

# The River Stiffkey

## A State of the Environment Report



**Produced by Norfolk Biodiversity Information  
Service**

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Report written by Lizzy Oddy, May 2014.

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## FOREWORD

The River Stiffkey (or Stewkey as is sometimes locally known) rises from its source from a small wooded lake in Swanton Novers. It then travels through and passes the villages of Fulmodeston, Great Snoring, East Barsham, North Barsham, Houghton St Giles and Little Walsingham.

Like many rivers its cultural and historical influence can still be seen, such as by the impressive priory in Walsingham and the Iron Age Hill Fort at Warham. These significant settlements were no doubt selected due to their proximity to the river which at the time would have transported goods and materials in flat bottomed barges.

The river itself is a very beautiful and ecologically rich habitat and has a good population of brown trout. It is also surrounded by some of the country's best arable farmland. Some of these farmers are working with the Norfolk Rivers Trust to help improve the quality of the river that flows through their land and these individuals are crucial players in the long term management and health of the river.

The river then runs through Great Walsingham, Wighton, Warham and Stiffkey before meeting the marshes at Blakeney. In total the river is around 18 miles long from source to sea.

The river is special in that it is a chalk river of which there are only around 200 in the world. It is surrounded by arable land, coniferous plantations, woodland and marshland.

Access to this river is relatively limited. However for wildlife and river enthusiasts there are spots at which you are guaranteed to see something special. Water voles and otters are regular visitors along with buzzards, osprey, barn owls and kingfishers. Trout and brook lamprey may be glimpsed in the clear waters. The river is also special for INVERTEBRATES and includes a wide selection of damselflies and dragonflies.

There are some good accessible points, including Public Rights of Way, a circular walk near the source at Swanton Novers, four fords at Houghton St Giles and three permissive walks at Binham that take in the breathtaking Priory. There is also the hill fort at Warham and a linear walk via Cockthorpe Common linking to the Norfolk Coast Path National Trail and following the river to the sea.

The 9 Chalk Rivers project recognises the important part the river plays in the wider area both for wildlife and people. The river has been modified (straightened) in places. It also suffers from silt build up from roads and adjacent farmland. Habitats need to be improved for species alongside the need for better flood storage solutions to safeguard communities. Enhancement work from the Norfolk Rivers Trust aims to improve functioning and quality for wildlife and people even more.

I hope you enjoy reading this guide to the river and please do see it for yourself. Norfolk is so lucky to be blessed with the presence of these amazing chalk rivers, which truly are gems of the natural world. However they need our attention if we want to safeguard their future so if you want to get involved with the work of the project then we would love to hear from you.

**Gemma Clark - 9 Chalk Rivers Project Community Involvement Officer**  
**<http://www.norfolkriverstrust.org/>**

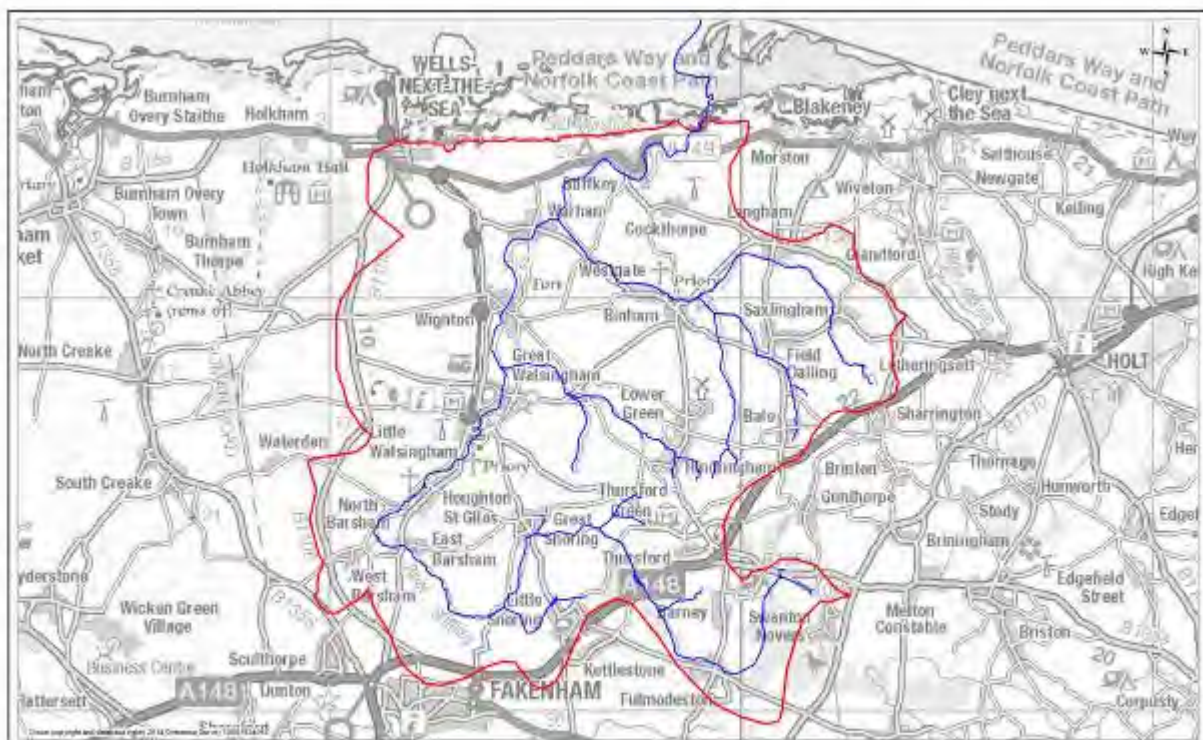


## WELCOME

The River Stiffkey is a North Norfolk chalk river which flows from its source at Swanton Novers to the marshes at Blakeney. Its catchment encompasses the area from Wells-next-the-Sea to Morston and south as far as Fakenham, covering an area of **14200 hectares**. The boundary of the catchment can be seen on the map below. Partly included in the Norfolk Coast Area of Outstanding Natural Beauty, the Stiffkey catchment area has some fantastic scenery, important wildlife and heritage sites and a great variety of habitats and land uses.

This report is written by Norfolk Biodiversity Information Service (NBIS) with contributions from people who are involved with the Stiffkey catchment. It brings together key information about the environment of the Stiffkey catchment, showcasing some of 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 Stiffkey area. The data included provide an important baseline to be compared against in the future, to show how the environment of the Stiffkey catchment is changing.

If, after reading this State of the Environment Report, you want to find out more about particular aspects of the Stiffkey catchment environment, useful web links are provided on page 38 for further information. Definitions of words in SMALL CAPITALS are given in the glossary on page 36.



The red outline on the map above shows the boundary of the River Stiffkey catchment area. The blue line shows the River Stiffkey and its tributaries.

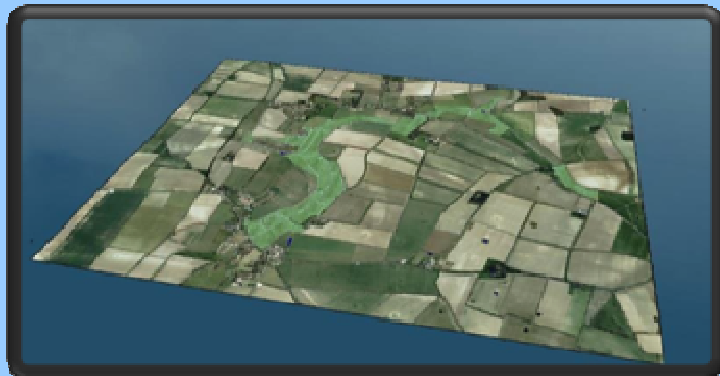
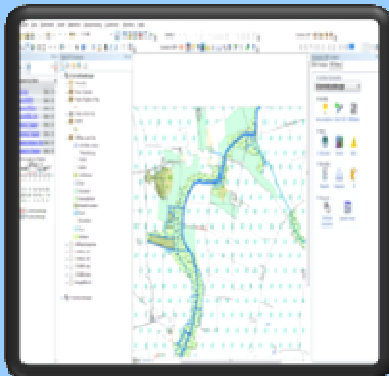


## A New Future for the Stiffkey – Sarah Taigel, UEA

Over the first half of 2013 a collaborative project between the Norfolk Rivers Trust and a team from the UEA successfully developed and trialled a unique approach to creating a catchment management plan for the Stiffkey. The most important catchment issues were seen to be:

- Silt runoff and build up requiring in river dredging
- Lack of river function due to CANALISATION and the river being detached from its floodplain
- Low flow, seasonal flooding and lack of buffering (no wetlands) impacting in-channel habitat
- Lack of access for community to enjoy the recreation potential of the river area

The UEA team created 3D computer models and maps representing the current landscape and a possible future landscape if the river was restored. During March 2013 these models and maps were shown at workshops for stakeholders to gather feedback on these issues within the Stiffkey catchment. Comments on the visualisations were displayed at a second open day in May 2013 to allow additional contact with a wider community focus.



Overall results indicated unanimous agreement that priority should be given to the reduction and mitigation of silt runoff into the river network. Improving the habitat along the river and reducing damaging flooding were considered equally important.

Feedback indicated a good response to the idea of restoring sections of the River Stiffkey. In particular comments were noted on the potential for improved water quality, better quality habitat, and the more natural aesthetics of the restored land form and possibility of improved access.

The Stiffkey visioning research has been developed as part of a PhD based at the UEA to develop tools to enable the visioning of future catchment landscapes. Sarah Taigel's research is being conducted as part of ESRC PhD Studentship No. ES/I022139/1



## LANDSCAPE AND GEODIVERSITY

GEODIVERSITY underpins the landscape of the Stiffkey catchment. Natural processes have been working 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. 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.

### County GEODIVERSITY Site

There is **one** County GEODIVERSITY Site (CGS) intersecting the Stiffkey catchment. A CGS is a tier above GEODIVERSITY Sites (see below) and has the same status in planning as a County Wildlife Site (see page 4) They are designated by the Norfolk CGS Group which is a sub-committee of the Geological Society of Norfolk.

**Rising Hill CGS** is a small private gravel pit, occasionally used by the owner for farm aggregates, ensuring fresh exposures. The main sections reveal tills, gravels and sands from the latter part of the ANGLIAN GLACIAL PERIOD.

(Information from CGS Citation)

### GEODIVERSITY Sites

These are non-designated sites of GEODIVERSITY interest determined by the Norfolk GEODIVERSITY Partnership. There are **eight** GEODIVERSITY sites within the Stiffkey catchment. These are:

Name	Description
Four Acre Plantation Pit	Disused gravel pit
Little Barney Brickworks	Former brickworks
Bilsey Hill Pit	Former quarry
Morston Cliff	Cliff
Cockthorpe Chalk Pit	Small exposure
Hall Farm Chalk Pit & Stiffkey Chalk Pit	Disused chalk pit
Wells Chalk Pit & Leicester Lime Company Pit	Disused chalk pit
Wells Railway Cutting	Old railway cutting used as a contractors yard

## IMPORTANT SITES

Did you know that there are sites within and immediately adjacent to the Stiffkey catchment 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.

## Statutory Sites adjacent to and in the Stiffkey Catchment

Site Type	Site Name	Area within Stiffkey catchment (ha)
Ramsar	North Norfolk Coast	Immediately adjacent
Special Area of Conservation	North Norfolk Coast	Immediately adjacent
Special Area of Conservation	The Wash & North Norfolk Coast	Immediately adjacent
Special Protection Area	N Norfolk Coast	Immediately adjacent
National Nature Reserve	Swanton Novers Wood	82.80
National Nature Reserve	Blakeney	Immediately adjacent
National Nature Reserve	Holkham	Immediately adjacent
Local Nature Reserve	Hindringham Meadows	6.82



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## Sites of Special Scientific Interest

There are **eight SSSIs** in the Stiffkey catchment, covering an area of **564.4 hectares (ha)**. They are Bilsey Hill, Cockthorpe Common, Stiffkey; Morston Cliff; North Norfolk Coast; Stiffkey Valley; Swanton Novers Wood; Warham Camp and Wells Chalk Pit.

**Bilsey Hill** is a rare 20m deep exposure, important for showing the composition of the till plain of north Norfolk.

**Cockthorpe Common, Stiffkey** is one of the best remaining examples of chalk downland in Norfolk. Its steep slopes support a diverse chalk grassland flora and hawthorn scrub. A small area of elm woodland and a disused pit provide the site with additional interest.

**Morston Cliff** is a “key PLEISTOCENE site providing a view of what is probably the only INTERGLACIAL raised-beach deposit in East Anglia”.

The **North Norfolk Coast SSSI** comprises a wide range of coastal habitats and species, with many rare and local species occurring. The area “constitutes one of the largest expanses of undeveloped coastal habitat of its type in Europe.” Part of this SSSI falls within the Stiffkey catchment.



**Stiffkey Valley** comprises a range of wetland habitats and supports important assemblages of birds as well as nationally important populations of breeding avocet.

**Swanton Novers Wood** comprises four blocks of ancient woodland, all likely to be of primary origin. They form what is considered one of the most important groups of woods in

the country, as they include many woodland stand-types, several of which are nationally uncommon. The flora, BRYOPHYTES, fungi and lichens are diverse and include uncommon species. Plus the breeding birds and INVERTEBRATES are also diverse and interesting.

**Warham Camp** is an old Iron Age fort with steep banks and ditches supporting a diverse chalk grassland flora. There are several locally uncommon plants and butterflies include Common Blue, Brown Argus and Chalk Hill Blue.

**Wells Chalk Pit** is “an occasionally worked quarry”. The site is developing a diverse flora with “exceptionally large populations of orchids” on the more undisturbed areas. Breeding birds at the site include lapwing, sand martin and lesser whitethroat.



(Information and quotes taken from Natural England citations)



### 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>)

SSSI	Condition*	Last Monitored
Bilsey Hill	Favourable	Feb 2014
Cockthorpe Common, Stiffkey	Unfavourable Recovering	Sep 2013
Morston Cliff	Unfavourable Recovering	Mar 2010
North Norfolk Coast	Favourable – 68 units Unfavourable Recovering – 2 units	Various dates
Stiffkey Valley	Unfavourable Recovering	Sep 2013
Swanton Novers Wood	Unfavourable Recovering	Sep 2011 & Oct 2013
Warham Camp	Favourable	July 2009
Wells Chalk Pit	Unfavourable Recovering	July 2010

\* See 'SSSI Condition' box above for further information

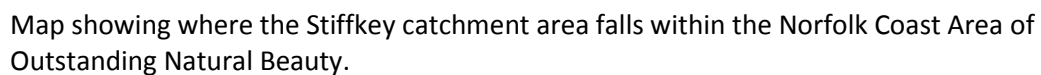
(Information taken from <http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm>)





The AONB contains habitats including sand and mud flats, dunes, shingle, saltmarsh, reedbeds, grazing marsh and soft cliffs. The natural beauty of the area includes its distinctive wildlife and cultural heritage as well as the scenic beauty of the landscape.

(Information and quotes from: <http://www.norfolkcoastaonb.org.uk/index.php>)



## County Wildlife Sites

**County Wildlife Sites (CWS)** are particularly important sites for wildlife in Norfolk. While not protected by law, they are taken into account in the planning process. There are **32** CWS in the Stiffkey catchment, covering an area of **151.29 ha**. Many CWS are privately owned and do not allow public access. However **one** of them is publicly accessible (see pg 11).



### County Wildlife Site Monitoring

County Wildlife Sites are monitored every year to determine what percentage of them is 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 (see page 19 for more information on Environmental Stewardship).

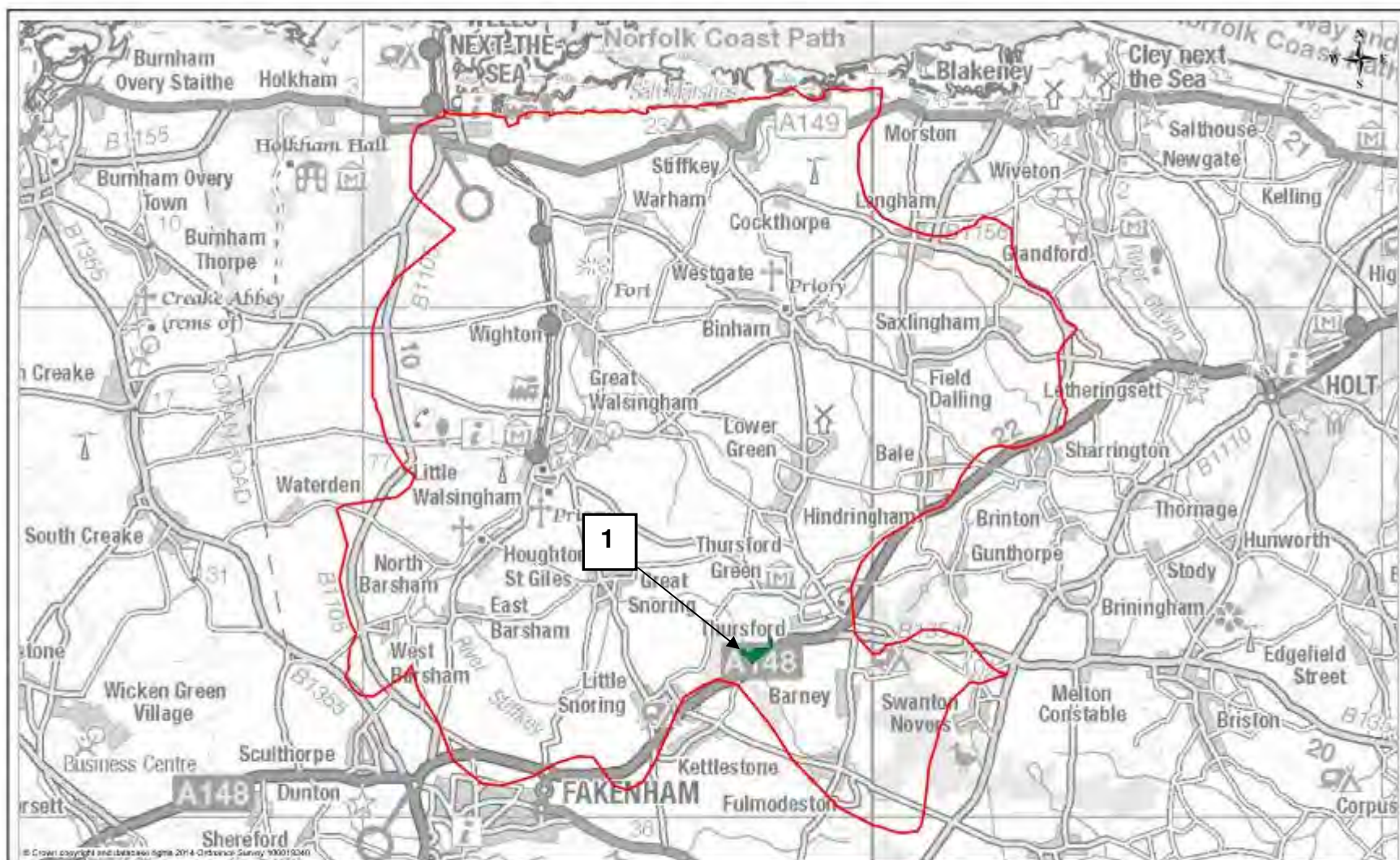
In the reporting year 2012/13, of the 32 County Wildlife Sites within or overlapping the Stiffkey catchment **24** of them (**75%**) were in positive conservation management and **8** of them (**25%**) were not.



Thursford Wood County Wildlife Site © [Evelyn Simak](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)







County Wildlife Site with public access within the Stiffkey catchment

1 – Thursford Woods

**1 – Thursford Woods:** (10.5ha). A Norfolk Wildlife Trust nature reserve of three distinct woodland types: pasture woodland with very large oak pollards; ALDER CARR; and an area of maiden trees. The site also contains ponds, streams and seepage areas. The western pond is fairly deep and has abundant water with a central island of willows. The eastern pond is largely silted up and contains stands of great willowherb along with willow. As well as containing some of the oldest oak trees in Norfolk (some thought to be over 500 years old), Thursford Wood is also a great place to see bluebells in spring.

**NWT Thursford Wood is located 5km north east of Fakenham. Leave Fakenham on the A148 road towards Cromer. Cross the river Stiffkey and up the small hill. The car park is on the left.**

(Information from County Wildlife Site citations and Norfolk Wildlife Trust website)



Old oak tree at Thursford Woods © [Evelyn Simak](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)

**Roadside Nature Reserves (RNRs)** are stretches of road verge designated for their ecological interest. Many contain the last remaining fragments of old unimproved grassland that was once widespread, and often hold rare or unusual plants. The RNR scheme is run by Norfolk County Council, and although the designation is non-statutory, the RNRs are individually managed to protect the plants and animals living there. There are **four** RNRs within the Stiffkey catchment covering a total length of over **700m**. These are at Hindringham, Wells, Binham and Barsham. The RNR at Binham is particularly unusual as it comprises a stretch of the boundary wall of Binham Priory, which has the nationally scarce plant Wall Bedstraw growing on it.

(Information from Roadside Nature Reserve citations)

## 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 goods such as 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 15 shows the different habitat types (e.g. saltmarsh, neutral grassland, deciduous woodland etc) and land uses (e.g. arable land, playing fields, churchyards etc) within the boundary of the Stiffkey catchment.

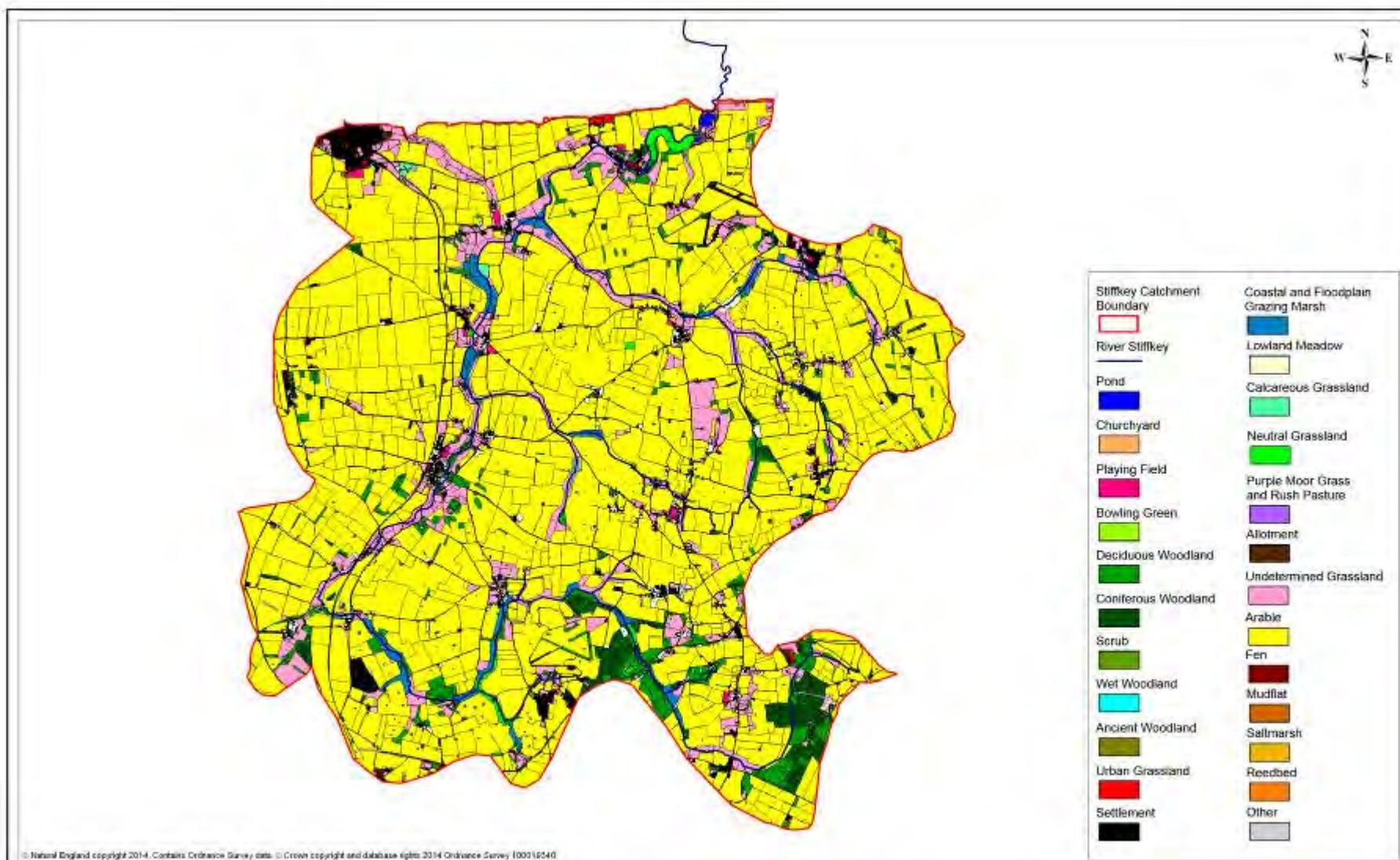
The habitats and land uses were mapped from a combination of aerial photographs and from the Natural England Priority Habitat Inventory information held by NBIS. In some cases, exact habitat types could not be determined using these methods e.g. grassland types not included in the Natural England Priority Habitat Inventories. In this case, the area was mapped as 'undetermined grassland'.

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



Pond at Langham © Norfolk Rivers Trust





## Habitats and Land-Use in the Stiffkey Catchment





**Grassland** – There are a number of types of grassland within the Stiffkey catchment area. These include **Calcareous Grassland (30.8ha, 0.2% of total area)**, **Neutral Grassland (including Lowland Meadows, 105.9ha, approx 0.75% of total area)** and **Coastal and Floodplain Grazing Marsh (165.3ha, approx 1.2% of total area)**. These are all Biodiversity Action Plan habitats. Calcareous grassland is found on base rich soils and often supports a very rich flora, including nationally rare or scarce species (UKBAP 2007). Unimproved neutral grassland can be found on a wide variety of sites – from grazed or hay-cut fields to recreation grounds and churchyards. The habitat has undergone a dramatic decline over the last century, mainly due to changes in farming methods.

Coastal and Floodplain Grazing Marsh is defined as “periodically inundated pasture, or meadow with ditches which maintain the water levels, containing standing brackish or fresh water” (UKBAP 2007). It is usually grazed, or cut for hay or silage, and is important for both breeding and wintering birds. Much of the habitat and land

use mapping for the area was completed using aerial photos,

which doesn’t allow for different grassland types to be determined. Therefore any grassland areas not included in the Natural England Priority Habitat Inventory Mapping have been classified as **Undetermined Grassland (1193.1ha, 8.4% of total area)**.



Floodplain grazing marsh by the River Stiffkey © [N Chadwick](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)

**Woodland** – The Stiffkey Catchment contains both **deciduous (573.1ha, 4.04% of total area)** and **coniferous woodland (257.1ha, 1.8% of total area)**. Some of the woodlands are also classified as ancient woodland or wet woodland.

**Wet woodland (33.6ha; 0.24% of total area)** is important for many species. The high humidity levels are ideal for mosses to grow. Deadwood in association with water provides a unique habitat important for many invertebrates.



Oak and sycamore woodland south of Stiffkey Marshes © [N Chadwick](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)

**Ancient woodland (33.3ha; 0.23% of total area)** is defined as an area that has been continuously wooded since at least 1600AD. It can include both semi-natural woodland and plantations on ancient woodland sites. Ancient woodland is rare – it is thought to cover just 3% of England’s land area. It is also exceptionally rich in wildlife, and can act as a reservoir from which wildlife can spread out into new woodlands.

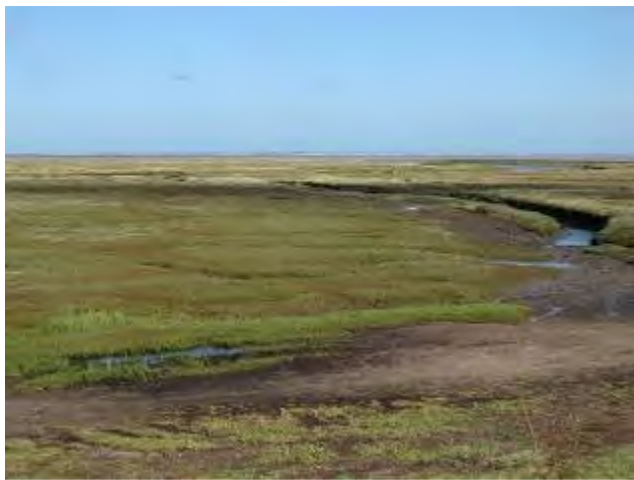


**Mudflats (0.22ha; 0.002% of total area)** – This intertidal habitat (mainly found just outside of the catchment area) consists of deposited clay and silt sediments. It is commonly found between subtidal channels and saltmarsh. Mudflats are known for their high productivity but relatively low diversity of species present. They can support large numbers of predatory birds and fish.



Mudflats at Stiffkey saltmarsh © [Evelyn Simak](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)

**Saltmarsh (2.07ha; 0.015% of total area)** – Coastal saltmarsh (mostly found just outside the catchment area) consists of the upper, vegetated portions of intertidal mudflats. The vegetation on a saltmarsh is limited to a low number of salt-tolerant species which are adapted to regular immersion by the tides. They act as an important resource for wading birds and wildfowl, and provide sheltered nursery sites for several species of fish. Since medieval times, many saltmarshes have been converted to agricultural land.



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Stiffkey saltmarsh © [Phil Champion](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)

(Information taken from UK Biodiversity Action Plan documents)

**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 over **11000ha** of arable land in the Stiffkey catchment – by far the largest area of any habitat or land-use type, at **77.75%** of the total area of the catchment.

### Agri- Environment Schemes

Agri Environment Schemes reward farmers for managing parts of their land in a way that benefits the environment. Environmental Stewardship is an agri-environment scheme run by Natural England. There are **631** parcels of land currently under Environmental Stewardship in the Stiffkey catchment. There are different levels of Environmental Stewardship:

- *Entry Level Stewardship (ELS)* – **71 land parcels** in the Stiffkey catchment are 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)* – **560 land parcels** in the Stiffkey catchment are under Higher Level Stewardship. This is a competitive scheme that involves more complex management options and aims to provide more wide ranging environmental benefits.

Current Environmental Stewardship options in place within the Stiffkey catchment include:

- Management of woodland edges
- Field corner management
- Protection of in-field trees
- Low input permanent grassland
- Wet grassland creation for wading birds and wildfowl
- Arable reversion by natural regeneration

Environmental Stewardship is now coming to an end, and will be replaced by the New Environmental Land Management Scheme (NELMS).

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



## Stiffkey Saltmarsh – Dr Hannah Mossman & Prof Anthony Davy, UEA

Stiffkey is best known for its infamous rector from the 1930s, Harold Davidson, and its distinctive cockles ('Stewkey Blues'). Fewer people may realize that it is home to one of the finest salt marshes in northern Europe. A beautifully stark landscape harbours important biodiversity, with a plethora of highly salt-tolerant plant species and fluctuating populations of migratory birds.

The marsh is divided into ecologically distinct upper and lower areas by a hooked shingle ridge, similar in structure to the one at nearby Blakeney Point. Both marshes have formed by the build-up of marine sediments deposited by the tides. Colonization by salt-tolerant plants helps to trap and stabilize the sediments – part of a process called ecological succession, which sees a sequence of species successively adapted to higher, better-drained elevations on the marsh. The upper marsh, landward of the ridge, is ancient, having been formed when the coastline stabilized in its current position after the rapid rise in sea-level associated with the end of the last glaciation, some 6-7000 years ago. The lower marsh, seaward of the ridge, is much younger, probably having developed on the sand flats in the last few hundred years, and is drained by small creeks directly to the sea.

Stiffkey marsh has now been a focus of research by ecologists and environmental scientists from the University of East Anglia for nearly 40 years. Currently, we are working to better understand the factors which determine the distributions of salt marsh plants. We have known for some time that species such as Sea Purslane (*Atriplex*

*portulacoides*), a large bluish-green shrub, is dominant at higher elevations and on raised creek banks, whilst other species such as annual Samphire (*Salicornia*) are often found lower on the marsh. However, with the development of new technology a greater understanding of this complex environment is possible. For example, new satellite technology (GPS) now allows us to quickly and very accurately measure elevation, and the development of small pressure sensors allows us to directly calculate how frequently, and for how long, plants are inundated by the tide at different areas of the marsh.

The fascinating evolutionary adaptations of salt-marsh plants to the twin challenges of salinity and waterlogging, manifested in features ranging from biochemistry to life-history, have been dissected at Stiffkey. Just to survive there, these plants need to tolerate salt, avoid water stress and oxygenate their waterlogged roots. Apart from its value for biodiversity conservation, amenity and recreation, Stiffkey marsh has been aptly described as a field laboratory.

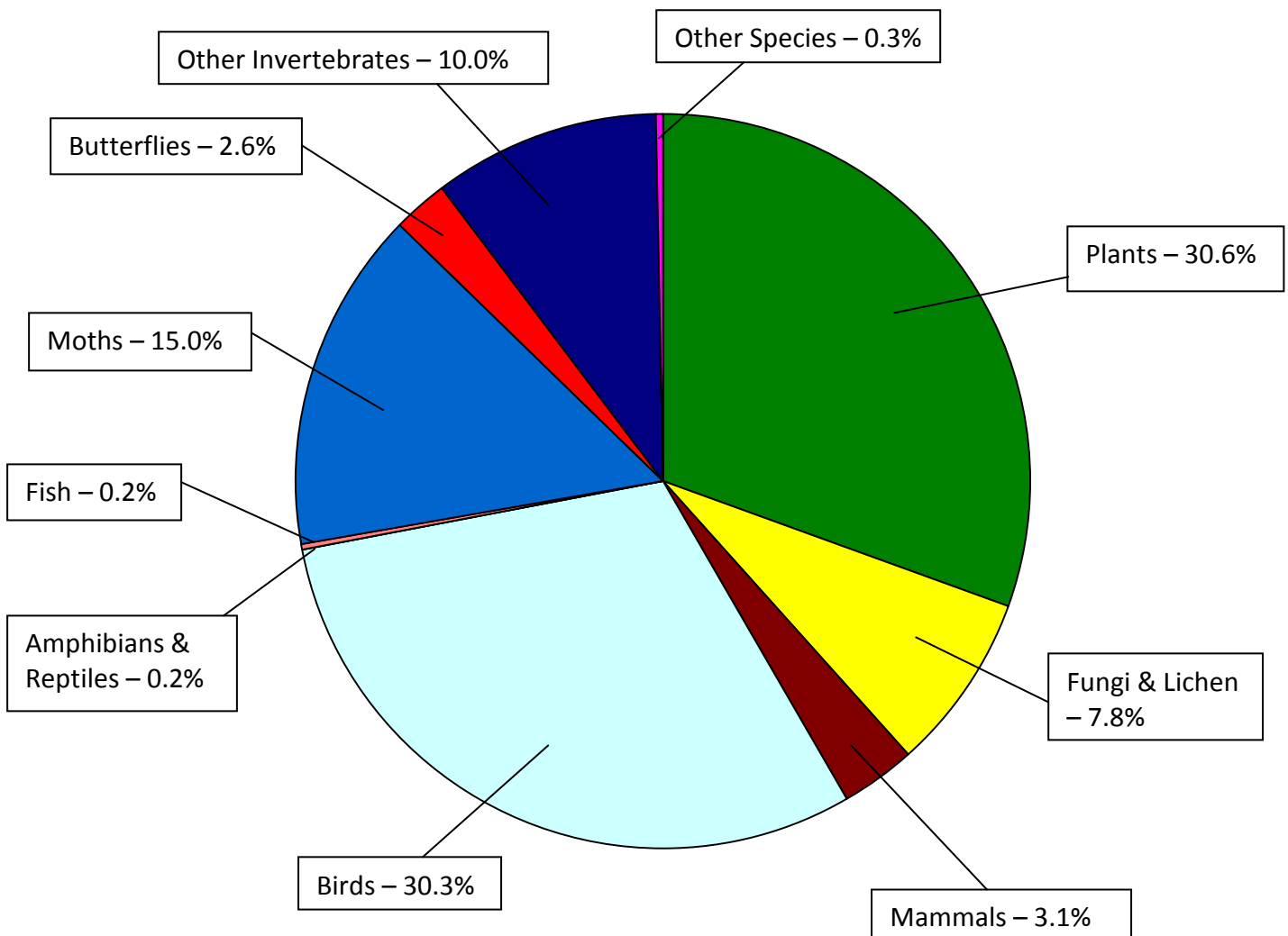




## SPECIES

There are thousands of species which call the Stiffkey catchment area home. From the spiky sea holly to the tuneful blackcap, from the strangely shaped bullhead fish to the tiny pygmy shrew, NBIS holds **62997** individual records of **4921** species from within the Stiffkey catchment.

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 Stiffkey catchment. [Based on the data held by Norfolk Biodiversity Information Service, January 2014]



You can see from the graph that the largest proportion of records is made up of birds and plants. The North Norfolk Coast is well known for its fantastic bird life and the flocks of bird watchers who visit generate large numbers of records. Many of the plant records are from the late 1980s and early 1990s when there was a concerted recording effort by plant recorders in the county. Fish, amphibian and reptile records make up a much smaller proportion of total records for the Stiffkey catchment. This is perhaps both due to the fact that they are relatively elusive and that there are many fewer species of these groups to be found in this area.

## Rare Species

**431** of the species recorded in the Stiffkey catchment since 2000 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 **35** species of flowering plant and **23** species of mammal. 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 34.



Grey partridge © David North

## Invasive Non-native Species



Invasive Common cord grass © [Jürgen Howaldt](#) licensed under the [Creative Commons Attribution-Share Alike 2.0 Germany](#) license

**Twelve** of the species recorded in the Stiffkey catchment since 2000 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.

**179** of the Species of Conservation Concern in the Stiffkey catchment are **Biodiversity Action Plan Priority species**.



Brown Hare © [Galatas](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)

## Fish in the River Stiffkey

(Information taken from: Davies C *et al* (2004) *British Freshwater Fishes – the Species and their Distribution*. Harley Books.)

The River Stiffkey was rated as 'Good' for fish by the Environment Agency in 2009, under the terms of the Water Framework Directive. 15 species of fish have been recorded in the River Stiffkey. Here are just a few of them:

### River Lamprey and Brook Lamprey

These are a primitive, jawless fish which have a skeleton made of cartilage instead of bone. The round mouth has a sucker and teeth in adult lamprey. River Lamprey migrate from saltwater to spawn in freshwater, while brook lamprey remain in freshwater for their entire lives. While river lamprey migrate to the sea in autumn and feed on host fishes, attaching to them with their powerful sucker and rasping through the skin to feed on flesh and blood, brook lamprey don't feed as adults and live for only 6 months. Lamprey are secretive and rarely seen and require clean, flowing water and a loose gravel substrate to spawn successfully. They die after spawning. They are threatened by habitat degradation, and river lamprey are affected by physical barriers to their upstream migration, such as locks, weirs and dams.

### European Eel

The European Eel has a long, thin cylindrical body and a very slimy skin. It is thought that they spawn in the Sargasso Sea, south-west of Bermuda, after which the adults die. The eggs drift on the Gulf Stream to Europe, hatching and developing en-route. The GLASS EELS enter the rivers in spring, using the tidal flow. Eels remain in freshwater for several years before beginning their return journey. Individuals of more than 40 years old have been recorded. Eels are unique among British fish in being able to migrate overland, over wet terrain. This is usually done at night. There has been a major decline in glass eel numbers during the last few decades in Europe.

### Bullhead

This is a small, bottom-dwelling fish which feeds on aquatic INVERTEBRATES. It is vulnerable to predation by fish such as trout and birds like kingfishers and herons. Spines on the fins offer it some protection but it generally hides during the day, venturing out at dawn and dusk to feed. Generally a solitary species, during the summer and winter months, males become aggressively territorial.

### 3-Spined Stickleback

With its 3 or 4 spines aligned in front of its dorsal fin, this small and short-lived fish is commonly found while pond-dipping. During the breeding season, males develop a vivid red belly and flanks with a bright blue iris. Once the eggs are fertilised it is the male who cares for the nest and the fry alone. He fans oxygenated water over the nest, protects it from predators and looks after the fry for the first few days after hatching.



River Lamprey © [Tiit Hunt](#) licensed under the [Creative Commons Attribution-Share Alike 3.0 Unported license](#)



Bullhead © [Hans Hillewaert](#) licensed under the [Creative Commons Attribution-Share Alike 3.0 Unported license](#)



3-spined stickleback © [JaySo83](#) licensed under the [Creative Commons Attribution-Share Alike 3.0 Unported license](#)





## A Crayfish 'Ark' Project on the Stiffkey – The Environment Agency

Native white-clawed crayfish are threatened with extinction. Non-native signal crayfish are spreading fast, outcompeting the natives and spreading a fatal 'crayfish plague'. One of the conservation measures being taken is to create so-called 'ark' sites, establishing populations in safe areas free from invasives.

In the past, native crayfish were found in the Stiffkey. However they had since died out, most likely due to poor water quality. Habitat and water quality on the Stiffkey are now excellent, and as the risk of invasive crayfish being introduced was thought to be low, the Stiffkey was chosen as an ark site.

Several hundred crayfish were transferred in September 2011 from a population on the River Glaven (which was threatened by invasives) to the River Stiffkey. This was followed up in September 2012, when approximately 400 more crayfish were moved and transferred to two new sites on the Stiffkey. The transfers were organised by the Norfolk Non-native Species Initiative, with support from the Environment Agency, Essex Wildlife Trust and a large number of volunteers.

During the second transfer, a search was made for crayfish at the previous ark site. As crayfish were found to be present the previous introduction was deemed a success. An immature male crayfish found was too small to have been released at the site in 2011 and therefore must have hatched in the river – the first indication of successful breeding!



Immature male white clawed crayfish caught in 2012 in the River Stiffkey, indicating successful breeding © Martin Pugh, EECOS



Searching for crayfish © Haidee Bishop

## HISTORIC ENVIRONMENT – Kelly Powell, Norfolk County Council Historic Environment Service

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

Within the Stiffkey catchment there are records of **587** historic monuments, **595** 'find spots' (places where historic artefacts have been found) and **436** historic buildings. These records range from the PALAEOLOGIC right through to Cold War monuments.

### Settlement along the River

The significance of the River Stiffkey to the surrounding area throughout history can be seen by studying aerial photographs of the area. Notable clusters of earthworks survive along the banks of the river and its tributaries; this is particularly significant given the general rarity of earthworks within Norfolk, where many have been levelled by agriculture over the centuries.

### Iron Age Monuments

Warham Camp is one of the most impressive earthwork sites in Norfolk and arguably the best earthwork of this period in the region. The SCHEDULED MONUMENT comprises a large and very well-preserved Iron Age fort. It is a circular structure with an overall diameter of 212m. The course of a channel of the River Stiffkey cuts across the south western edge of the earthworks, although this is an 18th century alteration; the original river ran in a curve to the west. There are outer and inner ditches and banks, and excavation in 1914 and 1959 produced evidence for a timber palisade and platform at the rear and timber revetment on the inner face. Excavation has also shown that the fort was used in both the Iron Age and Roman periods. Archaeologists are not agreed on what function Iron Age 'hillforts' had. While they may have been permanently occupied it seems likely that they were places of refuge or for large gatherings of dispersed groups.

There are very few hill forts in Norfolk but it is possible that a circular enclosure at Wighton performed the same function. This was recorded as an earthwork embankment which was later destroyed. Excavation of the feature showed that it was also occupied in the Iron Age and Roman periods.

A rectangular enclosure to the north east of Warham camp has been interpreted as a possible unfinished hill fort and excavations of a rectangular cropmark near Wighton during 1957-58 found the feature to be a Late Iron Age fort. Roman coins and pottery sherds were also found inside the fort, suggesting it was re-occupied by the Romans during about AD 75-200.



Banks at Warham Camp © Norfolk County Council Historic Environment Service



## Walsingham

Walsingham became a highly significant religious centre in the medieval period and remains so today. Its historic importance is clearly visible in the modern day village of Little Walsingham.

The rise of Walsingham began in 1061 when Richelde of Fervaques built a holy house after receiving visions of the Virgin Mary. This structure was probably a small wooden building said to have been modelled on the house in Nazareth where the Annunciation took place. The Augustinian Priory of St Mary was begun sometime after 1153 and funded by Richelde's son Geoffrey and the holy house was replaced in the mid-13th century by a larger chapel. Later a Franciscan Friary of St Mary (known as Greyfriars) was also built near the site and these sites became the main centre of pilgrimage in England from the 12th to the 14th century. The priory became prosperous and was patronised by the Royal family. A large new priory church with a gatehouse and prior's hall was built in the 14th-15th centuries. The village of Little Walsingham grew around the site in order to accommodate the pilgrims.

Existing remains of the priory comprise fragments of 13th to 15th century buildings including the chancel, refectory, precinct walls and gates. There are also two Holy wells east of the priory. Greyfriars survives to the south west; the ruins now surrounding a 19<sup>th</sup> century house. Surviving medieval/early post medieval buildings include the Shirehall dating to the late 15th or early 16th century. The structure of this early building suggests it had a main first floor hall with kitchen and services beneath or possibly a poor pilgrims' room below a hall for wealthier clientele. In the 18th or 19th century it was used as a courtroom and the fittings now make up part of the Shirehall Museum exhibits. A medieval cross stood in Common Place, the brick structure that supported it now houses a pump and is a SCHEDULED MONUMENT.

The prosperity of the village came to an end with the dissolution of the monasteries and the priory had been dismantled by 1539. It was gifted to Thomas Sidney who appears to have sold much of the fittings and stonework. Evidence from excavations on the site indicates the Holy House was destroyed by burning. After the dissolution of the priory in 1538 some of the ruins were built into a new mansion (Abbey House) that was built on the site.

Many of the late and post medieval buildings in Little Walsingham contain reused medieval stones from the religious buildings that were removed at the dissolution and numerous historic buildings are standing in the village. Pilgrimage to Walsingham began again in the modern period.



Walsingham Priory ruins © Norfolk County Council Historic Environment Service

## Binham Priory

Binham Benedictine Priory was foundeded in the late 11th / early 12th century and dissolved in 1539, and is an important example of the almost complete survival of a monastic precinct. In 1086 Binham was held by Peter de Valognes and the priory was founded by him and his wife, subordinate to St Albans Abbey, possibly as early as 1093.

The cloisters, conventual buildings (including dormitories, garderobes, the chapter house and refectory) precinct wall and gatehouse are in ruins, but the nave of the church, which is still in use as a parish church, is upstanding. The buildings date mostly from the 13th or 14th centuries. Earthworks of other buildings survive within the precinct, including possible guest accommodation and agricultural buildings. A complex water management system has also survived, including the remains of fishponds. An evaluation excavation to determine the location of the lost west precinct wall in 2007 located the line of the inner face of the medieval wall along with evidence for structures located against the wall. In 2009 an evaluation revealed two graves pre-dating the 12th century north aisle, which may have belonged to an earlier church, possibly of Saxon date.

The importance of the river to the priory is demonstrated by the presence of earthworks along the river to the east, thought to be the remains of dams.

Binham Priory is owned by Norfolk Archaeological Trust and partly in English Heritage guardianship.



Binham Priory church © Norfolk County Council Historic Environment Service

A medieval wayside cross on the village green at Binham still stands and is thought to have been erected by the monks of the priory following a medieval market grant. A market and fair were held here until the early 1950s. A similar medieval cross still stands in the village of Cockthorpe to the north. Both the priory and crosses are designated SCHEDULED MONUMENTS.

## Airfields and the Dome!

Langham airfield was constructed in 1940 as an emergency landing-ground, later a satellite for Bircham Newton and raised to the status of an independent station in 1942. It was in use 1941 to 1944 and 1944 to 1957 latterly as a target practice base, finally closing in 1961. In 1944 the airfield was home to one of Coastal Command's Strike Wings, attacking German shipping from the air.

Most of the runways remain and structures within the airfield consist of several large aircraft hangars, an underground Battle Headquarters and a dome trainer, one of only three examples surviving in the country. A large number of Nissen huts and military accommodation buildings are located to the south and east of the main airfield. The concrete dome trainer, 12 m in diameter, was used for training anti-aircraft gunners, with films of enemy aircraft projected onto the walls for target practice. Due to its rarity the dome is designated as a SCHEDULED MONUMENT. It has recently been restored and it is hoped the dome will soon be open as a public attraction.



Langham dome trainer © Norfolk County Council Historic Environment Service

Further south Little Snoring airfield opened in July 1943 as a satellite to Foulsham. It was initially used by Lancaster bombers and later by Mosquitoes and Beaufighters in bombing support operations. After the war it was used as a maintenance base and then for target aircraft training. From 1953 to 1963, the United States Army Air Force used it for storage before it was finally closed as a military base. The airfield has since been in private civilian use, most of the runways having been broken up, though some buildings remain. A sunken battle headquarters, designed to coordinate airfield defences in the event of an attack, stood to the west of the control tower, but this was demolished in about 1989. There is a small museum dedicated to the airfield's wartime history, and the local church has boards of the time recording hits made on enemy aircraft and decorations awarded to aircrew.

## WATER QUALITY

Measuring the quality of the water in the River Stiffkey gives an indication of how healthy the river is. It shows the effect of habitat restoration work on the river, and also means that where water quality levels are not as high as they should be, measures can be put in place to improve them.

The Environment Agency monitors the water quality of rivers in order to assess them 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 DIATOMS, fish and INVERTEBRATES present, the levels of dissolved oxygen, phosphate and ammonia in the water, and the pH of the river amongst other measures.

The 2009 baseline overall ecological potential of the River Stiffkey is **POOR**.

The 2009 baseline overall ecological potential of the Binham Tributary is **MODERATE**.

OVERALL ECOLOGICAL QUALITY	DIATOMS	Fish	INVERTEBRATES	Ammonia	Dissolved Oxygen	pH	Phosphate
Poor	Poor	Good	High	High	High	High	Good

The HYDRO-MORPHOLOGICAL quality of the river ('is Not High') means that the river can only achieve Good ecological status overall.

(Data from the Environment Agency website)



River Stiffkey © [N Chadwick](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)

## **The Anglian Rivers Sea Trout Project on the Stiffkey – The Wild Trout Trust**

The Anglian Rivers Sea Trout Project is a collaboration between anglers, fishery scientists and managers, conservationists, landowners and local communities. It aims to conserve and improve the habitat and wildlife of four rivers in North Norfolk (the Glaven, Stiffkey, Burn and Nar), using sea trout stocks to measure river health.

A review of existing information on sea trout on the Stiffkey suggested that there was good spawning habitat above Wighton, but a lack of suitable gravel areas below, and that the sluice where the river meets the sea could be a barrier to fish migration. A lack of cover could also mean that predation by herons was a problem, especially when the water level was low. Research showed that brown trout density had increased between 1988-2007, but that populations were declining in the Binham stream tributary.

Once the existing information had been collated, detailed conservation plans could be designed to enhance stocks, prepare and undertake surveys and design appropriate monitoring programmes to measure progress. On the Stiffkey this included an initial survey of barriers to fish migration and a habitat assessment.

Finally, a prioritised programme of capital conservation projects including fish passes, barrier removal and habitat restoration could be delivered. There have been two projects implemented on the Stiffkey so far:

### Gravel Riffle Installation

The Stiffkey channel has been artificially straightened and widened for a long time. This has made it prone to sediment accumulation and the growth of emergent vegetation such as reeds and rushes, necessitating regular maintenance dredging. The dredging has limited trout populations, mainly due to the absence of the clean, silt-free gravel required for trout spawning. In 2009, working with Holkham Estate (the landowner), the Wild Trout Trust installed ten gravel riffle areas. Approximately 700 tonnes of gravel were used to create 300m of shallow riffle habitat. The river banks were reprofiled alongside the gravel, and stockproof fencing and drinking points were installed. Since completion, a number of trout spawning sites have been seen each winter on the introduced gravel. Luke Mitchell, a PhD student from University College London has studied the use of the installed gravels and egg survival rates compared with natural gravel areas. Silt accumulation within installed gravels is an ongoing problem and modification of the channel size and shape, as well as addressing the sources of sediment, is needed to provide a sustainable solution.

### Tidal Sluice Fish Pass

The Stiffkey enters the sea through a sluice which closes at high tide to protect reclaimed and protected land from flooding. This is potentially a significant barrier to the free movement of fish. To overcome this problem, a “pet door” type opening was installed in the main tidal flap gate. This remains open after the main gate shuts on a rising tide, and then closes much more gradually via a door attached to an adjustable floatation device. Research on the effectiveness of the pass and movements of trout and eels between the Stiffkey and the sea is being carried out by Gill Wright, a PhD student from Southampton University in conjunction with the Environment Agency.

### Future works

Future works are being discussed on the lower river and wetlands by the Norfolk Rivers Trust and landowners. Experience from projects on other Norfolk rivers such as the Glaven has shown that restoring the river’s natural channel size, meandering course and floodplain connection provides a long-term, self-sustaining improvement for biodiversity. Options for similar improvements on the Stiffkey are being considered.

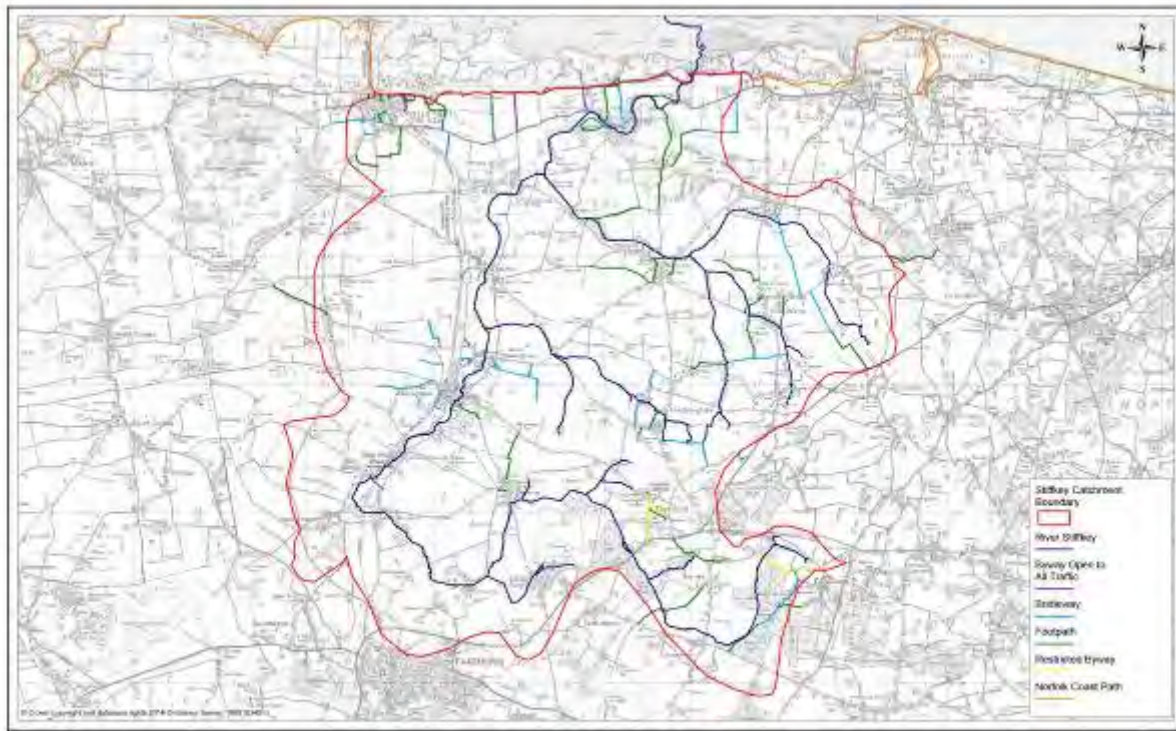
For more information on this project see [www.wildtrout.org/content/anglian-rivers-sea-trout-project](http://www.wildtrout.org/content/anglian-rivers-sea-trout-project)



## GETTING OUT IN THE STIFFKEY CATCHMENT AREA

There are lots of opportunities for getting out and enjoying the Stiffkey catchment.

There are over **39km** of public footpaths within the Stiffkey catchment, along with **24.5km** of bridleways, **4km** of restricted byways (restricted byways allow access on foot, horseback, cycling or any other non-mechanical vehicle) and **3.8km** of 'byways open to all traffic'.



Public rights of way in the Stiffkey catchment

### The Norfolk Coast Path

The Norfolk Coast Path runs for 42 miles between Hunstanton in the west and Cromer in the east. At Holme it combines with the Peddars Way and becomes the Peddars Way & Norfolk Coast Path National Trail.

Almost the entire route of the Norfolk Coast Path runs through the Norfolk Coast Area of Outstanding Natural Beauty. It is a relatively modern route and combines the peace and quiet, and at times remoteness, of nature, with the warmth of village life.

The section close to/passing through the Stiffkey catchment area lets you skirt around salt marshes, creeks and mudflats teeming with life.

## Walk near Swanton Novers Wood

Provided under the Higher Level Stewardship Scheme, this circular walk gives you closer views of the privately owned Swanton Novers Wood. During the summer you might be lucky enough to spot birds such as honey buzzard, red kite, marsh harrier and hobby, among others. A pollen and nectar mixture has been planted on the south side of the wood for the benefit of butterflies, bees and other insects.

Please keep to the footpath, and remember that there is no access to Swanton Novers Wood itself.

## Binham to Stiffkey Walk

This walk is 5.3 miles in length and should take around 2.5 hours to complete.

The route begins at the spectacular Binham Priory, an English Heritage site which is open all year. You will then follow quiet country lanes and footpaths across the disused Langham Second World War airfield, through the beautiful Cockthorpe Common, beside Stiffkey Fen (a great spot for birdwatching!) before finishing along a short section of the Norfolk Coast Path, beside Stiffkey saltmarshes.

For route details and information about public transport (as the route is **not** circular) download the pdf from [www.norfolkcoastaonb.org.uk/pages/pspage.php?PageID=628](http://www.norfolkcoastaonb.org.uk/pages/pspage.php?PageID=628)



Langham Airfield © [Nigel Jones](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)



Binham Priory © [nick macneill](#) and licensed for [reuse](#) under this [Creative Commons Licence](#)

## GETTING INVOLVED

If you want to do more than simply get outside and explore the Stiffkey catchment area, 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.

### North Norfolk Workout Group

The North Norfolk Workout Group is a local community group run entirely by volunteers. It started out as part of The Conservation Volunteers (TCV) and is now part of their Community Network.

The group meets on Mondays and Fridays, usually 1-4pm at various sites across North Norfolk. Their aim is to take part in conservation tasks to help to maintain the natural beauty of the countryside while also improving the health and well-being of the volunteers themselves.

People (over the age of 18) of all abilities are welcome. No experience is necessary and you don't need to be fit to join. Everyone is encouraged to do as much or as little as they want to. All tools are provided and you don't need to book.

A programme of events, as well as information on past projects, are available on the North Norfolk Workout Group website [www.northnorfolkworkoutgroup.org](http://www.northnorfolkworkoutgroup.org) and there is also a contact page if you want any further information.



Details of other conservation groups in Norfolk can be found at:  
<http://www.norfolkbiodiversity.org/communityprojects/Default.aspx>



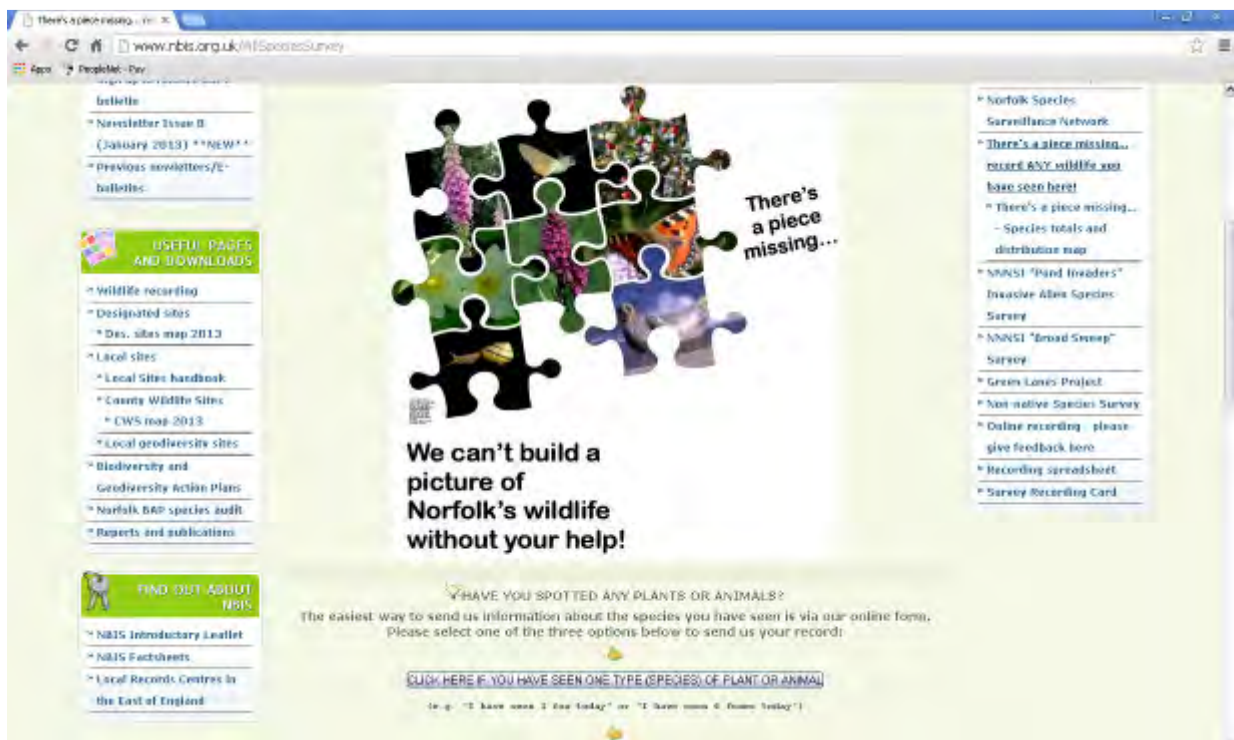
## Species Recording

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 Stiffkey catchment 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 their online recording form at <http://www.nbis.org.uk/AllSpeciesSurvey>





## 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

**ALDER CARR** – A waterlogged area of woodland dominated by alder trees.

**ANGLIAN GLACIAL PERIOD** – An extreme Ice Age which occurred about 450,000 years ago.

**BRYOPHYTES** - Mosses and liverworts.

**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.

**CANALISATION** – The process of artificially straightening and deepening a river, altering its characteristics.

**COPPICING** – A traditional method of woodland management involving cutting back a tree or shrub to ground level to stimulate new growth.

**DIATOM** – A single-celled alga which has a cell wall made of silica.

**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).

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

**GLASS EELS** – A young eel at the time that it first enters brackish or fresh water, when it is translucent.

**HYDRO-MORPHOLOGICAL** – The physical characteristics of the shape, boundaries and content of a water body.

**INTERGLACIAL** - A period of milder climate between two glacial periods.

**INVERTEBRATES** – Animals without a backbone.

**PALAEOLITHIC** - The cultural period of the Stone Age beginning with the earliest chipped stone tools, about 750,000 years ago, until about 15,000 years ago.

**PLEISTOCENE** – The geological age forming the earlier half of the Quaternary Period, about 2 million years ago to 10,000 years ago, characterised by widespread glacial ice.

**SCHEDULED MONUMENT** – A nationally important archaeological site or historic building, given protection against unauthorised change.

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

**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/>

Norfolk Rivers Trust: <http://www.norfolkriverstrust.org/>

### Landscape and Geodiversity

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

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

### Important Sites

Protected sites:

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

SSSI Citations: <http://www.sssi.naturalengland.org.uk/special/sssi/search.cfm>

Norfolk Coast AONB: [www.norfolkcoastaonb.org.uk](http://www.norfolkcoastaonb.org.uk)

Thursford Wood County Wildlife Site: <http://www.norfolkwildlifetrust.org.uk/wildlife-in-norfolk/nature-reserves/reserves/thursford-wood>

### Habitats and Land-Use

UK Biodiversity Action Plan Habitats: <http://jncc.defra.gov.uk/page-5706>

Norfolk Biodiversity Action Plans: <http://www.norfolkbiodiversity.org/actionplans/>

Ancient Woodland: [www.naturalengland.org.uk/Images/standing-advice-ancient-woodland\\_tcm6-32633.pdf](http://www.naturalengland.org.uk/Images/standing-advice-ancient-woodland_tcm6-32633.pdf)

Environmental Stewardship:

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

### Species



UK Biodiversity Action Plan Species: <http://jncc.defra.gov.uk/page-5717>

### Historic Environment

Norfolk Heritage Explorer: <http://www.heritage.norfolk.gov.uk/>

### Environmental Quality

Water Quality: [http://maps.environment-agency.gov.uk/wiyby/queryController?topic=wfd\\_rivers&ep=2ndtierquery&lang=e&layerGroups=1&x=595717.4994999999&y=336138.001&extraClause=EA\\_WB\\_ID~%27GB105034055840%27&textonly=off&latestValue=&latestField=](http://maps.environment-agency.gov.uk/wiyby/queryController?topic=wfd_rivers&ep=2ndtierquery&lang=e&layerGroups=1&x=595717.4994999999&y=336138.001&extraClause=EA_WB_ID~%27GB105034055840%27&textonly=off&latestValue=&latestField=)

Anglian Rivers Sea Trout Project: [www.wildtrout.org/content/anglian-rivers-sea-trout-project](http://www.wildtrout.org/content/anglian-rivers-sea-trout-project)

### Getting Out in the Valley

Norfolk Coast Path:

<http://www.nationaltrail.co.uk/PeddarsWay/>  
[www.norfolk.gov.uk/Leisure\\_and\\_Culture/Norfolk\\_Trails/Norfolk\\_Coast\\_Path/index.htm](http://www.norfolk.gov.uk/Leisure_and_Culture/Norfolk_Trails/Norfolk_Coast_Path/index.htm)

Swanton Novers Permissive Walk: [cwr.defra.gov.uk/mapboards/pdfs/AG00250819.pdf](http://cwr.defra.gov.uk/mapboards/pdfs/AG00250819.pdf)

Binham to Stiffkey walk: [www.norfolkcoastaonb.org.uk/pages/pspage.php?PageID=628](http://www.norfolkcoastaonb.org.uk/pages/pspage.php?PageID=628)

### Getting Involved in the Valley

North Norfolk Workout Group: [www.northnorfolkworkoutgroup.org](http://www.northnorfolkworkoutgroup.org)

Norfolk Community Groups:

<http://www.norfolkbiodiversity.org/communityprojects/Default.aspx>

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