

Norwich Policy Area

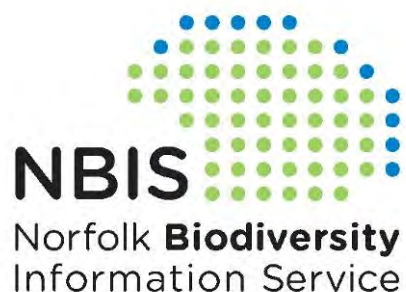
State of the Environment Report

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Information Service

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Norfolk Biodiversity Information Service is the Local Environmental Record Centre for Norfolk. It collects, collates, manages and disseminates information on species, habitats, protected sites and geodiversity in the county. For more information go to www.nbis.org.uk



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Introduction

This report draws together environmental data for the area bounded by the Norwich Policy Area, detailed below, along with case studies written by people and organisations involved in the environmental sector in the area. As well as providing an overview of the environment, the data contained in the report can be used as a baseline to be compared against in future years. This is particularly valuable due to the amount of development proposed within the area. Topics covered include geodiversity, historic environment, protected sites, species, habitats and access to the natural environment. The report is aimed both at people with an interest in the natural environment of the Norwich area, and decision makers who are responsible for ensuring that the natural environment of the area is adequately protected and enhanced for the benefit of people now and generations to come. It aims to inform and inspire the reader of the importance of the natural environment of Norwich and its surrounding areas.

The Area Covered

This State of the Environment Report is based on the Norwich Policy Area.

This area “comprises the city of Norwich, the immediate fringe parishes, together with the first ring of large villages around the city (extending to Long Stratton and Wymondham)” (Broadland District Council (2009)). The Norwich Policy Area covers an area of 385.67km².

The boundary of this area is shown in figure 1 and the districts included in this area are shown in figure 2.



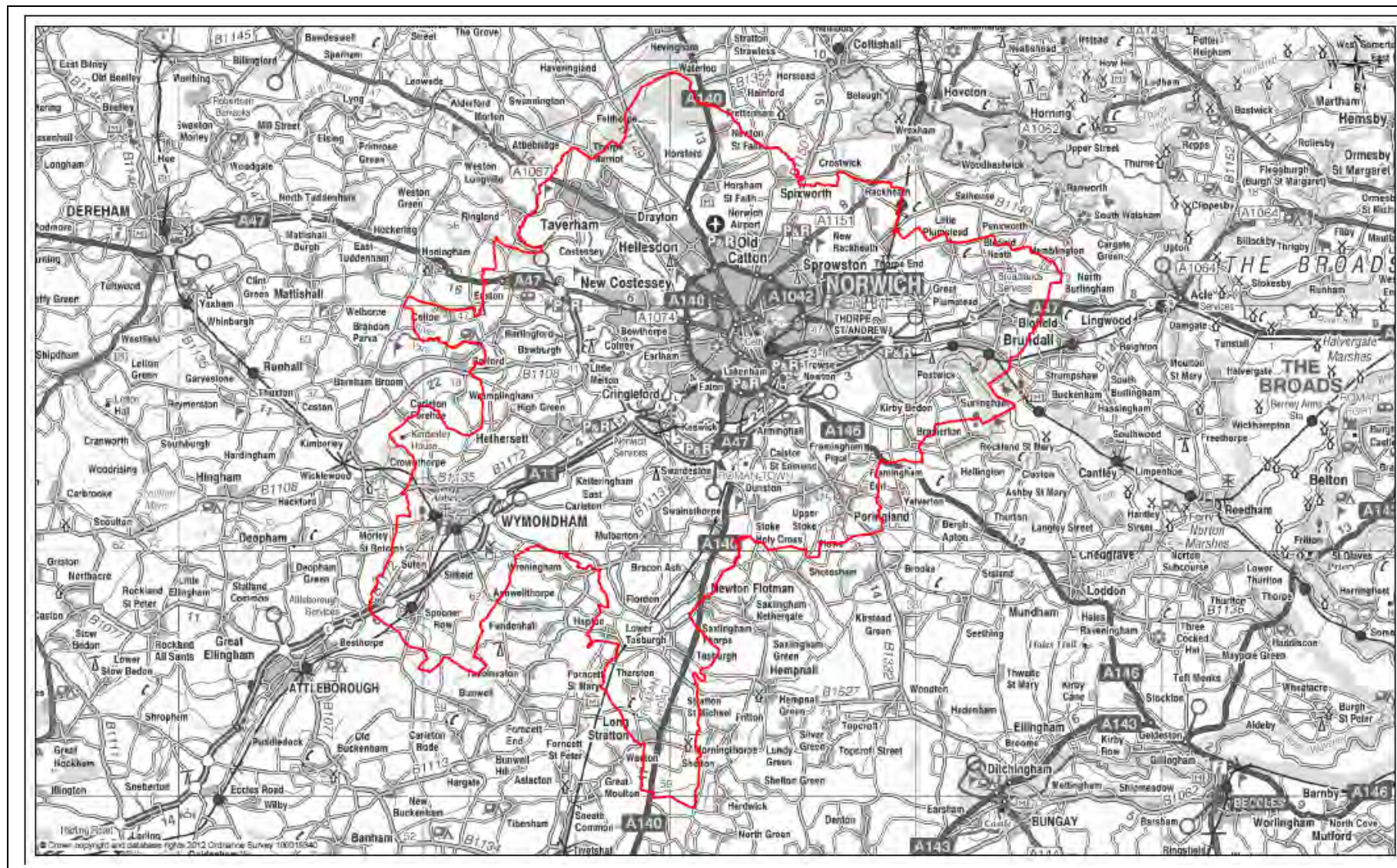


Figure 1. The boundary of the Norwich Policy Area (red line).

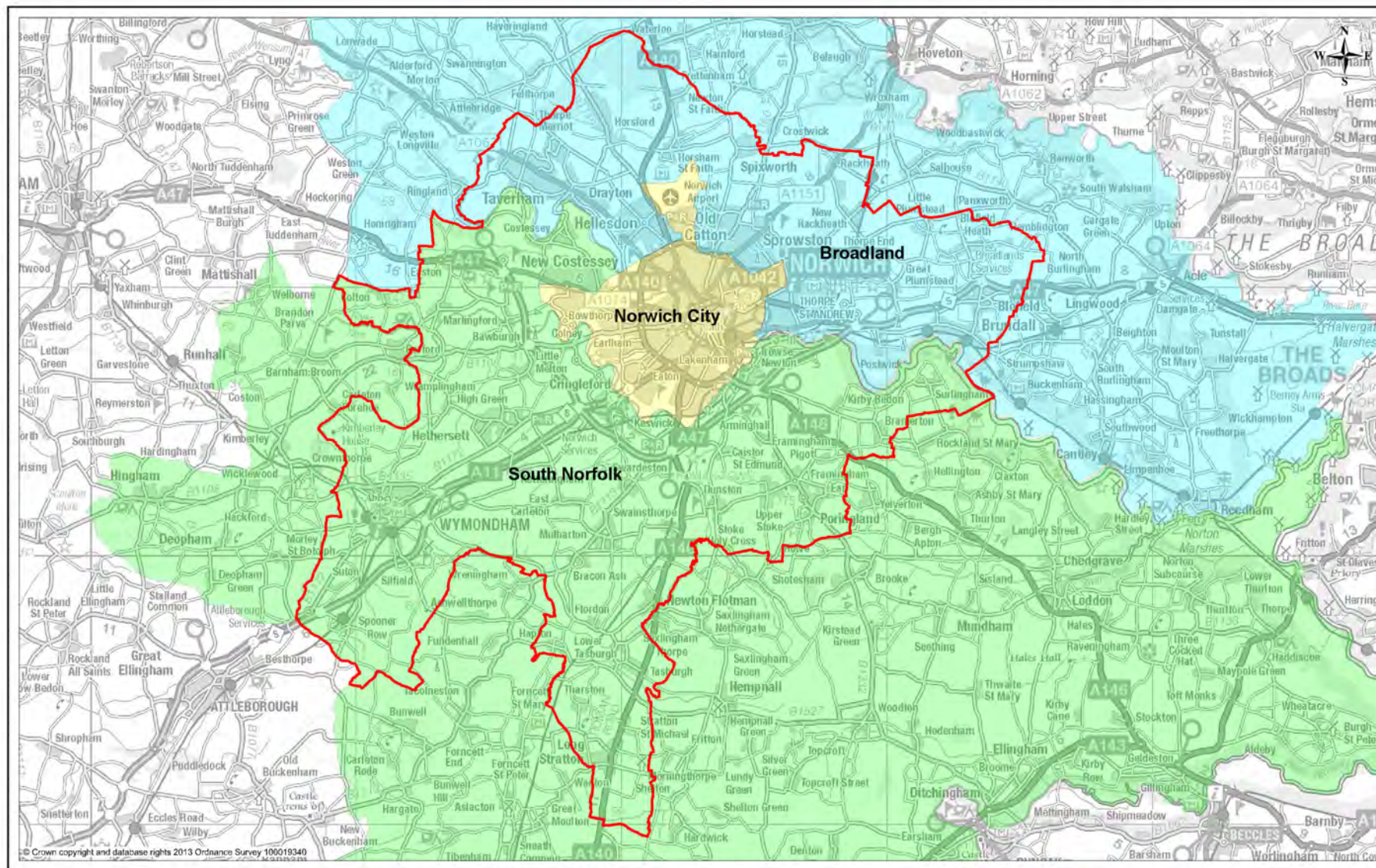


Figure 2. Districts included in the Norwich Policy Area.

Geodiversity

The geodiversity of an area underpins its topography, landscape character and biodiversity. Geodiversity is the diversity of rocks, minerals, fossils, landforms and processes, soil and water features that make up the landscape. It forms the non-biological substrate for all living things (Norfolk Geodiversity Partnership website).

The Norwich area is covered by many different soil types in different areas (see table 1)



Table 1 – Soil types found in the Norwich area (Source: NorwichHEART website)

Chalk – Underlies the other soil types.
Gravel – Laid down when the River Wensum was faster-flowing.
Peat – Found on the inside of the river bends, where there used to be grazing marsh.
Crag – Orange coloured sands, deposited in an ancient sea.
Glacial Sand & Gravel – From melting ice at the end of the last Ice Age.
Small areas of Brickearth and Boulder Clay .
Topped off by Fill – Dark coloured soil made up of rubbish, waste soil, old foundations etc. Used to build up the ground level and fill in hollows, or generally accumulated.

Mousehold Heath Earth Heritage Trail

The Mousehold Heath Earth Heritage Trail has been designed to allow people to discover the geological history of Mousehold Heath, in Norwich, as well as its landscape and wildlife. A map shows the position of 18 points of interest, some of them waymarked with posts, which can be visited in any order.

Mousehold Heath today is just a small remnant of what was once an extensive tract of open heathland to the north east, including Rackheath and Blofield Heath. The area has a fascinating history, including over two centuries of quarrying for sand, gravel and brickearth.

The points of interest include brick-pits, gravel pits, quarry sites and the spot where a Neanderthal hand-axe was found in the 1930s. A huge mound in the woods south of Beech Drive was the butts for a rifle range used by the army in Victorian times. Also highlighted is the 'Lazar House' on Gilman Road, which is made mainly out of materials sourced from Mousehold Heath. St James' Hill – offering a fine viewpoint over Norwich – is described as 'a good place to see one of the dry valley landforms of Mousehold'. The nearby St James' Hollow, a big chalk and gravel pit, is one of the best sites in Britain to find the fossil remains of *Mosasaurus* (a predatory aquatic reptile which could reach up to 15m in length). It is designated a Site of Special Scientific Interest for its geological importance. More information on the trail can be found on the Norwich City Council website.



Mousehold Heath Earth Heritage Trail. Photos credit: Lizzy Carroll

Historic Environment

In addition to an interesting geological past, the Norwich Policy Area also contains many examples of sites showing evidence of human history. The Historic Environment Service of Norfolk County Council holds **8149** records of historic sites, monuments, buildings and artefacts from within the Norwich Policy Area boundary. These include:

2955 monuments;
1861 buildings; and
2744 artefacts.

Each record is classified according to the time period it dates from. A summary of the number of records from each time period within the Norwich Policy Area can be seen in Table 2.

Table 2. The number of records from each time period within the Norwich Policy Area boundary.

Period	Number of Records
Prehistoric	281
Palaeolithic	34
Mesolithic	23
Neolithic	273
Beaker	29
Bronze Age	170
Iron Age	27
Roman	414
Post Roman	7
Saxon	105
Medieval	568
Post Medieval	858
Modern	83
World War One	6
World War Two	586
Cold War	10
Undated	302
Unknown	269

A further **4104** records are classified as being from between two periods, and can therefore not be classified under one.

Scheduled Ancient Monuments

There are **53** Scheduled Ancient Monuments within the Norwich Policy Area. These range from the city walls and towers of Norwich, to the remains of St Leonards Priory, from St Bartholemew's Church in Heigham to Newton Flotman Bridge.

Arminghall Henge

Arminghall Henge, a Scheduled Ancient Monument, located to the south of Norwich, is one of the most important prehistoric discoveries in Norfolk. Mainly visible as a crop mark on aerial photographs, this late Neolithic to Bronze Age monument was first seen from the air in 1929, and was excavated in 1935. The aerial photos show two concentric circles; these were ditches, and the soil from them was piled up as a bank between them. The central horseshoe pattern of dark patches are the sockets for the huge wooden posts of the henge. These were probably whole mature tree trunks. It is presumed that the site had a ceremonial function, and its location – at the intersection of the Rivers Yare and Tas – may also be of significance. The presence of barrows and ring ditches nearby suggest the henge could have been the focus of a landscape important for funerals and burials. (Norfolk Heritage Explorer website).



Arminghall Henge NHER TG 2306AG (NLA 361/HMY1) 14-JUN-1996 © Norfolk County Council. Photograph by Derek A. Edwards

Caistor St Edmund Roman Town

Sarah Horlock – NCC Historic Environment Service

The parish of Caistor St Edmund, located to the south of Norwich, is exceptionally rich in archaeological sites – in particular those known from cropmarks – and has formed the focus of much archaeological investigation and activity in the past. The area contains numerous notable prehistoric cropmark sites, including the Markshall Henge complex and the Harford Farm barrow cemetery and Iron Age settlement. However the heritage asset of greatest significance within the parish, and potentially the whole of the Greater Norwich area, is Caistor Roman Town, *Venta Icenorum*. The town has been the subject of antiquarian and twentieth century investigation, including major excavations in the 1920s. A long-term archaeological research project, the Caistor Roman Project, is currently being undertaken by the University of Nottingham in partnership with South Norfolk District Council, Norfolk Archaeological Trust and Norfolk County Council to investigate the Roman town and its surroundings, using a variety of archaeological techniques (Caistor Roman Project website). The complex cropmark evidence for the site has also recently been recorded as part of a project to assess the archaeology of the Greater Norwich area using aerial photographs (Tremlett 2007, Bales *et. al.* 2010). This mapping and interpretation project, undertaken by the Historic Environment Service at Norfolk County Council, forms part of the countrywide English Heritage initiative the ‘National Mapping Programme’ (NMP). The results have already had a significant impact on the heritage protection of the site, with the recent NMP mapping and interpretation of the site have necessitated a revision of the extent of the Scheduled area at Caistor St Edmund and a reassessment of the importance and character of the site (SAM 35641 Inspector’s Report November 2010).

The town was established during the second half of the first century AD and a system of streets, public buildings and eventually stone-built defences developed at the site. Whilst substantial walled remains and ramparts survive at the site, the archaeology of the wider site is best revealed through the cropmarks visible on aerial photographs and mapped by the NMP Project, and through the results of recent geophysical surveys undertaken by the Caistor Roman Project (Bowden & Bescoby 2008, Bowden *et. al.* 2009). Outside of the town walls are an extensive extra-mural settlement and a number of significant structures, such as a probable amphitheatre and a substantial temple complex. The main focus of the town is surrounded by a large polygonal triple ditch defensive system, which has most commonly been interpreted as relating to a defended Roman military base that pre-dates the town. However more recent interpretations, in part due to new evidence provided by aerial photographs, would tend to favour a later civil town defence interpretation (Bales *et. al.* 2010). The results of 2012 excavations on the sections of the triple ditches by the Caistor Roman Project will hopefully provide further information on their date and interpretation. Aerial photographs also reveal that the town itself sits within a complex network of Roman roads linking it to the wider Roman landscape. Later Roman and Saxon date surface finds suggest that the focus of the settlement appears to shift to the west of the river, where a large group of enclosures and sunken-floored buildings, characteristic of the Saxon period, are visible on aerial photographs and one of which was also excavated in 2012 by the Caistor Roman Project.

The site is owned by the Norfolk Archaeological Trust, who were bequeathed the main area of the town in 1984, and have subsequently purchased much of the surrounding land, including the most recent acquisition of the significant late Roman and Saxon settlement to the west of the river, with the aid of a package of grants from the National Heritage Memorial Fund (NHMF), English Heritage, Norfolk County Council and South Norfolk Council. A programme of site management is now well established, both to permit public access and presentation and to ensure the highest possible standards of conservation of the monument from the standpoints of both archaeology and wildlife (Norfolk Archaeological Trust website). The annual Caistor Roman Project excavations, typically undertaken in August, are also open to the public.

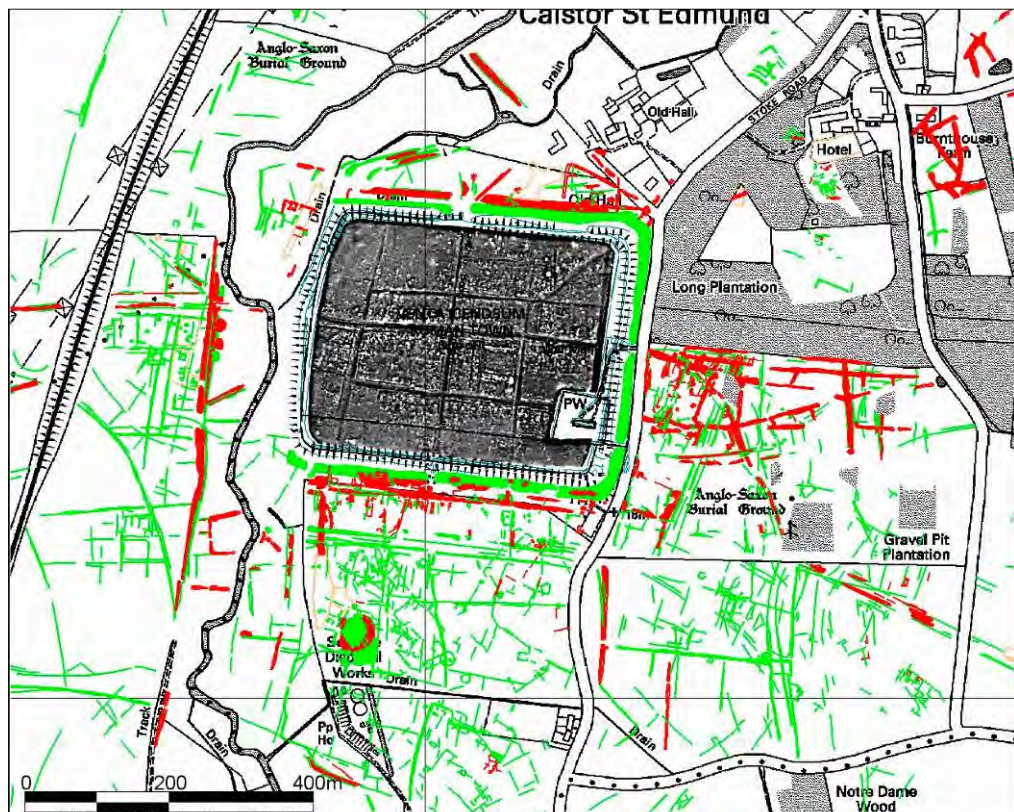


Illustration showing the NMP mapping of cropmarks visible on aerial photographs of the extra-mural settlement around the walls of the Caistor Roman town. The green depicts extant and former cut-features, such as ditches, pits and sunken buildings and the red shows the location of extant or levelled banks or compacted features and subsurface stonework, such as former roads and buildings. The geophysics results for the walled interior of the town are also shown (Caistor Roman Project/Dave Bescoby). Both datasets clearly illustrate the wealth of archaeological features that survive beneath the ground.

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Protected and Important Wildlife Sites

Protected and important wildlife sites also form an intrinsic part of the Norwich area. Protected sites are those which are protected by law. Important sites include those sites that, while they do not have any legal protection, are nevertheless recognised for their importance to wildlife or geodiversity and are considered during the planning process.

Protected Sites

Ramsar Sites - wetlands of international importance and designated under the Ramsar Convention. Many are also very important for birds and are therefore also designated as Special Protection Areas.

Special Areas of Conservation (SAC) - strictly protected under the EC Habitats Directive. Forming part of a European network (Natura 2000) these high quality sites make a significant contribution to conserving those habitats and species considered most in need of protection at a European level.

Special Protection Areas (SPA) - form the other part of the Natura 2000 network and are designated due to their importance for birds, in accordance with the EC Birds Directive.

Sites of Special Scientific Interest (SSSI) - the country's best sites for wildlife or geology. They have statutory protection under the Wildlife and Countryside Act 1981 as amended by the CROW Act 2000 and the NERC Act 2006. Many SSSIs are also international or European designated sites (Ramsar, SPA, SAC), National Nature Reserves or Local Nature Reserves. Natural England is responsible for identifying and designating England's SSSIs.

National Nature Reserve (NNR) - chosen as the best of the SSSIs. In addition to managing rare and significant habitats, species and geology the majority of reserves are accessible and offer fantastic opportunities for people to get close to nature.

Local Nature Reserve (LNR) - designated for the benefit of both people and wildlife. Designated and controlled by Local Authorities in consultation with Natural England, LNRs are important for wildlife, geology, education and/or public enjoyment.

Site	Number within NPA	Area covered
Ramsar	1	3.25km ²
SAC	1	3.79km ²
SPA	3	3.25km ²
SSSI	10	4.15km ²
NNR	1	2.49km ²
LNR	13	1.74km ²

Important Sites

County Wildlife Sites (CWS) - sites considered to be important for wildlife in a county context. They aim to identify, protect and enhance the most important places for wildlife outside legally protected land. While they do not have statutory protection they are taken into account in planning decisions. Many County Wildlife Sites are privately owned and have no public access.

Roadside Nature Reserves (RNR) - established to protect and promote those road verges in Norfolk containing rare and scarce plant species. Norfolk's road verges are often of special botanical significance and act as havens for wildlife as they are not sprayed or fertilised. Co-ordinated by Norfolk County Council, the RNR scheme brings the most important verges into appropriate conservation management.

County Geodiversity Sites (CGS) - used to be known as Regionally Important Geological Sites (RIGS) and had their name changed to reflect the importance of the geodiversity of a site in a county context.

Geodiversity Sites - non-designated sites of geodiversity interest within the county of Norfolk, determined by the Norfolk Geodiversity Partnership.

Site	Number Within NPA	Area Covered
CWS	173	18.25km ²
RNR	10	1836m (length)
CGS	1	0.022km ²
Geodiversity Site	64	n/a



Credit: Norfolk County Council



Credit: Norfolk Wildlife Trust

SSSI Condition

Sites of Special Scientific Interest are designated and managed by Natural England. As these are important sites it is crucial to know whether or not the management of a particular site is effective or not, and to monitor the health of each site. The condition of SSSIs are assessed every few years by Natural England staff against a set of targets and classed into one of six categories: Favourable, Unfavourable Recovering, Unfavourable No Change, Unfavourable Declining, Part Destroyed or Destroyed. When a site is in favourable condition it is deemed to be meeting its conservation objectives.

Almost **56%** of the SSSI units in the Norwich Policy Area are in Favourable condition according to Natural England as of 01/08/2012. **30.3%** are in Unfavourable Recovering condition, **13.8%** in Unfavourable No Change and **0.36%** in Unfavourable Declining condition. [Please note that the River Wensum and the Yare Broads & Marshes SSSIs include large areas outside of the Norwich Policy Area, as well as some within. The whole of the reserves were included in this condition summary] (Natural England website).

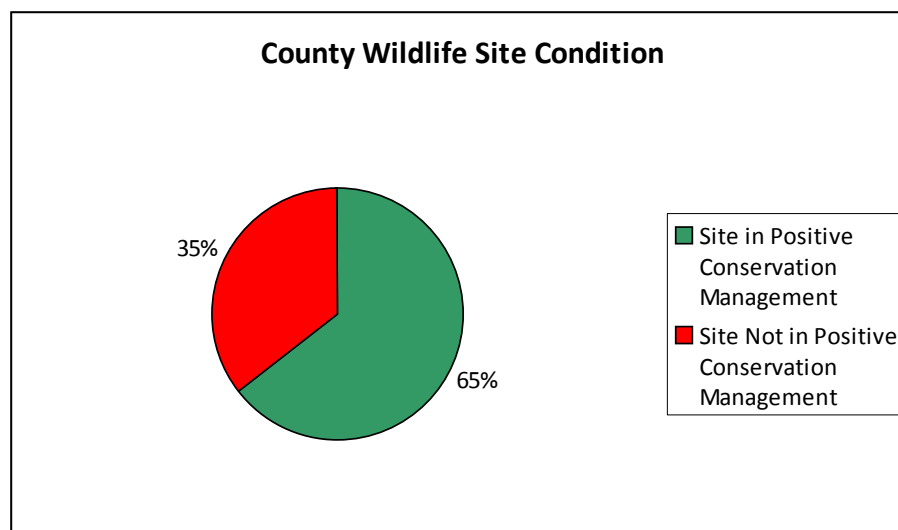


Figure 3: County Wildlife Sites in Positive Conservation Management in 2011/12

County Wildlife Site Condition

Local Authorities are required to report annually on the number of local sites (County Wildlife Sites and County Geodiversity Sites) in Positive Conservation Management.

Figure 3 shows the percentage of the 172 County Wildlife Sites in Positive Conservation Management or not for the year 2011/12 (One further County Wildlife Site was designated part way through the year and is therefore not included in the statistics.) Of the sites in Positive Conservation Management, **41** sites are in Entry Level Stewardship, **29** are also in Higher Level Stewardship and **31** in the English Woodland Grant Scheme. The one County Geodiversity Site is not currently in Positive Conservation Management.

County Wildlife Sites in the Norwich Policy Area

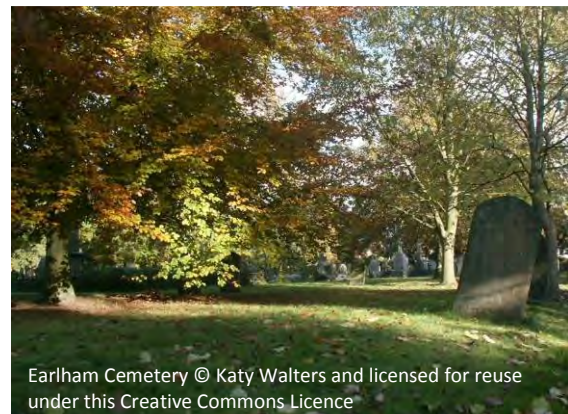
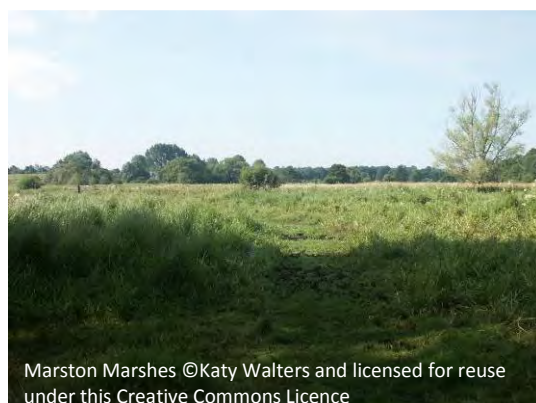
The 173 County Wildlife Sites found within the Norwich Policy Area boundary play an important role in the conservation of habitats and species in the area. Many are on privately owned land, with no access to the public and they cover a whole variety of habitats – all of them designated for their conservation importance.

The ancient woodland site of Fundenhall Wood contains a ground flora of locally rare and uncommon species. The semi-natural woodland of Hill Farm Woodland contains a series of huge oak pollards, possibly up to 300 years old, while the mature pine plantation of Horsford Woods contains relict heathland vegetation.

There are also lots of grassland sites – from the neutral grassland and scrub of Wood Green to the remnant unimproved grassland areas of Spixworth Meadows and the marshy grassland of Wymondham Marshes. Horsham Meadows contains a number of large, shallow hollows, believed to be either fossil pingos or thermokarst hollows. The ramparts of Caistor Roman Town (see also page 12) are designated a county wildlife site for the chalk grassland species which are able to thrive there due to the site's archaeology - lime mortar was used to construct the walls of the Roman town.

Wetter sites include Bluebell Marsh – reedbed and marshy grassland on the floodplain of the River Yare; Whitlingham Marsh – an area of inundated swamp consisting mostly of sedgebeds; and Melton Beck – neutral marshy grassland with ponds, wet depressions and a small stream, all containing a diverse range of both aquatic and semi-aquatic flora.

And then there are the waterbodies themselves, such as UEA Broad – a large mesotrophic lake with moderately species-rich marginal vegetation. And the ponds at Wood Green, all of which support a subtly different flora.



RSPB & NWT Reserves

There is **one** RSPB Reserve and **two** Norfolk Wildlife Trust Reserves within the Norwich Policy Area.

Mid Yare Valley RSPB Reserve – Surlingham Church Marsh

Offers a circular walk taking in reedbeds, fens and pools. Colourful wetland wild flowers provide the backdrop to marsh harriers, kingfishers, water rails and reed & sedge warblers in spring and summer. Winter flooding attracts bitterns, gadwalls and shovellers. There are no facilities or car parking at this reserve (RSPB Reserves website).

Thorpe Marshes NWT Reserve

This 25 hectare site is Norfolk Wildlife Trust's first urban nature reserve. The dykes support a wide variety of Broadland plants and are home to many dragonflies and damselflies – including the impressive Norfolk Hawker. Reed buntings and reed warblers can be found in the reedbeds. Partly grazed, the site hosts regular guided walks (Norfolk Wildlife Trust Reserves website).

Hethel Old Thorn NWT Reserve

At just 0.025 hectares, Hethel Old Thorn is the smallest Wildlife Trust reserve in the country! Standing in a tranquil setting, beside the church in a tiny Norfolk village, it is a 700 year old hawthorn – the oldest recorded in East Anglia (Norfolk Wildlife Trust Reserves website).



Habitats and Land Use

Despite centring on Norwich and therefore containing significant amounts of urban land use, the Norwich Policy Area also contains many other habitats, from the heathland of Mousehold Heath, to ancient woodland, from ponds and lakes to meadows and grazing marsh. And of course, urban areas can also be used by a many wildlife species.

Knowing the baseline areas for important habitats means that any loss of these habitats due to development can be quantified and hopefully compensated for. The areas detailed below have been calculated from habitat and land use mapping undertaken by Norfolk Biodiversity Information Service (NBIS) using a combination of the Natural England Habitat Inventory data and aerial photographs. Some habitat types cannot be determined using aerial photographs, such as differentiating between grassland types, therefore these have been categorised as ‘undetermined’ until ground truthing can be undertaken. The habitat and land use map is shown in figure 4.

The most important habitat types are designated as Biodiversity Action Plan (BAP) habitats. The UK Biodiversity Action Plan (UKBAP) was published in response to the Convention on Biological Diversity signed in Rio in 1992. Local Biodiversity Action Plans (LBAPs) were also developed to identify local priority species and habitats and agree actions and targets for conserving them. Priority BAP habitats include a wide variety of semi-natural habitats that are particularly important for nature conservation. The Norfolk Biodiversity Action Plans are prepared and implemented by the Norfolk Biodiversity Partnership, which includes Local Authorities, statutory agencies and voluntary groups.



Photos credit: Lizzy Carroll

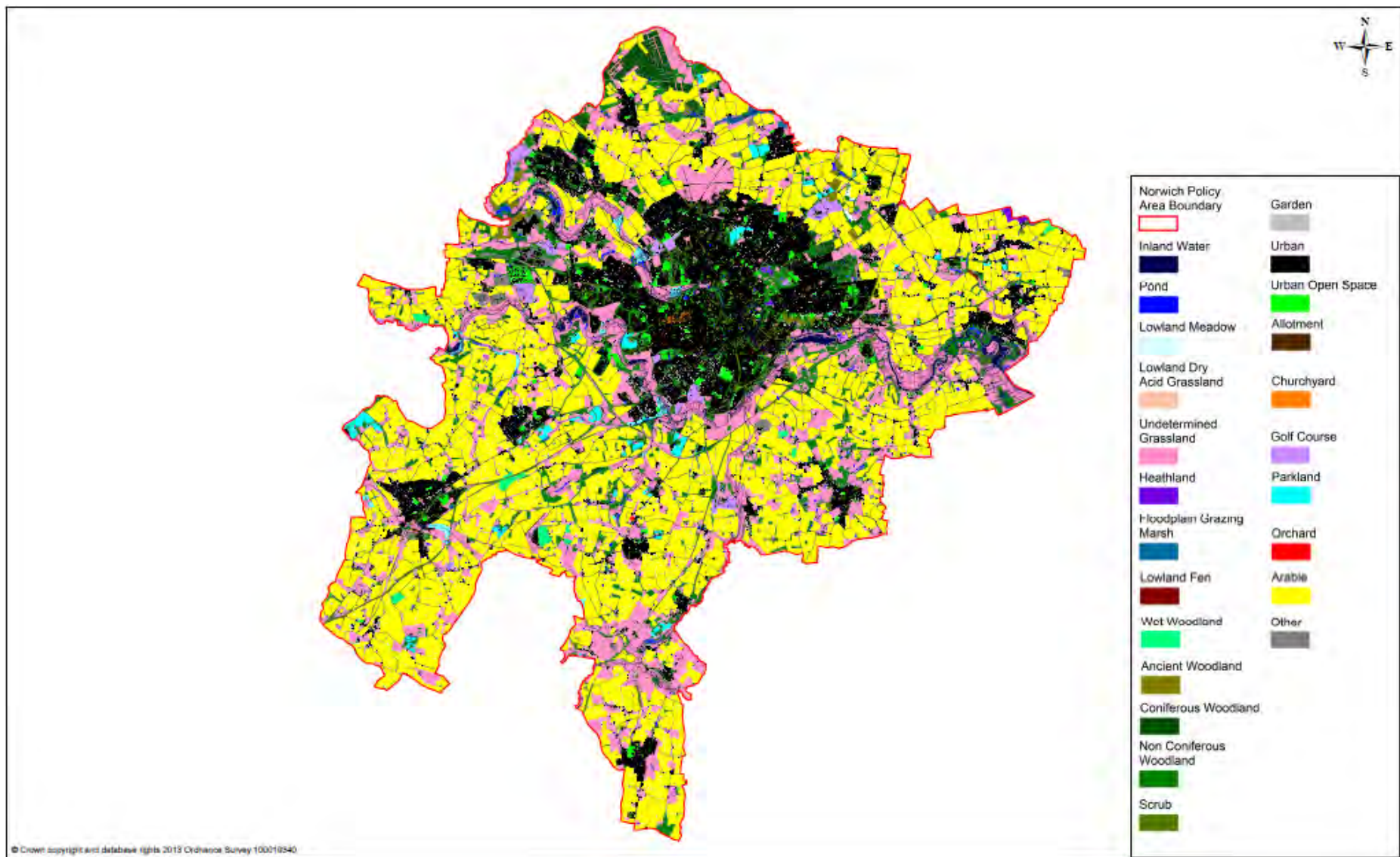


Figure 4. Habitats and land use within the Norwich Policy Area.

*Please note: The habitat areas given below are the maximum areas for each habitat type. Some of the actual values may be lower. This is a particular problem for habitats which cannot be accurately mapped from aerial photography. NBIS maps habitats using the Natural England standard. This states that sites which partly contain a particular habitat of an unknown extent be mapped as that habitat. Those marked with a * are Biodiversity Action Plan habitats.*

- Wet Woodland – Generally found on fens in East Anglia, though there is a small amount within the Norwich Policy Area, with alder, birch and willow usually the predominant tree species.*

Area of wet woodland (km ²)	1.09
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- Wood Pasture and Parkland – Areas that have been managed by a long-established tradition of sustainable grazing. Tree and woodland structure shows the effects of large herbivore grazing. Old and veteran trees are present and the vegetation over the site is a mixture of woodland and open grass/heath communities.*



Area of parkland (km ²)	3.63
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- Lowland Heathland & Acid Grassland – Heathland generally occurs on mineral soils and thin peats and contains vegetation with more than 25% cover of heather and/or gorse. Lowland heathland often occurs together with lowland dry acid grassland (also a BAP priority habitat) and it is often not possible to map the two separately.*



Area of lowland heathland and dry acid grassland (km ²)	0.34
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- Coastal and Floodplain Grazing Marsh – Pasture or meadow that is periodically inundated. Ditches maintain water levels and are especially rich in plants and invertebrates. Almost all areas are grazed or cut for hay or silage.*



Area of coastal and floodplain grazing marsh (km ²)	0.46
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- Lowland Meadow – Areas of unimproved neutral grassland.*

Area of lowland meadow (km ²)	0.84
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- Lowland Fen – Waterlogged peatlands which receive water from ground water and surface water run-off as well as rainfall.*

Area of lowland fen (km ²)	0.04
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- Ponds – A pond is defined as a standing water body between 1m² and 2ha (0.02km²) in area.*



Number of ponds	2142
Area of ponds (km ²)	1.37

- Ancient Woodland – These are sites that have been woodland continuously since at least 1600AD. Rich both in wildlife and cultural heritage, these woodlands are irreplaceable – when they are lost, they're gone forever.



Area of ancient woodland (km ²)	2.33
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Arable Land Use

It is evident from the habitat map (figure 4) that a large area of land outside of the urban areas is taken up by arable land use. Arable land use within the Norwich Policy Area covers **181.26km²**.

Agri-environment schemes

Agri-environment Schemes reward farmers for managing parts of their land in a way that benefits the environment. Some schemes also include options relating to public access. Environmental Stewardship is an agri-environment scheme run by Natural England with a number of different levels:

- *Entry Level Stewardship (ELS)*. Open to all farmers, ELS delivers simple and effective environmental management, including options such as hedgerow management, providing wild bird cover and creating buffer strips.
- *Higher Level Stewardship (HLS)*. This is a competitive scheme that involves more complex management options and aims to provide more wide ranging environmental benefits.
- *Countryside Stewardship Scheme (CSS)* – Now succeeded by Environmental Stewardship, CSS used to be the main scheme for environmental stewardship outside of protected areas. Some of the 10 year agreements are still running until 2014.

Number of land parcels within the Norwich Policy Area that are still under live Countryside Stewardship Schemes: **287**

Number of land parcels within the Norwich Policy Area under Environmental Stewardship Schemes which are:

In Entry Level Stewardship: **647**

In Higher Level Stewardship: **17**

In Entry Level plus Higher Level Stewardship: **758**

In Organic Entry Level Stewardship: **15**

Number of land parcels within the Norwich Policy Area with a scheme involving an access option: **124**



Churchyards

Norwich is famous for the number of old churches within its walls. While the majority of them don't function as churches anymore, many still retain their churchyard, which acts as a haven for wildlife in a city environment. There are also several cemeteries within the Norwich Policy Area, some of which have parts of them specifically managed for their wildlife value. There are **84** churchyards and cemeteries in the Norwich Policy Area covering an area of **0.72km²**.



Rosary Cemetery. Credit: Norwich City Council



St Andrews churchyard. Credit: Lizzy Carroll

Allotments

Allotments are tremendously valuable for wildlife, providing habitat mosaics and wildlife corridors. One average allotments have a species diversity of up to 30% higher than urban parks. This is due to the habitat variety that can be found on them, which can include empty plots, compost heaps, nectar producing flowers, grassy areas, sheds and stores and the boundary hedges and banks.

According to a desk top study carried out by NBIS in 2011 there were approximately 2.83km² of allotment habitat in Norfolk, with noticeable clusters in the larger urban areas.

Allotments can be under threat from a number of factors including being built on, insensitive design and management, inappropriate planting, use of pesticides and the control of plants considered to be weeds. (Norfolk Biodiversity Action Plan for Allotments 2012)

There are **35** allotment sites within the Norwich Policy Area boundary, covering a total area of **0.59km²**.

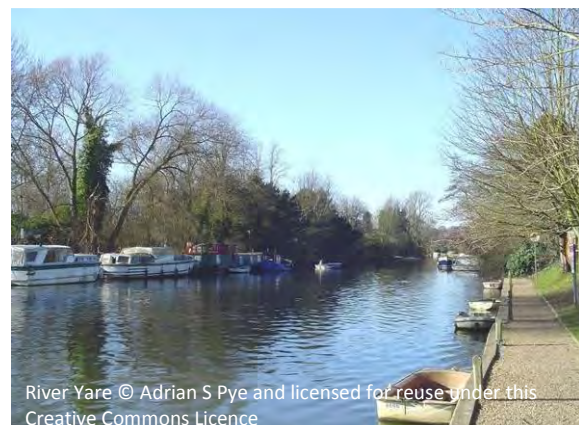


Norwich allotments. Credit: Lizzy Carroll

Rivers and Water Courses

There are **222.328km** of rivers and water courses within the NPA. These include section of the Rivers Bure, Chet, Tas, Tiffey, Tud, Wensum and Yare along with smaller water courses including Spixworth and Hellington Becks and Mulbarton Reach. A map of these rivers and water courses can be seen in figure 5.

The River Wensum is a chalk fed river that runs through the centre of Norwich, entering from the north-west and joining with the River Yare at Whitlingham. The complete river is designated as a SSSI and an SAC. Surveys have shown it is in a poor ecological condition, and efforts are being made through the River Wensum Restoration Strategy to improve it. The RWRS is a partnership developed by Natural England with the Environment Agency and the Water Management Alliance. They aim to restore the physical functioning of the river. Water quality is improving, and invasive non-native species are being tackled by the Norfolk Non-native Species Initiative (see also page 37) (Environment Agency website – River Wensum Restoration Strategy).



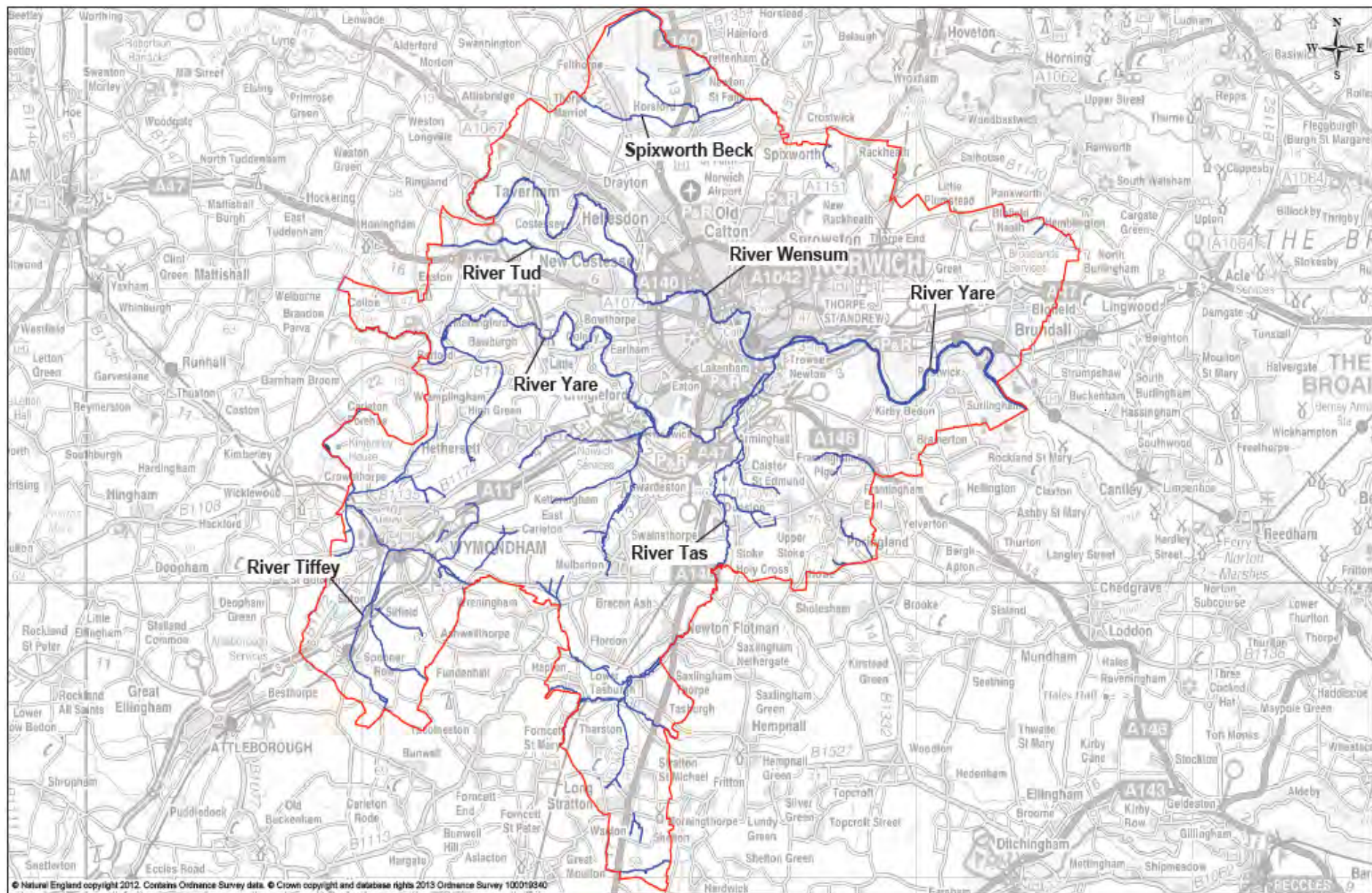


Figure 5: Rivers and larger water courses within the Norwich Policy Area

Heathland Management on Mousehold Heath

Will Stewart – Norwich City Council

Mousehold Heath is a unique 88 hectare area, made up of woodland, heathland and recreational open space within Norwich. The site has played an important part in the history of Norwich and it is a designated Local Nature Reserve and County Wildlife Site. Mousehold Heath today is the last remnant of a once larger tract (6,000 acres) of open heathland that reached as far as the Norfolk Broads, founded on Ice Age sands and gravels. Until the 19th century, it was a rolling and hummocky expanse of heather and bracken. The open heath was maintained by the nibbling teeth of sheep and rabbits, by quarrying and continuing removal of firewood. In 1886 it was declared an outdoor leisure space for the City.

In more recent times, the bare and open nature of the historic landscape has largely been replaced with birch and oak secondary woodland. However, areas of the original heathland landscape and its biodiversity still existed, so in recent years a Management Plan was written and conservation management work began to conserve and improve the condition of the existing heathland areas and restore areas that had been lost to secondary woodland and scrub. This heathland restoration was supported by ecological studies, which showed that a large number of scarce and threatened heathland associated species were present. In 2007, a survey of the Aculeate wasp and bee fauna was carried out - 83 species were recorded; including 4 red data book listed species and another 9 Notable species.

Although grazing by deer and rabbits does take place, due to the urban nature of the site, the grazing of livestock is not a practical option in the short term. Therefore other management techniques are used to conserve and restore Mousehold's heathland. Areas of secondary woodland and scrub on existing or adjacent to heathland areas are cleared by the Mousehold Heath Wardens, volunteers for local groups such as The Conservation Volunteers (TCV) and Norwich Community Green Gym and contractors.

In recent times large amounts of nutrients have built up in the humus layer, so it is imperative that humus stripping takes place if the target habitat of bare ground and heather regeneration is to take place. In many areas, Common and Bell Heather (*Calluna vulgaris* and *Erica cinerea*) seeds exist in the seed-bank. Humus is carefully stripped by a small digger (see Fig 1), under the watchful eye of a Mousehold Warden, to leave the crucial seed-bank layer - usually about a centimetre thick - between the humus and mineral layers. Although this management technique can be costly and initially creates unsightly bare ground, it is proving to be the only way to restore heather heathland (see Fig 2) in humus and nutrient rich areas and ensure that the historic heathland landscape, along with its associated wildlife, will be conserved for future generations to enjoy.

Volunteers cut gorse, broom and seedlings/saplings by hand in the existing heathland areas and spend the summer months bruising (or bashing) bracken, using sticks. This damages the plants stem, resulting in reduced growth in future years.



Fig 1. Humus stripping. Credit: Will Stewart



Fig. 2 Restored heathland. Credit: Will Stewart

Ancient woodland is important, as if it is destroyed it is irreplaceable. Ancient woodlands are also generally species rich, particularly in their flora. Continuous networks of habitats are also crucial for wildlife to have enough space to survive, and to allow movement between populations to avoid inbreeding. It is important that where man-made barriers to species movement are created, that any remaining passable routes across such a barrier – such as the Witton Run across the A47 - are retained and protected.

The Ancient Woodland Landscape of North-east Norwich **Dr Dave White – Greater Norwich Development Partnership**

Norfolk is often described as being one of the least wooded counties in England, and certainly there are no large tracts of native broadleaved woodland. But around Norwich we are fortunate in having a number of small broadleaved woods, some of which are ancient in origin. In the area to the north-east of Norwich, there is a cluster of old woods associated with the landscaped parks of Sprowston Manor, Rackheath Hall and Beeston Hall. These parks were created in the 17th and 18th Century, when the existing ancient landscape of heaths, woodland and wood pasture was modified in the fashion of the day. Some of the ancient woods were retained in the parkland landscaping schemes providing attractive backdrops to restored county houses and privacy for their owners.

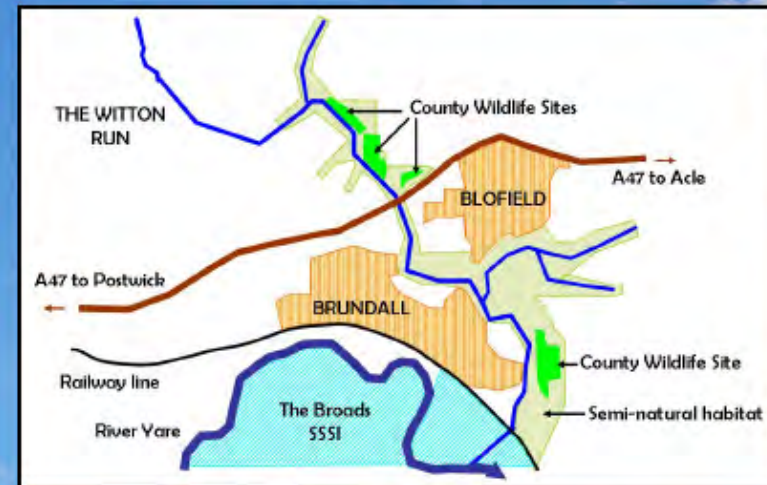
Much of the woodland incorporated into the historic parklands survives today despite modern additions to the landscape such as the Wroxham railway line and the WWII airfield at Rackheath. These old woods include Tollshill Wood, Bulmer's Coppice, Sprowston Wood, Church Wood, Lady's Carr and parts of Racecourse Plantation. Whilst some of these woods have been replanted with the addition of exotic conifers (when they are sometimes known as Plantation on Ancient Woodland Sites or PAWS), their rich ground flora reveals their ancient origins. Several plants occur that are more-or-less confined to ancient woods in Norfolk including scaly male fern (*Dryopteris affinis*), great woodrush (*Luzula sylvatica*), and wood sedge (*Carex sylvatica*), whilst dense patches of bluebells (*Hyacinthoides non-scripta*), and wood anemone (*Anemone nemorosa*), are present in places alongside some relic patches of heathland. Recent surveys have also shown that Racecourse Plantation is the only known extant site in Norfolk for allseed (*Radiola linodes*), and chaffweed (*Anagallis tenella*), two specialist species of damp patches on acid woodland soils.

As well as their flora, it is increasingly being recognised that these woods are important for their populations of bats. Recent surveys, including by the Norwich Big Bat Project (see pg 39), have identified a number of roosts of barbastelles, Daubenton's and long-eared bats in large trees with crevices and flaking bark while the former parkland landscape provides important foraging habitats particularly along the woodland edges and hedgerows.

These important woodlands are situated in the area of north-east of Norwich that has been identified as a location for major development with up to 10,000 homes proposed. The ancient woodlands should be protected within this development and could be a major asset to the green infrastructure of the area; currently most of the woodlands have no public access but they could have a role in allowing people to enjoy 'wild' places. It will also be important to ensure that housing development is strategically planned to ensure that wildlife will be able to continue to thrive. The maintenance and enhancement of hedgerows and ecological corridors between the woodlands should be a priority in the development plan for the area.

The Witton Run: An example of an ecological network

Recently there has been a general acceptance that we can no longer rely on our Nature Reserves and SSSIs for the conservation of our wildlife. Reports like the influential *Making Space for Nature* (Lawton, 2010) highlighted the need for landscape-scale conservation and called for the protection and enhancement of ecological networks to protect the biodiversity of the wider countryside. One example of an ecological network is the Witton Run, a small stream arising east of Norwich, running between the villages of Brundall and Blofield and flowing into the River Yare.



Whilst unassuming and in many ways apparently unremarkable, the Witton Run is the type of network that should be valued. Like many of the tributary streams of the Broadland rivers, the damp soils in the shallow valley means historically it has been less-intensively farmed than the surrounding flatter plateau landscape. Consequently, it retains more semi-natural habitat than much of the general countryside. Four County Wildlife Sites (the best examples of habitat in a county context) are associated with the Witton Run. These contain areas of damp grassland, meadow and wet woodlands – all local BAP habitats.

Ecological networks are all about connectivity. As the habitats are all connected within the valley, wildlife is able to move freely allowing dispersal of young animals from their breeding sites and for plant seeds to be spread into new suitable habitats. The Witton Run also provides animals with a safe crossing-point of the A47 – the only such safe point on the dualled-section between the Postwick and Acle roundabouts. In addition, the valley is an important feeding area for bats; eleven species have been recorded feeding over the meadows – particularly at the northern end - including substantial numbers of barbastelles. But of course the Witton Run does not stand alone; it is connected with the River Yare and therefore with the wider ecological network of the Broads. The protection and enhancement of groups of local ecological networks, such as the Witton Run, may be the best chance for the conservation of biodiversity in our wider countryside.



Species

Despite the large urban area within the Norwich Policy Area boundary, there are many species which call the area home. These range from commonly seen urban species, through to the inconspicuous and rare. In recent times many animals have adapted to take advantage of urban areas for food and shelter, and can be seen more often in towns and cities than in the countryside! Other species have been pushed out by human development and are only seen in the remaining natural habitats.

Total Species Records

NBIS holds **256337*** individual records of **9186*** different species within the Norwich Policy Area. Figure 6 breaks these down by taxon group. **142176*** of these records (**4773*** species) were recorded from 1995 onwards.

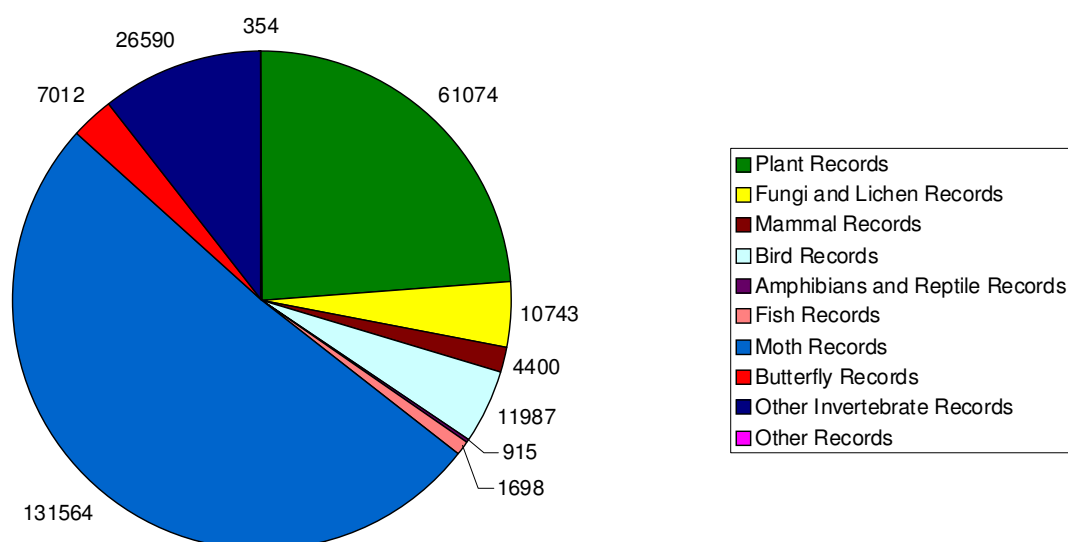


Figure 6. Number of Species Records from the Norwich Policy Area by Taxon Group

Species of Conservation Concern

Species of Conservation Concern (or SoCC) are those species which have legal protection, or which are classified as nationally notable, rare or scarce. NBIS holds **28610*** individual records of **885*** different Species of Conservation Concern within the Norwich Policy Area. This includes **19*** mammal species, **205*** bird species, **156*** plant species and **9*** species of fish, amongst others. These are summarised by designation in Table 3.

*Based on an NBIS data search carried out September 2012.

Table 3. Number of records and Species of Conservation Concern under each designation within the Norwich Policy Area.

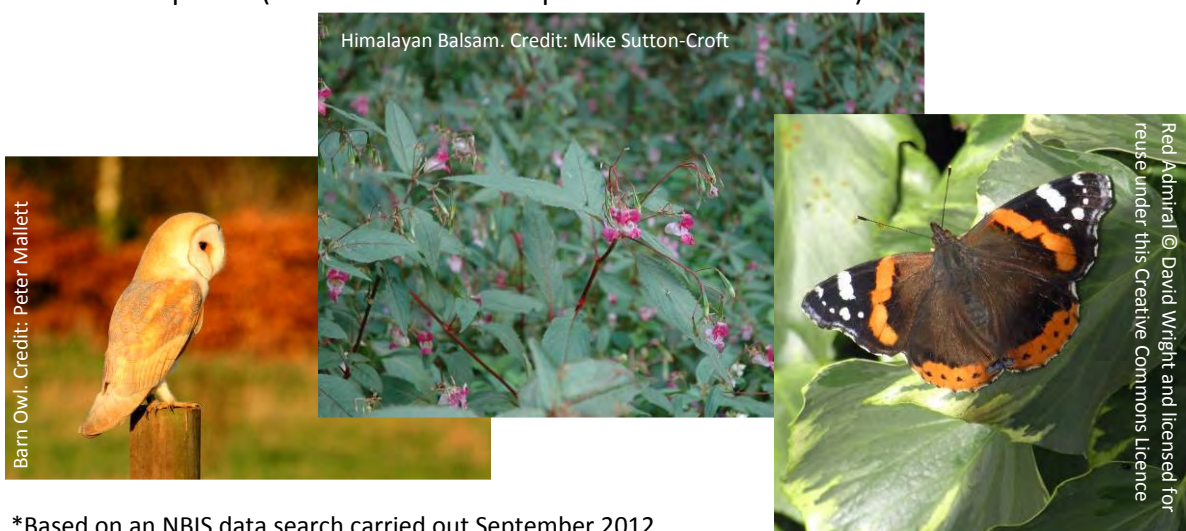
Designation	Number of Records*	Number of Species*
Amber listed birds	4780	105
Bern Convention	6501	125
Birds Directive	5253	118
Bonn Convention	5714	104
Habitats Directive	1865	44
Nationally Notable	1534	334
Nationally Rare or Scarce	1117	120
Red Data Book (Critical, Endangered, Vulnerable)	1041	104
Red listed birds	2305	30
UKBAP	15884	257
Wildlife & Countryside Act	6157	130

Invasive Non-native Species

Non-native species are those that do not occur in an area naturally, but have been introduced (purposely or accidentally) by humans. While many of these species do no harm, a small number do cause damage to native species and/or to us. These are known as Invasive Non-native Species. NBIS holds **637*** records of **21*** invasive non-native species (recorded since 1995).

Norfolk Non-native Species Initiative (NNNSI)

Launched in 2008, NNNSI promotes the prevention, control and eradication of invasive non-native species in Norfolk. It was established under the umbrella of the Norfolk Biodiversity Partnership and operates through a stakeholder forum, with representatives from more than 20 organisations. The Initiative collates and monitors distribution data, develops action plans, facilitates control and eradication projects and promotes awareness of the risks and impacts associated with invasive non-native species (Norfolk Non-native Species Initiative website).



*Based on an NBIS data search carried out September 2012.

The Norwich Policy Area is home to some unusual species. The Sandy Stiltball fungus is one of them!

The Sandy Stiltball fungus in Norwich

Paul Holley – Norwich City Council

The Ipswich Road Roadside Nature Reserve (RNR) consists of a fairly undistinguished looking stretch of road verge adjacent to Danby Wood Local Nature Reserve, on the south-western edge of Norwich. This RNR does, however, hold a nationally important population of one of our strangest and most mysterious fungi, the Sandy Stiltball (*Battarrea phalloides*), also known as the Sandy Stilt Puffball. This rare species is classified as 'Endangered' on the UK Red Data List for fungi, it is a UK Biodiversity Action Plan priority and it has its own Norfolk Species Action Plan.

The fruiting body of this species consists of a light brownish stipe (stem) usually from 10 – 25 cm in height, topped by a small, rounded head of rusty-brown spores. The fruiting bodies are usually present from September to November, although the stipes may persist over the winter months. The numbers of fruiting bodies do tend to fluctuate from year to year (and in some seasons they may be entirely absent from a particular site), and it is possible that this rather inconspicuous species may be under-recorded.

Much remains to be discovered about the Sandy Stiltball's life history and habitat needs. In Britain, it seems to prefer dry, sunny hedge banks or roadside verges where dead wood is present and at least in East Anglia there may be an association with elms; interestingly, the wooded area immediately behind the Ipswich Road RNR contains elms which re-grow repeatedly from suckers.

The Sandy Stiltball was first identified in 1782 at a site near Bungay, and Norfolk and Suffolk are still the British stronghold for the fungus, although it or a very closely related species has been found elsewhere in Europe, in parts of North America and even in Australia. Despite this, the number of sites where the species occurs locally seems to be declining. From an original 10 sites in Norfolk or on the Norfolk Suffolk border, the fungus was found at only 6 locations by 1995 and 3 in 2011.

Ipswich Road RNR is now by far the most important site for the Sandy Stiltball in Norfolk. The 2011 survey revealed 27 fruiting bodies, several of which were outside the RNR boundaries. At the time of the survey, the lighting columns within the RNR were being replaced, and although the contractors were aware of the presence of the Sandy Stiltball and took care to avoid the fruiting bodies, it was still feared that the disturbance may have had an adverse impact on the species. This was not so, as a survey the following year (2012) found 110 fruiting bodies! The RNR boundary has also been extended to take in all the recorded fruiting bodies.

The main challenge for the future conservation of the Sandy Stiltball will be to ensure that its remaining sites are protected from habitat damage. Road verges are especially vulnerable to inadvertent damage through various highway engineering operations, as well as anti-social activities such as fly-tipping. Good communication with highway engineers and contractors, and the prompt removal of illegally dumped waste and measures to discourage further fly-tipping are key issues that are being addressed. In the longer term, it is to be hoped that research might tell us more about the Sandy Stiltball's habitat needs and enable its re-introduction to sites where it formerly occurred.



Sandy Stiltball. Credit: Lizzy Carroll

Some species are synonymous with urban areas, such as opportunistic foxes, robins 'befriending' gardeners, chattering starlings and, in Norwich, the rabbits which inhabit the grounds of the University of East Anglia! The chirpy house sparrow is another such species, however studies show declines in urban house sparrow populations.

House Sparrows in Norwich

"The general impression is of a once highly adaptable bird now in retreat from an unsatisfactory environment."(Stuart Paston, 2000)

Stuart Paston undertook a survey in the last two months of 2000 of the house sparrows in Norwich (within the outer ring road). He counted a total of 1018 sparrows at 125 locations (this is likely to be an under-estimate of population due to the methods used). Sparrows were only found at a handful of locations within the inner ring road, and 67% of the birds counted were found north of the River Wensum, where there was a greater amount of wild open space (such as allotments, waste land and derelict and unkempt gardens). Schools also seemed to attract house sparrows. This could be as they are one of the few areas of open space among housing, or because of the attraction to left-over food often present at such sites. There was certainly evidence that bird tables and feeders increased the likelihood of sparrows occurring in otherwise non-ideal areas.

During autumn/winter 2011 the central Norwich part of the survey was repeated. Of the five locations within the inner ring road where sparrows were seen in 2000, only two appear to still be occupied. These are at Bishopgate and Boswell's Yard. However one new site (Elm Hill - first identified by the author as containing sparrows in 2001) was still occupied in 2011. The author suggests that over 60 house sparrows were present at the remaining three sites.

The three remaining sites are all to the north of the city, continuing the pattern seen during the first survey. Common factors at the three remaining sites are the presence of feeding stations and gardens containing a high density of shrubs.



House Sparrow. © Walter Baxter and licensed for reuse under this Creative Commons Licence.

(Stuart Paston 2000 & 2011, Norfolk Bird and Mammal Report)

This study shows the importance of species monitoring in demonstrating how well (or not) a species is faring. The Norwich Big Bat Project (see pg 39) gave the public the chance to be a part of a large scale bat monitoring programme. And it's not all doom and gloom. One species in Norwich which appears to be having a positive change of fortune is the peregrine falcon (see pg 40).

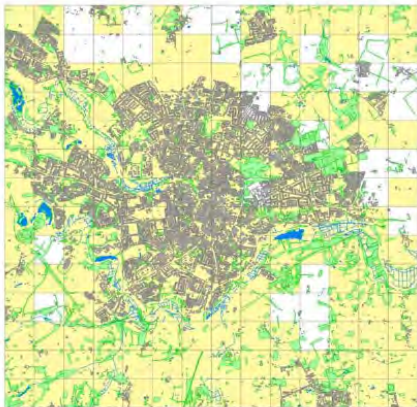
The Big Norwich Bat Project

Stuart Newson – British Trust for Ornithology

The Big Norwich Bat Project¹

“The Big Norwich Bat Project” (www.norwichbatgroup.org.uk/project.html) was run over the spring and summer of 2012 to enable large-scale high quality monitoring of bats in the Norwich area. The idea was simple and involved project members working with members of the public to move high-quality real time detectors between (mainly private) sites each night. By doing this we gave members of the public an opportunity to discover what bat species lived near to them and to be part of a novel project. Such acoustic monitoring has proven to be a reliable way of identifying and monitoring bats. With recent developments in bat recording technology for automating the capture and analysis of sound files, there is now the potential to collect and analyse large volumes of data for informing on bat distribution, status and trends. Unfortunately the cost of full spectrum bat detectors required for this purpose remain high, so this technology is normally restricted to use by environmental consultants or University research groups.

Over the course of a season, the project had surveyed 161 of 196 1-km squares (82%) in the wider Norwich area (see below map), generating close to 30,000 high quality records of 11 species to feed into county and UK reporting. Relative abundance maps for two species listed as Priority species under the UK Biodiversity Action Plan (UK BAP), Soprano Pipistrelle and Noctule are shown below. The value of this data is clear to see and we plan to continue and build on this project in 2013.



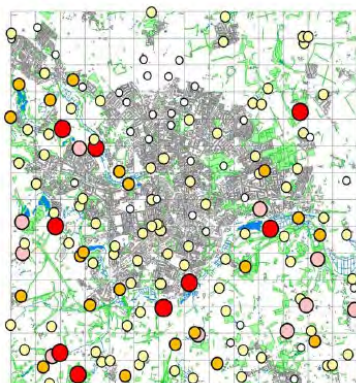
Survey coverage. A point within each of 161 x 1-km squares was surveyed for bats in 2012.



Photo: Mike Toms

The Brown long-eared bat was recorded from about 10% sites.

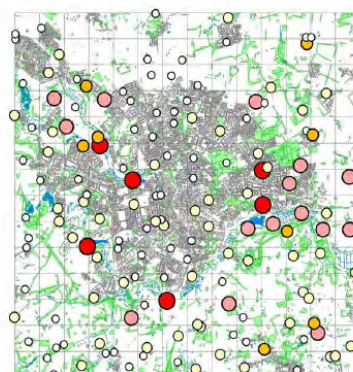
Soprano Pipistrelle



79% of surveyed squares

Number of bat passes
○ 0
○ 1 - 20
○ 20 - 100
○ 100 - 300
○ 300 - 1800

Noctule



53% of surveyed squares

Number of bat passes
○ 0
○ 1 - 10
○ 10 - 20
○ 20 - 100
○ 100 - 700

¹ The Big Norwich Bat Project was set up as a collaboration between the Norwich Bat Group, The University of East Anglia and the British Trust for Ornithology.

Norwich Cathedral Peregrines

Nigel Middleton - Conservation Officer Hawk and Owl Trust

Until recent times the Peregrine (*Falco peregrinus*) had not bred in Norfolk for more than 200 years. There is some reference to Peregrines breeding on Hunstanton cliffs and the young taken from the nest by members of the Le Strange family for falconry use. Reference is also made by the Rev Richard Lubbock in his book 'Observations on the Fauna of Norfolk' of peregrines living in the spire of the cathedral, to the great annoyance of the pigeon fanciers of the city; one was shot from one of the Norwich bridges in pursuit of a pigeon. Thankfully persecution of peregrines in Norwich is a thing of the past.

Peregrines in Norwich have been seen as a passage bird for many years. It was in 2008 that a male bird spent a summer roosting on the cathedral spire, and in 2009 a male and a female were seen for most of the summer. In 2010 the Hawk and Owl Trust approached the cathedral estates department with the view to placing a nesting platform on the cathedral spire, although they agreed it was only allowed to be placed on the roof of the bell tower. A webcam was installed, with a monitor fitted in the vergers' office, hopefully to record any activity. By September 2010 it was evident that the platform was not going to be used by the peregrines. Discussions then took place with the cathedral architect and estates department to place a nesting platform on the actual spire. After several meetings a design that was acceptable to the cathedral (bearing in mind that it is a 900 year old building) was agreed. On the 16th February 2011, with the help of volunteers from Norfolk Fire and Rescue Service and the Hawk and Owl Trust, the platform was installed 250ft high under the south east window. Web cams were also installed so that any activity could be recorded and transmitted to the Hawk and Owl Trust website.

Within five days of the platform being in place the peregrines had started to visit. By March a single egg was laid. Unfortunately due to the female peregrine being in immature plumage and a previous season's fledgling the egg did not hatch. In 2012 the hard work and effort by all those involved proved fruitful and the peregrines produced 3 chicks. Sadly one died before fledging, but with 50% surviving it was good news for Norwich (and bad news for the pigeons!)

A viewing area was set up at the cathedral; it was manned by volunteers who were able to talk to visitors, who came from all four corners of the world. From March through till July 23,500 visitors came to look at the peregrines through the telescopes. This put an enormous strain on the resources of the trust locally, so for 2013 we are employing a Peregrine Project Officer to run the cathedral viewing area and deal with volunteers and the media. This project certainly captured the hearts of local people, and the webcams became an instant success. Within 10 days there were more than 1.3 million views when the first chick hatched. The peregrine project would have never been possible if it hadn't had the support of local sponsors and dedicated volunteers. Here's hoping for a successful 2013 breeding season.



Peregrine on Norwich Cathedral © Hawk and Owl Trust

Air quality

Air quality is an important factor in the quality of life of an area and the health of its inhabitants, and is monitored by Local Authorities in urban environments.

The main pollutant source in Norwich is road traffic. In 2003 three Air Quality Management Areas (AQMAs) for nitrogen dioxide (NO₂) were declared by Norwich City Council, at Grapes Hill, St Augustine's Street and the Castle area. A further AQMA was declared at Riverside in 2009, and in 2012 these four AQMAs were revoked and replaced with one larger area, encompassing them all, plus a new potential AQMA at King Street.

Passive monitoring for air quality using NO₂ diffusion tubes was carried out across the city by Norwich City Council. In 2011, **nine sites** were identified as exceeding the air quality objective limit of 40µg/m³. All of these sites are covered by the town centre AQMA.

Automatic air quality monitoring occurred at two locations in Norwich during 2011 – an urban background location at Lakenfields and a roadside location on Castle Meadow:

Table 4. Nitrogen dioxide monitoring results at two locations in Norwich

		2008	2009	2010	2011	2012***
Castle Meadow	Annual Mean NO ₂ (µg/m ³)*	45	41	53	52	50
	No. 1 hour mean exceedences (>200µg/m ³)**	0	1	15	34	2
Lakenfields	Annual Mean NO ₂ (µg/m ³)*	-	16	13	13	-
	No. 1 hour mean exceedences (>200µg/m ³)**	-	0	0	0	-

*Objective annual mean is ≤ 40 µg/m³

**Max no. exceedences allowed per year is 18

***Provisional data up to 03/08/12

Table 5. PM₁₀ (particulate matter) monitoring results at two locations in Norwich

		2008	2009	2010	2011
Castle Meadow	Annual mean (µg/m ³)*	19	21	19	25
Lakenfields	Annual mean (µg/m ³)*	-	17	18	19

*Objective annual mean is ≤ 40 µg/m³

There were **17** exceedences at Castle Meadow, from a permitted 35 days, and **13** exceedences at Lakenfields.

At both Lakenfields and Castle Meadow, the objective for SO₂ has not been exceeded in 2011 or in past years.

As there were more than 18 exceedences of the 1-hour mean NO₂ air quality objective of 200 µg/m³ at the Castle Meadow site in 2011, a Detailed Assessment was required. This report concluded that the vast majority of exceedences occurred within a short time period of winter 2010/11 until the end of April 2011. It is thought that highways improvement machinery present on Castle Meadow at that time could have contributed to these exceedences. Provisional data suggest that only two exceedences were recorded in 2012 (until August) and therefore the objective is unlikely to be exceeded again. This will be confirmed in the 2012 Progress Report.

(Norwich City Council 2012)



Castle Meadow, Norwich. © Katy Walters and licensed for reuse under this Creative Commons Licence

Public Green Spaces and Getting Involved

Norwich and the surrounding areas have many green space areas that are publicly accessible, from parks and gardens to woodland and heaths. Additionally there are miles of footpaths, cyclepaths and bridleways to explore. There is also the opportunity for people to get more involved in their local environment, such as through joining local wildlife groups.

43 of the 173 County Wildlife Sites (**25%**) in the Norwich Policy Area permit public access. A further **47** have public access adjacent to them.



Credit: Scott Perkin



Credit: Norfolk County Council



Wherryman's Way footpath © Evelyn Simak and licensed for reuse under this Creative Commons Licence

Public Rights of Way within the Norwich Policy Area

Footpath – Open to walkers only. Doesn't usually include the pavement (footway) along roads: **1969.96km**

Bridleway – Open to walkers, horse riders and cyclists. Cyclists must give way to walkers and horses: **269.53km**

Restricted Byway – Open to walkers, cyclists, horse riders and horse-drawn vehicles: **94.17km**

Byways Open to All Traffic (BOAT) – Open to walkers, cyclists, horse riders, horse-drawn vehicles and motor vehicles: **21.62km**

Undefined: **128.12km**

Long Distance Trails

There are three long distance trails partly within the Norwich Policy Area. These are the Marriott's Way to the west, the Wherryman's Way to the east and the Tas Valley Way to the south.

Marriott's Way – A **41 km** (26 mile) trail which runs between Norwich and Aylsham. Within the Norwich Policy Area the trail runs for 10.89km from the Barn Road roundabout on the inner ring road in Norwich, past Hellesdon and Costessey to just past Taverham. The trail is open to walkers, cyclists and horse riders and forms part of the National Cycle Network. It follows the route of two disused railway lines (Marriott's Way website).

Wherryman's Way - A **57km** (35 mile) trail running between Norwich and Great Yarmouth. Within the Norwich Policy Area the trail runs for 15.3km from Norwich train station, through Whitlingham Country Park and past Surlingham as far as Wheatfen Nature Reserve. Suitable for cyclists and walkers (Wherryman's Way website).

Tas Valley Way – A **41km** (26 mile) trail which runs between Cringleford and Attleborough. Within the Norwich Policy Area the trail runs for 15.5km from the ancient bridge at Cringleford, through Intwood, Mulbarton and Flordon, and meeting the River Tas at Hapton. (Countryside Access website – Tas Valley Way)

Public rights of way and long distance trails within the Norwich Policy Area are shown in figure 6.



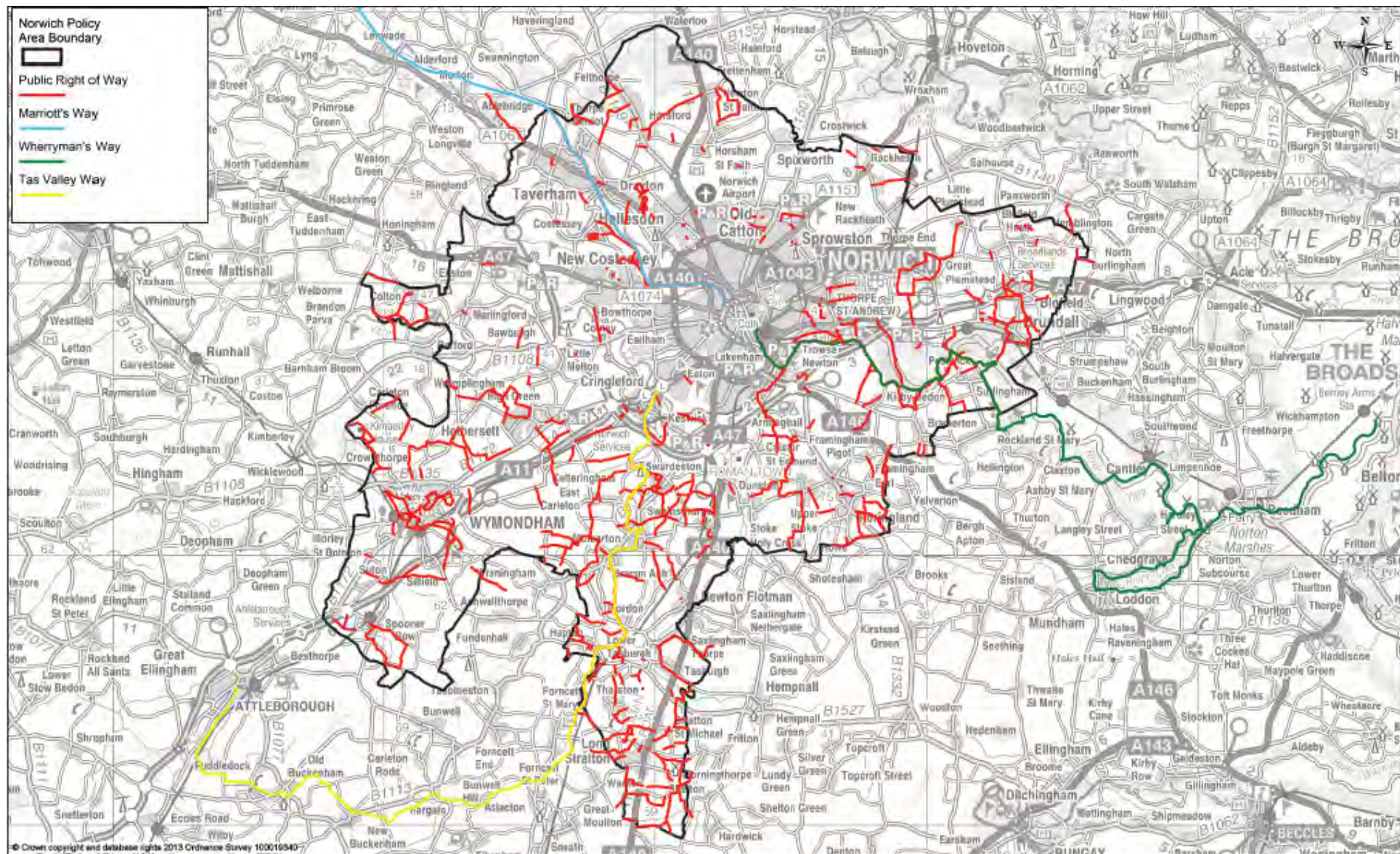


Figure 6: Public Rights of Way and long distance trails within the Norwich Policy Area

The Yare Valley Walk – River and Ridge Section

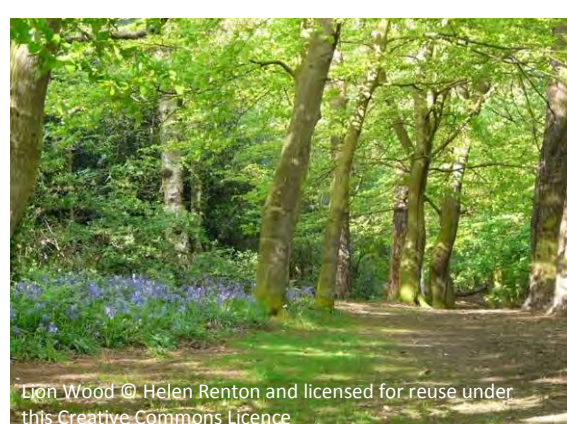
The River Yare is 58 miles in length, running from the Brecks to Great Yarmouth. The Norwich section of the Yare Valley is very variable – from the broad flood plain towards Easton to the steeper, wooded slopes at Thorpe and Trowse.

This 7 mile circular walk starts at Trowse Millgate – the upper navigable reaches of the Yare. It passes St Andrews Church at Trowse Newton, and the ruins of Trowse Newton Hall – some parts of which date back to 1350. The route goes through Whitlingham Country Park and passes the ruins of another St Andrews Church. These ruins are only visible in winter when the vegetation dies back.

After crossing over the Norwich to Yarmouth railway line, St Andrews hospital is passed. This was originally the county asylum! The walk continues through Norfolk Wildlife Trust's Thorpe Marshes reserve and then heads up to the Thorpe wooded ridge, through Pilling Park and into Lion Wood. Lion Wood used to be part of a much larger area of woodland that was once considered a valuable resource. In spring, bluebells, wood anemone and wood sorrel can be seen in flower.

The route then passes through Rosary Cemetery – the first private cemetery of its kind in England and a haven for wildlife. The walk then joins the Riverside Walk along the River Wensum, before heading back to Trowse.

(Yare Valley Walk – River and Ridge Section website)



Norwich Parks

Norwich contains **23** parks, **59** natural areas and **95** open spaces (Norwich City Council website).

Parks in the city range from the 100-year old Grade II registered Plantation Garden, to the Grapes Hill Community Garden planted in 2011, and from the bowls, tennis, putting and paddling pool at Waterloo Park to the 180 acres of woodland and heath at Mousehold Heath. The adjacent St James' Hill gives superb views over Norwich, while the historic Eaton Park boasts a model yachting park and railway as just some of its facilities. See the Visit Norwich website for more information.



There are many opportunities to get more involved in the local environment of Norwich and the surrounding areas – from supporting local groups, to practical conservation work, and recording and monitoring wildlife.

Catton Park and the Community

David Yates – Norfolk County Council

Catton Park is the last surviving area of private parkland out of the once numerous estates that ringed Norwich from the late 18th Century onwards. It is notable as the first landscape commission undertaken by the landscape architect Humphry Repton and is recognised as being of national heritage significance. Being one of the few large areas of meadow and woodland within the urban area to the north of Norwich, Catton Park is also an important site for biodiversity.

The 70 acre park was officially opened to the public in 2007 by the Catton Park Trust, who lease the land from two separate land-owners. A considerable amount of work had to be done to re-create wildflower meadows from what had been arable land, create paths through the park and manage the boundary woodland belts. This was financed by grants from the Heritage Lottery Fund, the local authorities, the Forestry Commission and a government Countryside Stewardship Agreement (now Higher Level Stewardship). The funding has helped to pay for the employment of a Warden, who carries out much of the on-going management at the site.

In 2011, a new Education Building was opened in Catton Park. This provides facilities for school and community groups to use when they visit the park.

Catton Park would not be what it is today without community involvement. A small group of local people were the driving force behind the creation of the park as a public open space. The Board of Trustees who oversee the management of the park is made up of local residents as well as the landowners and representatives of the local authorities. There is also an active 'Friends of Catton Park' group, who organise events in the park and help to raise funds. Local volunteers also help the Warden to manage the park.



Wymondham Nature Group

Ann Roberts

Wymondham Nature Group is one of Norfolk Wildlife Trust's local groups so therefore everything we do upholds NWT's ethics. We try to protect, enhance wild sites and educate the public about the wild places and their wildlife. We are a committee of 8 who organise ten indoor meetings, fundraise, undertake conservation and survey work, lead walks, give advice and actively interact with the local planning system.

Our indoor meetings are well attended and cover all subjects of wildlife both UK and foreign. Over the years we've led walks to woodlands, meadows, fungi forays and natural and man made (ex mineral extraction sites) wetland areas, all of which are in the local area, as many people have no knowledge of what is on their doorstep.

Fundraising is by holding market stalls, book and plant sales, raffles and Christmas Fairs. These raise money and just as importantly we get to talk to the public about wildlife. We also run the Sensory stand for NWT at Wild About Norfolk where hundreds of children get a chance to touch nests, feathers, shells etc.

Over the last year we continued to carry out habitat and species surveys to gain County Wildlife Site status for two new sites, and surveyed two local Green Lanes. All of these are fed into NBIS, Norfolk County Council and our local planning authority South Norfolk Council. We actively work with the local ecologist as Wymondham is under pressure from a great number of large developments near vulnerable wildlife sites. Our hope is that our work will help to inform the councillors and planners when large development applications for housing come in.

Another part of our group is the conservation work carried out at Ashwellthorpe Lower Wood and Tolls Meadow Nature Reserve. Both reserves are special sites, one ancient woodland and SSSI the other a rare fen meadow looked after for its Water Voles and nearly two hundred plant species. Both conservation teams are local volunteers who also swing into action if needed on other sites.



Ashwellthorpe Lower Wood walk, Credit: Ann Roberts

Ashwellthorpe Lower Wood. Credit: Ann Roberts

Norwich Fringe Project

Established in 1990, this partnership organisation covers a four-mile radius around Norwich. The Project aims to work with local communities to manage and look after the countryside on their doorstep and to improve their surroundings. There are two paid staff members – one full time and one part time - and many volunteers involved!

The work undertaken by the Norwich Fringe Project is incredibly diverse; from organising grazing cattle, building boardwalks and managing hazel coppices to developing partnerships with local communities, landowners and councils and giving guided walks and talks.

For more information see the Norwich Fringe Project website.



Bowthorpe Marshes (left) and Marston Marshes (right) in Norwich, both managed by the Norwich Fringe Project. Photo credit: Matt Davies

Recording Wildlife

One way in which anyone can get out and about and make a positive contribution to wildlife conservation is through recording wildlife and submitting records to NBIS. If we don't know what species are located where then it is very difficult to protect them or to spot population declines. Records submitted to NBIS are checked by local experts (the County Recorders – see below) and then stored in a database. They are then available to be used to inform planning decisions and conservation work, as well as for student and academic research projects and for interested members of the public.

For a record to be of use, it needs to have the four 'W's – WHAT was seen, WHEN it was seen, WHERE it was seen (preferably with a grid reference), and WHO saw it (in case we need to contact the recorder for further details).

Records can be emailed to NBIS (nbis@norfolk.gov.uk) or entered online via the NBIS website (<http://www.nbis.org.uk/AllSpeciesSurvey>)



The County Recorder Network

Co-ordinated largely through the Norfolk and Norwich Naturalists' Society, the County Recorder Network is made up of expert volunteer recorders and specialists. They cover almost all taxonomic groups of plants and animals, and as well as carrying out their own recording they also receive, store and validate records from others, and provide these validated records to NBIS and to appropriate national schemes and societies.

Without these enthusiastic volunteers we would have far fewer data on species in Norfolk (Norfolk Biodiversity Information Service website).

A Survey of a Section of Marriott's Way

Stuart Paston – County Hoverfly Recorder

A survey of flies at Marriott's Way, Norwich, undertaken during 2011 and 2012, has produced a number of noteworthy records including a species new to Norfolk.

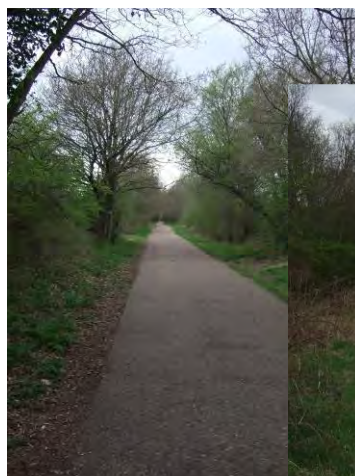
The area studied is a section of County Wildlife Site (no. 1453) on the north side of Marriott's Way between Sloughbottom Park and Sweet Briar Road which comprises grassland, scrub and woodland. The woodland, consisting mainly of oak and birch, was the focus of most sampling during 2012 with a white water trap producing some significant records. Among these was a female of the muscid *Lispocephala brachialis* in late June, a first record for the county and only the second for East Anglia following a 2011 record from Suffolk. The species, to date, has otherwise only been recorded in Scotland, Wales and a few places in western England. Its life history is unknown but the larva is possibly aquatic.

The richness of the fly fauna in the woodland is, to a large degree, attributable to the amount of dead timber available, with plentiful rotten birch on the ground likely to support a significant number of species. The crane fly *Achyrolimonia decemmaculata*, a Notable species, whose larvae feed in fungi associated with dead wood, is also present here. Tachinid flies were especially in evidence in spring 2012 with a number of species attracted to the water trap including the infrequently recorded *Campylocheta praecox* which, like the majority of this family, is a parasitoid of moth larvae. Other good records of tachinids were a male of the diminutive *Cinochira atra*, (a parasitoid of Lygaeid bugs), which occurred in an aerial trap, and *Actia lamia* swept from rough grassland adjoining the woodland in 2011. The hoverflies *Cheilosia lasiopa* and *Pipiza luteitarsis* were recorded in the vicinity of the woodland in 2011, the former quite numerous over grassland.

The survey area includes a patch of wasteland adjoining the industrial estate west of Sloughbottom Park. This supports a ruderal flora which testifies to frequent disturbance over the years and a distinctive fly fauna occurs here which includes *Machimus cingulatus* (The Brown Heath Robberfly), and a flesh fly *Blaesoxipha plumicornis* which is a parasitoid of grasshoppers on heaths and sandy waste ground. Among hoverflies recorded here was *Paragus haemorrhous* which is widely distributed but easily overlooked on account of its small size.

The survey to date has produced close to 250 species and further sampling using a wider range of methods is likely to produce more records of significance in relation to the County fauna. The open areas were heavily grazed by horses in autumn 2011 but this has not been repeated in 2012.

Aside from flies, the occurrence of a White-letter Hairstreak (*Satyrium w-album*) butterfly nectaring on wild parsnip on the ruderal area in July 2012 is of interest, whilst botanical records include flaxweed in the area above and a small quantity of basil thyme on the embankment alongside the entranceway to the industrial estate.



Conclusion

The area covered by the Norwich Policy Area contains the large populated centres of Norwich and Wymondham and the urban land-use associated with it. However, by no means has this resulted in the natural environment of the area being lacking.

There are numerous historic archaeological sites – from the prehistoric to the Cold War, and a good number of protected and important wildlife sites, designated for their habitats, flora and fauna. Almost 56% of SSSI units are in favourable condition and 65% of county wildlife sites were in positive conservation management in 2011/12.

A number of Biodiversity Action Plan habitats are found within the boundary of the Norwich Policy Area, including grassland, woodland, fen and water sites. Much of the land outside of the urban centres is used as arable land – as is the case in much of Norfolk. And many of these land parcels are under Environmental Stewardship Schemes, and are therefore managed positively for wildlife.

Norfolk Biodiversity Information Service holds records of over 9000 species from within the Norwich Policy Area, over 4000 of which were recorded from 1995 onwards. And almost 900 of these species are Species of Conservation Concern – species with legal protection or which are nationally notable, rare or scarce.

There are many opportunities to get out and involved in the environment of Norwich and its surroundings. There is a comprehensive network of public rights of way and three long distance trails intersect the Norwich Policy Area. There are many accessible open spaces – from parks and gardens to local nature reserves. There are also local community groups to get involved with, who organise practical conservation work days, fundraising, nature walks, recording and more.

The Norwich Policy Area is earmarked for large amounts of growth in the coming decades. It is crucial that the environment and biodiversity is taken into account during every stage of this development. Networks of habitats need to be retained to allow species movement. Important habitats need to be preserved and appropriately managed, and where damage is unavoidable, appropriate mitigation needs to be employed. The environment of the Norwich Policy Area is a hugely important part of both the quality of life of residents and key in attracting visitors to the area. Its importance must not be underestimated.

Glossary

Aculeate wasps: A taxonomic group of wasps which possess a sting.

Biodiversity: The variety of life in the world or in a particular habitat or ecosystem.

EC Habitats Directive: A European Union Directive adopted in 1992 aiming to protect 220 habitats and around 1000 species listed in the directive's Annexes. Led to the setting up of a network of Special Areas of Conservation.

Humus: The organic component of soil, formed by the decomposition of plant material by soil microorganisms.

Landscape Character: The distinct and recognisable pattern of elements (both natural - such as soil or landform - and human - such as settlement or development) that occurs consistently in a particular type of landscape.

Mesotrophic lake: A lake containing a moderate amount of plant growth.

Natura 2000: An EU wide network of nature protection areas established under the 1992 Habitats Directive. It aims to assure the long-term survival of Europe's most valuable and threatened species and habitats.

Parasitoid: An insect whose larvae live as parasites that eventually kill their hosts.

Pingo: Pond formed by a dome-shaped mound consisting of a layer of soil over a large core of ice, occurring in permafrost areas. When the ice melted, the soil collapsed and a hollow formed.

Ruderal flora: Weedy vegetation adapted to growing on compacted, plowed, or otherwise disturbed ground.

Scheduled Ancient Monument: A nationally important archaeological site or historic building, given protection against unauthorized change under the Ancient Monuments and Archaeological Areas Act 1979.

Thermokarst hollows: Land-surface configuration that results from the melting of ground ice in a region underlain by permafrost. In areas that have appreciable amounts of ice, small pits, valleys, and hummocks are formed when the ice melts and the ground settles unevenly.

Topography: The arrangement of the natural and artificial physical features of an area.

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