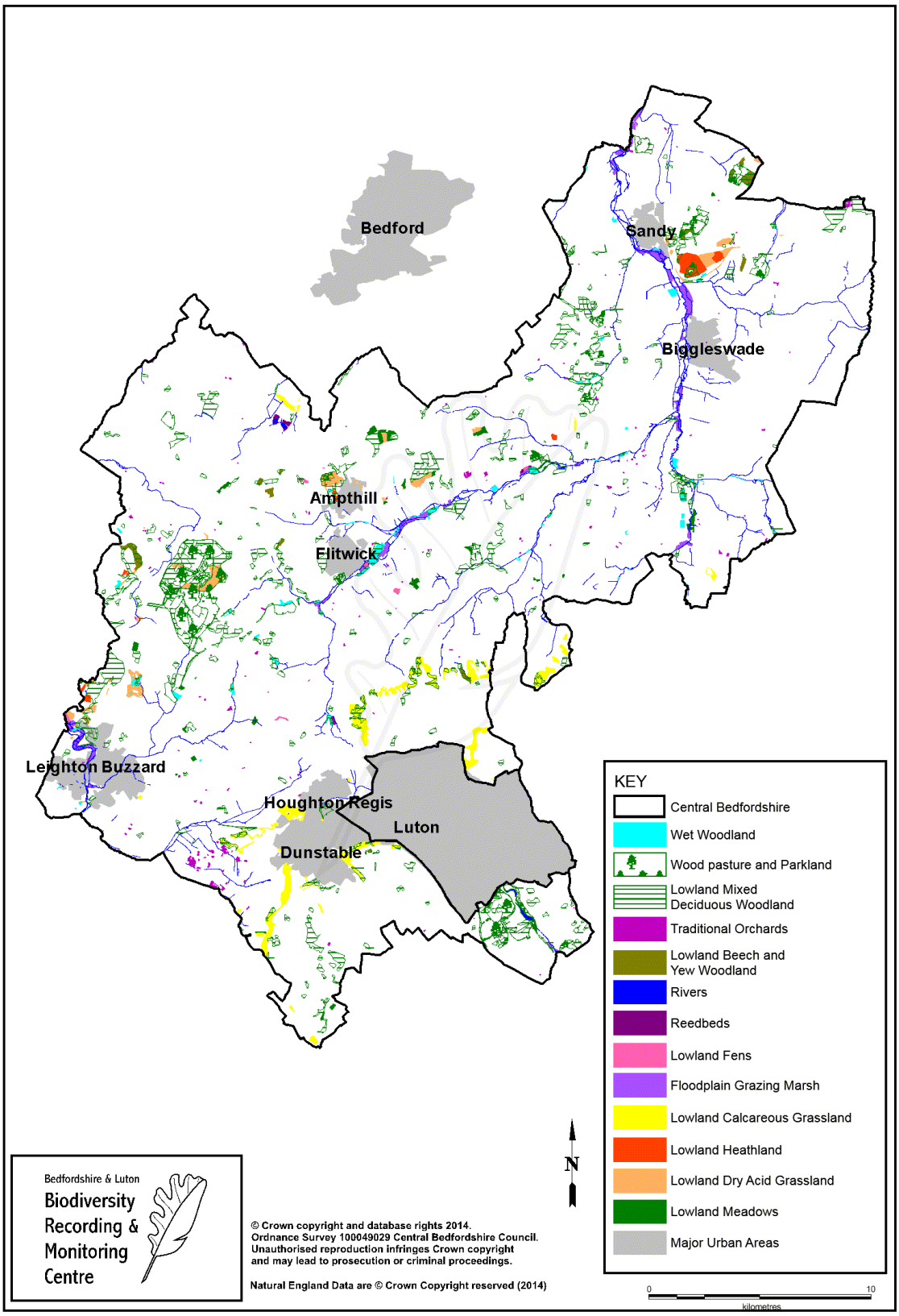

Figure 11: Habitats of principal importance for the purpose of conserving biodiversity within Central Bedfordshire

Much of the following information in this section is taken from the relevant Biodiversity Action Plans. For further details please see the BRMC website.

Grasslands

The geology of Central Bedfordshire strongly influences the grasslands which exist within it. There are extensive areas of species poor grassland throughout Central Bedfordshire, and after arable this is probably the second commonest habitat in the area. Quality of grassland, with regard to wildlife interest, covers a large spectrum with only very small amounts of the total grasslands being species rich.

Many of the wildlife sites within Central Bedfordshire contain areas of wildflower rich neutral grassland or lowland meadows and where the soils are thin and the chalk bedrock comes to the surface, calcareous grasslands exist. Much of the Chilterns Area of Outstanding Natural Beauty (AONB) is made up of grassland habitats. Grassland sites which are of particular note include Knocking Hoe NNR, Galley and Warden Hills SSSI and Pegsdon Grasslands CWS. These wildflower rich grasslands are particularly beautiful in late spring and early summer when their many wildflowers are in bloom.

Cemeteries and churchyards are often relatively undisturbed areas of grassland habitat and have areas of longer grass around the graves. They can provide important refuges for wildlife, even the gravestones can provide a good substrate for mosses and lichens. Within Central Bedfordshire, five churchyards have been designated as CWS in recognition of their importance for wildlife. The Living Churchyards Scheme is active in Central Bedfordshire and is coordinated by a volunteer from the Diocese of Saint Albans. Further information on this scheme can be found at http://www.stalbans.anglican.org/faith/living-churchyards/

Figure 12: Cowslip meadow H.Webb

Ampthill Cemetery and the Knoll CWS	A good example of Greensand grassland. A high quality acid grassland containing abundant sheep's sorrel (*Rumex acetosella*), common bent (*Agrostis capillaris*), field wood rush (*Luzula campestris*), cat's-ear (Hypochaeris radicata) and ribwort plantain (*Plantago lanceolata*). Meadow saxifrage (*Saxifraga granulata*) and mouse-ear hawkweed (*Pilosella officinalis*) are also present.
Everton Churchyard CWS	A small site but with an attractive grassland. There is a very good population of meadow saxifrage as well as other neutral grassland indicators including common knapweed (*Centaurea nigra*), cowslip (*Primula veris*) and mouse ear hawkweed (*Hieracium pilosella*). Acid grassland indicators include sheep's sorrel (*Rumex acetosella*) and harebell (*Campanula rotundifolia*).
Millbrook Churchyard CWS	Acid grassland and neutral grassland including small-fruited prickly-sedge (*Carex muricata* subsp. *pairae*).
Old Linslade Churchyard CWS	Contains good examples of semi-improved acid and neutral grassland on sandy soil.
Shillington Churchyard CWS	A good example of neutral and calcareous grassland.

Lowland calcareous grassland

Lowland calcareous grasslands are developed on shallow lime-rich soils generally overlying limestone rocks, including chalk. In Bedfordshire these are predominantly associated with the steep scarp slopes of the Chilterns chalk outcrop. Many of the calcareous grasslands that remain are on steep scarp slopes where development or agricultural 'improvement' has never been feasible. Since 1950 it is estimated that Bedfordshire as a whole has lost 80% of its neutral grasslands. The County's calcareous grasslands have probably fared a little better but only because many received some sort of conservation designation in the post-war period (Boon and Outen 2011, Plantlife 2012). Many of them, including those in Central Bedfordshire, still suffer due to agricultural intensification, the invasion of scrub and lack of grazing. Recreating these diverse grasslands once they are lost is very difficult as they rely on complex associations between many organisms. It is, therefore, very important that the remaining sites are protected and managed appropriately to conserve them for future generations. Many disused chalk quarries and cuttings are good sites for calcareous grassland and appropriate management can help with their restoration. Grassland creation schemes such at Pegsdon Hills nature reserve are an important way of increasing this habitat locally. In 1992 this special block of flower rich chalk grassland was surrounded by intensive arable cultivation and was itself gradually being invaded by hawthorn bushes. The Wildlife Trust has bought both the Site of Special Scientific Interest (SSSI) and surrounding arable land and has set about management which has both pushed back the invading species and established grassland on the former arable land. This new area of grassland is carefully managed by cattle and by The Wildlife Trust's own Hebridean and Manx Loaghtan sheep and is slowly becoming a valuable flower-filled habitat in its own right.

The grasslands at Galley and Warden Hills contain areas of calcareous and neutral grassland, as well as sections of scrub which add to its diversity. The site contains purple milk-vetch (*Astragalus danicus*) (Red List: Endangered), great pignut (*Bunium bulbocastanum*) (Nationally Rare), dwarf spurge (*Euphorbia exigua*) (Red List: Near Threatened) and knapweed broomrape (*Orobanche elatior*) (County Rarity). The rich grasslands support populations of butterflies such as small heath (*Coenonympha pamphilus*), small blue (*Cupido minimus*) and chalk hill blue (*Polyommatus coridon*) butterflies, all of which are species of 'principal importance'.

Lowland meadows

Lowland grasslands classed as lowland meadows are taken to include most forms of species rich neutral grassland. This type of grassland is found in recreational sites, churchyards, roadside verges and a variety of other localities. Unimproved neutral grassland habitat has undergone a remarkable decline in the 20th century, almost entirely due to changing agricultural practice. It is estimated that by 1984 in lowland England and Wales, semi-natural grassland had declined by 97% over the previous 50 years to approximately 0.2million ha. Losses have continued during the 1980s and 1990s, and have been recorded at 2 -10% per annum in some parts of England.

The phase 1 habitat survey carried out in Bedfordshire and Luton in 1987/88 revealed just 87 hectares of unimproved neutral grassland and 113 hectares of marsh or marshy grassland. Grassland containing some elements of lowland meadow vegetation was described as semi-improved neutral grassland during the phase 1 survey. Over 8000 hectares of this habitat were recorded together with a further 8000 hectares of agriculturally improved grassland.

Neutral grassland or lowland meadow occurs as an important element in 10 of the 40 Sites of Special Scientific Interest in the County but is generally regarded as the dominant reason for SSSI status in just five of those sites. Many of the remaining species rich areas of lowland meadow have been identified as County Wildlife Sites with approaching 100 CWS having this habitat as a primary reason for their status.

Within Central Bedfordshire notable Lowland Meadow sites include

- **Fancott Woods and Meadows CWS** which exhibits the characteristic species richness of unimproved neutral grassland traditionally managed for hay and grazing. This has been recognised as Bedfordshire's Coronation Meadow under the scheme run by the Prince of Wales, the Wildlife Trusts, Plantlife and the Rare Breeds Survival Trust. http://coronationmeadows.org.uk/. The wettest parts are dominated by meadowsweet (*Filipendula ulmaria)* with ragged robin (*Lychnis floscuculi)*, great burnet (*Sanguisorba officinalis)* and a good population of common spotted-orchid (*Dactylorhiza fuchsia)*. The drier grassland has mostly red fescue (*Festuca rubra)* with quaking-grass (*Briza media)*, crested dog's-tail (*Cynosurus cristatus)*, meadow fescue (*Festuca pratensis)*, sweet vernalgrass (*Anthoxanthum odoratum)*, sedges Carex spp. and a rich variety of herbs, including species characteristic of old meadows and now uncommon in the

county such as pepper saxifrage *Silaum silaus*, saw-wort (*Serratula tinctoria)*, dropwort (*Filipendula vulgaris)*, adder's-tongue (*Ophioglossum vulgatum)* and green-winged orchid (*Orchis morio)* for which Fancott meadows are the best-known site in Bedfordshire.

- The Glebe meadows area of **King's Wood, Houghton Conquest CWS.** These meadows exhibit a species richness typical of unimproved neutral grassland, traditionally managed for hay and grazing. Such grasslands are confined to the south of the country where they are now rare, especially in the east. Parts of the meadows exhibit ridge and furrow with abundant cowslips (*Primula veris)* and throughout, characteristic species include pepper saxifrage (*Silaum silaus)*, spiny restharrow (*Ononis spinosa),* yellow rattle (*Rhinanthus minor)* and two species, uncommon within the county, saw-wort (*Serratula tinctoria)* and dropwort (*Filipendula vulgaris).*
- **Maulden Church Meadow SSSI** which rests on a thin cap of boulder clay, and supports neutral grassland communities which are dominant over most of the site. The Lower Greensand is exposed in the southernmost part of the meadow and here a more acidic grassland community has developed. Maulden Church Meadow represents a habitat that is now scarce throughout lowland Britain due largely to changes in agricultural practice. Several species uncommon within the county are recorded on this site, including meadow saxifrage (*Saxifraga granulate)* and Adder's-tongue (*Ophioglossum vulgatum*).

Lowland heathland and **Lowland dry acid grassland**

Lowland heathlands are characterised by dwarf shrubs typically comprising heathers and (in Bedfordshire) wavy hair grass. They are closely related to lowland dry acid grassland and often form integral communities with it. Lowland heath is one of the most threatened habitats in the UK and is internationally important. Over 20% of the world resource occurs within Great Britain, therefore committing the UK to a global responsibility to maintain and improve the current heathland resource. Heathland is highly valued, both as an important wildlife habitat and as a culturally beautiful and distinctive landscape, with purple heather, yellow gorse and containing distinctive animals and plants. It is much valued by humans for its history, landscape and wildlife, and as places of 'wildness' and unique beauty.

Figure 12: Heathland

All of Bedfordshire's current heathland sites (37.5 ha) occur along the geological outcrop of acidic, sandy soils known as the Greensand Ridge. Five sites are actively managed for nature conservation; the other ten are mostly heathland remnants within forestry plantations. Four sites, Sandy Warren/Sandy Heath Quarry (c. 100ha), Maulden Wood/Heath (c. 3.5ha), Rammamere Heath (c. 20ha), and Rushmere Country Park (c. 28ha), are currently under significant restoration programmes to create and increase the amount of heathland present.

Five of the county's fifteen heathland sites fall within Sites of Special Scientific Interest (SSSI), although Shire Oak and Rammamere Heaths are both within the same SSSI. With the exception of Cooper's Hill, heathland forms only part of the interest of the SSSIs. Four of the SSSIs – Cooper's Hill, Rammamere/Shire Oak Heath, Maulden Wood/Heath and Sandy Warren – are currently actively managed for their heathland interest.

Figure 14: Gorse in the snow

A further five sites are designated County Wildlife Sites (CWS). This is a non-statutory designation that offers no legal protection against damage or interference, but does provide some protection from development through planning regulations. Three of these sites receive adequate management for heathland: Gamlingay Cinques, Rowney Warren and Rushmere Country Park.

Purple moor grass and rush pastures

Purple moor grass and rush pasture occurs on poorly drained, mainly acidic sites in lowland areas with high rainfall and wet soils. It is often found with other habitats, such as wet heath, scrub and dry grassland, making up a patchwork of diverse places that support a wide range of insects. It mainly occurs on gently sloping land or on floodplains where it may be periodically flooded during the winter.

This habitat is found at Flitwick Moor SSSI where areas of rush pasture and purple moor grass occur in a complex mosaic with other wetland communities including wet woodland, floodplain grazing marsh and lowland fen priority habitats. Many areas of fen meadow dominated by purple moor grass (*Molinia caerulea)*, rushes (*Juncus* sp.), and sedges (*Carex* sp.) and rich in bog-moss (*Sphagnum* sp.) have developed following the clearance of woodland areas. Older areas of rush pasture remain in the fields which were not cut during the commercial peat digging during the 20th century.

Cereal field margins

Approximately 41% of the British landscape is tilled (44% in England), of which cereals alone comprise 51% (Joint Nature Conservation Committee 2006). Much of the wildlife interest in arable areas is now found at the field edges or headlands. Some species that were once considered to be problem weeds are now among Britain's rarest plants. There is little known about arable field margins themselves in Bedfordshire but approximately 65% of land in Bedfordshire is classified as arable (79,000 ha). Arable or cereal field margins can support many rare or endangered plant species such as corn parsley (*Petroselinum segetum*), field cow-wheat (*Melampyrum arvense*) and shepherd's-needle (*Scandix pecten-veneris*). Margins can also provide habitats for insects and mammals, and declining bird species such as corn bunting (*Emberiza calandra*), lapwing (*Vanellus vanellus*) and grey partridge (*Perdix perdix*). Analysis of arable plant records in 2007/2008 indicates that the thin soils on the chalk are particularly significant for many of these plant species.

These reports are available on the Bedslife website

- "Important Arable Plant Areas In Bedfordshire: Preliminary Study (June 2007)" http://www.bedscape.org.uk/BRMC/newsite/docs/bedslife/species%20docs/arable%20plant%20preliminary%20survey%20rpt.pdf
- "Important Arable Plant Areas In Bedfordshire's Chalk Arc (2008)" http://www.bedscape.org.uk/BRMC/newsite/docs/bedslife/species%20docs/arable%20plant%20areas_chalk%20arc.pdf

Current factors affecting arable margins include intensification of crop production, including the use of herbicides to ensure a weed-free monoculture, and summer use of insecticides, misunderstanding in the farming community about complexity of creating and maintaining arable margins, regular recreational (e.g. dog walkers, horse riders) trespassing onto arable margins set aside for wildlife and the reduction in rotation of cereal crops and other land covers (including grass leys and fallows).

The eastern part of Bedfordshire is known to be particularly important for a number of farmland birds including corn buntings (*Emberiza calandra*), yellow wagtails (*Motacilla flava*) and skylarks (*Alauda arvensis*).

Hedgerows

Central Bedfordshire contains many hedgerows. These can provide feeding opportunities and shelter for wildlife as well as linking sites together to allow wildlife to move across the landscape. Diverse, well-structured hedgerows are habitats of 'principal importance' and some hedgerows are also covered by The Hedgerow Regulations 1997.

Although there are no comprehensive data or information about hedgerows across the whole of Central Bedfordshire, there have been small local surveys undertaken in Studham in 2006, Maulden in 2007 and Pegsdon in 2009. A desktop survey from

aerial photographs was undertaken for Sundon/Barton using photographs from 1946, 1968, 1981, 1991 and 2002 which showed the following data:

Year	Total hedge length (km)
1946	37
1968	34
1981	31
1991	34
2002	37

This survey did not provide any information about the condition of the hedgerow or the species contained within it.

A survey of hedgerow cover was carried out by Bedfordshire County Council Planning Department in 1978-79, and was published in 1980 as part of the Landscape and Wildlife Landscape Technical Volume. The purpose of this survey was to update this information in the Bedfordshire Environment Report No 3 published in spring 1993. Unfortunately because the original survey work was missing it was necessary to repeat the Hedgerow Sample Survey for 1976 using new sample data and the original aerial photographs. Paper copies of the hedgerow surveys for 1978-79, plus 1980 are held by BRMC.

Lowland fens

Lowland fens have become increasingly rare in the UK and are now very restricted in their distribution. They occur on wet peat soils, can be acidic or calcareous, and are fed by rain or groundwater. The only area of this habitat within Central Bedfordshire is at Arlesey Meadows CWS. Along the Hiz, in the north of the site is a small area of Phragmites-Urtica dioica tall-herb fen, with common reed (*Phragmites australis*), stinging nettle (*Urtica dioica*), great willowherb (*Epilobium hirsutum*) and reed canary-grass (*Phalaris arundinacea*).

Woodlands and Trees

Bedfordshire as a whole is one of the least wooded counties in England (The Woodland Trust 2012) and therefore, Central Bedfordshire's woodland habitats are of particular importance. Woodlands provide great open spaces for local residents as they provide a great escape from urban areas. They also change dramatically through the seasons and often harbour a wealth of wildlife.

Two of the largest areas of forest in Central Bedfordshire are the Bedford Estate which incorporates 3000 acres of Woburn deer park and is home to many areas of ancient woodland and veteran trees and the Old Warden Estate which includes ancient woodland and parkland as well as a number of veteran trees.

Figure 15: Ancient Woodland

Trees also play a very important role within Central Bedfordshire's urban streets and parks. Within Central Bedfordshire there are many Tree Protection Orders which aim to preserve those trees which have significant amenity value. As well as being aesthetically pleasing, the trees across Central Bedfordshire benefit biodiversity and are used by a variety of organisms from birds and bats to beetles and fungi.

Veteran trees can be defined as: 'a tree that is of interest biologically, culturally or aesthetically because of its age, size or condition'. Veteran trees are recognised as having significant ecological importance as well as being part of our historic and cultural heritage. They are found in woodland and parkland, they can be old oaks, limes or sweet chestnuts in hedgerows or the pollard willows along the banks of rivers. The Natural England publication "Veteran Trees: A guide to good management (IN13)" (2000) is available here http://publications.naturalengland.org.uk/publication/75035.

Lowland mixed deciduous woodland

Lowland mixed deciduous woodland grows on all kinds of soils, and includes most semi-natural woodland. Many are ancient woods which have been continuously wooded since the 17th century. It may form a mosaic with other habitats, including patches of beech woodland and wet areas. Rides and edges may grade into grassland and scrub types.

Two good examples of Lowland mixed deciduous woodland in Central Bedfordshire are Chicksands Wood CWS and King's and Baker's Woods and Heaths CWS and SSSI. The majority of Chicksands Wood CWS is ancient woodland dominated by standards of Ash (*Fraxinus)* and Oak (*Quercus)* with occasional Hornbeam (*Carpinus betulus*), Aspen *(Populus tremula)* and stands of mature Small Leafed Lime trees (*Tilia cordata)* coppice

King's and Baker's Woods and Heaths CWS and SSSI represents the largest area of woodland in Bedfordshire as well as remnants of lowland heath and acidic grassland. It lies on the Boulder Clay passing to Lower Greensand, producing an outstanding series of soil types ranging from slightly calcareous to acid and from wet to well drained. This exceptional range is reflected in the rich variety of species and habitats. Most of the wood is ancient and the diverse tree and shrub layer shows wide structural variety derived from centuries of coppice and high forest management. The ground flora includes a large number of species which are uncommon or rare in the county, and the wide system of rides supports rich grassland that is an important element of the woodland.

Lowland beech and yew woodland

This is a subset of Lowland mixed deciduous woodland. Lowland beech and yew woodland spans a variety of distinctive vegetation types reflecting differences in soil and topographical conditions. Beech can grow on both acidic and calcareous soils, although its association with yew tends to be most abundant on the calcareous sites. These woods have been managed historically as coppice, coppice with standards, wood-pasture, high forest and minimum intervention. They are often found as intricate mosaics with other woodland communities.

The most important ancient semi natural lowland beech wood on calcareous soils in Central Bedfordshire is Leete wood, part of Barton Hills NNR. This is a small ancient beech (*Fagus sylvatica)* wood. Ash (*Fraxinus excelsior)* occurs in the beech high forest over a shrub layer comprising hazel, spindle (*Euonymus europaeus)*, yew (*Taxus baccata)* and elder (*Sambucus nigra)*. Under the densely shading beech, white helleborine (*Cephalanthera damasonium)* occurs.

Traditional orchards

Traditional Orchards are a habitat of ‘principal importance’ because of the wealth of wildlife that they support. They can also be important for retaining fruit tree varieties which would otherwise be lost. Since 1950, 57% of England’s orchards have disappeared; this includes both commercial and traditionally managed sites, although declines have been most severe amongst traditional orchards (BRIG 2007).

Bedfordshire has a long history of fruit growing and there are many local varieties of fruit trees which originate in Bedfordshire. Many of these originate from the experimental fruit breeding by Thomas Laxton and his sons in Sandy and Bedford in the nineteenth century. Local varieties include apples (including Barnack Orange, Laxton's Epicure, Lord Lambourne and Laxton's Fortune) plums (including Early Laxton and Laxton's Supreme) pears (including the locally unique Warden Pear) and various damsons and prunes in the area around Totternhoe.

Historically orchards in Bedfordshire were on a small scale and run by smallholders rather than large farmers. These have been in decline over recent years as a result of traditional orchard sites being developed for housing or converted into arable land due to lack of protection under the current planning system, the absence of local niche markets for diverse orchard produce and neglect through lack of management and loss of traditional skills such as pruning and cultivation management skills. As a result this network of sites which are important for wildlife is under threat.

In Bedfordshire, agricultural census data show a decline in the orchard area of 95% since the peak decade of the 1950s (Brown 2008).

An England-wide inventory, carried out by the People's Trust for Endangered Species (PTES) during 2008-12, found 322 traditional orchards in Bedfordshire covering a total area of 126.6 ha. 11% of these individual orchards were verified by survey and seven orchard owner questionnaires supplied additional information revealing that 4% of traditional orchards in Bedfordshire are in excellent condition, 32% in good condition and 64% in poor condition. 3 traditional orchards were in Environmental Stewardship comprising 0.92 ha (be aware that these figures are based on a very small number of surveys).

Orchard sites are afforded some protection by planning policies through generic policies covering the Local Biodiversity Action Plan and its habitats and species. The National Planning Policy Framework (NPPF) also affords protection to veteran trees, many of which can be found in orchards.

Sites can also be protected (or new sites created) through conditions as part of the planning process.

Traditional Orchards are included on the Section 41 (S41) List of Habitats of Principal Importance in England used to guide decision-makers such as public bodies in implementing their duty under Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006.

Four orchards in Central Bedfordshire are designated as CWS (Fairfield East Orchard CWS, Fairfield West Orchard CWS, Park Wood LNR and Steppingley Hospital - the first two of these are also good sites for lichens which are associated with traditional orchard habitat. There are a number of orchards across Central Bedfordshire including a large number of privately owned orchards in the Totternhoe area (see figure 17). A number of orchards are run by community groups including Southill Community Orchard near Old Warden (a new orchard containing Warden pears) and Park Wood Community Orchard which has over 200 varieties of apples, pears, figs, damsons, plums, medlar, quince and walnuts including a good selection of fruits bred in Bedford by Thomas Laxton and his sons.

Orchards are good habitats for a number of birds and also numerous species of fungi and invertebrates, many of which cannot tolerate the chemicals used in agriculture and fruit growing. Orchards also contain a lot of dead and decaying wood which is particularly important for a group of insects and other life forms that rely on it, such as the Noble chafer beetle (*Gnorimus nobilis*) which lives almost entirely in traditional orchards where their young depend on the dead and decaying wood in fruit trees.

This beetle is becoming increasingly rare as agricultural intensification and neglect reduce its habitat meaning that conserving the remaining traditional orchards is very important for this species. The beetle's distribution in England is mainly centered on Worcestershire, Herefordshire and Gloucestershire, with outlying populations in the New Forest, south Oxfordshire and Kent. The species is not currently recorded in Bedfordshire but has been found in an adjoining county - however any old orchard with suitable decaying wood habitat has the potential to contain and support a population of noble chafer.

Stag beetles (*Lucanus cervus*) are also associated with traditional orchards and have recently been recorded in Totternhoe as a result of survey work by the Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire for the first time since 1980.

Figure 16: Stag Beetle, Totternhoe

As a result of many of the issues described above it was decided, in 2010, to set up the Bedfordshire and Luton Orchard Group (BLOG) with the aim of surveying, improving and promoting the county's orchard and fruit tree heritage, biodiversity and management. BLOG is run by a partnership of conservation organisations, interested individuals and local people all with an interest in the above aims.

The People's Trust for Endangered Species (PTES) is undertaking a Traditional Orchard Survey to understand where traditional orchards remain and what condition they are in in order to better protect them. Details can be found at http://ptes.org/get-involved/surveys/countryside-2/traditional-orchard-survey/.

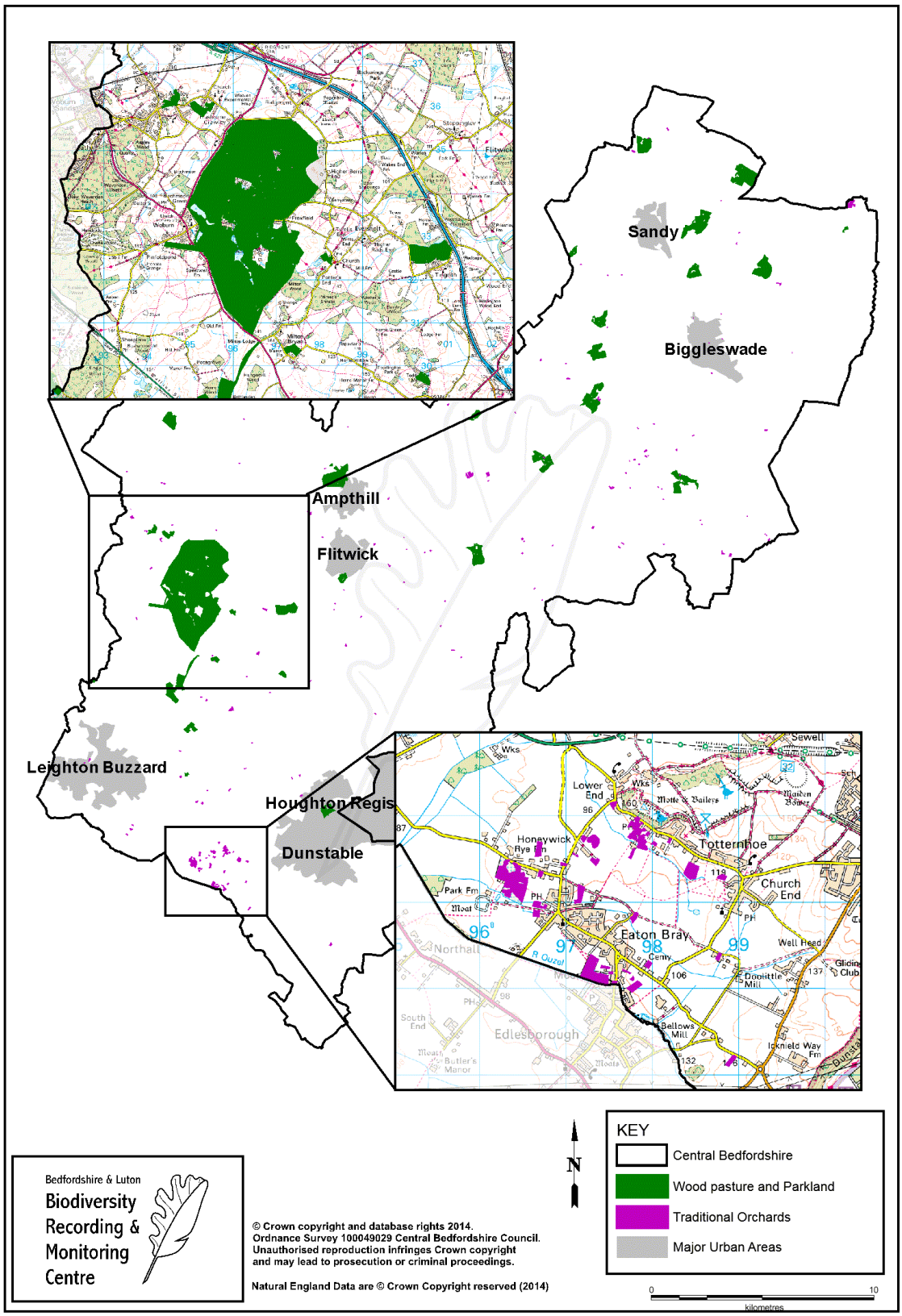

Figure 17: The current distribution of orchards and woodpasture and parkland within Central Bedfordshire.

Wet woodland

Another BAP priority habitat which is prominent in Central Bedfordshire is wet woodland. Wet Woodland is a National Priority Habitat in the UK BAP, although the extent of wet woodland has declined nationally due to drainage and improvement of neighbouring land. Wet Woodlands can support a rich, varied and unique community of species including plants, mosses, lichens and invertebrates as well as larger animals including otters and birds.

In Central Bedfordshire wet woodlands are found in the floodplains of the major river valleys and spring fed locations on the Greensand Ridge. The floodplain wet woodlands are mainly present along the main Ouse, Ivel and Flit valleys along with others along the smaller rivers such as the Ouzel and Lea.

The Flit valley is one of the most important sites for wet woodland in the country and includes Flitwick Moor SSSI, Moors Plantation CWS, Upper Alders CWS and Pennyfathers Moor CWS. Flitwick Moor is a remnant of a eutrophic (nutrient rich), valley mire and is the largest area of wetland in Bedfordshire. It includes two types of woodland, pedunculate oak/birch (*Quercus robur/Betula spp.*) and alder (*Alnus glutinosa*) communities. A characteristic species of the woodland ground flora is greater tussock-sedge (*Carex paniculata*).

These sites support locally uncommon plant species such as opposite-leaved golden saxifrage (*Chrysosplenium oppositifolium*), wood club-rush (*Scirpus sylvaticus*) as well as nationally important populations of species such as mosses, liverworts and fungus including the rare liverwort Ghostwort (*Cryptothallus mirabilis*).

Wet woodland and scrub has also developed in some of the disused clay pits in the Marston Vale. These pits offer opportunities for the creation of a mosaic of wetland habitats including extensive wet woodland such as that already developing at Coronation Pit. This constitutes a valuable ecological resource.

Also associated with wet woodland are willows, alder, black poplar and other riverside trees which are of great importance for both wildlife and the landscape. These provide linkage between areas of wet woodland as well as having their own importance to wildlife.

The Greensand Ridge is almost the only site in the country with spring fed wet woodlands. There are relatively large spring fed wet woodlands at Sutton Fen CWS near Potton and Southill Lake and Woods SSSI but spring fed wet woodlands are often part of larger areas of woodland such as the alder woodland in Washer's and Daintry Woods CWS near Woburn, or present as part of a mosaic of other habitats such as at Stockgrove Country Park CWS at Heath and Reach.

Wood-pasture and parkland

Both formal and informal parks and playing fields provide very valuable green spaces for people but are also important for wildlife. Although many formal parks contain

areas of close mown grass and formal flowerbeds which are less useful for wildlife, there are many opportunities to incorporate habitat corridors and to improve the habitat for wildlife.

The mixture of standard trees and grassland which have developed over many years often leads to there being significant wildlife interest within historic parklands and this is why it is included as a habitat of 'principal importance'. The largest area of parkland within Central Bedfordshire can be found at Woburn. The Woburn Estate is the family seat of the Duke of Bedford (the Bedford Estates) and is an extensive area of deer-grazed parkland. 364 acres of Woburn Park are designated as a County Wildlife Site. The grassland contains extensive areas of mature broadleaved parkland, clumps of broadleaved plantation, ponds and a small area of marshy grassland. The Bedford Estates also manage large areas of surrounding woodland, much as commercial forestry. The Greensand ridge has the highest surviving percentage of historic parkland (including Woburn, Southill, Old Warden and Haynes) of any National Character Area. These estates have many fine veteran trees and have also strongly influenced the architecture of individual late 18th- and 19th-century farmsteads and entire villages and towns.

Figure 18: Deer grazing

Open mosaic habitats on previously developed land

Areas of previously developed land which have become derelict provide opportunities for many pioneer species of plant that are the first to colonise new areas in difficult conditions. These often become outcompeted when more vigorous species arrive. Such areas are also likely to support a fairly distinct and specialist assemblage of insects, along with reptiles which take advantage of the warmth provided by areas of bare ground for basking. The contribution of such sites to the biodiversity of an area should not be underestimated, although they are very difficult to protect and manage. The sand pits around Leighton Buzzard and Heath and Reach contain a range of wetland, wet woodland, acid grassland and open bare ground habitats. These areas have an interesting invertebrate assemblage associated with them. The disused clay pits in the Marston Vale such as Coronation Pit also offer opportunities for the development of a mosaic of wetland habitats. This constitutes a valuable ecological resource.

Landscaping schemes around commercial sites and along transport routes can provide food and shelter for wildlife as well as acting as corridors to link more diverse habitats. They often have a well-established flora of perennial species and scrub which are similar to those on previously developed land

Ponds

Ponds can be seasonal or permanent and can be important habitats for biodiversity including rare wetland plant species, aquatic invertebrate species and aquatic vertebrate species such as Great Crested Newts (*Triturus cristatus*). Other ponds are recognised as important because of their age, rarity of type or landscape.

Limited surveys of ponds have been undertaken in Bedfordshire and extrapolations from these surveys would indicated that there are around 2-3000 ponds in the county. 20% of ponds nationally are likely to be of Priority Pond status; this would equate to around 700 Priority Ponds in Bedfordshire and Luton.

Pond habitats are at risk from a number of factors including

- Direct loss from neglect, infilling and drainage
- Ecological successional changes due to poor or absent pond management, eventually resulting in the loss of habitat for uncommon species of early and mid-succession ponds (e.g., great crested newt)
- Chemical pollution, nutrient enrichment and siltation with polluted sediments, which adversely affect the diversity of pond life
- Overstocking with fish and ducks
- The spread of exotic species (such as fish or terrapins and many invasive plant species)
- The spread of exotic disease, in particular Chytrid fungus which indiscriminately attacks amphibians
- Climate change, which may reduce the viability of shallow or ephemeral ponds (either by reducing, increasing or shifting the period of time over which they hold water)

Figure 19: Felmersham gravel pits

Ponds may be protected under the Wildlife and Countryside Act 1981 (as amended) by virtue of the species they support, such as white-clawed crayfish (*Austropotamobius pallipes*), great-crested newt (*Triturus cristatus*) and water vole (*Arvicola amphibius*).

Reedbeds

Reedbeds are wetlands dominated by stands of common reed Phragmites australis wherein the water table is at or above ground level for most of the year. The reedbeds in the UK are of geographical importance in a global context. The area of reedbed has declined due to drainage and lack of management.

Reedbeds support a distinctive breeding bird assemblage including 6 nationally rare Red Data Book birds including bittern (*Botaurus stellaris*), marsh harrier (*Circus aeruginosus*), and bearded tit (*Panurus biarmicus*). Reedbeds also provide roosting and feeding sites for migratory birds and have five Red Data Book invertebrates closely associated with them.

Reedbed in Bedfordshire can be found in ditches, along the margins of rivers, around ponds, lakes and the numerous flooded brick and gravel pits. Most areas of reedbed are very small and the river margin reedbeds may cumulatively be the largest area of reed in the county. However, there are only about 22.3 ha of discrete reedbed in the county; 20 ha of this was created in 1999 at the Marston Vale Forest Centre. The other discrete reedbeds are: Chalton Sewage Treatment Plant (0.4 ha), Sandy Smith Nature Reserve (0.8 ha), Houghton Regis Quarry (1 ha) and Churchways Quarry (0.1 ha).

Floodplain grazing marsh

Grazing marsh is defined as periodically inundated pasture or meadow with ditches. Sites may contain ponds and seasonally water-filled hollows with swamp communities but not extensive areas of tall fen communities. The majority of sites are grazed although some are cut for hay or silage.

Marshes are very important for breeding waders such as snipe, lapwing and curlew and can support a high diversity of native plant species. Sites are very sensitive to nutrient levels.

The largest areas of floodplain grassland in Bedfordshire are located in the Ouse, Ivel, Ouzel and Flit valleys, with more fragmented areas alongside some of the smaller watercourses such as the River Lea. Whilst some areas, particularly in the Ivel and Flit valleys are of County Wildlife Site status most are now improved grasslands.

A good example of floodplain grazing marsh in Central Bedfordshire is **Sandy Smith Nature Reserve CWS** which lies on the floodplain and northern slopes of the Flit Valley between Clophill and Chicksands near Shefford. In addition to floodplain grazing marsh this is also an important site for a number of other important wetland habitats – the wet woodland of Upper Alders, marsh and reedbeds. The wetland areas of the reserve support plants, mosses and breeding birds including reed warblers (*Acrocephalus scirpaceus*). Purple loosestrife (*Lythrum salicaria*), meadowsweet (*Filipendula ulmaria*) and harvest mice (*Micromys minutus*) are found in the fen areas and otters (*Lutra lutra*) and kingfishers (*Alcedo atthis*) have been

seen on the river Flit. Other species found here include skylarks (*Alauda arvensis*), yellowhammers (*Emberiza citrinella*), brown hares (*Lepus europaeus*) ladies bedstraw (*Galium verum*), cowslips (*Primula veris*) and bee orchids (*Ophrys apifera*). There also a number of veteran oak trees.

Rivers

There are a number of important rivers in Central Bedfordshire. The largest river in Bedfordshire is the River Great Ouse. Although this does not run through Central Bedfordshire many smaller rivers and tributaries form the Ouse catchment many of which are in Central Bedfordshire, the most significant of these are:

- The Elstow Brook joining the Ouse at Willington;
- The Ouzel in the south of the county joins the Ouse at Milton Keynes; the Clipstone Brook is a Tributary of the Ouzel.
- The River Ivel is a comparatively large tributary of the Ouse and rises not far into Hertfordshire joining the Ouse at Tempsford. The Flit becomes the Ivel Navigation and joins the Ivel near Langford, the river Hiz also drains from north Hertfordshire and joins the Ivel near Henlow, the Hit joins near Shefford.
- The river Lea rises in Luton and flows south-east to join the Thames in London. Only the upper reaches of this river are in Central Bedfordshire.

Rivers and their associated wetlands provide habitats for many species and potentially enable them to travel between wildlife rich sites. The river itself is a habitat of 'principal importance' along with the small areas of fen and wet woodland which are contained within some of the green spaces beside it. All the rivers in Central Bedfordshire and many of the tributaries are designated as CWSs. This designation also includes area of valuable wildlife habitat surrounding the rivers, such as the bankside willows and riverside grasslands.

The river Flit is associated with a number of locally and nationally important wildlife sites. **Flitwick Moor (SSSI)** is an important wetland with an interesting mix of fen, meadow, wet woodland, and fragile peaty soils. Woodlands of oak and birch, over dense stands of bracken, reveal the acidic nature of the site. Acid-water springs rise in the reserve, complementing the more alkaline nature of the nearby river Flit. Alder woods have developed in the wetter areas, a rarity nowadays owing to land drainage and conversion to farmland. The wet fen and the boggy nature of the mire provide habitat for cottongrass, ten species of Sphagnum moss and marsh pennywort. The site is also good for meadowsweet, purple-loosestrife and square-stalked St. John's-wort. The dense vegetation provides ideal cover for water rail and warblers nest in the reed and sedge beds. Further downstream is **Flitton Moor LNR** which is a patchwork of semi-improved neutral grassland and former arable land with mature pollarded willows and a small wet woodland area to the north of the site. The wetland flora of the ponds, marsh and ditches is of particular interest and forms one of the best areas for dragonflies in Bedfordshire. **Sandy Smith Nature Reserve CWS** lies on the floodplain and northern slopes of the Flit Valley between Clophill and Chicksands near Shefford. (See Floodplain grazing marsh section).

Other Habitats

Houses, Private Gardens and Allotments

Although often overlooked, private gardens and allotments provide many habitats for wildlife within urban areas and when added together cover a large area. There are currently 59 allotment sites containing over 3000 plots across Central Bedfordshire. A range of species can often be found on allotments. For example, slow worms often take advantage of the warmth created in compost bins and help with the control of slugs. Private gardens can provide food and shelter for many species of birds, as well as a variety of insects, such as bees and butterflies. The addition of a garden pond also creates habitat for frogs, newts, toads and dragonflies which can make use of a network of ponds across many gardens.

One of these sites has a County Wildlife Site (Biggleswade Allotments Meadow CWS) associated with it. This is designated for its neutral grassland and hedgerows and has over 50 grassland species with hedgerows over 500m in length and an average of eight woody species per 30m.

Commercial Sites, Roads and Railways

Landscaping schemes around commercial sites and along transport routes can provide food and shelter for wildlife as well as acting as corridors to link more diverse habitats. They often have a well-established flora of perennial species and scrub which are similar to those on previously developed land (see above).

Central Bedfordshire has 20 Roadside Nature Reserves (see page 29). These are important wildlife habitats and even for non-designated road verges there are many opportunities to enhance the management of the roadsides to benefit wildlife together with areas of landscaping within commercial sites which would add significantly to the creation of a network of green corridors across Central Bedfordshire.

Disused railways also provide useful wildlife corridors. For example in Central Bedfordshire Old Warden Tunnel is recognised as a County Wildlife Site as a habitat mosaic containing calcareous grassland, neutral grassland, scrub, semi-natural broadleaved woodland, wet woodland, pools, marsh and ruderal vegetation.

Chapter 4

The Nature Conservation Strategy's Policies

This section sets out the Nature Conservation Strategy's policies. The Action Plan for the implementation of these policies is included in the next chapter.

General Statement

The NERC Act 2006 includes the 'Biodiversity Duty' which requires all public bodies to 'in exercising their functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. In order to fulfill this duty the Council is required to consider biodiversity in all the policies and decisions that it makes across all the activities in which it is involved. This includes the management of Council land and property, raising public awareness and the strategic planning process. Where services have been contracted out to other bodies the NERC Act should still be considered. The importance of protecting and caring for our green environment, within CBC has been highlighted with the Sustainable Community Strategy. It emphasised the value that residents put on the natural environment and their wish to preserve it for future generations. Working with other statutory bodies, community groups and individuals to achieve these aims should be encouraged. Biodiversity 2020, England's Biodiversity Strategy also emphasizes the importance of working for biodiversity across all sectors of organisations.

NC 1: Having Regard to Biodiversity Across all Council Functions
The Council will ensure that biodiversity issues are taken into account, wherever possible, in all aspects of its activity and will encourage other groups and individuals to give equal consideration to such issues.

Although the 'Biodiversity Duty' applies across all aspects of the Council's work there are specific areas within which a more pro-active role can be taken. The following sections cover areas where this is the case.

Internationally important wildlife sites

There are currently no sites designated to be internationally important wildlife sites within Central Bedfordshire. There are sites, such as Flitwick Moor SSSI which may have the potential to be designated in the future. There are also a number of internationally recognized sites relatively close to Central Bedfordshire which may be affected by activities occurring within Central Bedfordshire. One of these is Portholme Special Area of Conservation (SAC). This is the largest surviving traditionally-managed meadow in the UK and includes a nationally significant area of alluvial flood meadow surrounded by channels of the River Great Ouse. As this is downstream from Central Bedfordshire this site is vulnerable to effects from activities within Central Bedfordshire.

NC 2: Internationally important wildlife sites

If any sites within Central Bedfordshire are recognised as being of international importance the council will support this designation and will ensure that it meets any legal obligations with regard to the protection of such sites. The Council will also ensure its actions do not have negative impacts on any internationally important wildlife sites external to Central Bedfordshire, including the Portholme Special Area of Conservation (SAC), Upper Nene Valley Gravel Pits Special Protection Area (SPA), and Chilterns Beechwoods SAC.

National Nature Reserves

There are 224 National Nature Reserves (NNRs) in the country, of which three are within Central Bedfordshire. These sites are designated by Natural England and represent some of the most important sites for wildlife nationally. NNRs were established under the National Parks and Access to the Countryside Act 1949, which specified that they were for "preserving flora, fauna or geological or physiographical features of special interest in the area and/or for providing opportunities for the study of, and research into, those features". The Natural Environment & Rural Communities Act 2006 extended the role of NNRs to include the provision of opportunities for public enjoyment of nature and/or open-air recreation. Section 35 Wildlife & Countryside Act 1981allows Natural England to approve other organisations (Approved Bodies) to manage NNRs. Natural England will use this standard to ensure that potential Approved Bodies understand and have the capabilities needed to meet the standard at a specific site.

NC3: National Nature Reserves

The Council recognises the importance and value of NNRs and will protect and enhance the management of NNRs in conjunction with Natural England into the future.

Sites of Special Scientific Interest

SSSI represent the country's best wildlife and geological sites. They are a selection of the available habitats, not an exhaustive list of wildlife rich areas, which are protected under the National Parks and Access to the Countryside Act 1949, Wildlife and Countryside Act 1981 (as amended) and Countryside and Rights of Way Act 2000. SSSIs represent a range of habitats. Improving the condition of SSSI is one of the priorities within Biodiversity 2020.

NC4: Sites of Special Scientific Interest

The Council recognises the importance and value of SSSI and will protect and enhance the management of SSSIs in conjunction with Natural England into the future. It will also promote the designation of other sites within Central Bedfordshire as SSSI where their quality is sufficient.

County Wildlife Sites

Each year a small number of CWS within Central Bedfordshire are surveyed by the Wildlife Trust as part of an ongoing monitoring and survey project. These detailed site surveys monitors the condition of each of the sites, as well as identifying those which may require additional work or are under threat. It enables resources to be distributed wisely to create the best quality sites possible.

Single Indicator 160 is an annual review of which CWS and LGS are deemed to be in "positive conservation management" within the last five years. This is reported to central government at the end of September each year. While this gives a general idea of the state of the local sites, a number of factors can affect the condition of a site and these can change within the five year period leading to some sites not being in as positive condition as SI160 might indicate. As well as being important for management, keeping information on the sites up-to-date is vital should they need to be defended through the planning process.

NC5: Support of the County Wildlife Site System

The Council will support the County Wildlife Site system in order to promote a well monitored and managed network of sites across Central Bedfordshire. This will include sitting on the County Wildlife Site Panel, the local sites partnership and supporting the administration of sites within Central Bedfordshire.

In order to allow the efficient storage and distribution of information on CWS across Bedfordshire the BRMC keeps all the relevant data on them. For an up-to-date list of sites or monitoring information please contact them.

Local Nature Reserves

Under the National Parks and Access to the Countryside Act, 1949, the Council can declare areas as Local Nature Reserves. These areas provide opportunities for local residents to enjoy and appreciate local wildlife, as well as offering educational opportunities. As part of their designation they must be managed for nature conservation purposes and have an adopted management plan. There are currently 11 sites designated as Local Nature Reserves within Central Bedfordshire.

NC6: Local Nature Reserves

The Council will, in consultation with Natural England, use its powers under the National Park and Access to the Countryside Act, 1949, to declare statutory Local Nature Reserves and instigate appropriate byelaws for their protection.

The Council will continue to protect and support existing Local Nature Reserves and support their status through appropriate management.

Nature Improvement Areas

In Central Bedfordshire there is currently one Nature Improvement Area recognised by Central Bedfordshire Council - the Greensand Ridge Nature Improvement Area (NIA) which lies almost exclusively within Central Bedfordshire. Nature Improvement Areas (NIA) have been established by DEFRA in order to create joined up and resilient ecological networks at a landscape scale. They are run by partnerships of local authorities, conservation organisations, local communities, landowners and the private sector.

NC7: Nature Improvement Areas

The Council will support the concept of Nature Improvement Areas and work with conservation organisations to establish and support such initiatives if/when these are brought forward.

Currently there is one NIA identified within Central Bedfordshire. This is the *Greensand Ridge Nature Improvement Area*. The Council will support the aspirations of the NIA partnership with regards to strengthening the ecological networks of the Ridge, enhancing public awareness of the NIA, its biodiversity and the wider benefits it brings; providing opportunities for people to access and experience the best the Ridge has to offer in terms of its wildlife, habitats and landscape, in a sympathetic and sustainable way and ensuring growth and development in and around the Ridge makes a real and lasting contribution, supporting, valuing and benefiting the natural environment and achieving a net gain in biodiversity by 2020.

Bedfordshire Local Nature Partnership

Local Nature Partnerships (LNPs) are a key element of the Government's Natural Environment White Paper – "The Natural Choice – Securing the Value of Nature" (June 2011) and have been established across England. There is a legal duty on local planning authorities, County Councils and public bodies to engage with LNPs constructively and have regard to their views on strategic planning matters, recognising LNPs as balanced, strategic and knowledgeable partnerships.

NC8: Bedfordshire Local Nature Partnership

The Council will engage with LNPs constructively and have regard to their views on strategic planning matters.

Biodiversity Network

The long-term success of the wildlife sites which have been designated across Central Bedfordshire depend not only on their maintenance but also on the provision of linkages to other sites and the wider countryside. Small isolated wildlife communities, even if protected, are more vulnerable to local extinction than large areas. Linkages can be stepping stones like open spaces and green roofs, or corridors such as road verges or hedgerows. Such links help to maintain diversity by encouraging wildlife to move through the urban area. The main emphasis within Biodiversity 2020 is the creation of an integrated habitat network. Creating the opportunities for wildlife to move is particularly important in the face of climate change as the areas where they are currently found may not be suitable for them in the future.

Central Bedfordshire's Biodiversity Network incorporates the South and Mid Bedfordshire elements of the network which was developed for the Bedfordshire Green Infrastructure Plan. The Biodiversity Network includes those elements which pertain to biodiversity and conservation such as green corridors, nature reserves, woodlands and parks but does not include those elements which solely relate to leisure, heritage or landscape.

Figure 6 illustrates where the best opportunities exist for enhancing and creating a network of sites, stepping stones and corridors across the urban area which link into the wider countryside.

Opportunities to protect and enhance the biodiversity network could come from many aspects of the Council's work. For example, protecting existing wildlife sites in the planning process and promoting links across new developments, managing parks with wildlife networks in mind and enhancing key road verges to provide wildlife corridors. Creating a network will also enable Central Bedfordshire's residents to experience nature close to where they live or work providing healthy recreational and educational opportunities into the future.

NC9: Creating a Network for Biodiversity

The Council will promote the creation of a biodiversity network across all relevant aspects of its work. This includes protecting and enhancing, where appropriate, the network of sites, stepping stones and corridors shown on the Biodiversity Network map.

Bedfordshire and Luton Biodiversity Recording and Monitoring Centre

Optimally managing designated sites, creating biodiversity networks and protecting wildlife in the wider landscape all require up-to-date correct information on species and habitats. The Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC) collate, store and disseminate verified wildlife records from across the Central Bedfordshire. The resulting data can be displayed in a variety of ways making it easy to access alongside the current legislative or rarity status of each species. They are also the repository for information about CWS and habitat maps for the area with both recent and historical information available. Much of this information is available in GIS format making it

easy to assess and integrate with other evidence. The BRMC is a partnership organisation based at the Bedford office of The Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire.

Biodiversity 2020 recognised how vital good information is, paragraph 2.34 says:

> "Above all, we need evidence to guide our decisions, from issues of national policy to choices about individual site management and we need to continue to develop and test solutions to address biodiversity loss and engage people, natural resource managers and business."

It also emphasises the importance of partnership working and the voluntary sector, particularly local recording networks, in achieving good information. Locally the BRMC is the body taking these issues forward. To enable Central Bedfordshire Council to access the best evidence for decision making, keeping it in line with the Biodiversity Duty from the NERC Act 2006; support for the BRMC is needed. This support would include information sharing and contributing financially whenever possible. More information can be found on the BRMC website (www.bedsbionet.org).

NC10: Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC)

The Council recognises the importance of up-to-date verified biodiversity information and requires it to manage its own sites effectively, create biodiversity networks and adequately consider biodiversity within the planning system. To enable the BRMC to continue to collate, store and disseminate data the Council will support it financially where possible and share information.

The Planning Process

Both Strategic Planning and Development Control have a very important role to play in protecting Central Bedfordshire's existing wildlife sites and biodiversity network. They also have opportunities to enhance areas for wildlife and create new habitats within developments which will help provide better connections between wildlife rich sites. Many habitats are irreplaceable as they have developed over a long time period and involve complex relationships between the organisms they contain, the soil and the wider environment. As legally protected designated sites are not abundant, protecting other sites with existing biodiversity interest is essential. The NPPF requires designated sites and biodiversity networks to be identified and mapped as part of the Local Plan process.

SSSIs receive legal protection due to this designation. The defense of other important wildlife sites, such as CWS, falls largely to the planning process and so it is important that they are well protected by robust policies in the Development Strategy. This approach is encouraged by the NPPF. Some of the habitats within Central Bedfordshire have been identified as of "principal importance to the purpose of conserving biodiversity" and so receive protection under the NERC Act 2006 and require particular note within the planning process.

While the Council would wish to protect all important wildlife sites from development there are occasions where development is permitted for an overriding need. The definition of this

need will be different for each level of designation. In such cases the Council will seek suitable mitigation for the loss which would contribute to the wider biodiversity network.

NC11: The Planning Process

The Council will refuse planning permission for proposals that would result in harm to designated or proposed Sites of Special Scientific Interest (SSSI) or National Nature Reserves (NNR), unless the reasons for the development clearly outweigh the nature conservation value of the site and the national policy to safeguard such sites. Where such development is permitted, measures will be required to mitigate and/or compensate for the effects of the development. Development that would impact on the strategic ecological network, including County Wildlife Sites, Local Nature Reserves and Roadside Nature Reserves, causing fragmentation or otherwise prejudice its effectiveness will not normally be permitted.

The planning process can have a positive role to play in encouraging the creation of new habitats within developments and enhancing the wider biodiversity network. This can create pockets of wildlife rich habitat on people's doorsteps. Developers should consider existing biodiversity features and how to link them within their landscaping scheme at an early stage. Landscaping schemes which retain existing features, such as hedgerows, whilst enhancing them using locally sourced native species should be encouraged. Such features improve new developments for wildlife and people.

NC12: Development Criteria.

The Council will seek a net gain in biodiversity and geodiversity and support the protection, maintenance and enhancement of habitats, identify opportunities to create buffer zones and restore and repair fragmented biodiversity networks. Development that would impact on the strategic ecological network causing fragmentation or otherwise prejudice its effectiveness will not normally be permitted.

Species Protection

Some species are protected by legislation which requires their possible presence to be taken into consideration as part of the planning process or during management works on sites. Species are protected by the Wildlife and Countryside Act 1981 (as amended), the Badgers Act 1991 and the Conservation of Habitats and Species Regulations 2010. Some of the protected species that occur within Central Bedfordshire include great crested newts, bats, badgers, hazel dormouse and slow worms. The NERC Act 2006 includes a list of species which are "of principal importance to the purpose of conserving biodiversity" which is also included in the CROW Act 2000. This list was developed as part of the Biodiversity Action Plan process. These Acts require local authorities to have regard for these species across all their functions. It is important to note that while the maintenance of wildlife sites will benefit many protected species, others occur more widely across the urban area, such as bats, and will require special consideration.

NC13: Species Protection

The Council will have regard to protected species and species of principal importance in exercising all of its functions. In particular where the need for development outweighs its impact and is permitted within, adjacent to, or in proximity to designated sites or known locations of protected species or elements of the ecological network, appropriate mitigation and/or compensation to minimise such impacts will be necessary.

Trees and Orchards

The landscape and biodiversity value of individual trees, notably ancient and specimen trees, including those found in avenues and traditional orchards, should not be underestimated particularly where they provide 'stepping stones' between otherwise isolated habitats. Hedgerows also provide vital wildlife corridors as well as being habitats in their own right. Opportunities to protect and safeguard orchards and other important habitats involving trees come through the planning system as well as during the Council's everyday works.

NC14: Trees and orchards;

Semi-ancient natural woodlands, planted ancient woodland sites, orchards, hedgerows, specimen and veteran trees found outside woodlands will be protected from development and improved through proper management. Any trees, including avenue trees, orchards, or hedgerows unavoidably lost to development will, where appropriate, be replaced with landscape and habitat features of at least equivalent value.

Waterways

Opportunities to enhance rivers occur through the planning process and through management practices. Results from the Water Framework Directive highlight issues with each watercourse that can be worked on in association with the Environment Agency and other organisations like water authorities and anglers.

NC15: Waterways

The Council will seek to improve the quality of its waterways to achieve Good Ecological Condition under the Water Framework Directive in association with the Environment Agency and others.

Habitat Creation

Although the Council should take opportunities to create new habitats on its own land, other opportunities often exist during the development and redevelopment of other sites. This could include the creation of wildlife gardens or community orchards within school grounds

or the inclusion of sympathetic landscaping within new developments. This approach can create an enhanced environment to benefit the whole community.

The Council recognises that it has an important role to play in encouraging new habitat creation schemes. Guidance on habitat creation for anyone who is interested is available from the Council, local Wildlife Trust and other environment groups.

NC16: Habitat Creation
The Council will seek the creation and improvement of wildlife habitats particularly where this will enhance stepping stones and linkages across Central Bedfordshire.

Non-native Invasive Species

Making Space for Nature (Lawton 2010) recognises the threats to British wildlife from invasive non-native species. An audit of England in 2005 found 2721 non-native species living in the wild (English Nature 2005). Most of these have not had noticeable negative impacts, but a small minority have caused considerable harm, including Grey Squirrels (*Sciurus carolinensis*), Sudden Oak Death (*Phytophthora ramorum*) and Signal Crayfish (*Pacifastacus leniusculus*). The problems caused by non-native species could increase because of climate change.

In Central Bedfordshire there are substantial populations of Himalayan Balsam (*Impatiens glandulifera*) which are causing significant problems to a number of important wildlife sites, particularly on the river Flit where large swathes of Himalayan Balsam have taken over areas of Flitwick Moor SSSI. Other species which are currently causing problems in Central Bedfordshire include Giant Hogweed (*Heracleum mantegazzianum*), American Mink (*Mustela vison*) and Japanese Knotweed (*Fallopia japonica*).

At a government level, British coordination involves the GB Non-native Species Coordinating Mechanism, which consists of a Programme Board, Secretariat, Risk Analysis Panel, Stakeholder Forum and Working Groups. The Programme Board and key stakeholders interact via working groups and the annual stakeholder forum; this is facilitated by the Secretariat and its website http://www.nonnativespecies.org/

Biosecurity is important to reduce the risk of introducing or spreading invasive non-native species (and other harmful organisms such as diseases). The Non-native Species Secretariat runs a number of campaigns helping to raise awareness of these issues such as Be Plant Wise and Check Clean Dry for freshwater environments.

Be Plant Wise - http://www.nonnativespecies.org//beplantwise/index.cfm?

Check Clean Dry - http://www.nonnativespecies.org//checkcleandry/index.cfm?

Horizon scanning for future potential threats is important so that action against new invasive species can be rapid and effective.

NC17: Non-native Invasive Species

The Council will support work to tackle the impacts of non-native invasive species across Central Bedfordshire. The Council will also support the GB non-native species secretariat's Be Plant Wise and Check, Clean Dry campaigns and will ensure that work undertaken by the council will not inadvertently lead to any further spread of these species by adopting appropriate biosecurity measures. It will also encourage other landowners and managers to establish similar practices. The council will take an approach of prevention and rapid, targeted action. Central to this is the identification of those non-native species that are likely to become newly invasive in Central Bedfordshire so the council will work with other agencies to undertake regular horizon scanning in order to be aware of any potential threats.

Minerals Sites

The Council is fully committed to achieving higher standards of restoration following mineral extraction CBC are working with minerals operators to achieve good habitat on restored sites with the objective of protecting and enhancing biodiversity.

NC18: Minerals Sites

The Council will seek high quality progressive reclamation and aftercare of sites. Proposals for restoration will be considered with respect to biodiversity and opportunities for habitat creation will be sought, particularly within the NIA.

Building and Site Design

Through the planning system, the Council encourages, as far as possible, the protection of existing features and use of locally sourced native plants in new landscaping. The planning system also offers an opportunity to encourage developers to think more innovatively in their approaches to conservation, such as incorporating green roofs or walls within densely developed parts of the urban area; the inclusion of natural open spaces within developments; or the design of storm water drainage and balancing ponds for maximum conservation benefit. To assist developers the Council has produced a Design Guide which sets out the key principles and standards to ensure the delivery of high quality design in Central Bedfordshire

NC19: Building and Site Design

The Council will require all developers to promote the positive enhancement of sites and buildings for wildlife wherever possible, using the Design Guide as reference.

Site Works

Where development takes place, there can also be wider environmental effects. Major projects, for example roads, can have impacts through the creation of spoil heaps during the works which can have an impact directly or indirectly on areas of interest for nature

conservation. This needs to be considered in advance of site works commencing. as does aftercare to ensure that preliminary enhancements are not wasted unnecessarily as time goes by. Consideration must also be given to the safety of wildlife on site during construction works, for example trenches should be covered when not in use in areas frequented by badgers, and measures put in place to prevent pollution, particularly near watercourses.

Land Management

The Council is a major landholder within the area. Through effective management, sites in the Council's ownership are being enhanced for nature conservation purposes. This may mean making variations in cutting regimes or other management programmes. This does not mean that areas will be left to go wild and, on occasion, some areas of high quality landscaping and cultivation are appropriate. The appropriateness of management regimes for nature conservation will continue to be carefully considered for each site and will be judged on issues such as usage and the proximity to other wildlife sites. This is particularly important for sites such as Galley and Warden Hills Local Nature Reserve where, as the owner of the land, the Council has a statutory responsibility to manage the land for nature conservation purposes.

On important nature conservation sites, like Sundon and Streatley Hills, the Council is already implementing a management plan. Management plans for the CWS owned by the Council have also been prepared and are being implemented. The Council will encourage other owners of CWS to do the same. A strategy for County Farms is being prepared.

While the management of CWS is very important there also needs to be appropriate action to enhance wildlife in other areas, for example, road verges, hedgerows and small green spaces. Slight variations in cutting regimes could enhance the nature conservation interest of grass verges. Such activities would need to be accompanied by suitable interpretation and publicity.

NC20: Land Management

In accordance with Aim 5 of the CBC Access Strategy the Council will, where appropriate, establish working practices to sympathetically manage land for nature conservation and to enhance the wildlife interest of open spaces and other areas of open land in its ownership. It will also encourage other landowners and managers to establish similar practices.

Pollinators

The National Pollinator Strategy: for bees and other pollinators in England was published by DEFRA in November 2014 and urges councils to make a number of simple adjustments to

existing planting and management to improve the quality and extent of habitats suitable for pollinators. These are (quoted from the Strategy):

- Grow more flowers, shrubs and trees that provide nectar and pollen as food for bees and other pollinators throughout the year. For example, pussy willow, primroses and crocuses in spring, lavenders, meadow cranesbill and ox-eye daisies in summer, ivy and hebes in autumn, and mahonia shrubs and cyclamen in winter.
- Leave patches of land to grow wild with plants like stinging nettles and dandelions to provide other food sources (such as leaves for caterpillars) and breeding places for butterflies and moths.
- Cut grass less often and ideally remove the cuttings to allow plants to flower.
- Avoid disturbing or destroying nesting or hibernating insects, in places like grass margins, bare soil, hedgerows, trees, dead wood or walls.
- Think carefully about whether to use pesticides especially where pollinators are active or nesting or where plants are in flower. Consider control methods appropriate to your situation and only use pesticides if absolutely necessary. Many people choose to avoid chemicals and adopt methods like physically removing pests or using barriers to deter them. If you choose to use a pesticide, always follow the label instructions.

The Strategy can be found at
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/370199/pb14221-national-pollinator-strategy.pdf

NC21: Pollinators
The council will review its current practices and work towards more pollinator friendly protocols including planting / mowing regimes and use of pesticides. It will also encourage other landowners and managers to establish similar practices.

Access

The ability to access open spaces and sites of nature conservation interest is an important issue to many local people and communities. The benefits of outdoor access and recreation for both recreational and educational purposes and for health and well-being are well-known and recognised. In some cases, access is difficult for physical reasons particularly for the elderly or disabled. At other sites the land may be in private ownership where access is restricted. In some instances access to sites needs to be managed carefully to avoid the pressures which can occur from overuse or from inappropriate levels of access. It would not be appropriate to prevent access to important sites in the Council's ownership, but rather to encourage appropriate access and management of habitats. In particular areas problems, such as motorbike damage, do need to be considered.

Care needs to be taken to provide not only managed sites, whether with marked trails or managed areas, but also "natural" areas where habitats are left to develop and change in their own way through restricting access where appropriate

Accessibility is not only about being able to gain physical access to sites but also in creating the confidence of non-users to feel that local green spaces and the wider countryside are

available to them. It is easier to create “confidence” at local sites which then act as stepping stones to the wider countryside

Access may need to be restricted on some sites where, for example, there are nesting birds or plant species which are easily damaged. This may be for a short period of time or for small areas. On sites where livestock may be used for conservation purposes access for dog walkers will need to be managed carefully. In these areas visitors should be required to keep their dog on a lead.

The Council has brought in four dog control orders which came into effect on 19 October 2014 and aim to cut down the amount of dog foul, restrict dogs from places such as enclosed children’s playgrounds and ensure that dog owners keep their dogs on leads in certain areas including cemeteries and marked sports pitches.

NC22: Access

In accordance with Aim 10 of the CBC Access Strategy the Council will, in partnership with others, endeavour to ensure that the public has access, including where possible access for people with disabilities, to publicly accessible sites of importance for nature conservation except where such access would be detrimental to nature conservation interests or land use of the site.

Community Involvement

It is very important that local people and the community are involved in the management, protection and enhancement of sites and they should also have an awareness of the importance of Central Bedfordshire’s environment. Nature conservation is not only concerned with protecting wildlife but also about the local community enjoying sites and understanding them. Biodiversity 2020 has this as one of its main priorities. Therefore, community involvement with sites, whether to use the area for relaxation, play or education or to assist in their management, is an essential element of the continued protection and improvement of sites.

Involvement in nature conservation issues can be on a number of levels. Communities may wish to create new habitats on small areas of land or to provide improved or increased access to existing sites. Individuals can also become involved by joining a volunteer group such as those run by the Wildlife Trust or the Greensand Trust. They can also encourage wildlife in their back garden, for example, by putting up bird or bat boxes or creating a pond. Involvement does not have to be on a formal basis, for example, local residents may wish to form their own local group to help look after wildlife habitats close to their homes. The involvement of local people benefits biodiversity alongside improving communities and promoting wellbeing and an active lifestyle. The Council’s ‘P3’ scheme can help with this through advice, tools and training with projects as described above.

There are also opportunities to comment on documents such as site management plans and people’s views on this Nature Conservation Strategy are also welcomed. Individuals and local groups can also be pro-active in suggesting projects and initiatives to the Council and other organisations to improve wildlife habitats in their areas.

NC23: Community Involvement

In accordance with Aim 7 of the CBC Access Strategy the Council will encourage local community groups, schools and the general public to become involved in nature conservation and will, where appropriate, liaise with such interested persons and organisations when considering nature conservation schemes on individual sites.

Interpretation and Publicity

Local communities and individuals can only become involved in nature conservation activities if they are aware of what is going on. This has to be achieved through good publicity and interpretation. Information is required where projects are being undertaken and this can be particularly important where management for nature conservation interest can easily be misunderstood and unnecessary complaints are then made.

People's awareness of the importance and interest of sites can be greatly enhanced by appropriate information. This could be in the form of leaflets, websites or on-site notice boards. Other activities could include guided walks, talks or podcasts. Many of these activities are already carried out by the Council and others working within Central Bedfordshire. The Council supports these groups in their activities and has worked in partnership with them on a number of initiatives. As above, the P3 scheme can help develop projects.

NC24: Interpretation and Publicity

In accordance with Aim 10 of the CBC Access Strategy the Council will, in partnership with conservation organisations and others, continue to publicise and promote nature conservation through a variety of interpretive techniques including leaflets, exhibitions, on site explanatory panels, guided walks, special events and through social media.

Resources and Implementation

As with any policy document it is its implementation through projects, programmes and initiatives that is most important. The following chapter highlights more specific proposals for how this can be achieved as part of an on-going programme that will be monitored and reviewed. Many of the programmes and initiatives outlined in the Action Plan will only require small changes in working practices or can be accommodated within existing resources; some may even save time and money.

NC25: Implementation

The Council will monitor the implementation of the policies and progress will be reviewed regularly.

Chapter 5

Implementation and Action Plan

The policies contained in the Nature Conservation Strategy are intended to provide a framework for the protection and enhancement of Central Bedfordshire's natural environment. The policies themselves are, therefore, a useful reference tool providing guidance to those people, both individuals and community groups, who are interested in Nature Conservation or who wish to take such issues into account when undertaking management or development of land in Central Bedfordshire. However, the Strategy can only be successful if it has a supporting programme of initiatives and actions in the form of more specific proposals. This is what the Action Plan chapter deals with.

The Strategy has stressed the need for co-operation and co-ordination between Council departments, local organisations and statutory bodies and this is the starting point for the Action Plan. It defines a number of programmes and initiatives but is not an exhaustive list and should be reviewed on a regular basis.

A previous set of Policies and Actions was included in "A Nature Conservation Strategy for Bedfordshire" (1994). This document is held by the BRMC. Please consult them if you require more detail.

Action
General Statement
To comply with the NERC Act 2006 the Council will have regard to the purpose of conserving biodiversity across all its functions and information/guidance will be made available to facilitate this.
The Council will ensure that all relevant Officers and Members are provided with information to ensure that the implementation of the Nature Conservation Strategy can proceed smoothly at all levels of the Council. Where necessary training will be provided.
The Council will liaise with bodies such as Natural England, The Wildlife Trust, BRMC and other environmental groups. This should include survey data, species lists and other relevant materials. An information network will be established to ensure that information is circulated.
The Council will support measures to promote the general principals of wildlife conservation and the natural conservation resources of the district to all interested parties.
Designated Sites (SSSI, CWS, LNR)
The Council will manage its SSSIs and NNRs in accordance with the site's management plan agreed with Natural England to fulfil its statutory duties.
The Council will support the designation of additional SSSI by Natural England where sites within Central Bedfordshire are of the appropriate national standard.

The Council will ensure that all Sites of Scientific Interest, Local Nature Reserves and County Wildlife Sites will be managed in accordance with the best interests of the wildlife of the site where they are in Council ownership.
The Council will support the Greensand Ridge Nature Improvement Area (NIA) in seeking to restore and create priority habitats.
Management groups will be formed for each Local Nature Reserve involving interested local community organisations and individuals.
The Council will continue to seek further opportunities for the creation of Local Nature Reserves (LNRs) on land within Central Bedfordshire and will review existing landholdings to identify adjacent land that could be acquired for this purpose.
Biodiversity Network
A programme of monitoring and review of the biodiversity network will be introduced. The review programme will identify new habitats and the possibilities for further enhancement of the biodiversity network including the provision of new habitats through planning of new developments and through management procedures.
Where the biodiversity network extends into the wider countryside and beyond the Council's boundaries, the Council will liaise with other local authorities, landowners and conservation bodies to ensure the network is not separated from its wildlife hinterland.
The Council will seek to develop an integrated approach to nature conservation wherever possible on the basis of suites of sites in conjunction with neighbouring authorities, landowners and tenants. Potential suites of sites include the South Bedfordshire chalklands and the River Lea Valley (with tributaries) and the Forest of Marston Vale. The contribution of such sites to sustaining ecosystem services will be recognised.
Bedfordshire and Luton Biodiversity Recording and Monitoring Centre
To enable the BRMC to continue to collate, store and disseminate data, the Council will support it both financially, where possible, and by sharing any data it generates.
The Planning Process
Procedures will be devised to ensure that nature conservation issues are taken into account throughout the planning process, including the preparation of Local Plans, development briefs and in the consideration of planning applications. Such procedures will include the need, where appropriate, to consult groups such as Natural England and The Wildlife Trust and the use, in appropriate circumstances, of conditions and agreements requiring the protection and enhancement of features of wildlife interest and will take account of the biodiversity network.
Notes for the guidance of developers on issues relating to nature conservation will be prepared and made easily accessible. Items on which guidance will be given will include: - Protection of existing features of nature conservation interest in development - Use of native species in landscaping schemes - Habitat creation in new development - Innovative approaches to nature conservation in building design. - Renewable energy generation projects including wind and solar farms

Species Protection
The Council will have regard to the protection and enhancement of legally protected species and species of "principal importance for the purpose of conserving biodiversity" across all its functions.
In planning applications where protected or notable species are likely to be affected the Council will seek expert in house advice.
Non Native Invasive Species
The Council will support work to tackle the impacts of non-native invasive species across Central Bedfordshire. The Council will also support the GB non-native species secretariat's Be Plant Wise and Check, Clean Dry campaigns and will ensure that work undertaken by the council will not inadvertently lead to any further spread of these species by adopting appropriate biosecurity measures.
Minerals sites
The Council will seek high quality progressive reclamation and aftercare of sites with opportunities for habitat creation being sought, particularly within the NIA.
Waterways / river systems
The Council will seek the advice and assistance of the Environment Agency with regard to enhancement Waterways / river systems to work towards 'Good Ecological Status' as part of the Water Framework Directive.
Orchards
The Council will encourage the creation of community orchards and promote the establishment of orchards on new developments. The Council will support work to increase the number of traditional orchards designated as CWS and will support the development of a Bedfordshire and Luton 'reference orchard' to provide a gene bank of local fruit varieties and a location for traditional orchard management skills and training.
Wet Woodlands
The Council will continue to support and protect existing wet woodlands through designations and the planning system and work to prevent damage to these woodlands from land drainage, flood prevention measures and abstraction which result in a lowered water table. The council will work to maintain water quality (run off from agricultural land and roads - high in nutrients) and support opportunities for Wet Woodland Habitat Creation where possible for example with the restoration of extensive mineral workings in the Lower Ouse and the Ivel Valleys. The council will also support schemes to help removal of non-native invasive species which can damage wet woodland habitats such as Himalayan balsam (*Impatiens glandulifera*)

Habitat Creation
The Council will be mindful of the benefits that creating habitats can have in maintaining and improving ecosystem services, such as water management and local climate control. When considering new projects the importance of ecosystem services will be recognised.
The Council will seek to undertake schemes for habitat creation where appropriate in areas in Council ownership and will encourage other landowners to create new habitats where opportunities occur.
The use of Rushmere Country Park which is managed jointly by The Council and The Greensand Trust as a community resource with educational facilities will be encouraged.
The Council will provide advice to Landowners and tenants, where required, on the creation of areas of new wildlife habitat on their land, such as planting new native hedgerows, natural trees and creation of new grassland.
The Council will seek opportunities for enhancement of aquatic habitats within its ownership such as Tiddenfoot waterside park and floodplain meadows at Henlow and Langford common and will give encouragement to private landowners to create and enhance aquatic habitats on their land.
Building and Site Design
The Council will provide suitable structures for mammals and birds to nest, roost and hibernate in suitable locations. These would include bird boxes, bat boxes, hedgehog shelters, etc. and will encourage community involvement in such activity.
Site Works
Where major development or new road proposals are being considered, or work is being undertaken, the Council will monitor carefully the effect on wildlife. Where such works are programmed to take place the Council will ensure that the procedures outlined in the Planning Process actions will be followed.
Land Management
Encouragement will be given to landowners to enter into Management Agreements with the Council to safeguard the ecological value of the land. Where required or requested such management schemes will need to be based on management plans prepared by the Council or other environmental group.
A review of management of all Council owned land will be undertaken to ascertain whether more sympathetic regimes could be introduced, particularly on land within the biodiversity network, roadside verges, in public parks and other green spaces.
Where practices for more sympathetic management of Council owned land have been identified these will be introduced as soon as possible.
Management practices on roadside verges will be reviewed and regimes to encourage wildlife interest will be introduced – these will include habitat creation.
The importance of cemeteries and churchyards as semi-natural habitats in built-up areas will be given particular recognition. The Council will liaise with Church bodies and The Living Churchyard Project, to ensure that management of these areas are sympathetic to wildlife, particularly older burial grounds with more mature habitats.
The Council will liaise with bodies such as local environmental groups to ensure that land management policies are supported by professional organisations concerned with nature conservation, even where they have no formal role.

The Council will, in co-operation with other organisations, encourage landowners to adopt agricultural and forestry practices of benefit to nature conservation, and to take advantage of schemes and grants available to enhance conservation. For example Environmental Stewardship agreements.
Where necessary, training will be provided for Council Officers employed to manage land sympathetically for nature conservation purposes.
A review of the Council's use of herbicides, insecticides and pesticides will be undertaken.
Following the launch of the National Pollinator Strategy in November 2014, the Council will review its current practices and work towards more pollinator friendly protocols including planting / mowing regimes and use of pesticides.
The use of peat free alternatives will be recommended for use to our contractors / agents / partners.
The Council will continue the programme of implementing composting of waste garden materials.
The Council will ensure that, where appropriate, certain habitats are managed to retain "natural" elements of landscape. These areas will be identified and interpretation material provided.
Access
A programme of review of all open spaces with Nature Conservation interest will be undertaken to evaluate accessibility and if works are needed such works will be supported where it will not be to the detriment of the Nature Conservation interest of the sites concerned. Full account will be taken of the needs of the emergency services, the general public and those with disabilities.
The Council, in co-operation with the other authorities, will maintain and enhance the network of Public Rights of Way and permissive paths to allow easy access to and across sites of wildlife importance.
Where works are carried out to publicly usable paths the sensitivity of sites and natural aesthetic value will be taken into account.
The Council will liaise with neighbouring authorities and other bodies to ensure that the Public Rights of Way network through the wider countryside and beyond Central Bedfordshire's boundaries is maintained.
The Council will support projects and initiatives to increase education on the environment and the appreciation of conservation.
Research has established the positive health benefits, particularly for mental illness, of experiencing wildlife close to home. In recognition of this the Council will seek to work in partnership with health organisations to provide access to wildlife sites within the Central Bedfordshire.
Community Involvement
The involvement of voluntary bodies and local community groups in managing and developing Local Nature Reserves, County Wildlife Sites and other areas of wildlife interest will be encouraged.
The Council will provide support financially, wherever possible, to the undertaking of local practical volunteer conservation groups to carry out practical work (e.g. scrub management, hedgerow maintenance and planting), particularly on local Sites of Special Scientific Interest, Local Nature Reserves and County Wildlife Sites. The P3 scheme will support this where possible.
The Council will support the setting up of resident and community groups to maintain local wildlife sites. The P3 scheme will support this where possible.
The Council will support opportunities for individual volunteers to take part in recording elements of nature conservation interest. Opportunities for wardening and monitoring of

wildlife sites will be explored. Examples will include botanical and invertebrate surveys, reporting vandalism or damage to sites, and recording the effects of management regimes, etc. The P3 scheme will support this where possible.
The Council will provide information and encourage individuals to undertake management of their own land for conservation (e.g. wildlife gardening and domestic pond creation).
Interpretation and Publicity
Interpretation material, including interpretation panels and leaflets will be prepared for Local Nature Reserves and other sites. The P3 scheme will support this where possible.
Selected wildlife sites will be promoted as sites for educational work. Educational materials for these sites will be prepared for use by teachers, students and school children. The P3 scheme will support this where possible.
Where land in the Council's ownership is already being managed for nature conservation purposes the Council will indicate to the public the management being undertaken.
Local people will be consulted, wherever possible, with regard to major projects affecting their local wildlife area, such as Local Nature Reserve declaration, fencing or large scale habitat modification (e.g. scrub management) which would noticeably alter the appearance of the site.
The Council will promote educational opportunities on wildlife topics at Rushmere Park and elsewhere by promoting and giving talks and guided walks as appropriate.
The Council will produce and support the production of material to promote nature conservation in Central Bedfordshire. Information on local wildlife areas, in the form of hand-outs, leaflets, posters and trail guides both in-house and by other local organisations may be appropriate. The P3 scheme will support this where possible.
Information will be made available on the network of public paths and other means of access to the wildlife sites and the wider countryside in liaison with other environmental groups. The P3 scheme will support this where possible.
Resources and Implementation
The Council will encourage projects to develop and enhance all aspects of nature conservation in Central Bedfordshire that involve all sections of the community. Financial support is available through grant funding via the Green Infrastructure Fund and CIL which is open to bids from local organisations and communities to manage areas of wildlife importance for their conservation value in justifiable cases. The P3 scheme will support this where possible.
The Council will continue to provide advice and financial assistance, where available, and expertise where necessary to voluntary organisations and community groups wishing to carry out practical work on sites of importance. The P3 scheme will support this where possible.

Footnote

The maps within this document represent the situation in November – December 2014. Up to date information is available via the Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC).

Weblinks within this document are correct as of January 2015.

Appendix 1: Comparison of objectives from the 1994 Nature Conservation Strategy for Bedfordshire (Bedfordshire County Council and English Nature) and this Nature Conservation Strategy for Central Bedfordshire.

1994 Nature Conservation Strategy for Bedfordshire		2015 Nature Conservation Strategy for Central Bedfordshire.	
1	TO IDENTIFY THOSE SITES, HABITATS AND FEATURES OF VALUE FOR NATURE CONSERVATION IN THE COUNTY.		These are covered generally.
	The identification of sites and features of wildlife interest within the County was undertaken between 1987 and 1989 by English Nature and The Wildlife Trust, Bedfordshire with support from the County Council. The Phase I Habitat Survey of Bedfordshire (1990) and the Prime Sites of Bedfordshire (1989) provide the current basis of our knowledge of the County nature conservation resource. This information will however require periodic review and up-dating.		
2	TO PROTECT AND ENHANCE EXISTING KEY WILDLIFE SITES, HABITATS AND FEATURES AND THEIR ASSOCIATED FLORA AND FAUNA.	NC4:	SITES OF SPECIAL SCIENTIFIC INTEREST The Council recognises the importance and value of SSSI and will protect and enhance the management of SSSIs in conjunction with Natural England into the future. It will also promote the designation of other sites within Central Bedfordshire as SSSI where their quality is sufficient.
	National Nature Reserves, Sites of Special Scientific Interest and Local Nature Reserves, together with certain nationally rare and declining species are protected through the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 (as amended). In the wider countryside sites with significance for wildlife in the county context are identified as County Wildlife Sites. Together, these are the key sites for	NC5:	SUPPORT OF THE COUNTY WILDLIFE SITE SYSTEM The Council will support the County Wildlife Site system in order to promote a well monitored and managed network of sites across Central Bedfordshire. This will include sitting on the County Wildlife Site Panel, the local sites partnership and supporting the administration of sites within Central

	protection within the county. Outside these areas however, are a range of other sites and features of wildlife value requiring protection as part of the overall mosaic of habitats which contribute to a sustainable nature conservation resource.		Bedfordshire.
		NC13:	SPECIES PROTECTION The Council will have regard to protected species and species of principal importance in exercising all of its functions. In particular where the need for development outweighs its impact and is permitted within, adjacent to, or in proximity to designated sites or known locations of protected species or elements of the ecological network, appropriate mitigation and/or compensation to minimise such impacts will be necessary.
		NC14:	TREES AND ORCHARDS Semi-ancient natural woodlands, planted ancient woodland sites, orchards, hedgerows, specimen and veteran trees found outside woodlands will be protected from development and improved through proper management. Any trees, including avenue trees, orchards, or hedgerows unavoidably lost to development will, where appropriate, be replaced with landscape and habitat features of at least equivalent value.
3	TO PROMOTE THE APPROPRIATE MANAGEMENT OF HABITATS AND FEATURES TO MAINTAIN IBEIR WILDLIFE INTEREST.	NC15:	WATERWAYS The Council will seek to improve the quality of its waterways to achieve Good Ecological Condition under the Water Framework Directive in association with the Environment Agency and others.
	Site protection alone is not sufficient to safeguard the wildlife resource that remains. Many habitats require active, sympathetic management to ensure the survival of the species they contain and areas where there is no management, or where management is inappropriate will deteriorate resulting in loss of species diversity.	NC20:	LAND MANAGEMENT In accordance with Aim 5 of the CBC Access Strategy the Council will, where appropriate, establish working practices to sympathetically manage land for nature conservation and to enhance the wildlife interest of open spaces and other areas of

			open land in its ownership. It will also encourage other landowners and managers to establish similar practices.
4	TO IDENTIFY AND PROMOTE OPPORTUNITIES FOR ENHANCING THE WILDLIFE RESOURCE OF EXISTING AREAS BY THE PROVISION OF ADDITIONAL WILDLIFE HABITAT.	NC6:	LOCAL NATURE RESERVES The Council will, in consultation with Natural England, use its powers under the National Park and Access to the Countryside Act, 1949, to declare statutory Local Nature Reserves and instigate appropriate byelaws for their protection. The Council will continue to protect and support existing Local Nature Reserves and support their status through appropriate management.
	The integration of nature conservation with other land-use interests in the County is fundamental to the strategy, and opportunities that this may offer for wildlife must be identified and promoted. Opportunities which arise as a result of land-use change, such as that set to occur in the agricultural sector, should be fully investigated. On a smaller scale, changes in the way our open-spaces are managed, and the use of locally native plants, shrubs and trees in planting schemes can greatly increase the amount and range of wildlife in the County. Roadside verges and railway embankments can be managed to benefit wildlife and schools and parks can be encouraged to set areas aside as wildlife 'gardens'. With imagination and enthusiasm, the opportunities are endless.	N12:	DEVELOPMENT CRITERIA. The Council will seek a net gain in biodiversity and geodiversity and support the protection, maintenance and enhancement of habitats, identify opportunities to create buffer zones and restore and repair fragmented biodiversity networks. Development that would impact on the strategic ecological network causing fragmentation or otherwise prejudice its effectiveness will not normally be permitted.
		NC18:	MINERALS SITES The Council will seek high quality progressive reclamation and aftercare of sites. Proposals for restoration will be considered with respect to biodiversity and opportunities for habitat creation will be sought, particularly within the NIA.
		NC19:	BUILDING AND SITE DESIGN The Council will require all developers to promote the positive enhancement of sites and buildings for wildlife wherever possible, using the Design Guide as reference.
5	TO IDENTIFY AND PROTECT ANY EXISTING LINEAR HABITATS AND ZONES WHICH LINK IMPORTANT SITES, AND PROMOTE THE CREATION OF A COMPREHENSIVE NETWORK OF LINKING HABITATS AND ZONES BETWEEN SITES.	NC9:	CREATING A NETWORK FOR BIODIVERSITY The Council will promote the creation of a biodiversity network across all relevant aspects of its work. This includes protecting and enhancing, where appropriate, the network of sites,

	The maintenance of natural variation within a species is necessary to allow adaptability and the continuation of evolutionary processes. These processes are hindered when populations of species become isolated from one another. By maintaining a network of linking habitats including linear habitats and habitat zones such as hedgerows, river corridors, roadside verges and railway embankments, the problem of species isolation may be partially overcome. Such a network may also enable species to colonise areas that would otherwise be inaccessible, and may therefore lead to an increase in the frequency and distribution of some species.		stepping stones and corridors shown on the Biodiversity Network map.
		NC16:	HABITAT CREATION The Council will seek the creation and improvement of wildlife habitats particularly where this will enhance stepping stones and linkages across Central Bedfordshire.
6	TO GENERATE INTEREST IN NATURE CONSERVATION THROUGH INFORMATION AND EDUCATION, BY PROMOTING ACCESS TO APPROPRIATE SITES, AND BY ENCOURAGING COMMUNITY INVOLVEMENT	NC22:	ACCESS In accordance with Aim 10 of the CBC Access Strategy the Council will, in partnership with others, endeavour to ensure that the public has access, including where possible access for people with disabilities, to publicly accessible sites of importance for nature conservation except where such access would be detrimental to nature conservation interests or land use of the site.
	Voluntary and community involvement is vital to the success of this strategy. The inclusion of nature conservation in the school curriculum, in colleges and as a part of adult education, together with dissemination of information to the general public results in greater awareness of the natural world. Through individual and community involvement local people can gain a better understanding and can help to ensure that what we enjoy today, future generations can enjoy tomorrow.	NC23:	COMMUNITY INVOLVEMENT In accordance with Aim 7 of the CBC Access Strategy the Council will encourage local community groups, schools and the general public to become involved in nature conservation and will, where appropriate, liaise with such interested persons and organisations when considering nature conservation schemes on individual sites.
		NC24:	INTERPRETATION AND PUBLICITY In accordance with Aim 10 of the CBC Access Strategy the Council will, in partnership with conservation organisations and others, continue to publicise and promote nature conservation

			through a variety of interpretive techniques including leaflets, exhibitions, on site explanatory panels, guided walks, special events and through social media.
7	TO PROVIDE A CLEAR AND APPROPRIATE FRAMEWORK FOR TARGETING LIMITED RESOURCES WITHIN THE COUNTY FOR THE GREATEST BENEFIT TO WILDLIFE AND NATURAL FEATURES. Resources for nature conservation are always limited, therefore it is vital that we identify priority areas for action if we are to achieve effective results in an efficient and co-ordinated way. By so doing, the results of our efforts will be maximised	NC10:	BEDFORDSHIRE AND LUTON BIODIVERSITY RECORDING AND MONITORING CENTRE (BRMC) The Council recognises the importance of up-to-date verified biodiversity information and requires it to manage its own sites effectively, create biodiversity networks and adequately consider biodiversity within the planning system. To enable the BRMC to continue to collate, store and disseminate data the Council will support it financially where possible and share information.
8	TO PROMOTE A POLICY FRAMEWORK TO SUPPORT THE STRATEGY OBJECTIVES AND TO IDENTIFY AND PROMOTE WAYS IN WHICH THEY CAN BE IMPLEMENTED. In order for the strategy to succeed, there must be clear policies and guidance on how objectives are to be implemented, and who they are targeted towards. English Nature; the County Council; District, Borough and Parish Councils; government departments; statutory and voluntary bodies; local education authorities; land owners/occupiers ; land managers ; commerce; industry; local societies and the general public all have an important role to play.	NC 1:	HAVING REGARD TO BIODIVERSITY ACROSS ALL COUNCIL FUNCTIONS The Council will ensure that biodiversity issues are taken into account, wherever possible, in all aspects of its activity and will encourage other groups and individuals to give equal consideration to such issues.
	IN ADDITION - these areas were not covered by the 1994 nature conservation strategy for Bedfordshire	NC2:	INTERNATIONALLY IMPORTANT WILDLIFE SITES If any sites within Central Bedfordshire are recognised as being of international importance the council will support this designation and will ensure that it meets any legal obligations with regard to the protection of such sites. The Council will also ensure its actions do not have negative impacts on any internationally important wildlife sites external to Central Bedfordshire, including the Portholme Special Area of Conservation (SAC), Upper Nene Valley Gravel Pits Special Protection Area (SPA), and Chilterns Beechwoods SAC.

		NC3:	NATIONAL NATURE RESERVES The Council recognises the importance and value of NNRs and will protect and enhance the management of NNRs in conjunction with Natural England into the future.
		NC7:	NATURE IMPROVEMENT AREAS The Council will support the concept of Nature Improvement Areas and work with conservation organisations to establish and support such initiatives if/when these are brought forward. Currently there is one NIA identified within Central Bedfordshire. This is the Greensand Ridge Nature Improvement Area. The Council will support the aspirations of the NIA partnership with regards to strengthening the ecological networks of the Ridge, enhancing public awareness of the NIA, its biodiversity and the wider benefits it brings; providing opportunities for people to access and experience the best the Ridge has to offer in terms of its wildlife, habitats and landscape, in a sympathetic and sustainable way and ensuring growth and development in and around the Ridge makes a real and lasting contribution, supporting, valuing and benefiting the natural environment and achieving a net gain in biodiversity by 2020.
		NC8:	BEDFORDSHIRE LOCAL NATURE PARTNERSHIP The Council will engage with LNPs constructively and have regard to their views on strategic planning matters.

		NC11:	THE PLANNING PROCESS The Council will refuse planning permission for proposals that would result in harm to designated or proposed Sites of Special Scientific Interest (SSSI) or National Nature Reserves (NNR), unless the reasons for the development clearly outweigh the nature conservation value of the site and the national policy to safeguard such sites. Where such development is permitted, measures will be required to mitigate and/or compensate for the effects of the development. Development that would impact on the strategic ecological network, including County Wildlife Sites, Local Nature Reserves and Roadside Nature Reserves, causing fragmentation or otherwise prejudice its effectiveness will not normally be permitted.
		NC17:	NON-NATIVE INVASIVE SPECIES The Council will support work to tackle the impacts of non-native invasive species across Central Bedfordshire. The Council will also support the GB non-native species secretariat's Be Plant Wise and Check, Clean Dry campaigns and will ensure that work undertaken by the council will not inadvertently lead to any further spread of these species by adopting appropriate biosecurity measures. It will also encourage other landowners and managers to establish similar practices. The council will take an approach of prevention and rapid, targeted action. Central to this is the identification of those non-native species that are likely to become newly invasive in Central Bedfordshire so the council will work with other agencies to undertake regular horizon scanning in order to be aware of any potential threats.
		NC21:	POLLINATORS The council will review its current practices and work towards more pollinator friendly protocols including planting / mowing regimes and use of pesticides. It will also encourage other landowners and managers to establish similar practices.

Appendix 2: List of Sites of Special Scientific Interest in Central Bedfordshire

SSSI	**Reason for designation** (will fill in later)
Barton Hills	Immediately south of Barton, the chalk escarpment forms a natural amphitheatre. At its head and along the eastern side, rising abruptly from the flat valley floor are steep-sided, rounded hills still retaining an extensive cover of unimproved chalk grassland supporting many species of grasses and flowering plants. Opposite, on the western slope is a small ancient beech (*Fagus sylvatica*) wood and developing secondary woodland and scrub. The scrub includes abundant hazel (*Corylus avellana*) which is an unusual coloniser. Part of the grassland has been quarried for chalk in the past and this area has now recolonised with a rich variety of flowers. A spring rises near the head of the coombe feeding a chalk stream which runs along the valley floor and adding a wetland element to the outstanding flora of this site.
Knocking Hoe	This section of Lower Chalk escarpment, dissected by a flat bottomed valley, still retains areas of unimproved calcareous grassland supporting a downland flora, which includes several nationally rare plants and other species rare in the county. The steep slopes of the knoll at the western end classically illustrate the influence of aspect upon the composition of plant communities and extensive scientific studies have been undertaken. Management practices aimed at preventing the spread of coarse grasses, particularly upright brome Bromus erectus, ensure the continuation of Knocking Hoe's botanical interest.
Houghton Regis Marl Lakes	Houghton Regis Marl Lakes have developed in a large disused quarry within the Lower Chalk north of Dunstable. The Lakes are an example of habitat type which is the rarest form of standing water in Britain confined to chalk or limestone areas with very few examples in southern England.
Dunstable & Whipsnade Downs	A steep escarpment situated on the Middle Chalk, this site extends for three kilometres between Dunstable and Whipsnade. With a westerly aspect, the steep slopes support a typical chalk downland flora, a habitat greatly reduced in extent both within Bedfordshire and nationally.
Flitwick Moor	Flitwick Moor is a remnant of a eutrophic (nutrient rich), valley mire and the largest area of wetland in Bedfordshire. Nationally this is a habitat that has become increasingly uncommon especially in south east England where it is most characteristic. The moor is renowned for both its flora and rich invertebrate fauna.

Sundon Chalk Quarry	Sundon Chalk Quarries are part of a large disused complex of chalk pits just to the west of Upper Sundon in Bedfordshire. Within the quarries is found a range of habitats including small areas of fen lakes, chalk grassland, species-rich scrub and developing woodland. This variety of habitat has enabled a rich and varied insect fauna to develop making this one of the most important invertebrate sites in the county.
Blow's Down	Blow's Down is part of the Lower Chalk escarpment situated to the south east of Dunstable. Here the escarpment changes abruptly from a north west aspect to south west facing and the chalk is capped by clay. These marked geographical and geological features which also include a small disused quarry and old banks associated with medieval cultivation terraces, have influenced the development of a wide range of grassland communities which are a particular feature of this site.
Galley & Warden Hills	Located on the northern edge of Luton, and situated on the Middle Chalk with an overlying cap of clay-with-flints, this site supports areas of unimproved neutral and calcareous grassland with structural variety provided by scattered and dense scrub.
Cooper's Hill	Cooper's Hill is the best remaining example in Bedfordshire of the once more extensive heathland situated on the thin acidic soils of the Lower Greensand ridge. The site is one of the most northerly examples of lowland heath representing the Anglo-Norman association. Lowland heath has a limited distribution in south eastern England where it has declined markedly in recent years.
Pulloxhill Marsh	A very good example of a base-rich marsh, occurring in this part of the county where springs arise along the sedge of a cap of glacial gravel overlying impervious Gault clay. This type of habitat, although widely distributed in southern Britain has been greatly diminished both in extent and quality as a result of drainage and changes in agricultural practice. Lying in a small valley, the marsh has a rich assemblage of plant species, forming a mosaic of associations dominated by species characteristic of a base-rich habitat but with some components indicative of more acidic conditions. Species composition also varies downhill with increasing wetness while higher up the slope the marsh merges into drier unimproved neutral grassland.
Deacon Hill	Deacon Hill is a remnant of chalk downland with a characteristic species rich, calcareous grassland flora. Many of the plants are now uncommon in the county. Nationally this is a habitat that has been greatly reduced both in extent and quality through agricultural improvement and changes in agricultural practice.
Dropshort Marsh	Dropshort Marsh represents a type of wetland habitat once common in South Bedfordshire where a series of springs issue at the junction of glacial gravels with the underlying impervious Oxford clay.

Kensworth Chalk Pit	This site provides the best Chalk Rock exposure in central England, a distinct band which forms a marker horizon in the late Cretaceous Period. The top surface of the Chalk Rock is extremely fossiliferous and has yielded many well preserved and rare specimens including ammonites. The large quarry exposes much of the Turonian stage and the base of the overlying Coniacian stage. The extent of the exposure here makes this an unrivalled locality for stratigraphic studies in the Upper Cretaceous.
Potton Wood	Potton Wood is a large ancient woodland of the wet ash-maple type which is largely restricted in its national distribution to the heavy soils of lowland Britain. Situated close to the county boundary, the wood has a structure and rich flora characteristic of the West Cambs Boulder Clay woodland group. Most of the wood is primary with some very old secondary woodland on ridge and furrow. Some of the rides are a particularly valuable element of the wood, supporting a rich neutral grassland flora including species uncommon in the county.
King's Wood & Glebe Meadows, Houghton Conquest	Kings Wood is an example of ash/maple woodland, characteristic of the heavy Oxford and Boulder Clays. It represents a habitat which has become increasingly scarce in Bedfordshire and over its natural range in lowland England. The wood demonstrates the structural and biological diversity of an ancient, seminatural woodland, and the rich flora includes several species which are uncommon within the county.
Sandy Warren	This site supports one of the few remaining examples in Bedfordshire of the once more extensive heathland situated on the acidic soils of the Lower Greensand ridge and representing one of the more northerly examples of lowland heath of the Anglo-Norman association.
Smithcombe, Sharpenhoe & Sundon Hills	Between Sundon and Streatley, on the steep sinuous north-facing Lower Chalk escarpment are areas of unimproved calcareous grassland with a rich assemblage of characteristic plants. The natural process of habitat change is amply illustrated by the formation of species-rich scrub which merges into mature beech (*Fagus sylvatica)* woodland.
Maulden Heath	Maulden Heath is an example of lowland acidic grassland, situated on a gentle south-facing slope of the Lower Greensand ridge near Clophill, about 11 miles south of Bedford. The site consists of two separate areas supporting characteristic plant communities with variations which reflect their distinctive topographies. The grassland represents a habitat type uncommon nationally and restricted in its distribution in Bedfordshire where it is now one of the few remaining examples.
Maulden Wood & Pennyfather's Hills	Maulden Wood and Pennyfather's Hill is a large block of mixed deciduous and coniferous woodland situated 10 km south of Bedford. The site supports an exceptionally rich invertebrate fauna including both county and national rarities and therefore

	has a distinctive and important contribution to make to invertebrate conservation in Bedfordshire. Especially important is the ride-associated invertebrate fauna. These species require a continuity of open and sunny wood edge habitat and this is provided by the rides and clearings which develop in woodland with a history of continuous management. Although much of the wood is now plantation it retains a well developed ride system which is lacking in many other woods in the county. Other factors which contribute to the importance of this site for invertebrates are the large size of the wood and the range of plant communities which reflect the varied geology and soil conditions.
Southill Lake & Woods	Southill Woods is an example of a wet valley alderwood which has developed where springs and flushes arise at the junction of the Lower Greensand with the Gault Clay of mid-Bedfordshire. The woodland grades westward into open, tall fen vegetation. A small stream bisects the wood, and where it meets Southill lake there is an area of old reed bed. The lake is important for its small island which is occupied by the larger of only two heronries in the county. Valley alderwood is uncommon both in the county and throughout eastern England. Drainage has generally reduced the extent of wetland habitats nationally.
Maulden Church Meadow	Maulden Church Meadow is an unimproved pasture situated on the Lower Greensand ridge about 11 km south of Bedford. The higher northern part of the meadow rests on a thin cap of boulder clay, and supports neutral grassland communities which are dominant over most of the site. The Lower Greensand is exposed in the southernmost part of the meadow and here a more acidic grassland community has developed. Maulden Church Meadow represents a habitat that is now scarce throughout lowland Britain due largely to changes in agricultural practice.
Fancott Woods & Meadows	Fancott meadows are mainly ancient ridge and furrow, exhibiting the characteristic species richness of unimproved neutral grassland traditionally managed for hay and grazing. Such grasslands are confined to the south of the country where they have been severely reduced by changes in agricultural practice. Part of the site is surrounded by a strip of semi-natural woodland with a varied ground flora and providing shelter for the meadow.
Nares Gladley Marsh	Nares Gladley Marsh is situated on the alluvial deposits which overly the Lower Greensand in the valley of the River Ouzel in Bedfordshire, about 3 km north west of Leighton Buzzard. A series of springs emerging from the Greensand form a complex of wet flushes surrounded by marshy grassland which have developed rich plant communities. These grade into unimproved acidic grassland on the drier slopes. The site represents one of

	the best remaining river valley and hillside marsh systems in the county and is typical of wetland habitat now seriously reduced in extent nationally.
Double Arches Pit	This locality shows the best accessible exposure of Lower Greensand and Gault in the Leighton Buzzard area, an area celebrated for its outcrops of these rocks. The study of these Lower Cretaceous rock units locally has played an important part in the elucidation of sedimentary, fossil and environmental changes through time in the Cambridge-Bedford province, particularly during the tardefurcata and mamillatum zones. The locality also shows unique examples of channelling in the Junction Beds and a clear development of the Cirripede (crustacean) Bed.
Totternhoe Chalk Quarry	The site is situated on a north-west facing slope of the Chilterns escarpment which has been much quarried in the past. It supports species-rich unimproved chalk grassland which has close affinities with that of the nearby Totternhoe Knolls SSSI. The grassland includes a mosaic of plant associations related to the uneven terrain and variety of aspects. The rich assemblage of characteristic chalk grassland plants includes several county and national rarities. In the central part of the site the grassland has been replaced by dense shrub. Chalk grassland is a habitat under threat, having been greatly reduced in extent both locally in Bedfordshire and nationally. Three main calcareous grassland communities occur on the site. These are characterised by sheep's fescue (*Festuca ovina)* and meadow oat-grass (*Helictotrichon pratense)*, upright brome (*Bromus erectus)*, and tor grass (*Brachypodium pinnatum).* A wide variety of other species occur on the site. These include yellow wort (*Blackstonia perfoliata)*, clustered bellflower (*Campanula glomerata),* autumn gentian (*Gentianella amarelle)*, horseshoe vetch (*Hippocrepis comosa)*, large thyme (*Thymus pulegioides)*, squinancywort (*Asperula cynanchica),* pyramidal orchid (*Anacamptis pyramidalis),* and bee orchid (*Ophrys apifera).* Other notable species are cypress spurge (*Euphorbia cyparissias)*, a plant rare in Bedfordshire*,* chalk eyebright (*Euphrasia pseudokerneri)* and man orchid (*Aceras anthropophorum)*, both nationally scarce species, and the nationally rare great pignut (*Bunium bulbocastanum)*. The site has invertebrate interest including butterflies such as chalkhill blue (*Lysandra coridon)*, small blue (*Cupido minimus)*, dingy skipper (*Erynnis tages)* and the nationally scarce Duke of Burgundy (*Hamaeris Lucina)*.
King's & Baker's Wood & Heaths	The site represents the largest area of woodland in Bedfordshire as well as remnants of lowland heath and acidic grassland. It lies on the Boulder Clay passing to Lower Greensand, producing an outstanding series of soil types ranging from slightly calcareous to acid and from wet to well drained. This exceptional range is reflected in the

	rich variety of species and habitats Most of the wood is ancient and the diverse tree and shrub layer shows wide structural variety derived from centuries of coppice and high forest management. The ground flora includes a large number of species which are uncommon or rare in the county, and the wide system of rides supports rich grassland that is an important element of the woodland. The lowland heath and acidic grassland represents a habitat that now has a very limited distribution, both in Bedfordshire and over its natural range in southern Britain.
Tebworth Marsh	One of the largest surviving base-rich marshes in the county, with a diverse community. This type of marshland, although widely distributed in Southern Britain, is nowhere common and has greatly diminished recently throughout its geographical range as a result of drainage and agricultural change.
Totternhoe Knolls	Totternhoe Knolls is a remnant of a chalk downland with characteristic species-rich calcareous grassland flora. Situated on a bluff of the lower chalk the site incorporates a Norman earthworks and old stone quarry workings. Chalk grassland has become greatly reduced in extent both locally and nationally. Within Bedfordshire extensive areas of the downland have been lost through agricultural reclamation and changes in management practice. The grassland has a mosaic of plant associations related to the uneven terrain and variety of aspects. They support a rich assemblage of characteristic chalk grassland plants including species now uncommon or rare in the county. Orchid species are well represented, including common spotted orchid (*Dactylorhiza fuchsia)*, bee orchid (*Ophrys apifera)*, twayblade (*Listera ovata)* and several county rarities. Characteristically the grassland supports a rich invertebrate fauna including butterflies such as the common blue and chalkhill blue.
Wavendon Heath Ponds	Wavendon Heath is located two kilometres north-west of Woburn and is situated on the Lower Greensand ridge. The site includes several habitats including three ponds representing areas of acidic mire and supporting plant communities uncommon throughout eastern England, two meadows of unimproved and semi-improved acid grassland, and an area of damp birch woodland. The importance of this site centres on the three ponds artificially created by dams across a small valley and fed by a wet flush on the hill slope. They represent a habitat characteristic of the Bedfordshire Greensand but now uncommon due to agricultural changes and afforestation. The meadows are traversed by a small stream representing a rich flora, including species uncommon in this county.

Marston Thrift	Marston Thrift is an example of ash/maple woodland, characteristic of the heavy Oxford and Boulder Clays. It represents a habitat which has become increasingly scarce in Bedfordshire and over its natural range in lowland England. The wood is characteristic of an ancient, semi-natural woodland, formerly managed as coppice-with standards. A population of Forster's woodrush (*Luzula forsteri)* occurs here at its only known station in Bedfordshire.
Nine Acres Pit	This locality shows a Lower Cretaceous section spanning the Aptian and Albian stages, including the finest development of Carstone and Shenley Limestone in the Leighton Buzzard area as well as superb exposures of dune bedding in the Upper Woburn Sands. The famous Shenley Limestone contains a unique fossil fauna of a diversity virtually unparalleled in the Albian elsewhere.
Totternhoe Stone Pit	The phosphatic base of the Totternhoe Stone is exposed at this site. It consists of a lime mud containing phosphatic pebbles and a rich late Cretaceous deposit of shark teeth. It has yielded many taxa of small sharks, some of which are underdescribed, and will be an important research site for years to come. Working upwards through the deposit the faunal composition changes. The basal part contains larger teeth, but as the sediment fines upwards small rays make an appearance.

Appendix 3: List of County Wildlife Sites in Central Bedfordshire

CWS	Habitat for which the site is recognised
Ampthill Cemetery and the Knoll CWS	• Acid grassland
Ampthill Park CWS	• Acid grassland • Neutral grassland • Pasture woodland and parkland • Habitat mosaic
Ampthill Tunnel CWS	• Neutral grassland
Apesfield Spring CWS	• Ancient semi-natural woodland
Apsleybury Wood CWS	• Ancient semi-natural woodland
Arlesey Meadows CWS	• Mosaic of neutral grassland and wetland habitats
Arlesey Road Pit CWS	• Water body

Ashen Grove CWS	• Ancient semi-natural woodland
Aspley Guise Meadows CWS	• Neutral grassland
Aspley Heath Field CWS	• Acid grassland
Badgerdell Wood CWS	• Ancient semi-natural woodland
Barley Brow CWS	• Neutral and calcareous grassland
Barton Gravel Pits CWS	• Neutral and calcareous grassland
Barton Hills CWS	• Neutral and calcareous grassland • Ancient semi-natural woodland
Barton Pit CWS	• Semi-natural broadleaved woodland
Barton Quarry CWS	• Mosaic of calcareous grassland, scrub and secondary woodland
Barton scrubby grasslands CWS	• Calcareous grassland
Battlesden Lake CWS	• Mosaic of a water body, marsh, neutral grassland and semi-natural woodland
Beal's Wood CWS	• Ancient semi-natural woodland
Begwary Brook Pits CWS	• Mosaic of freshwater and wetland habitats
Biggleswade Allotments Meadow CWS	• Neutral grassland • Hedgerows
Biggleswade Common CWS	• Neutral grassland • Pond
Birchall's Wood CWS	• Ancient semi-natural woodland
Blow's Down CWS	• Neutral and calcareous grassland • Scrub
Blue Lagoon CWS	• Water body • Calcareous grassland
Blunham Disused Railway CWS	• Neutral grassland
Bottom Wood CWS	• Ancient semi-natural woodland
Boughton End Grasslands CWS	• Neutral grassland
Bramagar Wood CWS	• Ancient semi-natural woodland
Braystone CWS	• Mosaic of species-rich neutral grassland, species-rich hedgerows, ponds supporting Great Crested Newts, mature willows and diverse small mammal population
Briar Stockings Woods CWS	• Ancient semi-natural woodland
Broadlands CWS	• Ancient semi-natural woodland
Brogborough Lake CWS	• Mosaic of a water body, wetland habitats, neutral grassland, scrub and woodland • Population of nationally rare field cow-wheat (*Melampyrum arvense*)
Buckle Grove CWS	• Ancient semi-natural woodland
Bunker's Hill CWS	• Heathland and acid grassland
Bushycommon Wood CWS	• Ancient semi-natural woodland • Neutral grassland

Cainhoe Lakes CWS	• A habitat mosaic of semi-improved acid and neutral grassland, ruderal communities, secondary woodland, scrub, hedgerows, marshy grassland, swamp, ditches, ponds and lakes
Cainhoepark Wood CWS	• Ancient semi-natural woodland • Hedgerow • Pond
Castle Croft and Bluebell Wood CWS	• Ancient semi-natural woodland • Habitat Mosaic
Caswell Lane Field CWS	• Neutral grassland
Chalton scrub and grassland CWS	• Calcareous grassland
Charle Wood CWS	• Ancient semi-natural woodland
Chicksands Grassland CWS	• Neutral grassland
Chicksands Wood CWS	• Ancient semi-natural woodland • Neutral grassland
Chiltern Green CWS	• Neutral grassland • Ancient semi-natural woodland
Church Meadows CWS	• Habitat mosaic of neutral grassland, mature trees and open water • Pollard willows and black poplars
Cityfield Farm Pits CWS	• Water body
Clipstone Brook CWS	• River/Stream • Water body • Pollard willows • Neutral grassland
Cockayne Hatley Wood CWS	• Ancient semi-natural woodland
College Wood CWS	• Ancient semi-natural woodland
Cooper's Hill CWS	• Heathland and acid grassland • Acid mire
Coronation Pit CWS	• Water body • Neutral and calcareous grassland
Cranfield Manor Farm Meadow CWS	• Neutral grassland
Deacon Hill CWS	• Calcareous grassland
Dedmansey Woods CWS	• Ancient semi-natural woodland
Dell Wood CWS	• Ancient semi-natural woodland
Dog Kennel Down CWS	• Urban criteria • Calcareous grassland
Double Arches Pit CWS	• Mosaic of habitats including water bodies, marshy grassland, acid grassland, neutral grassland, calcareous grassland, scrub and developing woodland
Dropshort Marsh SSSI	• Marsh and bog • Neutral grassland • Pollard willows
Duck End Marshy Grassland CWS	• Wetlands • Rare plants • Acid grassland

Dunstable and Whipsnade Downs CWS	• Calcareous grassland • Neutral grassland • Scrub
Dunstable Meadow CWS	• Neutral and calcareous grassland
Dunstable to Luton disused railway CWS	• Mosaic of species-rich calcareous grassland, species rich neutral grassland, species rich scrub communities and species rich communities of dry open habitats
Dunton Green Lane CWS	• Hedgerows
East Hyde Riverside CWS	• Mosaic of swamp, neutral grassland, ruderal vegetation, scrub, open water and marginal vegetation.
Eaton Bray Meadow CWS	• Neutral grassland
Edlesborough Hill CWS	• Neutral and calcareous grassland
Eggington Fields CWS	• Neutral grassland • Marsh
Eversholt Millennium Pond CWS	• Water body
Everton Churchyard CWS	• Neutral grassland
Everton Hill CWS	• Neutral grassland
Fairfield East Orchard CWS	• Traditional Orchard
Fairfield West Orchard CWS	• Traditional Orchard
Fancott Woods and Meadows CWS	• Neutral grassland • Ancient semi-natural woodland
Flasket's Wood CWS	• Ancient semi-natural woodland
Flit Valley CWS	• Mosaic of wet woodlands, mature trees and pollards, grasslands, ponds and wet ditches
Flitwick Manor CWS	• Habitat mosaic containing semi-improved grassland, mature trees, secondary woodland, marshy grassland, swamp and open water including a river, streams, ditches, a pond and lake
Flitwick Moor CWS	• Wet woodland • Fen, swamp and marsh • Neutral grassland
Flitwick Wood CWS	• Ancient semi-natural woodland
Folly Wood CWS	• Ancient semi-natural woodland
Fox and Hounds Quarry CWS	• Rare vascular plant - Wood Vetch • Neutral grassland
Foxhole Wood CWS	• Ancient semi-natural woodland
Galley and Warden Hills CWS	• Neutral and calcareous grassland • Hedgerows
George Wood, Hyde CWS	• Ancient semi-natural woodland
George Wood, Streatley CWS	• Ancient semi-natural woodland
Grange Meadow, Haynes CWS	• Neutral grassland • Acid grassland
Graves Wood CWS	• Ancient semi-natural woodland
Great Barford Gravel Pits CWS	• Water bodies

Grove Wood CWS	• Ancient semi-natural woodland
Hardingdell and Fernell's Woods CWS	• Ancient semi-natural woodland
Harlington Village Pond CWS	• Water body
Hay Wood, Woburn CWS	• Ancient semi-natural woodland
Heath Wood, Leighton Buzzard CWS	• W14 woodland • Dwarf gorse (*Ulex minor*)
Heath Wood, Whipsnade CWS	• Ancient semi-natural woodland
Henlow Park Woods CWS	• Habitat mosaic of ruderal communities, mature trees, secondary woodland, scrub, swamp and open water
Henlow Pit CWS	• Water body
Heydon Hill CWS	• Ancient semi-natural woodland • Acid grassland
Hill Farm Pit CWS	• Water body • Neutral grassland
Hill's Plantation CWS	• Habitat mosaic supporting extensive woodland with open water and small areas of semi-improved grassland, ruderal communities, scrub, marshy grassland and swamp
Hipsey Spinney CWS	• Ancient semi-natural woodland
Holcot Wood CWS	• Ancient semi-natural woodland • Neutral grassland • Ponds
Holt Wood CWS	• Ancient semi-natural woodland
Home Wood, Northill CWS	• Ancient semi-natural woodland • Neutral grassland
Home Wood, Potsgrove CWS	• Ancient semi-natural woodland • Neutral grassland • Marsh • Water body
Horsemoor Farm Marsh CWS	• Marsh fed by springs • Mature broadleaved woodland
Horsley's Wood CWS	• Ancient semi-natural woodland
Houghton Regis Chalk Pit CWS	• Calcareous scrub and grassland
Hudnall Corner CWS	• Semi-natural broadleaved woodland
Hudnall Field CWS	• Calcareous scrub and grassland
Hungerhill Wood and New Planting CWS	• Neutral grassland on Boulder Clay
Icknield Way CWS	• Chalk habitats • Hedgerows • CWS Link
Ickwell Bury CWS	• Habitat mosaic of woodland, scrub, semi-improved grassland, swamp, open water and hedges
Keepers Warren CWS	• Greensand habitat
Kensworth Chalk Pit SSSI	• Chalk rock geology
Kettledean Farm Grassland CWS	• Calcareous scrub and grassland
Keyse's Spinney CWS	• Grassland on Boulder Clay

	• Semi-natural broadleaved woodland
Kidney and Bull Woods CWS	• Ancient semi-natural woodland • Trailing tormentil (*Potentilla anglica*)
King's and Baker's Woods and Heaths CWS	• Ancient semi-natural woodland • Heathland habitat
King's Wood, Houghton Conquest CWS	• Ancient semi-natural woodland • Neutral grassland • Boulder Clay grassland
Kingshoe Wood CWS	• Ancient semi-natural woodland
Knocking Hoe CWS	• Chalk habitats • Ground pine (*Ajuga chamaepitys*) and great pignut (*Bunium bulbocastanum*)
Langford Common CWS	• Neutral grassland
Lark Hill CWS	• Grassland on Boulder Clay
Latch Pool and Ditch CWS	• Water bodies
Lidlington Pit CWS	• Water body • A habitat mosaic containing semi-improved grassland, swamp and open water.
Linslade Wood CWS	• Ancient semi-natural woodland
Little John's and Dame Ellen's Woods CWS	• Ancient semi-natural woodland
Long Grove CWS	• Ancient semi-natural woodland
Lord's Wood CWS	• Ancient semi-natural woodland
Lower Alders CWS	• Ancient semi-natural woodland
Lowe's Wood CWS	• Ancient semi-natural woodland
Luton Hoo Park CWS	• Ancient woodland • Special woodland interest • Diversity
Marston Thrift CWS	• Ancient semi-natural woodland
Maulden Church Meadow SSSI	• Boulder Clay grassland • Greensand grassland
Maulden Woods and Heaths CWS	• Ancient semi-natural woodland • Habitat mosaic of woodland, plantations, acid and neutral grassland • Greensand grassland
Meadhook Wood CWS	• Ancient semi-natural woodland
Millbrook Churchyard CWS	• Acid grassland • Neutral grassland
Millbrook CWS	• A habitat mosaic containing marsh, swamp, acid grassland, neutral grassland, broadleaved woodland, springs and streams
Millbrook Pillinge Pit CWS	• A habitat mosaic containing semi-improved grassland, ruderal vegetation, mature trees, scrub, hedgerows, swamp and open water

Millbrook Warren CWS	• Ancient semi-natural woodland • W6 woodland • Lowland dry acid grassland • Ponds
Milton Wood CWS	• Ancient semi-natural woodland • A habitat mosaic containing semi-improved grassland, mature trees, woodland, scrub, hedgerows, marshy grassland, swamp and open water.
Mogerhanger Park CWS	• A habitat mosaic containing semi-improved grassland, species-rich ruderal communities, mature trees, woodland and hedgerows
Montague Wood CWS	• Ancient semi-natural woodland
Moors Plantation CWS	• Carr • Wetlands
Nine Acres Pit SSSI	• Geological SSSI
Northley Farm Meadows CWS	• Neutral grassland
Nunswood CWS	• Ancient semi-natural woodland
Oaket Wood CWS	• Ancient semi-natural woodland • Hedgerows
Old Linslade Churchyard CWS	• Neutral grassland • Acid grassland
Old Warden Church CWS	• Biologically significant trees
Old Warden Disused Railway CWS	• A habitat mosaic containing calcareous grassland, neutral grassland, scrub, semi-natural broadleaved woodland, wet woodland, pools, marsh and ruderal vegetation
Oldhill Wood CWS	• Ancient semi-natural woodland
Oosey Hill CWS	• Scrub • Hedgerows
Ouzel Valley CWS	• A large habitat mosaic containing neutral grassland, acid grassland, springs, ditches and channels, marshy grassland, scrub, broadleaved woodland and ruderal vegetation • Pollard willows
Palmer's Shrubs CWS	• Ancient semi-natural woodland • Marsh
Palmers Wood CWS	• Ancient semi-natural woodland • Neutral grassland
Pateman's Wood CWS	• Ancient semi-natural woodland
Pedley Hill and Greencroft Wood CWS	• Ancient semi-natural woodland • Hedgerow
Pegsdon Grasslands CWS	• Calcareous grassland
Poplars Nursery CWS	• Neutral grassland
Poppyhill Pits CWS	• Waterbodies • River
Portobello Wood CWS	• Ancient semi-natural woodland

Potsgrove Grasslands CWS	• Neutral grassland • Hedgerows
Potton Wood CWS	• Ancient semi-natural woodland
Pulloxhill Marsh SSSI	• Marsh • Neutral grassland
Pulloxhill South Grasslands CWS	• Neutral grassland
Rackley Hill Pit CWS	• Water body
Ravensdell Wood CWS	• Calcareous grassland • Ancient semi-natural woodland
Readshill Grassland CWS	• Acid grassland
River Flit CWS	• River • Adjacent habitats, including ponds, leat, ditches, rough grassland, ruderal vegetation, scrub, copses, plantations, wet woodland, mature trees and pollards.
River Great Ouse CWS	• River • Adjacent habitats and features which are considered part of the river system
River Lea CWS	• River • Adjacent habitats and features considered part of the river system • Population of Water Voles (*Arvicola amphibius*)
River Ouzel CWS	• River • Adjacent habitats and features considered part of the river system
Rivers Ivel and Hiz CWS	• River • Adjacent habitats and features considered part of the river system • Population of Water Voles (*Arvicola amphibius*)
Rock Lane CWS	• Hedgerows
Rod Wood and Steppingley Copse CWS	• Ancient semi-natural woodland
Rookery Clay Pit CWS	• Water bodies
Round Wood, Hyde CWS	• Ancient semi-natural woodland
Rowney Warren CWS	• Heathland and acid grassland
Rushmere Manor Woods CWS	• Heathland and acid grassland
Rushmere Park CWS	• Water bodies • Heathland and acid grassland
Salford Wood CWS	• Ancient semi-natural woodland
Sallowspring Wood CWS	• Ancient semi-natural woodland
Sandy Cemetery CWS	• Acid grassland
Sandy Disused Railway CWS	• Habitat mosaic containing acid grassland, neutral grassland, ruderal vegetation, mature trees, secondary woodland, scrub, hedgerows, marshy grassland, swamp and open water.
Sandy Meadows CWS	• Marsh • Neutral grassland

Sandy Warren CWS	• Habitat mosaic of heathland, acid grassland, secondary woodland and mature trees
Sewell Disused Railway CWS	• Calcareous grassland
Sharpenhoe Grove CWS	• Ancient semi-natural woodland
Sheerhatch Wood CWS	• Ancient semi-natural woodland
Shillington Churchyard CWS	• Neutral grassland
Shillington Little Fields CWS	• Neutral grassland
Shillington Meadow CWS	• Neutral grassland
Silsoe Pit CWS	• Neutral grassland
Simpsonhill Plantation CWS	• Ancient semi-natural woodland • Acid grassland
Sir John's Wood CWS	• Ancient semi-natural woodland
Skimpot Wood CWS	• Ancient semi-natural woodland
South Mills Pits CWS	• Mosaic of wetland habitats, neutral grassland and scrub
Southill Lake and Woods CWS	• Valley alderwood • Semi-natural broadleaved woodland • Marshy grassland • Neutral grassland
Speedsdairy Wood CWS	• Ancient semi-natural woodland
Spoondell CWS	• Species rich chalk grassland • Species rich scrub
Stanbridge and Blackgrove Woods CWS	• Ancient semi-natural woodland • Semi-natural scrub
Stanbridge Meadows CWS	• Calcareous grassland • Neutral grassland
Stanford Plantation CWS	• Mosaic of habitats including mixed plantation and a small open lake
Stanner's Wood CWS	• Ancient semi-natural woodland
Steppingley Hospital CWS	• Neutral grassland • Traditional Orchard
Stewartby Lake CWS	• Calcareous grassland • Neutral grassland • Ponds
Stockgrove Country Park CWS	• Mosaic of Greensand habitats
Stotfold Watermill Wetland CWS	• Population of Water Voles (*Arvicola amphibius*)
Stratton Park Balancing Pond CWS	• Rare breeding birds
Studham Common CWS	• A mosaic of species rich habitats
Suncote Pit CWS	• Neutral grassland • Species rich chalk grassland & scrub mosaic
Sundon Chalk Pits CWS	• Diverse calcareous habitats
Sundon Hills CWS	• Chalk habitats • Unimproved calcareous grassland • Semi-natural broadleaved woodland
Sundon Wood CWS	• Ancient semi-natural woodland

Sunshine Riding Stables CWS	• Neutral grassland • Calcareous grassland • Hedgerows
Sutton Fen and Woods CWS	• Ancient semi-natural woodland • Mire, swamp or carr habitats
Swiss Garden Woodland CWS	• Wet woodland • Fern diversity
Tebworth Marsh SSSI	• Base-rich marsh
Tebworth Meadow CWS	• Semi-improved neutral grassland
Temple Grove CWS	• Ancient semi-natural woodland
The Linces CWS	• Calcareous grassland and woodland on cultivation terraces, or lynchets.
The Paddocks CWS	• Grassland habitat mosaic
The Pinnacle CWS	• Species rich acid grassland
Thorn Spring CWS	• Ancient semi-natural woodland
Thrift Wood CWS	• Ancient semi-natural woodland
Tiddenfoot Park CWS	• Habitat mosaic • Lake • Acid grassland • Neutral grassland
Tingley Field Plantation CWS	• Semi-natural broadleaved woodland • Calcareous grassland
Toddington Manor Lakes CWS	• Lakes • Marsh
Totternhoe and Sewell Quarries CWS	• Unimproved calcareous grassland
Totternhoe Knolls CWS	• Unimproved calcareous grassland
Totternhoe Stone Pit SSSI	• Unimproved calcareous grassland
Upper Alders CWS	• Ancient semi-natural broadleaved woodland • Swamp habitats • Fen
Utcoate Grange Meadow CWS	• Unimproved acid grassland • Semi-improved acid grassland
Warden Abbey Grasslands CWS	• Neutral grassland • Grassland on Boulder Clay
Warden Great Wood CWS	• Ancient semi-natural broadleaved woodland • Unimproved neutral grassland
Warden Little Wood CWS	• Ancient semi-natural broadleaved woodland
Warden Warren CWS	• Mixed and broadleaved semi-natural woodland
Warren Villas CWS	• Lake • Ponds
Warren Wood CWS	• Ancient semi-natural broadleaved woodland
Washer's and Daintry Woods CWS	• Ancient semi-natural broadleaved woodland
Waterloo Thorns CWS	• Semi-natural broadleaved woodland • Neutral grassland

Wavendon Heaths and Aspley Wood CWS	• Ancient semi-natural broadleaved woodland • Ponds • Lowland heathland
Well Head CWS	• Chalk springs • Stream • Marshy grassland
Wentworth Fields CWS	• Calcareous grassland • Neutral grassland
Whipsnade Heath CWS	• Semi-natural broadleaved woodland • Clay with flints grassland
Whipsnade WAP Grasslands CWS	• Calcareous grassland • Neutral grassland
Whipsnade Wood CWS	• Ancient semi-natural broadleaved woodland
White Wood CWS	• Ancient semi-natural woodland
Whitehill Wood CWS	• Ancient semi-natural broadleaved woodland
Woburn Park CWS	• Pasture woodland / parkland • Mature trees
Woburn Park Grassland CWS	• Acid grassland
Wood End Alders CWS	• Mature alder coppice
Wood near Washer's Wood CWS	• Ancient semi-natural broadleaved woodland
Woodbury Moats and Spinneys CWS	• Semi-natural broadleaved woodland • Neutral grassland
Woodbury Sinks CWS	• Ancient semi-natural broadleaved woodland • Neutral grassland • Acid grassland
Woodcock Wood CWS	• Ancient semi-natural broadleaved woodland
Wrest Park Grounds CWS	• Parkland habitat mosaic • Neutral grassland • Semi-natural mixed woodland • Lakes
Zwetsloots Pits CWS	• Water bodies

Appendix 4: List of Local Geological Sites in Central Bedfordshire

Local Geological Sites (LGS) in Central Bedfordshire	Reason for designation
Barton Hills	An evocative scenery displaying excellent chalk landscape features including a dramatic coombe, dry valleys, soil creep, frost shattering, small natural exposures of Lower and Middle Chalk and a natural spring which forms a small stream from source.
Broom Quarry	A sequence of Quaternary glaciofluvial sands and gravels, including a fossiliferous organic layer, cryoturbated horizons and a wide variety of sedimentary structures.
Cainhoe Quarry	Good section through part of the Woburn Sands Formation, showing excellent sedimentary structures. Cainhoe Quarry is in an area that shows transitional facies between typical Woburn Sand successions in SW Bedfordshire and areas to the northeast.
Chamberlain's Barn Quarry	Lower Cretaceous Woburn Sand Formation present, overlain by Gault Clay. A stratigraphically important and extensive exposure.
Churchway's Quarry	The site displays a good section through the Lower Cretaceous Woburn Sands Formation ('Brown Sands'). It has several faces which show excellent sedimentary structures that are typical of this stratigraphic interval. The contact with the overlying 'Silver Sands' is usually exposed. It is an excellent teaching site for undergraduates or geology groups.
Deepdale Quarry	This former quarry has been partially landscaped and planning permission is being sought to turn it into a camping ground. The principal exposure is a long, N-S trending cliff developed in the Lower Cretaceous Woburn Sands Formation. An excellent variety of sedimentological features are preserved and access is both safe and easy, making this an ideal Local Geological Site.
Dunstable and Whipsnade Downs	This is a beautiful landscape on the edge of a steep escarpment of Middle Chalk. Upper Chalk and other thin deposits are locally preserved at the top of the scarp. Rock type can be inferred at the grand scale by landscape features (e.g. chalk escarpment, clay vale with gravel-capped hills) and also from small exposures in pathways or in rabbit scrapings. This further encourages links to be made between rock type and soils/vegetation (the site is an SSSI for chalk grassland species) and the manner in which the geomorphological features of the chalk (escarpment, coombes, dry valleys) developed during the Quaternary.
Kensworth Nature Reserve	This exposure was retained during an early phase of the ongoing restoration of the enormous Kensworth Chalk Pit. The aim was to create a safe and accessible site where at least some of the features periodically exposed in the working quarry could be examined routinely. The area around the preserved face has been designated a Nature Reserve and it includes re-created calcareous grassland and woodland habitats.

	Exposed at the site is a section from the upper part of the Upper Turonian Lewes Nodular Chalk Formation into the Lower Coniacian Top Rock. It is possible to see three small faults with minor displacement, a large solution hollow with an infill of rubbly chalk and large flint nodules, and smaller solution pipes near the top of the exposure filled with red-brown Clay-with-flints. The Reed (Caburn) Marl occurs in the lower part of the succession at the northern end of the face, whilst the Chalk Rock hardground is exposed about half way up the face at the southern end.
Landpark Quarry LGS	A former quarry with an overgrown crescent-shaped face some 35m long, but the west-facing portion has been cleared and can be inspected closely by climbing up the talus bank along the foot of the 2.5m face. The succession consists of soft, deeply weathered white chalk with three prominent flint horizons but no obvious distinguishing marl seams or hardgrounds. Geological mapping (Hopson, et al. 1996) suggests that the succession forms part of the Lewes Nodular Chalk Formation (White Chalk Sub-Group). Echinoids and bivalves found here indicate a likely Upper Turonian – Lower Coniacian age. The site is important because it provides safe access to an interesting chalk succession that contains flints and fossils. It complements the nearby LGS at Kensworth Nature Reserve and forms part of a network of chalk exposures around Dunstable that illustrate different facets of Upper Cretaceous geology.
Ledburn Quarry	Ledburn preserves a section through part of the Woburn Sands Formation. The exposure is presently inaccessible and not particularly noteworthy.
Munday's Hill Quarry	This is a large quarry that has been worked since 1925 and, over the decades, it has revealed excellent and unusually complete Lower Cretaceous successions. Formerly known as Garside's Pit, a typical succession (based on Shephard-Thorn et al., 1994), with maximum stratigraphic thicknesses indicated, comprises: · Gault Clay (10m), including the 'Cirripede Bed' locally near the base · Shenley Limestone (0.1m) · Woburn Sands 'Red Sands' (4m) · Woburn Sands 'Silty Beds' (4.5m) · Woburn Sands 'Silver Sands' (10m) · Woburn Sands 'Brown Sands' (5m)
New Trees Quarry	A good section through the Lower Cretaceous Woburn Sands Formation ('Silver Sands') and a rare opportunity to see the 'Carstone Conglomerate' at the base of the Gault Clay Formation.
Ouzel Valley	An accessible and safe section of the River Ouzel which shows down-cutting and incision through a series of Pleistocene river terraces. There are intermittent exposures of Woburn Sands along the valley sides, especially where badgers have been active.
Quest Pit, Stewartby	This quarry opened in 1983 and it was the last active brick pit in Bedfordshire, ceasing operations in 2008. It provides access to the highly fossiliferous lower and middle parts of the Oxford Clay succession and drainage trenches allow occasional access to the underlying Callovian Kellaways Beds.
River Ivel, Biggleswade	An accessible site suitable for observing and explaining modern river processes and comparing them with those that would have formed the ancestral River Ivel during the latter stages of the Ice Age. Hand

	specimens of river gravel can occasionally be seen in the eroded bank and terraces.
Sandy, The Pinnacle Recreation Ground	This site forms an interesting and accessible geomorphological site and fine viewpoint. The bedrock here consists of friable Lower Cretaceous Woburn Sands and it is locally eroded by pedestrians and cyclists. At a larger scale the River Ivel has completely breached the sandstones and formed a broad valley to the west of the hilltop that is floored by the Oxford Clay and mantled with superficial deposits. Further west the low-lying clay vale shows areas of low hills caused by resistant glacial deposits.
Sandy Warren, The Lodge Quarry	An extensive quarried face of Woburn Sands Formation (formerly the Lower Greensand) providing a rare opportunity to examine these rocks in a consolidated and stable exposure. Sedimentary structures preserved here allow palaeo-environmental reconstructions to be made, linking this part of the county with the more extensive exposures of similar rocks around Woburn and Leighton Buzzard. The quarry provided building stone for local use from medieval times to the 18th century. Examples include the churches at Sandy and Everton, as well as the packhorse bridge at Sutton.
Scout Hut Quarry, Potton	This exposure of the Lower Cretaceous Woburn Sands Formation (historically called the Lower Greensand) was cleared in 2007-8. Formerly a quarry worked for sand and gravel, it was infilled during the early nineteenth century, but now a safe and accessible low face of sandstone has been revealed, making it an ideal site for educational visits. It contributes to an understanding of the regional geology of the Woburn Sands Formation and provides historical links with the local aggregate and phosphate fertilizer industries.
Smithcombe, Sharpenhoe and Sundon Hills	The area between Smithcombe and the Sundon Hills forms spectacular countryside and yet is less than 10 kilometres north of Luton. It provides an excellent example of a chalk scarp and dip slope, features which rely on the topographic expression of gently dipping chalk beds over a large area to be seen and appreciated. Fine views are afforded over the clay vale to the north and there is a strong link between rock type, scenery, soil type and vegetation.
Stockgrove Country Park	A pleasant, safe and accessible Country Park with geomorphological features such as dry valleys and springsapping hollows. It provides a strong linkage between geology, geomorphology, soil type and vegetation.

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Abbreviations

AONB – Area of Outstanding Natural Beauty. In Central Bedfordshire, this is the Chilterns AONB.

BAP - Biodiversity Action Plan – The UK Biodiversity Action Plan was created in response to a commitment at the 2002 Convention on Biological Diversity. It summarises the status of the most threatened habitats and species in the UK and then sets out a series of actions to halt their decline and then reverse it. There are local as well as national biodiversity action plans.

BLOG – Bedfordshire and Luton Orchard Group - by a partnership of conservation organisations, interested individuals and local people all with an interest in surveying, improving and promoting the county's orchard and fruit tree heritage, biodiversity and management.

BRMC – Bedfordshire and Luton Biodiversity Recording and Monitoring Centre - is a partnership organisation based at the Bedford office of The Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire which collates, stores and disseminates verified wildlife records from across the Central Bedfordshire. Also the repository for information about CWS and habitat maps for the area with both recent and historical information available.

CBC – Central Bedfordshire Council

CROW Act 2000 - Countryside and Rights of Way Act 2000

CWS – County Wildlife Site - sites which have been selected on a county basis for being important for wildlife when assessed against a set of criteria.

DEFRA – Department for Environment, Food and Rural Affairs (Defra) - government department responsible for environmental protection, food production and standards, agriculture, fisheries and rural communities in the United Kingdom.

GI – Green Infrastructure

GIS - Geographic Information System

GSR – Greensand Ridge - a distinctive 'island' of significantly wooded sands and sandstone that rises prominently above the surrounding clay vales in Central Bedfordshire.

LGS - Local Geological Site - selected primarily for their scientific and educational importance but may also have considerable aesthetic value.

LEP – Local Enterprise Partnership

LNP – Local Nature Partnership - The Bedfordshire Local Nature Partnership is a partnership of approximately 20 organisations from across the county all with an interest in enhancing our natural environment & ensuring that across Bedfordshire is protect our incredibly diverse landscape.

LNR – Local Nature Reserve

NE – Natural England

NERC - Natural Environment and Rural Communities Act 2006

NIA – Nature Improvement Area

NNR – National Nature Reserve - established under the National Parks and Access to the Countryside Act 1949, which specified that they were for "preserving flora, fauna or geological or physiographical features of special interest in the area and/or for providing opportunities for the study of, and research into, those features". The Natural Environment & Rural Communities Act 2006 extended the role of NNRs to include the provision of opportunities for public enjoyment of nature and/or open-air recreation.

NPPF – National Planning Policy Framework. This came into force in 2012 and replaced most of the planning guidance that was available previously.

OAIP – Outdoor Access Improvement Plan

ODPM circular – circular from the Office of the Deputy Prime Minister

P3 group - 'People, Projects, Partnerships' - a scheme that works with volunteers to help improve access to the local countryside and green spaces.

PPS9 - Planning Policy Statement 9

RBMPs – River Basin Management Plans - have been drawn up by the Environment Agency for the 10 river basin districts in England and Wales as a requirement of the water framework directive. River basin management plans set out measures to improve water in rivers, lakes, estuaries, coasts and in groundwater.

RNR - Road Verge Nature Reserves - The Council has identified areas of roadside verge that have high value of flora and fauna to be maintained appropriately.

RoW – Right of way

RSPB – Royal Society for the Protection of Birds

SAC - Special Areas of Conservation - strictly protected sites designated under the EC Habitats Directive.

SEMLEP – South East Midlands Local Enterprise Partnership

SPA - Special Protected Areas - strictly protected sites classified in accordance with Article 4 of the EC Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species.

SSSI – Site of Special Scientific Interest - These are protected under the National Parks and Access to the Countryside Act 1949, Wildlife and Countryside Act 1981 (as amended) and Countryside and Rights of Way Act 2000 and represent the country's best wildlife and geological sites.

SuDS - Sustainable Urban Drainage Systems are a sequence of water management practices and facilities designed to drain surface water in a manner that will provide a more sustainable approach than what has been the conventional practice of routing run-off through a pipe to a watercourse.

TPO - Tree Protection Orders – these can be made by local authorities to safeguard trees of significant amenity value.

WFD – Water Framework Directive - a European initiative to improve and protect waterways.

WT (BCN) – The Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire.