

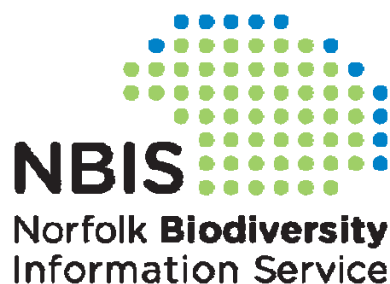


# The Gaywood River Valley

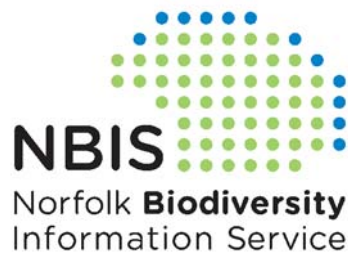
## A State of the Environment Report



**Produced by Norfolk Biodiversity Information Service  
Spring 2012**



Norfolk Biodiversity Information Service (NBIS) is a Local Record Centre holding information on species, geodiversity, habitats and protected sites for the county of Norfolk. For more information see our website: [www.nbis.org.uk](http://www.nbis.org.uk)



This report is available for download from the NBIS website [www.nbis.org.uk](http://www.nbis.org.uk)  
A summary report is also available from the NBIS website [CLICK HERE](#)

Report written by Lizzy Carroll, March 2012.

Acknowledgements:

The author would like to thank the following people for their help and input into this report:

Bill Boyd (Norfolk Wildlife Trust); Gemma Clark (Gaywood Valley Project Officer); Jackie Fookes (Mott MacDonald); Joanne Godwin (Norfolk Wildlife Trust); Will Hancock (Church Farm); Tim Holt-Wilson (Norfolk Geodiversity Partnership); Brenda Mace (Environment Agency); Nicola Marray-Woods (Reffley Woods Volunteer Group); David North (Norfolk Wildlife Trust); Dave Robson (King's Lynn & West Norfolk Borough Council); Robin Stevenson (County Recorder).

Cover Photos: Clockwise from top left: Roydon Common (Credit: Norfolk Wildlife Trust); The Walks (Credit: Gemma Clark); Upper Gaywood (Credit: Robin Stevenson); Bawsey Ruins (Credit: Kirsty Webber-Walton).

# CONTENTS

<b>Foreword</b> – <i>Gemma Clark, Gaywood Valley Project Officer</i> .....	v
<b>Welcome</b> .....	1
<b>Landscape History &amp; GEODIVERSITY</b> – <i>Tim Holt-Wilson</i> .....	2
The roots of the landscape .....	2
Earth heritage in the Gaywood Valley .....	2
Norfolk Wildlife Trust Living Landscape Project in the Gaywood Valley .....	6
<b>Important Sites</b> .....	7
Site designations .....	7
Norfolk Wildlife Trust Roydon Common National Nature Reserve – <i>David North</i> .....	8
Sites of Special Scientific Interest .....	9
County Wildlife Sites .....	10
<b>Habitats and Land-Use</b> .....	14
Ecosystem Services .....	14
Habitat and Land-use Mapping .....	15
Norfolk Wildlife Trust Grimston Warren; the story of a heathland reborn – <i>Bill Boyd &amp; David North</i> .....	20
Urban Greenspace	
The Walks .....	22
Tower Gardens .....	23
Harding’s Pits Doorstep Green .....	23
Agriculture	
Agri-environment Schemes .....	24
Farmland in the Gaywood Valley – Church Farm, Bawsey .....	25
Important Areas for ARABLE PLANTS .....	25
<b>Species</b> .....	26
Rare Species .....	27
Invasive Non-Native Species .....	27
Biodiversity Action Plan Priority species .....	27
The Flora of the Gaywood Valley – <i>Robin Stevenson</i> .....	28
Other Species ‘Highlights’ .....	29
Moths in the Valley .....	30
<b>Historic Environment</b> .....	31
Salterns and the Wash .....	31
Bawsey Ruins .....	32
Reffley Spring .....	32
<b>Environmental Quality</b> .....	33
Air quality .....	33
Water quality .....	33

<b>Getting Out in the Valley .....</b>	<b>34</b>
The Gaywood Valley and the Accessible Natural Greenspace Standard (ANGSt) .....	35
Accessing the Valley .....	36
Norfolk Wildlife Trust, Living Landscapes Outreach in Schools – <i>Joanne Godwin</i> .....	37
<b>Getting Involved .....</b>	<b>38</b>
Community Conservation Groups .....	38
Reffley Wood Volunteer Group – <i>Nicola Marray-Woods</i> .....	39
Plantation Wood – <i>Nicola Marray-Woods</i> .....	40
Species Recording .....	41
<b>The Countryside Code .....</b>	<b>42</b>
<b>Glossary .....</b>	<b>43</b>
<b>Useful Web Links .....</b>	<b>45</b>

## FOREWORD

The Gaywood River Valley Project is one of a number of pilot projects receiving funding through the Interreg North Sea programme as part of an international Initiative called SURF (Sustainable Urban Fringes). SURF runs until summer 2012 and involves 15 partners from across the North Sea Region who are working together to test ideas to improve the social, economic and environmental quality of urban fringe areas.

The Gaywood is a short chalk river 13km in length that rises from springs near Derby Fen to the east of King's Lynn. The river discharges into the Great Ouse at King's Lynn through a tidal flap, and then into the North Sea through The Wash estuary. The SURF project area follows the catchment of the River Gaywood and spans approximately 5,700 ha.

The mid to lower reaches of the Gaywood River run through urban areas. These areas are a mixture of housing developments with some industrial activity. Some areas are still in the process of being developed.

The upper reaches encompass important wildlife habitats, including chalk river, woodland, heathland and fen. Designated nature conservation sites, including Sites of Special Scientific Interest (SSSI) and County Wildlife Sites (CWS), form an integral part of the Gaywood Valley environment.

To meet the huge challenges posed by climate change and the rapid pace of development in and around King's Lynn, the importance and true value of these natural assets need to be reassessed. This will ensure that habitats and species are protected from the impacts of climate change and population growth and that local people can have easy access to the countryside whilst understanding and valuing its importance. This will be achieved by listening to the views of local communities and working with them to create a shared vision and prioritised actions. The Gaywood River Valley Project aims to explore and develop a wide variety of connected programmes to add value to the various managed landscapes and designations of the project area and deliver community benefits. These benefits will make the area more accessible for recreational activities such as walking and biking, provide varied learning opportunities, improve wildlife habitats helping to safeguard species, explore the issues of flooding and climate change in the area and bring local communities together to create a shared vision for the Valley. Broad Areas of interest in the project include:

- Biodiversity
- GEODIVERSITY
- Historic environment
- Flood alleviation
- Access and health – physical and intellectual
- Learning and education – formal and informal
- Community engagement
- Training and skills

The Gaywood Valley really is a local treasure of West Norfolk and I hope that after reading this report you will see why. Perhaps you will feel inspired to get involved in a local voluntary group, submit some records or even just get outside into the valley to enjoy its stunning scenery and wildlife.

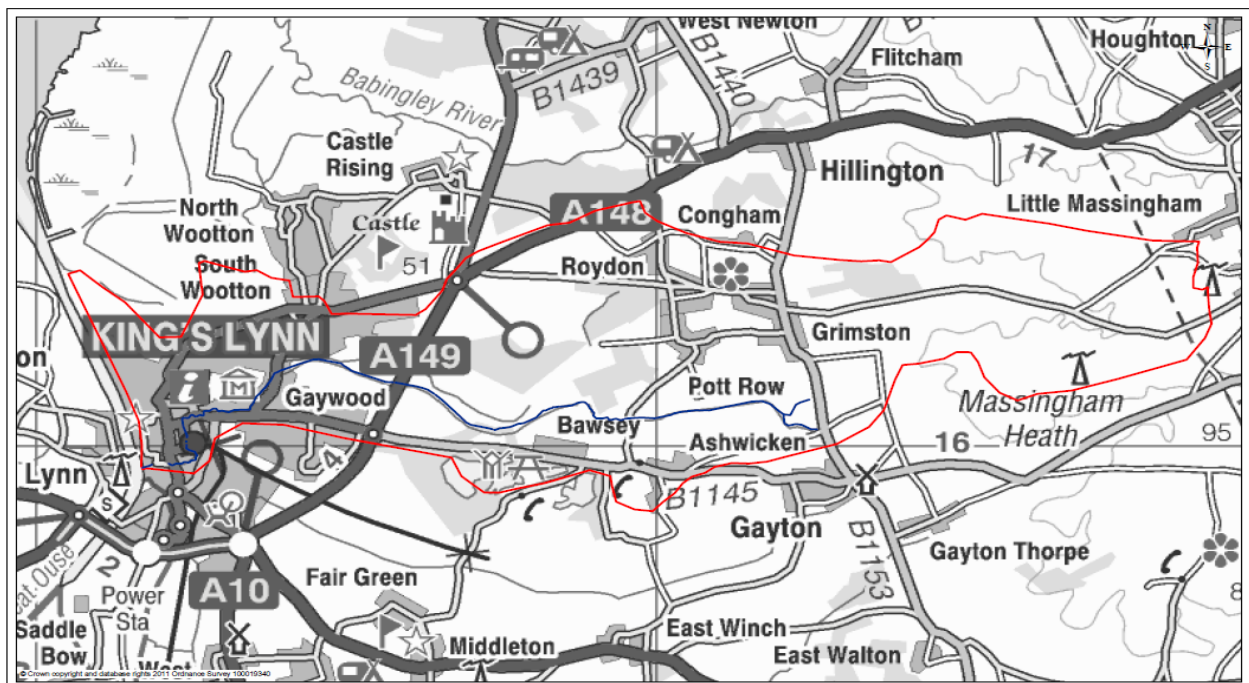


## WELCOME

The Gaywood River Valley, stretching from the historic town of King's Lynn eastwards out to Great Massingham, is a little known, often forgotten part of Norfolk. Even people who live there are often unaware of the treasures to be found in the Valley. This report aims to change that! The Gaywood Valley has a fascinating past and contains important protected sites, a fantastic variety of landscapes and habitats, and a wealth of wildlife.

This report is written by Norfolk Biodiversity Information Service (NBIS) with contributions from people who live, work and volunteer in the Gaywood Valley. It brings together key information about the environment of the Gaywood Valley, showcasing the important sites, species, habitats, geology and historic features of the area. It aims to inform, inspire and enthuse local people like you to get out and enjoy the Gaywood Valley. The data included provide an important baseline to be compared against in the future and show how the environment of the Gaywood Valley is changing.

If, after reading this State of the Environment Report, you want to find out more about particular aspects of the Gaywood Valley environment, useful web links are provided on page 45 for further information. Definitions of words in SMALL CAPITALS are given in the glossary on page 43.



The red outline on the map above shows the boundary of the Gaywood Valley Project Area. The blue line shows the River Gaywood.

## LANDSCAPE AND GEODIVERSITY – Tim Holt-Wilson, Norfolk Geodiversity Partnership

GEODIVERSITY underpins the landscape of the Gaywood Valley. Natural processes have been working on beds of clay, chalk and sandstone over many thousands (and millions) of years to produce the landforms and soils of the valley, and the range of important wildlife habitats we see today. Groundwater and surface water flows have created the Gaywood River. GEODIVERSITY has made a big contribution to human life through resources which we often take for granted such as drinking water, minerals, building stone and soils for farming.

The Gaywood Valley area ranges from chalk hills to saltmarshes, and includes an interesting range of physical landscape features. There two Sites of Special Scientific Interest (SSSIs) designated for their geological value (see page 9 for more information).

### The roots of the landscape

500,000 years ago the Gaywood River was a stream draining westward from an ESCARPMENT of high chalk hills which probably resembled the Chilterns today. The crest of the ESCARPMENT may have been somewhere near Grimston.

About 450,000 years ago this area was in the grip of the ANGLIAN GLACIATION, with ice sheets over 1km thick. Ice approached the Gaywood Valley from the west, surged up the valley and covered the chalk hills, eroding them to a depth of as much as 65 m; it broadened the valley and shifted the crest of the ESCARPMENT backwards and eastwards to its present position at Great Massingham.

When the ice sheets retreated they left behind a layer of glacial deposits covering the landscape<sup>1</sup>. The present day Valley has developed on this surface over the last 425,000 years: upland areas have been lowered and valleys have deepened, underlying early Cretaceous rocks have been exposed, soil and sediment have moved downhill to make valley floors, the river has shifted material seawards. The landscape we see today, with its fields, woods and houses, rests on these physical foundations and natural processes.

### Earth heritage in the Gaywood Valley

#### Chalk uplands

A rolling upland of chalk hills forms the eastern backdrop to the Gaywood Valley. There are many dry valleys, which may once have held streams in periods of colder climate. In past centuries much of this landscape was open heathland.

>>> *Footpaths over Grimston Heath and Lanky Hill give splendid views across the landscape towards Great Massingham.*

---

<sup>1</sup> These deposits include till (unsorted material deposited directly by glacier ice, sometimes called 'boulder clay') and outwash sediments (sands, gravels and silts deposited by glacial meltwaters).





A dry valley at Grimston Heath, cutting through a bank of glacial gravel, probably laid down by the Anglian ice sheet about 450,000 years ago.

### **Patterned ground**

Curious striped patterns in the chalky soil of Grimston Heath were formed by FREEZE-THAW ACTION in the last Ice Age, about 18,000 years ago. These are reflected in crop-marks, best seen from aerial photos.

### **Springlines**

An important SPRING LINE has developed at Grimston, where water filtering down through the chalk AQUIFER meets an impermeable clay layer. Water emerges in a low-lying area with abundant chalk-rich springs, for example Sowshead, forming the headwaters of the Gaywood River, and a cluster of wetlands such as Derby Fen and Sugar Fen.

>>> *Take a 'spring walk' along the springline between Grimston and Gayton, passing Sowshead Spring and Well Hall.*

### **Re-wilding the river**

The Gaywood River has been tamed over the last 200 years, to reclaim land for farming. Old maps show that it once meandered through expanses of wet fenland. It has now been over-deepened and straightened, and wetlands such as Grimston Fen have been drained. Work has begun on re-wilding the river through the Living Landscape Project (see pg 6). This includes reconnecting it with the floodplain and reinstating former MEANDERS. This may help prevent thick layers of peat, built up over thousands of years, from drying out and wasting away.

>>> *Visit the wetland nature reserves at Leziat Fen, Derby Fen and Sugar Fen. See alder trees with 'stilt' roots, showing how peat soil has wasted away in recent decades.*



Photo: Tim Holt-Wilson

The Gaywood River near Sugar Fen SSSI has been over deepened, and now flows some two metres below floodplain level. As a result the nature reserve is drying out.

### **Stones and clays**

West Norfolk is noted for its interesting range of building stones, and walls in the Gaywood Valley are no exception. Diverse rocks of Cretaceous age include flints and orange-brown sandstones; there are also exotic 'erratic' rocks from elsewhere in Britain, transported here by glacier ice. Local clays have been used for brickmaking and pottery, notably at Pott Row where Cretaceous clays were fired in Medieval times to make a distinctive Grimston Ware pottery.

>>> *See displays of Grimston Ware pottery at Lynn Museum. Old walls display a fascinating variety of rock types, gleaned from local fields as well as dug from stone quarries.*



Photo: Tim Holt-Wilson

Local building materials at St Botolph's Church, Grimston: flint and lime mortar from the Chalk, iron-rich sandstone from the Mintlyn Beds, brickearth from the Gault Clay.

### **Sand quarries**

The early Cretaceous sands of the Leziat Bed have been exploited locally for centuries as a nationally-important resource of silica sand, used for glassmaking and foundry work. The nearby Leziat quarries produce some 450,000 tonnes of silica sand per year. The attractive lakes and beaches at Bawsey Country Park are part of this industrial heritage.

>>> *Take a walk at Bawsey Country Park, where ocean-going ammonites and plesiosaurs once swam. The sand in the beaches and cliffs was deposited when dinosaurs walked the Earth.*





Bawsey County Park. The yellow sands and brown mudstones (right) were laid down in warm, shallow tropical seas about 135 million years ago. Glacial deposits cap the rock sequence here.

### **The lower Gaywood Valley**

The Gaywood River valley widens out towards Kings Lynn. It is floored by layers of freshwater peat and marine silts laid down in the last 10,000 years. The lower part of the valley was a shallow estuary in Roman times.

*>>> Escape into the open landscapes of the lower Gaywood Valley, via the network of tracks, footpaths and permissive rights of way (see pg 34).*



View up the Gaywood Valley from St James's Church, Bawsey. It stands proud on a knoll of GLACIAL TILL, and was built using locally-sourced flint and sandstones, while the decorative stonework is Jurassic limestone imported from Barnack, near Peterborough.

### **A lost estuary landscape**

18<sup>th</sup> century maps show that the Great Ouse estuary once flowed in a wide meandering channel north of King's Lynn, flanked by mudflats and saltmarshes. Embankment and drainage work in the 1850s forced the river to change course into the present day Lynn Channel, and the Docks were built on reclaimed land.

*>>> Take a walk out to see the area's last surviving piece of saltmarsh at Point Green, designated as a County Wildlife Site.*



## Norfolk Wildlife Trust Living Landscape Project in the Gaywood Valley

There are over 100 Living Landscape schemes across the UK. These schemes aim to restore damaged habitat, recreate those habitats and wildlife corridors that have been lost, and reconnect natural areas, linking them with urban greenspace.

One of these projects, run by the Norfolk Wildlife Trust and started in 2008 focuses on the Gaywood Valley. A landscape of “heathland and mire of international conservation importance”, much of the wetland in the valley bottom has been drained, the Gaywood River straightened and sand extracted from the valley sides.

The Gaywood Valley Living Landscape Project aims to:

- Restore the natural functioning and enhance the water quality of the Gaywood River;
- Restore wetland habitats along the length of the floodplain;
- Enhance and expand heathland on the edges of the Valley;
- Improve arable farmland for wildlife and environmental protection; and
- Provide new opportunities to enjoy, understand and value the existing and potential wildlife around King’s Lynn.

(Source: [www.wildlifetrusts.org/living-landscape/schemes/gaywood-valley](http://www.wildlifetrusts.org/living-landscape/schemes/gaywood-valley))



The Gaywood River. Photo: Norfolk County Council

The Gaywood River, showing where the original MEANDERS have now been reinstated by the Environment Agency and the Internal Drainage Board as part of the Living Landscape Project.

## IMPORTANT SITES

Did you know that there are sites within the Gaywood Valley that are important for their wildlife or geology at a county, national or even international level? These sites are crucial for the conservation of rare plants, animals and geology, and many of them are open to the public allowing you to explore and experience nature for yourself.



### Site Designations

There are a number of designations that a site can be given in the UK, providing different levels of protection. For example, 'statutory sites' are protected by law in the planning process, while 'non-statutory' sites are not, although they are still recognised as important and taken into account in planning. The different levels of designation are summarised below:

Designation		Description
Ramsar Site	Statutory international	An internationally important wetland site, designated under the RAMSAR CONVENTION.
Special Protection Area (SPA)	Statutory international	European designation for sites of international importance for birds.
Special Area of Conservation (SAC)	Statutory international	European protected site designated by the UK government. Sites of international importance under the EC HABITATS DIRECTIVE.
Site of Special Scientific Interest (SSSI)	Statutory national	Designated and protected by Natural England as the best sites for wildlife or geology in the country.
National Nature Reserve (NNR)	Statutory national	A site of national importance for nature conservation. Allow scientific research and most have at least some public access.
Local Nature Reserve (LNR)	Statutory local	A site of special nature conservation interest locally, designated by local authorities.
County Wildlife Site (CWS)	Non-statutory county	Sites outside of statutory protected areas but of wildlife importance at a county level.

Roydon Common, just outside of King's Lynn, is designated a **Ramsar site**, a **National Nature Reserve** and falls within a **Special Area of Conservation** (along with Dersingham Bog). It is also a **SSSI** (see pg 9).





## Norfolk Wildlife Trust Roydon Common National Nature Reserve – David North, NWT

Roydon Common is one of the largest and most important heathlands in Norfolk. The mix of habitats - wet heath, dry heath, mire and woodland - together with the landscape scale of the nature reserve make this a very important area for wildlife. The nature reserve was established by Norfolk Wildlife Trust in 1963 and in recognition of its national importance was declared a National Nature Reserve in 1995. The NNR area is 192 hectares making this not just the largest open heath in the Gaywood Valley but the largest remaining area of heathland and VALLEY MIRE in Norfolk.

### Rare and special wildlife:

The sweeping views across open heather-clad heath and primeval looking bogs can at first seem largely devoid of wildlife. However the rich mix of wet and dry habitats hides an astonishing diversity of birds, plants and animals, including many which are nationally rare. The mix of plant communities grading from wet acid heath, through waterlogged VALLEY MIRE to calcareous fen is considered one of the best examples of this vegetation in Britain. There are many uncommon plants including black bog-rush, marsh fern, cranberry, bog asphodel, common cotton-grass, carpets of sphagnum moss and all three species of sundew. Look out for the rare black darter dragonfly only known at a handful of sites in East Anglia. It may be seen on the wing between July and October and frequents the wettest areas of heath where bog asphodel grows. Rare breeding birds include nightjar and woodlark. Small pools are home to the very rare raft spider *Dolomedes fimbriatus*, Roydon Common being the only site for this species in East Anglia. This nature reserve also supports many less obvious groups of wildlife such as bees, dragonflies, beetles, reptiles, amphibians, moths and butterflies, often including rare heathland 'specialist' species. The reserve is a stronghold for adders, common lizards and minotaur beetles to name just a few heathland 'specials'.

### Protecting Roydon Common:

Much heathland in the Gaywood Valley (as is true for Norfolk and across England generally) has been lost through conversion to agriculture or forestry plantation or is being lost to neglect and lack of grazing (causing a process of natural succession from heathland to birch and oak woodland).

Norfolk Wildlife Trust has been managing Roydon Common since 1990 by active clearance of birch scrub and the use of grazing animals - sheep and more recently Dartmoor ponies are utilised (*please don't approach or try to feed the ponies*). Bracken control is also required. Much wardening and volunteer time goes into clearance of birch scrub. Monitoring of wildlife populations is also an important conservation tool and management of public access (and dogs) during the breeding season is essential.

The bog habitat at Roydon includes some of the most acidic and nitrogen-poor semi-natural vegetation in the county and is therefore especially sensitive to increases in acidity and nitrate levels. Threats to the reserve include atmospheric pollution, pollution of ground and surface waters, soil blow from nearby arable land and over- abstraction of ground water, so nutrient monitoring and water level management plans are important tools to maintain the habitats.

### Access:

The nature reserve is open every day from dawn to dusk. Entrance is via two car parks on the Rising Lodge to Grimston road. There are clearly way-marked trails to follow and good interpretation and route signs near both entrances. For further details, including a downloadable reserve leaflet visit [www.norfolkwildlifetrust.org.uk](http://www.norfolkwildlifetrust.org.uk)

## Sites of Special Scientific Interest

There are **four SSSIs** in the Gaywood Valley, covering an area of **291.4 hectares (ha)**. They are Bawsey, Roydon Common, Grimston Warren Pit and Leziate, Sugar & Derby Fens.

Bawsey SSSI is a nationally important geological site for understanding the development of the ANGLIAN GLACIATION in the region about 450000 years ago. The glacial sediments are key evidence for determining the origin of the GLACIAL TILL deposits of West Norfolk, and their relationships to the mainland till sheet of the region.

**This site is in Favourable\* condition (*Natural England, 2009*).**



Roydon Common (see also pg 8) is one of Britain's best examples of lowland mixed VALLEY MIRE, which supports many rare and locally uncommon plants. Also contains large areas of nationally important dry heathland. The site is home to many important bird and invertebrate species.

**The heathland part of this site is in Unfavourable Declining\* Condition (*Natural England, 2006*).**

**The fen and mire part of this site is in Unfavourable Recovering\* Condition (*Natural England, 2010*).**

Grimston Warren Pit is a nationally important geological site for understanding the Lower Cretaceous period in North Norfolk, and for shedding light on the environmental conditions which existed during Hauterivian times (136-130 million years ago).

**This site is in Favourable\* condition (*Natural England, 2010*).**



Leziate, Sugar and Derby Fens are remnants of a once extensive valley fen system. They contain a wide range of habitats – from dry chalky grassland to wet, boggy heath. Soil variations across the site give rise to diverse plant communities.

**This site is in Unfavourable Recovering\* condition (*Natural England 2009*)**

\* See 'SSSI Condition' box on page 10 for further information



### SSSI Condition

SSSIs are managed by Natural England who regularly assesses their condition under six categories:

**Favourable:** This means the site is being adequately conserved and is meeting its conservation objectives.

**Unfavourable Recovering:** All the necessary management measures are in place on the site and provided that this is sustained, favourable condition will be reached in time.

**Unfavourable No Change:** The site is not being conserved and is in poor, but not worsening condition. The longer it remains in this state the more difficult it is likely to be to achieve recovery.

**Unfavourable Declining:** The site condition is becoming progressively worse and changes to site management or external pressures are needed to reverse this.

**Part Destroyed:** Part of the special interest feature of the site has suffered lasting damage and will never recover.

**Destroyed:** All of the special interest feature of the site has suffered lasting damage and will never recover.

(Information taken from the Natural England website: <http://www.sssi.naturalengland.org.uk/special/sssi/glossary.cfm>)

## County Wildlife Sites

**County Wildlife Sites (CWS)** are particularly important sites for wildlife in Norfolk. There are **18** CWS in the Gaywood Valley, covering an area of **353.6 ha**. Many CWS are privately owned and do not allow public access. However **five** of them are publicly accessible (see pg 11).



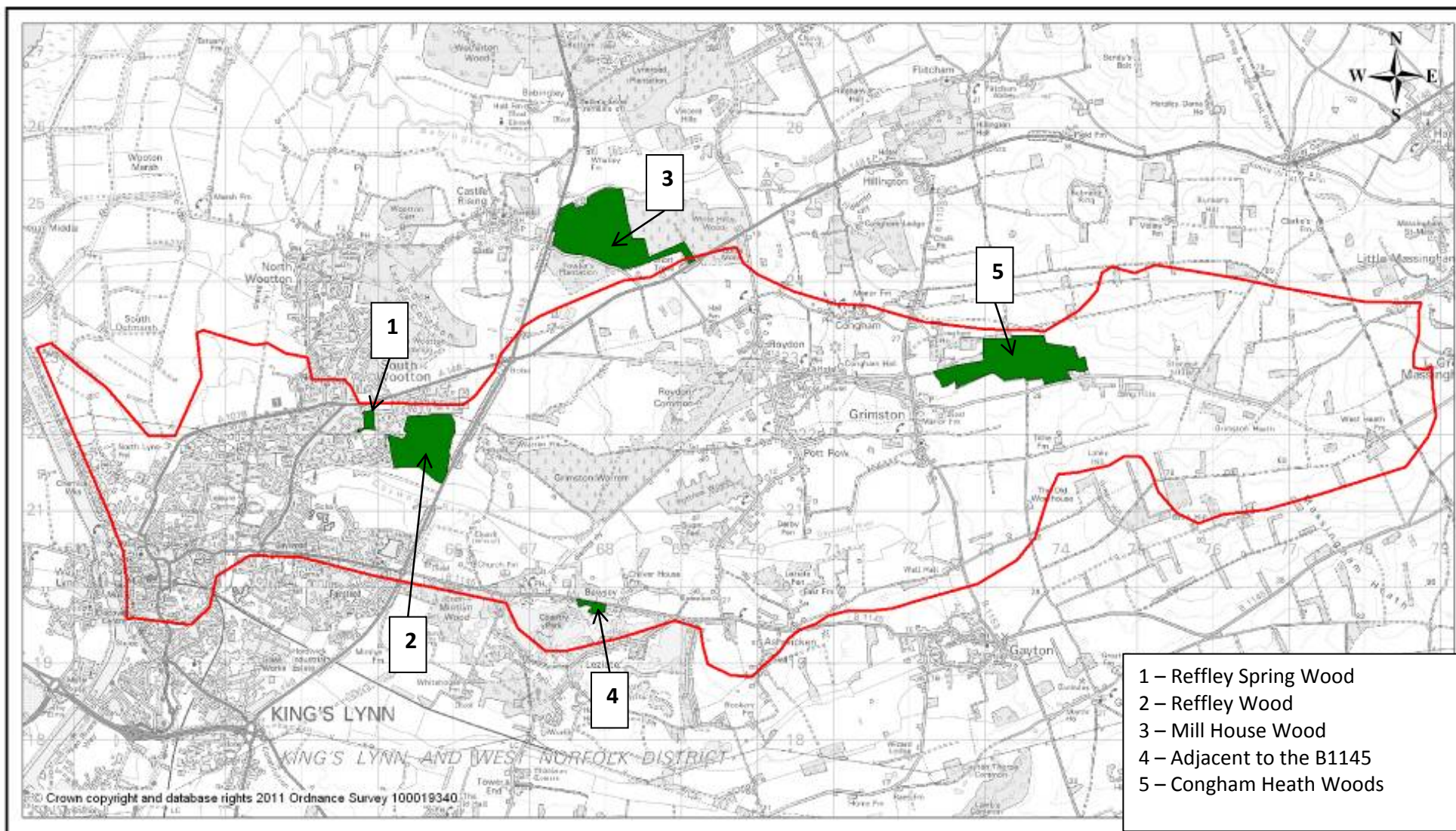
### County Wildlife Site Monitoring

County Wildlife Sites are monitored every year to determine what percentage are in Positive Conservation Management. The statistic for each district is reported to central government.

Being in Positive Conservation Management means that a site is actively being maintained or improved for the species for which is designated as important. This is often achieved through Environmental Stewardship schemes. Such schemes are run by Defra, and they encourage farmers and landowners to manage their land in a way that provides benefits to the environment alongside the traditional farming outputs such as crops and livestock. For more information on Environmental Stewardship in the Gaywood Valley see pg 24.

In the reporting year 2010/11, of the 18 County Wildlife Sites in and immediately adjacent to the Gaywood Valley **10** of them (**55.6%**) were in positive conservation management and **8** of them (**44.4%**) were not.





County Wildlife Sites with Public Access in the Gaywood Valley Project Area.



**1 – Reffley Spring Wood:** (3.6ha). A small area of semi-natural woodland, with a network of informal footpaths. Rich and varied plant life. The scarce aquatic plant Fine-leaved Water Dropwort has been found in a pond on the site. For more information on the fascinating history of Reffley Spring, see page 32.

**The wood is located off Reffley Lane, opposite the community centre.**

**2 – Reffley Wood:** (52.9ha). Ancient woodland site, owned and managed by the Woodland Trust. The wood contains an extensive network of rides and informal footpaths. It is currently being restored to deciduous woodland, having been planted with conifers in the 1950s and 60s. Several large oak trees can still be seen along the boundary of the wood, as can a huge veteran POLLARD near the northern edge.

**The main entrance to the wood is via Sandy Lane (off Grimston Road).**

**3 – Mill House Wood:** (90.2ha). A large area of woodland, mainly north of the Gaywood Valley project area. The scarce Bog Pondweed is found in some of the drainage ditches within the wood.

**The entrance to these woods is off an unnamed road linking the A148 and the A149 near to Castle Rising.**

**4 – Adjacent to the B1145:** (3.9ha). Possibly an old heathland, this is now an area of woodland with lots of silver birch trees. A recreational trail runs through the wood.

**This site can be accessed from Bawsey Country Park.**

**5 – Congham Heath Woods:** (77.9ha). This large woodland consists mainly of coniferous trees grown commercially for timber. It is privately owned by a forestry company, but there are several rides which have been opened up and waymarked for public access. This area used to be heathland, and some heathland vegetation still remains, particularly along the rides. Lily-of-the-Valley can be seen on a sloping ride in the south-west of the site.

**The woods can be accessed from a track off Congham Road in Grimston.**



## HABITATS AND LAND USE

A habitat is “an environment in which an organism or ecological community normally lives or occurs”. While some species are able to live in a variety of habitats, there are others that can only survive in a particular habitat type. Land use describes how the land is being utilised by people.

Different habitats also provide different ‘services’ to people. For example woodlands provide timber and help absorb CO<sub>2</sub>. Areas of grassland in built-up areas are important for flood prevention during heavy rain, as they allow the excess water to soak into the ground. Plus, getting out into nature helps people to unwind and relax from the stresses of daily life. This concept, known as ‘ECOSYSTEM Services’ is explained further below.



### ECOSYSTEM Services

As humans we gain many benefits from natural ECOSYSTEMS. These are known as **ECOSYSTEM services** and they can be divided into four categories:

*Provisioning* – nature providing us with food, fuel, fresh water, natural medicines and biochemicals.

*Regulating* – nature providing services such as pollination, pest control, water purification and climate regulation.

*Cultural* – the non-material benefits of nature, such as spiritual enrichment, recreation and aesthetic experiences.

*Supporting* – nature providing services which underpin all the other ECOSYSTEM services, such as soil creation, nutrient cycling and photosynthesis.

Over the last few years, more and more people have realised the importance of the natural world to the health, wellbeing and even the survival of humans. Many ECOSYSTEM services are being assigned monetary values, often based on how much it would cost to replace the service with a human-made alternative. This helps decision makers by expressing the value of an ECOSYSTEM in a tangible way, but can be controversial. Some people argue that the ‘intrinsic value’ of nature should be reason enough to conserve it.

## **Habitat and Land-Use Mapping**

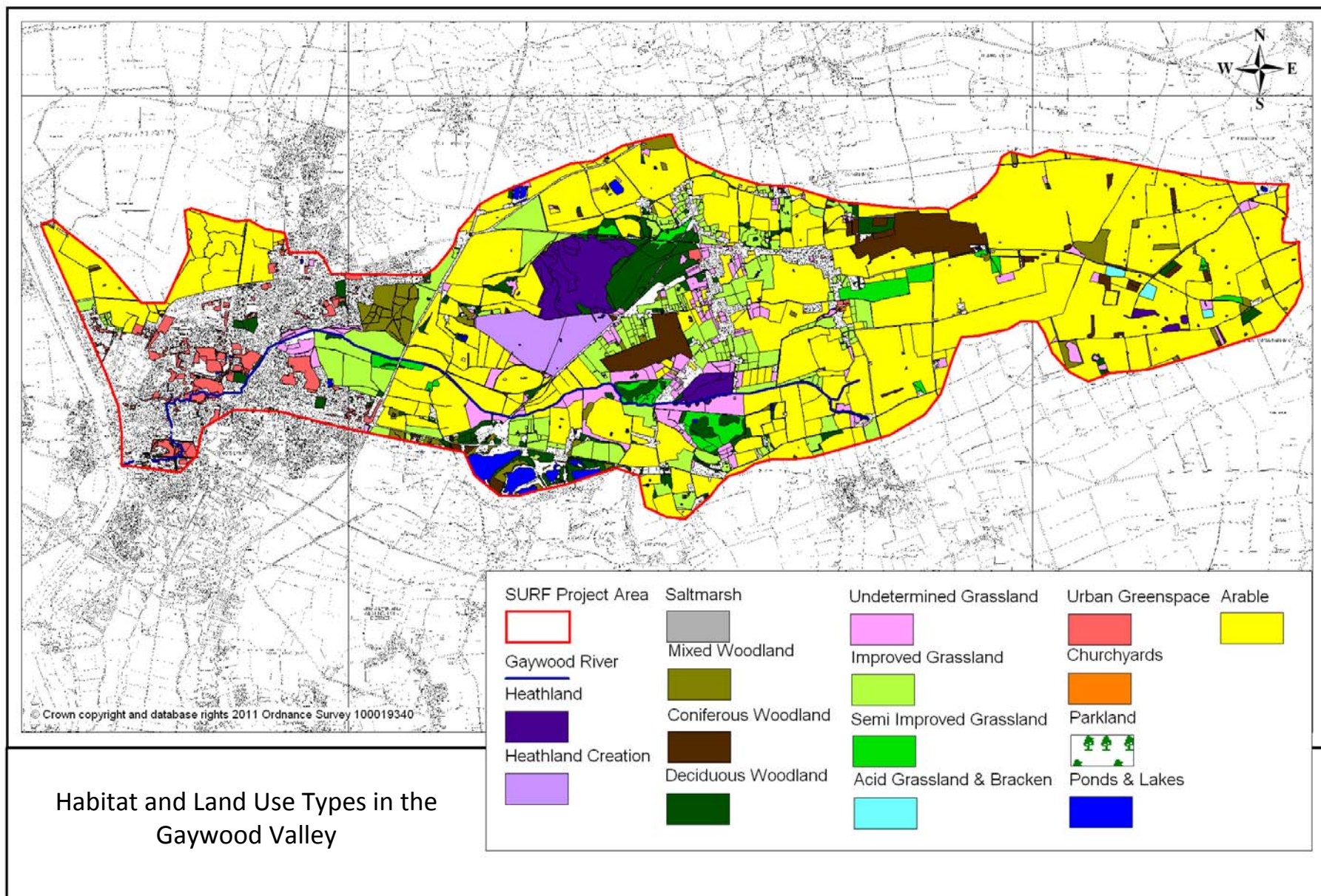
The map on page 17 shows the different habitat types (e.g. heathland, improved grassland, deciduous woodland etc) and land uses (e.g. arable land, parkland, churchyards etc) within the boundary of the Gaywood Valley Project.

The habitats and land-uses were mapped, wherever possible, from aerial photographs. Some habitats cannot be mapped in this way, so these areas were surveyed by an ecologist and mapped from their field notes. This included distinguishing between improved and semi-improved grassland types. Some areas of grassland could not be surveyed due to access restrictions and time constraints. These were mapped as 'undetermined grassland'.

The final map was used to determine the overall area of each habitat and land-use type in the Gaywood Valley. These areas can be compared over time to reveal losses or gains in particular habitats and land-uses.











There are three types of **woodland** in the Gaywood Valley – **deciduous (256ha; 4.48% of the Gaywood Valley project area)**, **coniferous (178ha; 3.12%)** and **mixed** (which contains both deciduous and coniferous trees, **133ha; 2.33%**). Reffley Wood is also an example of **ancient woodland**. This means the site has been woodland since at least 1600. Planting woodlands was much less common before that time, so it is therefore likely to have occurred naturally.



Deciduous woodland. Photo: Robin Stevenson



Coniferous woodland. Photo: Robin Stevenson



Photo: Andrina Walmsley

**Grassland** – Grassland areas in the Valley can also be divided into three categories: Semi-improved (**102ha; 1.79%**), improved (**482ha; 8.44%**) and urban greenspace (*see later*). Semi-improved grassland contains the highest number of species of the three, as it has had less fertiliser applied to it so nutrient levels are lower. This is better for wildlife. The improved grassland in the Gaywood Valley was mainly horse paddocks. The horse dung adds nutrients to the soil and as a result the

grassland contains fewer species. Some areas of grassland in the Valley have yet to be surveyed and are classed as ‘undetermined grassland’ (**223ha; 3.90%**).

**Heathland** is an important habitat in the Gaywood Valley. Heathland in Norfolk (and the whole UK) has declined massively in the last few decades. Heathland contains areas of heather and gorse, and is important for many rare INVERTEBRATES and birds such as nightjar and woodlark. The habitat has to be managed to keep it in good condition, and to stop scrub and bracken from spreading. There are **153ha (2.68% of the Gaywood Valley project area)** of heathland in the Gaywood Valley.



Photo: Ed Stocker



## **Norfolk Wildlife Trust Grimston Warren; the story of a heathland reborn – Bill Boyd & David North, NWT**

### **A long and fascinating history:**

Across England more than 75% of heathlands have been lost since 1800. Heathlands have very likely been present in the Gaywood Valley since the Neolithic and Bronze Ages, having developed on the acid sandy soils through a combination of grazing, burning and felling trees by early farmers. The remains of Bronze Age barrows can still be seen at Grimston Warren indicating human activity here at this time. The name Warren is a strong indication that in medieval times RABBIT WARRENING took place here. Right up to the twentieth century heathlands in the Gaywood Valley were valued by local people for a range of wild produce: gorse for kindling and creating hot fires for baking ovens, bracken for animal bedding, peat for fuel, sand for building work and mushrooms, rabbits, birds and deer for the pot. Local people also had rights to graze sheep, cattle, horses and geese on the common land. These traditional uses largely ceased after the Second World War and so during the 1960s and 1970s large areas of former heathland were planted with conifers.

### **Heathland Restoration:**

In 1999 Norfolk Wildlife Trust acquired its first area of land at Grimston Warren, a 40 hectare block of land, originally heathland but planted with conifers, adjacent to the NWT Roydon Common nature reserve. Work to clear the conifers began in 2000 and today the success of the restoration is clearly demonstrated: nightjars and woodlarks now nest among heathers and heathland plants, which germinated from long dormant seeds as soon as the conifers were felled and light was let in.

When the remaining much larger block of conifer plantation came up for sale in 2004, a major appeal was launched by NWT and, at a cost of more than £300,000 a further 69 hectares at Grimston Warren were secured. Restoration work necessitated building and then removing a road to allow the conifers to be felled, removal and grinding of stumps, the scraping off of leaf litter and the infilling of the forestry drains which had originally been created to enable tree planting to go ahead. The felling of conifers was completed in 2008 and 2009, transforming the landscape and opening up views not seen for decades. Work has continued since then to control bracken, birch and bramble and the signs of heathland recovery are already apparent.

### **Creating a Living Landscape in the Gaywood Valley:**

The work to restore, recreate and reconnect heathland in the Gaywood Valley in the Grimston Warren and Roydon areas is part of a national programme of Living Landscape projects by the Wildlife Trusts aimed at benefiting wildlife and people. Grimston Warren provides an excellent case study with ecosystem services being restored, new access for local people to enjoy wildlife and the unique landscape and populations of rare wildlife enhanced. Many species have benefited and recently natterjack toads have been introduced to the Grimston Warren heathland. There is still much further work to ensure the successful return of heathland plants but the introduction of Dartmoor ponies to graze on Grimston Warren is a major step forward.

### **Further information:**

More information on the Gaywood Valley Living Landscape project can be found at [www.norfolkwildlifetrust.org.uk](http://www.norfolkwildlifetrust.org.uk)

**Churchyards** provide important pockets of habitat, often in more built up areas. Many will not have had fertiliser or other treatments added, and contain a wonderful variety of wild flowers and plants. They can act as an oasis for birds and INVERTEBRATES, offering space and resources for them to shelter, feed and nest. They are also important greenspaces for people in an urban environment. There are **15** churchyards within the Gaywood Valley, covering an area of almost **4ha**.



Photo: Andrina Walmsley

**Ponds** are often overlooked but are vital habitats for many species, including protected species such as the Great-Crested Newt. There are **149** ponds and other standing water bodies (such as the lakes at Bawsey Country Park) within the Gaywood Valley.



Photo: © Richard Humphrey and licensed for reuse under this Creative Commons Licence.

**Urban Greenspace** includes areas such as parks and recreation grounds, playing fields, allotments and grass verges. Many of these areas will have been treated with fertilizers and other chemicals and be regularly mown short. While the value to wildlife of these improved grasslands is lower than for other more 'natural' habitats, that is not to say they are not important! Acting like 'GREEN LUNGS' in the urban landscape, urban greenspace improves the environment and lets people experience nature on their doorstep. The Gaywood valley contains **117ha (2.05% of the Gaywood Valley project area)** of urban greenspace.



Photo: Lizzy Carroll



## Urban Greenspace

### The Walks

A 17 hectare park in the heart of Kings Lynn, The Walks acts as a GREEN LUNG to the surrounding urban areas and is accessible to the whole community.

It is the only surviving 18<sup>th</sup> Century town walk in Norfolk and is a designated Grade II historic park. Developed over a number of centuries, The Walks was first designed as a promenade for the citizens of King's Lynn, away from the smell, grime and bustle of the town centre.

The highest point of the Walks is the Red Mount. In the late 15<sup>th</sup> Century, Red Mount Chapel acted as a wayside chapel for pilgrims on their way to the Shrine of Our Lady of Walsingham. Now a scheduled ancient monument and a Grade I listed building, the Chapel is open to visitors from April to September. It offers excellent views of the surrounding landscape.

The area also used to form part of the King's Lynn town defences. The historic earthworks in the centre of the park have been described by experts as 'part of one of the most complete systems of earthwork town defences in Eastern England.' The watercourses in The Walks were also part of the former town defences, as well as playing a role in flood defence.

(Information taken from <http://www.west-norfolk.gov.uk/Default.aspx?page=22720>)



The Walks. Photo: Gemma Clark

## Tower Gardens

Tower Gardens were laid out in 1911, to mark the coronation of King George V, on land formerly within the boundary of a friary established in 1230 by Franciscan Friars. The Gardens contain an iconic landmark of King's Lynn – Greyfriars Tower. This is the last significant remaining part of the Friary, and is a Grade I listed building and Scheduled Ancient Monument. One of only a handful of surviving remains of Franciscan Friaries in the country, the Tower was also used for centuries as a seamark for traders and sailors navigating the difficult waters of The Wash.

Tower Gardens, which also contain the King's Lynn war memorial, have been remodelled using hard landscaping to indicate the location and extent of features such as the nave, north aisle, chancel, cloister walks and chapter house of the friary.

The Tower and Gardens are open to the public and can be found off London Street between King's Lynn library and the Police Station.

(Information taken from <http://www.west-norfolk.gov.uk/default.aspx?page=21822>)

Greyfriars Tower. Photo: Gemma Clark



## Harding's Pits Doorstep Green

Doorstep Greens provide open space for wildlife and recreation to local communities. At 2.2 hectares, Harding's Pits is one of the largest in the country. Managed by local residents through the Harding's Pits Community Association, the Green was developed over a 3 year period from 2004.

The Green has easy access, and is located between the rivers Great Ouse and Nar, with the residential areas of Hillington Square to the north, The Friars to the east, South Lynn to the south and West Lynn and open country across the Ouse to the west.

The site of Harding's Pits has a fascinating and colourful history. In the 12<sup>th</sup> – 14<sup>th</sup> centuries it was part of land belonging to the Carmelite Monks, whose monastery gate still stands on the edge of the Friars area. By the 16<sup>th</sup> century the Green formed part of the defences of the walled town, before it played host to various industries, from brick kilns to timber yards to market gardens. During the First World War it was used for grazing horses requisitioned by the army from Norfolk farms before they were taken away by trains to pull the heavy guns on the Western Front.

The centrepiece of Harding's Pits Doorstep Green today is the large whale sculpture in the centre. This reflects the fact that during the 16<sup>th</sup> – 19<sup>th</sup> centuries the area close to the Green was home to the Lynn whaling industry.

Harding's Pits now acts as a GREEN LUNG for the surrounding community, as habitat for many plants, insects, birds and mammals and as a recreational space. There are regular volunteer working days and various guided wildlife walks throughout the year.

(See the website for more details: <http://www.hardings-pits.org.uk/news.html>)



## Agriculture

Arable areas can sometimes seem boring, bare and devoid of wildlife. However if they are managed well they support important species, some of which are found nowhere else.

There are **2913ha** of arable land in the Gaywood Valley – the largest area of any habitat or land-use type, and 50.98% of the total area of the Gaywood Valley project area. The average field size is **11.4ha** (ranging from 0.4ha – 124.9ha) Because of the large amount of land under their management, farmers have a big effect on wildlife - either positive or negative - depending on how they manage that land.

### Agri- Environment Schemes

Agri Environment Schemes reward farmers for managing parts of their land in a way that benefits the environment. There are **32** agreements currently operating in the Valley.

Environmental Stewardship is an agri-environment scheme run by Natural England with a number of different levels:

- *Entry Level Stewardship (ELS)* – **60ha** of land in the Valley is covered by Entry Level Stewardship or the organic equivalent. 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)* – **413ha** of land in the Valley is under Higher Level Stewardship. 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. There are **9** Countryside Stewardship Schemes still operating in the Gaywood Valley.

The English Woodland Grant Scheme (EWGS) is run by the Forestry Commission. It offers grants for landowners who want to create new woods, or manage woodlands in such a way that their environmental or social value is protected and enhanced. **284ha** of land in the Gaywood Valley is currently covered by this scheme.

There are **5** sites where habitat is being created under agri-environment schemes in the Gaywood Valley, and **9** sites where habitat is being restored. **7** of the schemes include options that will permit public access when completed.

(Information taken from <http://www.naturalengland.org.uk/ourwork/farming/funding/es/default.aspx> and <http://www.forestry.gov.uk/ewgs>)



## Farmland in the Gaywood Valley – Church Farm, Bawsey

‘Farming gets much easier when you stop fighting nature and start working with it’, says Gaywood Valley farmer Will Hancock.

His 303 hectare (ha) Church Farm, at Bawsey, is an excellent example of how the Higher Level Stewardship scheme (HLS) has enabled farmland adjacent to the River Gaywood to be converted from arable to a more environmentally friendly mixed farming system with grassland predominating.

The HLS agreement was approved in 2006 and 263ha of the 303ha farm was converted to grassland using a species rich seed mix including wild flowers and clover to fix nitrogen. The first cattle were introduced in 2007 and the farm now supports a herd of 200 Red Poll beef cattle, a hardy, traditional East Anglian breed. Beef sales are in part made through a local farm shop just a few miles away, supporting the local economy. Today 4ha of the farm are woodland and 36ha remain arable growing mainly potatoes and sugar beet. This arable land is rented to other farmers enabling Will to concentrate on developing his beef herd which now includes 90 breeding cows.

These changes have had huge benefits to local wildlife. Will comments, ‘Since we converted the farm from arable to grassland I have seen birds such as snipe, lapwing, skylarks, woodlarks and wagtails return to the farm. Yellowhammers are now a common sight around the farm.’ In the wintertime low lying fields next to the river are now allowed to become wet attracting flocks of duck such as teal and waders including curlew.

Will also takes great pride in looking after Bawsey Ruins which lie on high ground close to Church Farm. Recently he has started grazing the land around the ruins with Wiltshire Horn sheep which will help encourage a wild flower rich sward to develop here. The conversion of fields next to the river from arable to grassland brings wider benefits to the valley downstream reducing the run-off of nitrates into the river and helping improve its water quality. Otters and water voles both now use the river. Farmers like Will demonstrate that it is possible to run a commercial farm business while at the same time improving the landscape and encouraging wildlife.

### Important Areas for ARABLE PLANTS

Work has recently highlighted several areas within the Gaywood Valley that are particularly important for ARABLE PLANTS. ARABLE PLANTS are among the most threatened flora in the UK thanks to changes in farming methods. However by making a few changes to these methods, such as leaving field margins uncropped, rare plants can gain a foothold and start to thrive.

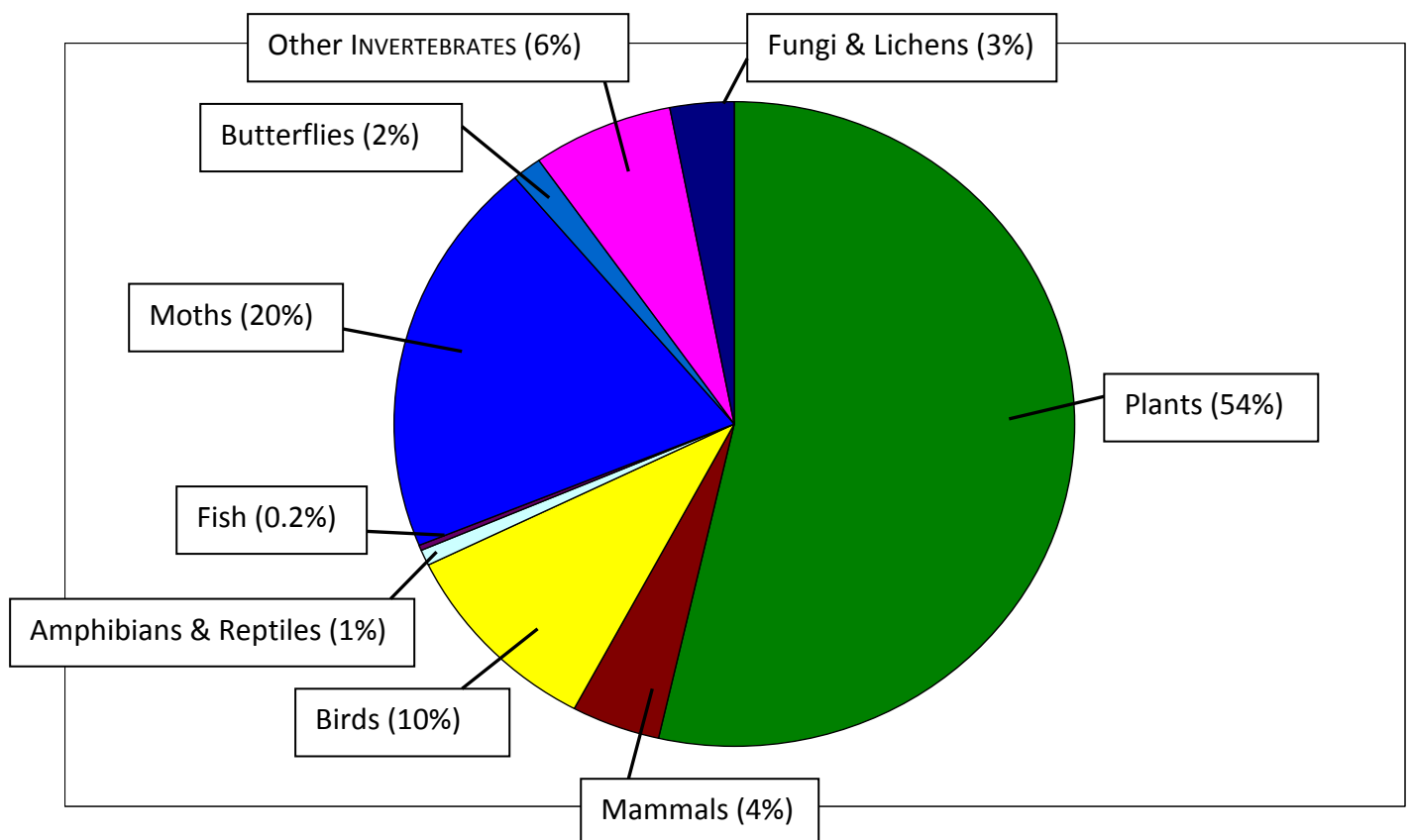
The project, undertaken by Norfolk Farming and Wildlife Advisory Group (FWAG), divided the county up into 2km squares and looked at the number of important ARABLE PLANTS within that square. **Seven** out of 22 squares covering the area of the Gaywood Valley were found to be **nationally important** for ARABLE PLANTS, with a further **eight** of **county importance**.

(Source: Walker, H, Cunningham, S, Ellis, B & Neal, S (2011). *Important Arable Plant Areas in Norfolk. A preliminary study.*)

## SPECIES

It might surprise you to know that literally thousands of species call the Gaywood Valley home. From minute slime moulds to the magnificent marsh harrier, from tiny ants to towering conifers, NBIS holds **21828** individual records of **3102** species from the Gaywood Valley.

This chart shows the percentage of the total number of species records made up by each group of species (plants, mammals, birds etc) recorded in the Gaywood Valley. [Based on the data held by Norfolk Biodiversity Information Service, Oct 2011]



You can see that just over half (54%) of all species recorded in the Valley are plants. This is perhaps unsurprising as there are a lot of species of plants. They are also a popular group to record – for one thing they don't move around when you are trying to identify them!

Moth records also make up a fairly large chunk of Gaywood Valley species records (20%). These are another popular group for recording as the survey methods mean the moths come to you, and large numbers of species can be recorded in a relatively short amount of time. For more information on surveying moths, see pg 30.

The least well recorded groups in terms of total numbers of records are fish and amphibians and reptiles. This is probably due to a combination of a much smaller number of species being found within the Gaywood Valley and the fact that these groups are more difficult to survey, due to their shyness or the fact that they live in habitats that are trickier to access, such as rivers.



## Rare Species

**262** of the species recorded in the Gaywood Valley since 1995 are what would be classed as '**Species of Conservation Concern**'. These are species that are rare or scarce, or that are protected at an international, European, national or local level. They include **27** species of plants and **11** species of mammals. It is important to know where these species are found in order to protect them from further decline. For more information on how you can get involved in species recording see pg 41.



Barn Owl. Photo: Peter Mallett

## Invasive Non-native Species



Himalayan Balsam. Photo: Mary Pipes

**Fourteen** of the species recorded in the Gaywood Valley are **invasive non-native species**. These have been introduced to the area by people and have a tendency to spread rapidly and cause problems for our native wildlife. Knowing where they are enables conservationists to keep a check on their distribution and intervene before they start causing a problem. The Norfolk Non-Native Species Initiative co-ordinates this work.

## Biodiversity Action Plan Priority species

Biodiversity Action Plan (BAP) Priority species are a priority for conservation in the UK based on their international importance, rapid decline and high risk of further decline and extinction. The list was revised in 2007 and now includes 1150 species.

**46** of the Species of Conservation Concern in the Gaywood Valley are **Biodiversity Action Plan Priority species**.



Hedgehog. Photo: David Gittens



## The Flora of the Gaywood Valley – Robin Stevenson, County Recorder

A wide variety of habitats and soil types make the Gaywood valley, for its size, very rich botanically.

Intensive surveys of King's Lynn have resulted in over 800 species of plants being recorded. Whilst this total includes a lot of aliens and garden escapes, it also includes many native plants, which have survived in woodlands and on small pieces of waste land. Reffley Wood, on the edge of the town, has good populations of plants such as Bluebells, Primrose and Ramsons (Wild Garlic), whilst in small fragments of woodland elsewhere in the town Wood Anemone and Goldilocks Buttercup can also be found. Amongst the most interesting plants to survive on fragments of wasteland are Grass Vetchling, Bee Orchid and Southern Marsh-orchid.

The main roads are salted in winter, allowing salt-tolerant coastal plants such as Sea Couch grass, Dittander and Danish Scurvygrass to establish themselves alongside.

Roydon Common, a National Nature Reserve with wide stretches of heather and bog contains a number of interesting flowering plants on the bog, such as Cranberry, but is mainly remarkable for the number and variety of mosses that grow on it. Close by are several Sites of Special Scientific Interest, at Sugar, Derby and Leziate Fens. Sugar and Derby Fen have rather acid vegetation with plants such as Devil's-bit Scabious and Sundew, whilst Leziate Fen has much chalkier soils, with plants such as Stemless Thistle and Fairy Flax.

Much of the rest of the valley is covered in arable fields. These sometimes contain rare weeds of cultivation such as Venus's-looking-glass and Night-flowering Catchfly. Along the many footpaths in the upper part of the Valley nice plants such as Wild Basil, Harebell, Rockrose and Dropwort can still be found.

The Gaywood River itself, and the various ditches feeding into it, provide habitat for water loving plants such as Wood Club-rush, which was thought to be extinct in the county until found recently on Derby Fen. Other attractive water plants in the Valley include Water Forget-me-not, Purple Loosestrife, Flowering Rush and Water Primrose.



Bee Orchid. Photo: Robin Stevenson



Harebell. Photo: Robin Stevenson



Ramsons. Photo: Robin Stevenson



Primrose. Photo: Robin Stevenson



Sundew. Photo: Robin Stevenson



## Other species 'highlights'

The magnificent **Red Kite** can sometimes be spotted soaring over the Gaywood Valley. On the verge of extinction in the 1960s due to persecution, reintroduction programmes begun in the 1990s have seen numbers rise and spread into new areas, including Norfolk. Look out for the reddish-brown colouration and deeply forked tail. [NBIS hold **14 records from the Gaywood Valley**].



A strange looking bird with an even stranger song, you will normally hear **Nightjar** rather than see them. They are NOCTURNAL and the male makes a curious 'churring' call between late April and September. Roydon Common, Grimston Warren and Massingham Heath are all good places for hearing nightjar. [NBIS hold **38 records from the Gaywood Valley**].

The **Turtle Dove** has recently been announced as the most threatened farmland bird in Britain. Changes to farming practices have resulted in large population declines due to reduced food and nest site availability. This delicate, pretty bird migrates to Britain for the summer all the way from sub-Saharan Africa where it spends the winter. In the Gaywood Valley it has been recorded at Massingham Heath, Roydon Common, Bawsey, Grimston Warren and Pott Row. [NBIS holds **48 records from the Gaywood Valley**].

One of Britain's most recognisable mammals (the only one with spines!) the **Hedgehog** can often be found in both urban and rural areas. Coming out at night to forage for food, a hedgehog can travel up to 2km in the process. They hibernate in the winter, emerging around Easter. Hedgehogs have been recorded in lots of locations in and around the Gaywood Valley, including Leziate, Grimston, South Wootton, Congham, Bawsey, Gaywood, Ashwicken and Gayton. [NBIS holds **140 records from the Gaywood Valley**].



Similar in appearance to a rabbit, the **Brown Hare** is larger with much longer hind legs and longer, black-tipped ears. Look out in spring for 'mad March hare' behaviour – this 'boxing' is actually unwilling females fending off amorous males! For most of the year hares are mainly NOCTURNAL and they have been recorded in many locations throughout the Valley, including Gayton, Little Massingham, Grimston, Derby Fen and Pott Row. [NBIS holds **77 records from the Gaywood Valley**].

For more information on recording the species you see in the Gaywood Valley see pg 41.

## Moths in the Valley

Most people appreciate the beauty of butterflies. Moths on the other hand don't always get such good press, often being thought of as small brown insects that eat clothes!



Elephant Hawk-moth. Photo: Chris Jones

There were **230** species of moth recorded in the Gaywood Valley in 2009. These included the spectacular Burnished Brass, with its metallic coloured forewings; the distinctive Angle Shades, which looks like a withered leaf when at rest; the pink and green Elephant Hawk-moth, so called because its caterpillar supposedly looks like an elephant's trunk; and the Merveille du Jour, one of our most beautiful moths,

with its attractive green colour and delicate black and white markings. Our largest resident hawk-moth, the Privet Hawk-moth has a distinctive pink and black striped body and the white males of the spooky-sounding Ghost Moth can sometimes be seen 'hovering' over grassy areas at dusk.

### How to See Moths

Most moths are NOCTURNAL, meaning they can be difficult to spot. Many of the moths that are recorded will have been caught at moth traps. This method of studying moths doesn't kill them – once identified the moths are released unharmed. The traps work by attracting moths using a bright light. Moths enter the trap and cannot escape. These traps are set at dusk, left at night and checked in the early morning. Alternatively, a bright light can be rigged up with a white sheet stretched out in front of it. Moths will be attracted to the light and will land on the sheet. They can then be caught for identification. As the moths aren't trapped, you need to stay by the sheet for the duration of the session.



Lime Hawk-moth. Photo: John Crouch



Poplar Hawk-moth. Photo: Chris Jones

Another moth attracting technique is known as 'sugaring'. A mixture is made using beer or stout, brown sugar and molasses. This is painted on to fence posts and other objects at dusk and acts as artificial nectar. Check the post regularly and catch any moths feeding there in a jar or pot for identification. A similar technique is 'wine roping'. Soak lengths of rope in a solution made of cheap red wine, sugar and molasses

and drape them over fences, bushes or low branches at dusk.

(Further information is available from the Norfolk Moths website:  
(<http://www.norfolkmoths.co.uk/index.php?NMS=yes&guides=1>))

## HISTORIC ENVIRONMENT

The historic environment encompasses all of the physical evidence and material remains that our ancestors have left on the landscape.

Within the Gaywood Valley there are records of **1240** historic monuments, **170** listed buildings, **315** 'find spots' (places where historic artefacts have been found) and **34** other historic buildings. These records range from the Paleolithic right through to World War II artefacts, with the majority being from the medieval and post medieval periods.

In 1908, a substantial number of Mesolithic flints along with a Neolithic flint arrowhead were discovered on a field at Bawsey. There are many more sites around the Bawsey, Leziate and Ashwicken areas that are of regional or even national importance for historic environment finds. These include:

- a Bronze Age bowl barrow at Leziate Heath, which is protected as a Scheduled Monument;
- the site of a Medieval Parish Church in Leziate, where building material, floor tiles and human bones have been uncovered;
- and pottery fragments dating from the Roman to Medieval periods discovered at the site of Leziate shrunken village (during Medieval times the village of Leziate was significantly larger, but had shrunk by the late 15<sup>th</sup> Century).

### Salterns and The Wash

'Salterns' are sites where marine salt was produced, and there are many examples from the Iron Age and Roman times around the coastline of The Wash. These indicate where the edge of the coastline would have been during those times.

The production of the marine salt involved evaporating sea water in troughs over a hearth, leaving salt crystals behind. Fragments of these troughs, along with the pedestals supporting them, were dumped in mounds. The material that these mounds contain creates a distinctive red-coloured soil mark when ploughed, so these mounds are known as 'red hills'.

## Bawsey Ruins

The ruins of St James' Church today stand isolated on a small hill just outside of King's Lynn. However a settlement surrounded the church back in the Iron Age (800BC – AD100), and became a large village by the mid-late Saxon period.

However the village was destroyed in the 16<sup>th</sup> century, when the landowner removed the tenants and tore down their houses in order to create more sheep pasture. The church itself was left intact but gradually fell into disrepair (although baptisms and burials continued to occur in the church until the 1770s).

Today, the church and the surrounding area are designated as a Scheduled Ancient Monument and the area has been the focus of significant archaeological interest. Only sections of the tower, nave and chancel still survive. However these are sufficient to tell experts that the main part of the church was built during Norman times, while some features of the tower are of a later date suggesting that it was built over a long period of time.

In terms of archaeological finds, the Bawsey settlement was one of the most prolific Middle Saxon sites in Norfolk. Additionally, in 1999 a Time Team dig at the site uncovered several important finds, including a human skeleton showing a significant skull injury from a sword!

Bawsey Ruins can be accessed via a track from Church Farm, which is off the B1145 between Queen Elizabeth Way and Bawsey Country Park.



Photo: Kirsty Webber-Walton

## Reffley Spring

Reffley Spring Wood is so named because of the mineral spring which used to rise up within it, producing iron-rich waters.

A group known as the Reffley Society, dating back to 1650, was originally a Royalist organisation, founded at the time of Cromwell, in the parish of Gaywood near King's Lynn. They met annually at Reffley Spring. At these meetings, each member of the "Reffley Brethren" was required to drink a punch made from various liquors mixed with the spring water.

The group built an obelisk and a small temple (the Reffley Temple) near to the spring. A more permanent temple was built in 1789, and enlarged in 1851. There was a commemorative plaque over the door, and the temple was guarded by a pair of stone sphinxes.

Unfortunately in more recent times the Temple fell into disuse, and was extensively vandalised in the 1970s. The building was demolished in 1982, with some contents being placed in the museum and some in private ownership.

## ENVIRONMENTAL QUALITY

Measuring the quality of the environment, such as that of air and water, gives an indication of how pleasant an environment the Gaywood Valley is to live in. It also means that where environmental quality levels are not as high as they should be, measures can be put in place to improve them.

### Air Quality

King's Lynn and West Norfolk Borough Council have to monitor air quality within the borough to assess it in relation to the national standards. Nitrogen dioxide (which mainly comes from road traffic) is one of the health-threatening chemicals measured. Diffusion tubes are attached to buildings at strategic points on main traffic routes in King's Lynn and analysed monthly for nitrogen dioxide (NO<sub>2</sub>) levels. The maximum annual average level specified in the National Air Quality Objectives is 40micrograms/m<sup>3</sup>.

Of the 28 diffusion tubes monitoring the NO<sub>2</sub> levels in King's Lynn in 2010, **11** showed annual average levels **above** the 40 micrograms/m<sup>3</sup> specified by the National Air Quality Objectives, and **17** were **under**. Where levels are found to exceed the national standard, an Air Quality Management Area is declared. An air quality action plan is then prepared, showing how concentrations of certain pollutants in the air can be reduced.

(Data from King's Lynn & West Norfolk Borough Council website: <http://www.west-norfolk.gov.uk/Default.aspx?page=24991>)

### Water Quality

The Environment Agency monitors the water quality of the Gaywood River in order to assess it against the standards set out in the Water Framework Directive. These standards allow the river to be classified as having 'High', 'Good', 'Moderate', 'Poor' or 'Bad' ecological status. 'High' means the conditions are largely undisturbed.

Monitoring takes into account the populations of macroinvertebrates present, the levels of dissolved oxygen, phosphate and ammonia in the water, and the pH of the river.

The current overall ecological status of the Gaywood River (based on data collected from 2006-2008) is **GOOD**.

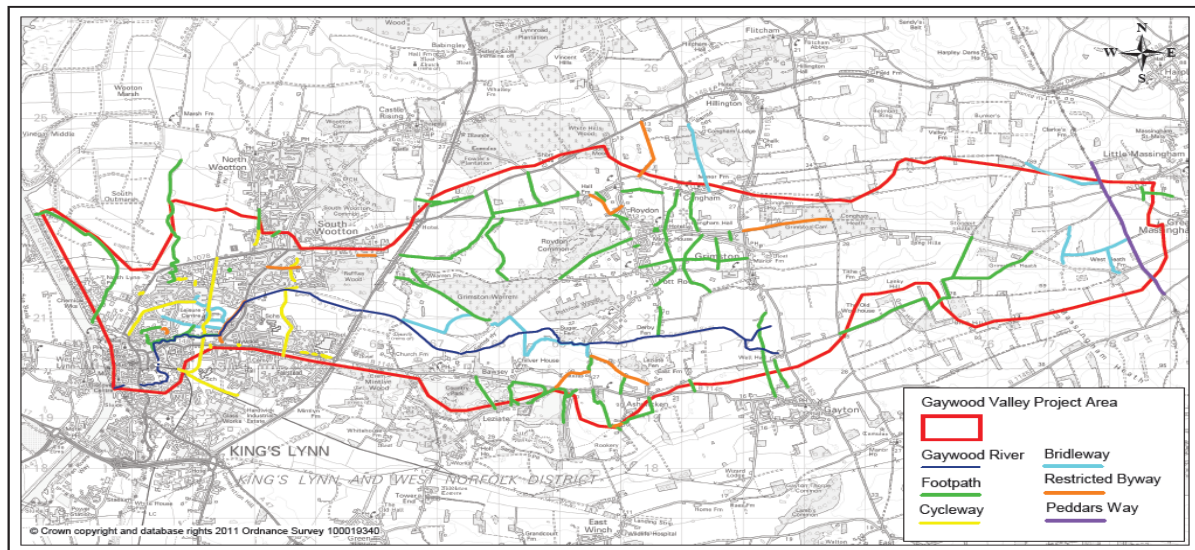
OVERALL BIOLOGICAL QUALITY	MACROPHYTES	OVERALL PHYSICO-CHEMICAL QUALITY	Ammonia	Dissolved Oxygen	pH	Phosphate
Good	Good	Good	High	Good	High	High

(Data provided by the Environment Agency)



## GETTING OUT IN THE VALLEY

There are lots of opportunities for getting out and enjoying the Gaywood Valley. You may not realise it, but there are almost **50km** of public footpaths within the Gaywood Valley, along with **12km** of bridleways, **8.4km** of cycleways and **7.4km** of restricted byways (restricted byways allow access on foot, horseback, cycling or any other non-mechanical vehicle).



A 3km section of the **Peddars Way** crosses the eastern end of the Gaywood Valley near Great and Little Massingham. This National Trail runs from Knettishall Heath Country Park in Suffolk right the way up to Holme on the North Norfolk Coast, where it meets the Norfolk Coast Path and continues to Cromer. The Peddars Way runs in pretty much a straight line. This is because it follows the route of an old Roman Road, which were built straight to make travelling along them as quick as possible.

Norfolk County Council has produced a series of booklets of circular walks, including one for King's Lynn. The booklet can be downloaded and printed from <http://www.countrysideaccess.norfolk.gov.uk/walk.aspx?id=84> and includes walks around South Quay and West Lynn, Reffley Wood, Leziate and Ashwicken and Roydon Common, as well as others a little further afield.



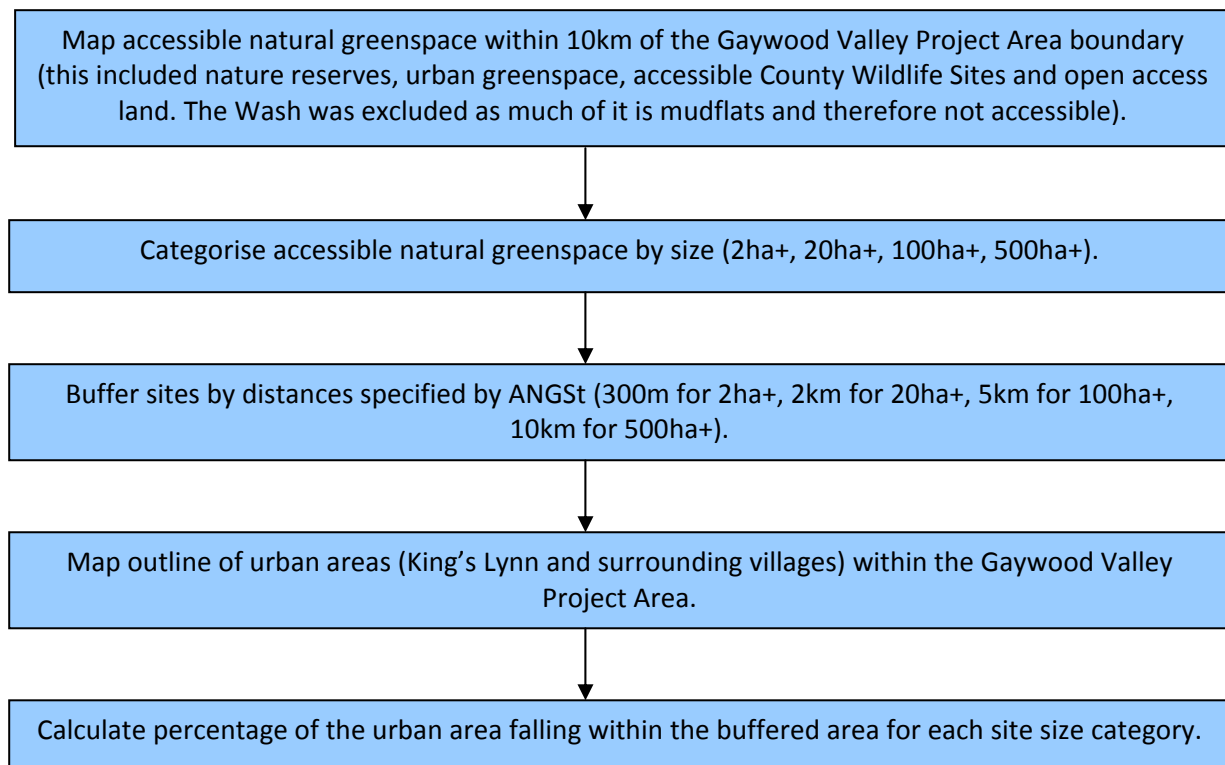
Also, four new circular walks boards have been installed in the villages of Roydon, Pott Row, Grimston and Congham (see left). These boards help you to explore these villages, their wildlife and history. The route is clearly marked and some of the routes have shorter alternatives.



## The Gaywood Valley and the Accessible Natural Greenspace Standard (ANGSt)

In the early 1990s, research into how far people would travel to visit the natural environment was used to develop the 'Accessible Natural Greenspace Standard' (ANGSt). Reviewed and improved in 2008 by Natural England, ANGSt sets out recommendations for the provision of accessible natural greenspaces within certain distances of people's homes. For example, ANGSt recommends that everyone should have an accessible natural greenspace of at least 2 hectares in size, within 300m (5 minutes walk) from home.

We used a modified method to assess the provision of Accessible Natural Greenspace to those living within the Gaywood Valley. The method used is summarised below:



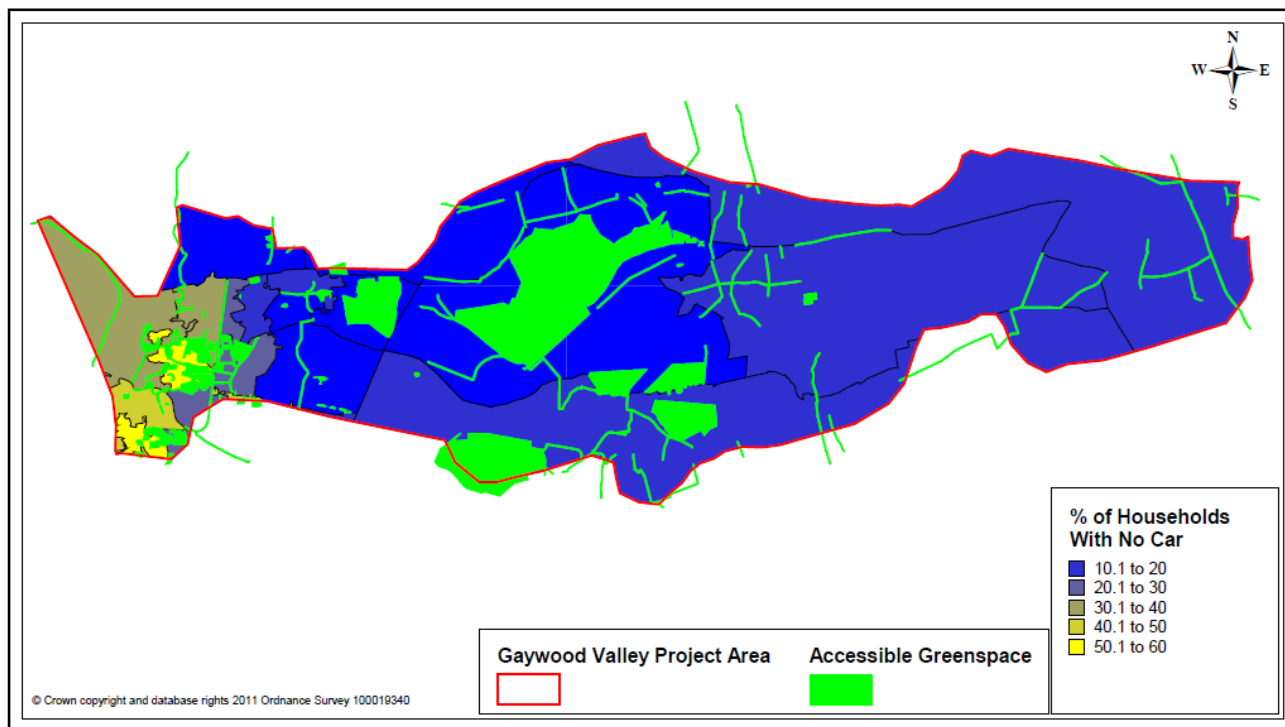
The analysis found that:

- **44.9%** of the urban area of the Gaywood Valley was within 300m of an accessible greenspace site of 2ha or more.
- **69.1%** of the urban area of the Gaywood Valley was within 2km of an accessible greenspace site of 20ha or more.
- **100%** of the urban area of the Gaywood Valley was within 5km of an accessible greenspace site of 100ha or more.
- **91.4%** of the urban area of the Gaywood Valley was within 10km of an accessible greenspace site of 500ha or more.

(Note that distances were calculated as the crow flies and actual travelling distances might be longer).

## Accessing the Valley

Whether or not someone has access to a car could potentially influence how easily they are able to access greenspace areas, particularly those further from where they live.



This map shows the percentage of households with no car (based on the 2001 census, data from the Norfolk Insights website) in relation to areas of accessible greenspace and public rights of way.

Bright blue areas have the *lowest* percentage of households with no car, while yellow areas have the *highest* percentage of households with no car. The green areas are accessible greenspace, including public rights of way.

### From the map we can see that:

The highest percentages of households without access to a car are in urban King's Lynn. Most of the larger accessible greenspace sites (such as Roydon Common, Grimston Warren, Leziate, Sugar & Derby Fens and Bawsey Country Park) are located in areas where more households own a car.

The A149 (Queen Elizabeth Way) is a large and busy road, and effectively cuts King's Lynn off from the rest of the Gaywood Valley (and therefore from much of the accessible greenspace). This makes it difficult for non-car users in King's Lynn to access the rest of the Valley.



## Norfolk Wildlife Trust, Living Landscapes Outreach in Schools - Joanne Godwin, Norfolk Wildlife Trust Education Team

### Aim

Norfolk Wildlife Trust education team seek to inspire people about the natural world through education and involvement. Our 'Living Landscapes' outreach work in schools aims is to raise awareness of the importance of the Gaywood Valley for its wildlife and habitats.

### Why Living Landscapes?

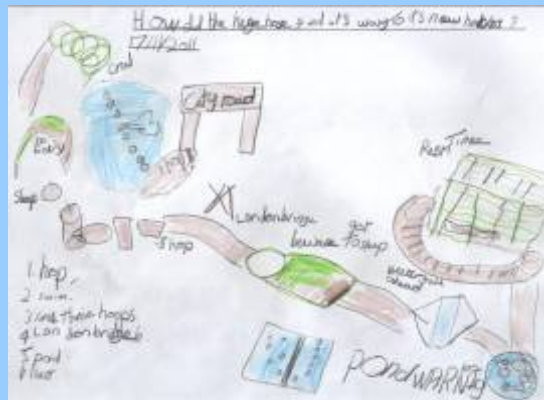
Faced with the uncertainties of climate change, the fragmentation of habitats is one of the main threats to wildlife. Our vision is to create a joined up landscape where species can expand their range and move through a wildlife-rich countryside along networks of linked habitat. Our aim is to **restore**, **recreate** and **reconnect** habitats so that wildlife has a better chance of surviving.

### Work in schools

We have worked with approximately 400 pupils from 6 schools across the Gaywood Valley. The session encourages pupils to take on the identity of an animal and think about what animals and plants need to survive. Pupils then work together using props to 'create' habitats that they would like to live in and think about the problems they would face if the habitats were interrupted by roads and buildings. A whole variety of objects from a duck's beak to hedgehog poo help to engage the pupils in finding more about the wildlife that lives in their local area.



Pupils from South Wootton Junior School engaged in the Living Landscapes session.



Follow up work done by pupils from South Wootton Junior.

## GETTING INVOLVED

If you want to do more than simply get outside and explore the Gaywood Valley, there are ways that you can become more involved, such as by joining a community conservation group, or recording the wildlife you encounter and make a positive contribution to species and habitat conservation.

### Community Conservation Groups

#### Hardings Pits Community Association

Hold workdays nearly every month, weather permitting. Work to keep the site safe and tidy, enhance wildlife habitats and try to encourage more types of wildlife. There are also occasional events and guided walks.

See their website for more information: <http://www.hardings-pits.org.uk/index.htm>

#### West Norfolk Conservation Volunteers

A small group who generally work on the local nature reserves in the King's Lynn area. A practical countryside conservation group, projects include tree planting, pond improvements, hedge planting, woodland and nature reserve work.

#### Reffley Wood Volunteer Group

See page 39.



Photo: Nicola Marray-Woods





## Reffley Wood Volunteer Group – Nicola Marray-Woods, Community Contractor

The Reffley Wood Volunteer Group (RWVG) was started in 2009 when the Woodland Trust, which owns Reffley Wood, obtained a Heritage Lottery Fund grant to fund capital works and community engagement. To this end they appointed myself, a local artist, as their Community Contractor. The success of the initial 2 year HLF project led the Woodland Trust to continue funding me for at least another 2 years.

I set up a programme of monthly maintenance and family events, inviting people to enjoy and contribute to the well-being of the woodland. The maintenance group works on coppicing, rhododendron removal and other tasks as requested by the Woodland Trust. There are usually between 5 -10 people at each session which are scheduled according to the availability of the volunteers and may be during the week or at weekends. Sessions usually last around 3 hours, in all weathers, with a break for tea and biscuits half-way through. New volunteers are always welcome. The latest schedule and contact details are posted on the website.

The family events take place once a month at the weekend or during school holidays and have included Easter Egg Hunts, Bear Hunts and even a Gruffalo Hunt. Creative activities using woodland materials also take place, including den building, and each year the group takes part in the national celebration of drawing - 'The Big Draw'. In 2011 a dragon was built out of a fallen tree incorporating a belly that could be crawled inside and giant wings out-stretched. Numbers at each event vary from around 20 – 90 depending on the weather and the activity. The group is always looking for new volunteers to help organise events.

In addition to the above activities I have also been engaging with local schools delivering informal play activities in the wood, initially funded by WREN. These allow children and staff to experience den building, exploration and exercise in an exciting outdoor environment and have been very positively received by the schools. A map illustrated with points of interest can be downloaded from the website.

For more information contact: Nicola Marray-Woods email [reffleywood@gmail.com](mailto:reffleywood@gmail.com) or check the website [www.reffleywood.co.uk](http://www.reffleywood.co.uk)



Den building in Reffley Wood.



Coppicing in Reffley Wood



## Plantation Wood – Nicola Marray-Woods, Community Contractor

At the beginning of 2011 I was appointed by the Woodland Trust to take on a similar community contractor role to the one I hold in Reffley Wood, in Plantation Wood. Supported by King's Lynn and West Norfolk Borough Council, the project is for 2 years initially. Plantation Wood is a much smaller woodland than Reffley and has suffered from anti-social behaviour in the past.

By working with local people and especially the local schools and church, the site is gradually being used more in a positive way. New paths, bridges and fences, funded by WREN, have improved access and appearances. There have been bulb and tree planting activities as well as fun activity days.

I am in the process of setting up an active hands-on group of local people and organisations and 2013 will see more maintenance and community events taking place. New volunteers, whether individuals or groups, are always welcome as are ideas for activities using the wood.

I can be contacted by email on [plantationwoodkl@gmail.com](mailto:plantationwoodkl@gmail.com)



Tree planting at Plantation Wood



Litter picking event at Plantation Wood

A total of **719** people attended activities run by Reffley Wood Volunteer Group in 2011. This includes **267** school pupils and staff. The highest monthly attendance was recorded in April (**68** attendees) and the average monthly attendance across the year was **38**.

**509** people attended events at Plantation Wood in 2011, including **159** from schools. The most popular event in terms of numbers was bulb planting, with **123** attendees.



## Species Recording

Norfolk Biodiversity Information Service (NBIS) collects, collates, manages and disseminates information on species, habitats, GEODIVERSITY and protected sites in Norfolk. The majority of species records come from volunteer recorders, who regularly send in details of the wildlife they have seen.

If you want to record wildlife in the Gaywood Valley and be part of improving our understanding of the Valley's environment, helping to protect it, you need to record the 'four Ws' – WHAT you saw, WHERE you saw it, WHEN you saw it and WHO you are.

If you're not 100% sure of what species it is, then please don't record it. Or send a photo to NBIS so they can check the identification.

You can email your records to [nbis@norfolk.gov.uk](mailto:nbis@norfolk.gov.uk) or why not use our online recording form at <http://www.nbis.org.uk/AllSpeciesSurvey>



The NBIS website All Species Survey (above) allows you to submit your wildlife records online.



## THE COUNTRYSIDE CODE

The countryside code helps members of the public to respect, protect and enjoy the countryside. It is mostly common sense, and by following it we can ensure that visiting the countryside is an enjoyable experience for everyone.

**Be safe, plan ahead and follow any signs:**

Even if you're just venturing out locally it is best to get the latest information on where you can and can't go. For example some areas of open land may be closed while work is carried out or during breeding seasons. Follow advice and local signs. Be prepared for the unexpected!

**Leave gates and property as you find them:**

Respect the working life of the countryside. Our actions can have an effect on people's livelihoods, our heritage and the safety and welfare of animals and ourselves.

**Protect plants and animals, and take your litter home:**

We have a responsibility to protect our countryside both now and for future generations. Make sure you don't harm animals, birds, plants or trees.

**Keep dogs under close control:**

The countryside is a great place to exercise dogs. However it is every owner's duty to ensure that their dog is not a danger or nuisance to farm animals, wildlife or other people.

**Consider other people:**

Showing consideration and respect for other people who live, work or use the countryside for recreation helps to make it a pleasant environment for everyone.

## GLOSSARY

**ANGLIAN GLACIATION** – An Ice Age period which occurred between 475,000 and 430,000 years ago.

**AQUIFER** – An underground layer of permeable rock, sediment or soil that contains water and releases it in appreciable amounts.

**ARABLE PLANTS** – Wild plants that are well adapted to grow in arable fields (generally along the field margins).

**BUFFER STRIPS** – Strips of land left uncultivated between cultivated land and features such as ponds, streams, ditches and woodland. They protect these features from fertiliser run-off from the cultivated land and can also provide extra habitat for wildlife if managed correctly. An Environmental Stewardship option.

**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.

**ECOSYSTEM** – A biological environment consisting of all the organisms living in a particular area, as well as the non-living components with which the organisms interact (such as air, soil, water and sunlight).

**ESCARPMENT** – Long steep slope or cliff, usually formed by erosion, separating two relatively level areas of differing heights.

**FREEZE-THAW ACTION** – Freezing and thawing processes in the ground in a cold, periglacial climate; this caused sandy and chalky soil layers to become sorted into patterns; these are visible today as cropmarks.

**GEODIVERSITY** – The variety of rocks, minerals, fossils, soils and landforms, and the natural processes that formed them.

**GLACIAL TILL** – Material deposited by a glacier. Content may include clay, sand, gravel and/or boulders.

**GREEN LUNG** – An area of greenspace within a town or city, so called because of the healthier environment it provides.

**INVERTEBRATES** – Animals without a backbone.

**MACROPHYTES** – Plants that are large enough to be seen with the naked eye. Generally refers to an aquatic plant.

**MEANDERS** – Naturally forming bends in a winding watercourse or river.

**NOCTURNAL** – Active at night.

**POLLARD** – The tradition of pollarding involves removing the upper branches of a tree to encourage new wood growth. On trees that have been previously pollarded and then just left, the regrowth forms thick, trunk-like branches.

**RABBIT WARRENING** – The raising of rabbits for their meat and fur.

**RAMSAR CONVENTION** – An international treaty for the conservation and sustainable use of wetlands.

**SPRING LINE** – A zone of springs in the landscape where percolating groundwater meets an underlying impermeable rock layer and emerges at the surface.

**VALLEY MIRE** – Area of water-logged deep peat at the bottom of a valley.

**WILD BIRD COVER** – An Environmental Stewardship option where land is planted specifically to provide cover for wild birds.



## USEFUL WEB LINKS

### General

Norfolk Biodiversity Information Service: [www.nbis.org.uk](http://www.nbis.org.uk)

Norfolk Biodiversity Partnership: [www.norfolkbiodiversity.org](http://www.norfolkbiodiversity.org)

Norfolk Non-native Species Initiative: <http://www.norfolkbiodiversity.org/nonnativespecies/>

Norfolk Wildlife Trust: <http://www.norfolkwildlifetrust.org.uk/>

### Geodiversity

Geological Society of Norfolk - <http://www.norfolkgeology.co.uk/>

Norfolk Geodiversity Partnership - <https://sites.google.com/site/norfolkgeodiversity>

More information about Norfolk's Geodiversity -  
<https://sites.google.com/site/norfolkgeodiversity/links>

### Important Sites

Norfolk Wildlife Trust Gaywood Valley Living Landscapes Project: [www.wildlifetrusts.org/living-landscape/schemes/gaywood-valley](http://www.wildlifetrusts.org/living-landscape/schemes/gaywood-valley)

Protected sites:  
<http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/default.aspx>

Roydon Common: <http://www.norfolkwildlifetrust.org.uk/Wildlife-in-Norfolk/Reserves/Roydon-Common.aspx>

### Habitats and Land-Use

Environmental Stewardship:  
<http://www.naturalengland.org.uk/ourwork/farming/funding/es/default.aspx>

Grimston Warren: <http://www.norfolkwildlifetrust.org.uk/Wildlife-in-Norfolk/Reserves/Grimston-Warren.aspx>

Hardings Pits: <http://www.hardings-pits.org.uk/index.htm>

Reffley Wood: <http://www.woodlandtrust.org.uk/en/our-woods/Pages/wood-details.aspx?wood=4279>

### Species

Biodiversity Action Plans: <http://jncc.defra.gov.uk/default.aspx?page=5155>

Information on moth trapping: <http://www.norfolkmoths.co.uk/?NMS=yes&guides=1>

The Flora of Kings Lynn: <http://www.nnns.org.uk/content/occasional-publications>

### Historic Environment

Reffley Spring: <http://www.usask.ca/ecs-at-uofs/spectacle/english/reffley.html>

### Environmental Quality

Air quality: <http://www.west-norfolk.gov.uk/Default.aspx?page=24609>

Water quality: <http://www.environment-agency.gov.uk/research/planning/33260.aspx>

### Getting Out in the Valley

Accessible Natural Greenspace Standard:

<http://www.naturalengland.org.uk/ourwork/enjoying/places/greenspace/greenspacestandards.aspx>

Norfolk Health, Heritage and Biodiversity Walks – King’s Lynn:

<http://www.countrysideaccess.norfolk.gov.uk/walk.aspx?id=84>

Peddars Way: <http://www.nationaltrail.co.uk/PeddarsWay/>

### Getting Involved in the Valley

NBIS Online Recording: <http://www.nbis.org.uk/AllSpeciesSurvey>

Reffley Wood Volunteer Group: [www.reffleywood.co.uk](http://www.reffleywood.co.uk)