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1. INTRODUCTION

1.1 APPOINTMENT AND BRIEF

In April 2003, as part of a Service Level Agreement, the Built and Natural Environment Section of Northamptonshire County Council appointed the Wildlife Trust for Northamptonshire to carry out a Biodiversity Character Assessment of Northamptonshire. However, due to staff changes at the Trust in July 2004, Denton Wood Associates was appointed to complete the project.

1.2 THE NORTHAMPTONSHIRE ENVIRONMENTAL CHARACTERISATION PROCESS

The Biodiversity Character Assessment forms part of a wider project that seeks to deliver an integrated, robust and transparent Environmental Characterisation of Northamptonshire: the Northamptonshire Environmental Characterisation Process (ECP) through the integration of three parallel studies; the Historic, Biodiversity and Current Landscape Character Assessments, to produce the county’s Environmental Character Assessment (ECA).

The principal objective of the overall project is to:

- Develop key environmental baseline datasets that inform, develop and enhance the sustainable planning and management of the landscape.

Building on this principal objective, the ECA will:

- enable the development of environmental planning guidance and joint environmental strategies, in conjunction with partners and stakeholders;
- replace Special Landscape Area local designations with a more objective character based assessment;
- inform the assessment of development proposals;
- guide the best use and targeting of initiatives and resources in respect of management, conservation and enhancement of the landscape, and
- demonstrate the value of a fully accessible GIS database to classify, analyse and model change.

Delivery will conform to the standards set out in the e-Government Metadata Framework (e-GMF, 2001) and data will be incorporated into a national internet metadata database, based on National Geospatial Digital Framework (NGDF) Discovery Metadata.

The ECA and its component assessments will be reviewed on a five-year cycle to ensure that they incorporate the most up to date information, such as the results of wildlife site surveys, habitat creation or the effects of development.

All three elements will base their assessment on a single physiographic model, which acts as a reference for and link between each component of the Environmental Characterisation Process. A current land use dataset has also been prepared which, together with the physiographic model, provides the primary common baseline data for the three parallel assessments. The three separate assessments, which will also be published individually, have been brought together to form a single integrated Environmental Character Assessment and Map of the county.

1.3 CHARACTERISATION IN PRACTICE

Characterisation is the process by which areas of distinctive character are classified, mapped and described, through the identification of Character Types and Character Areas. Character Types are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in several parts of the county, but wherever they occur they share broadly similar combinations of geology, soils, landform, drainage patterns, vegetation and historical land use. By comparison, Character Areas are unique and geographically discrete, sharing characteristics of the generic Character Type to which they conform.

An important feature of the character assessment process is that it is objective, with no judgment being made of a particular area’s value or quality. However, attention is given to identifying characteristics that are distinctive, rare or special as well as the more commonplace.
The Northamptonshire Biodiversity Character Assessment is the first study of its kind to be carried out in the county. It builds on the Natural Areas approach developed by English Nature, which was developed to offer a more efficient framework for the planning and achievement of nature conservation objectives in England. It sub-divided the country into a number of Natural Areas based on the distribution of habitats, species and natural features as well as the land use patterns and human history. The assessment placed the ecological landscape of Northamptonshire within five Natural Areas, each of which extends beyond Northamptonshire’s administrative boundary. The Natural Areas covering Northamptonshire are shown in Table 1.1 and summaries of the Natural Area Profiles (Natural Area descriptions) can be found in Appendix 2.

**TABLE 1.1. NATURAL AREAS IN NORTHAMPTONSHIRE**

<table>
<thead>
<tr>
<th>Natural Area</th>
<th>Percentage of Natural Area within Northamptonshire</th>
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<tr>
<td>Rockingham Forest</td>
<td>84%</td>
</tr>
<tr>
<td>Yardley-Whittlewood Ridge</td>
<td>58%</td>
</tr>
<tr>
<td>Midlands Clay Pastures</td>
<td>44%</td>
</tr>
<tr>
<td>West Anglian Plain</td>
<td>26%</td>
</tr>
<tr>
<td>The Cotswolds</td>
<td>2%</td>
</tr>
</tbody>
</table>

The Northamptonshire Biodiversity Character Assessment considers Northamptonshire as a mosaic of different Biodiversity Character Types, made up of one or more Biodiversity Character Areas. A Biodiversity Character Type has a set of common ecological characteristics. The overall aim of this assessment is to provide a detailed understanding of the biodiversity of Northamptonshire as it stands in 2003.

The Biodiversity Character Assessment has the following main objectives:

- Provide an assessment of the character and distinctiveness of Northamptonshire’s biodiversity through the identification and description of the county’s component Biodiversity Character Types and Biodiversity Character Areas,
- Summarise the key characteristics associated with each Biodiversity Character Type; and
- Promote awareness of the county’s biodiversity and the importance of habitat management, restoration and creation.

The Biodiversity Character Assessment has been integrated with the Current Landscape Character Assessment and the Historic Landscape Assessment as composite digital overlays. Together they provide a single Environmental Character map of the county encompassing full time depth. With the combined datasets brought together, the final Environmental Character Types have been determined, leading to their representation as geographically distinct county Environmental Character Areas.
1. INTRODUCTION

1.5 PARALLEL PROJECTS AND SURVEYS

The Northamptonshire Biodiversity Character Assessment has drawn on the findings, and is complementary to, several relevant studies.

1.5.1 NORTHAMPTONSHIRE PHYSIOGRAPHIC MODEL

The Northamptonshire Physiographic Model, produced by Northamptonshire Archaeology on behalf of the Northamptonshire County Council Built and Natural Environment Service, was undertaken to provide a common primary baseline data set onto which the three primary environmental aspects of the Northamptonshire Environmental Characterisation Process could be based. The model provides the reference for, and link between, the three separate strands of the model.

1.5.2 NORTHAMPTONSHIRE LAND USE DATA MODEL

The Northamptonshire Land Use Data Model, produced by Northamptonshire County Council Built and Natural Environment Section, provides the second of the common primary baseline data sets for the wider Northamptonshire Environmental Characterisation Process. The desk-based data is sourced down to individual field components and provides a comprehensive record of the current land use distribution and field patterns across the county.

1.5.3 NORTHAMPTONSHIRE HISTORIC LANDSCAPE CHARACTERISATION

The historic character of the county’s landscape is subject to a separate parallel study: the Northamptonshire Historic Landscape Character Assessment. This important piece of work provides a detailed analysis of the cultural dimension of the landscape and allows for an understanding of the historic structure of the landscape and maps the dynamics of change over a long period of time.

The findings of this assessment have been integrated with the Current Landscape Character Assessment and other datasets to formulate the final combined Environmental Character Area map. The integration of this key dataset gives the final composite character map full time depth and provides a valuable opportunity to identify areas where relict landscapes survive and gives a wider historic landscape context for point source historical data.

1.5.4 NORTHAMPTONSHIRE CURRENT LANDSCAPE CHARACTERISATION

The current landscape of the county is also subject to a separate parallel study: The Current Landscape Character Assessment, which provides a detailed record and analysis of the Northamptonshire landscape as it is today and provides a detailed understanding of the physical and cultural patterns that have influenced its development.

As with the Historic Landscape Character Assessment, the findings of the Current Landscape Character Assessment have been integrated with both the Biodiversity Character Assessment and other datasets to formulate the final integrated county Environmental Character Area map.

Alan Smith – Common Lizard
1. INTRODUCTION

1.6 STRUCTURE OF THE REPORT

The biodiversity of Northamptonshire, the collection of habitats and species that make up the ecological landscape, has evolved over thousands of years, and is the result of the interaction of physical and human influences. Section 2 outlines the factors affecting Northamptonshire’s biodiversity and describes the principal habitats that are found in the county.

Section 3 presents a review of the biodiversity character of Northamptonshire and a classification of the 11 Biodiversity Character Types, excluding urban areas, and the 79 Biodiversity Character Areas. For each Biodiversity Character Type a description of the key characteristics and principal physical and human influences has been prepared.

Section 4 of the report comprises a glossary of key terms, followed by Section 5, which lists the bibliography. Finally, Section 6, Acknowledgements, identifies individuals who made valuable contributions to the Biodiversity Character Assessment.

Bruce Shortland – Hairbell
2. THE BIODIVERSITY RESOURCE

2.1 INTRODUCTION

Without human intervention Northamptonshire would be a largely wooded county, with substantial areas of wetland along the river valleys. However, this is not the case as people have radically altered the landscape. Although large areas of the county are overlain by heavy clay soils, some areas are drier and more easily drained. People were able to clear these areas of woodland and convert the land to grassland and crop fields. Although some areas of woodland were retained and managed for fuel and building materials throughout the county, substantial areas were only retained in those places where the effort involved in clearing and conversion to agriculture was too great. The landscape also underwent substantial change as a result of the Enclosure Acts. Prior to Enclosure there were few hedges and therefore few small field networks, away from areas of anciently enclosed land in the west of the county, in the vicinity of settlements and in north and south east of the county where woodland was claimed for agriculture as assarts.

People have had an equally dramatic effect on the wetlands. River valley meadows originated largely in the late Saxon period when the expansion of arable cultivation caused soil erosion resulting in major changes in the river systems. Later, the extensive draining of the fens paved the way for agricultural schemes that transformed the eastern part of the county. In more recent times, extensive river engineering work has been carried out to reduce the risk of flooding; meandering rivers have been straightened and much of the typical riverine vegetation has been lost. The river valleys, especially the Nene, have also been altered by sand and gravel extraction. Here quarrying has created many large water-filled gravel pits at the expense of the wet meadows which once flanked the river.

In other parts of the county quarrying has also altered the landscape. Large areas, particularly around Corby and Kettering, were quarried, creating long, narrow gullets. Vast areas were mined. Many of these gullets have been restored to farmland or woodland, although a few unrestored ironstone gullets still remain.

Today, the wildlife of the county comprises those plants and animals that have taken advantage of the new landscapes or have managed to survive change on small tracts of unimproved ground.

2.2 HABITAT AND SPECIES LOSS

Changing agricultural, forestry and river-management practices, urban expansion, road development, mineral extraction, pollution, water abstraction and climate change have all had a dramatic effect on the Northamptonshire countryside. There has been a steady decline in the areas that can be defined as semi-natural habitats of wildlife importance. Those areas that have survived are often small and have a fragmented distribution. The following key statistics exemplify the most recent changes.

- Since 1947 over 64% of the Ancient Woodlands have been lost. *
- Since 1900 more than 99% of semi-natural neutral grassland has been destroyed. *
- Between the mid 1980s and the mid 1990s around 10% of the surviving wildlife-rich meadows disappeared. *
- 94 species of plant, 8 species of lichen, 3 species of mammal, 14 species of bird, 16 species of butterfly, 13 species of moth and 3 species of grasshopper became extinct in Northamptonshire during the 20th Century. *


2.3 THE CURRENT BIODIVERSITY RESOURCE

The current biodiversity resource is defined by the extent of known sites of nature conservation value. These include Sites of Special Scientific Interest (SSSI), nationally important and legally protected biological and geological sites identified by English Nature under the Wildlife and Countryside Act 1981, and Wildlife Sites, identified by the Wildlife Trust, which represent the most important habitats at a county level that have not otherwise been designated as SSSIs. Wildlife Sites do not have statutory protection, but there is a presumption against their development in local authority development plans.

Much of the conservation effort over the past 30 years or so has been devoted to saving areas that have an acknowledged wildlife interest. Development control has proved relatively successful in conserving Wildlife Sites from detrimental development proposals, but has been less successful at countering land use changes, particularly those associated with agriculture or forestry. Many of these sites have also suffered from a lack of appropriate management, although the Countryside and Rights of Way Act 2000 seeks to improve the condition of Sites of Special Scientific Interest.
Today, in terms of sites designated for their wildlife importance in the national context, Northamptonshire is one of the poorest in the country. English Nature has identified only 2,450 hectares, or 1.1%, of Northamptonshire as SSSI. Only Warwickshire has a smaller proportion whereas, in comparison, Cumbria has 159,902 hectares representing 11.95% of the county, the county average area of SSSI in England being 6.8%. The area of Wildlife Sites, covering all habitats, is approximately 11,500 hectares, which are predominantly woodlands and open water sites. Therefore the combined total of the remaining sites of wildlife value is in the region of 14,000 hectares or 6% of Northamptonshire. (Figures calculated using English Nature SSSI and Wildlife Trust Wildlife Site GIS datasets).

A Biodiversity Action Plan for Northamptonshire (Northamptonshire Nature Conservation and Landscape Forum 2002 BAP) identifies the range of habitats that remain in the county, subdividing them by broad habitat types (Table 2.1), which collectively comprise the biodiversity resource. Each of the habitats, apart from urban sites (Towns and Villages), which are excluded from the Biodiversity Character Assessment, is briefly described below.

### TABLE 2.1. NORTHAMPTONSHIRE BAP PRIORITY HABITATS

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<tr>
<td>Open Standing Water</td>
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<tr>
<td>Reedbeds and Swamps</td>
</tr>
<tr>
<td>Wet and Marshy Grassland</td>
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<tr>
<td>Springs and Flushes</td>
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| **Trees and Woodlands:**                        |
| Lowland Mixed Woodland                          |
| Wet Woodland                                    |
| Lowland Wood-Pasture and Parkland              |

| **Farmland:**                                   |
| Cropped Land                                    |
| Field Margins and Beetle Banks                  |
| Hedgerows                                       |

| **Dry Grasslands and Heaths:**                  |
| Lowland Calcareous Grassland                   |
| Acid Grassland and Heathland                   |
| Lowland Neutral Grassland                      |
| Road Verges                                     |
| Quarries and Gullets                            |

| **Towns and Villages:**                         |
| The Built Environment                           |
| Urban Forest and Greenspace                     |

**Henry Stanier – Wetland**
2.3.1 RIVERS AND WETLANDS

2.3.1.1 RIVERS AND STREAM

Of the major rivers that flow through Northamptonshire the Tove, Great Ouse, Avon and Nene have their sources in the south-western uplands of the county. The Great Ouse and Tove flow east into Bedfordshire and the Avon flows west into Warwickshire. The Nene rises near Daventry and flows in an easterly direction to Cambridgeshire and the River Welland also flows east along Northamptonshire's northern boundary.

The upper reaches of these rivers flow through a mixed arable and pastoral landscape. These streams are mostly small, winding, narrow channels with bed substrates ranging from solid limestone to gravels and muddy silts.

The Nene is the largest river with tributaries joining the main course along its entire length. The major tributaries are the Brampton Nene, River Ise, Harper’s Brook and Willow Brook. These watercourses vary considerably in size, volume and water quality. Some drain agricultural land whilst others have almost entirely urban catchments. Similarly there is variation in the riparian habitat associated with each of these watercourses; some are highly engineered drainage channels, whilst others are open and exposed in an agricultural landscape, denuded of bank-side trees and shrubs. However, some streams remain secluded and relatively untouched, allowing trees, shrubs and thick vegetation cover to develop, providing corridors along which plants and animals can move and disperse, as well as supporting a diverse invertebrate fauna.

2.3.1.2 OPEN STANDING WATER

All open standing waters in Northamptonshire are considered to be eutrophic (nutrient rich) and are characterised by having high plant productivity with anaerobic and organically rich mud beds. They support a rich and diverse flora and fauna, with some species relying on these habitats for their entire lifecycle.

The Nene Valley, particularly between Northampton and Thrapston, is characterised by the large number of gravel pits. Whilst the area is still being worked for aggregates, many of the disused gravel pits have been restored to form important wildlife habitats. Gravel pits can be deep, steep sided excavations, up to several thousand square metres in surface area. The steep sides provide narrow margins which limits the growth of marginal vegetation, although surrounding land can support scrub, willow carr and rough grassland habitats. Those pits that have wider marginal zones with associated shallows and islands tend to be of greater nature conservation value as they support a diverse marginal and aquatic flora and invertebrate fauna. Their major importance, however, is the number of breeding and over wintering water birds that they support.

Reservoirs are man-made bodies of open water providing public water supply, winter water storage for crop irrigation or flood storage facilities in associated floodplains. Water supply reservoirs have developed into important nature conservation assets. The major difference between these water bodies and other areas of open standing water is drawdown. This occurs when abstraction from the reservoir exceeds recharge from feeder streams and rivers, typically in summer, causing a lowering of the water level. Drawdown exposes large areas of mud that is quickly colonised by specialist ruderal species.

Although water flows through canals via locks and sluices, the movement is so small that they are classified as standing water. The bulk of canals were constructed in the late 18th and early 19th centuries for commercial carriage of cargoes. The advent of the railways saw the gradual abandonment of the canals, so that today few remain as commercial navigations, although an extensive network is maintained for recreational use.

Although canals can be viewed as elongated ponds, their boundaries usually also include a towpath and hedge on at least one side. As well as supporting diverse flora, these corridors support otters, water voles and a variety of birds, bats and dragonflies. The degree to which the ecological value is able to develop is dependent upon the level of disturbance by boats and other recreational uses.

A pond is defined as a small water body, between 1m² and 2 hectares, that holds water for more than four months year (a water body larger than 2 hectares is a lake). Ponds can be formed naturally in depressions created by glacial activity, natural subsidence or river action. There are also many man-made ponds of more recent origin.
2.3.1.3 REEBEDS AND SWAMPS

Swamp and tall herb fen habitats are characterised by a water table at or above the soil surface for most of the year. They tend to be relatively species-poor wetland habitats dominated by coarse grasses, sedges or rushes. They typically form in depressions in the ground, or as fringing vegetation alongside rivers, ponds, reservoirs and gravel pits, although they can be more extensive, for example in wash lands.

Reedbeds are wetland habitats dominated by stands of common reed. Areas where the water level remains high, at least 20cm above the surface, in the summer months are referred to as reed swamp and those where the water table is at or below the surface are referred to as reed fen. In areas that are very wet, common reed can frequently be the only species present. Reedbeds are often rich in invertebrates and can support specialist birds. In Northamptonshire reed beds are very restricted in size and are mainly associated with the margins of open water bodies, particularly flooded gravel pits.

2.3.1.4 WET AND MARSHY GRASSLANDS

Wet and marshy grasslands in the UK are predominantly semi-natural or man-made habitats, strongly influenced by water management and by farming practices. They form important habitats for wildlife, perform a vital flood storage function and play a significant role in traditional farming systems. As a consequence their management is crucial. Wet grasslands normally occur in river valleys, where they are prone to winter flooding. These floods bring nutrients to the grasslands and traditional farming systems recognised this benefit, with the productive sward being managed for hay production and cattle grazing. There distribution in the county is now very limited.

Grasses, low-growing herbs and rushes, which can tolerate periodic inundation, typically dominate wet and marshy grassland communities. Often drainage channels or other water bodies are associated with this habitat and these can also support important species assemblages. The shallow winter floods create ideal conditions for feeding waterfowl, and in spring the receding floods leave damp conditions ideal for breeding waders such as snipe, lapwing and redshank.

There are a number of grassland types. Species-rich flood meadows experience periodic inundation in the winter, but have good sub-surface drainage and water retentive soils that allow the water table to fall in spring. Water meadows occur naturally or as a result of careful water level management where water levels are controlled to prevent drying out or water logging of the soil. Inundation grasslands occur on poorly structured clay soils that flood in winter and spring, but do not then readily drain, and support species-poor plant communities that have to contend with water-logging in early summer and then drought conditions as the soil dries out.

2.3.1.5 SPRINGS AND FLUSHES

Springs occur where water wells up from underground aquifers, whilst flushes occur on sloping ground with impeded drainage. The geology of Northamptonshire, which broadly consists of areas of limestone, clays and recent alluvial deposits, limits their distribution and changes in land use and the high demand for water have led to springs and flushes becoming increasingly rare.
2.3.2 TREES AND WOODLAND

2.3.2.1 LOWLAND MIXED WOODLAND

Lowland mixed woodlands, which include broadleaf and coniferous woods, are an important part of the county’s heritage as they provide a range of habitats that support a rich diversity of flora and fauna. They are also of key ecological importance as many woodland species depend entirely on the continued existence of this habitat for their survival. The largest areas of woodland are in the north of the county, in the Rockingham Forest, and on the south-eastern fringes, along the Yardley-Whittlewood Ridge.

The most important are Ancient Semi-Natural Woodlands on land that has had continuous woodland cover since at least 1600AD. They retain a native tree and shrub cover that has not been planted, although it may have been managed by coppicing or felling and allowed to regenerate naturally. They retain their historic features, including the coppice structure and ride networks, and have a rich fauna and flora including rare species such as dormice. They also represent a unique archaeological resource because they preserve medieval and earlier industrial remains in an exceptional state. Old forest grassland is a particularly rare habitat within a few of these woodlands.

2.3.2.2 WET WOODLAND

Wet Woodlands frequently occur in a mosaic with other woodland and wetland habitats. Many alder woodlands are ancient and have a long history of coppice management that has determined their structure. Other wet woodlands have developed through natural succession from open water and structurally have encountered little influence from commercial forestry practises.

Wet Woodland occurs on poorly drained or seasonally wet soils, usually with alder, birch and willows as the predominant tree species. It is often found on floodplains as a successional habitat particularly around wetlands and along streams. The soils on which these woods occur range from nutrient-rich mineral to very acid, nutrient-poor organic soils. Boundaries with dry woodland may be sharp or gradual and can change over time though natural succession or as a result of human influence.

2.3.2.3 LOWLAND WOOD-PASTURE AND PARKLAND

Lowland wood-pastures and parklands are a product of historic land management systems and represent a vegetation structure rather than a particular plant community. They occur mainly as components of the extensive woodlands in the Rockingham Forest and the Yardley-Whittlewood Ridge. Parkland and wood-pasture habitats are of particular value for the fungi, lichens, bryophytes and invertebrates associated with veteran
2.3.3 FARMLAND

2.3.3.1 CROPPED LAND

Cropped areas are defined as managed farmland that is under arable production or improved grassland leys. Despite continued urban expansion, Northamptonshire remains a rural county with agriculture as the major land use. The cropped areas of the county are as much a habitat as more recognised wildlife features. Many species are totally reliant on the annual disturbance of cultivation for suitable nesting and feeding areas. Others are heavily reliant on finding sufficient food in fields for rearing young and winter survival.

2.3.3.2 FIELD MARGINS AND BEETLE BANKS

Biodiversity in arable fields is at its most diverse at the field edge. A field margin comprising perennial vegetation acts as both a habitat in its own right and as a buffer between farm operations and adjacent habitats such as hedges and watercourses. Field margins have a considerable role to play in conserving key farmland species. They provide undisturbed cover for nesting birds and over-wintering invertebrates, a food source for nectar feeding insects and a year round feeding for foraging birds.

2.3.3.3 HEDGEROWS

Ancient hedgerows often form parish boundaries, follow streams or ancient roads and byways and often contain a wider variety of woody shrub species than more recent hedges. Shrubs such as dogwood, spindle and buckthorn are often present alongside the more common hawthorn. Old assart hedges were created when the original Wildwood was cut back for cultivation. As remnants of ancient woodland they often retain many plants characteristic of the woodland floor, such as dog’s mercury, bluebells and yellow-archangel.

The Enclosure Acts were concentrated in the 19th Century, but the enclosure of land with planted thorn hedges had been happening for centuries. Parishes such as Charwelton were enclosed as early as the 13th Century. Most enclosure hedges typically support a poorer diversity of plants and invertebrates than ancient hedges, but they are still a significant wildlife habitat for a very wide range of flora and fauna.

Hedgerow trees have developed, either as a result of planting or being allowed to naturally mature. They give the hedge structure and form important landscape features. In addition, they provide habitats for many species of wildlife.
2.3.4 DRY GRASSLAND AND HEATHS

2.3.4.1 LOWLAND CALCAREOUS GRASSLAND

Lowland calcareous grasslands cover a range of plant communities developed on shallow soils overlying limestone rock. They have never been widespread in Northamptonshire and as a result of agricultural change their extent has become even more limited. Some of the most important areas remaining in the county are man-made, either in old quarries or disused railway cuttings, where the limestone has been exposed.

In the agricultural landscape they are typically managed as components of pastoral or mixed farming systems, supporting sheep or cattle, with a few examples being cut for hay. Scrub is frequently associated with calcareous grassland and can contribute to local biodiversity by providing shelter and nectar for invertebrates and breeding habitat for birds.

2.3.4.2 ACID GRASSLANDS AND HEATHS

There is very little acid grassland remaining in Northamptonshire. Much is very isolated, existing as fragments, making it almost impossible for species to move between these patches. However, the acid grassland sites that do remain support a wide range of rare and unusual species.

The majority of acid grassland in Northamptonshire is found in the west of the county, mainly on the crests of hills in and around the Daventry area. Acid grassland often occurs where Northampton Sand Formation lies over clay. Here rainfall filters through the sand leaving well-drained surface soil. It also occurs where rainwater, filtered through sandstone, encounters a layer of clay and flushes out at the surface.

Heathland, dominated by heather, is a rare habitat and is mainly confined to the Harlestone and Dallington Heaths, north west of Northampton, where it survives among the conifer plantation at Harlestone Firs and on the adjacent golf course.

2.3.4.3 LOWLAND NEUTRAL (MESOTROPHIC) GRASSLAND

Dry Neutral Grassland, or mesotrophic grassland, is characterised by vegetation dominated by grasses and herbs on a range of neutral soils usually with a pH of between 4.5 and 6.5. In Northamptonshire it occurs as grazed pasture or hay meadows where the land is not frequently flooded. It was therefore once an extensive habitat, particularly on the dryer slopes of the river valleys. Even today more neutral grassland of wildlife value remains than calcareous or acid grassland, but the resource is becoming increasingly fragmented as sites are ploughed or sprayed.

The common knapweed-crested dog’s tail community is typical of traditionally grazed hay-meadows in lowland Britain. It is becoming rare due to agricultural improvement, but is still widespread in the farmed landscape. Fragmentary stands also occur in churchyards, on roadside verges and railway embankments.
2.3.4.4 ROADSIDE VERGES

Roadside verges probably constitute the largest extent of grassland of nature conservation value in Northamptonshire. They provide important corridors for the movement of species and sometimes support plant and animal communities that are important in their own right. The nature of the grassland is dependant upon the underlying geology and soils, with calcareous, acid and neutral grasslands all being represented.

The extent of road verges of nature conservation value has been much reduced in recent years, mainly due to road improvement schemes and lack of appropriate management. Hand cutting of grass verges and removal of cuttings, coppicing and even grazing was initially replaced by flail cutting and latterly large areas of verge are no longer managed. However, with intensive farming becoming the dominant land use in recent years, road verges have become increasingly valuable as wildlife sites.

2.3.4.5 QUARRIES AND GULLETS

Quarries and gullets support a wide range of vegetation communities, generally typified by a nutrient poor, thin soil. Some areas have notable areas of calcareous grassland whilst others have slightly acidic soils that support mesotrophic plant communities.

A variety of types of stone have been quarried in Northamptonshire. The earlier quarries were for building stone, either limestone or sandstone, and unrestored examples often support particularly rich plant communities, such as Collyweston Quarry SSSI and Bradlaugh Fields Hills and Hollows Local Nature Reserve. From Victorian times quarrying concentrated on ironstone. There are several large ironstone quarries, or gullets, around Kettering and Corby, several of which are important wildlife sites, such as Twywell Gullet SSSI and Cranford St. John Quarry SSSI. However, following quarrying, many of these ironstone gullets were restored to agriculture or woodland, and therefore do not support the biodiversity of unrestored sites.

Essentially, railway cuttings are very similar to gullets in that they are linear features often with exposed rock and nutrient poor soils. These poor soils provide ideal conditions for a variety of plant species, which in turn attract a wide range of invertebrates. The main difference between disused railway cuttings and gullets is that the former were regularly managed to prevent scrub encroaching onto the railway line and to reduce the risk of fires, which helped to maintain species-rich communities, whilst quarries were not usually managed.
3. THE BIODIVERSITY CHARACTER OF NORTHAMPTONSHIRE

3.1 INTRODUCTION

The aim of the Biodiversity Character Assessment is to produce a digital map that sub-divides Northamptonshire, excluding the large urban areas, into Biodiversity Character Types that exhibit a suite of similar ecological characteristics, followed by further sub-division of the generic Biodiversity Character Types into Biodiversity Character Areas which form geographically distinct and homogenous representations of that Type.

A Biodiversity Character Type is defined by a suite of common characteristics, such as the range of habitat types, geology, soils, topography and hydrology, which together typify a particular ecological landscape, but makes no hierarchical judgement of value.

A Biodiversity Character Area is a geographically discrete spatial unit that contains a suite of common characteristic ecological features as defined by a particular Biodiversity Character Type. Character Area boundaries are defined by topographic features such as changes in underlying geology, the extent of particular soil types, contours or landscape features such as rivers or the edges of plateaux landscapes.

The scope of the Biodiversity Character Assessment did not allow for any new fieldwork or subsequent ground-truthing, therefore this assessment relies entirely on the use of existing biological information and other environmental datasets, informed by extensive local knowledge of Northamptonshire’s biodiversity resource provided by the Wildlife Trust, Denton Wood Associates and other local experts.

3.2 BIODIVERSITY CHARACTER TYPE AND AREA BOUNDARY DETERMINATION

Surface geology, soils and hydrology are the principal factors that influence the development of natural vegetation. Geologically Northamptonshire is underlain by a variety of older sedimentary rocks and younger, more superficial, deposits, which give rise to an intricate pattern of different soils. The overlying soils are closely related to the rocks from which they are derived, in terms of their chemical content and physical characteristics, both of which are key factors in vegetation development in a particular locality. Coupled with the hydrology, for example the presence of springs or the extent of floodplains, analysis of these key influences should enable the characteristic natural vegetation and associated species that might be expected to occur in a particular location to be determined.

However, the nature of the vegetation has been substantially modified by human influences, including woodland clearances, woodland management, river engineering, farming and quarrying, over thousands of years, to such an extent that none of the county’s vegetation cover can now be described as truly natural.

Today only around 6% of the vegetation within Northamptonshire comprises wildlife-rich, semi-natural communities. The remaining 94% of the county comprises mainly urban areas and extensive tracts of agricultural land, made up of arable fields and improved grassland, divided by an extensive network of hedgerows, the wildlife value of which has not been specifically defined.

It is clear and unsurprising, therefore, that human intervention in the form of extensive land management over thousands of years has modified the natural vegetation and has limited the retention of habitats that support diverse wildlife. So, although we might expect a particular type of vegetation to be found in a particular location on the basis of natural influences, the extent to which man has modified the landscape needs to be factored into the determination of characteristic semi-natural vegetation, and thus Biodiversity Character Types, in the modern landscape.

This approach underpins the methodology used by English Nature to determine Natural Areas and provides a basis for the determination of Biodiversity Character Types and Biodiversity Character Areas in Northamptonshire.
3. THE BIODIVERSITY CHARACTER OF NORTHAMPTONSHIRE

3.2.1 CARTOGRAPHIC METHODOLOGY

Analysis to determine Biodiversity Character Types was undertaken using a Geographical Information System. A variety of geographical datasets were used and the biological characteristics of individual sites were informed by reference to the Wildlife Trust’s County Wildlife Site Register and English Nature SSSI Citations. The full list of geographical datasets used to define the Biodiversity Character is provided in Appendix 1. The methodology for the determination of Biodiversity Character Types is summarised below.

The draft boundaries of the Biodiversity Character Types and Areas were initially mapped to 1:50,000 scale. Reference to 1:10,000 scale maps and aerial photography was also an integral part of the desk study, in order to provide a more informed and detailed analysis of mapped features. Final boundaries were mapped at 1:10,000 scale.

Initially the distribution of designated sites, SSSI and Wildlife Sites, sub-divided into predominant habitat types and mapped by Brayshaw (2003), were examined to determine concentrations of particular habitats. This examination was informed by reference to the Biodiversity Hotspots developed by Jackson and Eversham (2003), which provided a spatial analysis of concentrations of designated sites irrespective of habitat type. Concentrations were obvious in the case of woodland and wetlands, where there are numerous examples in close proximity, but for the majority of habitat types, for example mesotrophic grasslands which are fewer in number and whose distribution is fragmented, there were no discernable concentrations.

By overlaying the designated sites on a geological map and the physiographic model of the county it was apparent that much of the woodland is concentrated on the Boulder Clay Uplands and that the wetlands are primarily associated with Alluvial deposits in the valley bottom floodplains. Therefore the county was sub-divided vertically into Floodplain and Boulder Clay Uplands, using changes in geological characteristics as the boundaries.

Re-examination of the distribution of particular habitats against this initial sub-division revealed that wetland habitats in some cases extend beyond the extent of the Alluvium, therefore the area of floodplain was refined to encompass areas that might be expected to flood or have been engineered to retain water using the extent of the Indicative Floodplain as defined by the Environment Agency following the Easter 1998 floods. These were then further subdivided in to Major and Minor Floodplain, on the basis of size of the river and the width of the valley floor.

Closer examination of the distribution of habitats against the geology also showed that, whilst some of the areas of Boulder Clay have high levels of woodland retention, there are other areas where woodland is limited in extent. This enabled the Boulder Clay to subdivided in to Boulder Clay Woodland and Cropped Clayland. It also showed high retention of woodlands in the north of the county. However, here the Boulder Clay drift is thinner and more fragmented and there are extensive limestone outcrops. Examination of the woodland communities and characteristic species that are known to occur in this area showed that these woodlands differed from those on Boulder Clay, often supporting species typical of sites with a calcareous influence. Consequently this area was identified as Limestone Woodlands.

To the north of wooded limestone area there is an extensive, unwooded limestone outcrop. There is also a similar unwooded limestone area in the southern extremity of the county. In these areas wildlife site survival is low because the land is easily cultivated, although the few remaining wildlife sites include some outstanding examples of calcareous grassland. These areas were defined as Cropped Limestone Plateau.

In west and central Northamptonshire there is only limited Boulder Clay drift. Instead, the geology is mainly dominated by Northampton Sand Formation on the higher ground with Lias Group Clays on the slopes. Close examination of the distribution of designated sites revealed that, although fragmentary in nature, many of the retained wildlife sites had a slightly acidic influence, particularly over the sands. These areas were identified as Acid Sands.

Further examination of the geological mapping revealed an area of unbroken Glacial Sands and Gravels in the Watford Gap within minimal wildlife site survival. This area was unique in character and was defined as the Glacial Sands and Gravels.

The geological map also revealed another unique area around Corby, where ironstone quarrying had been extensive. The soils mapping identified that much of this area comprised Disturbed Soils with a calcareous influence, a product of quarry infilling with overburden comprising Lincolnshire Limestone and Boulder Clay. Furthermore there were small exposures of Lincolnshire Limestone at the quarry edges. Consequently the characteristic vegetation of this area is no longer influenced by the Northampton Sand Formation but, instead, the major influence is from the limestone, therefore this area was defined as Quarryed Ironstone.

Having identified the uplands and floodplains, the remaining areas comprised valley slopes. Geologically the slopes showed some obvious and some more subtle variations. Liassic Slopes were identified where Lias Group Clays were the dominant geological feature and where wildlife sites were associated with the slightly acidic soils that derive from this substrate. Similarly Limestone Slopes were identified where wildlife sites had a calcareous influence. On some valley sides both types of geology were present, so areas were allocated to Type on the basis of the predominant geological influence on the surviving wildlife sites.
Finally Biodiversity Character Areas were defined by sub-dividing the extent of each Biodiversity Character Type into geographically recognisable units. Some Character Types formed small and discrete Areas, so these were defined as Biodiversity Character Areas in their own right. However, some areas of a particular Character Type were large. These large areas were sub-divided into individual Biodiversity Character Areas, principally but not exclusively, on the basis of river catchments.

Overall, the Northamptonshire Biodiversity Character Assessment has identified 11 Biodiversity Character Types, excluding urban areas, sub-divided into 79 Biodiversity Character Areas (see Table 3.1). The extent of each Biodiversity Character Type is shown in Figure 5 and Figure 6 shows the individual Biodiversity Character Areas by Type.

Each of the generic Biodiversity Character Types is described in Section 4. Here their key characteristics are summarised followed by a review of the physical and human influences that have shaped them and thus contribute to their character. This is followed by a description of the geographically unique Biodiversity Character Areas that conform to each Biodiversity Character Type. The Character Area descriptions include a description of one or more sites that typify the major vegetation types and, where possible, the characteristic fauna found in that area. The descriptions draw heavily on English Nature's SSSI citations and summary information on Wildlife Sites prepared by the Wildlife Trust. Each Character Area description concludes with a list of the designated sites that occur in that area. Appendices 3 and 4 provide summary information about each SSSI and Wildlife Site. The distribution of SSSI and Wildlife Sites is shown in Figures 3 and 4.

### TABLE 3.1. BIODIVERSITY CHARACTER TYPES AND BIODIVERSITY CHARACTER AREAS

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<thead>
<tr>
<th>Biodiversity Character Type</th>
<th>Biodiversity Character Area</th>
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<tbody>
<tr>
<td>1. Acid Sands</td>
<td>1a Eydon, Culworth and Thorpe Mandeville</td>
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<td></td>
<td>1b Warden Hill</td>
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<td></td>
<td>1c Litchborough and Pattishall</td>
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<td>1d Everdon and Badby</td>
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<td>1e Borough Hill</td>
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<td></td>
<td>1f Harlestone and Brampton Heaths</td>
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<td></td>
<td>1g Guilsborough and Spratton</td>
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<tr>
<td>2. Liassic Slopes</td>
<td>2a Cherwell Valley Liassic Slopes</td>
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<td></td>
<td>2b Great Ouse Valley Liassic Slopes</td>
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<td></td>
<td>2c Upper Tove Liassic Valley Liassic Slopes</td>
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<td>2d Wootton Brook Liassic Slopes</td>
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<td>2e Upper Nene Valley Liassic Slopes</td>
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<td>2f Avon Valley Liassic Slopes</td>
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<td>2g Brampton Valley Liassic Slopes</td>
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<td>2h Ecton to Great Doddington Liassic Slopes</td>
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### Biodiversity Character of Northamptonshire

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<tr>
<th>Biodiversity Character Type</th>
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<tr>
<td>2. Boulder Clay Woodlands</td>
<td>2i Ise Valley Liassic Slopes</td>
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<td></td>
<td>2j Upper Welland Liassic Slopes</td>
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<td></td>
<td>2k Dingley to Wakerley Liassic Slopes</td>
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<td></td>
<td>2l Collyweston to Easton-on-the-Hill Liassic Slopes</td>
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<tr>
<td>3. Boulder Clay Woodlands</td>
<td>3a Whittlewood and Hazelborough Forest</td>
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<td></td>
<td>3b Yardley Chase and Salcey Forest</td>
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<td></td>
<td>3c Geddington Chase</td>
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<td></td>
<td>3d Pipewell and Brampton Woods</td>
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<td>3e Fermyn and Southwick Woods</td>
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<tr>
<td>4. Cropped Clayland</td>
<td>4a Radstone</td>
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<td>4b Moreton Pinkney, Weedon Lois and Bradden</td>
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<td>4c Maidford and Grimscote</td>
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<td>4h Braunston and Kilsby</td>
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<td>4i East and West Haddon</td>
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<td></td>
<td>4j Sywell, Hardwick and Mawsley Plateau</td>
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<td></td>
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<td>4m Finedon Plateau</td>
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<td>4o Ashton and Barnwell Wolds</td>
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<td>5. Quarried Ironstone</td>
<td>5a Corby Quarries</td>
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<tr>
<td>6. Cropped Limestone Plateau</td>
<td>6a Croughton</td>
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<td></td>
<td>6b Easton-on-the-Hill and Collyweston</td>
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## 3. THE BIODIVERSITY CHARACTER OF NORTHAMPTONSHIRE

<table>
<thead>
<tr>
<th>Biodiversity Character Type</th>
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</table>
| **7. Limestone Woodlands** | 7a Wakerley and Fineshade Woods  
7b Collyweston Great Wood and Old Sulehay Forest |
| **8. Limestone Slopes**    | 8a Great Ouse Valley Limestone Slopes  
8b Greatworth to Brackley Limestone Slopes  
8c Upper Tove Limestone Slopes  
8d Lower Tove Valley Limestone Slopes  
8e Blisworth Limestone Slopes  
8f Great Houghton to Irchester Limestone Slopes  
8g Higham Ferrers to Titchmarsh Limestone Slopes  
8h Irthlingborough to Woodford Limestone Slopes  
8i Alledge Valley Limestone Slopes  
8j Islip to Perio Limestone Slopes  
8k Ise Valley Limestone Slopes  
8l Harpers Brook Valley Limestone Slopes  
8m Stoke Albany to Rockingham Limestone Slopes  
8n Thorpe Waterville to Warmington Limestone Slopes  
8o Willow Brook Valley Limestone Slopes |
| **9. Glacial Gravels**     | 9a Watford Gap |
| **10. Minor Floodplain**  | 10a River Cherwell  
10b River Great Ouse  
10c Upper Tove  
10d River Tove  
10e Upper Nene  
10f Brampton Nene  
10g Wootton Brook  
10h Grendon Brook  
10i Sywell Bottom  
10j River Avon |
3. THE BIODIVERSITY CHARACTER OF NORTHAMPTONSHIRE

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<tr>
<th>Biodiversity Character Type</th>
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<tr>
<td>10k Upper Welland</td>
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<td>10l River Ise</td>
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<td>10m Alledge Brook</td>
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<td>10n Harpers Brook</td>
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<td>10o Southwick Brook</td>
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<td>10p Willow Brook</td>
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<td>11a Middle Nene</td>
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<td>11b Lower Nene</td>
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<td>11c Welland</td>
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<td>12a Brackley</td>
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<td>12b Towcester</td>
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<td>12c Daventry</td>
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<td>12d Northampton</td>
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<td>12e Desborough</td>
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<td>12f Rothwell</td>
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<td>12g Corby</td>
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<td>12h Kettering</td>
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<td>12i Rushden and Higham Ferrers</td>
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<td>12j Wellingborough</td>
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<td>12k Raunds</td>
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<td>12l Thrapston</td>
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<td>12m Oundle</td>
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<td>12n Burton Latimer</td>
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<td>12o Irthingborough</td>
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1. ACID SAND

CHARACTER AREAS

1a Eydon, Culworth and Thorpe Mandeville
1b Warden Hill
1c Litchborough and Pattishall
1d Everdon and Badby
1e Borough Hill
1f Harlestone and Brampton Heaths
1g Guilsborough and Spratton

KEY CHARACTERISTICS

- Areas of Northampton Sand Formation on the upper ground, underlain by the Whitby Mudstone Formation;
- Soils are generally acidic, particularly over the Northampton Sand Formation;
- Retention of all wildlife sites is generally low;
- Several woodland types are associated with the acidic soils;
- Some unimproved semi-natural acid grassland is retained, together with limited Ericaceous Heath;
- Occasional unimproved mesotrophic (neutral) grasslands occur over the Whitby Mudstone Formation;
- Concentrations of small ponds are found in some areas; and
- Springs issue at the interface between the Northampton Sand Formation and the Whitby Mudstone Formation.
1. ACID SAND

INTRODUCTION
This Biodiversity Character Type occupies the highest elevations principally in the west of the county and lies within the Midland Clay Pastures Natural Area. It is identified as Acid Sand because of the major influence of the Northampton Sand Formation. Unimproved semi-natural heath, grassland and woodlands are associated with this Formation.

PHYSICAL INFLUENCES

Geology and Soils
The Acid Sands Character Type is characterised by deposits of Northampton Sand Formation of varying sizes, fringed by the Whitby Mudstone Formation, formerly known as Upper Lias Clay. The soils overlying the Northampton Sand Formation can be strongly acidic. Throughout the Acid Sands Character Areas there are areas of well-drained, fine and coarse loamy ferritic brown earth soils. Slightly stony, sandy loam soils are common, particularly on the higher ground around Northampton. Elsewhere the soils are mainly slowly permeable clays (Hodge 1984).

Hydrology
The Northampton Sand Formation is free draining therefore the presence of watercourses is not characteristic. However, a number of springs issue at the interface between the Northampton Sand Formation and the Whitby Mudstone Formation producing occasional species-rich flushes. The Acid Sands form the upland areas of western Northamptonshire and lie at the head of the catchments of many of the river systems that are described under the Minor Floodplains Biodiversity Character Type.

HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS

Agricultural change is the principal influence on the retention of unimproved semi-natural habitats. The free-draining soils over the Northampton Sand Formation ready absorb excess rainfall making flatter areas ideal for autumn sown cereals and ley grassland. Conversion of the flatter ground from grassland to arable cropping has resulted in the loss of acid grasslands. Where the ground is steeper permanent grassland is still common, but here the diversity of the grassland has been diminished by fertiliser application to improve grass production. Unimproved acid grassland is now confined to occasional sites on the steepest hillsides.

Soils over the Whitby Mudstone Formation would once have supported slightly acidic/mesotrophic grassland. However, improved land drainage techniques now enable these clayey soils to yield moderately good crops of cereals and oil-seed rape. Retention of grassland in these areas is low and the floristic diversity of the swards, like that of the grasslands over the Sand Formation, has also been adversely affected by fertiliser application. Few significant unimproved semi-natural grasslands remain.

Disused railways support some areas of mesotrophic grassland little affected by agriculture. Some are maintained by rabbit grazing, but many others are threatened by scrub encroachment. Without management the developing scrub will eventually overshadow these grasslands and result in the loss of their characteristic flora.

PRINCIPAL HABITAT TYPES

Trees and Woodlands
Various woodland types occur, each of which is influenced by variations in the underlying geology and soils

Woodland is typically of the oak Quercus robur – bracken Pteridium aquilinum – bramble Rubus fruticosus type, with a characteristically rich ground flora. Typical species include bramble Rubus fruticosus, honeysuckle Lonicera periclymenum, creeping soft-grass Holcus mollis and bluebell Hyacinthoides non-scripta. Many other species occur locally, including foxglove Digitalis purpurea, hairy wood-rush Luzula pilosa, red campion Silene dioica and greater stitchwort Stellaria holostea.

The Yorkshire fog Holcus lanatus sub-community of this woodland type also occurs. It is a species-poor sub-community, typical of oak and conifer plantations and of recent secondary birch/oak woods. The under storey is sparse or absent, with infrequent hazel Corylus avellana, and scatted hawthorn Crataegus monogyna, elder Sambucus nigra or blackthorn Prunus spinosa. Yorkshire fog Holcus lanatus is the most distinctive feature, bracken Pteridium aquilinum is often abundant and Bramble Rubus fruticosus and honeysuckle Lonicera periclymenum can be common.

Everdon Stubbs SSSI uniquely supports sessile oak Quercus petraea woodland with the driest and most acidic soils giving rise to lowland birch Betula pendula - sessile oak Quercus petraea woodland containing silver birch Betula pendula, rowan Sorbus aucuparia and hornbeam Carpinus betulus.
1. ACID SAND

**Rivers and Wetlands**

There are some concentrations of farm ponds and occasional ornamental lakes on the clays of Whitby Mudstone Formation, although few are designated as Wildlife Sites. The Grand Union Canal is also a feature of some of the Character Areas, but this artificial feature cannot be described as characteristic of the Acid Sands.

**Dry Grasslands and Heaths**

Acid grasslands and heaths are characteristic of sites overlying the Northampton Sand Formation.

The only extensive heath land cover is the heather *Calluna vulgaris* – sheep’s fescue *Festuca ovina* heath community at Harlestone Firs where characteristic species, in addition to the above, include petty whin *Genista anglica*, broom *Cytisus scoparius*, dwarf gorse *Ulex minor*, dog violet *Viola canina*, heath bedstraw *Galium saxatile*, heath speedwell *Veronica officinalis*, bracken *Pteridium aquilinum*, wood sage *Teucrium scorodonia*, oval sedge *Carex ovalis* and green ribbed sedge *C. binervis*.

Acid grasslands are more widespread, but limited in number. Typically they are of the sheep’s fescue *Festuca ovina* – common bent *Agrostis capillaris* – sheep’s sorrel *Rumex acetosella* type. They tend to be found on the slopes of hillsides where the Northampton Sand Formation lies over clay. Here rainwater filters through the sandstone leaving well-drained soils. This type of grassland was once more widespread where land was grazed, but is now more likely to be found under scrub, on road verges or in small patches of ground where rabbit grazing causes some disturbance.

Grasslands overlying the Whitby Mudstone Formation tend to be mesotrophic and are only retained on man-made sites.
31 km² of Northampton Sand Formation, Whitby Mudstone Formation and occasional Boulder Clay deposits at the head of the River Cherwell catchment. Farmland is in mixed usage, with agriculturally improved grasslands on the higher ground to the north and a greater proportion of arable fields in the centre and south of the area. Retention of all unimproved semi-natural habitats is poor, although previous survey work in this area has been patchy. A comprehensive survey may identify additional sites. Woodlands are small and isolated, with no sites of ancient origin. Unimproved semi-natural mesotrophic grasslands are only retained on man-made sites.

Ward’s Copse and Ashby Gorse overlap the boundary of the Character Area, with Ward’s Copse overlying Boulder Clay (outside the area) and Ashby Gorse overlying Northampton Sand Formation. The name, Ashby Gorse suggests that this area is a wooded heath. Ashby Gorse is planted with Scots pine *Pinus sylvestris* and spruce *Picea sp*, plus some broadleaved species, including oak *Quercus robur*. Sheep’s sorrel *Rumex acetosella* is recorded in the acid grassland that occurs in the cleared sections.

![Image of Sheep Sorrel](image)

### DESIGNATED SITES

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<th>National Nature Reserves</th>
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<tr>
<td>Sites of Special Scientific Interest</td>
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<td>Wildlife Sites</td>
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<td>Canons Ashby Lower Lake</td>
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<td>Canons Ashby Woodland</td>
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<tr>
<td>Eydon Disused Railway</td>
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<td>Moreton Pinkney Disused Railway (North)</td>
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<td>Thorpe Mandeville Cutting</td>
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<td>Ward’s Copse and Ashby Gorse</td>
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<td>Woodford Halse Railway Cutting</td>
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1. ACID SAND

1a EYDON, CULWORTH AND THORPE MANDEVILLE

1a - Henry Stanier - Sheep Sorrel
1b WARDEN HILL

10km² of Northampton Sand Formation and Whitby Mudstone Formation in the west of the county, cut off from the larger Everdon and Badby Acid Sands by tributaries of the River Cherwell. Agriculturally improved grassland and arable fields are mixed in roughly equal proportions. Woodland retention is reasonably high for such a small area and woodlands represent the only examples of unimproved semi-natural habitat.

Redhill Wood is a block of ancient semi-natural woodland on a thin, poor, sandy soil. The tree canopy consists of oak *Quercus robur*, ash *Fraxinus excelsior* and sycamore *Acer pseudoplatanus* with old hazel *Corylus avellana* coppice and some dead elms *Ulmus procera*. Young ash and hazel, suckering elm, field maple, elder *Sambucus nigra*, blackthorn *Prunus spinosa*, holly *Ilex aquifolium*, bramble *Rubus fruticosus* and gorse *Ulex europaeus* make up the shrub layer. The ground flora is still intact despite extensive clearance/thinning of dead elm and is mostly dominated by bluebell *Hyacinthoides non-scriptus*. Other species include greater stitchwort *Stellaria holostea*, three-nerved sandwort *Moehringia trinervia*, germander speedwell *Veronica chamaedrys*, false brome *Brachypodium sylvaticum*, cow parsley *Anthriscus sylvestris*, herb Robert *Geranium robertianum* and ground ivy *Glechoma hederacea*.

Warden Grange Spinney is probably a forested heath and lies on a sandy hillside. Amongst younger ash *Fraxinus excelsior* and oak *Quercus robur* there are mature oak and beech *Fagus sylvatica*. The shrub layer is sparse. The ground flora is locally dominated by bluebell *Hyacinthoides non-scriptus*, with much rarer dog’s mercury *Mercurialis perennis*. Other species present include enchanter’s nightshade *Circaea lutetiana*, male fern *Dryopteris filix-mas*, germander speedwell *Veronica chamaedrys*, ground ivy *Glechoma hederacea*, wood avens *Geum urbanum*, herb Robert *Geranium robertianum* and bush vetch *Vicia sepium*. Bracken *Pteridium aquilinum* and raspberry *Rubus idaeus* are frequent throughout the wood and reflect the acidic, free-draining substrate.

DESIGNATED SITES

**National Nature Reserves**
- None

**Sites of Special Scientific Interest**
- None

**Wildlife Sites**
- Redhill Wood
- Warden Grange Spinney

**Local Nature Reserves**
- None
1c LITCHBOROUGH AND PATTISHALL

27km² of Northampton Sand Formation and Whitby Mudstone Formation, with other minor geological influences. It forms an extension to the Everdon and Badby Acid Sands, but unlike this area, apart from one unusual site, there are no extant unimproved semi-natural acidic habitats. Land use is mainly arable with an area of improved grassland to the north of Pattishall. woodland cover is almost non-existent. The Grand Union Canal and a disused railway cross the area.

Litchborough Walls is a unique Wildlife Site. The short lengths of old sandstone wall on either side of Litchborough High Street are noted as a site for the county rarities navelwort *Umbilicus rupestris* (the most easterly site in England) and the fern intermediate polypody *Polypodium interjectum*. Other species include ivy-leaved toadflax *Cymbalaria muralis*, ivy *Hedera helix* and mouse-ear-hawkweed *Pilosella officinarum*. Less frequent are red fescue *Festuca rubra*, herb Robert *Geranium robertianum*, white stonecrop *Sedum album*, biting stonecrop *S. acre*, sheep’s sorrel *Rumex acetosella*, sheep’s fescue *Festuca ovina* and foxglove *Digitalis purpurea*. The latter three species are all associated with acidic substrates and demonstrate the acidic influence of the Northampton Sand Formation.

Gayton Disused Railway is a long stretch of disused railway cutting with dense scrub, young trees and a sparse ground flora. The small open areas of grassland support a rich flora characteristic of thin soils. This site overlaps an area of Acid Sands and Limestone Slopes and many of the species are more typical of sites with a calcareous influence. Species includes twayblade *Listera ovata*, common spotted orchid *Dactylorhiza fuchsii*, quaking grass *Briza media*, upright brome *Bromus erectus* and an isolated record of large thyme *Thymus pulegioides*, one of only two sites for this species in the county.

The Bugbrooke section of the Grand Union Canal through this area is rather open with a wider variety of emergent species than in other sections. Typical species include greater pond-sedge *Carex riparia*, water mint *Mentha aquatica*, branch bur-reed *Sparganium erectum*, marsh woundwort *Stachys palustris*, reed sweet-grass *Glyceria maxima* and yellow iris *Iris pseudacorus*, together with purple loosestrife *Lythrum salicaria* and flowering rush *Butomus umbellatus* both of which are more common in this section than elsewhere. The bushy towpath and well-kept hedges provide an important wildlife corridor in an intensively farmed area. Other nearby wetlands include the lake, ponds and stream at the Gayton Reserve.

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**DEVELOPMENTAL SITES**

**National Nature Reserves**
- None

**Sites of Special Scientific Interest**
- None
- Gayton Disused Railway Line
- Gayton Reserve Ponds
- Gayton Reserve Lake and Stream
- Grand Union Canal: Bugbrooke
- Grand Union Canal - Northampton Arm
- Litchborough Walls

**Wildlife Sites**
- None

**Local Nature Reserves**
- None

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1c - Henry Stanier - Foxglove
1. ACID SAND

1d EVERDON AND BADBY

A 50km² horseshoe of Northampton Sand Formation and Whitby Mudstone Formation at the head of the Upper Nene Valley. To the west the land drains towards the Rivers Avon and Cherwell. There are areas of high woodland retention around Badby and Everdon, but elsewhere woodland is limited to scattered coverts. Several woodlands are of ancient origin and four are designated as SSSI. Occasional unimproved semi-natural acid grasslands occur, particularly on the steeper slopes, but overall the majority of grassland is agriculturally improved. This area retains a greater quantity and quality of unimproved semi-natural habitats than the other Acid Sand Character Areas.

Badby Wood SSSI is the largest of a localised group of ancient semi-natural woodlands lying mainly on acidic soils. It has a history of continuous woodland cover for over seven hundred years. Lowland hazel Corylus avellana – pedunculate oak Quercus robur woodland is the most common vegetation type present, with pedunculate oak Quercus robur – ash Fraxinus excelsior – hazel Corylus avellana woodland occurring locally in the wetter areas. The canopy consists mainly of pedunculate oak Quercus robur and occasional ash Fraxinus excelsior with downy birch Betula pendula and silver birch B. pendula present. Coppiced hazel Corylus avellana dominates the shrub layer with hawthorn Crataegus monogyna and Midland hawthorn C. laevigata, elder Sambucus nigra and honeysuckle Lonicera periclymenum occurring frequently. Holly ilex aquifolium and rowan Sorbus aucuparia are occasional. In parts of the wood the native community is modified by the presence of sycamore Acer pseudoplatanus and sweet chestnut Castanea sativa as overgrown coppice or standards. The ground flora contains a good assemblage of species with some areas dominated by bramble Rubus fruticosus agg or creeping soft-grass Holcus mollis and others with herb-rich communities including bluebell Hyacinthoides non-scripta, wood anemone Anemone nemorosa, wood sorrel Oxalis acetosella and yellow archangel Lamiastrum galeobdolon. Several county rarities have been recorded including wood horsetail Equisetum sylvaticum, blinks Montia fontana, hairy wood-rush Luzula pilosa and wood melick Melica uniflora.

Everdon Stubbs SSSI supports two kinds of sessile oak Quercus petraea woodland. In the damper areas the mixture of native trees and shrubs are unknown from elsewhere in the county. To the west the woodland entirely overlies Whitby Mudstone Formation and the eastern area overlies Northampton Sand. The driest and most acidic soils give rise to lowland birch Betula pendula – sessile oak Quercus petraea woodland containing silver birch B. pendula and rowan Sorbus aucuparia. On the Whitby Mudstone Formation of Everdon Wood the original canopy is acid pedunculate oak Quercus robur – hazel Corylus avellana – ash Fraxinus excelsior woodland. This has been considerably modified by planted sweet chestnut Castanea sativa and sycamore Acer pseudoplatanus, both as coppice and as standards. Hornbeam Carpinus betulus is probably native. A characteristic and rich ground flora occurs in association with the different canopy types. Typical species include bramble Rubus fruticosus, dewberry Rubus caesius, honeysuckle Lonicera periclymenum, creeping soft-grass Holcus mollis with bluebell Hyacinthoides non-scripta, dog’s mercury Mercurialis perennis, wood anemone Anemone nemorosa and yellow archangel Galeobdolon luteum. Among the locally uncommon plants present are wild daffodil Narcissus pseudonarcissus, orpine Sedum telephium, wood vetch Vicia sylvatica, moschatel Adoxa moschatellina and bitter vetch Lathyrus linifolius.
Mantles Heath SSSI is an area of woodland that overlaps the edge of the character area and partly lies on calcareous and poorly drained Boulder Clay where it exhibits contrasting vegetation. The mature stand on the acidic, drier soils is a representative example of acid pedunculate oak *Quercus robur* - hazel *Corylus avellana* -ash *Fraxinus excelsior* woodland. The ground flora comprises creeping soft-grass *Holcus mollis*, bracken *Pteridium aquilinum*, bramble *Rubus fruticosus*, bluebell *Hyacinthoides non-scripta*, red campion *Silene dioica* and wood sorrel *Oxalis acetosella*. Several uncommon plants in the county context are recorded, including wood vetch *Vicia sylvatica*, opposite-leaved golden-saxifrage *Chrysosplenium oppositifolium* and slender St John’s wort *Hypericum pulchrum*.

The woodland at nearby High Wood SSSI is a similar type to Mantles Heath and the meadow adjacent to the wood represents an excellent example of sheep’s fescue *Festuca ovina* - common bent *Agrostis capillaris* acid grassland. This community is now uncommon and declining in the East Midlands and in Northamptonshire is confined to a few steeply sloping sites in the west of the county. The sward is characteristically of low species diversity with a high cover of common bent *Agrostis capillaris*, sweet vernal-grass *Anthoxanthum odoratum*, red fescue *Festuca rubra* and Yorkshire fog *Holcus lanatus*. The main herbs include cat’s-ear *Hypochaeris radicata*, tormentil *Potentilla erecta*, sheep’s sorrel *Rumex acetosella* and heath bedstraw *Galium saxatile*. The presence of neutral grassland and base-rich marsh on silty peat adds significantly to the scientific interest.

Part of the Ramsden Corner Plantation SSSI is another example of this grassland type, with similar acid/neutral characteristics.

### DESIGNATED SITES

#### National Nature Reserves
- None

#### Sites of Special Scientific Interest
- Badby Wood
- Everdon Stubbs
- High Wood and Meadow
- Mantles Heath
- Ramsden Corner Plantation
  - Badby Plantation
  - Badby Wood
  - Badby Wood Meadow
  - Charwelton Disused Railway (North)
  - Charwelton Disused Railway (South)
  - Church Wood
  - Cleaver’s Clump
  - Cockcrow Spinney
  - Cow Pasture Wood
  - Dane Hole

#### Wildlife Sites
- East Spinney
- Hen Wood
- Hogstaff Spinney
- Holywell Pool
- Knightley Wood
- Mantles Heath
- Ramsden Corner
- Stowe Old Hedges
- Stowe Spinney
- Stowe Wood
- Woodhill Plantation

#### Local Nature Reserves
- None
**1e BOROUGH HILL**

An area of 10km² lying occupying the higher ground to the east and south of Daventry. Land use is mainly agriculturally improved grassland, with some areas of arable land. The highest ground is underlain by Northampton Sand Formation, whilst Whitby Mudstone Formation underlies the slopes. There are scattered coverts and shelterbelts and a single area of ancient semi-natural woodland. Overall the survival of unimproved semi-natural habitats is low.

Typical acid grassland, a semi-natural habitat that would have once been more widespread on the sandy soils, lies at the north end of Borough Hill. The eastern side of the field is dominated by heath bedstraw Galium saxatile, with grasses including abundant common bent Agrostis capillaris, yellow oat-grass Trisetum flavescens, Yorkshire fog Holcus lanatus, sweet vernal grass Anthoxanthum odoratum and locally dominant red fescue Festuca rubra. Sheep’s fescue Festuca ovina is present in small patches. The shortest areas have some lady’s bedstraw Galium verum and localised patches of sheep’s sorrel Rumex acetosa. Other species throughout the site include the rarity heath milkwort Polygala serpyllifolia, with cat’s-ear Hypochaeris radicata, field wood-rush Luzula campestris, bird’s-foot-trefoil Lotus corniculatus, yarrow Achillea millefolium, Pignut Conopodium majus, heath speedwell Veronica officinalis, germander speedwell V. chamaedrys and occasional bracken Pteridium aquilinum. The eastern edge of the field, on the earthworks, has old hawthorns Crataegus monogyna and hazel Corylus avellana, with scattered bluebell Hyacinthoides non-scripta beneath.

Nearby, on the steep north slopes of Borough Hill, is the Daventry District Golf course, part of which is an acid grassland Wildlife Site. The substrate is sandy, with short low-diversity turf and small areas of longer, acid grassland and scattered scrub. The grassy strip has a good mixture of grasses and herb species are sparse but frequent and include harebell Campanula rotundifolia and heath bedstraw Galium saxatile.

Staverton Wood is an ancient semi-natural woodland on the sandy north slopes of Big Hill and an example of oak Quercus robur – bracken Pteridium aquilinum – bramble Rubus fruticosus woodland, possibly of the Yorkshire fog Holcus lanatus sub-community, although bluebell is frequent. The woodland is oak Quercus robur dominated, with beech Fagus sylvatica, birch Betula pendula and sparse scrub, a dense bramble Rubus fruticosus layer and abundant Yorkshire fog Holcus lanatus. There is an overlying carpet of bluebell Hyacinthoides non-scripta and greater stitchwort Stellaria holostea. Foxglove Digitalis purpurea is frequent and bracken Pteridium aquilinum occurs in patches. Other species include common chickweed Stellaria media, male fern Dryopteris filix-mas, and wood sorrel Oxalis acetosella. The wood is fairly open, with a limited shrub layer, although there are occasional rhododendron Rhododendron ponticum bushes.

**DESIGNATED SITES**

- **National Nature Reserves**: None
- **Sites of Special Scientific Interest**: None
  - Borough Hill Field
  - Borough Hill Spring
  - Borough Hill Plantation
  - Daventry and District Golf Course
- **Wildlife Sites**: Oak Spinney, Pond Spinney, Staverton Clump, Staverton Wood, Stepnell Spinney
- **Local Nature Reserves**: None
Lying predominantly on free-draining Northampton Sand, this area, which covers 15 km² to the north west of Northampton, comprises the only substantial area of extensive Ericaceous heath in the county. Land use is a mixture of arable fields, golf courses and plantations. None of the woodlands are of ancient origin. Harlestone Firs is a large area of wooded heath land, known also as Dallington Heath and Harlestone Heath. It was partly planted with conifers in 1921 and more extensively after 1945. It now forms the most outstanding example of Ericaceous heath in Northamptonshire. Part of the site was formerly designated as SSSI. However, this was subsequently denotified because the dense new planting shaded out the heath land vegetation. Some of the compartments have shown a remarkable regeneration of heath land species following recent clearance. The re-emergence of dwarf gorse *Ulex minor* and Dog violet *Viola canina*, unrecorded for over 100 years, suggests that a rich seed bank survives under the plantation areas. However, recent regeneration is again threatened by subsequent replanting.

The site lies on free-draining Northampton Sand is therefore unusually acidic for the county as a whole. Indicators of this acidity include brome *Cytisus scoparius*, heath bedstraw *Galium saxatile*, heath speedwell *Veronica officinalis*, bracken *Pteridium aquilinum*, wood sage *Teucrium scorodonia*, heather *Calluna vulgaris*, petty whin *Genista anglica*, oval sedge *Carex ovalis* and green ribbed sedge *C. binervis*.

Adjacent is another large area of heath land and scrub, Church Brampton Golf Course. The rolling topography of the course predominantly comprises areas of very closely cropped turf and scattered patches of trees and scrub. The most diverse grassland can be found in the tussocky rough of the south course. Species include red fescue *Festuca rubra*, common bent *Agrostis capillaris*, harebell *Campanula rotundifolia*, tormentil *Potentilla erecta*, heath bedstraw *Galium saxatile*, oxeye daisy *Leucanthemum vulgare*, bracken *Pteridium aquilinum*, Perforate St John’s-wort *Hypericum perforatum*, bird’s-foot trefoil *Lotus corniculatus*, field wood-rush *Luzula campestris*, heather *Calluna vulgaris* and a small patch of the rare bell heather *Erica cinerea*. The edges of the bunkers also have some interesting acid species including sheep’s sorrel *Rumex acetosella*, sand spurrey *Spergularia rubra*, heath bedstraw *Galium saxatile* and heath speedwell *Veronica officinalis*. The rarities trailing St John’s-wort *Hypericum humifusum* and bird’s-foot *Ornithopus perpusillus* have also been recorded.

Typical of the plantations on sandy soils is Fox Covert, a mixed plantation similar in nature to Harlestone Firs and adjacent to the County Golf Club. A striking feature is the large nests of wood ants *Formica rufa*. Trees and shrubs in the covert include large areas of larch *Larix decidua* and Scots pine *Pinus sylvestris*, with oak *Quercus robur*, holly *Ilex aquifolium*, sweet chestnut *Castanea sativa*, sycamore *Acer pseudoplatanus*, beech *Fagus sylvatica*, birch *Betula pendula*, broom *Cytisus scoparius* and gorse *Ulex europaeus*. Most of the broadleaved species are located in the southern part of the wood, which is divided by sandy tracks with small areas of acid grassland alongside the compartments. Grassland species include red fescue *Festuca rubra*, Yorkshire fog *Holcus lanatus*, common bent *Agrostis capillaries*, lesser stitchwort *Stellaria graminea*, sorrel *Rumex acetosa*, mugwort *Artemisia vulgaris*, hedge bedstraw *Galium mollugo*, heath bedstraw *G. saxatile* and patches of bluebell *Hyacinthoides non-scriptus.*
### DESIGNATED SITES

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#### 1g GUILSBOROUGH AND SPRATTON

Three closely associated areas covering 21km² that are underlain by Northampton Sand Formation. Despite this being the largest unbroken area of Northampton Sand Formation in the county there are no areas of associated unimproved semi-natural habitat. The sparse woodland cover comprises typically small, isolated coverts. Land use generally comprises a mix of arable fields and improved grassland, although there is a greater proportion of grassland associated with settlement. The only wildlife site is the thickly wooded Hollowell Green Lane, which provides a valuable wildlife corridor, but has only limited biological interest.
2. LIASSIC SLOPES

CHARACTER AREAS

2a Cherwell Valley Liassic Slopes
2b Great Ouse Valley Liassic Slopes
2c Upper Tove Valley Liassic Slopes
2d Wootton Brook Liassic Slopes
2e Upper Nene Valley Liassic Slopes
2f Avon Valley Liassic Slopes
2g Brampton Valley Liassic Slopes
2h Ecton to Great Doddington Liassic Slopes
2i Ise Valley Liassic Slopes
2j Upper Welland Liassic Slopes
2k Dingley to Wakerley Liassic Slopes
2l Collyweston to Easton-on-the-Hill Liassic Slopes

KEY CHARACTERISTICS

- A narrow band of Northampton Sand Formation on the upper slopes with Lias Group Clays on the lower slopes;
- soils are generally slightly acidic;
- retention of all unimproved semi-natural habitats is low;
- a range of woodland types occur, influenced by the sandy or clay soils;
- occasional acid grasslands and acid variants of mesotrophic grasslands are retained;
- concentrations of small ponds are found in some areas; and
- springs issue at the interface between the Sands and the Clay.
INTRODUCTION

This Biodiversity Character Type occupies several areas of generally sloping ground on the valley sides, predominantly in west and central Northamptonshire. This Character Type is perhaps the most difficult to characterise as the underlying geology, soil chemistry, drainage and topography has given rise to a wide range of habitat types which tend to be limited in number and are often isolated. Geologically the Character Areas are similar to the Acid Sands Character Areas, but as the Northampton Sand Formation is more limited in extent and the presence of Lias Group Clays more extensive, the retained habitats are on the whole only slightly acidic with the majority of grasslands, for example, being classified as mesotrophic. The nature and degree of retention of woodland is also variable.

Geology and Soils

The Liassic Slopes exhibit similar characteristics to the Acid Sands. However the extent of the Northampton Sand Formation is much more limited. Where present it occurs as a thin band at the top of the slopes. In the west of the county, where the valleys are deeper the geological sequence associated with the Liassic Slopes comprises the complete Lias Group sequence: the Whitby Mudstone Formation, Marlstone Rock Formation, Dyrrham Siltstone Formation and Charmouth Mudstone Formation, beneath the narrow band of the Northampton Sand Formation. In more easterly areas of the county the shallower valley sides comprise only Northampton Sand Formation and Whitby Mudstone Formation.

Fine clay loam soils occur widely over the Lias Group and occupy extensive areas on the slopes. Over the Northampton Sand Formation soils are well-drained, fine and coarse loamy ferritic brown earth soils, with slightly stony, sandy loam soils on the higher ground around Northampton. These soils tend to be slightly acidic at the surface. Elsewhere, on the more level ground, there are smaller areas of slowly permeable clays and fine loamy over clayey soils, both of which are also slightly acidic (Hodge 1984).

Hydrology

A number of springs issue at the interface between the Northampton Sand Formation and the Whitby Mudstone Formation, producing occasional species-rich flushes. These springs and surface drainage give rise to the headwaters of the all of the county’s major systems. On the steeper slopes in the west of the county streams can be fast flowing, creating small, steep-sided valleys where the retention of unimproved semi-natural habitats is often at its greatest.

HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS

Agricultural change is the principal influence on the retention of unimproved semi-natural habitats. Woodlands tend to be isolated with many of those that remain being located on the steeper slopes and/or on the poorest soils. Here the opportunity for the production of high crop yields is compromised by poor access for agricultural machinery or by the quality of the soil.

Where the free-draining soils over the sands occur on gentle slopes many grasslands have been converted to arable cropping. This has resulted in the loss of traditionally managed grasslands. Where the ground is steeper permanent grassland is still common, but here the diversity of the grassland has been diminished by fertiliser application to improve grass production. Unimproved grassland is now confined to occasional sites on the steepest hillsides.

Soils over the Lias Group Clay would once have supported semi-natural slightly acidic/mesotrophic grassland. However, improved land drainage techniques now enable these clayey soils to yield moderately good crops of cereals and oil-seed rape. Retention of grassland in these areas is low and the floristic diversity of the swards, like that of the grasslands over the Northampton Sand Formation, has also been adversely affected by fertiliser application. Few unimproved semi-natural grasslands remain.

Quarrying and the construction of railways in some of the more elevated areas have created areas of thin soil on which areas of less acidic mesotrophic grassland have developed. Some sites are maintained by rabbit grazing, but many are threatened by scrub encroachment. Without management the developing scrub will eventually overshadow these grasslands and result in the loss of the characteristic flora.
PRINCIPAL HABITAT TYPES

Trees and Woodlands

A variety of woodland types occur, each of which is influenced by variations in the underlying geology, soils and drainage.

On the lighter, acid influenced, well-drained soils, the woodland is typically of the Oak *Quercus robur* – bracken *Pteridium aquilinum* – bramble *Rubus fruticosus* type. Typical species include bramble *Rubus fruticosus*, honeysuckle *Lonicera periclymenum*, creeping soft-grass *Holcus mollis* and bluebell *Hyacinthoides non-scripta*. A wide range of other species occurs locally including foxglove *Digitalis purpurea*, hairy wood-rush *Luzula pilosa*, red campion *Silene dioica* and greater stitchwort *Stellaria holostea*.

The Yorkshire fog *Holcus lanatus* sub-community of this woodland type also occurs. It is a species-poor sub-community, typical of oak and conifer plantations and of recent secondary birch/oak woods. The under storey is sparse or absent, with infrequent hazel *Corylus avellana*, and scattered hawthorn *Crataegus monogyna*, elder *Sambucus nigra* or blackthorn *Prunus spinosa*. Yorkshire fog *Holcus lanatus* is the most distinctive feature, bracken *Pteridium aquilinum* is often abundant and bramble *Rubus fruticosus* and honeysuckle *Lonicera periclymenum* can be common.

On heavier soils, which are less frequent, woods are typically ash *Fraxinus excelsior* – maple *Acer campestre* communities, although several variants occur. For example Birch Spinney, part of Birch Spinney and Mawsley Marsh SSSI, is a variant of ash-maple woodland developed on light soils with poor drainage. The canopy is dominated by ash *Fraxinus excelsior*, oak *Quercus robur* and downy birch *Betula pubescens* over a shrub layer of hazel *Corylus avellana*, elder *Sambucus nigra* and goat willow *Salix caprea*. The ground flora is notable for the abundance of ferns. The adjacent Ragsdale Spinney is by contrast a heavy soil form of wet ash *Fraxinus excelsior* - wych elm *Ulmus glabra* woodland.

Rivers and Wetlands

There are some concentrations of farm ponds and occasional ornamental lakes on the Lias Group Clays, although few are designated as Wildlife Sites. The Grand Union Canal is also a feature of some of the Character Areas, but this artificial feature cannot be described as characteristic of the Liassic Slopes.

Dry Grasslands and Heaths

Acid grasslands and acid variants of mesotrophic grasslands are characteristic of sites overlying free draining soils over the Northampton Sand and Lias Group Formations, particularly on the steeper slopes. Typical acid grasslands are sheep’s fescue *Festuca ovina* - common bent *Agrostis capillaris* – sheep’s sorrel *Rumex acetosella* grassland and sheep’s fescue *Festuca ovina* - common bent *Agrostis capillaris* – heath bedstraw *Galium saxatile* grassland.

Typical mesotrophic grasslands include the common knapweed *Centaurea nigra* - crested dog’s-tail *Cynosurus cristatus* grasslands and acid variants of this community.
2a CHERWELL VALLEY LIASSIC SLOPES

An area of 90km² of land, divided into several smaller areas, which slope west to the River Cherwell. The southern area has outcrops of Northampton Sand Formation at the top of the slopes and this has a strong acidic influence on the retained unimproved semi-natural habitats. In the northern area the Northampton Sand Formation is absent. Woodland retention is low, with widely dispersed plantations and occasional areas of woodland of ancient origin. Land use is mixed.

Coleready Plantation is a large area of woodland and the best example of the variation of woodland type that occurs over different geological strata. The more elevated sections lie over Northampton Sand Formation and support acid grassland flora in the more open areas, dominated by creeping soft-grass *Holcus mollis* and common bent *Agrostis capillaris*. Other species present include Lesser Stitchwort *Stellaria graminea*, sheep’s sorrel *Rumex acetosella*, tormentil *Potentilla erecta*, heath bedstraw *Galium saxatile* and occasional gorse *Ulex europaeus*. Some woodland compartments comprise broadleaved species, others have a high proportion of Scots pine *Pinus sylvestris* and larch *Larix decidua*. All the compartments have a very broad diversity of tree and scrub species, including oak *Quercus robur*, ash *Fraxinus excelsior*, sweet chestnut *Castanea sativa*, beech *Fagus sylvatica*, rowan *Sorbus aucuparia*, hazel *Corylus avellana*, dogwood *Cornus sanguinea* and spindle *Euonymus europaeus*. The field layer has abundant dog’s mercury *Mercurialis perennis* in many areas, but also has more overgrown undergrowth with abundant bramble *Rubus fruticosus*, raspberry *Rubus idaeus* and honeysuckle *Lonicera periclymenum*. Other field layer species present include false brome *Brachypodium sylvaticum*, ground ivy *Glechoma hederacea*, bugle *Ajuga reptans*, wood sedge *Carex sylvatica* and foxglove *Digitalis purpurea*. Heather *Calluna vulgaris* has also been recorded.

The southern part of the wood is wetter and lies mostly on Whitby Mudstone Formation. It is an area of ancient semi-natural ancient woodland dominated by oak *Quercus robur* and ash *Fraxinus excelsior*. Previously recorded in this area were common spotted orchid *Dactylorhiza fuchsii* and sanicle *Sanicula europaea*, but no acid indicators.

The typical dry grassland community is common knapweed *Centaurea nigra* - Crested dog's-tail *Cynosurus cristatus* mesotrophic grassland, although there are few examples in this area. They include Poor’s Piece and Causeway Field, which has traces of ridge and furrow. Other examples of this type are located in the vicinity of Boddington Reservoir, where two separate grasslands lie partly in the floodplain. The drier grassland contains a mixture of fine leaved grasses including abundant sweet vernal-grass *Anthoxanthum odoratum*, red fescue *Festuca rubra*, crested dog's-tail *Cynosurus cristatus* and meadow foxtail *Alopecurus pratensis*. Other species include sorrel *Rumex acetosa*, meadow buttercup *Ranunculus acris*, bird’s-foot-trefoil *Lotus corniculatus*, self heal *Prunella vulgaris*, meadow vetchling *Lathyrus pratensis* and common knapweed *Centaurea nigra*.

The presence of oval sedge *Carex ovalis*, a county rarity, in the damper areas is indicative of an acidic influence.

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2. LIASSIC SLOPES

- Charlton Old Workings
- Cockley Brake
- Coleready Plantation
- Croughton Spring Copse
- Duckpond Spinney
- Farthinghoe Lodge Lake
- Farthinghoe Reserve
- Newbottle Spinney
- Old Down Covert
- Parsons Spinney
- Pesthouse Wood
- Poor’s Piece and Causeway Field
- Robin Wood and Stream
- Rowler’s Covert
- The Moors
- Thenford House Grounds
- Warkworth Hall Farm Lake
- Woodford Halse New Plantation
- Woodford Halse Railway Cutting

Local Nature Reserves

- None
2b GREAT OUSE VALLEY LIASSIC SLOPES

An area of 11km² to the west and north west of Brackley. Land use is predominantly arable, consequently few unimproved semi-natural habitats are retained. There are few areas of woodland, although there are two small contrasting areas, Gooseholm Copse and Brackley Gorse, in close proximity. The former is ancient semi-natural woodland and the latter, as its name suggests, is probably afforested heath. Some unimproved grassland is retained at Steane Park and on the Brackley Disused Railway.

Gooseholm Copse is a derelict area of ancient semi-natural woodland, separated into two parts by the A422. The ground flora in the southern area is more diverse. Both areas are dominated by dog’s mercury Mercurialis perennis, with occasional bluebell Hyacinthoides non-scriptus. Other species include ivy Hedera helix, wood avens Geum urbanum, enchanter’s nightshade Circaea lutetiana, rough meadow-grass Poa trivialis, honeysuckle Lonicera periclymenum, herb Robert Geranium robertianum and false brome Brachypodium sylvaticum. Common spotted orchid Dactylorhiza fuchsii and early purple orchid Orchis mascula are rare. Tree species include oak Quercus robur, ash Fraxinus excelsior, beech Fagus sylvatica, sycamore Acer pseudoplatanus and wild cherry Prunus avium. The shrub species present are unmanaged and tall, with field maple Acer campestre, hazel Corylus avellana, dogwood Cornus sanguinea, hawthorn Crataegus monogyna and crab apple Malus sylvestris, all of which are mature.

Brackley Gorse is a damp woodland on an area of sandy soil that has previously been recorded as supporting patches of scrub and acid grassland. Hardly any grassland remains and the woodland surrounding the stream alongside the site is overgrown, with mature crack willow Salix fragilis, young ash Fraxinus excelsior and dense sallow Salix cinerea scrub. The drier areas of the site have hawthorn Crataegus monogyna, blackthorn Prunus spinosa, guilder rose Salix fragilis, gorse Ulex europaeus and bramble Rubus fruticosus. The ground flora has frequent nettles Salix fragilis, in the wetter areas, false brome Brachypodium sylvaticum throughout the better-lit woodland and a patch of soft rush Juncus effusus along the stream.

Steane Park Grounds overlap the edge of the Character Area and comprises open parkland, with mature trees such as oak Quercus robur, horse chestnut Aesculus hippocastanum and lime Tilia platyphyllos, horse paddock, meadows, and a series of old ponds. The best botanical diversity is actually outside the Character Area, on an area overlying limestone. The short, sheep-grazed turf has harebell Campanula rotundifolia, quaking grass Briza media, field wood-rush Luzula campestris, lady’s bedstraw Galium verum, cat’s-ear Hypochaeris radicata, yarrow Achillea millefolium, red fescue Festuca rubra, wild carrot Daucus carota and sorrel Rumex acetosa.

Brackley Disused Railway provides a valuable wildlife corridor with thick hedges and scrub along its length. The westernmost part of this site is adjacent to Brackley Gorse. The grassland on either side of the old track is sparse and herb-rich, with abundant bird’s-foot-trefoil Lotus corniculatus, oxeye daisy Leucanthemum vulgare, red clover Trifolium pratense, wild carrot Daucus carota, yarrow Achillea millefolium red fescue Festuca rubra and yellow oat-grass Trisetum flavescens, all dominated by false Oat-grass Arrhenatherum elatius.

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• Brackley Gorse  
• Brackley Pocket Park  
• Gooseholm Copse  
• Steane Park Grounds |
| Local Nature Reserves | • None |
2c UPPER TOVE VALLEY LIASSIC SLOPES

A geologically complex area of the Upper Tove Valley where the small areas of limestones, that form the dominant geology elsewhere in the Upper Tove, combine with areas of Northampton Sand Formation and Lias Group Clay. It covers 23km², comprising mainly agriculturally improved grassland in the west and a greater proportion of arable fields in the east. Wildlife site retention is very low, and is limited to two unimproved meadows over sands, two areas of woodland, Potcote Copse and Kingthorn Wood, which both overlap the boundary of the Character Area, and two sections of disused railway line.

Potcote Copse is a well-established broadleaved plantation probably planted on heath land. The plantation is dominated by ash *Fraxinus excelsior* coppice with frequent oak *Quercus robur*. The ground flora includes lords and ladies *Arum maculatum*, burdock *Arctium sp* and red campion *Silene dioica*, but is mostly heavily shaded by scrub species. These are fairly diverse and have probably spread from the ancient hedge that connects the wood to Grubs Copse. Species include hawthorn *Crataegus monogyna*, Midland hawthorn *C. laevigata*, blackthorn *Prunus spinosa*, elder *Sambucus nigra*, raspberry *Rubus idaeus* and field rose *Rosa arvensis*.

Kingthorn Wood is the only area of ancient semi-natural woodland and mainly comprises thinned oak *Quercus robur* and ash *Fraxinus excelsior* standards with dense scrub. In places it has been partly replanted with poplars *Populus spp*. The ground flora is locally dominated by bluebell *Hyacinthoides non-scriptus* and has abundant dog’s mercury *Mercurialis perennis*, both of which are indicative of its ancient origin.

Adstone Meadows is an area of mesotrophic grassland with pronounced ridge and furrow. Typical species in the best areas of grassland include common bent *Agrostis capillaris*, crested dog’s-tail *Cynosurus cristatus*, Yorkshire fog *Holcus lanatus*, sorrel *Rumex acetosa*, rough hawkbit *Leontodon hispidus*, cat’s-ear *Hypochaeris radicata*, smooth hawk’s-beard *Crepis capillaris* and field wood-rush *Luzula campestris*. More notable species are tormentil *Potentilla erecta*, harebell *Campanula rotundifolia* and the county rarity spring-sedge *Carex caryophyllea*.

Duncote Marshy Field is a sloping, poorly drained field comprising two main grassland types. The lower parts of the field, which lie outside this Character Area, are very waterlogged, with herb-rich marshy grassland dominated by soft rush *Juncus inflexus* in some areas and blunt-flowered rush *J. subnodulosus* in others. There is a spring in the centre of the site from which red water issues, coloured by percolation through the Northampton Sand Formation above. The section of mesotrophic grassland within the Character Area comprises a series of small patches of drier turf with short, varied vegetation and predominantly fine-leaved grasses. These patches have abundant crested dog’s-tail *Cynosurus cristatus*, bulbous buttercup *Ranunculus bulbosus*, red clover *Trifolium pratense* and pignut *Potentilla erecta*, harebell *Campanula rotundifolia* and the county rarity spring-sedge *Carex caryophyllea*. Other species include meadow foxtail *Alopecurus pratensis*, sweet vernal-grass *Anthoxanthum odoratum*, daisy *Bellis perennis*, hairy sedge *Carex hirta*, lady’s bedstraw *Galium verum*, thyme-leaved speedwell *Veronica serpyllifolia*, sorrel *Rumex acetosa* and frequent field wood-rush *Luzula campestris*.

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2d WOOTTON BROOK LIASSIC SLOPES

A very small area, 4km², over Dyrham Siltstone and Charmouth Mudstone Formation to the south of Northampton where no unimproved semi-natural habitat is retained. Land use is predominantly arable.

DESIGNATED SITES

- **National Nature Reserves**: None
- **Sites of Special Scientific Interest**: None
- **Wildlife Sites**: None
- **Local Nature Reserves**: None
A large area between Daventry and Northampton, covering 80km², which forms the catchment of the Upper Nene. Land use is predominantly arable with some areas of agriculturally improved grassland. For such an extensive area the survival of unimproved semi-natural habitats is very low, with occasional small woodlands and mesotrophic grasslands. Wetland Wildlife Sites are represented by a few ponds and an unusual mire.

Two closely associated unimproved mesotrophic grasslands, Badby East Meadow and Badby Church Meadow, lie on the slopes below Badby Wood and are part of a larger suite of mixed unimproved semi-natural habitats in the vicinity of Badby. East Meadow has a more or less homogeneous sward, with no one dominant grass. Grasses include frequent Meadow foxtail *Alopecurus pratensis* and sweet vernal-grass *Anthoxanthum odoratum*, with occasional red fescue *Festuca rubra*, crested dog's-tail *Cynosurus cristatus*, Cock's foot *Dactylis glomerata*, smooth meadow-grass *Poa pratensis* and perennial rye-grass *Lolium perenne*. Herb species are abundant, including yellow-rattle *Rhinanthus minor*, pignut *Conopodium majus*, ribwort plantain *Plantago lanceolata*, bulbous buttercup *Ranunculus bulbosus* and goat's-beard *Tragopogon pratensis*. Other less frequently occurring herb species include red clover *Trifolium pratense*, greater bird's-foot-trefoil *Lotus pedunculatus*, meadow buttercup *Ranunculus acris*, cat's-ear *Hypochaeris radicata*, yarrow *Achillea millefolium* and lady's bedstraw *Galium verum*. Field wood-rush *Luzula campestris* is occasional throughout. There are also sections of mesotrophic grassland on the Dodford disused railway.

Watford Mire is a small area of wet neutral grassland including blunt-flowered rush *Juncus subnodulosus* - marsh thistle *Cirsium palustre* fen meadow. This site was only recently been discovered. Along with blunt-flowered rush *Juncus subnodulosus* and marsh thistle *Cirsium palustre*, species include hard rush *Juncus inflexus*, soft rush *J. effusus*, sharp-flowered rush *J. acutiformis*, meadowsweet *Filipendula ulmaria*, brooklime *Veronica beccabunga* and celery-leaved buttercup *Ranunculus sceleratus*.

Arbury Hill Pond is typical of the better-vegetated ponds in the area. There are young crack willows *Salix fragilis* along part of the bank and a mature crack willow *Salix fragilis* pollard. Emergent species includes zones dominated by Common Spike-rush *Eleocharis palustris*, soft rush *Juncus effusus*, hard rush *J. inflexus*, yellow iris *Iris pseudacorus* and most notably Cyperus Sedge *Carex pseudocyperus*. Amongst these, marsh bedstraw *Galium palustre* and floating sweet-grass *Glyceria fluitans* are frequent. Floating and submerged species include frequent Canadian pondweed *Elodea canadensis*, common water crowfoot *Ranunculus aquatilis*, water forget-me-not *Myosotis scorpioides*, broad-leaved pondweed *Potamogeton natans* and water-plantain *Alisma plantago-aquatica*.

Woodland is not a typical feature of the area, with only isolated spinneys, none of which are of ancient origin. The Grand Union Canal Bridge Spinneys comprise ash *Fraxinus excelsior*, beech *Fagus sylvatica*, goat willow *Salix caprea*, witch elm *Ulmus glabra* and oak *Quercus robur*. The undergrowth is mostly thick with bramble *Rubus fruticosus* and small areas of gorse *Ulex europaeus* with bracken *Pteridium aquilinum*, the latter two being indicative of the slightly acidic soils.
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2f AVON VALLEY LIASSIC SLOPES

A large area, 101km², of land sloping westwards to the River Avon. Compared to other areas of Liassic Slope this area retains a greater proportion of unimproved semi-natural habitat. The ground drops steeply over the Dyrham Siltstone Formation and then the slope decreases over the Charmouth Mudstone Formation Lias and the Valley Terrace. The characteristic vegetation shows subtle changes over the different geological strata. As would be expected, woodlands and grasslands predominate on the steepest slopes, although the majority of the grasslands are agriculturally improved. The unimproved semi-natural habitats on these slopes have an acidic influence, with spring lines creating species-rich flushes. On the flatter ground there is a greater proportion of arable land, although grasslands are still well represented. Here, where unimproved grassland survives, it tends to be mesotrophic. The Grand Union Canal and other minor canals are a feature of this area.

Bosworth Mill Meadow SSSI is a traditionally managed hay meadow with a wide variety of grassland communities, developed over complex soils derived from Glacial Sand and Gravel and Charmouth Mudstone Formation and, on the lower slopes, river deposits, which are outside this character area. Moss and sedge-rich flushes watered by springs are very scarce due to land drainage and this site represents one of the best examples in the county. The dry, sandy upper slopes support a thin, species poor turf of common bent Agrostis capillaris, red fescue Festuca rubra and sweet vernal-grass Anthoxanthum odoratum with abundant pignut Conopodium majus and common sorrel Rumex acetosa. On moister, more fertile soil these species are joined by many others including; Yorkshire fog Holcus lanatus, lady’s bedstraw Galium verum, bulbous buttercup Ranunculus bulbosus, field wood-rush Luzula campestris, bugle Ajuga reptans, betony Stachys officinalis and devil’s-bit scabious Succisa pratensis. The turf is very heterogeneous with conspicuous patches of meadowsweet Filipendula ulmaria and rushes Juncus spp. associated with the spring line. Also found here are the county rarities meadow saxifrage Saxifraga granulata and adder’s tongue Ophioglossum vulgatum. The floodplain vegetation is described under the Avon Valley floodplain.

Hellidon Hill Golf Course represents another good example of mesotrophic grassland with species such as crested dog’s-tail Cynosurus cristatus, common bent Agrostis capillaris, early hair-grass Aira praecox, sweet vernal-grass Anthoxanthum odoratum, glaucous sedge Carex flacca, devil’s-bit scabious Succisa pratensis, yarrow Achillea millefolium, betony Stachys officinalis, cuckooflower Cardamine pratensis, salad burnet Sanguisorba minor, tormentil Potentilla erecta and bird’s-foot-trefoil Lotus corniculatus, amongst other typical neutral grassland species.

Higher on the valley side there is a greater acidic influence. Elkington Spring is a narrow wooded valley with rough, neutral-acid grassland now partly taken over by gorse and hawthorn scrub. Many grassland species are present, mostly reflecting the wet or acidic soils. These include bog stitchwort Stellaria uliginosa, harebell Campanula rotundifolia, tormentil Potentilla erecta, slender St John’s-wort Hypericum pulchrum, heath bedstraw Galium saxatile, heath groundsel Senecio sylvaticus and sheep’s sorrel Rumex acetosella.
Dark Spinney is an example of the woodlands that occur on the steeper slopes. It is part of a suite of closely associated woodlands predominantly over the Dyrham Siltstone Formation on the Hemplow Hills. Species associated with the sandy soil include foxglove *Digitalis purpurea*, heath bedstraw *Galium saxatile*, tormentil *Potentilla erecta* and sheep’s sorrel *Rumex acetosella*. The trees include sycamore *Acer pseudoplatanus*, Scots pine *Pinus sylvestris* and some older mature oaks *Quercus robur*. Bluebells *Hyacinthoides non-scriptus* are fairly frequent and the shrub layer includes abundant bramble *Rubus fruticosus*.

The Grand Union Canal is an important wildlife corridor, with the continuous hedges linking several small woodlands. The most northerly section adjoins Bosworth Mill Meadow SSSI and the grassland in this area is diverse, including many meadow species not often found in towpath grassland. The emergent vegetation fringing the canal forms a broad margin next to the towpath, with frequent common reed *Phragmites australis*, greater pond-sedge *Carex riparia*, reed sweet-grass *Glyceria maxima* and small areas of common club-rush *Schoenoplectus lacustris*. Elsewhere other typical fringing emergent species include branched bur-reed *Sparganium erectum*, reed canary-grass *Phalaris arundinacea*, bulrush *Typha latifolia*, yellow iris *Iris pseudacorus*, fool’s-water-cress *Apium nodiflorum* and floating sweet-grass *Glyceria fluitans*.
2. LIASSIC SLOPES

- Leam Fishponds
- Old Hemplow
- Onley Long Pond
- Oxford Canal: Barby
- Prince of Wales Spinney
- Shenley Farm Ponds
- Stanford Covert
- Sybolds Spinney
- Ward’s Spinnies
- Yelvertoft Fieldside Covert

Local Nature Reserves

- None
2g BRAMPTON VALLEY LIASSIC SLOPES

A large area of 111km² that forms the catchment of the Brampton Arm of the River Nene. Land use is a mixture of large arable fields and agriculturally improved grassland. There is greater grassland retention on the steepest slopes and in association with parkland surrounding large country houses. Wildlife Sites in this large area are dominated by isolated groups of small estate plantations. The unimproved grassland that remains is entirely associated with the Brampton Valley Way, a disused railway, which forms an important wildlife corridor through the area.

The collection of woodlands to the north of Cottesbrooke demonstrates the variation of vegetation associated with the different geological strata. Shutterdown Spinney, overlying Northampton Sand Formation, comprises a well-spaced collection of mature oaks Quercus robur, beech Fagus sylvatica, ash Fraxinus excelsior and sycamore Acer pseudoplatanus on the sandy top of a steep hill. Scattered scrub includes gorse Ulex europaeus, blackthorn Prunus spinosa and elder Sambucus nigra. Bramble Rubus fruticosus occurs in patches, mostly near the edges of the wood. Ground flora species include bluebell Hyacinthoides non-scriptus, germander speedwell Veronica chamaedrys, sweet violet Viola odorata, ground ivy Glechoma hederacea, nettle Urtica dioica and enchanter’s-nightshade Circaea lutetiana. Rough meadow-grass Poa trivialis is frequent in small, lighter, grassy areas.

The nearby New Covert is apparently replanted ancient woodland on Whitby Mudstone Formation and is more typical of ash-maple woodland, with old ash Fraxinus excelsior stools still intact in parts of the wood. The planting is largely dominated by sycamore Acer pseudoplatanus, but also includes beech Fagus sylvatica, ash Fraxinus excelsior and Scots pine Pinus sylvestris. Remnants of the shrub layer comprise areas of over mature field maple Acer campestre and blackthorn Prunus spinosa. Hazel Corylus avellana is found only in part of the old hedge around the site. The field layer is heavily shaded throughout the newly planted areas, but more grassy and open under the older ash stools. Ground flora species include dog’s mercury Mercurialis perennis, rough meadow-grass Poa trivialis, creeping bent Agrostis stolonifera, common bent A. capillaris, enchanter’s nightshade Circaea lutetiana, soft rush Juncus effusus, male fern Dryopteris filix-mas and red campion Silene dioica.

The most species rich neutral grassland on the Brampton Valley Way occurs between Draughton Crossing and Kelmarsh Station. The old track bed has been surfaced for cyclists, but the margins have a good collection of colonising species and the embankments contain a mixture of dense, scattered scrub and grassland with anthills. The banks have hedgerow, woodland and meadow species including garlic mustard Alliaria petiolata, enchanter’s nightshade Circaea lutetiana, red fescue Festuca rubra, yellow oat-grass Trisetum flavescens, field pansy Viola arvensis, sweet violet V. odorata, tufted vetch Vicia cracca, hairy tare V. hirsuta, common vetch V. sativa, burnet saxifrage Pimpinella saxifraga, field scabious Knautia arvensis, lady’s bedstraw Galium verum, bird’s-foot-trefoil Lotus corniculatus, common toadflax Linaria vulgaris, fairy flax Linum catharticum, common knapweed Centaurea nigra, greater knapweed C. scabiosa, sorrel Rumex acetosa, grass vetchling Lathyrus nissolia, self-heal Prunella vulgaris and lesser stitchwort Stellaria graminea, along with many other species on the ballast surface, including great mullein Verbascum thapsus and the very rare corn buttercup Ranunculus arvensis.

2g - Nathalie Hueber - Brimstone butterfly on Black Knapweed
A small area of wet grassland is located adjacent to the Brampton Valley Way at Green Lane Crossing. The grassland has a tussocky structure and the wettest ground has a marsh dominated by blunt-flowered rush *Juncus subnodulosus*. The grassland is mostly dominated by tufted hair-grass *Deschampsia caespitosa*, Yorkshire fog *Holcus lanatus* and creeping soft-grass *H. mollis*. Other species include meadow vetchling *Lathyrus pratensis*, meadowsweet *Filipendula ulmaria*, sorrel *Rumex acetosa*, hoary ragwort *Senecio erucifolius*, hedge woundwort *Stachys sylvestris*, lesser stitchwort *Stellaria graminea*, common vetch *Vicia sativa* and cow parsley *Anthriscus sylvestris*. Scrub is scattered throughout the site and concentrated alongside the stream.

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2. LIASSIC SLOPES

- Nursery Wood
- Oak Spinney
- Old Covert
- Scaldwell Spinney
- Shutterdown Spinney
- Tennis Court Field
- The Hen Roost

Local Nature Reserves
- None

2h ECTON TO GREAT DODDINGTON LIASSIC SLOPES

Although characterised as Liassic Slopes this 31km² area contains a large Boulder Clay deposit and on the higher ground and, adjacent to the Boulder Clay, exposed sections of the Grantham Formation. The Grantham Formation is free draining and the soils have an acidic influence, similar to the Northampton Sand Formation and the Lias Group Clays. Land use is a patchwork of arable fields and agriculturally improved grasslands. Unimproved semi-natural habitats are limited in extent. Some woodland is retained on the higher ground and in association with parkland, but there is only a single area of unimproved neutral grassland. Earls Barton Quarry has exposed limestone and the calcareous grassland here contrast with mesotrophic grasslands that would have been more widespread in this area, prior to agricultural improvement.

Parsons Wood overlies Lower Estuarine Sands and comprises an area of park woodland containing old parkland trees inter-planted with more recent specimens and a large amount of rhododendron Rhododendron ponticum. The ground flora is limited and much of the floor of the wood is bare and sandy. There are numerous old mature limes Tilia platyphyllos. Other species include oak Quercus robur, sweet chestnut Castanea sativa, beech Fagus sylvatica and sycamore Acer pseudoplatanus. There are also patches of bracken Pteridium aquilinum and raspberry Rubus idaeus, which are indicative of the acidic, sandy soils.

The adjacent New Plantation is a large area of replanted old woodland on Northampton Sand Formation and Whitby Mudstone Formation with several named compartments of differing age and composition. Trees include frequent ash Fraxinus excelsior, sycamore Acer pseudoplatanus, and oak Quercus robur, with occasional field maple Acer campestre, hazel Corylus avellana, larch Larix decidua and Norway spruce Picea abies. The ground flora is variable, including locally dominant bluebell Hyacinthoides non-scriptus, with male fern Dryopteris filix-mas and enchanter’s-nightshade Circaea lutetiana and less frequently wood anemone Anemone nemorosa, dog violet Viola riviniana and raspberry Rubus idaeus. Bracken Pteridium aquilinum is dominant in cleared areas over sand.

2h - Henry Stanier - Bird’s-foot Trefoil
Great Doddington Meadow is the only example of species-rich traditionally-managed unimproved mesotrophic grassland in this area. The ridge and furrow field has a wide variety of grasses including red fescue (*Festuca rubra*), crested dog’s-tail (*Cynosurus cristatus*), yellow oat-grass (*Trisetum flavescens*), timothy (*Phleum pratense*), common bent (*Agrostis capillaris*), cock’s-foot (*Dactylis glomerata*) and perennial rye-grass (*Lolium perenne*), with herbs such as bird’s-foot-trefoil (*Lotus corniculatus*), sorrel (*Rumex acetosa*), lady’s bedstraw (*Galium verum*), zigzag Clover (*Trifolium medium*), meadow buttercup (*Ranunculus acris*), and daisy (*Bellis perennis*).

Earls Barton Quarry is a long-disused limestone quarry that consists of a sheer rock face and a slightly terraced slope down to a damp base. Quarrying had exposed limestone about 3 metres below the surface, marking a change in the vegetation type. The vertical north edge of the quarry has sparse, largely ruderal, vegetation with finer grasses and a diverse herb layer on the paler rock slopes. This calcareous grassland contains hundreds of common spotted orchids (*Dactylorhiza fuchsii*), amongst abundant cat’s-ear (*Hypochaeris radicata*), patches of dominant mouse-ear-hawkweed (*Pilosella officinalis*), bird’s-foot-trefoil (*Lotus corniculatus*), ribwort plantain (*Plantago lanceolata*), red clover (*Trifolium pratense*), fairy flax (*Linum catharticum*), sorrel (*Rumex acetosa*), black medick (*Medicago lupulina*), and yarrow (*Achillea millefolium*). The grasses on these slopes are dominated by crested dog’s-tail (*Cynosurus cristatus*), with Yorkshire fog (*Holcus lanatus*) in the more shaded/damp parts and abundant red fescue (*Festuca rubra*), yellow oat-grass (*Trisetum flavescens*) and smooth meadow-grass (*Poa pratensis*) on the majority of the area. There is a second calcareous grassland type on two of the upper slopes, with mouse-ear-hawkweed (*Pilosella officinalis*), common broomrape (*Orobanche minor*), sheep’s fescue (*Festuca ovina*), narrow-leaved meadow-grass (*Poa angustifolia*), and large patches of kidney vetch (*Anthyllis vulneraria*). Scrub occurs on all the slopes, but particularly to the south and east. Species here include frequent dog rose (*Rosa canina*), field rose (*R. arvensis*), and hawthorn (*Crataegus monogyna*).
ISE VALLEY LIASSIC SLOPES

An area of 107km² that forms the catchment of the River Ise. Land use is a combination of larger arable fields interspersed with agriculturally improved grassland. Former ironstone and limestone quarries are a feature of the Finedon area. Retained unimproved semi-natural habitat is relatively low, but there are a variety of vegetation types. Woodlands are small and isolated, apart from a concentration on the Kelmarsh Estate. Various woodland types occur. Some are associated with lighter soils and others with heavy clays. A unique example of wet ash-wych elm woodland can be found at Ragsdale Spinney, part of Birch Spinney and Mawsley Marsh SSSI. Unimproved grasslands tend to be mesotrophic, with a more acidic influence in places and some examples of damper grassland are retained. However, on quarried sites the grasslands have a calcareous influence. Areas of standing open water also occur in several quarries.

Birch Spinney and Mawsley Marsh SSSI lies in a small valley and comprises a unique mixture of wildlife habitats. Birch Spinney is an unusual woodland type partly developed on peat and no other examples are known in the county. Unimproved and botanically rich grasslands adjoin one of the finest remaining Northamptonshire marshes. The variety of vegetation types is due to the complex geology and hydrology. Birch Spinney is a variant of ash Fraxinus excelsior - field maple Acer campestre woodland developed on light soils with poor drainage. The canopy is of ash Fraxinus excelsior, pedunculate oak Quercus robur and downy birch Betula pubescens over a shrub layer of hazel Corylus avellana, elder Sambucus nigra and goat willow Salix caprea. The ground flora is notable for the abundance of ferns. Ragsdale Spinney is by contrast a heavy soil form of wet ash - wych elm woodland. Its situation on a spring-line gives rise to a rich ground flora, including the locally rare giant bellflower Campanula latifolia.

The grassland is of a geographically widespread calcareous loam type The sward comprises a large number of herbs and grasses characterised by sweet vernal grass Anthoxanthum odoratum, crested dog’s tail Cynosurus cristatus, quaking grass Briza media, yellow oat-grass Trisetum flavescens, harebell Campanula rotundifolia, dwarf thistle Cirsium acaule and salad burnet Sanguisorba minor. There are several damp flushes on the slopes that enhance the botanical interest.

Mawsley Marsh lies outside the character area, on the valley floor, and is described under the section on the River Ise Floodplain.

Sunderland Wood is one of a group of woodlands on the Kelmarsh Estate, all of which overlie Whitby Mudstone Formation. It is apparently replanted ancient woodland with ash Fraxinus excelsior, sycamore Acer pseudoplatanus, oak Quercus robur and larch Larix decidua. Some older oaks and old ash coppice stools remain. The substrate is mainly clay, and most of the site is poorly drained, however, the more elevated areas are on more acidic sandy soils largely dominated by bracken Pteridium aquilinum and bramble Rubus fruticosus. This change in the soils demonstrates the variability of the Whitby Mudstone Formation. Species on the rather wet, grassy rides are a mixture of ruderal and typical woodland species, and include rough meadow-grass Poa trivialis, meadow fox-tail Alopecurus pratensis, soft rush Juncus effusus, cuckooflower Cardamine pratensis, creeping buttercup Ranunculus repens, wood avens Geum urbanum, ramsons Allium ursinum, meadowsweet Filipendula ulmaria, marsh bedstraw Galium palustre and nettle Urtica dioica. Creeping soft-grass Holcus mollis is locally abundant in the vicinity of the bracken Pteridium aquilinum and the sandier parts of the rides. The scrub layer is open but rather neglected in appearance, and mostly consists of hawthorn Crataegus monogyna and elder Sambucus nigra.
Corner Meadow adjacent to the Brampton Valley Way in the upper reaches of the Ise Valley is a fragment of mesotrophic grassland, more typical of a floodplain, with tussocks of tufted hair-grass *Deschampsia cespitosa*, cock’s-foot *Dactylis glomerata* and abundant crested dog’s-tail *Alopecurus pratensis*. There is also red fescue *Festuca rubra*, Yorkshire fog *Holcus lanatus*, common bent *Agrostis capillaris*, creeping bent *A. stolonifera* and jointed rush *Juncus articulatus*. The herb content is high, with abundant great burnet *Sanguisorba officinalis*, marsh thistle *Cirsium palustre*, sorrel *Rumex acetosa*, lady’s bedstraw *Galium verum*, tormentil *Potentilla erecta*, germander speedwell *Veronica chamaedrys*, meadowsweet *Filipendula ulmaria* and patches of the rarities sneezewort *Achillea ptarmica* and saw-wort *Serratula tinctoria*.

A series of grasslands with a calcareous influence have developed on the former ironstone and limestone quarries around Finedon, many of these sites have associated ponds. The grassland at White Lodge Quarry, a typical site, includes red fescue *Festuca rubra*, sheep’s fescue *F. ovina*, crested dog’s-tail *Cynosurus cristatus*, glaucous sedge *Carex flacca*, common knapweed *Centaurea nigra*, abundant bird’s-foot-trefoil *Lotus corniculatus*, self heal *Prunella vulgaris*, fairy flax *Linum catharticum*, dwarf thistle *Cirsium acaule* and wild carrot *Daucus carota*. The pools are surrounded by hawthorn *Crataegus monogyna* scrub, with some grey and goat willow *Salix spp* and young ash *Fraxinus excelsior*. The pools are dominated by common spike-rush *Eleocharis palustris* associated with frequent tubular water-dropwort *Oenanthe fistulosa*, a county rarity. Other emergent species include common club-rush *Schoenoplectus lacustris*, jointed rush *Juncus articulatus* and water plantain *Alisma plantago-aquatica*, with abundant amphibious bistort *Persicaria amphibia*, rigid hornwort *Ceratophyllum demersum* and broad-leaved pondweed *Potamogeton natans* in the water.

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Biodiversity Character Assessment 50
2j UPPER WELLAND LIASSIC SLOPES

An area of 27km², comprising mainly arable land on the flatter ground and grassland and woodland on the steepest slopes. The majority of the retained unimproved semi-natural sites are located on the steep valley side to the north of Sibbertoft. These comprise a suite of woodlands and acidic grasslands over Dyrham Siltstone Formation. The only other site is a section of the Brampton Valley Way, a disused railway with heavy public access, in the east of the area.

Coombe Hill Hollow has a mixture of wildlife habitats, but the major interest is the mesotrophic grassland which represents an acid soil variant of calcareous loam pastures, a geographically widespread grassland type, but now very restricted due to cultivation and agricultural improvement. The soils are developed from clays and silts of the Dyrham Siltstone Formation and are varied in their chemistry, texture and drainage. These factors, together with a topographic influence, provide suitable conditions for a wide range of flowering plants. Typical species include common bent Agrostis capillaris, red fescue Festuca rubra, Yorkshire fog Holcus lanatus, crested dog’s-tail Cynosurus cristatus, pignut Conopodium majus, tormentil Potentilla erecta and sheep’s sorrel Rumex acetosella. The more lime-rich soils have harebell Campanula rotundifolia, lady’s bedstraw Galium verum and mouse-ear hawkweed Pilosella officinarum.

Nearby Barnhill Spinney is another area of unimproved acid grassland, with dotted oaks and gorse scrub. There is some evidence of ridge and furrow near the bottom of the field and a marshy flush caused by a spring. The site supports abundant bluebells Hyacinthoides non-scriptus, with tormentil Potentilla erecta, heath bedstraw Galium saxatile, sheep’s sorrel Rumex acetosella and other acid grassland indicators.

Sibbertoft Coombes is the largest of the woodlands on the cluster of deep valleys. These woodlands have not been surveyed recently, but they typically have abundant bluebells Hyacinthoides non-scriptus. Previous records include primrose Primula vulgaris, sanicle Sanicula europaea, wood anemone Anemone nemorosa, moschatel Adoxa moschatellina and foxglove Digitalis purpurea, the last two being indicative of the sandy, acidic substrate. The mixed tree cover includes larch Larix decidua, Scots pine Pinus sylvestris, oak Quercus robur, ash Fraxinus excelsior, sweet chestnut Castanea sativa and sycamore Acer pseudoplatanus, with a correspondingly varied shrub layer.

The most northerly section of the Brampton Valley Way forms an important wildlife corridor through the area.

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2j - Jane Pearman - Gorse
2. LIASSIC SLOPES

2k DINGLEY TO WAKERLEY LIASSIC SLOPES

This area covers 39km² of the steeply sloping Welland scarp slopes. A section of the upper valley side is dominated by limestone geology and is excluded, but an area of Boulder Clay drift which occupies a more undulating landscape to the south is included. The land use is mainly improved grassland with a greater proportion of arable land and some woodland on the undulating clays. However, there are no designated Wildlife Sites or Sites of Special Scientific Interest in this area.

DESIGNATED SITES

| National Nature Reserves       | None |
| Sites of Special Scientific Interest | None |
| Wildlife Sites                | None |
| Local Nature Reserves         | None |

2l COLLYWESTON TO EASTON-ON-THE-HILL LIASSIC SLOPES

A small area, 16km², of steep Welland scarp slope in the far north west of the county. Agriculturally improved grassland is the principal land use and a group of plantation woodlands occupy the northern part of the area.

The only designated Wildlife Site is Wothorpe Groves, which overlaps the boundary of the area. It comprises an area of park woodland, thought to be on old mineral workings, but with a few signs of ancient woodland species. The trees are mostly ash Fraxinus excelsior, with frequent wych elm Ulmus glabra and English elm Ulmus procera suckers, sycamore Acer pseudoplatanus and occasional beech Fagus sylvatica and oak Quercus robur. There are two very old and one slightly younger small-leaved limes Tilia cordata on the eastern boundary of the wood. The ground flora is dominated by dog’s mercury Mercurialis perennis and nettle Urtica dioica, with herb Robert Geranium robertianum, wood avens Geum urbanum and wood sedge Carex sylvatica. Yellow archangel Lamiastrum galeobdolon and bluebell Hyacinthoides non-scriptus are rare.

DESIGNATED SITES

| National Nature Reserves       | None |
| Sites of Special Scientific Interest | None |
| Wildlife Sites                | Wothorpe Groves |
| Local Nature Reserves         | None |
3. BOULDER CLAY WOODLANDS

CHARACTER AREAS

3a Whittlewood and Hazelborough Forests
3b Yardley Chase and Salcey Forest
3c Geddington Chase
3d Pipewell and Brampton Woods
3e Fermyn and Southwick Woods

KEY CHARACTERISTICS

- Boulder Clay forms the surface geology;
- heavy, stony, slowly permeable clay soils;
- many woodland SSSI and Wildlife Sites, with biodiversity as a management priority;
- extensive ash-field maple woodland;
- limited areas of mesotrophic (neutral) grassland;
- few watercourses and springs;
- some seasonal ponds; and
- key species include black hairstreak and wood white butterfly, breeding woodcock and nightingale and dormouse.
INTRODUCTION

The Boulder Clay Woodlands are primarily located on Boulder Clay and peripheral Oxford Clay deposits in the Rockingham Forest in the north of Northamptonshire and on Boulder Clay in Yardley-Whittlewood Ridge on the south eastern fringe of the county. In the Rockingham Forest the woodland can be found across the extent of the Boulder Clay. However, on the Yardley-Whittlewood Ridge the woodland is confined to the Boulder Clay on higher ground, with a large area of unwooded, farmed Boulder Clay on the gently sloping ground between the woodland and the River Nene and westward to the River Tove.

The principal habitat type comprises extensive tracts of Ancient Semi-Natural Woodland, with areas of more recent woodland often planted on former Ancient Woodland sites. There are also smaller areas of associated unimproved semi-natural habitats in the form of fragmented calcareous and mesotrophic (neutral) grasslands, several of which are a result of recent quarrying.

PHYSICAL INFLUENCES

Geology and Soils

Although the woodlands are underlain by varying rock types from a number of geological periods, the thick Boulder Clay cap and the overlying soils influence the nature of vegetation development.

The soils comprise extensive areas of pelo-stagnogley soils and calcareous pelosols. The former are seasonally waterlogged and slowly permeable and the latter are stony clays that crack deeply in dry seasons and are slowly permeable when wet (Hodge 1984). The characteristic vegetation shows little change across the two soils types although subtle variations in soil chemistry, the degree of water logging and light, particularly within the woodlands, give rise to local variations in species composition.

Hydrology

Lying on higher ground, these wooded clays form the head of the various catchments, therefore the presence of watercourses is not characteristic. Springs are rare, occurring infrequently on the edge of the Boulder Clay. The watercourses and associated springs that issue from the clay tops are described under the adjacent Minor Floodplain Character Area.

Human Influences Affecting Semi-Natural Habitats

At the end of the last ice age woodland cover developed over most of the Northamptonshire. With the development of agriculture from about 4000 BC this woodland was systematically cleared leaving isolated tracts of Wildwood between the major river valleys.

Large areas of woodland were retained for two reasons. Firstly the heavy, slowly permeable soils were less easy to work than the lighter soils in the river valleys which meant that large areas of woodland remained uncleared and secondly, following the Norman Conquest, the woodlands were defined as Royal Forests where hunting was the primary purpose.

After the Medieval period the area of forest declined and there was further clearance of woodland. The greatest clearance followed the removal of the legal status of the forest that occurred at enclosure in the 19th Century. After enclosure, many of the woodlands were managed as coppice with standards.

In the 19th Century many of the remaining woodlands were clear felled and planted with oak and the more extensive planting in the 20th Century often consisted of conifers. Where the woodland was retained coppicing was carried out into the last century. However, this too has now declined and lack of traditional woodland management has seen the redundant coppice become overgrown, resulting in the decline or loss of species reliant upon open and diverse woodland habitat.

In the cleared areas, on the periphery and between the retained woodland, farming has become increasingly intensive and few unimproved semi-natural habitats have been retained. A shift from pasture to arable that has taken place, particularly since the Second World War, resulted in the loss of much of the characteristic unimproved mesotrophic grassland. Where grassland has survived this now tends to be intensively managed, particularly by the use of fertilisers to improve the grass crop and through the application of selective herbicides to control weed species, resulting in a reduction in the diversity of the semi-natural vegetation.
PRINCIPAL HABITAT TYPES

Trees and Woodlands

The characteristic habitat is broadleaved woodland and woodlands with a significant broadleaved woodland component. Many are Ancient Semi-Natural Woodlands; woodlands on land that has had continuous woodland cover since at least 1600AD and which retains a native tree and shrub cover that has not been planted, although it may have been managed by coppicing or felling and allowed to regenerate naturally. These woodlands retain their historic features including the coppice structure and ride networks and have a rich fauna and flora. The remaining woodlands have been planted on ancient woodland sites and some have a significant coniferous component. The Forestry Commission, through the East Midlands Ancient Woodland Project, is planning to restore plantations on ancient woodland sites to broad-leaved woodland.

Typical Boulder Clay Woodlands are classified by the National Vegetation Classification as ash *Fraxinus excelsior* - field maple *Acer campestre* woodland, and the majority are of the typical sub-community. The tree canopy is typically pedunculate oak *Quercus robur* and ash *Fraxinus excelsior* over a mixed shrub and coppice layer of hazel *Corylus avellana*, hawthorn *Crataegus monogyna*, Midland hawthorn *Crataegus oxyacanthoides*, field maple *Acer campestre*, blackthorn *Prunus spinosa*, with sallows *Salix caprea* and *S. cinerea* in the damper areas. The ground flora is characterised by dog's mercury *Mercurialis perennis*, bluebell *Hyacinthoides non-scripta* and primrose *Primula vulgaris* and notable species include herb Paris *Paris quadrifolia*, early purple orchid *Orchis mascula* and violet helleborine *Epipactis purpurata*.

The fauna is characterised by diverse butterfly populations, including wood-white *Leptidea sinapis*, white admiral *Limenitis Camilla* and black hairstreak *Satyrium pruni*, breeding birds, such as sparrowhawk *Accipiter nisus*, nightingale *Luscinia megarhynchos* and woodcock *Scolopax rusticola*, and mammals, including the common dormouse *Muscardinus avellanarius*.

Rivers and Wetlands

Rivers and streams are not characteristic of this Biodiversity Character Type. However, there are occasional small, heavily shaded ponds within the woodlands and more open ponds in the adjacent farmed land. The majority of these ponds are man-made and consequently there is no discernable pattern of distribution. Many of these ponds are only seasonally wet.

The most significant suite of ponds occurs within Yardley Chase SSSI where they were created through the excavation of material to cover ammunition dumps.

Dry Grasslands

There is limited survival of unimproved semi-natural dry grasslands in the farmland adjacent to the major woodland blocks. Those that remain are generally mesotrophic, with a mild calcareous influence, although where the soil is most freely drained and with a high lime content limited areas of calcareous grassland occur. Areas of unimproved semi-natural dry grassland can also be found on some of the wider rides within the woodlands.

Grasslands are typically of the common knapweed *Centaurea nigra* - crested dog's-tail *Cynosurus cristatus* community, probably the most frequent grassland vegetation type to be found in the British lowlands prior to modern agricultural improvement. Typical species include red fescue *Festuca rubra*, tufted hair-grass *Deschampsia cespitosa*, quaking-grass *Briza media*, lady's bedstraw *Galium verum*, cowslip *Primula veris* and meadow vetchling *Lathyrus pratensis*. Among the more notable species are green-winged orchid *Orchis morio*, adder's-tongue *Ophioglossum vulgatum* and pepper-saxifrage *Silvia silaus*. 
3a WHITTLEWOOD AND HAZELBOROUGH FORESTS

This area of 86km$^2$ lies to the south of Towcester and forms the westerly extent of the Yardley-Whittlewood Ridge Natural Area. It is separated from the Yardley Chase Biodiversity Character Area by the River Tove valley. The woodlands are of ancient origin, with Whittlewood Forest comprising a cluster of ancient semi-natural woodlands including Buckingham Thick Copse National Nature Reserve, whilst Hazelborough Forest comprises more extensive coniferous and broadleaved plantations. There is poor survival of unimproved semi-natural mesotrophic grassland, although Bucknell Wood Meadow SSSI represents a good example. Whilst most of the area is underlain by Boulder Clay drift, there are also small areas of free-draining glacial gravels that give rise to more acidic conditions.

Whittlewood Forest SSSI comprises a suite of woodlands exhibiting a wide range of canopy structure. The relative abundance of mature and over-mature trees and the extent of self-set stands is notable within Northamptonshire. The site also includes an area of parkland notable for its beetle fauna.

The main canopy trees are ash *Fraxinus excelsior* and pedunculate oak *Quercus robur*, the latter including scattered specimens of considerable age and girth. Silver birch *Betula pendula* and aspen *Populus tremula* are thinly spread with local concentrations of elm *Ulmus procera* and *U. glabra*, most of which is now dead or diseased.

The under storey and shrub layer is typically composed of ash *Fraxinus excelsior*, field maple *Acer campestre*, hazel *Corylus avellana* and both hawthorn species *Crataegus monogyna* and *C. laevigata*. Crab apple *Malus sylvestris*, blackthorn *Prunus spinosa* and field rose *Rosa arvensis* occur frequently with sallows *Salix sp.*, in damp pockets and alongside streams. Calcareous clay soils have other shrubs such as dogwood *Cornus sanguinea*, guelder rose *Viburnum opulus*, traveller’s joy *Clematis vitalba* and spindle *Euonymus europaeus*. The more acid clay, which normally lacks field maple *Acer campestre*, has abundant honeysuckle *Lonicera periclymenum* and sparse holly *Ilex aquifolium*.
The understorey and shrub layer is typically composed of ash *Fraxinus excelsior*, field maple *Acer campestre*, hazel *Corylus avellana* and both hawthorn species *Crataegus monogyna* and *C. laevigata*. Crab apple *Malus sylvestris*, blackthorn *Prunus spinosa* and field rose *Rosa arvensis* occur frequently with sallows *Salix sp.*, in damp pockets and alongside streams. Calcareous clay soils have other shrubs such as dogwood *Cornus sanguinea*, guelder rose *Viburnum opulus*, traveller’s joy *Clematis vitalba* and spindle *Euonymus europaeus*. The more acid clay, which normally lacks field maple *Acer campestre*, has abundant honeysuckle *Lonicera periclymenum* and sparse holly *Ilex aquifolium*.

Variation in soil chemistry, drainage and light gives rise to a rich ground flora predominately composed of true woodland (shade tolerant) plants. Bramble *Rubus fruticosus*, dog’s mercury *Mercurialis perennis*, tufted hair-grass *Deschampsia cespitosa* and false brome *Brachypodium sylvaticum* are some of the commoner species. Of the many herbs strongly associated with ancient woodland the following are widespread: wood anemone *Anemone nemorosa*, bluebell *Hyacinthoides non-scripta*, ramsons *Allium ursinum*, yellow archangel *Lamiastrum galeobdolon*, pendulous sedge *Carex pendula*, pignut *Conopodium majus*, broad-leaved helleborine *Epipactis helleborine* and wood sorrel *Oxalis acetosella*. Local species of note include herb Paris *Paris quadrifolia*, bearded couch *Elymus caninus*, wood meadow-grass *Poa nemoralis*, early purple orchid *Orchis mascula*, violet helleborine *Epipactis purpurata* and goldilocks buttercup *Ranunculus auricomus*.

The parkland oaks support an important assemblage of beetles, dependent upon a continuity of old and over-mature timber. Dormice are present in old holly coppice, notably in Hazelborough Forest.

Bucknell Wood Meadows SSSI and the adjacent Bucknell Wood Pastures comprise an area of unimproved mesotrophic grassland. Of the several grassland communities represented, the most widespread is common knapweed *Centaurea nigra* - crested dog’s-tail *Cynosurus cristatus* grassland. The sward associated with this community is herb rich and supports a diverse range of plant species. There is considerable variation in species composition throughout the site, resulting partly from local soil and drainage conditions and partly from past management practices. The grasses sweet vernal-grass *Anthoxanthum odoratum*, crested dog’s-tail *Cynosurus cristatus*, red fescue *Festuca rubra* and cock’s-foot *Dactylis glomerata*, glaucous sedge *Carex flacco*, and the herbs common knapweed *Centaurea nigra*, common bird’s-foot-trefoil *Lotus corniculatus*, meadow buttercup *Ranunculus acris*, devil’s-bit scabious *Succisa pratensis* and clovers *Trifolium repens* and *T. pratense* are generally abundant. Other species characteristic of this grassland type, which occur occasionally, include quaking-grass *Briza media*, meadow vetchling *Lathyrus pratensis*, common spotted-orchid *Dactylorhiza fuchsii*, adder’s tongue *Ophioglossum vulgatum*, field wood-rush *Luzula campestris* and rough hawkbit *Leontodon hispidus.*
## 3. BOULDER CLAY WOODLANDS

### DESIGNATED SITES

<table>
<thead>
<tr>
<th>Category</th>
<th>Sites</th>
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</thead>
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<tr>
<td><strong>National Nature Reserves</strong></td>
<td>Buckingham Thick Copse</td>
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| **Sites of Special Scientific Interest** | Bucknell Wood Meadows  
                                   | Whittlewood Forest                                                  |
| **Wildlife Sites**              | Bedlam Copse                                                        |
|                                 | Birch and Linshire Copses                                            |
|                                 | Bucknell Wood                                                       |
|                                 | Bucknell Wood Pastures                                               |
|                                 | Burcote Wood                                                        |
|                                 | Cheese Copse                                                        |
|                                 | Cosgrove Old Canal                                                  |
|                                 | Deanshanger Old Canal                                               |
|                                 | Foxhole Copse                                                        |
|                                 | Grand Union Canal: Navigation Inn                                   |
|                                 | Great Oaken Copse                                                   |
|                                 | Hazelborough Woods                                                  |
|                                 | Jack’s Copse                                                         |
|                                 | Little Oaken Copse                                                  |
|                                 | Old Stratford A5 Verge                                               |
|                                 | Park Copse                                                           |
|                                 | Rabbit Wood                                                         |
|                                 | Wicken Wood                                                          |
|                                 | Wild Wood                                                           |
|                                 | Wydymore Lane                                                       |
| **Local Nature Reserves**       | None                                                               |

Biodiversity Character Assessment
This area covers 57km² and comprises two extensive blocks of woodland of ancient origin to the south of Northampton on the border with Buckinghamshire. The majority of woodlands have been replanted. The woodlands are confined to the higher ground on Boulder Clay drift, which extends in an unwooded form north to the River Nene. Some of the unwooded Boulder Clay has been included in this Biodiversity Character Area as it is likely that it was previously more wooded.

The key site in this area is Yardley Chase SSSI, as it typifies the range of unimproved semi-natural habitats that have been retained or would have occurred across the area prior to agricultural intensification. Much of the site was originally a Norman Hunting Chase and is now comprises woodland, pasture and parkland. More recently military use over a large part of the site has left a series of disused railways, grassland glades and open pools. The value of these habitats, particularly for invertebrates, is enhanced by their long isolation from intensive agriculture.

Much of the former ancient semi-natural woodland has been replanted or modified and this has created a range of woodland types including plantations of oak, mixed broadleaves and conifers, with the relatively unmodified areas being of particular significance. These are typically high forest of the ash *Fraxinus excelsior* - field maple *Acer campestre* - dog’s mercury *Mercurialis perennis* woodland type with an under storey of relict coppice with hawthorn *Crataegus monogyna*, Midland hawthorn *C. laevigata*, hazel *Corylus avellana*, dogwood *Cornus sanguinea* and guelder rose *Viburnum opulus*. Honeysuckle *Lonicera periclymenum* is an abundant climber in places, and is important as the larval food plant for the uncommon butterfly white admiral *Limentis camilla* which occurs here. Field layer species include bluebell *Hyacinthoides non-scripta* and dog’s mercury *Mercurialis perennis* with a wide range of associated species such as woodsedge *Carex sylvatica*, bugle *Ajuga reptans*, primrose *Primula vulgaris* and male fern *Dryopteris filix-mas*. Bramble *Rubus fruticosus* is locally abundant. Modified stands still retain ground flora species characteristically associated with ancient woodland such as herb Paris *Paris quadrifolia*. In many areas the plantations have failed and the woodland is reverting to a semi-natural mixture of native trees and shrubs. This explains the widespread presence of the birch species *Betula pendula* and *B. pubescens*. Natural regeneration of ash and field maple is also prolific.
The extensive system of rides in the woodland comprises a significant area of unimproved grassland with a varied flora and, together with the disused railways, these areas are important for invertebrates, particularly uncommon butterflies such as wood-white *Leptidea sinapis*, purple hairstreak *Neozephyrus quercus* and black hairstreak *Satyrium pruni*. Since 1977, 30 breeding species have been recorded, more than any other Northamptonshire site, including the largest known British population of wood-whites.

Unimproved mesotrophic grassland is a feature, including former pasture and parkland, and forms the largest known area of its type in the East Midlands. It is of the crested dog’s-tail *Cynosurus cristatus*-common knapweed *Centaurea nigra* type. Local variation in soil structure and chemistry has allowed the development of an intricate patchwork of different plant associations. Typical species include common bent *Agrostis capillaris*, Yorkshire fog *Holcus lanatus* and sweet vernal-grass *Anthoxanthum odoratum* with locally abundant sedges such as glaucous sedge *Carex flacca*. Herbs present throughout are common knapweed *Centaurea nigra*, lady’s bedstraw *Galium verum*, meadow vetchling *Lathyrus pratensis* and bird’s-foot-trefoil *Lotus corniculatus*, with those of additional note including pepper saxifrage *Siliaum silaus* and large numbers of adder’s tongue *Ophioglossum vulgatum*. In areas with lighter, well-drained and more acidic soils, plants such as heath-grass *Danthonia decumbens*, heath milkwort *Polygala serpyllifolia*, tormentil *Potentilla erecta* and betony *Stachys officinalis* are characteristic. Correspondingly, local base enrichment provides conditions for saw-wort *Serratula tinctoria*, dropwort *Filipendula vulgaris*, cowslip *Primula veris* and early-purple orchid *Orchis mascula*. The tussocky growth of tufted hair-grass *Deschampsia cespitosa* and small-reed *Calamagrostis spp.* in damper areas of grassland is an important habitat for invertebrates including the Red Data Book moth *The Concolorous Photedes extrema* and the nationally scarce Mere Wainscot Chortodes fluxa moth.

Outstanding examples of pasture-woodland, which probably formed an important element of the Hunting Chase, have also survived and represent a valuable transitional habitat. The large over-mature pollards and maidens of ash *Fraxinus excelsior* and oak *Quercus robur* provide a deadwood habitat which supports rare saproxylic invertebrates. These insects are regarded as relict populations whose survival has been dependent upon the continuity of suitable habitat and site management. Old individuals of hawthorn *Crataegus monogyna* and crab apple *Malus sylvestris* are particularly valuable for the feeding invertebrates.
Salcey Forest is a large area of ancient woodland, the majority of which is commercially reforested. The SSSI contains the greater part of the remaining 19th Century mature oak stands. There is an uncommon and extensive example of acid pedunculate oak *Quercus robur* - hazel *Corylus avellana* - ash *Fraxinus excelsior* high forest, demonstrating a high degree of naturalness in structure and botanical composition. Wet ash *Fraxinus excelsior* - maple *Acer campestre* woodland is also represented on the site. The shrub layer and ground flora are typical of other Boulder Clay Woodlands. A number of locally rare plants occur, such as thin-spiked wood-sedge *Carex strigosa* and bird’s-nest orchid *Neottia nidus-avis*, and there is a strong population of black hairstreak *Satyrium pruni* butterflies.

Few unimproved semi-natural habitats survive away from the wooded areas.

### DESIGNATED SITES

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<th>Sites of Special Scientific Interest</th>
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<tr>
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<td>Yardley Chase</td>
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</table>
The southern extent of the Rockingham Forest, occupying 50km² of Boulder Clay to the south of Corby and the north and east of Kettering. The boundary of this area is defined by the River Ise and Harpers Brook valleys and the heavily quarried valley side north of the Alledge Brook.

There are extensive areas of broadleaved woodland of ancient origin, but unlike the wooded clays to the north east much of the woodland is in private ownership. As public access is limited many of the woods are used for pheasant rearing and cover species, such as snowberry *Symphoricarpos albus*, have been planted. There is also a strong element of coniferous planting in most of the woodlands. Key woodland sites include Geddington Chase SSSI and Alder Wood SSSI. There are only fragments of other unimproved semi-natural habitats.

Geddington Chase is the third largest extant ancient wood in Northamptonshire and was formerly part of the once extensive Royal Forest of Rockingham. The bulk of the Chase is now commercially reafforested and the SSSI comprises the largest discrete block of remaining semi-natural broadleaved woodland. The site is a good example of the wet ash *Fraxinus excelsior*-maple *Acer campestre* woodland, a type that has declined significantly in the county since the Second World War. In places the original coppice with standards structure is well preserved and, elsewhere, oak *Quercus robur*-ash *Fraxinus excelsior* high forest provides a contrasting habitat. The tree canopy is predominantly pedunculate oak *Quercus robur* and ash *Fraxinus excelsior* over a mixed shrub and coppice layer of hazel *Corylus avellana*, Midland hawthorn *Crataegus oxyacanthoides*, field maple *Acer campestre*, blackthorn *Prunus spinosa*, dogwood *Cornus sanguinea* and grey willow *Salix cinerea*. Mixed plantations occur in some areas.

The ground flora is typically diverse with bluebell *Hyacinthoides non-scriptus*, dog’s mercury *Mercurialis perennis*, tufted hair-grass *Deschampsia cespitosa*, ramsons *Allium ursinum* and yellow archangel *Galeobdolon luteum* all locally dominant. The wild daffodil *Narcissus pseudonarcissus*, which is rare in Northamptonshire, occurs sparsely. Some of the rides contain botanically-rich permanent grassland with characteristic species such as sweet vernal-grass *Anthoxanthum odoratum*, field woodrush *Luzula campestris*, hairy lady’s mantle *Alchemilla filicaulis*, cowslip *Primula veris* and pignut *Conopodium majus*.

Alder Wood is also of the wet ash *Fraxinus excelsior*-maple *Acer campestre* type and has been managed as coppice with standards, but now, although there are areas of young growth, much of the coppice is over-mature. The canopy is predominantly ash *Fraxinus excelsior* with occasional oak *Quercus robur*, and the coppiced shrub layer consists of hazel *Corylus avellana* and field maple *Acer campestre*. 

---

3c - Bruce Shortland - Ash
The ground flora is typical of base rich wet soil with much tufted Hair-grass Deschampsia cespitosa, dog’s mercury Mercurialis perennis, enchanter’s nightshade Circaea lutetiana and bluebell Hyacinthoides non-scripta with other species such as common spotted-orchid Dactylorhiza fuchsii, twayblade Listera ovata and sanicle Sanicula europaea also present. Herb Paris Paris quadrifolia and giant bellflower Campanula latifolia, both rare in Northamptonshire, also occur.

Other unimproved semi-natural habitats are poorly represented, but there are some outstanding examples of mesotrophic grassland. The best is Alder Meadow, adjacent to Alder Wood. Together they comprise Alder Wood and Meadow SSSI. The meadow is an agriculturally unimproved, ridge and furrow hay field. Variation in soil properties and in past management has led to the development of several grassland types of which the most common is that characterised by the presence of common knapweed Centaurea nigra and crested dog’s-tail Cynosurus cristatus. This is a diverse type and many plant species are found such as lady’s bedstraw Galium verum, red fescue Festuca rubra, cowslip Primula veris, tufted hair-grass Deschampsia cespitosa, quaking-grass Briza media and meadow vetchling Lathyrus pratensis. In damper parts of the field the grassland is characterised by meadow foxtail Alopecurus pratensis and great burnet Sanguisorba officinalis or by betony Stachys officinalis and devil’s-bit scabious Succisa pratensis.

Another important grassland is Great Oakley Meadow, a fragment of ancient meadow now managed as a reserve by the Wildlife Trust and lying where the Boulder Clay deposit is thinning. The higher, southwest corner of the site has ridge and furrow with a low botanical diversity in the damp furrows, which are dominated by tufted hair-grass Deschampsia cespitosa. The tops of the ridges are much more diverse, with quaking-grass Briza media, cowslip Primula veris, tormentil Potentilla erecta and common knapweed Centaurea nigra. The richest flora is on the flat lower ground near the brook where some areas appear more calcareous than neutral, with dwarf thistle Cirsium acaule, salad burnet Sanguisorba minor and hoary plantain Plantago media. The wettest parts of the lower slopes have a flood-meadow structure, with hairy sedge Carex hirta, cuckooflower Cardamine pratensis and great burnet Sanguisorba officinalis.
3d PIPEWELL AND BRAMPTON WOODS

A series of Ancient Semi-Natural Woodlands occupying 35km² of Boulder Clay to the west of Corby and bounded by the Harpers Brooks to the south and the steep Welland scarp slope to the north. The biodiversity character of this area is similar to that of the Geddington Chase Biodiversity Character Area, with the majority of woodlands being in private ownership.

The key woodland sites are Pipewell Woods SSSI and Stoke and Bowd Lane Woods SSSI. The remaining ancient semi-natural woodlands are all designated as Wildlife Sites.

Pipewell Woods consist of several small contiguous woodlands that together comprise a good example of wet ash *Fraxinus excelsior* - maple *Acer campestre* woodland both in its typical form and in a nationally rare form. The structure of the woodland is almost entirely coppice with standards, some of which remains under active management.
The canopy is dominated by pedunculate oak *Quercus robur* with ash *Fraxinus excelsior* and occasional birch *Betula pendula* in some areas. The coppiced shrub layer is of various ages, with the majority remaining over-mature, and consists mainly of hazel *Corylus avellana*, field maple *Acer campestre* and ash *Fraxinus excelsior*, with dogwood *Cornus sanguinea* occurring occasionally. The ground flora is diverse and variable with dog's mercury *Mercurialis perennis*, bluebell *Hyacinthoides non-scripta* and false brome *Brachypodium sylvaticum* occurring in the drier areas and tufted hair-grass *Deschampsia cespitosa*, meadowsweet *Filipendula ulmaria*, sedges and rushes found on the damper soils. The county rarities, giant bellflower *Campanula latifolia*, herb Paris *Paris quadrifolia* and wood speedwell *Veronica montana* have been recorded.

Stoke and Bowd Lane Woods are similar to Pipewell Woods, with the areas owned by the Woodland Trust still being actively coppiced. Stoke Wood has a thriving dormouse *Muscardinus avellanarius* population which is the subject of regular monitoring.

Unlike the other areas of this Biodiversity Character Type there are no examples of other unimproved semi-natural habitats.

### DESIGNATED SITES

#### National Nature Reserves
- None

#### Sites of Special Scientific Interest
- Pipewell Woods
- Stoke and Bowd Lane Woods
- Ash Coppice
- Askershaw Wood
- Blackthorn Wood
- Brampton Valley Way
- Brampton Wood including:
  - Dingley Wood
  - Goodman’s Spinney
  - Great Cattage Wood
  - Great Coppice
  - Great Hollow
  - Hermitage Wood including:
    - Lodge Coppice
    - New Coppice Reserve
    - Sawtry Coppice
    - South Wood
    - Spring Grove
    - Spring Pond
    - Stanion Lane Plantation including:
      - Swinawe Wood
      - Walter Wood
      - West Lodge Quarry
- Pond Quarter Pond
- Hermitage Wood Drive
- Embankment

#### Local Nature Reserves
- None
3. BOULDER CLAY WOODLANDS

3e FERMYN AND SOUTHWICK WOODS

Essentially this area, covering 87km², is the core of the Rockingham Forest with Corby to the west and Oundle to the East. The valleys of the River Nene and its tributaries, the Harpers Brook and Willow Brook, form the boundaries.

Throughout the area there is a high density of SSSI and Wildlife Sites, the majority of which are woodlands. Key woodland sites include Weldon Park, Banhaw, Spring and Blackthorns Wood, Short Wood and Glapthorn Cow Pasture SSSIs. The majority are owned/managed by the Forestry Commission and much of the remainder is owned/managed by the Wildlife Trust, which ensures that management of the biodiversity resource is a high priority in this area.

Weldon Park SSSI is one of the largest intact ancient woodlands in the county to have survived unaffected by clearance or plantation forestry. The site is composed entirely of semi-natural vegetation with ash Fraxinus excelsior - maple Acer campestre and hazel Corylus avellana - ash Fraxinus excelsior canopy types. The wood has a rich flora for its size, including an uncommon vegetation variant on the wettest soils of the southeast quarter and unimproved old grassland on the rides.

Banhaw, Spring and Blackthorns Woods SSSI consist of three neighbouring blocks of semi-natural broadleaved woodland that together form one of the largest remnants of the ancient Royal Forest of Rockingham. The vegetation conforms to the wet ash Fraxinus excelsior - maple Acer campestre woodland type with a coppice and standards structure, overlying calcareous clay soils.

Ash, both as standards and regrowth from old coppice, forms the main component of the canopy, with pendunculate oak Quercus robur occurring infrequently. There is a strong secondary element of field maple Acer campestre and in some areas silver birch Betula pendula, willows Salix spp. and crab apple Malus sylvestris are also present. The under storey is composed of derelict coppiced field maple Acer campestre, ash Fraxinus excelsior and hawthorn Crataegus monogyna with hazel Corylus avellana, Midland hawthorn Crataegus laevigata, wild service tree Sorbus torminalis, dogwood Cornus sanguinea and guelder rose Viburnum opulus also occurring.

The ground flora in these woodlands is rich and varied, with some areas dominated by dog’s mercury Mercurialis perennis and bluebell Hyacinthoides non-scripta with abundant enchanter’s-nightshade Circaea lutetiana, yellow archangel Limiastrum galeobdolon, meadowsweet Filipendula ulmaria, wood sorrel Oxalis acetosella and male fern Dryopteris filix-mas. Other parts of the woods support a variety of grasses, including tufted hair-grass Deschampsia cespitosa, rough meadow-grass Poa trivialis, wood millet Milium effusum and wood melick Melica uniflora. Notable woodland species occur throughout and include herb Paris Paris quadrifolia, sweet woodruff Galium odoratum, early-purple orchid Orchis mascula, common spotted orchid Dactylorhiza fuchsii and common twayblade Listera ovata. Sanicle Sanicula europaea and greater butterfly orchid Plantanthera chlorantha are also present.
The numerous and varied rides support a good range of plants including wild angelica Angelica sylvestris, yellow pimpernel Lysimachia nemorum and the sedges Carex sylvatica, C. pendula, C. remota and notably C. strigosa. They provide valuable additional habitats for butterflies and other invertebrates.

Glapthorn Cow Pasture is an area of dense blackthorn scrub and ash-maple woodland which supports the largest colony of the black hairstreak butterfly Satyrium pruni in Northamptonshire, and is one of the most important sites for this species in Britain. The black hairstreak is a notable woodland species that has been recorded from only 78 localities in Britain of which only about 30 colonies were still present in 1970. All these localities are now confined to the low-lying area of the Oxford Clay between Oxford and Peterborough and Brisworth Clay Formation overlain by Boulder Clay (as at Glapthorn) to the northwest.

An important requirement of the black hairstreak is a high density of Prunus, usually blackthorn Prunus spinosa, in sunny, sheltered situations. The traditional management of East Midlands forests favours these conditions and consists of long coppice cycles, in which small areas of wood are cleared annually, allowing the development of mixed stands of scrub that survive for at least 20 years. At Glapthorn, the blackthorn scrub is now specifically managed to provide these conditions. The scrub also forms a nesting site for nightingales Luscinia megarhynchos.

The most important mesotrophic grassland site is Sudborough Green Lodge Meadows SSSI, two adjacent hay meadows, the larger of which is agriculturally unimproved with extensive medieval ridge and furrow. This represents the vegetation type that would once have been characteristic of this area, but is now limited to this site. The sward mostly comprises a characteristic example of the crested dog’s-tail Cynosurus cristatus - common knapweed Centaurea nigra - lady’s bedstraw Galium verum sub-community. In discrete areas an uncommon upright brome Bromus erectus community occurs. The smaller meadow is semi-improved but herb-rich character. The major grassland type has a widespread distribution in Britain, though centred on the more calcareous soils of the Midland claylands. Agricultural change has drastically reduced its former extent and this site is now the largest and best, traditionally managed example of its kind in Northamptonshire. The upright brome community is of considerable scientific interest since it is believed to be restricted to very few localities in the East Midlands and is regarded as a link between unimproved mesotrophic grasslands and the grasslands of chalk and limestone soils. The smaller hay meadow is the result of a successful experiment to recreate attractive species-rich grasslands.

Red Kites are now a common sight in the area. Once a familiar sight in most parts of Britain, red kites were persecuted throughout the 19th century, so that by the early 1900s only a few survived in Wales. In 1995 English Nature, the Forestry Commission and the RSPB commenced a release programme in the Rockingham Forest and successful breeding soon followed. 24 breeding pairs were located in 2003.
### Designated Sites

#### National Nature Reserves
- None

#### Sites of Special Scientific Interest
- Banhaw, Spring and Blackthorns Woods
- Glapthorn Cow Pasture
- Short Wood
- Sudborough Green Lodge Meadow
- Weldon Park

#### Wildlife Sites
- Bearshank Pond
- Bearshank Wood
- Benefield Road Verges
- Biggin Fishpond
- Brickhill Pond
- Brigstock Country Park
- Bullicks Wood
- Burn Coppice
- Bushey Wood
- Cadge Wood
- Cat’s Head Wood
- Crow Coppice
- Fermyn Woods including:
  - Cherry Lap
  - Royal Coppice
  - Sling’s Nook
  - Stephen Oak Pond
  - Stephen Oak Riding
  - Tresham Coppice
- Frere Hill Wood
- Hostage Wood
- Langley Coppice
- Laundimer Woods including:
  - Harry’s Park Wood
  - Meadow Leys
  - Middle Laundimer Wood
  - Nether Laundimer Wood
  - Old Dry Bushes
  - Old Dry Hills
  - Upper Laundimer Wood
- Lilford Wood
- Lyveden Moat
- Lyveden New Bield
- Mounterley Wood
- Oundle and Stoke Woods
- Park Wood
- Rough Close
- Samby Sykes
- Shire Hill Lodge Woods
- Souther Woods including:
  - Green Side Wood
  - Lady Wood
  - Little Wood
  - Oxen Wood
  - Souther Wood
  - Titchmarsh Wood
- Southwick Wood
- Stubby Stiles
- The Nook
- Tomlin Wood
- Wadenhoe Great Wood
3. BOULDER CLAY WOODLANDS

- Wadenhoe Little Wood including:
  - Well Coppice

Local Nature Reserves
- None

- Little Wood Pond
4. CROPPED CLAYLAND

CHARACTER AREAS

4a Radstone
4b Moreton Pinkney, Weedon Lois and Bradden
4c Maidford and Grimscote
4d Flitton and Blisworth Hills
4e Bugbrooke, Rothersthorpe and Collingtree
4f Brafield and Hackleton
4g The Bringtons
4h Braunston and Kilsby
4i East and West Haddon
4j Sywell, Hardwick and Mawsley Plateau
4k Clipston, Naseby and Welford
4l Bozeat
4m Finedon Plateau
4n Hargrave and Chelveston
4o Ashton and Barnwell Wolds

KEY CHARACTERISTICS

• Boulder Clay forms the predominant surface geology, with variable amounts of Glacial Sand and Gravel;
• heavy, stony, slowly permeable clay soils overlie the thicker boulder clay deposits;
• more permeable, deeper soils overlie thinner Boulder Clay and Glacial Sands and Gravel;
• poor retention of unimproved semi-natural habitats;
• some retention of typical ash - field maple woodland;
• many woodlands of ancient origin have been converted to mixed plantations;
• limited areas of unimproved mesotrophic ridge and furrow grasslands comprising both knapweed - crested dog's-tail and Yorkshire fog - tufted hair-grass grassland communities;
• few watercourses and springs; and
• some small farm ponds.
INTRODUCTION
Cropped Clayland can be found throughout the county, but the areas to the west of Northampton are more fragmented. The geology and soils are somewhat similar to those associated with the Boulder Clay Woodlands, but woodland retention is generally poor. Retention of unimproved semi-natural habitats is similarly poor which is reflected in low number of Sites of Special Scientific Interest and Wildlife Sites. Small farm ponds and some ornamental lakes are scattered throughout.

PHYSICAL INFLUENCES

Geology and Soils
Cropped Clayland generally applies to the areas of higher ground throughout Northamptonshire that are occupied by Boulder Clay drift. In the east of the county this forms an almost unbroken formation, but to the west of Northampton the drift also includes some large areas of Glacial Sand and Gravel.

To the east of Northampton the soils comprise extensive areas of calcareous pelosols and more limited areas of pelo-stagnogley soils. The former soils are seasonally waterlogged and slowly permeable and the latter are stony clays that crack deeply in dry seasons and are slowly permeable when wet. However, the juxtaposition of soil types in areas with a greater proportion of Glacial Sand and Gravel is more complicated. The soils over the Boulder Clay are similar to those in the east, but where they overlie more permeable Glacial Sand and Gravel there comprise deep well-drained loams (Hodge 1984).

Hydrology
Lying on higher ground, these wooded clays lie at the head of the catchments, therefore the presence of watercourses is not characteristic. Springs are rare, occurring infrequently on the edge of the Boulder Clay. The watercourses and associated springs that issue from the clay tops are described under the Minor Floodplain Biodiversity Character Type.

HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS
The extent to which unimproved semi-natural habitats are retained is a direct result of farming and woodland management practice. Much of the clayland is suitable for arable cropping and major woodland clearances took place in the distant past. The retained woodlands were formerly worked as coppice for fuel and construction materials, but as coppice products are no longer required the woodlands have become neglected. There is strong evidence of the change in woodland management, with the majority of woodland on ancient woodland sites having been converted to broadleaved and coniferous forestry plantations in the 20th Century.

Unimproved mesotrophic (neutral) grasslands would have been typical and widespread in the form of grazed lowland hay meadows prior to the post-war agricultural intensification, but these are now very scarce. This is due principally to use of fertilisers to improve grass production, the change from hay cropping to silage and herbicide applications. This has resulted in low-diversity grass swards. Post War agricultural incentive schemes also accelerated the drainage of damper sites and conversion of grasslands to arable cropping.

PRINCIPAL HABITAT TYPES

Trees and Woodlands
Although woodland retention is somewhat limited and most sites are isolated, the semi-natural woodlands are typical of those found in the Boulder Clay Woodlands Character Areas and are mainly classified by the National Vegetation Classification as W8 ash Fraxinus excelsior - field maple Acer campestre woodland. The tree canopy is typically pedunculate oak Quercus robur and ash Fraxinus excelsior over a mixed scrub and coppice layer of hazel Corylus avellana, hawthorn Crataegus monogyna, Midland hawthorn Crataegus laevigata, field maple Acer campestre, blackthorn Prunus spinosa, with sallows Salix caprea and S. cinerea in the damper areas. The ground flora is characterised by dog’s mercury Mercurialis perennis, bluebell Hyacinthoides non-scripta and primrose Primula vulgaris and notable species include broad-leaved helleborine Epipactis helleborine, early purple orchid Orchis mascula and sanicle Sanicula europaea. However, many woodlands have been cleared and restocked with various broadleaved and coniferous trees. Despite this many of these plantations retain the characteristic ground flora and shrub layer, particularly along the rides.

Rivers and Wetlands
Rivers and streams are not characteristic of this Biodiversity Character Type. However, there are occasional small, heavily shaded ponds within the woodlands and more open ponds in the adjacent farmed land. The majority of these ponds are man-made and consequently there is no discernable pattern of distribution. Many of these ponds are only seasonally wet.
There is limited survival of unimproved semi-natural dry grasslands in the farmed landscape. Those that remain are generally mesotrophic, with a mild calcareous influence. Areas of unimproved semi-natural dry grassland can also be found on some of the wider rides within the woodlands.

Grasslands are typically of the MG5 common knapweed *Centaurea nigra* - crested dog's-tail *Cynosurus cristatus* community, probably the most frequent grassland vegetation type to be found in the British lowlands prior to modern agricultural improvement. Typical species include red fescue *Festuca rubra*, tufted hair-grass *Deschampsia cespitosa*, lady's bedstraw *Galium verum*, cowslip *Primula veris*, and meadow vetchling *Lathyrus pratensis*. Among the more notable species are green-winged orchid *Orchis morio*, adder’s-tongue *Ophioglossum vulgatum*, and pepper saxifrage *Silaum silaus*.

The undulating micro-topography of unimproved ridge and furrow grasslands can give rise to the occurrence of an association of two mesotrophic grassland types: the MG5 common knapweed *Centaurea nigra* - crested dog's-tail *Cynosurus cristatus* community on the dryer ridges and the MG9 Yorkshire fog *Holcus lanatus* - tufted hair-grass *Deschampsia cespitosa* community in the damper furrows. The Yorkshire fog - tufted hair-grass community is characterised by grasses, including creeping bent *Agrostis stolonifera* and Yorkshire fog *Holcus lanatus*, with tufted hair-grass and herbs such as common knapweed *Centaurea nigra*, red clover *Trifolium pratense* and white clover *T. repens* occurring frequently.

Calcareous grassland occurs in man-made habitats, such as disused railway cuttings, over very thin soils where boulder clay has been removed to reveal underlying limestones. These grasslands are often unmanaged and scrub is a feature.
4a RADSTONE

13km² of Boulder Clay with occasional Glacial Sand and Gravel deposits immediately to the north of Brackley. The area mainly comprises arable fields with some agriculturally improved grassland. Woodland cover is limited to two sites of ancient origin, the Halse Copses, which are separated by an arable field. Helmdon Disused Railway SSSI cuts through the boulder clay in places, exposing the limestone geology beneath. There are no unimproved semi-natural grassland sites on the Boulder Clay.

Halse Copse South is an ash *Fraxinus excelsior* - field maple *Acer campestre* woodland with oak *Quercus robur*, some remnants of hazel *Corylus avellana* coppice and an under storey of field maple *Acer campestre*, hawthorn *Crataegus monogyna* and Midland hawthorn *Crataegus laevigata*. The ground flora includes typical species such as bluebell *Hyacinthoides non-scriptus*, together with occasional broad-leaved helleborine *Epipactis helleborine* and sanicle *Sanicula europaea*. Halse Copse North is similar, with ancient woodland indicator species including bluebell *Hyacinthoides non-scriptus*, enchanter’s nightshade *Circaea lutetiana*, wood anemone *Anemone nemorosa*, bugle *Ajuga reptans*, wood-sedge *Carex sylvatica*, lady fern *Athyrium filix-femina* and wood millet *Milium effusum*. The shrub layer is sparse in places. There has also been some planting of larch *Larix decidua* and Norway spruce *Picea abies*.

Helmdon Disused Railway SSSI is more appropriately described under the Great Ouse Valley Limestone Slopes. However, Greatworth Hall Cutting, which lies entirely within this Character Area is also a length of disused railway cutting, although much shorter in length, cut into the underlying limestones. Formerly a herb-rich calcareous grassland, scrub has now developed and shaded out much of the grassland interest, an example of how lack of management of such sites can be detrimental to the biological interest.

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4b MORETON PINKNEY, WEEDON LOIS AND BRADDEN

26 km² of almost unbroken Boulder Clay with large areas of arable farmland and a concentration of improved grasslands, some of which have ridge and furrow. The area lies to the west of Towcester. Woodland retention is limited to Plumpton Wood, a replanted ancient woodland, and occasional small coverts. Several road verges represent fragments of formerly widespread mesotrophic grasslands, but the best example is the ridge and furrow grassland at Plumpton Pasture SSSI.

Plumpton Wood was previously planted with conifers, but is now being returned to broad-leaved woodland. There is a very wide range of tree and scrub species as a result of both the planting and the regrowth of scrub along the edge of the compartments. The ride vegetation has been damaged, or destroyed in order to create surfaced tracks to facilitate timber extraction. Despite the damage, both the rides and the ground flora have a good collection of ancient woodland species. Tree and scrub species present include oak *Quercus robur*, ash *Fraxinus excelsior*, field maple *Acer campestris*, yew *Taxus baccata*, silver birch *Betula pendula*, privet *Ligustrum vulgare*, crab apple *Malus sylvestris*, field rose *Rosa arvensis* and dogwood *Cornus sanguinea*. The more open areas of the field layer, where not dominated by bare litter, have abundant bluebells *Hyacinthoides non-scriptus*. Other field layer and ride species include glaucous sedge *Carex flacca*, wood sedge *C. sylvatica*, jointed rush *Juncus articulatus*, hard rush *J. inflexus*, wood anemone *Anemone nemorosa*, wood melick *Melica uniflora*, enchanter’s nightshade *Circaea lutetiana*, primrose *Primula vulgaris*, common spotted orchid *Dactylorhiza fuchsii*, lesser celandine *Ranunculus ficaria* and greater stitchwort *Stellaria holostea*. Creeping buttercup *Ranunculus repens* is abundant on the grassy rides, many of which have frequent sedges as well as Yorkshire fog *Holcus lanatus* and cock’s foot *Dactylis glomerata*.

Plumpton Pasture SSSI is an area of unimproved grassland overlying Boulder Clay, with a pronounced ridge and furrow formation. The vegetation present includes two mesotrophic grassland communities. The well-drained ground on the ridge-tops supports a herb-rich community of the common knapweed *Centaurea nigra* - crested dog’s-tail *Cynosurus cristatus* type, whilst the vegetation on the wetter ground in the furrows conforms to the Yorkshire fog *Holcus lanatus* - tufted hair-grass *Deschampsia cespitosa* community. The crested dog’s-tail - common knapweed community is now rare both in Northamptonshire and in Great Britain. This community is dominated by sweet vernal-grass *Anthoxanthum odoratum*, common bent *Agrostis capillaris*, Yorkshire fog *Holcus lanatus*, common knapweed *Centaurea nigra*, lady’s bedstraw *Galium verum* and meadow vetchling *Lathyrus pratensis* with frequent crested dog’s-tail *Cynosurus cristatus*, red fescue *Festuca rubra*, yellow oat-grass *Trisetum flavescens*, rough hawkbit *Leontodon hispidus* and common bird’s-foot-trefoil *Lotus corniculatus*. Grassland species associated with this community type include quaking-grass *Briza media*, ox-eye daisy *Leucanthemum vulgare*, devil’s-bit scabious *Succisa pratensis*, bitter vetch *Lathyrus linifolius*, pepper-saxifrage *Silaum silaus*, yellow rattle *Rhinanthus minor*, cat’s-ear *Hypochaeris radicata* and autumn hawkbit *Leontodon autumnalis*. Betony *Stachys officinalis* is locally abundant.

The Yorkshire fog-tufted hair-grass community of the furrows is dominated by the grasses creeping bent *Agrostis stolonifera* and Yorkshire fog *Holcus lanatus*, with tufted hair-grass *Deschampsia cespitosa* and herbs such as common knapweed *Centaurea nigra*, red clover *Trifolium pratense* and white clover *T. repens* occurring frequently.

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4b - Henry Stanier - Yellow Rattle
4. CROPPED CLAYLAND

- Plumpton Wood Corner
- Ward’s Copse and Ashby Gorse
- Weston Verge

Local Nature Reserves
- None
MAIDFORD AND GRIMSCOTE

An area of 18km² comprising Boulder Clay with occasional Glacial Sand and Gravel deposits to the north west of Towcester. The farmland is mainly arable with some concentrations of improved agricultural grassland. Woodland retention is greater than in many of the Cropped Clayland Biodiversity Character Areas, with the majority being replanted ancient woodlands. The only unimproved semi-natural grassland is Maidford Meadow and there are scattered farm ponds.

Although not the largest woodland, Grub’s Copse is the largest area of ancient-semi natural woodland in the locality and indicative of a once more widespread woodland type. The majority of the other woods on ancient woodlands sites have been replanted with conifers. Grub’s Copse is rather overgrown, but the coppice and ground flora structure is more or less intact. The trees are predominantly oak *Quercus robur* and ash *Fraxinus excelsior* poles, with some standards. The shrub layer and surrounding hedge are the most diverse features, with species including hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, field maple *Acer campestre*, hazel *Corylus avellana*, field rose *Rosa arvensis* and elder *Sambucus nigra*. The field layer comprises dog’s mercury *Mercurialis perennis*, meadowsweet *Filipendula ulmaria*, bluebell *Hyacinthoides non-scriptus*, wild angelica *Angelica sylvestris*, enchanter’s nightshade *Circaea lutetiana*, wood sedge *Carex sylvatica*, bugle *Ajuga reptans* and male fern *Dryopteris filix-mas*. Older records include broad-leaved helleborine *Epipactis helleborine*, common spotted orchid *Dactylorhiza fuchsii* and early purple orchid *Orchis mascula*.

Grimscote Heath is one of several woodlands in the county that are not ancient, but are very well established forested heaths. This site is unusual as the mapped geology and soils do not indicate an acidic site, although the Bolder Clay deposit over the Northampton Sand Formation may be very thin giving rise to more locally acidic conditions. Young ash *Fraxinus excelsior* poles are dominant, alongside much older oak *Quercus robur*, ash and mature field maple *Acer campestre*. Hedge and shrub species include dogwood *Cornus sanguinea*, hazel *Corylus avellana*, field maple *Acer campestre*, wayfaring tree *Viburnum lantana*, hawthorn *Crataegus monogyna* and field rose *Rosa arvensis*. The ground flora is typical of Boulder Clay Woodland, but is becoming overgrown with gorse *Ulex europaeus*, bramble *Rubus fruticosus* and raspberry *Rubus idaeus*, which are all indicative of acidic conditions.
Maidford Meadow is an unploughed, unimproved mesotrophic meadow with ridge and furrow. All sides are hedged and the habitat is further enhanced by two small areas of very wet grassland. The wettest areas include dominant reed sweet-grass *Glyceria maxima* with common water-crowfoot *Ranunculus aquatilis*, but few additional species. The rest of the meadow supports a roughly homogeneous sward of meadow foxtail *Alopecurus pratensis*, red fescue *Festuca rubra*, crested dog’s-tail *Cynosurus cristatus* and sweet vernal-grass *Anthoxanthum odoratum*, with abundant herbs, including pignut *Conopodium majus*, meadow buttercup *Ranunculus acris* and lady’s bedstraw *Galium verum*. Tormentil *Potentilla erecta* and bird’s-foot-trefoil *Lotus corniculatus* are occasional, but only on the ridges, which are slightly drier with finer-leaved grasses than in the furrows.

Wetlands in the form of small ponds are relatively well represented. Maidford Lodge Ponds is a Wildlife Site, with broad-leaved pondweed *Potamogeton natans*, water plantain *Alisma plantago-aquatica*, water horse-tail *Equisetum fluviatile*, water mint *Mentha aquatica*, common water-crowfoot *Ranunculus aquatilis*, bur-reed *Sparganium sp.*, jointed rush *Juncus articulatus*, hard rush *J. inflexus* and water forget-me-not *Myosotis scorpioides*. Maidford Bog, an unusual patch of spring-fed bog with standing water, almost entirely choked with bottle sedge *Carex rostrata*, water horse-tail *Equisetum fluviatile* and bogbean *Menyanthes trifoliata*, an extreme rarity in the county, is nearby.

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This area of 21 km² forms a lightly wooded extension of the Yardley Chase and Salcey Forest Character Area (Boulder Clay Woodland Type). There is poor survival of unimproved semi-natural habitats, comprising two small isolated woodlands of ancient origin and two sections of dry grassland on a disused railway line and a road verge. There is an area of parkland with mature trees set in improved pasture at Easton Neston, but this area is not notified as a Wildlife Site. Away from this area the land use is predominantly arable.

Stoke Park Wood is an area of ancient woodland, very little of which has been cleared and replanted. Where woodland has been removed the area has been converted to sheep pasture, with a few standard trees left to form parkland. A small strip has been re-coppiced, and both hazel *Corylus avellana* and wych elm *Ulmus glabra* are regenerating. The canopy consists of ash *Fraxinus excelsior*, oak *Quercus robur* and derelict hazel *Corylus avellana* coppice with frequent field maple *Acer campestre*. Other shrub species are patchy throughout, but include blackthorn *Prunus spinosa*, hawthorn *Crataegus monogyna*, Midland hawthorn *Crataegus laevigata* and elder *Sambucus nigra*. There is a good variety of typical ground flora species including large areas dominated by dog’s mercury *Mercurialis perennis* in the darker areas and bluebell *Hyacinthoides non-scripta* in the lighter areas. Primrose *Primula vulgaris*, wood anemone *Anemone nemorosa*, wood avens *Geum urbanum*, bugle *Ajuga reptans*, germander speedwell *Veronica chamaedrys*, sweet violet *Viola odorata* and lords and ladies *Arum maculatum* are less frequent. Early purple orchid *Orchis mascula* and common spotted orchids *Dactylorhiza fuchsii* have also been recorded. The woodland on the east side of the road has a typical old coppice structure, and the ground flora here is more diverse, with yellow archangel *Lamiastrum galeobdolon* and pignut *Conopodium majus* in addition to the above. There are also fewer signs of disturbance and correspondingly less weedy vegetation.
Nun Wood is also an ancient woodland site. Its composition differs from Stoke Park Wood in that it has been partly replanted, but it largely retains its ancient woodland ground flora structure. It still has some relict coppice, and the scrub layer, as a whole, is diverse. The presence of large, mature trees amongst the newer planting greatly enhances the wildlife value.

Dry grasslands are represented by the Tiffield Road Verges and a nearby, dismantled railway. The flora of the railway, which, when in cutting reflects the calcareous nature of the sub-surface geology, is not typical of the grassland that would normally occur over the Boulder Clay. The site grades from open calcareous grassland with upright brome *Bromus erectus*, quaking grass *Briza media*, common spotted orchid *Dactylorhiza fuchsii*, cowslip *Primula veris*, hoary plantain *Plantago media*, and lady’s bedstraw *Galium verum*, to areas of dense scrub, with hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa* and dog-rose *Rosa canina*, where little grassland remains.

The road verges are more typical of the calcareous influenced neutral grassland that would once have been more widespread in the area. They support abundant meadow grasses some of which are characteristic of areas with impeded drainage, including red fescue *Festuca rubra*, rough meadow-grass *Poa trivialis*, cock’s-foot *Dactylis glomerata*, tufted-hair grass *Deschampsia cespitosa* and glaucous sedge *Carex flacca*. Herb species on both sides of the road include ribwort plantain *Plantago lanceolata*, meadow buttercup *Ranunculus acris*, agrimony *Agrimonia eupatoria*, yarrow *Achillea millefolium*, bird’s-foot-trefoil *Lotus corniculatus*, restharrow *Ononis repens*, common spotted orchid *Dactylorhiza fuchsii* and common knapweed *Centaurea nigra*.
4. CROPPED CLAYLAND

4e BUGBROOKE, ROTHERSTHORPE AND COLLINGTREE

A closely related series of Boulder Clay areas covering 19km² with variable amounts of surface Glacial Sand and Gravel which are being quarried to the north west of Rothersthorpe. Woodland cover is not a prominent feature. However, there are some isolated coverts at the east end of the area. Land use is predominantly arable.

The two designated Wildlife Sites are man-made habitats. The first, the Northampton Arm of the Grand Union Canal, bears no relation to the local geology and soils and the second Collingtree Golf Course, only part of which lies in this Biodiversity Character Area, demonstrates the value of golf courses for wildlife.

The Northampton Arm Grand Union Canal connects to the River Nene at Northampton. The waterway and associated hedgerow provide a valuable wildlife corridor for terrestrial and wetland species. A broad strip of emergent vegetation in the vicinity of Milton Malsor locks contains purple loosestrife *Lythrum salicaria*, greater pond-sedge *Carex riparia*, water mint *Mentha aquatica*, branch bur-reed *Sparganium erectum*, orange balsam *Impatiens capensis* and marsh woundwort *Stachys palustris*. The gradation from reed sweet-grass *Glyceria maxima* swamp, greater pond-sedge *Carex riparia*, yellow iris *Iris pseudacorus* and bur-reed *Sparganium sp.* to shorter herbs and meadow species is one of the best examples of canal side vegetation forming a distinctive, consistent vegetated strip. Elsewhere the typical 2-3m strip of emergent vegetation is variously dominated by greater pond-sedge *Carex riparia*, bur-reed *Sparganium sp.* or reed sweet-grass *Glyceria maxima*.

Collingtree Golf Course is described under the Wootton Brook Biodiversity Character Area.

DESIGNATED SITES

| National Nature Reserves | None |
| Sites of Special Scientific Interest | None |
| Wildlife Sites | Collingtree Golf Course, Northampton Arm Grand of the Union Canal |
| Local Nature Reserves | None |
4f  BRAFIELD AND HACKLETON

A 21 km² area of undulating clayland to the north of Yardley Chase. Woodland cover is limited to a few isolated game coverts. Land use is predominantly arable and there are no retained areas of unimproved semi-natural habitat.

DESIGNATED SITES

- National Nature Reserves: None
- Sites of Special Scientific Interest: None
- Wildlife Sites: None
- Local Nature Reserves: None
4g THE BRINGTONS

A 13 km² area dominated by Boulder Clay to the east and Glacial Sands and Gravels to the west, lying to the west of Northampton. The land use is predominantly arable, but there are some areas of woodland, the largest of which is the ancient semi-natural Nobottle Wood, which lie mainly on the Boulder Clay. This site is important as a pool of species for the adjacent woodlands, some of which have subtly different soils and species composition, but most of which are more recently disturbed examples of the same woodland type. Woodland is the only unimproved semi-natural habitat occurring in this Biodiversity Character Area.

Nobottle Wood has very wet rides on heavy clay soil, and rather overgrown, dark compartments with frequent hazel Corylus avellana coppice. Trees include old and young oak Quercus robur, old sweet chestnuts Castanea sativa, sycamore Acer pseudoplatanus, ash Fraxinus excelsior, beech Fagus sylvatica, turkey oak Quercus cerris and two mixed compartments dominated by larch Larix decidua and Norway spruce Picea abies. The shrub layer is almost non-existent in the coniferous areas, but quite dense and diverse in most of the rest of the wood. Species include field maple Acer campestre, goat willow Salix caprea, dogwood Cornus sanguinea, hawthorn Crataegus monogyna, guelder rose Viburnum opulus and blackthorn Prunus spinosa. The presence of silver birch Betula pendula and raspberry Rubus idaeus is indicative of the change to lighter, more acidic soils.

The ground flora is dominated by dog’s mercury Mercurialis perennis and bluebell Hyacinthoides non-scriptus. Broad-leaved helleborine Epipactis helleborine, early purple orchid Orchis mascula, sanicle Sanicula europaea and ramsons Allium ursinum have also been recorded.

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4h- Nathalie Hueber - Small Copper
An area of 16 km² comprising two closely associated Boulder Clay deposits immediately north of Daventry. Land use is predominately arable, but there is a concentration of smaller agriculturally improved grasslands in the north of the area. Retention of unimproved semi-natural habitat is poor and woodland cover is limited to Ashby Home Wood and Braunston Covert, both of which are Wildlife Sites, although neither is of ancient origin. Unimproved grassland is limited to a section of the disused railway running north from Daventry.

Ashby Home Wood is an area of mixed park woodland with a large lake. The woodlands consist of replanted ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus* and white poplar *Populus alba*, with a sparse shrub layer of hawthorn *Crataegus monogyna*, elder *Sambucus nigra*, field maple *Acer campestre*, guelder rose *Viburnum opulus*, privet *Ligustrum vulgare* and hazel *Corylus avellana*. The ground flora is disturbed, with frequent nettles *Urtica dioica*. Species indicative of older woodland included sanicle *Sanicula europaea*, pendulous sedge *Carex pendula* and bluebell *Hyacinthoides non-scriptus*.

Braunston Covert overlaps the edge of this character area and parts of the wood may be more acidic. It comprises a mosaic of woodland, stream and grassland. The Covert is an old woodland site that has been felled and allowed to regenerate, with a few of the older trees left as standards. Trees include very large old oaks *Quercus robur*, which are scattered throughout, ash *Fraxinus excelsior* standards, young ash and sycamore *Acer pseudoplatanus* and dense elder *Sambucus nigra*, hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa* scrub. The ground flora is dominated by nettle *Urtica dioica*. The smaller patch of woodland opposite the Covert lies alongside a fast-flowing stream and comprises is a greater variety of tree species. It is likely that this has not been cleared recently. The neutral grassland between the woodlands is being gradually invaded by scrub. Grassland species include frequent lady’s bedstraw *Galium verum*, bird’s-foot-trefoil *Lotus corniculatus*, creeping cinquefoil *Potentilla reptans*, lesser stitchwort *Stellaria graminea* and red clover *Trifolium pratense*. The grasses are dominated by Yorkshire fog *Holcus lanatus*, with frequent common bent *Agrostis capillaris*, creeping bent *A. stolonifera*, tufted hair-grass *Deschampsia cespitosa*, crowned dog’s-tail *Cynosurus cristatus*, red fescue *Festuca rubra*, timothy *Phleum pratense* and cock’s foot *Dactylis glomerata*.

Daventry Disused Railway is a varied length of disused railway line, partly within the town. The site comprises a mixture of scrub and grassland and provides a valuable, undisturbed wildlife corridor. The greatest botanical diversity is found on the former track bed and the sides of the deepest cutting. The base of this cutting is damp with the growth of scrub starting about halfway up the sides, leaving grassland and anthills on the lower slope. There is a badger *Meles meles* sett to the north. Scrub comprises guelder rose *Viburnum opulus*, hawthorn *Crataegus monogyna*, dogwood *Cornus sanguinea*, elder *Sambucus nigra*, field rose *Rosa arvensis* and young ash *Fraxinus excelsior*, whilst the grassland species on the grassy slopes include red fescue *Festuca rubra* and common bent *Agrostis capillaris*, with frequent lady’s bedstraw *Galium verum*, common knapweed *Centaurea nigra*, bird’s-foot-trefoil *Lotus corniculatus*, sweet vernal-grass *Anthoxanthum odoratum*, sorrel *Rumex acetosa*, self-heal *Prunella vulgaris*, wild strawberry *Fragaria vesca*, field horse-tail *Equisetum arvense* and agrimony *Agrimonia eupatoria*.
4i EAST AND WEST HADDON

An area of Boulder Clay and extensive surface Glacial Sands and Gravels lying to the east of the Watford Gap. The area covers 19 km² and comprises a mixture of improved agricultural grasslands and arable fields with limited woodland cover. There are only three wildlife sites, Buckby Folly Covert and Holdenby House Parkland, both of which lie on the periphery of the area, and Blackthorn Spinney which predominantly lies outside.

Buckby Folly Covert overlaps the Boulder Clay and the Northampton Sand Formation. It is a well-established plantation, part of which may be ancient in origin, growing partly over old ridge and furrow. The trees are mostly larch *Larix decidua* and oak *Quercus robur*, with beech *Fagus sylvatica*, ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus* and sweet chestnut *Castanea sativa*. The ground flora in the more open areas is dominated by bluebell *Hyacinthoides non-scripta*. Species over the sands reflect the change in the geology, which has a more acidic influence.

Holdenby House Park consists of ponds, sheep-grazed grassland and numerous old parkland trees and also overlaps the boundary of this Biodiversity Character Area. The trees used to be a lot more numerous but, around 250 elms *Ulmus procera* were lost due to Dutch Elm Disease. The house is thought to date from at least the 13th Century and the fishponds are probably also very old features. Typical marginal wetland species include un-branched bur-reed *Sparganium emersum*, water figwort *Scrophularia auriculata*, bulrush *Typha latifolia*, great willowherb *Epilobium hirsutum*, hard rush *Juncus inflexus*, watercress *Rorippa nasturtium-aquaticum* and mare’s-tail *Hippuris vulgaris*. Aquatic species include abundant broad-leaved pondweed *Potamogeton natans*, white water lily *Nymphaea alba* and Rigid hornwort *Ceratophyllum demersum*.

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4j SYWELL, HARDWICK AND MAWSLEY PLATEAU

A Boulder Clay plateau covering 63km² and located between the valleys of the Brampton Nene and River Ise. It comprises a predominantly arable farming landscape with some grassland and limited woodland cover. The survival of unimproved semi-natural habitats is poor, but in comparison to other areas of Cropped Clayland their retention is better than most. Habitats include woodlands of ancient origin and more recently planted coverts.

Badsaddle, Withmale Park and Bush Walk Woods SSSI represent the woodland type that would once have been more widespread in this area. They are examples of the wet ash *Fraxinus excelsior* - maple *Acer campestre* type. Until relatively recently they have been managed as coppice with standards.

The canopy is dominated by oak *Quercus robur* and ash *Fraxinus excelsior*. The shrub layer which still shows coppice compartments of varying age, comprises mainly field maple *Acer campestre* and hazel *Corylus avellana* with hawthorn *Crataegus monogyna* and some dogwood *Cornus sanguinea*, Guelder rose *Viburnum opulus*, spindle *Euonymus europaeus* and Midland hawthorn *C. laevigata* also occur. The ground flora is dominated by dog's mercury *Mercurialis perennis*, bluebell *Hyacinthoides non-scripta* and, locally, ramsons *Allium ursinum*, together with other typical woodland species such as wood anemone *Anemone nemorosa*, giant bellflower *Campanula latifolia*, enchanter's nightshade *Circaea lutetiana* and wood avens *Geum urbanum*. Bush Walk, although of a similar structure, has been managed to produce a more open canopy. The resulting ground flora contains several species of note such as herb Paris *Paris quadrifolia*, Goldilocks buttercup *Ranunculus auricomus*, and four species of orchid including greater butterfly *Platanthera chlorantha*. Badsaddle Wood supports the largest colony in the county, and possibly in the region, of the rare yellow star of Bethlehem *Gagea lutea*. Along the rides and in the wetter areas to the north of Withmale Park, willows *Salix spp.* occur with meadowsweet *Filipendula ulmaria* and tufted hair-grass *Deschampsia cespitosa*.

*4j- Nathalie Hueber - Bumble bee on Meadow Vetchling*
There is evidence that some former grassland sites became wooded, prior to modern agricultural change, either by planting or through natural succession. Old Poors Gorse is an old woodland, partly on ridge and furrow, but not identified as being of ancient origin. Despite this there is a good variety of ancient woodland ground flora species. Although no acid indicators are recorded, the name suggests that this site may have been heath land and geologically it lies on Boulder Clay over Northampton Sand Formation, the latter giving rise to the most acidic habitats in the county.

The best example of intact mesotrophic grassland is Hardwick Lodge Meadow SSSI, an extensive, species-rich and agriculturally-unimproved permanent pasture. The grassland is a fine example of the crested dog’s-tail *Cynosurus cristatus* - common knapweed *Centaurea nigra* community developed on soils ranging from poorly-drained and lime deficient to freely-drained and calcareous. Such grasslands are the result of a long continuity of traditional management and this site’s existence is documented as far back as 1587.

Hardwick Lodge Meadow has particular importance in a county context as the largest site of its kind and in demonstrating the full range of floristic variation in the major grassland community. An exceptionally large number of plants rare in Northamptonshire occur. The vegetation shows four variants. Typically there is a very diverse mixture of grasses and herbs such as red fescue *Festuca rubra*, sweet vernal-grass *Anthoxanthum odoratum*, crested dog’s-tail *Cynosurus cristatus*, common bird’s-foot-trefoil *Lotus corniculatus*, clovers *Trifolium spp.*, meadow vetchling *Lathyrus pratensis*, glaucous sedge *Carex flacca* and field wood-rush *Luzula campestris*. Dryer, more lime-enriched parts are broadly similar with additional species including crested hair-grass *Koeleria macrantha*, salad burnet *Sanguisorba minor*, dwarf thistle *Cirsium acaule*, hoary plantain *Plantago media* and cowslip *Primula veris*.

Over much of the site these communities are modified by the presence of abundant tufted hair-grass *Deschampsia cespitosa*, indicating seasonally waterlogged soils. Here, more locally, there is an acidic influence that favours plants such as betony *Stachys officinalis*, tormentil *Potentilla erecta*, heath-grass *Danthonia decumbens* and devil’s bit scabious *Succisa pratensis*. In the northwest corner, alongside a bisecting stream, permanently moist soil conditions support marshy grassland. Common spike-rush *Eleocharis palustris*, hard rush *Juncus inflexus*, sneezewort *Achillea ptarmica*, marsh-marigold *Caltha palustris*, meadowsweet *Filipendula ulmaria* and saw-wort *Serratula tinctoria* are characteristic of these areas. Also occurring here are large populations of heath spotted-orchid *Dactylorhiza maculata* and common spotted-orchid *D. fuchsii*.

Neutral grassland indicators still occur on some road verges and tracks. Broughton Green Lane is a broad green lane with tall trees and scrub on both sides. Although dominated by coarse grasses, the sward includes species typical of neutral meadows such as meadow vetchling *Lathyrus pratensis*, self heal *Prunella vulgaris* and common knapweed *Centaurea nigra*.
4k CLIPSTON, NASEBY AND WELFORD

A large area of Boulder Clay covering 49 km² which forms the watershed of the Brampton Nene and the Rivers Avon, Welland and Ise in the northwest of the county. Although the area is large, unimproved semi-natural habits are limited to a few fragmented woodland blocks, of which only Scotland Wood is of ancient origin, and a thickly hedged green Lane at Cottesbrooke, which provides a valuable wildlife corridor.

Scotland Wood is an area of ancient woodland with three out of the six compartments replanted with a mixture of broadleaves and conifers. The rides are broad, grassy and mostly very wet. Much of the diversity of scrub on the site is in the surrounding hedges. The rides are dominated by meadow foxtail Alopecurus pratensis in some areas and rough meadow-grass Poa trivialis in the more disturbed parts. Frequently occurring herbs include meadowsweet Filipendula ulmaria, cuckooflower Cardamine pratensis, germander speedwell Veronica chamaedrys, creeping buttercup Ranunculus repens and silverweed Potentilla anserina.

The character of the ground flora in the two types of compartment differs sharply. Although replanted and subject to more disturbance, the conifer-dominated areas is more diverse than most conifer plantations. Species include male fern Dryopteris filix-mas, wood-sedge Carex sylvatica, wood avens Geum urbanum, herb Robert Geranium robertianum and frequent bramble Rubus fruticosus. The scrub layer in these compartments is dominated by blackthorn Prunus spinosa. Trees present include a small area of yew Taxus baccata.

The less disturbed compartments have been thinned, but not replanted with conifers. The trees include typical broadleaved species and the under storey contains some derelict old hazel Corylus avellana coppice as well as a mix including hawthorn Crataegus monogyna, field maple Acer campestre, blackthorn Prunus spinosa and holly Ilex aquifolium. The typical ash-maple woodland flora also includes common twayblade Listera ovata, common spotted orchid Dactylorhiza fuchsii and sanicle Sanicula europaea.

DESIGNATED SITES

| National Nature Reserves | None |
| Sites of Special Scientific Interest | None |
| Wildlife Sites | Barlow Farms Fields, Blackpits Spinney, Cottesbrooke Green Lane, Hanwell Spinney, Lodge Ground Spinney, Long Hold Spinney, Naseby Road Belt, Old Hemplow, Scotland Wood |
| Local Nature Reserves | None |
This small 15km² area is located predominantly to the east of the A509 in the vicinity of Bozeat. Although in the Yardley-Whittlewood Natural Area this area of Boulder Clay within Northamptonshire is unwooded. However, immediately to the east, in Bedfordshire, there is a cluster of important ancient woodland sites. The area mainly comprises arable farmland.

There are only two examples of unimproved semi-natural habitat in this area including Dungee Corner Meadow SSSI, a traditionally managed hay meadow where the hay is cut late and the aftermath grazed until the autumn. The grassland is a rich, but somewhat atypical, example of the mesotrophic crested dog’s-tail Cynosurus cristatus - common knapweed Centaurea nigra - lady’s bedstraw Galium verum sub-community, unusual for the presence of tor grass Brachypodium pinnatum and upright brome Bromus erectus.

The sward is composed of many grass species (over 20 are recorded) and the more abundant include, sweet vernal grass Anthoxanthum odoratum, Yorkshire fog Holcus lanatus, sheep’s fescue Festuca ovina, red fescue F. rubra, quaking-grass Briza media and crested dog’s-tail Cynosurus cristatus. Characteristic herbs include bulbous buttercup Ranunculus bulbosus, bird’s-foot-trefoil Lotus corniculatus, rough hawkbit Leontodon hispidus, field wood-rush Luzula campestris and red clover Trifolium pratense. There are differences in the composition of the grassland reflecting past management and the least disturbed area has a strong population of green-winged orchid Orchis morio.

The other site, Wollaston Roman Road, is a long stretch of green lane with a variety of habitat types along its length. It provides an important wildlife corridor through agricultural land, linking several small spinneys that would otherwise be isolated. The broad verges contain red fescue Festuca rubra, rough meadow-grass Poa trivialis, smooth meadow-grass P. pratensis, cock’s-foot Dactylis glomerata, common knapweed Centaurea nigra, lady’s bedstraw Galium verum and yarrow Achillea millefolium. Other species include bee orchid Ophrys apifera, bird’s-foot-trefoil Lotus corniculatus, ribwort plantain Plantago lanceolata, yellow-rattle Rhinanthus minor, wild carrot Daucus carota, goat’s-beard Tragopogon pratense and self-heal Prunella vulgaris. Where the grassland is taller additional species include crested dog’s-tail Cynosurus cristatus, glaucous sedge Carex flacca, hairy sedge C. hirta, spiked sedge C. spicata, oxeye daisy Leucanthemum vulgare, and meadow buttercup Ranunculus acris.

DESIGNATED SITES

| National Nature Reserves       | None |
| Sites of Special Scientific Interest | Dungee Corner Meadow |
| Wildlife Sites                  | Wollaston Roman Road |
| Local Nature Reserves           | None |

4I- Nathalie Hueber - Common Blue on Rough Hawkbit
4. CROPPED CLAYLAND

4m FINEDON PLATEAU

A small area of Boulder Clay covering 20km² to the northwest of Wellingborough and bounded by the valleys of the Rivers Nene, Ise and the Alledge Brook. Land use is mainly arable with predominantly large fields. Woodland is limited to small plantations and retention of unimproved semi-natural habitats is limited to two Wildlife Sites: Finedon Poplars and Irthlingborough Newt Ponds.

Finedon Poplars is a dense broadleaved woodland, apparently on old ridge and furrow, with a mixture of tree species and frequent mature scrub. Some derelict coppice remains and elm *Ulmus procera* deadwood is frequent. Although not surveyed for some years the ground flora is noted for common twayblade *Listera ovata*, early purple orchid *Orchis mascula* and common spotted orchid *Dactylorhiza fuchsii*.

Irthlingborough Newt Ponds is one of the Wildlife Trust’s smallest nature reserves and comprises a series of deep pools, formed by mining subsidence, in which a thriving colony of crested newts *Triturus cristatus* and a limited number of aquatic plant species survive. The newts use the ponds in spring and early summer for breeding before leaving to live in the surrounding rough grassland. Over the winter the adult newts hibernate in the crevices in rocks around the ponds. Among the grassland plants are bird’s-foot-trefoil *Lotus corniculatus*, agrimony *Agrimonia eupatoria* and common knapweed *Centaurea nigra*.

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4m -Bruce Shortland- Slow-worm
This area of 53km² lies between the Nene Valley and the county boundary with Cambridgeshire. Thrapston is at the north-eastern corner and Higham Ferrers is immediately to the southwest. It is a formerly wooded area, part of the Forest of Bromswold, with the village of Newton Bromswold providing a reminder. There are isolated woodlands of ancient origin to the east in Cambridgeshire, but none remain in this part of Northamptonshire. The land is now predominantly arable farmland with occasional and fragmentary retention of poor quality semi-natural habitat on road verges, disused railways and in recently managed woodlands. The wildlife value of the majority of these sites is declining.

Denford Old Ash is apparently a small patch of former ancient woodland, although not included in the Ancient Woodland Inventory. Despite clearance and the subsequent development of dense scrub, some bluebell *Hyacinthoides non-scripta* remains, along with scattered oak *Quercus robur*, ash *Fraxinus excelsior* and hazel *Corylus avellana* coppice stools. Areas of woodland at Old Meadow and Stanwick Pastures have also been cleared, but they have been subsequently replanted with broad-leaved species. Had these sites been located in a more heavily wooded area the value of the habitat would have been minimal, however in this area they provide important refuges for common local species.

Dry grasslands are represented by two road verges, both of which have deteriorated in recent years. The Caldecott Verges comprises mainly coarse grasses except for a broad patch where species typical of mesotrophic grassland include red fescue *Festuca rubra* meadow vetchling *Lathyrus pratensis*, common knapweed *Centaurea nigra*, wild carrot *Daucus carota* and cat’s-ear *Hypochaeris radicata*. The Hargrave Verges include field scabious *Centaurea scabiosa*, bird’s-foot trefoil *Lotus corniculatus* and meadow Vetchling *Lathyrus pratensis*, all of which are indicative of a more calcareous influence.

Disused railway lines also provide valuable wildlife corridors. Raunds Disused Railway Cutting is a Wildlife Site that has been colonised by dense and varied scrub and young trees, offering valuable cover for birds and mammals amongst otherwise intensively managed farmland. However, its value as a wildlife corridor is reduced as it is severed by the A45 and used as a farm access to the south. Similarly Beggar’s Lane near Stanwick Pastures is also a useful wildlife corridor through arable farmland. The green lane comprises rank grassland with occasional patches of more species-rich vegetation, including red fescue *Festuca rubra*, common knapweed *Centaurea nigra* and yarrow *Achillea millefolium*.

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This is the most easterly Cropped Clayland Biodiversity Character Area, lying to the north of Thrapston between the River Nene and the county boundary with Cambridgeshire. It mainly occupies 73km² of unbroken Boulder Clay, but has been extended over the Oxford Clay to the west to encompass all the woodlands in the vicinity. The land use is predominantly arable, but there are two wooded areas with associated neutral grassland, Ashton and Barnwell Wolds, which are remnants of an, historically, much larger area of woodland, the Forest of Bromswold. Although overall retention of unimproved semi-natural habitats is poor this area exhibits the best retention of all the Biodiversity Character Areas of this type.

Barnwell Wold is a Wildlife Site comprising a suite of ancient semi-natural woodlands with rather overgrown scrub layers and rides. Gumwell’s Wold is the least disturbed of the woodlands and has the best remnants of ancient woodland ground flora. Some very old oak *Quercus robur* remains, plus ash *Fraxinus excelsior*, beech *Fagus sylvatica* and wych elm *Ulmus glabra*. The shrub layer includes field maple *Acer campestre*, privet *Ligustrum vulgare*, blackthorn *Prunus spinosa*, hawthorn *Crataegus monogyna* and spindle *Euonymus europaeus*. The rides contain a mix of woodland and neutral grassland species, including crosswort *Galium cruciatum*, hedge bedstraw *G. mollugo*, male fern *Dryopteris filix-mas*, yellow-rattle *Rhinanthus minus*, burnet saxifrage *Pimpinella saxifraga* and primrose *Prunella vulgaris*. Greater butterfly orchid *Platanthera chlorantha* has also been recorded.

Ashton Wold SSSI is surrounded by a much larger Wildlife Site. The central block of woodland, which comprises Ashton Wold and Bluestone Covert, is a good example of ancient secondary woodland that is developing into a ‘natural’ woodland. The woodland is growing over ridge and furrow and was planted prior to 1824.

The tree canopy is made up of very large mature oaks *Quercus robur*, ash *Fraxinus excelsior* and occasional birch *Betula pendula*. Elm *Ulmus procera* was at one time an important feature, but was removed after it had been devastated by Dutch Elm Disease. The shrub layer is a very dense mixture of ash *Fraxinus excelsior* saplings, elm *Ulmus procera* suckers, hawthorn *Crataegus monogyna*, Midland hawthorn *C. laevigata*, hazel *Corylus avellana* and buckthorn *Rhamnus cathartica*. The ground flora is sparse. In places bramble *Rubus fruticosus* and dog’s mercury *Mercurialis perennis* predominates. Male fern *Dryopteris filix-mas* is especially common under the ash. Other typical herbs include ground ivy *Glechoma hederacea*, wood avens *Geum urbanum* and herb Robert *Geranium robertianum* with sanicle *Sanicula europaea* along some ride edges. Redcurrant *Ribes rubrum* is also found occasionally.
In the past the Wold has been noted for a number of species of now rare butterflies and moths, in particular the Chequered Skipper *Carterocephalus palaemon*. Indeed this was the last known site for the species before its extinction in England in 1976.

Neutral hay meadows would have been typical of the area prior to extensive agricultural improvement. A few examples remain and one of the most interesting is Ashton New Meadows, which is adjacent to the main west to east road through the Ashton Estate. The site comprises two fields, both of which were ploughed comparatively recently, but were subsequently restored by sowing seed gathered from Sudborough Green Lodge Meadows SSSI, a site with identical soils overlying boulder clay in the heart of the Rockingham Forest. Their composition is comparable in most respects to that of an old-established hay meadow, with additional species that indicate recent disturbance. Both meadows are harvested for their seed on a commercial basis. They are dominated by yellow-rattle *Rhinanthus minor* with red fescue *Festuca rubra*, timothy *Phleum pratense*, sweet vernal-grass *Anthoxanthum odoratum*, yellow oat-grass *Trisetum flavescens* and cock’s foot *Dactylis glomerata* with cowslip *Primula veris*, dog daisy *Leucanthemum vulgare* and bird’s-foot trefoil *Lotus corniculatus*. Rarer herbs include pepper saxifrage *Silaum silaus*, bee orchid *Ophrys apifera* and salad burnet *Sanguisorba minor*. The success of the grassland restoration demonstrates that creative conservation projects may be an option in the future.

Typical plants of unimproved neutral grassland have also been recorded at Lutton Pasture, a small site away from the wooded areas. They include adders-tongue fern *Ophioglossum vulgatum* and green winged orchid *Orchis morio*.

Wetland habitats are represented by a few small woodland ponds and the former Ashton Dragonfly Reserve and adjacent marsh. The lake was constructed around 1900 and has fringing vegetation including common reed *Phragmites australis*, greater pond-sedge *Carex riparia*, reed canary-grass *Phalaris arundinacea*, bulrush *Typha latifolia* and yellow iris *Iris pseudacorus*.

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CHARACTER AREAS

5a  Corby Quarries

KEY CHARACTERISTICS

• Former Ironstone quarries are widespread;
• there are occasional Lincolnshire Limestone exposures;
• mixed Boulder Clay and Lincolnshire Limestone overburden was used to in-fill several quarries, creating sites with a calcareous influence;
• man-made habitats predominate;
• woodlands tend to be mixed plantations of recent origin planted on restored quarries;
• woodland ground flora includes some ancient woodland indicators;
• calcareous grasslands are a feature of the thinner soils;
• mesotrophic (neutral) grasslands are a feature of deeper soils, particularly on rides in the plantations; and
• many of the former quarries contain ponds.
### INTRODUCTION

A heavily quarried area covering 22km² to the north and east of Corby. The majority of Wildlife Sites in this area are associated with the quarries and comprise plantation woodlands, mesotrophic (neutral) and calcareous grasslands and wetlands associated with impeded drainage. There is also a single woodland of ancient origin. Overall the proportion of Wildlife Sites is high. The woodlands and old quarries receive little management. Elsewhere, where the quarries have been infilled, the land is mainly under arable cropping.

### PHYSICAL INFLUENCES

#### Geology and Soils

Formerly this area comprised an extensive area of Northampton Sand Formation comprising Ironstone overlain by Boulder Clay and Lincolnshire Limestone. Subsequently much of Ironstone was quarried. Occasional Lincolnshire Limestone quarry faces remain exposed, however, the majority of quarry gullies have been infilled with domestic waste and the Boulder Clay/Lincolnshire Limestone overburden. The restored quarries are now characterised by a thin topsoil which are either seasonally waterlogged and slowly permeable or stony clays that crack deeply in dry seasons and are slowly permeable when wet (Hodge 1984). The characteristic vegetation shows little change across the two soils types, although subtle variations in soils chemistry, the degree of water logging and the amount of light they receive, particularly within the woodlands, give rise to local variations in species composition.

#### Hydrology

Watercourses and springs are not typical of this Character Type. However, on the unrestored quarry floors where the soils tend to be heavy, compacted and poorly drained, ponds are a feature.

### HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS

Extensive quarrying has resulted in the development of a wide variety of habitats, and the retention of Wildlife Sites is far greater than would be expected had the land not been quarried. Prior to quarrying the typical habitats would have been those associated with the Cropped Claylands or Boulder Clay Woodlands Character Areas, with areas of broadleaved woodland and neutral grassland with a calcareous influence. However, the quarrying of Ironstone has exposed some Lincolnshire Limestone at the edges and subsequent infilling with mixed Boulder Clay and Lincolnshire Limestone overburden means that the habitats that have develop tend to be calcareous.

### PRINCIPAL HABITAT TYPES

#### Trees and Woodlands

There is a sizable woodland component, principally comprising various mixed plantations, which were established during the restoration of the ironstone quarries. The woodland flora tends not to be particularly diverse, although some plantations contain species more typical of ancient woodlands. The grassy rides dividing the woodland blocks are a key component of these woodlands and many comprise areas of mesotrophic (neutral) grassland. Areas of calcareous grassland are also found on thinner soils often associated with quarry railway cuttings.

Brookfield Plantation is typical of the woodlands planted on former ironstone quarries. It is a large mixed plantation comprising mainly sycamore *Acer pseudoplatanus*, larch *Larix decidua* and Norway spruce *Picea abies*, with some non-native alder *Alnus sp* established in the wetter areas. The planted compartments have a margin of varied scrub. The ground flora, which includes dog’s mercury *Mercurialis perennis* and bluebell *Hyacinthoides non-scriptus*, shows the influence of the nearby ancient woodland sites. The botanically diverse rides have a mixture of grasses include crested dog’s tail *Cynosurus cristatus*, smooth meadow grass *Poa pratensis* and false oat grass *Arrhenatherum elatius*. Glauccous sedge *Carex flacca* and hairy sedge *C. hirta* are abundant in places, sometimes taking the place of grasses. Herbs include common knapweed *Centaurea nigra*, meadow vetchling *Lathyrus pratensis*, self heal *Prunella vulgaris*, common mouse-ear *Cerastium fontanum*, red bartsia *Odontites verna* and frequent wild carrot *Daucus carota*.
The only area of woodland of ancient origin is Rockingham Wood, which has not been replanted with such a high density of conifers as the surrounding plantations. It retains some older oaks Quercus robur and a more typical ancient woodland ground flora. The compartments vary in both their ground flora and tree composition, from largely planted to mostly semi-natural. Trees include old and young oaks Quercus robur, ash Fraxinus excelsior, sycamore Acer pseudoplatanus, Norway maple Picea abies, larch Larix decidua and alders Alnus spp. The shrub layer is well developed with some younger hawthorn Crataegus monogyna, but mainly dog rose Rosa canina, dogwood Cornus sanguinea, goat willow Salix caprea, grey willow Salix cinerea, blackthorn Prunus spinosa and frequent old hazel Corylus avellana coppice. As a whole the ground flora has more bracken Pteridium aquilinum to the south and west, typical of the vegetation over free-draining sands, although there are smaller areas dominated by bluebell Hyacinthoides non-scriptus and dog’s mercury Mercurialis perennis, more typical of woodlands over Boulder Clay. Other species present include frequent bramble Rubus fruticosus, ground ivy Glechoma hederacea, herb Robert Geranium robertianum and ivy Hedera helix.

Dry Grasslands and Heaths

Both calcareous and mesotrophic (neutral) grasslands occur on the quarried sites. Calcareous grasslands tend to be found on the thinner soils, often in the disused railway cuttings. Mesotrophic grasslands are more typical of deeper soils in the restored quarries, particularly on the plantation rides.

Stanton Lane Plantation Embankment, part of the larger Stanton Lane Plantation, comprises an area of calcareous grassland on thin soils, including sweet vernal-grass Anthoxanthum odoratum, meadow foxtail Alopecurus pratensis, tor grass Brachypodium pinnatum and abundant wood small-reed Calamagrostis epigejos. The latter is dominant on much of the upper part of the embankment. Ribbed melilot Melilotus officinalis is also abundant and dominant in some parts. Other frequent species include restharrow Ononis repens, marsh thistle Cirsium palustre, common centaury Centaurium erythraea, glaucous sedge Carex flacca, bird's-foot-trefoil Lotus corniculatus, yellow-wort Blackstonia perfoliata, lady’s bedstraw Galium verum, common knapweed Centaurea nigra, basil thyme Clinopodium acinos, wild carrot Daucus carota and eyebright Euphrasia officinalis. Carline thistle Carlina vulgaris, occurs in some numbers along the top edge of the cutting.

Plantation Meadow, a mesotrophic hay meadow between Boundary Plantation and Gretton East Plantation, is typical of the more species rich neutral grasslands. Meadow foxtail Alopecurus pratensis is the dominant grass, with frequent red fescue Festuca rubra, sweet vernal-grass Anthoxanthum odoratum, smooth meadow grass Poa pratensis and field wood-rush Luzula campestris. Herb species include bird's-foot-trefoil Lotus corniculatus, yarrow Achillea millefolium, ribwort plantain Plantago lanceolata, meadow vetchling Lathyrus pratensis, red clover Trifolium pratensis, meadow buttercup Ranunculus acris, sorrel Rumex acetosa, and abundant lady’s bedstraw Galium verum.

Rivers and Wetlands

Ponds are typical of many of the quarried sites, for example the two deep pools in a particularly deep quarry working within Brookfield Plantation. Many are associated with marshy grassland in areas where drainage is impeded and, due to lack of management, are often heavily shaded by dense marginal goat willow Salix caprea and other scrub. Brookfield Plantation Pools comprise a fringe of emergent species plus variable degrees of submerged growth. The main species present are common club-rush Schoenoplectus lacustris, water plantain Alisma plantago-aquatica, common spike-rush Eleocharis palustris and patches of jointed rush Juncus articulatus in the shallows. Typical aquatics include broad-leaved pondweed Potamogeton natans and common water-crowfoot Ranunculus aquatilis.
5. QUARRIED IRONSTONE

5a CORBY QUARRIES

The Corby Quarries is the only Biodiversity Character Area associated with the Quarried Ironstone Biodiversity Character Type, therefore the above description applies to this area.

DESIGNATED SITES

National Nature Reserves
- None

Sites of Special Scientific Interest
- None

Wildlife Sites
- Boundary Plantation including:
- Brookfield Plantation including:
- Brookfield Plantation Cutting including:
- Corby Old Quarry Gullet including:
- Corby Tunnel Quarries
- Cowthick Plantation
- Harry’s Wood Quarry
- Plantation Meadow
- Rockingham Wood
- South Wood Quarry Grassland:
- Stanion Lane Plantation including:
- The Cow Pasture including:
- Weldon Old Workings
- Boundary Plantation Grassland
- Brookfield Plantation Pool
- West Cutting
- Brookfield Plantation Cutting Pool
- Corby Old Quarry Ponds
- Embankment
- Hills Planting Pond

Local Nature Reserves
- None
CHARACTER AREAS

6a Croughton
6b Easton-on-the-Hill and Collyweston

KEY CHARACTERISTICS

- Limestone geology is dominant, with Blisworth Limestone Formation in the south and Lower Lincolnshire Limestone Formation in the north of the county;
- light, free-draining soils occur throughout;
- arable cropping dominates the land use;
- retention of unimproved semi-natural habits is low;
- occasional outstanding examples of Upright brome *Bromus erectus* - tor grass *Brachypodium pinnatum* calcareous grassland occur; and
- the limited areas of woodland are small and fragmented.
LOCATION AND INTRODUCTION
Extensive areas of limestone plateau are present in the vicinity of Easton-on-the-Hill and Collyweston in the north and around Croughton in the southwest extremity of the county. The ease of cultivation of the light, well-drained soils on gently undulating land has led to extensive arable cropping and the limited retention of semi-natural woodlands and unimproved grasslands. Large military airfields are present in both areas. The northern area lies at the edge of the Rockingham Forest Natural Area, whilst the south-western area is in the Cotswolds Natural Area.

PHYSICAL INFLUENCES

Geology and Soils
The geology is simple compared to many other areas in Northamptonshire. The Croughton plateau lies almost entirely on Blisworth Limestone Formation and the Easton-on-the-Hill and Collyweston entirely on Lower Lincolnshire Limestone Formation. There is no glacial drift.

The soils are equally simple. In the south-western area two soil types are mixed in roughly equal proportion, neither occupying a particular position in the landscape. Both are easily worked, well drained, slightly to moderately stony, calcareous clay loams ideal for early cropping. In the north the soils comprise a well-drained calcareous fine loam (Hodge 1984).

Hydrology
Character Areas of this Type occupy well-drained soils, therefore watercourses and springs are not typical.

HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS
The retention of all semi natural-habitats is poor, with very few areas of semi-natural vegetation remaining. This is due to the easily workable soils that offer great potential for arable cropping.

Fragments of unimproved semi-natural calcareous grassland on unrestored quarries, road verges and woodland rides hint at the nature of the unimproved semi-natural grasslands that would have occurred more widely in the absence of agricultural improvement. The use of some of the land for military purposes has also ensured that some areas of grassland have not been cultivated and this has resulted in the retention of some botanical interest.

As the majority of calcareous grassland sites have already been lost the major threat to the remaining small, isolated sites is now likely to come from lack of appropriate management, such as under grazing which leads to the dominance of coarse grasses, tall herbs and invasion by scrub. The fragmentary nature of the habitat brings increased risk of species extinctions - many of the remaining areas of calcareous grassland are so small and isolated that chance extinctions due to unfavourable conditions, even if temporary, are likely to reduce the biological diversity over time.

PRINCIPAL HABITAT TYPES

Trees and Woodlands
Due to the extensive arable farming few unimproved semi-natural habitats are retained. The principal habitats described below represent a very small proportion of the total area defined by this Biodiversity Character Type, but they are indicative of the habitats that are likely to have occurred prior to agricultural intensification.

Woodland, in the form of small coverts, is widely dispersed. Mixed plantations variously contain larch *Larix decidua*, Scots pine *Pinus sylvestris* and Norway spruce *Picea abies* with scattered oak *Quercus robur*, ash *Fraxinus excelsior* and sycamore *Acer pseudoplatanus*. Some older examples of species associated with calcareous sites, including small-leaved lime *Tilia cordata* and beech *Fagus sylvatica*, also occur. The ground flora tends to be poor with few ancient woodland indicators.

Dry Grasslands and Heaths
Upright brome *Bromus erectus* - tor grass *Brachypodium pinnatum* calcareous grassland is the characteristic dry grassland type, although very few sites remain. This type of grassland, which developed on Oolite Group Limestones, is confined to the Cotswolds and a discreet part of the East Midlands.

Characteristic species include tor grass *Brachypodium pinnatum*, upright brome *Bromus erecta*, salad burnet *Sanguisorba officinalis*, rock rose *Helianthemum nummularium*, wild thyme *Thymus polytrichus*, wild liquorice *Astragalus glycyphyllos*, and marjoram *Origanum vulgare*. Carline thistle *Carlina vulgaris* and yellow-wort *Blackstonia perfoliata* often occur on quarried sites.

Characteristic butterflies include dingy skipper *Erynnis tagus* and green hairstreak *Callophrys rubi*. 
6a CROUGHTON

An area of 33km² underlain by predominantly by Blisworth Limestone Formation. RAF Croughton, which dominates the semi-natural habitat of the area, is unique in providing a very large area with highly restricted access in an open landscape. Woodlands are limited to occasional coverts and are not characteristic of the area. Land use is predominantly arable.

RAF Croughton is probably the most important area of calcareous grassland but, because of the private nature of the site, its interest has only become apparent in recent years. The sheep grazed areas on the eastern side of the site contain the greatest diversity of species including bird’s-foot-trefoil *Lotus corniculatus*, basil thyme *Clinopodium acinos*, fairy flax *Linum catharticum* and dwarf thistle *Cirsium acaule*. Fragments of calcareous grassland are also found in around the golf course and areas of mixed scrub.
Another example of calcareous grassland occurs at Charlton Old Workings, an area of long disused limestone quarry. The site comprises a series of rabbit-grazed ‘hills and holes’ with limestone grassland species dominating each hill. Species include abundant pignut *Conopodium majus*, salad burnet *Sanguisorba officinalis* and dwarf thistle *Cirsium acaule*, with grasses including sweet vernal-grass *Anthoxanthum odoratum*, red fescue *Festuca rubra*, crested dog’s-tail *Cynosurus cristatus*. Other herbs include wild carrot *Daucus carota*, lady’s bedstraw *Galium verum*, sorrel *Rumex acetosa*, cat’s-ear *Hypochaeris radicata*, ribwort plantain *Plantago lanceolata* and hoary plantain *P. media*.

Slade Covert is the largest area of woodland, with tree cover that has regenerated from earlier felling. Trees include sycamore *Acer pseudoplatanus* and ash *Fraxinus excelsior*, both in the form of young standards and regrown coppice stools, with wych elm *Ulmus glabra* and English elm *Ulmus procera*, the latter forming well-developed suckers. There are also frequent cherry *Prunus avium* standards. Much of the scrub layer is tall, including frequent hawthorn *Crataegus monogyna*, with wayfaring tree *Viburnum lantana*, elder *Sambucus nigra* and occasional bramble *Rubus fruticosus*. Traveller’s-joy *Clematis vitalba* is abundant around the edges of the wood. Ground flora species include locally frequent false brome *Brachypodium sylvaticum* and ground ivy *Glechoma hederacea* and locally abundant dog's mercury *Mercurialis perennis*, lords and ladies *Arum maculatum*, nettle *Urtica dioica* and violets *Viola spp.*
An area of 12km² with only four designated wildlife sites. However, two are Sites of Special Scientific Interest, Collyweston Quaries SSSI and Racecourse Farm Fields SSSI, which represent outstanding examples of CGS upright brome *Bromus erectus* – tor grass *Brachypodium pinnatum* calcareous grassland.

Collyweston Quaries is a former medieval limestone quarry, representing the largest example of this type of vegetation in Northamptonshire. More than one hundred flowering plant species have been recorded from the site. The sward is species-rich, dominated by upright brome *Bromus erectus* and tor grass *Brachypodium pinnatum*, with downy oat-grass *Helictotrichon pubescens* and quaking-grass *Briza media*. Among the locally uncommon herbs present are dyer’s greenweed *Genista tinctoria*, wild thyme *Thymus polytrichus*, rock rose *Helianthemum nummularium*, dropwort *Filipendula vulgaris* and clustered bellflower *Campanula glomerata*. Parts of the site are remarkable for the abundance of knapweed broomrape *Orobanche elatior* and pyramidal orchid *Anacamptis pyramidalis*. Collyweston Quaries is the only known site in Northamptonshire for the nationally rare spotted cat’s-ear *Hypochaeris maculata*, although the plant has not been seen in recent years.

Racecourse Farm Fields, a small meadow on the site of a former limestone quarry with a short sward, produced by all year round sheep and cattle grazing, shows interesting contrasts with the nearby Collyweston Quaries. The sward is floristically-rich, parts containing more than 30 flowering plant species per square metre. Upright brome *Bromus erectus*, red fescue *Festuca rubra* or tor grass *Brachypodium pinnatum* are the dominant grasses. Quaking grass *Briza media*, crested hair-grass *Koeleria cristata*, sheep’s fescue *Festuca ovina* and glaucous sedge *Carex flacca* are abundant throughout. A number of county rarities and locally uncommon plants are present including rock rose *Helianthemum nummularium*, autumn gentian *Gentianella amarella*, clustered bellflower *Campanula glomerata*, small scabious *Scabiosa columbaria* and dodder *Cuscuta epithymum*.
The only county records of squinancywort *Asperula cynanchica* and purple milk vetch *Astragalus danicus* are from this Biodiversity Character Area.

The only area of woodland that is designated as a Wildlife Site is Wothorpe Groves, which overlaps the boundary of the character area. It comprises park woodland, thought to be on old mineral workings, but with a few ancient woodland species. The trees are mostly ash *Fraxinus excelsior*, with frequent wych elm *Ulmus glabra* and English elm *Ulmus procera* suckers, sycamore *Acer pseudoplatanus* and occasional beech *Fagus sylvatica* and oak *Quercus robur*. There are two very old small-leaved limes *Tilia cordata* on the eastern boundary of the wood. The ground flora is dominated by dog’s mercury *Mercurialis perennis* and nettle *Urtica dioica*, with herb Robert *Geranium robertianum*, wood avens *Geum urbanum* and wood sedge *Carex sylvatica*. Yellow archangel *Lamiastrum galeobdolon* and bluebell *Hyacinthoides non-scriptus* are rare.

Whitewater Lake, near Burghley Park on the county boundary is one of the few areas of true fen-carr growing over peat in Northamptonshire. Numerous county rarities occur, owing to the unusual acidic habitat type including marsh pennywort *Hydrocotyle vulgaris*, black bog-rush *Schoenus nigricans*, tufted-sedge *Carex elata* and bay willow *Salix pentandra*. An extension to this site, Whitewater Valley, over the county boundary in Cambridgeshire is designated as SSSI.

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6b - Henry Stanier - Clustered Bellflower

6b - Henry Stanier - Dodder
7. LIMESTONE WOODLAND

CHARACTER AREAS

7a Wakerley and Fineshade Woods
7b Collyweston Great Wood and Old Sulehay

KEY CHARACTERISTICS

• The geology is dominated by Limestones, particularly on the valley sides;
• higher ground capped with thin boulder clay drift;
• blocks of woodland of ancient origin throughout;
• ash-lime and oak-lime woodland over limestones;
• ash-maple woodland over Boulder Clay;
• small fragmented areas of calcareous grassland on man-made sites; and
• localised areas of decalcified limestone creating more acidic conditions.
INTRODUCTION

The Limestone Woodlands are located in the north of the county and occupy the northern and north western extent of the Rockingham Forest Natural Area, separated from the Boulder Clay Woodlands by the valley of the Willow Brook. This is a complex area with habitats influenced by relatively thin Boulder Clay Drift and surface Limestones. There also two important retained blocks of woodland, Collyweston Great Wood and Old Sulehay Forest, growing over a limestone substrate, but also having localised acid characteristics. However, there are also small areas of Boulder Clay, three of which are occupied by woodlands that are mainly of ancient origin. These areas could be characterised as Boulder Clay Woodland, but due to fragmentation, their small size and the calcareous influence of the geology, particularly on their periphery, they are included in this Biodiversity Character Type.

Calcărceous grasslands are typical, although they are limited in number and extent. The remaining grasslands occur on man-made sites, including disused railway cuttings, road verges and unrestored quarries.

PHYSICAL INFLUENCES

Geology and Soils

Watercourses have shaped the landscape creating wide valleys between the higher ground, which is capped with Boulder Clay drift. The watercourses have cut through the geological strata mainly exposing sections of Blisworth Limestone Formation, Rutland Formation, Lincolnshire Limestone Formation (Upper) and Lincolnshire Limestone Formation (Lower). The Boulder Clay has a mild calcareous influence, however the influence of the Limestones is more alkaline.

The soils mainly comprise areas of pelo-stagnogley soils overlying the Boulder Clay, calcareous pelosols over Blisworth Limestone, and shallow, variably stony well-drained calcareous loams over the Lower Lincolnshire Limestone. The soils occurring widely over the Boulder Clay Woodland Biodiversity Character Areas are seasonally waterlogged and slowly permeable. Over the Blisworth Limestone the calcareous clays differ in depth and water regime according to the permeability of the sub-stratum. They are slowly permeable, but the well-developed structure in the topsoil and immediate sub-surface horizons reduce the incidence of water logging (Hodge 1984).

Very localised acidic deposits are found in the form of decalcified limestone, where leaching has removed the calcium carbonate content to leave a sandy substrate.

Hydrology

The presence of watercourses is not characteristic. Springs are rare. The watercourses and associated springs that issue in this area are described the under the Minor Floodplain Biodiversity Character Type.

HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS

At the end of the last ice age woodland cover developed over most of the Northamptonshire. With the development of agriculture from about 4000 BC this woodland was systematically cleared leaving isolated tracts of wildwood between the major river valleys.

The retention of woodland on the Boulder Clay is largely because the heavy, slowly permeable soils were less easy to work than the lighter soils in the river valleys, which meant that large areas of woodland remained uncleared. However, the same does not apply to Collyweston Great Wood and Old Sulehay Forest, both of which lie on more permeable soils. Their retention is probably due to their location, like the Boulder Clay Woodlands, within Royal Forest of Rockingham where hunting was the primary purpose.

After the Medieval period the area of forest declined and there was further clearance of woodland. The greatest clearance followed the removal of the legal status of the forest that occurred at enclosure in the 19th Century. After enclosure, many of the woodlands were managed as coppice with standards.

In the 19th Century many of the remaining woodlands were clear felled and planted with oak and the extensive planting in the 20th Century often consisted of conifers. Where the woodland was retained coppicing was carried out into the last century. However, this too has now declined and lack of traditional woodland management has seen the redundant coppice becoming overgrown, resulting in the decline or loss of species reliant upon open and diverse woodland habitat.
Timber management continues today. Dryleas Wood, near Deene, is an ash-maple woodland with remnant coppice and a diverse ancient woodland ground flora. In 1992 this site was described as having the greatest diversity of the woodlands in the locality, with correspondingly rich bird and mammal populations. However, when resurveyed in 2002 it was discovered that several areas within the wood had been felled and replanted resulting in the loss of some of their woodland plant interest, although it was thought that this should be regained from the surrounding ancient woodland and hedgerows. However a survey of nearby Mavis Wood at the same time reported that since the previous survey up to a third of the woodland had been felled and converted to grassland.

The construction of roads and railways and ironstone and limestone quarrying, where the underlying geology was exposed, has led to the development of calcareous grassland. Although calcareous grasslands are likely to have occurred widely on soils over the limestones and more neutral grasslands on the boulder clay areas, a shift from pasture to arable, particularly since the Second World War has resulted in the loss of the characteristic unimproved grasslands. Most of the grasslands that remain are intensively managed to produce a heavy grass crop through the application of agro-chemicals. As a consequence the diversity of wild plants has been lost.

PRINCIPAL HABITAT TYPES

Trees and Woodlands

Collyweston Great Wood National Nature Reserve lies on Lower Lincolnshire Limestone overlain by Upper Estuarine Series Sands. This has given rise to a range of soils with differing drainage and chemistry, which support an outstanding range of semi-natural woodland types. Little of the site has been affected by re-afforestation so that a complex mosaic of vegetation occurs, closely correlated with the soil characteristics.

The main coppice types are variants of ash Fraxinus - lime Tilia and oak Quercus robur - lime Tilia woodland with small-leaved lime Tilia cordata, the dominant component. The latter has a restricted distribution and lime woodland is therefore nationally uncommon. Of particular interest is the combination of lime and sessile oak Quercus petraea - one of the very few localities in the East Midlands. Wild Service-Tree Sorbus torminalis occurs frequently. Major coppice types represented include birch-oak, ash-maple and hazel-ash.

The characteristic ground flora is extremely rich due to the combination of calcareous and acidic soils (in areas of decalcified limestone) and there are many locally-rare plants, including lily-of-the-valley Convallaria majalis, wood spurge Euphorbia amygdaloides, great wood-rush Luzula sylvatica, nettle-leaved bellflower Campanula trachelium, fly orchid Ophrys insectifera and columbine Aquilegia vulgaris. Dog's mercury Mercurialis perennis, wood anemone Anemone nemorosa, creeping soft-grass Holcus mollis, wood sorrel Oxalis acetosella and false brome Brachypodium sylvaticum are some of the more widespread species. Several large areas of bracken Pteridium aquilinum occur.

Elsewhere there are large areas of woodland, although the majority are replanted variously with coniferous and broadleaved trees on ancient woodland sites. However, in the area around Deene Park, where the majority occupy the Boulder Clay, many are ancient semi-natural woodlands with species characteristic of ash Fraxinus excelsior - field maple Acer campestre woodland. The tree canopy here is typically pedunculate oak Quercus robur and ash Fraxinus excelsior, over a mixed scrub and coppice layer of hazel Corylus avellana, hawthorn Crataegus monogyna, field maple Acer campestre and blackthorn Prunus spinosa. Veteran trees and their associated standing and fallen deadwood are well represented in localised areas.

Despite the degree of replanting the majority of the plantations have been designated as Wildlife Sites. The plantations over Boulder Clay, for example areas of Wakerley Great Wood, often retain the characteristic ground flora typical of ash Fraxinus excelsior - field maple Acer campestre woodland along the rides and within some areas of broadleaved plantations, with dog's mercury Mercurialis perennis, bluebell Hyacinthoides non-scripta and primrose Primula vulgaris. The conifer plantations are also important for crossbill Loxia curvirostra, siskin Carduelis spinus and redpoll Carduelis flammea in the winter.
Dry Grasslands

Dry grasslands are represented by a few fragmented species-rich calcareous sites, none of which remain in the farmed landscape. Instead they are found on road verges, in disused railway cuttings, unrestored quarries and woodland glades. The calcareous grasslands are typically classified as CG5 upright brome *Bromus erectus* - tor grass *Brachypodium pinnatum* grassland. Characteristic species include tor grass *Brachypodium pinnatum*, upright brome *Bromus erecta*, salad burnet *Sanguisorba minor*, rock rose *Helianthemum nummularium*, wild thyme *Thymus polytrichus*, wild liquorice *Astragalus glycyphyllos*, and marjoram *Origanum vulgare*. Carline thistle *Carlina vulgaris* and yellow-wort *Blackstonia perfoliata* often occur on quarried sites.

Characteristic butterflies include dingy skipper *Erynnis tagus* and green hairstreak *Calliphrys rubi*. 
This area, covering 46km², is essentially a transition between Boulder Clay Woodland and Limestone Woodland and is located to the west and north of the Willow Brook. The woodlands, which are primarily coniferous and broadleaved plantations, are centred on relatively thin Boulder Clay drift and extend on to areas of surface Limestone geology and as such have a greater calcareous influence than the typical Boulder Clay Woodlands. Wakerley Spinney SSSI represents a site on the transition between the boulder clay and limestone.

Here the canopy represents a modified example of wet ash-maple woodland, notable for the presence of wild service tree *Sorbus torminalis*. The woodland ground flora contains several species, which, in a Northamptonshire context, are mainly restricted to the northeast of the county. The canopy is mainly dominated by pedunculate oak *Quercus robur*, ash *Fraxinus excelsior* and sycamore *Acer pseudoplatanus*, with downy birch *Betula pubescens* an important constituent. The shrub layer is varied with hawthorn *Crataegus monogyna*, Midland hawthorn *C. laevigata*, hazel *Corylus avellana*, field maple *Acer campestre*, dogwood *Cornus sanguinea*, and crab apple *Malus sylvestris*. The herb layer is typically bramble *Rubus fruticosus*, dog’s mercury *Mercurialis perennis* and grasses such as wood meadow-grass *Poa nemoralis*, and wood spurge *Euphorbia amygdaloides*. Locally uncommon species associated with calcareous soils include fly orchid *Ophrys insectifera* and wood spurge *Euphorbia amygdaloides*.

The calcareous grasslands in this area are found on road verges and disused railway lines, where the thin soils have developed following excavation. A section of road verge alongside the busy A43 has long been recognised as amongst the most important calcareous grasslands in the county and has previously been considered for SSSI designation. Their main value lies in the fact that the broad, relatively undisturbed grassland on both sides of the road is on almost bare limestone. Plants include false oat-grass *Arrhenatherum elatius*, red fescue *Festuca rubra*, tor grass *Brachypodium pinnatum*, upright brome *Bromus erectus* and many herb species associated with calcareous grassland, such as restharrow *Ononis repens*, spiny restharrow *O. spinosa*, fairy flax *Linum catharticum*, wild liquorice *Astragalus glycyphyllus*, cowslip *Primula veris*, common rock-rose *Helianthemum nummularium* and pyramidal orchid *Anacamptis pyramidalis*. 

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**7a WAKERLEY AND FINESHADE WOODS**

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## 7. LIMESTONE WOODLAND

### DESIGNATED SITES

#### National Nature Reserves
- None

#### Sites of Special Scientific Interest
- Wakerley Spinney

#### Wildlife Sites
- Bangrave Wood
- Brookfield Plantation Cutting including:
  - Deene Park Lakes
  - Dibbins & Hollow Woods
  - Dryleas Wood
  - Ferrels Wood
  - Fineshade Disused Railway (West)
  - Fineshade Woods including:
    - Pool
    - Fineshade Disused Railway
    - Fineshade Lane
    - Top Lodge Verge
  - Geese Wood
  - Hollow Wood
  - Household Coppice including:
    - King’s Cliffe Disused Railway (East)
    - King’s Cliffe Disused Railway (West)
    - King’s Cliffe Meadow
  - Laxton Verges
  - Lodge Coppice
  - Lodge Pond
  - Mavis Wood
  - Short Wood
  - Spanhoe Wood
  - Spanhoe Wood Road Verges
  - Town Hill Plantation
  - Wakerley Oaks
  - Wakerley Oaks Disused Railway Line
  - Wakerley Railway Line
  - Wakerley Spinney including:
    - Wakerley Verge
    - Wakerley Verges
    - Wakerley Woods including:
      - Weldon Little Wood
      - Adams Wood
      - Laxton Wood
      - Long Wood
      - St Marys Wood
      - Town Wood
      - Wakerley Great Wood
      - Wood Hollow
  - Household Coppice Pond

#### Local Nature Reserves
- None

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*7a - Nathalie Hueber - Primrose*
7. LIMESTONE WOODLAND

7b COLLYWESTON GREAT WOOD AND OLD SULEHAY

Predominantly overlying Limestone Formations in the north east of the county this 29km² area comprises the true limestone woodlands. Key woodland sites include Collyweston Great Wood and Easton Hornstocks National Nature Reserve and Old Sulehay Forest SSSI that form an important group of ancient woodlands on calcareous strata. They are characteristic of the semi-natural vegetation that would once have occurred more widely in this area, but which been significantly reduced by quarrying and re-afforestation over the last 40 years.

At Old Sulehay, as at Collyweston Great Wood, the varied soil conditions give rise to several coppice types, notably the nationally restricted acid birch Betula - ash Fraxinus excelsior - lime Tilia and acid pedunculate oak Quercus robur - lime Tilia stand types.

The canopy is almost entirely semi-natural and typically consists of coppice and standards, with patches of younger self-set trees. On heavy, poorly drained clay field maple Acer campestre, hazel Corylus avellana and Midland hawthorn Crataegus oxyacanthoides are the main Underwood species with standards of oak Quercus robur, ash Fraxinus excelsior and occasionally wych elm Ulmus glabra.

Outcrops of acidic sands are associated with a mixture of birch Betula pendula and oak Quercus robur over hazel Corylus avellana, and stands of small-leaved lime Tilia cordata. The composition of the shrub layer exhibits subtle changes due to differences in soil depth and drainage. A few herbs are widespread or locally abundant, for example dog's mercury Mercurialis perennis, bracken Pteridium aquilinum, bramble Rubus fruticosus, ramsons Allium ursinum, wood anemone Anemone nemorosa and bluebell Hyacinthoides non-scripta. The majority are more localised and some confined to open areas. Less common species include nettle-leaved bellflower Campanula trachelium, narrow buckler-fern Dryopteris carthusiana, wood meadow-grass Poa nemoralis and deadly nightshade Atropa belladonna.

Calcareous grasslands are represented by several quarries in the vicinity of Old Sulehay. The Wildlife Trust is also attempting to restore calcareous grassland in this area. However, the best example can be found at King’s Cliffe Banks SSSI, a small, disused quarry with a ‘hills and holes’ topography, which supports oolitic limestone grassland. A high quality, species-rich closed calcareous grassland sward has developed on the thinner soils. Neutral grassland and scrub communities are associated with deeper soils.
The limestone grassland is a floristically-rich example of the typical upright brome *Bromus erectus* - tor grass *Brachypodium pinnatum* community with frequent sheep’s fescue *Festuca ovina*, dwarf thistle *Cirsium acaule*, common rock-rose *Helianthemum nummularium*, mouse-ear hawkweed *Pilosella officinarum*, salad burnet *Sanguisorba minor* and wild thyme *Thymus praecox*, together with meadow oat-grass *Helictotrichon pratense*, crested hair-grass *Koeleria macrantha*, clustered bellflower *Campanula glomerata*, small scabious *Scabiosa columbaria* and hairy violet *Viola hirta*.

### DESIGNATED SITES

**National Nature Reserves**
- Collyweston Great Wood and Easton Hornstocks

**Sites of Special Scientific Interest**
- Old Sulehay Forest
- King’s Cliffe Banks

**Wildlife Sites**
- Fair Oak Sale including:
  - Great Byards Sale
  - Great Morton Sale including:
    - King’s Cliffe Disused Railway (East)
    - Little Morton Sale
    - Little Morton Sale Quarry
    - Nassington Railway Line & Sidings
    - Newton Spinney
    - Old Sulehay Sand Pits including:
      - Park Spinney and Green Lane
      - Prior’s Haw
      - Ring Haw including:
      - Stone Circle
  - Quarry One
  - Quarry Two
  - Great Morton Sale Disused Railway
  - Great Morton Sale Grassland

**Wildlife Sites**
- Andrews Quarry
- Old Sulehay West Quarry
- Ring Haw Green Lane
- Ring Haw Quarry Grassland
- Ring Haw Quarry Gullet
- Ring Haw Woodland

**Local Nature Reserves**
- None
CHARACTER AREAS

8a Great Ouse Valley Limestone Slopes
8b Greatworth to Brackley Limestone Slopes
8c Upper Tove Limestone Slopes
8d Lower Tove Valley Limestone Slopes
8e Blisworth Limestone Slopes
8f Great Houghton to Irchester Limestone Slopes
8g Higham Ferrers to Titchmarsh Limestone Slopes
8h Irthlingborough to Woodford Limestone Slopes
8i Alledge Valley Limestone Slopes
8j Islip to Perio Limestone Slopes
8k Ise Valley Limestone Slopes
8l Harpers Brook Valley Limestone Slopes
8m Stoke Albany to Rockingham Limestone Slopes
8n Thorpe Waterville to Warmington Limestone Slopes
8o Willow Brook Valley Limestone Slopes

KEY CHARACTERISTICS

- A range of limestone formations of the Great and Upper Inferior Oolite Group;
- Easily worked, well-drained, slightly to moderately stony, calcareous clay loam soils;
- Arable cropping is the principal land use;
- Woodland retention is low, mainly comprising plantations associated with quarrying and game coverts;
- Calcareous grasslands are typical of former ironstone quarries and disused railway lines; and
- Scrub and ponds are features of many former quarries.
INTRODUCTION

The Limestone Slopes are found on the slopes below the Boulder Clay drift in the north and along the eastern fringes of the county. Geologically the areas are complex, but the underlying influence is, on the whole, calcareous. Wildlife site retention tends to be low, with many of the areas of unimproved semi-natural habitat being associated with man-made features, such as quarries and disused railways.

PHYSICAL INFLUENCES

Geology and Soils

The Limestone Slopes are found on the slopes below the Boulder Clay drift in the north and along the eastern fringes of the county and comprise older sedimentary rocks of the Middle Jurassic age, dissected by the major river systems. Lincolnshire Limestone Formation is limited to the north of the county. However, the Great Oolite Group is more widespread, with Rutland Formation overlying the Lincolnshire Limestone Formation and Blisworth Limestone Formation outcropping in eastern Northamptonshire on the upper slopes of the Nene Valley. In the south-eastern fringes the limestones are generally overlain by superficial glacial deposits, however these are exposed in various quarries and railway cuttings. In more geologically complex areas the lower slopes also include sections of Whitby Mudstone Formation.

In the north and east of the county easily worked, well-drained, slightly to moderately stony, calcareous clay loams occur in thin strips on the limestone benches along the valley sides. There are also smaller areas comprising well-drained calcareous fine loams and slowly permeable calcareous clays. Over the Limestone Slopes in the south west of the county two soil types are mixed in roughly equal proportion, neither occupying a particular position in the landscape. Both are easily worked, well drained, slightly to moderately stony, calcareous clay loams ideal for early cropping (Hodge 1984).

Hydrology

Although dissected by a number of tributary streams, these are described under the Minor Floodplain Biodiversity Character Type. Springs are not typical.

HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS

Agricultural change is the principal influence on the retention of unimproved semi-natural habitats. The soils on the Limestone Slopes are easily worked in the autumn and in all but the wettest springs. They warm up fairly rapidly in spring and have an accessible reserve of water in the underlying limestone that helps to meet moisture demand by annual crops. Coupled with the fact that, on the whole, the Limestone Slopes are not as steep as those associated with the Liassic Slopes, large areas are now under arable cropping.

The ease of cultivation accounts for the loss of ancient semi-natural woodlands which where cleared many centuries ago. The woodlands that remain tend to be small isolated game coverts or new plantations associated with quarry restoration.

Prior to agricultural modernisation it is likely that species rich grasslands were a feature, particularly in association with stock rearing near settlement. However, unimproved grassland is now mainly confined to man-made sites such as quarries, disused railways and on occasional road verges, but many of these sites are now under threat. Several quarries and sections of disused railway cutting support areas of calcareous grassland. Some sites are maintained by rabbit grazing, but many are threatened by scrub encroachment. Without management the developing scrub will eventually overshadow these grasslands and result in the loss of the characteristic flora.

Species-rich roadside grasslands are also threatened. In recent years the Highways Authority has reduced the extent and frequency of road verge mowing, which previously maintained the floristic diversity of many roadside verges. Now that only a single-mower’s-width safety cut is carried out, most of the verge is not managed, resulting the dominance of coarse grasses and tall herbs and eventual scrub encroachment from the adjacent hedgerows. An example of this has occurred at a verge near Slipton, where an important species-rich calcareous/neutral grassland was identified in 1987. Species included yellow oat-grass *Trisetum flavescens*, crested dog’s-tail *Cynosurus cristatus*, goat’s-beard *Tragopogon*, small scabious *Scabiosa columbaria*, bird’s-foot-trefoil *Lotus corniculatus*, lady’s bedstraw *Galium verum*, cat’s-ear *Hypochaeris radicata* and field scabious *Knautia arvensis*. However, when resurveyed in 2002 “much of the interest was found to have been lost due to inappropriate management.”
PRINCIPAL HABITAT TYPES

Trees and Woodlands
Woodland cover is limited, therefore, woodlands are not characteristic of this Biodiversity Character Type. Where they do occur they tend to be conifer plantations, typically of larch *Larix decidua* and Scots Pine *Pinus sylvestris*, on restored quarry sites. Quarries, due to lack of grassland management, also support some areas of scrub, which is characterised by hawthorn *Crataegus monogyna*, dog rose *Rosa canina* and blackthorn *Prunus spinosa*, with goat willow *Salix caprea* in the damper areas.

Dry Grasslands
Calcareous grasslands are typical of many of the former ironstone quarries and disused railway lines. These grasslands occur occasionally on road verges, but very few are found in the farmed landscape.

The definition of calcareous grasslands covers a range of plant communities in which limestone-loving plants are prominent. Within this Biodiversity Character Type the National Vegetation Classification communities CG3 upright brome *Bromus erectus* grassland, CG4 tor grass *Brachypodium pinnatum* grassland and CG5 upright brome *Bromus erectus*-tor grass *Brachypodium pinnatum* grassland all occur. CG3 grassland is very much the predominant type, although this community is often the result of under grazing.


Scrub is frequently associated with calcareous grassland and can contribute to local biodiversity by providing shelter and nectar for invertebrates. A small amount of scrub on a calcareous grassland site is usually beneficial to wildlife, however the scrub cover should not be allowed to increase at the detriment of the grassland. Scrub control is necessary on many sites. Characteristic butterflies include dingy skipper *Erynnis tagus* and green hairstreak *Callophrys rubi*.

Wetlands
Ponds are typical of many of the quarried sites. Many are associated with marshy grassland in areas where drainage is impeded and, due to lack of management, are often heavily shaded by dense marginal goat willow *Salix caprea* and other scrub.
8. LIMESTONE SLOPES

8a GREAT OUSE VALLEY LIMESTONE SLOPES

A small area covering 7km² to the south and east of Brackley on the slopes of the Upper Great Ouse Valley. It is underlain by Blisworth Limestone Formation, Rutland Formation, Taynton Limestone and Grantham Formation, with a small section of atypical Whitby Mudstone Formation. The land use is mainly agriculturally improved grassland with occasional arable fields. Woodland cover is limited and not characteristic of the area. Although there is only a limited extent of unimproved semi-natural habitat, the grasslands, which are retained on sections of disused railway, are notable for county rarities typical of calcareous sites. Of particular note are the only known locations in Northamptonshire of the small blue butterfly *Cupido minimus*.

Helmdon Disused Railway SSSI is an extensive length of disused railway cutting and embankment, supporting plant communities typical of limestone grassland. Three distinct grassland communities are represented, reflecting the underlying soil conditions as well as past and present management practices. The steeper slopes of the cutting are characterised by upright brome *Bromus erectus* grassland supporting a wide variety of herbs, including dwarf thistle *Cirsium acaule*, salad burnet *Sanguisorba minor*, devil’s-bit scabious *Succisa pratensis*, common spotted-orchid *Dactylorhiza fuchsii*, bee orchid *Ophrys apifera* and green-winged orchid *Orchis morio*. Along the old railway track bed small rabbit grazed limestone spoil heaps have developed a very rich floral community including kidney vetch *Anthyllis vulneraria*, mouse-ear-hawkweed *Pilosella officinarum* and fairy flax *Linum catharticum*. On the shallower slopes of the site a more mesotrophic sward dominated by false oat-grass *Arrhenatherum elatius* is present.
Brackley Railway Embankment is another example of upright brome *Bromus erectus* calcareous grassland. The top and part of the southern side of the embankment has long grassland, managed only by rabbit grazing, which is becoming scrub encroached. Scrub species include hawthorn *Crataegus monogyna*, dog rose *Rosa canina*, grey willow *Salix cinerea* and young ash *Fraxinus excelsior* and sycamore *Acer pseudoplatanus*. However, the grassland is herb-rich with common knapweed *Centaurea nigra*, greater knapweed *C. scabiosa*, wild carrot *Daucus carota*, kidney vetch *Anthyllis vulneraria*, cat’s-ear *Hypochaeris radicata*, field scabious *Knautia arvensis*, salad burnet *Sanguisorba officinalis*, restharrow *Ononis repens*, mouse-ear-hawkweed *Pilosella officinarum* and fairy flax *Linum catharticum*. The grasses include false oat-grass *Arrhenatherum elatius*, sweet vernal grass *Anthoxanthum odoratum*, red fescue *Festuca rubra*, tall fescue *F. arundinacea*, yellow oat-grass *Trisetum flavescens*, annual meadow-grass *Poa annua* and narrow-leaved meadow grass *P. angustifolia*, all of which are frequent on the top of the embankment, but which grade into much shorter grassland to the south east. Here the grassland type becomes more typical of the upright brome community, with abundant upright brome *Bromus erectus* and quaking grass *Briza media*. Other species, in addition to those above include frequent yellow rattle *Rhinanthus minor* and occasional woolly thistle *Cirsium eriophorum* and blue fleabane *Erigeron acer*.

South Ground Covert is a mixed plantation close to Evenley Park. The compartments have a mixture of larch *Larix decidua*, Scots pine *Pinus sylvestris* and Norway spruce *Picea abies* with scattered oak *Quercus robur*, ash *Fraxinus excelsior* and sycamore *Acer pseudoplatanus* and a low diversity ground flora. However, the grassy rides are species rich and include common spotted orchid *Dactylorhiza fuchsii*, field scabious *Knautia arvensis*, common knapweed *Centaurea nigra*, wild liquorice *Astragalus glycyphyllos*, crested dog’s-tail *Cynosurus cristatus*, wild basil *Clinopodium vulgare* and dwarf thistle *Cirsium acaule*, several of which are calcareous grassland indicators.

Whitfield Border Spinney is notable for the presence of green hellebore *Helleborus viridis*, a county rarity that is limited to damp calcareous woodlands and scrub. Tree and shrub species include hawthorn *Crataegus monogyna*, Midland hawthorn *C. laevigata*, sycamore *Acer pseudoplatanus* and apple *Malus sp*. The site also includes a small pond with yellow iris *Iris pseudacorus* and a small wet area with bog stitchwort *Stellaria uliginosa* and Goldilocks *Ranunculus auricomus*. 
8B GREATWORTH TO BRACKLEY LIMESTONE SLOPES

A small area of 6km² to the north of Brackley, over Blisworth Limestone Formation, Rutland Formation, Taynton Limestone and Grantham Formation. Land use is mixed between agriculturally improved grassland and arable fields, with limited woodland cover. Although unimproved semi-natural habitats influenced by the calcareous substrate would be expected, none are retained.

DESIGNATED SITES

National Nature Reserves

- None

Sites of Special Scientific Interest

- Helmdon Disused Railway SSSI

Wildlife Sites

- Brackley Disused Railway (East)
- Brackley Railway Embankment
- South Ground Covert
- Whitfield Border Spinney

Local Nature Reserves

- None
8c  UPPER TOVE LIMESTONE SLOPES

A geologically complex area of 41km². The retained unimproved semi-natural habitats, the majority of which are grasslands on disused railway lines, are principally influenced by the underlying limestones, although there is also an extensive area of Whitby Mudstone Formation and smaller areas of Northampton Sand Formation where no wildlife sites are retained. Land use is primarily arable with a smaller extent of agriculturally improved grassland. Woodland cover is low.

Four Wildlife Sites: Helmdon Old Station, Helmdon cutting (North) Sulgrave Disused Railway and Moreton Pinkney Disused Railway (South), form an extension to Helmdon Disused Railway SSSI. These sites have not been thoroughly surveyed, but they are known to support areas of calcareous grassland and scrub and form an important wildlife corridor through this predominantly arable area.

The mixed scrub includes hawthorn *Crataegus monogyna*, with young ash *Fraxinus excelsior*, goat willow *Salix caprea*, blackthorn *Prunus spinosa*, dog rose *Rosa canina* and bramble *Rubus fruticosus*. Grassland species include kidney vetch *Anthyllis vulneraria*, common knapweed *Centaurea nigra*, centaury *Centaurium erythraea*, wild carrot *Daucus carota*, common-spotted orchid *Dactylorhiza fuchsii*, small scabious *Scabiosa columbaria* and a range of grasses typical of calcareous sites. The presence of occasional areas of gorse *Ulex europaeus* and tormentil *Potentilla erecta* betrays the more acid influence of the Whitby Mudstone Formation.

The disused railway lines also support important butterfly populations, with calcareous grassland specialists including green hairstreak *Callophyrs rubi* and small blue *Cupido minimus* having previously been recorded.
8. LIMESTONE SLOPES

8d LOWER TOVE VALLEY LIMESTONE SLOPES

An area of 39km² underlain by mainly Blisworth Limestone Formation on the upper slopes and Whitby Mudstone Formation on the lower slopes. The Lower Tove Valley Slopes are not typical of other Limestones Slopes as the areas of unimproved semi-natural habitat are retained on both the limestones and the clays. Wildlife Sites are few and far between and are principally man-made sites, such as disused railways, quarries and canals. Land use is primarily arable with a smaller extent of agriculturally improved grassland. Woodland cover is low.

Calcareous grasslands are typical of the quarried limestones. Tiffield Quarry is a denotified SSSI. Most of the quarry gullet is mainly dominated by very varied scrub, including goat willow Salix caprea, oak Quercus robur, ash Fraxinus excelsior, sycamore Acer pseudoplatanus, field maple Acer campestre, hawthorn Crataegus monogyna, buckthorn Rhamnus cathartica, dog rose Rosa canina and elm Ulmus procera. The few remaining areas of calcareous grassland have a high proportion and diversity of herb species. These include common knapweed Centaurea nigra, bee orchid Ophrys apifera, self heal Prunella vulgaris, cat's-ear Hypochaeris radicata, carline thistle Carlina vulgaris, agrimony Agrimonia eupatoria, yarrow Achillea millefolium, salad burnet Sanguisorba minor, wild basil Clinopodium vulgare and wild marjoram Origanum vulgare.

8d- Henry Stanier - Woolly Thistle
Cosgrove Quarry is an abandoned limestone quarry. The most botanically diverse areas contain species such as upright brome *Bromus erectus* and red fescue *Festuca rubra*, with many anthills. Herb species include salad burnet *Sanguisorba minor*, woolly thistle *Cirsium eriophorum*, pignut *Conopodium majus*, field wood-rush *Luzula campestris*, greater knapweed *Centaurea scabiosa*, common knapweed *C. nigra*, cowslip *Primula veris*, lady's bedstraw *Gallium verum*, yarrow *Achillea millefolium*, bird’s-foot-trefoil *Lotus corniculatus*, agrimony *Agrimonia eupatoria* and other species typical of calcareous grassland.

Mesotrophic grassland is typical of unimproved grassland on the Whitby Mudstone Formation. However, Grafton Regis Meadow is one of very few retained sites of this type. It comprises a fragment of old hay meadow on the edge of the Tove Valley, part of which lies in the floodplain, outside this Biodiversity Character Area. The area that lies within this Character Area comprises ridge and furrow mesotrophic grassland and supports a rich diversity of meadow species including cuckooflower *Cardamine pratense*, great burnet *Sanguisorba officinalis*, cowslip *Primula veris* and southern marsh-orchid *Dactylorhiza praetermissa*.

Also on the Whitby Mudstone Formation is Stoke Bruerne Brick Pits, an area of disused brick pits adjacent to the grand Union Canal that now contains grassland, marsh, reed bed and pools. The drier areas comprise mesotrophic grassland with species such as lady’s bedstraw *Gallium verum*, bird’s-foot trefoil *Lotus corniculatus*, common spotted orchid *Dactylorhiza fuchsii*, cuckooflower *Cardamine pratensis*, adder’s tongue fern *Ophioglossum vulgare* and cowslip *Primula veris*. Emergent species in the marshy areas and around the pools include gypsywort *Lycopus europaeus*, ragged-robin *Lychnis flos-cuculi*, purple loosestrife *Lythrum salicaria*, water dock *Rumex hydrolapathum* and common reed *Phragmites australis*.

### DESIGNATED SITES

**National Nature Reserves**
- None

**Sites of Special Scientific Interest**
- None

**Wildlife Sites**
- Cosgrove Old Canal
- Cosgrove Quarry
- Dogsmouth Brook Meadow
- Grafton Regis Meadow
- Grand Union Canal: Navigation Inn
- Stoke Bruerne Brick Pits
- Stoke Park Pavilions Woodland
- Stoke Park Wood
- Tiffield Lake
- Tiffield Quarry

**Local Nature Reserves**
- None
8e  BLISWORTH LIMESTONE SLOPES

5 km² of land underlain by Blisworth Limestone Formation. Land use is primarily arable with a smaller extent of agriculturally improved grassland. Woodland cover is very low.

The only wildlife Site is a short section of the much longer Gayton Disused Railway, which crosses the area. The small open areas of grassland between the encroaching scrub support a rich calcareous flora which includes twayblade *Listera ovata*, common spotted orchid *Dactylorhiza fuchsii*, quaking grass *Briza media*, upright brome *Bromus erectus* and other typical species now rare in the area.

DESIGNATED SITES

National Nature Reserves
- None

Sites of Special Scientific Interest
- None

Wildlife Sites
- Gayton Disused Railway Line

Local Nature Reserves
- None
8. LIMESTONE SLOPES

8f GREAT HOUGHTON TO IRCHESTER LIMESTONE SLOPES

An area of complex geology covering 38km² stretching from Northampton to Wellingborough on the southern slopes of the Middle Nene Valley. Part of the area is underlain by various limestone formations. Elsewhere there are extensive areas of Northampton Sand Formation and Whitby Mudstone Formation. Ironstone has been quarried near Wellingborough, resulting in limestone exposures. The quarries comprise areas of calcareous grassland and scrub, with some standing water. There are some unimproved semi-natural mesotrophic grasslands lying over well-drained calcareous clay and loam soils. Landscaped parkland is also a feature, providing the main areas of old trees and woodland. Land use is mainly arable.

A group of ironstone quarries to the west of Irchester, including Irchester Disused Quarry, Irchester South Quarry, Irchester Country Park and the Blue Lagoon, all have areas of calcareous grassland. Quarrying has exposed the limestones and Irchester Old Lodge Pit, a geological SSSI, includes one of the only two complete exposed White Limestone Formation sections in Northamptonshire.

Typical grassland species include upright brome *Bromus erectus*, tor grass *Brachypodium pinnatum*, red fescue *Festuca rubra*, sheep’s fescue *F. ovina*, glaucous sedge *Carex flacca*, colt’s foot *Tussilago farfara*, cowslip *Primula veris*, bee orchid *Ophrys apifera*, bird’s-foot-trefoil *Lotus corniculatus*, yarrow *Achillea millefolium*, common knapweed *Centaurea nigra*, greater knapweed *C. scabiosa*, fairy flax *Linum catharticum*, red bartsia *Odontites vernus*, salad burnet *Sanguisorba minor*, yellow-wort *Blackstonia perfoliata* and common broomrape *Orobanche minor*. Scrub is a feature and includes dog rose *Rosa canina* and hawthorn *Crataegus monogyna*.

The Blue Lagoon is a former quarry, but also contains open water with well-established emergent and aquatic vegetation including common club-rush *Schoenoplectus lacustris*, broad-leaved pondweed *Potamogeton natans*, water horse-tail *Equisetum fluviatile* and jointed rush *Juncus articulatus*. 

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8f- Nathalie Hueber - Field Scabious
Easton Maudit Verge lies predominantly over Blisworth Limestone Formation and is the only calcareous grassland in the area away from a quarried site. Species present include common knapweed *Centaurea nigra*, greater knapweed *C. scabiosa*, field scabious *Knautia arvensis*, hedge bedstraw *Galium mollugo* and lady’s bedstraw *G. verum*. The most significant plant, however, is the rarity common calamint *Calamintha ascendens*, which only occurs on dry calcareous grassland in Northamptonshire.

Meadow SSSI, Bozeat Cemetery and Bozeat Glebe Meadow comprise a suite of species-rich and agriculturally unimproved mesotrophic (neutral) grasslands lying over well-drained calcareous clay and loam soils. Bozeat Meadow SSSI was the best example, however, it was been partially damaged by the construction of the Bozeat bypass and the most recent survey by English Nature in 2001 (English Nature, 2005) suggested that the site may have been destroyed. The site shows a marked ridge and furrow formation which is most pronounced towards the south where the common knapweed *Centaurea nigra* - crested dog’s-tail *Cynosurus cristatus* community was previously found on the well-drained ridge tops. This community is characterised by a rich assemblage of plant species including abundant red fescue *Festuca rubra*, yellow oat-grass *Trisetum flavescens*, false oat-grass *Arrhenatherum elatius*, lady’s bedstraw *G. verum*, salad burnet *Sanguisorba minor* and common birds-foot-trefoil *Lotus corniculatus*. Quaking grass *Briza media* and dwarf thistle *Cirsium acaule* are indicative of the calcareous substrate.

Parkland is a feature, with examples at Castle Ashby and Delapre, the latter being a golf course, both of which comprise areas of woodland and open water. Delapre Wood lies over Whitby Mudstone Formation and a narrow section of Northampton Sand Formation and has a particularly diverse mixture of mature trees and shrubs including very large English oaks *Quercus robur*, hawthorn *Crataegus monogyna*, Midland hawthorn *C. laevigata*, crab apple *Malus sylvestris*, field rose *Rosa arvensis*, rowan *Sorbus aucuparia*, beech *Fagus sylvatica*, birch *Betula pendula*, hazel *Corylus avellana*, horse chestnut *Aesculus hippocastanum* and sycamore *Acer pseudoplatanus* amongst others. The ground flora contains a good diversity of fungi and some marsh species on a small flush next to the stream that leads through the centre of the wood. Gorse *Ulex europaeus* and bracken *Pteridium aquilinum* are indicative of the more acidic nature of the soils.

The woodland at Castle Ashby Parkland overlies Blisworth Limestone Formation and contains a large variety of parkland and semi-natural species with a large semi-natural ground flora including several ancient woodland species and one or two odd parkland additions. Trees include sycamore *Acer pseudoplatanus*, wych elm *Ulmus glabra*, horse chestnut *Aesculus hippocastanum*, hornbeam *Carpinus betulus*, beech *Fagus sylvatica*, yew *Taxus baccata* and lime *Tilia platyphyllos*. The shrub layer is not well defined, but has species such as box *Buxus sempervirens*, elder *Sambucus nigra* and hawthorn *Crataegus monogyna*. The ground flora has some common spotted orchid *Dactylorhiza fuchsii*, early purple orchid *Orchis mascula* and occasional bluebell *Hyacinthoides non-scriptus*. Elsewhere the dominant species is dog’s mercury *Mercurialis perennis*.

**DESIGNATED SITES**

| National Nature Reserves | • None |
| Sites of Special Scientific Interest | • Bozeat Meadow SSSI |
| Wildlife Sites | • Blue Lagoon |
| | • Bozeat Cemetery |
| | • Bozeat Glebe Meadow |
| | • Castle Ashby Woodland |
| | • Delapre Pond |
| | • Delapre Wood |
| | • Easton Maudit Verge |
| | • Grendon Pond |
| | • Hillside Pond |
| | • Irchester Country Park |
| | • Irchester Disused Quarry |
| | • Irchester South Quarry |
| | • Lower Pond |
| | • The Rookery |
| Local Nature Reserves | • None |

8f- Henry Stanier - Marble White on Greater Knapweed
8g HIGHAM FERRERS TO TITCHMARSH LIMESTONE SLOPES

24km² of land predominantly over Blisworth Limestone Formation and Whitby Mudstone Formation on the eastern side of the Middle Nene Valley. The only remaining unimproved semi-natural habitats are grasslands, although the disused railway at Titchmarsh is principally of value as a wildlife corridor. Woodland cover is very low and land use is mainly arable.

The Stanwick Verges mainly overlie Blisworth Limestone Formation and comprise species-rich tall neutral grassland with a calcareous influence in places. The dominant grasses include false oat-grass *Arrhenatherum elatius*, timothy *Phleum pratense*, creeping bent *Agrostis stolonifera*, common bent *A. capillaris*, red fescue *Festuca rubra* and rough meadow-grass *Poa trivialis*. Herb species are very frequent, and include common knapweed *Centaurea nigra*, greater knapweed *C. scabiosa*, field scabious *Knautia arvensis*, knapweed broomrape *Orobanche elatior*, sorrel *Rumex acetosa*, yarrow *Achillea millefolium*, cow parsley *Anthriscus sylvestris*, pepper saxifrage *Silium silaus*, burnet saxifrage *Pimpinella saxifraga* and abundant ribwort plantain *Plantago lanceolata*.

Rushden Field has a fairly homogeneous stand of tall grasses interspersed with shorter, finer grasses and neutral grassland vegetation on Whitby Mudstone Formation. Species present include false oat-grass *Arrhenatherum elatius*, red fescue *Festuca rubra*, Yorkshire fog *Holcus lanatus*, meadow foxtail *Alopecurus pratensis*, smooth meadow grass *Poa pratensis*, timothy *Phleum pratense*, perennial rye grass *Lolium perenne* and locally frequent common bent *Agrostis capillaris*, crested dog’s tail *Cynosurus cristatus* and yellow oat-grass *Trisetum flavescens*. Herb species include lady’s bedstraw *Galium verum*, bird’s-foot-trefoil *Lotus corniculatus*, ribwort plantain *Plantago lanceolata*, meadow buttercup *Ranunculus acris*, and localised patches of yellow rattle *Rhinanthus minor*.

Titchmarsh Disused Railway is a shallow disused railway cutting with a small amount of neutral grassland along the track, but mostly overgrown with scrub, including hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, buckthorn *Rhamnus cathartica*, dog rose *Rosa canina* and crab apple *Malus sylvestris*. It main value is as a wildlife corridor.

### DESIGNATED SITES

**National Nature Reserves**

- None

**Sites of Special Scientific Interest**

- None

**Wildlife Sites**

- Rushden Field
- Stanwick Verges
- Titchmarsh Disused Railway Cutting

**Local Nature Reserves**

- None
8h IRTHLINGBOROUGH TO WOODFORD LIMESTONE SLOPE

An area of 9km², mainly overlying Great Oolite Group rocks. Land use tends to comprise agriculturally improved grasslands on the higher ground and arable land on the lower slopes. The only Wildlife Site is a small woodland, the sole area of established woodland in the area.

Woodford Shrubbery is a small area of well-established secondary woodland, developed on a “stone-pit” which was quarried for building stone. There has not been a recent survey, but there is a very rich diversity of shrub species and violet helleborine *Epipactis purpurata* has been recorded.

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8i ALLEDGE VALLEY LIMESTONE SLOPES

A heavy quarried area, covering 22 km², between Kettering and Thrapston, lying either side of the Alledge Brook and the A14. The cluster of eight former ironstone quarries supports the greatest concentration of unimproved calcareous grassland in Northamptonshire. Plantations, scrub and ponds add to the wildlife value of several of these sites. Elsewhere there are occasional examples of calcareous grassland in the farmed landscape, but the majority of grasslands have been agriculturally improved.

Twywell Gullet SSSI is the best example of calcareous grassland developed over a worked-out ironstone quarry in Northamptonshire. It consists of a deep, narrow cutting, sloping banks and terraces and a series of old spoil heaps. The site presents a range of habitats, from extensive limestone grassland on the slopes and spoil heaps to a series of ponds and scrub in the bottom of the cutting. The grassland closely resembles the upright brome Bromus erectus - tor grass Brachypodium pinnatum community type, with more ruderal communities on the steeper slopes often dominated by species such as mouse-ear-hawkweed Pilosella officinarum or wild strawberry Fragaria vesca. In places dense patches of wood Small reed Calamagrostis epigejos occur. This grassland is generally species-rich and a number of locally uncommon plants occur, including knapweed broomrape Orobanche elatior, basil thyme Acinos arvensis, dwarf thistle Cirsium acaule, woolly thistle Cirsium eriophorum, carline thistle Carlina vulgaris, blue fleabane Erigeron acer, hound’s-tongue Cynoglossum officinale and bee orchid Ophrys apifera. In early summer there are hundreds of common spotted-orchid Dactylorhiza fuchsii, particularly on the old spoil heaps and the quarry slopes.
Well-vegetated ponds, with bulrush *Typha latifolia*, blunt-flowered rush *Juncus subnodulosus* and willows *Salix spp.*, add to the habitats available for the rich invertebrate fauna. Willows and other trees such as ash *Fraxinus excelsior* are also colonising the deeper parts of the gullet, adding to the general diversity of the area.

Away from the quarries there are other examples of calcareous grassland. Cranford Meadow is a small hay meadow with diversity of meadow grasses including abundant red fescue *Festuca rubra* and crested dog’s-tail *Cynosurus cristatus*. Glaucescent sedge *Carex flacca* and spiked sedge *C. spicata* are both frequent. The herb content is abundant, but not very diverse; with large numbers of bee orchids *Ophrys apifera*. Bird’s-foot-trefoil *Lotus corniculatus* and other leguminous species are all common.

### DESIGNATED SITES

| National Nature Reserves   | None |
| Sites of Special Scientific Interest | Twywell Gullet SSSI |
| Wildlife Sites            | Cranford Meadow, Cranford St. John Quarry, Duck End Quarry, Cranford, Ekens Copse, Ekens Copse Moat, Five Willow Farm Quarry, Quarry End, Cranford, Sandy Spinney Quarry, Slinton Verge, South East Quarry, Cranford, Twywell Gullet, Twywell Hills and Holes, Twywell Meadow |
| Local Nature Reserves     | None |
8j ISLIP TO PERIO LIMESTONE SLOPES

26km² of Limestone Slopes forming the western Lower Nene Valley side. Wildlife Site survival is low with the majority of sites, including Wadenhoe Marsh and Achurch Meadow SSSI and Oundle Nene Woodland, overlapping with the Lower Nene Floodplain. The main biodiversity interest at these sites lies outside this Character Area. The predominant land use is arable and woodland retention is low.

The only typical site is the Cotterstock Road Verges. There is a lack of recent survey information, but this site is known to support species-rich limestone grassland including the county rarity knapweed broomrape *Orobanche elatior*.

Biggin Fishpond is a man-made fishing lake adjacent to Oundle Golf Course. There are variable amounts of marginal and emergent vegetation including water mint *Mentha aquatica*, hard rush *Juncus inflexus*, gypsywort *Lycopus europaeus*, yellow iris *Iris pseudacorus* and bulrush *Typha latifolia*. In the open water are large patches of amphibious bistort *Persicaria amphibia* and white water lily *Nymphaea alba*.

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An area of 13km² to the north and east of Kettering. This area is more heavily wooded than all the other Limestone Slopes Biodiversity Character Areas, with some areas of ancient origin, although the majority are plantations on former ironstone quarries.

Weekley Hall Wood and Quarry and the associated railway cutting exemplify the range of habitats occurring in the area. Weekley Hall Wood is the largest area of semi-natural woodland with a high diversity of mature trees, scrub and ground flora. The Quarry has some of the best calcareous grassland in the area and contains very large numbers of bee orchids Ophrys apifera and common spotted orchids Dactylorhiza fuchsii. The base of the quarry has a marshy area with abundant spike sedge Carex spicata.

Weekley Hall Wood Railway Cutting is a very varied area of habitat that is all that remains of the Weekley Hall Wood Quarry mineral railway line. There is some hawthorn Crataegus monogyna and birch Betula pendula scrub at the margins, and plants typical of the quarry faces include centaury Centaurium erythraeum, blue fleabane Erigeron acer, mouse-ear hawkweed Pilosella officinarum, wild strawberry Fragaria vesca and scarlet pimpernel Anagallis arvensis. The most striking feature of the southwest bank of this site is the large number of common spotted orchids Dactylorhiza fuchsii.

Construction of the cutting has exposed various rock strata and the corresponding vegetation varies with the substrate. The more acid areas over sands have gorse Ulex europaeus and bracken Pteridium aquilinum. Elsewhere, the grassland is calcareous with frequent glaucous sedge Carex flacca, carline thistle Carlina vulgaris, burnet saxifrage Pimpinella saxifraga, ploughman’s-skenard Inula conyzae, wild marjoram Origanum vulgare, eyebright Euphrasia agg, cat’s-ear Hypochaeris radicata, bird’s-foot-trefoil Lotus corniculatus, yarrow Achillea millefolium and common knapweed Centaurea nigra. Woolly thistle Cirsium eriophorum occurs on the rockier parts of the north bank.
8. LIMESTONE SLOPES

HARPERS BROOK VALLEY LIMESTONE SLOPES

An area of 13km² between Corby and Thrapston with poor survival of semi natural habitat with isolated examples of both calcareous and mesotrophic grassland. Land use is mixed with a higher proportion of grasslands in the vicinity of settlement, although they are all agriculturally improved. Woodland cover is low.

Brigstock Country Park, now part of the larger Fermyn Woods Country Park that includes the adjacent woodland, is a former sand quarry which now comprises areas of sheltered, short turf and bare-ground habitats that are particularly attractive to characteristic butterflies include dingy skipper *Erynnis tages* and green hairstreak *Calliphrys rubi*. Ponds and scrub add to the interest. The calcareous grassland includes centaury *Centaurium erythraea*, yellow-wort *Blackstonia perfoliata*, bee orchid *Ophrys apifera*, bird’s-foot trefoil *Lotus corniculatus*, blue fleabane *Erigeron acer* and cowslip *Primula veris*.

Two areas of Drayton Park are identified as Wildlife Sites, the square pond in the gardens of the house and the short grassland on the ha-ha surrounding the gardens. The soils on the ha-ha are sandy, influenced by the underlying Upper Estuarine Sands and this is reflected by the mesotrophic grassland which includes red fescue *Festuca rubra*, upright brome *Bromus erectus*, timothy *Phleum pratense*, annual meadow-grass *Poa annua*, cat’s-ear *Hypochaeris radicata*, daisy *Bellis perennis*, yarrow *Achillea millefolium*, spike sedge *Carex spicata*, mouse-ear hawkweed *Pilosella officinarum*, hoary plantain *Plantago media*, goat’s-beard *Tragopogon pratensis*, lady’s bedstraw *Galium verum*, cowslip *Primula veris*, meadow vetchling *Lathyrus pratensis* and salad burnet *Sanguisorba minor*.

The square pond has a mixture of native and introduced aquatic species, with white water lily *Nymphaea alba*, rigid hornwort *Ceratophyllum demersum*, Canadian waterweed *Elodea canadensis* and water soldier *Stratiotes aloides*. The stone walls of the pond and their surrounding paving and grassland have a good diversity of short grassland and colonizing species, the most significant being wild thyme *Thymus polytrichus* on the short grassland surrounding the pond walls, which is indicative of the calcareous substrate.

DESIGNATED SITES

**National Nature Reserves**
- None

**Sites of Special Scientific Interest**
- None

**Wildlife Sites**
- Brigstock Country Park
- Drayton House Parkland

**Local Nature Reserves**
- None

8l- Tom Day - Dingy Skipper on Meadow Vetchling
8m  STOKE ALBANY TO ROCKINGHAM LIMESTONE SLOPES

A small area, 6km², to the west of Corby predominantly overlying Lower Lincolnshire Limestone Formation on the upper slopes of the Welland Valley. There are large areas of arable land and smaller areas of mainly agriculturally improved grassland. Woodland cover is low, as is wildlife site retention.

The Dale is a deep valley, currently managed as a Pocket Park, comprising short to tall grassland with occasional single trees and a small, fenced-off spring. The southwest slope has some coarse vegetation, but also supports very short, dry calcareous grassland. Species in the most diverse patch include dwarf thistle *Cirsium acaule*, cowslip *Primula veris*, fairy flax *Linum catharticum*, sorrel *Rumex acetosa*, wild carrot *Daucus carota*, glaucous sedge *Carex flacca*, wild thyme *Thymus polytrichus*, lady’s bedstraw *Galium verum*, burnet saxifrage *Pimpinella saxifraga*, small scabious *Scabiosa columbaria*, bird’s-foot-trefoil *Lotus corniculatus*, salad burnet *Sanguisorba officinalis*, common knapweed *Centaurea nigra* and hoary plantain *Plantago media*. Red fescue *Festuca rubra* is abundant.

New Coppice Lane is principally of value because of the ancient hedgerows and, although underlain by Lower Lincolnshire Limestone, the vegetation is more typical of the adjacent Boulder Clay Woodlands Character Area. Tree species are varied and include dominant ash *Fraxinus excelsior*, with hawthorn *Crataegus monogyna*, Midland hawthorn *C. laevigata*, frequent oak *Quercus robur*, field maple *Acer campestre*, wych elm *Ulmus glabra*, sycamore *Acer pseudoplatanus*, hazel *Corylus avellana*, field rose *Rosa arvensis* and locally frequent blackthorn *Prunus spinosa*. The ground flora of the hedge contains ancient woodland indicators such as bluebell *Hyacinthoides non-scriptus*, dog’s mercury *Mercurialis perennis*, violet *Viola spp.*, primrose *Primula vulgaris* and nettle-leaved bellflower *Campanula trachelium*.

DESIGNATED SITES

- **National Nature Reserves**: None
- **Sites of Special Scientific Interest**: None
- **Wildlife Sites**:
  - New Coppice Lane
  - The Dale
- **Local Nature Reserves**: None
8n THORPE WATERVILLE TO WARMINGTON LIMESTONE SLOPES

An area of 22km² forming the eastern Lower Nene Valley side. Unimproved semi-natural habitats are limited to a single area of calcareous grassland on a former quarry. Woodland cover is low and large arable fields predominate.

Barnwell Mill Fields is a narrow strip of very old quarried hills and holes on the top of a steep slope adjacent to the River Nene. The flatter areas, which have been horse grazed for a long period, have dense, rank vegetation dominated by false oat grass *Arrhenatherum elatius* with abundant creeping thistle *Cirsium arvense*, spear thistle *C. vulgare* and musk thistle *Carduus nutans*. Nettle *Urtica dioica* is abundant, and there are patches of hemlock *Conium maculatum*. However, the tops of some of the hills and holes and areas on the top of the main bank contain finer, shorter, rabbit grazed grassland that has escaped the horse grazing. These areas contain a very rich diversity of both grass and herb species. Species include dwarf thistle *Cirsium acaule*, salad burnet *Sanguisorba minor*, wild thyme *Thymus polytrichus*, abundant lady’s bedstraw *Galium verum*, mouse–ear hawkweed *Pilosella officinarum*, glaucous sedge *Carex flacca*, hoary plantain *Plantago media* and frequent bird’s-foot-trefoil *Lotus corniculatus*. There are frequent anthills.

**DESIGNATED SITES**

- **National Nature Reserves**: None
- **Sites of Special Scientific Interest**: None
- **Wildlife Sites**: Barnwell Mill Fields
- **Local Nature Reserves**: None
8o WILLOW BROOK VALLEY LIMESTONE SLOPES

An area of 13km² forming the southern slopes of the Willow Brook Valley. Despite the large area of Blisworth Limestone and Lower Lincolnshire Limestone, there are no areas of retained unimproved semi-natural habitat. Large arable fields predominate to the east, with a greater proportion of agriculturally improved grasslands to the west. Woodland cover is low.

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CHARACTER AREAS

9a  Watford Gap

KEY CHARACTERISTICS

• Surface geology comprises Glacial Sands and Gravels;
• a variety of soils types, with extensive areas of well-drained soils, ideal for cereal growing;
• some retention of grasslands, but all are agriculturally improved;
• very low retention of unimproved semi-natural habitats;
• all Wildlife Sites are linear, man-made habitats; and
• very few areas of woodland.
INTRODUCTION

An area of Glacial Sands and Gravels on the western slopes of the Upper Nene Valley to the West of Northampton, between Ashby St Ledgers and Nether Heyford. The area, known as the Watford Gap, covers 23km² and is the only extensive area of Glacial Sand and Gravel in Northamptonshire. Consequently there is only one Biodiversity Character Area associated with the Sand and Gravel Character Type. Land use is mixed, with an equal proportion of agriculturally improved grasslands and arable fields. There are very few areas of woodland.

PHYSICAL INFLUENCES

Geology and Soils
Geologically the area comprises unbroken Glacial Sand and Gravel and a few small areas of Boulder Clay. Whilst the surface geology is simple, the distribution of soils types is complex. The predominant soil association comprises well-drained, loamy typical brown earths. Elsewhere soils are mainly slightly stony clay or clay loams and fine loamy over clayey soils (Hodge 1984).

Hydrology
The land drains eastwards to the River Nene, but there are only occasional springs and streams in the area.

HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS

Much of the area is particularly well suited to cultivation because of the light texture, large porosity and small retained water capacity of the soils. Despite this, farming remains mixed. However, the retained grasslands have all been agriculturally improved to produce a heavier crop of grass resulting in the loss of species diversity.

Construction of the Grand Union Canal and the railway, now disused, in the vicinity of Dodford has created some areas of wildlife habitat that, although not typical of the surrounding farmland, provide important wildlife corridors.

PRINCIPAL HABITAT TYPES

Retention of unimproved semi-natural habitats is very low. The only retained areas of semi natural habitat are the Grand Union Canal Welton Section and a short section of the Dodford Disused Railway, both of which are man-made and as such are uncharacteristic of the unimproved semi-natural habitats that might be expected to have been retained in the more extensive farmed landscape.

Rivers and Wetlands
The Grand Union Canal Welton Section is the only wetland Wildlife Site in the area, with a boundary hedgerow that forms an important wildlife corridor. Emergent vegetation occupies at least one bank of the canal for the whole of this reach and often both sides are species-rich. Species include greater pond sedge Carex riparia, false fox sedge C. otrubae, greater tussock sedge C. paniculata, orange balsam Impatiens capensis, skullcap Scutellaria galericulata, square-stalked St John’s-wort Hypericum tetragonum, bulrush Typha latifolia and common reed Phragmites australis. Patches of both sweet flag Acorus calamus and yellow iris Iris pseudacorus occur occasionally. Submerged species are common, despite heavy use by boats, and are dominated by fennel pondweed Potamogeton pectinatus, with shining pondweed P. lucens and yellow water-lily Nuphar lutea.

The hedgerow is predominantly hawthorn Crataegus monogyna, with wych elm Ulmus glabra, ash Fraxinus excelsior, field maple Acer campestre, alder Alnus glutinoso and buckthorn Prunus spinosa and the edges of the towpath contain some finer grassland with species such as red fescue Festuca rubra, yellow oat-grass Trisetum flavescens, meadow vetchling Lathyrus pratensis, goat’s-beard Tragopogon pratensis, common knapweed Centaurea nigra and black medick Medicago lupulina.

Dry Grassland
A short section of the Dodford Disused Railway lies in this area. The cutting that was excavated during the construction of the railway is steep-sided and heavily rabbit grazed, and contains some areas of calcareous grassland that is not typical of the rest of the areas. Species include false oat-grass Arrhenatherum elatius, red fescue Festuca rubra, knapweeds Centaurea spp., mouse-ear hawkweed Pilosella officinarum, comfrey Symphytum sp, meadow vetchling Lathyrus pratensis and wild carrot Daucus carota.
9. GLACIAL GRAVELS

9a WATFORD GAP

The Watford Gap is the only Biodiversity Character Area associated with the Glacial Gravels Biodiversity Character Type, therefore the above description applies to this area.

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CHARACTER AREAS

10a River Cherwell
10b River Great Ouse
10c Upper Tove
10d River Tove
10e Upper Nene
10f Brampton Nene
10g Wootton Brook
10h Grendon Brook
10i Sywell Bottom
10j River Avon
10k Upper Welland
10l River Ise
10m Alledge Brook
10n Harpers Brook
10o Southwick Brook
10p Willow Brook

KEY CHARACTERISTICS

• Surface drift is dominated by Alluvium;
• narrow valleys subject to periodic winter flooding, defined by the extent of the Easter floods of 1998;
• small, often fast flowing streams in the upper reaches of the catchments;
• wider, slower flowing rivers lower down the river system;
• grasslands are predominant, but the majority are agriculturally improved;
• habitats are often damp all year round;
• wet woodland and carr is typical, but very limited in extent;
• a variety of wet and marshy grasslands occur;
• reservoirs and ornamental lakes are characteristic;
• sand and gravel pits are infrequent
10. MINOR FLOODPLAIN

- the reservoirs attract breeding and wintering water birds; and
- some springs and seepages occur;
- the reservoirs attract breeding and wintering water birds; and
- some springs and seepages occur.

INTRODUCTION

Character Areas defined by this Biodiversity Character Type are found in the upper reaches of all the river systems in Northamptonshire. Many of the tributary streams have been modified to encourage rapid drainage of the surrounding land and have lost the typical structure of a natural channel. The floodplain tends to be narrow. A variety of wet and damp unimproved semi-natural habitats occur, including wet and marshy grassland, damp hay meadows and wet woodland. Standing water is also a feature in the form of reservoirs, ornamental lakes and canals.

PHYSICAL INFLUENCES

Geology and Soils

In the lower areas the surface geology is dominated by Alluvium with deep clayey alluvial soils. The sub-soils are usually slowly or moderately permeable, but the main cause of water logging is groundwater that fluctuates seasonally with changes in river level. The duration of water logging is often related to the micro-topography of individual fields. In the winter months the water table tends to be high for long periods and flooding is frequent (Hodge 1984). In the upper reaches of the catchments a variety of soils occur, influenced by erosion of the adjoining valley slopes. Thin peaty topsoils occur occasionally.

Hydrology

Minor Floodplain Character Areas are essentially defined by the presence of streams and rivers that are subject to winter flooding. In the highest reaches of the river systems the streams are narrow and in places fast flowing, particularly where they are draining steeper ground. In these areas the channels are least modified and in places retain a natural structure. At lower elevations, where the ground is less steeply sloping, the narrow rivers are slow flowing. Here they have often been modified to encourage rapid drainage of the surrounding land and to reduce the flood risk. As a result the channels are straighter and lack many characteristic features of natural river channels.

HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS

Floodplains, as their name suggests, are subject to regular flooding, particularly in the winter months, but also at other times. The water table in these areas is also higher than that on land on the upper ground. These are the principal reasons for the widespread retention of grassland in the floodplains. Prior to agricultural improvement floodplain grasslands would often have been floristically diverse and, because the grasslands were unsuitable for grazing in the spring, breeding wading birds such as lapwing *Vanellus vanellus* and snipe *Gallinago gallinago* would have been widespread.

Floodplain grassland management traditionally involved hay cutting in the late spring or early summer followed by aftermath grazing, particularly by cattle, later in the year. Stock was removed over the winter months. However, improved land drainage techniques and the implementation of flood defence measures have reduced the frequency of flooding and the length of time that land remains wet. This has discouraged breeding waders in all but the wettest areas. As summer flooding is now much less frequent some areas of grassland have been converted to arable cropping. Where grasslands are retained, the use of chemical fertilisers has also improved grass production resulting in a change to the natural botanical composition of many grasslands. A better grass crop has also allowed greater stocking densities. Silage production has now taken over from traditional hay cropping which maintained the floristic diversity.

There are no natural lakes in Northamptonshire. However, they are now a feature of the floodplains. The construction of reservoirs, firstly to recharge the canal network and latterly for drinking water supply, has had a positive effect on local biodiversity by creating new wetland habitats that attract large numbers and a wide diversity of water birds. The creation of landscape parkland has also increased the extent of smaller open water habitats.
**10. MINOR FLOODPLAIN**

**PRINCIPAL HABITAT TYPES**

**Rivers and streams**

Unmodified streams, such as the River Ise upstream of Kettering, display a variety of semi-natural features including meanders and alternating series of pools, slacks, riffles and runs which give rise to a variety of flow patterns. Varied substrates create a variety of silty pools, gravel shoals and beds and bare clay areas. Occasional trees and small areas of woodland line the banks, with alder *Alnus glutinosa* and willow *Salix* pollards being typical. Stands of aquatic plants include bur-reed *Sparganium spp*, spiked water-milfoil *Myriophyllum spicatum*, yellow water-lily *Nuphar lutea*, arrowhead *Sagittaria sagittifolia*, common club-rush *Schoenoplectus lacustris*, broad-leaved pondweed *Potamogeton natans*, greater pond sedge *Carex riparia* and rigid hornwort *Ceratophyllum demersum*.

The characteristic fauna includes otter *Lutra lutra*, water vole *Arvicol a terrestris* and white-clawed crayfish *Austropotamobius pallipes*, although all three species are rare. Beautiful demoiselle *Calopteryx virgo* damselsflies are confined to the fast flowing streams with gravel beds in the south west of the county.

**Standing Open Water**

Open waters in the Minor Floodplain vary in size from small ponds to large reservoirs. Canals are also classified as standing water habitats. They also vary in depth, which influences the nature of the marginal, emergent and aquatic vegetation. Open water habitats typically have a broad fringe of tall vegetation comprising a variety of swamp and tall herb fen communities, with dominant species such as common reed *Phragmites australis*, reed sweet-grass *Glyceria maxima*, Greater pond-sedge *Carex riparia*, lesser pond-sedge *Carex acutiformis*, water horsetail *Equisetum fluviatile*, bulrush *Typha latifolia* and reed canary-grass *Phalaris arundinacea*. These areas attract typical breeding birds such as reed warblers *Acrocephalus scirpaceus*, sedge warblers *Acrocephalus schoenobaenus* and reed buntings *Emberiza schoeniclus*. Characteristic mammals include harvest mouse *Micromys minutus*.

Typical floating and submerged species include species include Canadian waterweed *Elodea canadensis*, curled pondweed *Potamogeton crispus*, common duckweed *Lemma minor* and amphibious bistort *Persicaria amphibia*.

Unlike the smaller ponds, the larger water bodies can attract large numbers of wintering wildfowl such as great crested grebe *Podiceps cristatus*, pochard *Aythya ferina*, shoveler *Anas clypeata*, wigeon *Anas penelope*, teal *Anas crecca*, and coot *Fulica atra*. Gadwall *Anas strepera* and tufted duck *Aythya fuligula* breed in small numbers. Typical breeding birds on smaller ponds include mallard *Anas platyrhynchos* and moorhen *Gallinula chloropus*.

**Wet and Marshy Grassland**

Grasses, low-growing herbs and rushes, which can tolerate periodic inundation, typically dominate wet and marshy grassland communities. Often drainage channels or other water bodies are associated with the habitat and these can also support important species assemblages.

Wet and marshy grasslands can be sub-divided into separate vegetation communities that develop according to the soil conditions and flooding regime of each site. A variety of wet grasslands occur in the county, including the following National Vegetation Classification (NVC) communities:

- MG4 Meadow foxtail *Alopecurus pratensis* - great burnet *Sanguisorba officinalis* grassland;
- MG8 Crested dog’s-tail *Cynodon dactylon* - marsh marigold *Caltha palustris* grassland;
- MG9 Yorkshire fog *Holcus lanatus* - tufted hair-grass *Deschampsia cespitosa* grassland;
- MG10 Yorkshire fog *Holcus lanatus* - soft rush *Juncus effusus* grassland;
- MG11 Red fescue *Festuca rubra* - creeping bent *Agrostis stolonifera* – silverweed *Potentilla anserina* grassland;
- MG12 Tall fescue *Festuca arundinacea* grassland;
- MG13 Creeping bent *Agrostis stolonifera* - marsh foxtail *Alopecurus geniculatus* grassland.

**Reedbeds and Swamps**

Swamps tend to be relatively species-poor wetland habitats often dominated by a single species. They typically form in depressions or as fringing vegetation alongside rivers, ponds and reservoirs. A wide variety of swamp communities occur in Northamptonshire and, in the case of wetlands that fringe water bodies, several discrete communities often occur adjacent to each other. Typical swamp include:

- S4 Common reed *Phragmites australis* swamp;
- S5 Reed sweet-grass *Glyceria maxima* swamp;
- S6 Greater pond-sedge *Carex riparia* swamp;
- S7 Lesser pond-sedge *Carex acutiformis* swamp;
- S10 Water horsetail *Equisetum fluviatile* swamp;
- S11 Bulrush *Typha latifolia* swamp;
- S14 Branched bur-reed *Sparganium erectum* swamp;
- S22 Floating sweet-grass *Glyceria fluitans* water margin;
- S23 Other water margin vegetation;
- S26 Common reed *Phragmites australis* – nettle *Urtica dioica* tall-herb fen;
- S28 Reed canary-grass *Phalaris arundinacea* tall-herb fen.
Springs and their associated wet flushes are generally limited in their distribution. Springs occur where water wells up from underground aquifers, whilst flushes occur on sloping ground with impeded drainage. They support important wet grassland and swamp communities that include rushes *Juncus* spp, sedges *Carex* spp and herb species such as marsh marigold *Caltha palustris* and ragged robin *Lychnis flos-cuculi*.

Trees and Woodland

Woodland is not a major feature of the floodplains. However, wet woodlands have developed in some locations.

The main woodland type is carr, which colonises waterlogged areas and the margins of open water and is often associated with a variety of swamp communities. It has a canopy dominated by willows *Salix* spp or alder *Alnus glutinosa*, but stands vary considerably in their overall appearance. Where invasion is more recent, there can be a mass of bushes of varying height and density, but older stands have a more even structure with, usually, a single tier of trees forming a canopy of 4-8m high. Here there can be an abundance of standing dead wood where thickly-set colonising bushes have been shaded out by the developing survivors, but long-established stands of willow carr, especially with multi-stemmed trees which form broadly-spreading crowns, usually cast a light shade.
10. MINOR FLOODPLAIN

10a  RIVER CHERWELL

The floodplain of the River Cherwell covers 11 km² in the south west of the county and comprises a variety of wetland habitats.

Along the county boundary with Oxfordshire, where the river is at its widest, there are a good variety of common marginal plant species. The river floods the low-lying fields either side of the county boundary in winter, creating over 1000 hectares of important wetland habitat key. Bewick’s Cygnus columbianus and whooper swans C. cygnus once used the area in some numbers, but are now only scarce visitors. Other wildfowl are still attracted in large numbers. These include hundreds of wigeon Anas penelope, teal A. crecca, mallard A. platyrhynchos and smaller numbers of gadwall A. strepera, pintail A. acuta and shoveler A. clypeata. Flocks of 3-5000 lapwing Vanellus vanellus have been recorded and 300 golden plover Pluvialis apricaria regularly winter with occasional dunlin Calidris alpina and snipe Gallinago gallinago. Many more waders visit when conditions are favourable. The series of small lakes near Nell Bridge attract breeding tufted duck Aythya fuligula and little grebe Tachybaptus ruficollis. Breeding birds of note are curlew Numenius arquata, reed warbler Acrocephalus scirpaceus, yellow wagtail Motacilla flava and kingfisher Alcedo atthis. Snipe Gallinago gallinago and redshank Tringa totanus are former breeders.

The area of botanically rich grassland in the valley is limited. Water Meadows Corner is typical of the mesotrophic grasslands that remain. The grasses are dominated by tufted hair-grass Deschampsia cespitosa, although common bent Agrostis capillaris, creeping bent A. stolonifera, marsh fox-tail Alopecurus geniculatus, Yorkshire fog Holcus lanatus, crested dog’s-tail Cynosurus cristatus, cock’s foot Dactylis glomeratus, red fescue Festuca rubra and false oat-grass Arrhenatherum elatius are all frequent throughout the site. Rushes and sedges are also common, particularly glaucous sedge Carex flacca, spiked sedge C. spicata, hairy sedge C. hirta, hard rush Juncus inflexus and jointed rush J. articulatus. Herb species are scattered, chiefly because of thistle patches caused by livestock poaching. The most diverse areas have frequent great burnet Sanguisorba officinalis, with creeping jenny Lysimachia nummularia, smooth hawk’s-beard Crepis capillaris, ribwort plantain Plantago lanceolata, yarrow Achillea millefolium, yellow-rattle Rhinanthus minor, daisy Bellis perennis, meadow saxifrage Saxifraga granulata, bird’s-foot-trefoil Lotus corniculatus, white clover Trifolium repens, sorrel Rumex acetosa and cuckooflower Cardamine pratensis. The most significant plant present is saw-wort Serratula tinctoria.
In the upper reaches wet and marshy grassland is also limited in extent. Wildlife Sites include Eydon Marshy Field, Culworth Marsh and Trafford Bridge Marsh, although the latter has since been planted with poplars. Eydon Marshy Field is a sheep and cattle grazed pasture with wet tussocky grassland. The grassland is dominated by Yorkshire fog *Holcus lanatus* and tufted hair grass *Deschampsia cespitosa*, but much of the wetter ground is rush dominated, with jointed rush *Juncus articulatus*, hard rush *J. effusus* and occasional soft rush *J. inflexus*. Meadow barley *Hordeum secalinum*, cock’s-foot *Dactylis glomerata*, crested dog’s tail *Cynosurus cristatus* and sweet vernal-grass *Anthoxanthum odoratum* are all frequent on the drier areas. A small ditch runs across the field and joins the stream that borders the south west side. There is a patch of willow carr in the south corner of the site, rather low in diversity, but providing good bird cover. Amongst the rush tussocks and by the stream there is a variety of marsh plants that have escaped grazing including hairy sedge *Carex hirta*, water-cress *Rorippa nasturtium-aquaticum*, marsh bedstraw *Galium palustre*, creeping jenny *Lysimachia nummularia*, marsh thistle *Cirsium palustre*, silverweed *Potentilla anserina* and frequent greater bird’s-foot-trefoil *Lotus pedunculatus*.

A few areas of wet woodland survive. Ayhho Viaduct Carr is a dense patch of wet woodland that has become established under the viaduct south of the disused Ayhho Station. Once open water, this area is now almost impenetrable and dominated by grey willow *Salix cinerea* and osier *S. viminalis*. Drier parts have mature sycamore *Acer pseudoplatanus* and field maple *A. campestris* scrub. Buckthorn *Rhamnus cathartica*, oak *Quercus robur*, hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa* are also frequent. The field layer varies from lesser pond sedge *Carex acutiformis* swamp to a drier and less diverse flora dominated by nettle *Urtica dioica* and/or giant fescue *Festuca gigantea*, with bramble *Rubus fruticosus* amongst the undergrowth. Marsh species present include marsh valerian *Valeriana dioica*, marsh bedstraw *Galium palustre*, water mint *Mentha aquatica*, water forget-me-not *Myosotis scorpioides* and hard rush *Juncus inflexus*. The few areas of standing water contain brooklime *Veronica beccabunga*. In the drier areas sweet violet *Viola odorata* is frequent, with other woodland/scrub species including black bryony *Tamus communis*, remote sedge *Carex remota*, hedge woundwort *Stachys sylvester* and enchanter’s nightshade *Circaea lutetiana*.

Baldwin’s Spinney is an apparently older area of wet woodland comprising a wide variety of scrub species and a marshy ground flora fed by the adjacent stream. The trees are neglected and the field layer is rather dark, with frequent fallen willows that continue to grow. Dead trunks support a wide variety of fungi.

Standing open water is represented by Boddington Reservoir, several small lakes and ponds and the Oxford Canal. Boddington Reservoir is owned by British Waterways and is used to recharge the nearby canal system. It is located at the centre of a suite of other Wildlife Sites, Boddington Meadow, Byfield Pool and Boddington Marshy Field, which together provide a wide diversity of habitats. Most of the western margin comprises boulder revetment, but the eastern edge is shallower and more natural. Marginal, emergent and floating vegetation is densest here and includes grey willow *Salix cinerea*, yellow iris *Iris pseudacorus*, common club-rush *Schoenoplectus lacustris*, marsh foxtail *Alopecurus geniculatus*, water horsetail *Equisetum fluviatile*, water forget-me-not *Myosotis scorpioides*. Aquatic species include shining pondweed *Potamogeton lucens*, fennel pondweed *P. pectinatus*, amphibious bistort *Persicaria amphibia* and common water starwort *Callitriche stagnalis*. Byfield Pool, a well-established pool separated from the reservoir by an earth dam, has much better-established emergent vegetation including common reed *Phragmites australis*, reed canary-grass *Phalaris arundinacea*, reed sweet-grass *Glyceria maxima* and bulrush *Typha latifolia*. The pool is less disturbed and attracts a variety of breeding and wintering waterfowl and warblers.

The Upper tributaries of the Cherwell are the primary breeding location of beautiful demoiselle *Calopteryx virgo* damselflies in Northamptonshire. This species requires clean, fast-flowing streams with a stony bed and nearby meadows and tall herbage where they feed. They are particularly frequent in the vicinity of the Farthinghoe Reserve.
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10b RIVER GREAT OUSE

2.5km² of wetland habitats mainly comprising mesotrophic grasslands in South Northamptonshire. The Upper Ouse tributaries drain to the south and converge at Brackley.

The most important wet/marshy grasslands in the area are Syresham Marshy Meadows, a SSSI comprising two wetlands of contrasting character situated in two narrow valleys. The northern area is relict valley mire on shallow peat. The field south of Primrose Hill Farm comprises agriculturally unimproved neutral grassland and spring-fed marsh. The drier areas lie outside the floodplain.

Though modified by past drainage this site is the largest surviving example of its type in Northamptonshire. The associated marsh and marshy grassland vegetation on peaty alluvium and mixed clay/loams supports a representative and diverse flora. The vegetation is composed of a mixture of sedges, rushes, grasses and herbs with a lush ground cover of mosses in places with marked differences due to variation in the water supply and water chemistry. The northern site has lesser pond-sedge Carex acutiformis, greater pond-sedge C. riparia, jointed rush Juncus articulatus, soft rush J. effusus, carnation sedge Carex panicoides, tufted hair-grass Deschampsia cespitosa and marsh horsetail Equisetum palustre. The many herbs include meadowsweet Filipendula ulmaria, greater bird’s-foot trefoil Lotus pedunculatus, fen bedstraw Galium uliginosum, common valerian Valeriana officinalis and lesser spearwort Ranunculus flammula. Of special note is the presence of southern marsh-orchid Dactylorhiza praetermissa and marsh arrowgrass Triglochin palustris.

At the southern site a vigorous limestone spring has created an extensive seepage area characterised by blunt-flowered rush Juncus subnodulosus. There is a matrix of plant communities with locally dominant lesser pond sedge Carex acutiformis, reed canary-grass Phalaris arundinacea, great willowherb Epilobium hirsutum and hard rush Juncus inflexus.
St James Lake to the west of Brackley is the only open water Wildlife Site. The lake has a variable fringe of vegetation, thicker in some parts than in others. Species include bulrush *Typha latifolia*, reed sweet-grass *Glyceria maxima*, common club-rush *Schoenoplectus lacustris* and a patch of lesser bulrush *Typha angustifolia* in the centre of the lake. Other species amongst the fringing vegetation include gypsywort *Lycopus europaeus*, bittersweet *Solanum dulcamara*, silverweed *Potentilla anserina* and trifid bur-marigold *Bidens tripartita*. There are small patches of white water lily *Nuphar lutea*. Fringing scrub includes a variety of typical marsh and riparian species such as grey willow *Salix cinerea*, white willow *S. alba*, osier *S. viminalis*, almond willow *S. triandra*, goat willow *S. caprea*, with frequent hawthorn *Crataegus monogyna* and occasional rose *Rosa spp.*

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10. MINOR FLOODPLAIN

10c  UPPER TOVE

5km² of floodplain with very limited wildlife site survival. The sites that remain, except for Astwell Mill Lake, are grasslands which lie in very narrow valleys with wet and marshy grasslands on the valley floor and drier grassland above the floodplain.

Adstone Marsh is a linear meadow with a variety of grassland types. The northwest end of the field lies on a slope and has very faint ridge and furrow, whereas the central part of the field has a slight depression that results in shallow flooding from the brook. The dominant species are brown sedge Carex disticha, lesser pond-sedge C. acutiformis, reed canary grass Phalaris arundinacea, with occasional herb species such as creeping buttercup Ranunculus repens, white clover Trifolium repens, lesser stitchwort Stellaria graminea, ragged robin Lychnis flos-cuculi and meadowsweet Filipendula ulmaria. Tussocks of hairy sedge Carex hirta, soft rush Juncus effusus and hard rush Juncus inflexus are frequent. The wettest areas contain abundant jointed rush Juncus articulatus. The rest of the field is inclined to coarse vegetation, but with many of the above species occasionally present. There are also some areas of marsh thistle Cirsium palustre and nettle Urtica dioica. The stream is fast flowing and, despite some cattle poaching, contains several aquatic species including brooklime Veronica beccabunga, water-cress Rorippa nasturtium-aquaticum and water mint Mentha aquatica.

Duncote Marshy Field is a poorly drained field with two main grassland types present, although only the lower part of the field lies in the floodplain. This area comprises herb-rich marshy grassland dominated by hard rush Juncus inflexus in some areas and blunt-flowered rush J. subnodulosus in others. The best patch, in the centre of the site, contains blunt-flowered rush J. subnodulosus and forms classic rush pasture comprising short wet grassland between tussocks. Species include ragged robin Lychnis flos-cuculi, brooklime Veronica beccabunga, cuckooflower Cardamine pratensis, hairy sedge Carex hirta, greater bird’s-foot-trefoil Lotus pedunculatus, creeping buttercup Ranunculus repens, lesser water-parsnip Berula erecta, bog stitchwort Stellaria uliginosa, water figwort Scrophularia auriculata, water forget-me-not Myosotis scorpioides, meadowsweet Filipendula ulmaria and jointed rush Juncus articulatus.

The only standing water Wildlife Site is Astwell Mill Lake which is surrounded by ash Fraxinus excelsior, alder Alnus glutinosa and crack willow Salix fragilis with emergent species including common club-rush Schoenoplectus lacustris, bulrush Typha sp. and common reed Phragmites australis, with amphibious bistort Persicaria amphibia in the open water.
10d  RIVER TOVE

An area of 10km², flowing east from Towcester and then south to the county boundary close to Milton Keynes. This character area also includes a reach of the River Great Ouse to the west of Milton Keynes where there has been limited sand and gravel extraction. There are a variety of wetland habitats, including wet grassland, drains, ponds, a section of canal and a flooded gravel pit.

Mill Crook is a traditionally managed hay meadow situated on alluvial soils. The grassland is floristically diverse and an outstanding example of the meadow foxtail *Alopecurus pratensis* - great burnet *Sanguisorba officinalis* flood-meadow community. This site is the best of the few remaining species-rich hay meadows recorded from the Tove Valley and is typical of a habitat that would have been much more widespread in the absence of agricultural improvement.

The sward comprises a good range of grasses and herbs, the central ‘core’ of the meadow being particularly rich in this respect. Grasses such as meadow foxtail *Alopecurus pratensis*, sweet vernal-grass *Anthoxanthum odoratum*, false oat-grass *Arrhenatherum elatius* and Yorkshire fog *Holcus lanatus* occur in abundance, accompanied by a number of less common species including quaking-grass *Briza media*. The herb flora is dominated by great burnet *Sanguisorba officinalis*, meadow buttercup *Ranunculus acris* and ribwort plantain *Plantago lanceolata* with associated species such as yellow rattle *Rhinanthus minor*, meadowsweet *Filipendula ulmaria*, pepper saxifrage *Silaus silaus*, common knapweed *Centaurea nigra* and cowslip *Primula veris*.

Damper parts of the meadow support sedges, such as spiked sedge *Carex spicata* and provide conditions for the growth of mosses, such as *Calliergon cuspidatum*. A well-developed boundary hedgerow, containing buckthorn *Rhamnus cathartica*, and a mature oak *Quercus robur*, situated within the meadow, add additional interest to the site.

Mill Crook is one of very fewer curlew *Numenius arquata* breeding sites in Northamptonshire.
There are a variety of standing water types, including an old gravel pit, ponds and a section of canal. Deanshanger Gravel Pits forms a series of mature lakes with a thick fringe of common club-rush *Schoenoplectus lacustris*, bulrush *Typha latifolia*, greater pond-sedge *Carex riparia* and lesser pond-sedge *C. acutiformis*. Submerged plants include broad-leaved pondweed *Potamogeton natans*, yellow water lily *Nuphar lutea*, Canadian waterweed *Elodea canadensis* and water plantain *Alisma plantago-aquatica*. Herbs include water figwort *Scrophularia auriculata*, water mint *Mentha aquatica*, wild angelica *Angelica sylvestris*, silverweed *Potentilla anserina*, occasional dropwort *Filipendula vulgaris* and various arable weeds on the bare gravel banks. Fringing tree species include goat willow *Salix caprea*, osier *S. fragilis*, white willow *S. alba* and some oak *Quercus robur*, ash *Fraxinus excelsior* and hawthorn *Crataegus monogyna*.

Yardley Gobion Ponds, the old castle moat and associated fishpond, are typical of the smaller ponds in the area. The margins comprise rank grassland, but the emergent vegetation includes common club-rush *Schoenoplectus lacustris*, bulrush *Typha latifolia*, jointed rush *Juncus articulatus*, pink water-speedwell *Veronica catenata* and water mint *Mentha aquatica*, with Canadian waterweed *Elodea canadensis*, curled pondweed *Potamogeton crispus* and abundant common duckweed *Lemna minor* in the water. Trees include very large old pollarded crack willows *Salix fragilis*, Scots pines *Pinus sylvestris*, white willows *Salix alba*, Midland hawthorn *Crataegus laevigata* and hawthorn *C. monogyna*.

The section of the Grand Union Canal north of Cosgrove, in the vicinity of the Navigation Inn, provides a valuable wildlife corridor, is a fairly open stretch of water with a good variety of species and a well-kept hedge. Vegetation on the towpath is quite variable, with some short, grassy areas with taller vegetation leading down to the water’s edge.

Flowing water Wildlife Sites include Cappenham Bridge Drain and Cosgrove Mill Stream. Cappenham Bridge Drain is a particularly good example of an unpolluted drain in undisturbed pasture. The drain is species-rich with abundant whorl grass *Catabrosa aquatica*, water-cress *Rorippa nasturtium-aquaticum*, fool’s water-cress *Apium nodiflorum* and the stonewort *Chara vulgaris*. There are also stands of bulrush *Typha latifolia* and branched bur-reed *Sparganium erectum*.

The vegetation fringing Cosgrove Mill Stream is not as species-rich as the Cappenham Bridge Drain, but includes water forget-me-not *Myosotis scorpioides*, fool’s water-cress *Apium nodiflorum*, water plantain *Alisma plantago-aquatica*, pink water speedwell *Veronica catenata*, water cress *Rorippa nasturtium-aquaticum*, water mint *Mentha aquatica* and some flowering rush *Butomus umbellatus*.

### DESIGNATED SITES

**National Nature Reserves**
- None

**Sites of Special Scientific Interest**
- Mill Crook SSSI

**Wildlife Sites**
- Cappenham Bridge Drain
- Cosgrove Priory Mill Stream
- Deanshanger Gravel Pits
- Grand Union Canal: Navigation Inn
- Lincoln Lodge Meadow
- Stoke Park Fishponds
- Yardley Gobion Ponds

**Local Nature Reserves**
- None
10. MINOR FLOODPLAIN

10e  UPPER NENE

An area of 16km², including the upper tributaries of the River Nene to the west of Northampton. Habitats associated with the Grand Union Canal feature prominently and there are some areas of unimproved semi-natural wet grassland and marsh.

Bugbrooke Meadows SSSI represents a range of grassland types that would once have been widespread in the floodplain. The site contains a group of low-lying meadows alongside the River Nene that have escaped drainage and improvement. They tend to flood in winter and often remain wet well into the growing season. As a result they support a range of damp grassland communities that are remarkably diverse and species-rich. The old hedgerows, drainage features and a short section of the River Nene form an integral part of this site, which is managed by a combination of grazing and hay cutting.

The mesotrophic grassland of the crested dog’s-tail *Cynosurus cristatus* - marsh marigold *Caltha palustris* flood meadow type, grade through meadow foxtail *Alopecurus pratensis* - great burnet *Sanguisorba officinalis* to crested dog’s-tail *Cynosurus cristatus* - common knapweed *Centaurea nigra* grassland in the drier areas. In some wetter places the creeping bent *Agrostis stolonifera* - marsh foxtail *Alopecurus geniculatus* inundation community occurs.

Wetter areas, particularly along spring lines and ditches, are dominated by hard rush *Juncus inflexus*, jointed rush *J. articulatus* and greater pond sedge *Carex riparia*, with marsh marigold *Caltha palustris*, common spike-rush *Eleocharis palustris*, great burnet *Sanguisorba officinalis* and ragged robin *Lychnis flos-cuculi*. The meadows are very species-rich and contain a number of species that are rare in the county, including sneezewort *Achillea ptarmica*, common cotton-grass *Eriophorum angustifolium*, adder’s tongue *Ophioglossum vulgatum*, lesser spearwort *Ranunculus flammula*, marsh arrow-grass *Triglochin palustris* and marsh valerian *Valeriana dioica*.

The old hedges surrounding the meadow are important features in themselves, both historically and as a wildlife habitat. Common trees and shrubs include blackthorn *Prunus spinosa*, hazel *Corylus avellana*, crab apple *Malus sylvestris*, hawthorn *Crataegus monogyna*, Midland hawthorn *C. laevigata*, spindle *Euonymus europaeus* and buckthorn *Rhamnus cathartica*. Some of the adjoining fields are also very interesting botanically, but although still part of the same management unit are not as species-rich as the SSSI.
Whilton Marsh is one of the few remaining areas of woodland. Because of the high nutrient levels the ground flora is dominated by nettle Urtica dioica, but it is also very wet. The trees consist of old crack willows Salix fragilis in one part of the wood, grading through mixed, damp scrub into a plantation of oak Quercus robur, sycamore Acer pseudoplatanus, aspen Populus tremula and in the driest section there are large old beeches Fagus sylvatica. In the wetter areas the scrub is varied and includes grey sallow Salix cinerea, osier S. viminalis and young crack willows S. fragilis. The wettest areas in the centre of the site have a small area of marsh vegetation with reed sweet-grass Glyceria maxima, orange balsam Impatiens capensis, brooklime Veronica beccabunga, water forget-me-not Myosotis scorpioides, greater bird’s-foot trefoil Lotus pedunculatus and frequent meadowsweet Filipendula ulmaria, together with the county rarity bog stitchwort Stellaria uliginosa.

Areas of standing water are well represented, particularly by wetlands associated with the Grand Union Canal, although the majority of the canal proper lies outside the area.

Daventry Reservoir, part of Daventry Country Park, was constructed to recharge the canal. Both the bird and the plant life of the reservoir are very diverse, whilst the fields around the reservoir, although not all included in the Wildlife Site, are nevertheless useful extensions to the area. The primary importance of the reservoir is ornithological, with a wide variety of breeding and wintering species.

The areas of mud around the water’s edge are mostly colonised by tall herb species, but the west edge of the reservoir has bare mud with a characteristic flora including the county rarities shoreweed Littorella uniflora and mudwort Limosella aquatica as well as marsh cudweed Gnaphalium uliginosum. Taller emergent species include reed canary-grass Phalaris arundinacea, water horsetail Equisetum fluviatile, common spike-rush Eleocharis palustris, soft rush Juncus effusus, hard rush J. inflexus and great yellow-cress Rorippa amphibia with water mint Mentha aquatica in a band alongside the draw-down zone. Areas of woodland include ash Fraxinus excelsior, aspen Populus tremula, alder Alnus glutinosa, oak Quercus robur and crack willow Salix fragilis.

At the south of the reservoir there are several ponds containing water plantain Alisma plantago-aquatica, Canadian pondweed Elodea canadensis, reed sweet-grass Glyceria maxima, common water starwort Callitriche stagnalis and jointed rush Juncus articulatus.

The only area of flowing water identified as a Wildlife Site is the Brook flowing from Daventry Reservoir to the Grand Union Canal near Welton. The stream is notable for the presence of important aquatic flora, including the rare lesser pondweed Potamogeton pusillus and horned pondweed Zannichellia palustris, and the restricted beautiful demoiselle Calyopterix virgo damselfly.

### DESIGNATED SITES

**National Nature Reserves**
- None

**Sites of Special Scientific Interest**
- Bugbrooke Meadows SSSI

**Wildlife Sites**
- Daventry Reservoir & Country Park
- Grand Union Canal: Watford
- Grand Union Canal: Weedon Bec
- Grand Union Canal: Welton
- Grand Union Canal: Brook
- Kilsby Landfill Lake
- Meg Spinney
- Sewell Valley including:
  - Weedon Marsh
  - Whilton Marsh

**Local Nature Reserves**
- None
10f BRAMPTON NENE

18km² of floodplain bordering a series of narrow tributaries of the River Nene. Drinking water reservoirs are characteristic of the area. The Brampton Valley Way, a disused railway now used as a recreational route, passes through the valley, although the associated dry grassland and scrub habitats are not typical of the floodplain. There is a greater proportion of plantation woodland along the Brampton Nene than in other areas of Minor Floodplain. Retention of unimproved semi-natural grassland is low.

Very little unimproved semi-natural wet and marshy mesotrophic grassland is retained with the majority occurring in the narrow floodplain to the west of Kingsthorpe. Kingsthorpe Tussocks is the best example of marshy grassland and comprises rough pasture with a high water table and associated swamp vegetation. The site is characterised by dense emergent vegetation next to the drain, grading through a botanically diverse swamp with permanent standing water to large tussocks of hard rush *Juncus inflexus* and tufted hair-grass *Deschampsia cespitosa*. There are also occasional patches of creeping bent *Agrostis stolonifera* dominated wet grassland, which floods in the winter and remains damp during the summer. Species in the deepest areas of swamp and the drain include reed canary-grass *Phalaris arundinacea*, reed sweet-grass *Glyceria maxima*, floating sweet grass *G. fluitans*, lesser water-parsnip *Berula erecta*, common duckweed *Lemna minor*, celery-leaved buttercup *Ranunculus sceleratus*, water plantain *Alisma plantago-aquatica* and abundant lesser pond-sedge *Carex acutiformis*. The main waterlogged area also has a good diversity of emergent species including common spike-rush *Eleocharis palustris*, jointed rush *Juncus articulatus*, marsh bedstraw *Galium palustris*, water figwort *Scrophularia auriculata*, greater bird’s-foot-trefoil *Lotus pedunculatus*, meadowsweet *Filipendula ulmaria*, marsh thistle *Cirsium palustre*, lesser stitchwort *Stellaria graminea* and common fleabane *Pulicaria dysenterica*. Snipe *Gallinago gallinago* are present in the winter.

There are several plantation woodlands, associated with streams. Maidwell Dale is a well-wooded, steep-sided valley with a stream and marsh in the valley bottom. The Dale is planted with a wide diversity of well-established trees including ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus*, oak *Quercus robur*, elm *Ulmus spp* and yew *Taxus baccata*. The large elms have died and the wych elm *Ulmus glabra* and English elm *U. procera* now occur only as suckering bushes. Scrub includes holly *Ilex aquifolium*, hazel *Corylus avellana*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, Midland hawthorn *Crataegus laevigata* and elder *Sambucus nigra*. Some of the trees are old, but most are immature. Dale Pond, at the lowest, east end of the Dale, is now choked with vegetation, mostly consisting of reed sweet-grass *Glyceria maxima*, and is surrounded by willows, including crack willow *S. fragilis*, purple willow *S. purpurea*, almond willow *S. triandra* and osier *S. viminalis*. The rest of the site has a tall field layer with species such as meadowsweet *Filipendula ulmaria*, marsh thistle *Cirsium palustre*, hogweed *Heracleum sphondylium*, cow parsley *Anthriscus sylvestris*, burdock *Arctium agg*, rosebay willowherb *Chamerion angustifolium* and nettle *Urtica dioica*.
There are three reservoirs, Hollowell, Ravensthorpe and Pitsford, in the area. Pitsford is the largest and is designated as an SSSI. Pitsford Reservoir is one of the major reservoirs for passage and wintering water birds in the East Midlands and the largest water body in Northamptonshire, with shoveler *Anas clypeata* wintering in internationally important numbers. The reservoir and marginal land supports a significant number and variety of breeding birds including great crested grebe *Podiceps cristatus*, little grebe *Tachybaptus ruficollis*, kingfisher *Alcedo atthis* and reed warbler *Acrocephalus scirpaceus*.

Smaller ornamental lakes are typified by Cottesbrooke Park Lake, a large fishpond in the grounds of Cottesbrooke Park. The edges, particularly of the eastern side of the lake, have a broad band of emergent vegetation, dominated by reed sweet grass *Glyceria maxima*, water mint *Mentha aquatica*, branched bur-reed *Sparganium erectum* or brooklime *Veronica beccabunga*. Other species present include water plantain *Alisma plantago-aquatica*, bittersweet *Solanum dulcamara*, meadowsweet *Filipendula ulmaria*, great willowherb *Epilobium hirsutum* and water forget-me-not *Myosotis scorpioides*. The deeper water has abundant fringed water lily *Nymphaeoides peltata* and submerged rigid hornwort *Ceratophyllum demersum*.

Flowing water is represented by Kingsthorpe Drains, a series of tributaries and side channels of the Brampton Arm of the River Nene. Each channel has subtly different vegetation. One or two of the very smallest drains are too narrow and low in species diversity to qualify for Wildlife Site status, but on the whole the remaining drains have permanent standing water and a good variety of aquatic and emergent species. The most northerly drain of the group is the most heavily shaded, with a tall hedge along much of the banks. The county rarity ivy-leaved crowfoot *Ranunculus hederaceus* occurs in one unshaded area. Typical species associated with the upper drains include reed sweet-grass *Glyceria maxima*, marsh bedstraw *Galium palustre*, ragged robin *Lychnis flos-cuculi*, water mint *Mentha aquatica*, meadow vetchling *Lathyrus pratensis*, water figwort *Scrophularia auriculata*, marsh thistle *Cirsium palustre*, greater bird’s-foot-trefoil *Lotus pedunculatus* and frequent soft rush *Juncus effusus*. There is plenty of open water with good flow in the lower mill race and tributary. Below the ruined mill species include common club-rush *Schoenoplectus lacustris*, reed sweet-grass *Glyceria maxima*, reed canary-grass *Phalaris arundinacea*, bur-reed *Sparganium spp.*., common water crowfoot *Ranunculus aquatilis*, river water crowfoot *R. fluitans*, river water-dropwort *Oenanthe fluviatilis*, broad-leaved pondweed *Potamogeton natans* and common duckweed *Lemna minor*.

**DESIGNATED SITES**

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<th>Wildlife Sites</th>
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<th>Houghton Crossing - Lamport Station</th>
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10f - Bruce Shortland - Golden Dock
10. MINOR FLOODPLAIN

10g WOOTTON BROOK

All the retained Wildlife Sites in this small 5km² valley to the south of Northampton are of fairly recent origin. They include wetlands associated with a recent golf course, an ornamental lake of earlier origin and plantation woodland.

Collingtree Golf Course has some existing features of interest and a series of man-made lakes with some introduced species augmented by natural colonisation. The Wootton Brook runs through the site and has good water quality for most of this length. Marginal species include marsh marigold Caltha palustris, large patches of branched bur-reed Sparganium erectum, water plantain Alisma plantago-aquatica, yellow iris Iris pseudacorus, water figwort Scrophularia auriculata, water cress Rorippa nasturtium-aquaticum, reed canary-grass Phalaris arundinacea, amphibious bistort Persicaria amphibia, brooklime Veronica beccabunga, water mint Mentha aquatica, jointed rush Juncus articulatus and soft rush J. effusus. The lakes at the north west end of the golf course are better established and have been naturally colonised by bulrush Typha latifolia, hard rush Juncus inflexus, purple loosestrife Lythrum salicaria and gypsywort Lycopus europaeus.

Icehouse Lake, upstream of the golf course, is heavily fringed with common reed Phragmites australis and bulrush Typha latifolia. Adjacent to Icehouse Spinney the water is more shaded and has abundant lesser pond-sedge Carex acutiformis, and open water with common water starwort Callitriche stagnalis, white water-lily Nuphar lutea, water mint Mentha aquatica and other emergent species.

Icehouse Spinney is a small plantation of mostly sycamore Acer pseudoplatanus, with a fairly open canopy. Scrub is sparse, and includes elder Sambucus nigra and hawthorn Crataegus monogyna, with some honeysuckle Lonicera periclymenum.

DESIGNATED SITES

National Nature Reserves
• None

Sites of Special Scientific Interest
• None

Wildlife Sites
• Campion Reserve
• Collingtree Golf Course
• Icehouse Lake
• Icehouse Spinney

Local Nature Reserves
• None
10h GRENDON BROOK

A small area covering 4km² of floodplain associated with the streams that drain the eastern end of the Yardley-Whittlewood Ridge. The area retains some important grasslands, although all of these sites have been damaged in recent years, and ornamental lakes mainly associated with Castle Ashby Park.

Mesotrophic grasslands are represented by Bozeat Meadow SSSI and Gillet’s Meadow. The former site overlaps the flood plain and is described elsewhere under the Cropped Clayland Biodiversity Character Area. Gillet’s Meadow, a small old hay meadow with remnant ridge and furrow, is similar to Bozeat Meadows, but it was ploughed following a proposal for SSSI designation in 1984. At this time it supported a rare variant of mesotrophic crested dog’s-tail Cynosurus cristatus - common knapweed Centaurea nigra grassland of the lady’s bedstraw Galium verum sub-community. Species recorded included the county rarities dropwort Filipendula vulgaris, spring sedge Carex caryophylica, adder’s tongue Ophioglossum vulgatum and green-winged orchid Orchis morio. Despite the ploughing it was subsequently discovered, in 2002, that the sward had been allowed to revert to grassland by means of natural regeneration. Although the biological diversity of the field had not been restored to its original state, many of the species that had previously been recorded, including dropwort Filipendula vulgaris and adder’s tongue Ophioglossum vulgatum, were still present and, consequently the site is designated as a Wildlife Site. A third grassland Wildlife Site, Yardley Brook Field, was lost during the 1990s due to the application of chemical fertilisers and overgrazing.

Scotland Pond is typical of the Castle Ashby Lakes, many of which are heavily fished. The lake is fringed with reed sweet-grass Glyceria maxima and occasional bulrush Typha latifolia. Emergent species include water figwort Scrophularia auriculata, brooklime Veronica beccabunga, water cress Rorippa nasturtium-aquaticum, fool’s water cress Apium nodiflorum, water forget-me-not Myosotis scorpioides and gypsywort Lycopus a. Surrounding trees are tall and include ash Fraxinus excelsior, sycamore Acer pseudoplatanus and white willow Salix alba, with scattered grey willow Salix cinerea scrub.

DESIGNATED SITES

National Nature Reserves • None
Sites of Special Scientific Interest • Bozeat Meadow
Wildlife Sites • Castle Ashby Lakes including:
  • Grendon Quarter Pond
  • Scotland Pond
  • The Basin
  • Engine Pond
  • Gillet’s Meadow
  • Paradise Ponds
  • The Tin Pits
Local Nature Reserves • None
10i SYWELL BOTTOM

The smallest of all the Minor Floodplain Biodiversity Character Areas covering less than 1km². There are four Wildlife Sites: a reservoir, a wooded stream and a series of shelterbelts and plantations.

Sywell Country Park is a former drinking water reservoir surrounded by sheep-grazed grassland and scattered patches of woodland and scrub. The edges of the water have fringing vegetation of variable density, mostly dominated by reed sweet-grass *Glyceria maxima*, with some patches of common reed *Phragmites australis*, common club-rush *Schoenoplectus lacustris*, bulrush *Typha latifolia* and other emergents. The reservoir attracts large numbers of birds including breeding great crested grebe *Podiceps cristatus* and common tern *Sterna hirundo*. The grassland with the greatest diversity lies on the south bank of the dam. Species here include common knapweed *Centaurea nigra*, ribwort plantain *Plantago lanceolata* and yarrow *Achillea millefolium*.

Sywell Bottom is a long belt of trees alongside the brook, providing a valuable wildlife corridor upstream of Sywell Reservoir. Trees include white willow *Salix alba*, grey willow *S. cinerea*, ash *Fraxinus excelsior* and poplars *Populus spp*. Other more substantial plantation woodlands include Earl’s Barton Bridge Shelter Belt and Ecton Park Spinneys.

Earl's Barton Bridge Shelter Belt is a plantation of oak *Quercus robur*, ash *Fraxinus excelsior* and hybrid poplars *Populus spp*. The under storey consists of elder *Sambucus nigra*, hawthorn *Crataegus monogyna* and occasional blackthorn *Prunus spinosa*. Ground flora and streamside species included meadowsweet *Filipendula ulmaria*, ground elder *Glechoma hederacea*, water forget-me-not *Myosotis scorpioides*, water mint *Mentha aquatica*, yellow Iris *Iris pseudacorus* and reed canary-grass *Phalaris arundinacea*. Ecton Park Spinneys comprise a group of small areas of woodland, mostly surrounding ponds.

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10i - Nathalie Hueber - Yellow Iris
10j RIVER AVON

An area of 11km² in the west of the county, dominated by a series of reservoirs that were constructed to recharge the Grand Union Canal. A fragment of mesotrophic grassland is retained and there is a small marsh associated with the canal system.

Stanford Reservoir, overlapping the county boundary with Leicestershire, is the largest of the reservoirs on the River Avon and is typical of the reservoirs in the areas. Part of the Northamptonshire side is managed as a nature reserve by the Wildlife Trust and consists of open water, fringing vegetation and a patch of rough grassland that provides useful complementary habitat. The open water contains abundant fennel pondweed *Potamogeton pectinatus*, with a patchy fringe of reed sweet-grass *Glyceria maxima*, reed canary-grass *Phalaris arundinacea* and lesser pond-sedge *Carex acutiformis*. Creeping bent *Agrostis stolonifera* and common duckweed *Lemna minor* occur in the shallow edges next to some of the bays. The main area of habitat cover is the thick scrub and hedges around the edges of the reservoir. These have abundant hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, grey willow *Salix cinerea* and young crack willows *S. fragilis*, along with bramble *Rubus fruticosus* and coarse grassland. The grassland is marshy adjacent to the streams feeding the reservoir. Wetter areas have wild angelica *Angelica sylvestris*, marsh marigold *Caltha palustris* and skullcap *Scutellaria galericulata*. However, most of the grassland around the site is fairly dry.

A small area of Bosworth Mill Meadow SSSI lies in the floodplain and provides the only area of unimproved semi-natural grassland in this Biodiversity Character Area. The deep, alluvial soils of the valley floor support the meadow foxtail *Alopecurus pratense* - great burnet *Sanguisorba officinale* community, this grades into tall fen along the riverside dominated by reed sweet-grass *Glyceria maxima* and lesser pond-sedge *Carex acutiformis*.

Braunston Marsh is part of Braunston Marina, but is being retained as a conservation feature. The marsh includes brooklime *Veronica beccabunga*, water mint *Mentha aquatica*, marsh marigold *Caltha palustris* and reed sweet grass *Glyceria maxima*, plus lesser water parsnip *Berula erecta* and almond willow *Salix triandra*.

### DESIGNATED SITES

**National Nature Reserves**
- None

**Sites of Special Scientific Interest**
- Bosworth Mill Meadow

**Wildlife Sites**
- Braunston Marsh
- Naseby Reservoir
- Stanford Reservoir
- Sulby Reservoir
- Welford Reservoir

**Local Nature Reserves**
- None
10. MINOR FLOODPLAIN

10K UPPER WELLAND

The upper reaches of the River Welland in the north west of the county comprise just over 2km² of floodplain. No areas of unimproved semi-natural habitat are retained.

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<tr>
<td>Sites of Special Scientific Interest</td>
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<td>Wildlife Sites</td>
<td>None</td>
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<td>None</td>
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</tbody>
</table>
Unlike many areas of Minor Floodplain in the north of the county, this area has a good proportion and diversity of retained unimproved semi-natural habitat. The Ise floodplain covers 13km² and part of the river is designated as SSSI.

The River Ise SSSI upstream of Kettering is the best example in the county of a lowland river on clay, fed by base-rich water. The channel displays a variety of semi-natural features that are increasingly uncommon in areas of intensive agriculture. Between Barford Bridge railway viaduct and the village of Geddington the river channel is narrow and meandering with numerous sharp bends and loops; with alternating pools, slacks, riffles and runs that modify the water flow. The substrate is equally varied with silty pools, gravel shoals and beds and bare clay. Areas of tall fen, woodland and semi-improved grassland along the banks, together with an area of species-rich flood meadow, provide additional habitats which complement the interest of the site.

The eastern section of the river is lined with mature trees including alder *Alnus glutinosa*, ash *Fraxinus excelsior*, pedunculate oak *Quercus robur* and white willow *Salix alba* pollards. Hawthorn *Crataegus monogyna*, Midland hawthorn *C. laevigata* and blackthorn *Prunus spinosa* are well represented, with occasional buckthorn *Rhamnus cathartica* and guelder rose *Viburnum opulus*. Where gaps in the tree cover allow, there are stands of aquatic plants dominated by unbranched bur-reed *Sparganium emersum*, spiked water-milfoil *Myriophyllum spicatum*, yellow water-lily *Nuphar lutea*, arrowhead *Sagittaria sagittifolia* and, on silt deposits, swards of branched bur-reed *Sparganium erectum*. Aquatic plant growth is more luxuriant and diverse in the western section where there are fewer trees and shrubs. Additional species occur here such as common club-rush *Schoenoplectus lacustris*, broad-leaved pondweed *Potamogeton natans*, greater pond sedge *Carex riparia* and rigid hornwort *Ceratophyllum demersum*. Aquatic plant growth is more luxuriant and diverse in the western section where there are fewer trees and shrubs. Additional species occur here such as common club-rush *Schoenoplectus lacustris*, broad-leaved pondweed *Potamogeton natans*, greater pond sedge *Carex riparia* and rigid hornwort *Ceratophyllum demersum*. The bank vegetation is rich and varied showing a typical zonation from nettle *Urtica dioica*, great willowherb *Epilobium hirsutum* and purple-loosestrife *Lythrum salicaria* to water forget-me-not *Myosotis scorpioides* at the water’s edge. Skullcap *Scutellaria galericulata* is less common.

There is a small self-supporting population of grayling *Thymallus thymallus*, the only example in Northamptonshire, and an important population of white-clawed crayfish *Austropotamobius pallipes*, a species which, due primarily to disease introduced by non-native crayfish species, is declining nationally.

Wet and marshy grassland is well represented. Species-rich mesotrophic flood meadow adjacent to the SSSI section of the River Ise is characterised by meadow foxtail *Alopecurus pratensis*, yellow oat-grass *Trisetum flavescens* and great burnet *Sanguisorba officinalis*, with drier slopes supporting lady’s bedstraw *Galium verum* and crested dog’s-tail *Cynosurus cristatus*. 
Southfield Farm Marsh is the largest area of long-established tall grass washland in the county, a characteristic, but now much reduced vegetation type on alluvial soils in river valleys that are subject to regular winter flooding. The site includes base-rich and floristically diverse mire developed on silty peats and watered by calcareous spring-flows. This locally rare community supports a specialised and uncommon invertebrate fauna. The washland is composed of large stands dominated by a few plants, notably reed-sweet-grass *Glyceria maxima*, with locally abundant reed canary-grass *Phalaris arundinacea*, tufted hair-grass *Deschampsia cespitosa*, floating sweet-grass *Glyceria fluitans*, lesser pond-sedge *Carex acutiformis* and tufted-sedge *Carex elata*. The spring-fed mire, by contrast, has a variety of wetland herbs with no obvious dominant, including wild angelica *Angelica sylvestris*, marsh thistle *Cirsium palustre*, water horsetail *Equisetum fluviatile*, greater bird’s-foot-trefoil *Lotus pedunculatus* and marsh-bedstraw *Galium palustre*.

Mawsley Marsh, part of a larger SSSI, lies at the bottom of a small valley comprising a unique mixture of wildlife habitats. Along the waterlogged valley floor there is an almost continuous linear strip of marshy grassland where rushes, sedges, grasses and herbs are all locally dominant. The more abundant species include blunt-flowered rush *Juncus subnodulosus*, bulbous rush *J. bulbosus*, jointed rush *J. articulatus*, false fox-sedge *C. otruba*, water horsetail *Equisetum fluviatile*, water mint *Mentha aquatica* and common fleabane *Pulicaria dysenterica*. Tussock sedge *Carex paniculata*, marsh arrow grass *Triglochin palustris* and marsh valerian *Valeriana dioica* are noteworthy.

Standing water is represented by Cransley and Thorpe Malsor Reservoirs and a few ornamental lakes. Cransley is the larger of the two reservoirs, which lie in adjacent valleys, and has vegetation typical of the water bodies in the area. It has an open perimeter, apart from occasional groups of grey willow *Salix cinerea* and hawthorn *Crataegus monogyna*. The open water contains abundant submerged and floating vegetation including shining pondweed *Potamogeton lucens*, amphibious bistort *Persicaria amphibia*, common duckweed *Lemna minor* and floating sweet-grass *Glyceria fluitans*, plus Canadian waterweed *Elodea canadensis*, rigid hornwort *Ceratophyllum demersum* and common water crowfoot *Ranunculus aquatilis*. There is a broad fringe of emergent vegetation including reed sweet-grass *Glyceria maxima*, meadowsweet *Filipendula ulmaria*, wild angelica *Angelica sylvestris*, reed canary-grass *Phalaris arundinacea*, bulrush *Typha latifolia* and common club-rush *Schoenoplectus lacustris*.

There are a few areas of plantation and park woodland mainly in the very highest reaches of the Ise valley. Kelmarsh Dale is a narrow wooded valley comprising a well-established, but rather neglected plantation, with large, well-spaced trees and tall scrub. Ash *Fraxinus excelsior* and poplar *Populus spp* are the main trees, with occasional oak *Quercus robur*, crack willow *Salix fragilis* and white willow *S. alba*, some of which have collapsed and are now regenerating. There is a well-lit under storey of tall hawthorn *Crataegus monogyna*, wych elm *Ulmus glabra*, elder *Sambucus nigra*, blackthorn *Prunus spinosa*, hazel *Corylus avellana* and wild privet *Ligustrum vulgare*. The field layer is marshy in places, especially next to the river. Species include abundant meadowsweet *Filipendula ulmaria*, cleavers *Galium aparine*, nettle *Urtica dioica* and red campion *Silene dioica*, with lesser celandine *Ranunculus ficaria* and creeping buttercup *R. repens* in areas of short vegetation.
10m ALLEDGE BROOK

The only Wildlife Site to survive in the 1.5km$^2$ Alledge Brook, adjacent to the A14, floodplain is the ornamental Woodford House Lake.

This lake was created comparatively recently, but is already well-established. The flora is particularly rich including large stands of lesser bulrush *Typha angustifolia*, with greater pond-sedge *Carex riparia*, brooklime *Veronica beccabunga*, water mint *Mentha aquatica*, hairy sedge *Carex hirta*, marsh horsetail *Equisetum palustre*, curled pondweed *Potamogeton crispus* and blunt-flowered rush *Juncus subnodulosus*. The brook in this area contains abundant lesser water parsnip *Berula erecta*, water-cress *Rorippa nasturtium-aquaticum* and fool's water cress *Apium nodiflorum*.

DESIGNATED SITES

<table>
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<tr>
<th>National Nature Reserves</th>
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<td>Woodford House Lake</td>
</tr>
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<td>Local Nature Reserves</td>
<td>None</td>
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</tbody>
</table>
10. MINOR FLOODPLAIN

10n  HARPERS BROOK

The Harpers Brook drains south from Corby and joins the Nene near Islip and was the county’s stronghold for otters *Lutra lutra* prior to the re-introduction programme and natural colonisation in the 1990s. Although the floodplain covers 3km² no Wildlife Sites are retained.

DESIGNATED SITES

| National Nature Reserves       | None          |
| Sites of Special Scientific Interest | None          |
| Wildlife Sites                | None          |
| Local Nature Reserves         | None          |

10o  SOUTHWICK BROOK

A short section of floodplain covering less than 1km² to the east of Fotheringhay. No Wildlife Sites are retained.

DESIGNATED SITES

| National Nature Reserves       | None          |
| Sites of Special Scientific Interest | None          |
| Wildlife Sites                | None          |
| Local Nature Reserves         | None          |
10. MINOR FLOODPLAIN

10p WILLOW BROOK

6km² of floodplain in the north of the county that drains the higher ground of the northern and central Rockingham Forest. Wildlife Site retention is low with a single area of wet and marshy grassland and two ornamental lakes.

Bulwick Meadows comprises two adjacent meadows that occupy the valley side and flood plain of the Willow Brook. Water draining from the Lincolnshire Limestone emerges as seepage areas where it meets the more impervious Grantham Formation deposits. This, together with the high water table of the valley floor Alluvium, has given rise to a complex mosaic of marshy grassland communities. This habitat type was formerly widespread in river floodplains, but has been greatly reduced in extent as a result of land drainage and is now extremely scarce in Northamptonshire.

The site supports a rich assemblage of wetland plants, including rare species, and is notable for the variety of sedges. The floodplain area comprises tall fen of lesser pond-sedge Carex acutiformis and reed sweet-grass Glyceria maxima, where the water table lies above ground level. Below the seepage areas there is a diverse mixture of grasses, rushes, sedges and herbs. Some of the main constituents are Yorkshire fog Holcus lanatus, creeping bent Agrostis stolonifera, hard rush Juncus inflexus, creeping buttercup Ranunculus repens, red fescue Festuca rubra and creeping Jenny Lysimachia nummularia. More locally abundant are floating sweet-grass Glyceria fluitans, marsh marigold Caltha palustris, common, hairy and glaucous sedges Carex nigra, C. hirta and C. flacca and common spike-rush Eleocharis palustris.

Approximately 1km upstream is a similar area of marsh, which supported Northamptonshire's only known pair of breeding snipe Gallinago gallinago in 2002.

Open water is represented by the lakes at Deene Park and Blatherwyke. Blatherwyke Lake is the largest and has well-established marginal vegetation, including greater pond sedge Carex riparia and common reed Phragmites australis, and mature parkland trees around the edges. Survey information is limited, although the area is known to be used by otters Lutra lutra and probably forms a very important stronghold due to its size, fish stocks and undisturbed nature. The site attracts breeding and wintering wildfowl. Deene Park Lakes comprises a series of lakes that are considered crucial to the water quality of the Willow Brook. Upstream of Deene the water quality is poor, but it is considerably better downstream.

DESIGNATED SITES

| National Nature Reserves | None |
| Sites of Special Scientific Interest | Bulwick Meadows |
| Wildlife Sites | Blatherwyke Lake, Deene Park Lakes |
| Local Nature Reserves | None |
11. MAJOR FLOODPLAIN

CHARACTER AREAS

11a Middle Nene
11b Lower Nene
11c Welland

KEY CHARACTERISTICS

• Surface drift is dominated by Alluvium;
• deep clayey alluvial soils;
• river channels have been substantially modified and retain few natural features;
• the wide valley floors are subject to periodic winter flooding, defined by the extent of the Easter floods of 1998;
• grassland is predominantly agriculturally improved;
• land drainage and flood defence schemes have allowed large areas of arable cropping;
• wet woodland and carr is typical, but very limited in extent;
• a variety of wet and marshy grasslands occur; and
• sand and gravel pits are dominant features in the Middle Nene, attracting internationally important numbers of wintering water birds.
INTRODUCTION

Biodiversity Character Areas defined by this Biodiversity Character Type are found in the lower reaches of the Rivers Nene and Welland. The rivers have been substantially modified to reduce the risk of flooding and, in the case of the Nene, for navigation purposes and no longer retain the typical structure of a natural channel. The floodplain is broad. A variety of unimproved semi-natural habitats occur, including wet grassland, hay meadows, marshes and wet woodland. Standing water is also a major feature in the form of flooded sand and gravel workings.

PHYSICAL INFLUENCES

Geology and Soils
The surface geology is dominated by Alluvium with deep clayey alluvial soils. The sub-soils are usually slowly or moderately permeable, but the main cause of water logging is groundwater that fluctuates seasonally with changes in river level. The duration of water logging is often related to the micro-topography of individual fields. In the winter months the water table tends to be high for long periods and flooding is frequent (Hodge 1984).

Hydrology
The Major Floodplain Character Areas are essentially defined by the presence of wide, slow flowing rivers flowing through a wide valley floor that is subject to periodic winter flooding. The rivers have been modified to encourage rapid drainage of the surrounding land and to reduce the flood risk. As a result the channels are straighter and lack many characteristic features of natural river channels.

HUMAN INFLUENCES AFFECTING SEMI-NATURAL HABITATS

Floodplains, as their name suggests, are subject to regular flooding, particularly in the winter months, but also at other times. The water table in such areas is also higher than that on land on the upper ground. These are the principal reasons for the retention of grassland and marshes in the floodplain. Prior to agricultural improvement floodplain grasslands would often have been floristically diverse and, because the grasslands were undisturbed in the spring, breeding wading birds such as lapwing Vanellus vanellus, redshank Tringa totanus and snipe Gallinago gallinago would have been a common.

Floodplain grassland management traditionally involved hay cutting in the early summer followed by aftermath grazing, particularly by cattle, later in the year, with the stock being removed over the winter months. However, improved land drainage techniques and the implementation of flood defence measures have reduced the frequency of flooding and the length of time that land remains wet. This has discouraged breeding waders in all but the wettest areas. As summer flooding is now much less frequent many areas of grassland have been converted to arable cropping. Where grasslands are retained, the use of chemical fertilisers has improved grass production, resulting in the loss of floristic diversity of many grasslands. A better grass crop has also allowed greater stocking densities. Silage production has now taken over from traditional hay cropping which previously maintained the botanical interest.

There are no natural lakes in Northamptonshire. However, lakes are now a feature in some areas of floodplain. Extensive sand and gravel extraction, particularly in the late 20th Century has created a new wetland landscape and had a positive effect on local biodiversity by creating new habitats that attract large numbers and a wide diversity of waterbirds with an associated wetland flora.

PRINCIPAL HABITAT TYPES

Rivers and Streams
The main river channels no longer retain a variety of semi-natural features including meanders and alternating series of pools, slacks, riffles and runs which give rise to a variety of flow patterns. However, the less disturbed backwaters are more diverse and habitat restoration schemes by the Environment Agency have restored naturalistic features in some locations. Occasional trees, including pollarded willows Salix spp, line the banks. Typical plants include bur-reed Sparganium spp, yellow water lily Nuphar lutea, arrowhead Sagittaria sagittifolia, common club-rush Schoenoplectus lacustris, reed sweet-grass Glyceria maxima and floating sweet-grass G. fluitans.

The characteristic fauna includes otter Lutra lutra. Kingfishers Alcedo atthis breed in the steep banks and breeding grey wagtails Motacilla cinerea are associated with old mills and stone bridges.
**Standing Open Water**

Gravel pits are a major feature of the Middle Nene and a minor feature of the Lower Nene. They vary in depth and age, which influences the nature of the marginal, emergent and aquatic vegetation. Open water habitats typically have a broad fringe of tall vegetation comprising a variety of swamp and tall herb fen communities, with dominant species such as common reed *Phragmites australis*, reed sweet-grass *Glyceria maxima*, Greater pond-sedge *Carex riparia*, lesser pond-sedge *Carex acutiformis*, water horsetail *Equisetum fluviatile*, bulrush *Typha latifolia* and reed canary-grass *Phalaris arundinacea*. These areas attract typical breeding birds such as reed warblers *Acrocephalus scirpaceus*, sedge warblers *Acrocephalus schoenobaenus* and reed buntings *Emberiza schoeniclus*. Characteristic mammals include harvest mouse *Micromys minutus*.

Typical floating and submerged species include Canadian waterweed *Elodea canadensis*, broad-leaved pondweed *Potamogeton natans*, common duckweed *Lemna minor* and amphibious bistort *Persicaria amphibia*.

The draw-down zone that emerges as water levels drop over the summer provides ideal conditions for specialist plants, such as the nationally notable mudwort *Limosella aquatica*, needle spike-rush *Eleocharis acicularis* and golden dock *Rumex maritimus*, all annual species which are characteristic of the distinctive vegetation that develops on nutrient-rich mud.

The gravel pits attract large numbers of wintering wildfowl such as great crested grebe *Podiceps cristatus*, pochard *Aythya ferina*, shoveler *Anas clypeata*, wigeon *Anas penelope*, teal *Anas crecca* and coot *Fulica atra*. Gadwall *Anas strepera* and tufted duck *Aythya fuligula* breed in small numbers and breeding waders and terns are a feature of some of the younger pits.

**Wet and Marshy Grassland**

Grasses, low-growing herbs and rushes, which can tolerate periodic inundation, typically dominate wet and marshy grassland communities. Often drainage channels or other water bodies are associated with the habitat and these can also support important species assemblages. The shallow winter floods create ideal conditions for feeding waterfowl and waders such as wigeon *Anas penelope*, teal *Anas crecca*, snipe *Gallinago gallinago* and golden plover *Pluvialis apricaria* and in spring the receding floods leave damp conditions ideal for breeding waders such as lapwing *Vanellus vanellus* and redshank *Tringa totanus*.

Wet and marshy grasslands can be sub-divided into separate vegetation communities that develop according to the soil conditions and flooding regime of each site. A variety of wet grassland communities occur with MG4 Meadow foxtail *Alopecurus pratensis* - great burnet *Sanguisorba officinalis* grassland and MG8 Crested dog’s-tail *Cynosurus cristatus* - marsh marigold *Caltha palustris* grassland being the most common.

**Reedbeds and Swamps**

Swamps tend to be relatively species-poor wetland habitats, often dominated by a single species. They typically form as fringing vegetation alongside rivers, ponds and gravel pits. A wide variety of swamp communities occur and, in the case of wetlands that fringe water bodies, several discrete communities often occur adjacent to each other. Typical swamp communities include:

- S4 Common reed *Phragmites australis* swamp;
- S5 Reed sweet-grass *Glyceria maxima* swamp;
- S6 Greater pond-sedge *Carex riparia* swamp;
- S7 Lesser pond-sedge *Carex acutiformis* swamp;
- S10 Water horsetail *Equisetum fluviatile* swamp;
- S12 Bulrush *Typha latifolia* swamp;
- S14 Branched bur-reed *Spartium erectum* swamp;
- S22 Floating sweet-grass *Glyceria fluitans* water margin;
- S23 Other water margin vegetation;
- S26 Common reed *Phragmites australis* – nettle *Urtica dioica* tall-herb fen;
- S28 Reed canary-grass *Phalaris arundinacea* tall-herb fen.

Reedbeds attract typical breeding birds such as reed warblers *Acrocephalus scirpaceus*, sedge warblers *Acrocephalus schoenobaenus* and reed buntings *Emberiza schoeniclus*. Harvest mice *Micromys minutus* are typically found in reed sweet-grass *Glyceria maxima* swamp.
Woodland is not a major feature of the floodplains. However, wet woodlands have developed in some locations.

The main woodland type is carr, which colonises waterlogged areas and the margins of open water and is often associated with a variety of swamp communities. It has a canopy dominated by willows *Salix spp* or alder *Alnus glutinosa*, but stands vary considerably in their overall appearance. Where colonisation is recent, there can be a mass of bushes of varying height and density, but older stands have a more even structure with, usually, a single tier of trees forming a canopy of 4-8m high. Here there can be an abundance of standing dead wood where thickly-set colonising bushes have been shaded out by the developing survivors, but long-established stands of willow carr, especially with multi-stemmed trees which form broadly-spreading crowns, usually cast a light shade.

Riverside pollarded willows are a feature in some areas.
11a MIDDLE NENE

39 km² of wide floodplain stretching from the M1 motorway, east through Northampton to the northern extent of Thrapston Gravel Pits. The river has been substantially modified to reduce the risk of flooding and to facilitate the river's use as a navigable waterway. Unimproved semi-natural grasslands and marshes are rare, but there are numerous Wildlife Sites associated with former gravel workings.

The River Nene is a typical lowland river, being wide and slow flowing. The water is eutrophic; receiving treated sewage effluent discharges from the Billing and Broadholme sewage treatment works. Agricultural run-off also contributes to the levels of nitrates and phosphates. This nutrient rich water supports high plant productivity, especially along the fringes. Routine weed cutting is undertaken for flood defence purposes and to ensure the river remains navigable. Drinking water is abstracted from the Nene at Duston and at various locations for crop irrigation.

Some lengths of the river, in particular the backwaters, remain secluded and relatively untouched, allowing trees, shrubs and thick vegetation cover to develop, providing corridors along which flora and fauna can move and disperse, as well as supporting a diverse invertebrate fauna. The Ecton Backwater is a typical example, with a very high diversity of emergent plants compared to the main river channel, and following an apparently natural course through pasture to the south and gravel pits to the north. Species present include flowering rush *Butomus umbellatus*, yellow water lily *Nuphar lutea*, reed sweet-grass *Glyceria maxima*, floating sweet-grass *G. fluitans*, common club-rush *Schoenoplectus lacustris*, fool’s water-cress *Apium nodiflorum*, water figwort *Scrophularia auriculata*, arrowhead *Sagittaria sagittifolia*, marsh woundwort *Stachys palustris*, water chickweed *Myosoton aquaticum*, branched bur-reed *Sparganium erectum*, common duckweed *Lemna minor*, orange balsam *Impatiens capensis* and tufted forget-me-not *Myosotis laxa*. There are occasional willows *Salix spp*. on the south bank.

Sand and Gravel extraction is widespread and this has created a huge number of Wildlife Sites, many of which are important sites for birds. Recent research has revealed that in excess of 20,000 migratory waterbirds regularly winter on the lakes created by mineral extraction and because of this the Upper Nene Valley gravel pits exceed the qualifying threshold for designation as a Special Projection Area (SPA) under the European Community Birds Directive and as a Ramsar Site under the Ramsar Convention. Furthermore gadwall *Anas strepera*, golden plover *Pluvialis apricaria* and mute swan *Cygnus olor* winter in internationally important numbers and smew *Mergus albellus*, great crested grebe *Podiceps cristatus*, tufted duck *Aythya fuligula*, coot *Fulica atra*, pochard *Aythya ferina*, shoveler *Anas clypeata* and wigeon *Anas penelope* winter in nationally important numbers. Several sites also qualify for designation as SSSI because of their outside breeding waterbird assemblage.

The gravel pits have the highest breeding density of wading birds in the county with species such as lapwing *Vanellus vanellus*, ringed plover *Charadrius hiaticula*, little ringed plover *Charadrius dubius*, redshank *Tringa totanus* and oystercatcher *Haematopus ostralegus*, as well as high densities of breeding reed warblers *Acrocephalus scirpaceus* and sedge warblers *Acrocephalus schoenobaenus* in the fringing swamp communities. Summer Leys Local Nature Reserve is an outstanding example.
Wollaston Meadows SSSI is the best example of the meadow foxtail *Alopecurus pratensis* - great burnet *Sanguisorba officinalis* flood meadow community in the Nene Valley and the largest in the county. Although once widespread in river valleys, this neutral grassland type is declining rapidly as a result of agricultural changes and is now very rare in Northamptonshire and generally rare in Great Britain.

The sward in both fields is composed of numerous species of grasses and herbs and is particularly rich in the larger western field, which has been less intensively managed. The most common species include meadow foxtail *Alopecurus pratensis*, crested dog’s-tail *Cynosurus cristatus*, red fescue *Festuca rubra*, Yorkshire fog *Holcus lanatus*, tufted hair-grass *Deschampsia cespitosa*, great burnet *Sanguisorba officinalis*, meadowsweet *Filipendula ulmaria*, meadow vetchling *Lathyrus pratensis* and common knapweed *Centaura nigra*. Other notable species include yellow oat-grass *Trisetum flavescens*, quaking-grass *Briza media*, salad burnet *Sanguisorba minor*, lady’s bedstraw *Galium verum*, meadow saxifrage *Saxifraga granulata*, cowslip *Primula veris* and dropwort *Filipendula vulgaris*.

Although of limited botanical interest, the extensive sheep grazed grassland associated with the Northampton Washlands flood storage reservoir is nationally important for wintering golden plover *Pluvialis apricaria*, with the flock exceeding 3,000 birds in most years.

Spring fed fens and marshes are a rare habitat and Aldwincle Marsh SSSI is the most diverse example in this area. The wettest part of the fen supports a mixture of lesser pond sedge *Carex acutiformis*, blunt-flowered rush *Juncus subnodulosus* and the locally rare bogbean *Menyanthes trifoliata*. Other plants dependent on a high water table include the very local marsh pennycwort *Hydrocotyle vulgaris* as well as tussock sedge *Carex paniculata*, marsh marigold *Caltha palustris* and wild angelica *Angelica sylvestris*. The rest of the site has experienced a lowering of groundwater and now comprises mostly tall grasses and herbs such as great willowherb *Epilobium hirsutum*, meadowsweet *Filipendula ulmaria* and greater bird’s-foot trefoil *Lotus pedunculatus*.

Established woodland is limited in extent, although wet willow carr has developed in some areas. The largest examples are found on former settling ponds associated with the gravel extraction process. Earls Barton Carr comprises one of the largest and most important areas of carr and reedbed in the county, with established wet woodland to the west and younger carr, reedbed and open water on the old silt beds to the east. Species that make up the carr include white willow *Salix alba*, crack willow *S. fragilis*, osier *S. viminalis*, goat willow *S. caprea*, grey willow and *S. cinerea*. The heavily shaded water has bulrush *Typha latifolia*, reed sweet-grass *Glyceria maxima* and common reed *Phragmites australis* and there is an extensive open area with common reed *Phragmites australis* and wood small-reed *Calamagrostis epigejos* in the centre of the site. Common spotted orchid *Dactylorhiza fuchsii* and southern marsh orchid *D. praetermissa* have been recorded.

Smaller areas of carr have developed around the fringes of many of the older gravel pits including Higham Ferrers Gravel Pits SSSI.
There are some extensive areas of plantation woodland created as a result of the restoration of mineral workings, although the majority are still very young. Titchmarsh Duck Decoy SSSI is a more established plantation. The woodland around the disused 19th Century decoy pond has been planted with several different species of trees and shrubs, including silver birch *Betula pendula*, crack willow *Salix fragilis*, Scots pine *Pinus sylvestris*, alder *Alnus glutinosa*, hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*. Many trees have died, leaving abundant dead wood. The decoy pond is becoming colonised by reed *Phragmites australis*, reed sweet-grass *Glyceria maxima* and other plants typical of wet habitats, such as trifid burr-marigold *Bidens tripartita*. Under the trees much of the vegetation is tall and rank with abundant nettles *Urtica dioica*. However, the main value of this site is as the largest heronry in Northamptonshire. There are also smaller grey heron breeding colonies at Higham Ferrers and Earls Barton Gravel Pits.

DESIGNATED SITES

National Nature Reserves

- None

Sites of Special Scientific Interest

- Aldwincle Marsh
- Higham Ferrers Gravel Pits
- Titchmarsh Duck Decoy
- Wollaston Meadows SSSI

Wildlife Sites

- Abington Meadow
- Barnes Meadow LNR
- Billing Aquadrome
- Billing East Lagoons
- Billing West Lagoon
- Briar Hill Canal Marsh
- Camp Lane & Drain
- Delapre Lake
- Ditchford Lock Gravel Pits
- Ditchford Lock Meadows
- Doddington Marshy Field
- Duston Junction Scrub
- Duston Mill Meadow
- Duston Mill Race
- Duston West Meadow
- Earl’s Barton Carr
- Earl’s Barton Lock Lake
- Earl’s Barton Spinney Pond
- Ecton Backwater
- Ecton East Gravel Pit
- Ecton West Gravel Pit
- Great Doddington River Nene
- Grendon Lakes
- Hardingstone Dyke
- Hardwater Dyke
- Hardwater Mill Lake
- Higham Ferrers Reserve
- Irthlingborough Old Pond
- Kinewell Lake
- Little Houghton Gravel Pits
- Mallows Cotton Lakes
- Marsh Lane Ponds
- Northampton Washlands
- Old Nene Railway Line
- Oxbow Lake
- Ringstead Grange Gravel Pits
- Skew Bridge Ski Lake
- Skew Bridge West Lake
- St James’ Lake

11a - Ken Plows - Shelduck

11a - Ken Plows - Great Crested Grebe
11. MAJOR FLOODPLAIN

- Stanwick Hay Meadow
- Stanwick Lakes
- Stanwick New Marsh
- Stanwick Osier Bed
- Stanwick Weir Lake
- Storton’s Gravel Pits
- Summer Leys Local Nature Reserve
- Thrapston Carr
- Thrapston Gravel Pit
- Thrapston North Pits
- Thrapston Willow Scrub
- Titchmarsh Local Nature Reserve
- Upton Mill Dyke
- Upton Mill North Lake
- Upton Mill South Lake
- Upton Pasture
- Viaduct Meadows
- Wellingborough Marsh
- Westfield Spinney & Pond
- Wilson’s Pits
- Wollaston Gravel Pit

Local Nature Reserves

- Barnes Meadow LNR
- Kinewell Lake LNR
- Summer Leys LNR
- Titchmarsh LNR
11b  LOWER NENE

16km² of wide floodplain with limited areas of sand and gravel extraction, but with several grassland, swamp and marsh Wildlife Sites, some of which support breeding redshanks Tringa totanus and lapwing Vanellus vanellus. Up to a thousand golden plover Pluvialis apricaria and lapwing winter. The river, as upstream, has been heavily modified by flood defence schemes and to maintain the navigation.

Grasslands, both dry and wet, and marshes are well represented. Achurch Meadow, part of Wadenhoe Marsh and Achurch Meadow SSSI, is the largest agriculturally unimproved permanent grassland in the area, developed over Alluvium and gravel. The riverside tall fen is characterised by reed sweet-grass Glyceria maxima, reed canary-grass Phalaris arundinacea, common reed Phragmites australis, lesser pond-sedge Carex acutiformis and meadowsweet Filipendula ulmaria. The flushes and marshy grassland have a varied flora including ragged robin Lychnis flos-cuculi, marsh-marigold Caltha palustris, marsh valerian Valeriana dioica and common fleabane Pulicaria dysenterica.

The most species-rich community is intermediate between the alluvial meadow and calcareous loam pasture types. Many grasses are co-dominant, such as sweet vernal Anthoxanthum odoratum, common bent Agrostis capillaris, crested dog’s-tail Cynosurus cristatus, red fescue Festuca rubra and downy oat-grass Helictotrichon pubescens. The variety and cover of herbs increases from the lower lying to the drier parts. These include common knapweed Centaurea nigra, cat’s-ear Hypochaeris radicata, lady’s bedstraw Galium verum and common bird’s-foot-trefoil Lotus corniculatus.

Where surface drainage is impeded a tussocky sward prevails with much tufted hair-grass Deschampsia cespitosa and creeping bent Agrostis stolonifera. Great burnet Sanguisorba officinalis is abundant here. Shallow depressions where floodwater persists are typified by sweet-grasses Glyceria spp., marsh foxtail Alopecurus geniculatus and amphibious bistort Persicaria amphibia. These areas are vital for the breeding requirements of redshank Tringa totanus and lapwing Vanellus vanellus, several pairs of which occur. Snipe Gallinago gallinago are recent former breeders. The oxbow pool and feeder channel is a valuable freshwater habitat, providing an essential feeding areas for wader chicks when the surrounding grassland dries out.
Titchmarsh Meadow SSSI is a small poorly drained field lying alongside a tributary stream of the River Nene, but within the floodplain of the river. It is much wetter than the nearby Achurch Meadow. A medieval fish pond, now drained and supporting marsh vegetation, occupies part of the site. The grazed sward is rich in plant species and varies considerably in composition according to local topography and drainage patterns. Much of the site comprises base rich marsh. The wetter areas of marsh, in the bottom of the fish pond, are dominated by the jointed rush *Juncus articulatus*, hard rush *J. inflexus*, soft rush *J. effusus*, false fox-sedge *Carex otrubae* and Yorkshire fog *Holcus lanatus*. Reed sweet-grass *Glyceria maxima*, small sweet-grass *G. declinata* and plicate sweet-grass *G. notata* are abundant and common reed *Phragmites australis*, reed canary-grass *Phalaris arundinacea*, ragged robin *Lychnis flos-cuculi* and water mint *Mentha aquatica* also occur.

Of special interest is the presence of the uncommon marsh arrowgrass *Triglochin palustris*. Outside the fish pond area the marsh is dominated by jointed rush *Juncus articulatus*, hard rush *J. inflexus* and common spike-rush *Eleocharis palustris* with blunt-flowered rush *Juncus subnodulosus* also present. Where drainage is better the grasses Yorkshire fog *Holcus lanatus*, crested dog’s-tail *Cynosurus cristatus*, false oat-grass *Arrhenatherum elatius*, brown bent *Agrostis canina* and cock’s foot *Dactylis glomerata* replace the rushes, and herbs such as pepper saxifrage *Silaum silaus*, marsh marigold *Caltha palustris*, marsh valerian *Valeriana dioica* and greater bird’s-foot-trefoil *Lotus pedunculatus* are found. Large numbers of the notable county rarity southern marsh-orchid *Dactylorhiza praetermissa* occur throughout this area.

There are few areas of woodland, although there is an area of alder *Alnus glutinosa* carr at Wadenhoe Marsh and a small area of dense, varied scrub is located adjacent to the River Nene at Oundle. The diversity of woody species at Wadenhoe Marsh is good and includes osier *Salix viminalis*, almond willow *S. triandra* and crack willow *S. fragilis* in the wetter areas, with crab apple *Malus sylvestris*, dog rose *Rosa canina*, oak *Quercus robur* and hawthorn *Crataegus monogyna* on the slightly higher ground. The ground flora is not diverse because the site is heavily shaded, but includes skullcap *Scutellaria galericulata*, purple loosestrife *Lythrum salicaria* and yellow iris *Iris pseudacorus*.

Pollard willows are a feature, particularly in the vicinity of Ashton.

There are small gravel pit complexes at Oundle, Tansor and Yarwell. The vegetation is typical of gravel pits elsewhere in the Nene Valley, comprising a variety of fringing swamp and tall-herb fen communities. The older pits, particularly those near Oundle are well-wooded, partly established through planting and partly through natural colonisation. Due to their small size they do not support large numbers of wintering and breeding waterbirds.

**DESIGNATED SITES**

- **National Nature Reserves**
  - None

- **Sites of Special Scientific Interest**
  - Titchmarsh Meadow
  - Wadenhoe Marsh and Achurch Meadow

- **Wildlife Sites**
  - Achurch Marsh
  - Aldwincle Meadows
  - Ashton Kingcup Marsh
  - Ashton Mill Fields
  - Ashton Old Water Meadows
  - Barnwell Country Park
  - Barnwell Nene Fishing Lake
  - Nassington Meadows and Dykes
  - Oundle Marina Lakes
  - Oundle Station Scrub
  - Oundle Wharf Meadow
  - Tansor Gravel Pits
  - Yarwell Gravel Pit
  - Yarwell Mill Lake

- **Local Nature Reserves**
  - None
11c WELLAND

11.5 km² of wide floodplain on the eastern side of the River Welland, which forms the county boundary with Leicestershire. The river itself has undergone extensive modification to reduce the risk of flooding. The former meandering river channel has been substantially straightened which has resulted in a dramatic reduction in its length. The river has also been deepened with the normal river level now 2-3 metres below the land surface. The surrounding land is now dry for much of the year. This has resulted in the conversion of large areas of grassland to arable cropping, the loss of typical river features and the destruction of characteristic mesotrophic hay meadows. There is only one Wildlife Site.

Woodland and open standing water is not a typical feature of the Welland Valley. Tinwell Meadow is the only unimproved grassland on the Northamptonshire side of the Welland Valley, although unimproved semi-natural grassland is very rare in the valley as a whole. The surrounding land-use mainly comprises arable fields and improved grassland. This large meadow has originally cut for hay, but has recently divided by a fence and horse grazed. Overall the sward is herb-rich and of good quality. Grassland communities range from a tall, coarse sward to a finer, herb-rich turf. Of particular interest is the general abundance of great burnet *Sanguisorba officinalis* throughout, together with occasional adder’s tongue *Ophioglossum vulgatum*, typical of MG4 Meadow foxtail *Alopecurus pratensis* - great burnet *Sanguisorba officinalis* grassland. Other species include dropwort *Filipendula vulgaris*, common knapweed *Centaurea nigra* and meadow vetchling *Lathyrus pratensis*.

**DESIGNATED SITES**

- National Nature Reserves
  - None
- Sites of Special Scientific Interest
  - None
- Wildlife Sites
  - Tinwell Meadow
- Local Nature Reserves
  - None
Acid grassland - grasslands that develop over nutrient poor, acidic soils.

Alluvium - sedimentary deposits resulting from the action of rivers, including those laid down in river channels, floodplains, estuaries and lakes.

Ancient woodland - land continuously wooded since AD 1600. It is an extremely valuable ecological resource, usually with a high diversity of flora and fauna.

Biodiversity - biological diversity or biodiversity is the living component of the natural world and embraces all plant and animal species and communities associated with terrestrial and aquatic habitats. It also includes the genetic variation within species. Wildlife conservation generally aims to maintain and enhance natural biodiversity.

Biodiversity Action Plan (BAP) - a framework for achieving the conservation of biodiversity based on the targeting of resources towards priority habitats and species.


Brown earths - a very large group of soils occurring on mainly permeable materials, below 300m, well drained and on well-weathered parent material. Mostly in agricultural use.

Calcareous grassland - species-rich grassland occurring on shallow lime-rich soils on chalk or limestone rock. Often supports a relatively wide variety of rare or threatened plants and invertebrates.

Calcifuge - refers to plants that prefer acidic soils and cannot exist on chalky or alkaline soils.

Carr - woodland in waterlogged terrain. Characteristic species include alder, willow and sallow.

Coppice / Coppicing - a traditional method of woodland management in which multiple stems are allowed to grow up from the base of a felled tree. The stems are then cut every few years. In the past this would have provided fuel and wood for making tool handles fencing and charcoal.

Cornbrash - the name applied to the uppermost member of the Bathonian stage of the Middle Jurassic formation in England. It is a very fossiliferous formation.

Emergent - aquatic plants rooted in water but growing up above the water surface.

Eutrophication - the over-enrichment of an aquatic habitat with inorganic nutrients, especially nitrates and phosphates, typically from sewage discharge or agrochemical run-off, which may result in an imbalance of the normal flora and fauna associated with the area.

Extant - still in existence. Not extinct.

Geomorphology - the scientific study of the origin of landforms.

Glacial – associated with ice; deposits carried down or associated with glaciers or ice sheets.

Ground flora - plants that grow at the lowest level of a plant community. They rarely grow to a height greater than one metre. Also known as the field layer.

Jurassic - the middle period of the Mesozoic era, preceding the Cretaceous and succeeding the Triassic. It commenced about 195 million years ago and ended 145 million years ago.

Loam - textural class name for soil with moderate amounts of sand, silt and clay. Clay loam - soil material that contains 18 to 35% clay, 20 to 50% sand and 20 to 62% silt using the UK classification.

Local Nature Reserve (LNR) - an area of land that is of special nature conservation interest locally. LNRs are declared and managed by local authorities under the National Parks and Access to the Countryside Act 1949.

Mesotrophic grassland - dry neutral grassland, or mesotrophic grassland, is characterised by vegetation dominated by grasses and herbs on a range of neutral soils, usually with a pH of between 4.5 and 6.5.

Micro-habitat - a small scale part of a habitat where the ecological conditions are different from the main habitat, e.g. a rotting log within a wood.

Oolite - a sedimentary rock made up largely of ooliths, usually calcium carbonate; Ooliths are small spherical rock particles formed by the gradual accretion of material around an inorganic (e.g. sand) or organic (e.g. shell) nucleus

Outcrop - the area where a particular rock appears at the surface.

Pedology - the scientific study of soils.

Pelosols (Pelo) - deeply cracking clay soils.
**Pollard** - a tree that has been felled at two or more metres above ground level in order to produce a crown of poles. This tree management technique is similar to coppicing, but was typically practiced where browsing by animals was likely to be problem. The crowns are often valuable nesting sites for birds.

**Ramsar Convention** - An international convention originally agreed in Ramsar in 1975. It aims to stem the progressive encroachment and loss of wetlands and promote the wise use of wetlands. It requires the designation of Wetlands of International Importance known as Ramsar Sites.

**Rank vegetation** - grassland or marshes that have not been cut or grazed for some time and have become tall, tussocky and dominated by coarse grass species.

**Relict** - A relict species is one that has survived periods of unfavourable conditions (e.g. glaciations, floods, drought) when other, related species became extinct. Relict species or habitats usually persist in very localised areas where they were more widely distributed in the past.

**Riparian** - riverside (habitats).

**Ruderal species** - weed species that are colonisers and often pioneers of bare substrates.

**Saproxyllic** - relating to dead or decaying wood.

**Saproxyllic invertebrates** - species of invertebrates that are dependent, during some part of their life cycle, upon the dead or dying wood of moribund or dead trees (standing or fallen), or upon wood-inhabiting fungi, or upon the presence of other saproxylics.

**Scrub** - a general term used to describe a community of tree and shrub species that colonise open ground, particularly grassland.

**Semi-natural vegetation** - vegetation not planted by humans but influenced by human actions.

**Site of Special Scientific Interest (SSSI)** - nationally important and legally protected biological and geological sites identified by English Nature under the Wildlife and Countryside Act 1981.

**Special Protection Area** - a site of international importance for birds designated under the Birds Directive where appropriate steps are taken to protect the bird species for which the site is designated.

**Stagnogley soils** - slowly permeable, seasonally waterlogged soils.

**Succession** - the gradual replacement of one plant community by another.

**Topography** - term used to describe the surface features of the earth’s surface.

**Unimproved** - a habitat, particularly grassland, which has never been treated with chemical fertilisers or herbicides and as a result is usually rich in wildlife.

**Veteran Tree** - a tree that is of interest biologically, culturally or aesthetically because of its age, size or condition.

**Washland** - an area specifically set aside to hold floodwater until it can be safely released.

**Wildlife Site** - a biologically important site identified by the Wildlife Trust, which represent the most important habitats at a county level where these have not otherwise been designated as SSSIs. Wildlife Sites do not have statutory protection but there is a presumption against their development in local authority development plans.


Wildlife Trust for Bedfordshire, Cambridgeshire, Northamptonshire and Peterborough. *Northamptonshire Wildlife Sites Summaries Statements*. 
FIGURES

PLEASE REFER TO THE DOCUMENT ‘BCA - FIGURE 1’.
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