



Natural Areas in the East of England Region

helping to set the regional agenda for nature



Introduction

Regional strategies and policy documents are being drawn up by the newly-created Regional organisations. These are required to encompass the protection and management of the environment by applying the principles of sustainable development.

This document has been produced by English Nature, the Government body that promotes the conservation of wildlife and natural features throughout England. It is for use by the Regional Development Agency, the Government Regional Office and the Regional Chambers, when making Regional policy. We hope that it will provide a starting point for discussion with our network of Regional Lead Teams, who can provide valuable support, and links into wider partnerships.

The conservation of nature is a key test of policy in all three facets of sustainable development, the social, the economic and the environmental. While its role in the environment is self evident, it also has social implications through the spiritual, cultural and recreational value of people's experience of the natural world; and economic implications through the provision of exploitable resources and the attractiveness to investors of high quality environments.

If we are serious about achieving sustainable development, then understanding the priorities for the conservation of the biodiversity and Earth heritage resource of the Region is therefore essential. This report is a first step towards that understanding, and provides the basis for integrating

local and national priorities for nature into the Regional decision-making framework. It contains information of direct relevance to the development of Regional Planning Guidance and Single Programming Documents to support the delivery of European Union Structural Funding, regeneration funding and other economic and social programmes.

The Ministry of Agriculture, Fisheries and Food, the Environment Agency, the country forestry organisations, local authorities and statutory and other agencies involved in land use and land management issues will also find it relevant and, we hope, of value.

We envisage that this document can therefore be used at a number of key points within the Regional strategy-making and planning process.



Shrubby sea-blite carpet at Blakeney, Norfolk. Peter Wakely/English Nature



Wormley Hoddesdonpark Woods, Hertfordshire. Peter Wakely/English Nature

Natural Areas as a Regional framework for nature

English Nature has divided England into a series of **Natural Areas**. Their boundaries are based on the distribution of wildlife and natural features and the land use patterns and human history of each area. They do not follow administrative boundaries but relate instead to variations in the character of the landscape. They reflect our cultural heritage and are central to English Nature's organisational strategy *Beyond 2000*.

We worked with the Countryside Commission (soon to become the Countryside Agency) to identify a joint approach to the characterisation of the countryside into locally distinctive units called character areas. Where the wildlife and natural features are similar between adjacent character areas we have merged them into one Natural Area - so, a Natural Area may contain several character areas that are considered to be different landscape types.

Natural Areas offer a more effective framework for the planning and achievement of nature conservation objectives than do administrative boundaries. Although they are not formal designations they are now recognised in Government Planning Policy Guidance (PPG) and other statutory advice.

Within this framework, we have defined a comprehensive set of issues, each with associated objectives that can provide the basis for regional policies and associated actions, and these are set out in the sections which follow. We believe that these can begin to provide a platform for progress and a means to establish partnerships to plan for the protection and management of our biodiversity and geological assets.

Relevant Government Planning Policy Guidance (PPG)

- PPG 7: The Countryside: environmental quality and economic and social development
- PPG 9: Nature Conservation
- PPG 11: Regional Planning Guidance
- PPG 12: Development Plans and Regional Planning Guidance (presently under review)
- PPG 13: Transport

Department of the Environment, Transport and the Regions Policy Guidance: Policy appraisal and the environment (DETR, 1998).

such as trees, hedges, grass strips, ditches, that may be destroyed, or fragmented be fully compensated/mitigated for?

- Do any plant and tree planting programmes use an appropriate mix of species native to the Natural Area in question?
- Will any habitat be in danger of abandonment, under management, change or intensification of management? (e.g. Overgrazing, loss of crop rotations and arable-pasture mosaics; shift from spring sown to autumn sown cereals, loss of winter stubbles, application of artificial fertiliser, etc. - leading to impacts on associated farmland species)
- Will any habitat be in danger of a secondary or indirect damage? (e.g. Wetland or aquatic habitats and ecosystems in danger of drying out, loss or degradation as a result of over-abstraction of surface and groundwaters, pollution and eutrophication of surface and groundwaters; development in a flood plain which may require canalisation of watercourses impacting on river valley wetlands and aquatic ecosystems; coastal

development that impacts on natural processes; etc.)

- Is there scope for the enhancement of geological interest? (e.g. Through the improvement of geological exposures or features; the creation of additional geological exposures or features, etc.)

Environmental good practice for nature

- Has an environmental impact assessment been carried out?
- Will post implementation impacts be assessed and managed by regular review and monitoring programmes?

Community involvement for nature

- Will all sections of the community be consulted as part of the decision making process?
- Have the needs of local communities for access to, and experience of, nature been taken into account?
- Does the project help vulnerable, disadvantaged or excluded groups



Wicken Fen, Cambridgeshire.
Peter Wakely/English Nature

to gain access to nature and wildspace?

- Will there be a contribution to improving the quality of life by local inhabitants, for example: through improved general access to nature, but in particular on foot or by public transport?
- Will local distinctiveness for nature be valued, and community and cultural identity be strengthened?
- Will community enterprises for nature be encouraged?

Designated areas

National/International Nature Conservation Designations:

- Sites of Special Scientific Interest (SSSI)
- National Nature Reserves (NNR)
- Special Protection Areas (SPA)
- Special Areas of Conservation (SAC)
- Ramsar Sites

Local Nature Conservation Designations (often non-statutory but recognised in local plans, PPG and other similar documents):

- Sites of Importance for Nature Conservation (SINC - locally other terms may be used)
- Local Nature Reserves (LNR)
- Regionally Important Geological/Geomorphological Sites (RIGS)
- Non-statutory nature reserves

(Modified and adapted from a document produced by the Environment & Energy Management Team, Government Office for the South West).

Annex 1: Benchmarks for nature

The conservation of nature is a key test of sustainable development. The list below provides a set of questions to be applied as positive indicators for biodiversity and Earth heritage, where relevant strategies, policies, projects and programmes are under consideration. These may include developments such as agricultural improvement or intensification, coastal and flood defence works and water abstraction, as well as built development or infrastructure such as roads, rail and energy.

Policy links

- Is there compatibility with relevant policies within: any local/regional Biodiversity Action Plan, sustainable development

plan, nature conservation strategy or priority setting document for nature; any Government Planning Policy Guidance or Regional Planning Guidance; Local Development Plans/Unitary Development Plans/Structure Plans/etc?

- Is there active contribution to the resolution of Natural Area issues and the delivery of UK, Regional and Local Biodiversity Action Plan targets and Natural Area objectives?
- Has there been an appraisal of the environmental impact of policies, plans and programmes within Regional strategic documents? (See: the eight step approach in Department of the Environment, Transport and the Regions Policy Guidance: 'Policy Appraisal and the Environment', DETR 1998)

Biodiversity and Earth heritage

- Will any areas with local/national/international designation for nature conservation be affected or directly damaged?
- Is there scope for the enhancement of biodiversity through the provision of: opportunities for achieving the targets for priority habitats and species in the context of UK, Regional and Local Biodiversity Action Plans; improved habitat and/or the creation of additional habitat for plants and animals, appropriate to the local character?
- Will any non-designated habitat such as woodland, grassland and other vegetation, linking habitats



Hunstanton Cliffs, Norfolk. Peter Wakely/English Nature

Objectives for sustainable development and nature conservation in the East of England Region

The East of England is a Region of dramatic, and often sharp, contrasts. Dense urban populations can be found in and around the historic metropolitan centres, where traditional industries operate alongside new business, whilst coastal resorts provide important tourist destinations. Agriculture is the dominant land use and underpins the rural economy. The overall population density is the lowest of the English Regions, whilst the rainfall is only two thirds of the national average.

The diverse landscapes, from the flat, open spaces of intensive arable farming and horticulture and the windswept beaches and dunes of the coast, to the more intimate rolling landscapes of village, woodland and hedgerow, support a characteristic combination of wildlife and geological heritage. Historical landscapes such as the Broads and Breckland have an outstanding diversity of habitats and species that are very rare, and of very high quality, of which the Region can be justifiably proud. The natural beauty of the Region, in particular the National Park and the coast, provides the mainstay of a significant tourism industry.

The distribution of wildlife and the texture of the landscape are the product of complex interactions. The basic physical qualities of the rock, soil and climate have set the scene, but the detail has been, and



Natural Areas covered in the East of England Region report

will continue to be, shaped through human activity which is driven by economic, social, and environmental forces.

Our ability to exploit the environment for economic gain is beginning to jeopardise our present and future well-being. Since our decisions can have far-reaching effects on present and future generations, we need to look at how we can act to maintain and improve both our local and global environments. There is no doubt that work at the Regional level can be a powerful force in steering local agendas for environmental action, whilst providing strong links to national and international programmes.

Sustainable development requires integration, rather than balance or

trade off. Decision makers need to build environmental and social criteria into the heart of their policies and programmes - and ensure that they are given the same weight as economic considerations at the beginning of the process. This is what is meant by integration, and contrasts with the more familiar situation, where proposals are drawn up against economic criteria alone and are only weighed against their environmental impact when they are about to be implemented.

The basic means for many of the Regional level structures and organisations to act will be through the planning process for built development and infrastructure. Planners have a key role in incorporating economic, environmental and social factors into

decisions about where to put homes, jobs, shops and leisure facilities. In this way, demands on land, the environment and nature can be managed more sustainably. Regional Planning Guidance will be written to help with this process.

Current government policy encourages investment in urban areas and existing centres rather than out of town sites. This means re-using previously developed urban land as much as possible, while ensuring that the quality of towns or cities is maintained or improved. The challenge will be to determine

which patterns and locations of development prove most sustainable.

Conserving and enhancing nature can be compatible with development and, whilst the built environment has fewer designated sites, Local Nature Reserves, pocket parks, green space and even private gardens, are the only contact the majority of people have with nature. They are also important reservoirs of biodiversity.

Another essential role will be played by those charged with the design and implementation of policy and programmes for forestry, agriculture,

water and recreation. Farming is the East of England Region's major land use. The habitats described in the following chapters are predominantly part of agricultural management systems. **Farmland therefore provides a major source of opportunity for habitat creation and maintenance, and species protection and enhancement. Its importance is reflected in the issues and objectives that are listed at the start of each section.**

The intensification of agriculture, and associated decline in traditional land management, combined with the huge growth of the major towns and cities, has resulted in the reclamation and loss of much of the lowland semi-natural habitat of value to wildlife in the East of England Region. The semi-natural habitats that remain are often small and isolated and are adversely affected by agricultural practices and pressure from development, including the use of pesticides and fertilisers, run-off of pollutants from industrial and housing estates, and the lowering of water tables through drainage and abstraction.

The populations of birds, mammals and plants which rely on the agricultural systems themselves have also plummeted. Major priorities therefore include: the sensitive management of existing habitats; increasing the area of existing habitats and re-establishing the links between them; and restoring the conditions in which the wildlife of cereal fields and pasture can also thrive.



Green-winged orchid.
Chris Gibson/English Nature



Sea-lavender at Blakeney, Norfolk. Peter Wakely/English Nature

nursery ground for young commercial fish species, for example plaice, cod and sole. Reefs of the tubeworm *Sabellaria spinulosa*, a priority BAP habitat, occur both in the Wash and in some of the Essex estuaries, and beds of horse mussels (also a priority BAP habitat) occur on gravel and muddy gravels at the mouth of the Wash. Further offshore, the sea bed is dominated by coarse sands and fine muddy sands.

The intertidal flats and saltmarshes of the estuaries are of international importance for the hundreds of thousands of birds they support over winter and during migration. These include pink-footed goose, dark-bellied brent goose, shelduck, wigeon, knot, oystercatcher, grey plover, bar-tailed godwit and black-tailed godwit. The saltmarshes also support breeding populations of redshank and oystercatcher.



Holkham, Norfolk. Peter Wakely/English Nature



Sea campion. Chris Gibson/English Nature



Sea pea. Chris Gibson/English Nature

These sites have a diversity of saltmarsh vegetation that is unparalleled in England. The saltmarshes in the estuaries of the Suffolk Coast and Greater Thames Estuary cover large areas and are of international importance. The Greater Thames Estuary supports the most extensive stand of small cord-grass remaining in Britain, and is the only British location of the pedunculate sea-purslane. Two BAP moth species occur on saltmarshes in the Region, namely the ground lackey moth, and Fisher's estuarine moth, which occurs at only one site in Essex.

Intertidal sediments are present around the coast with the most extensive areas in the shelter of the estuaries and embayments. Sediments range from the expanses of sandflats in the Wash and the North Norfolk Coast, to the intertidal flats in the Suffolk and Essex estuaries that grade from sands to muds. The intertidal sediments of Maplin Sands have large beds of seagrasses (both *Zostera marina* and *Z. noltii*), forming a priority BAP habitat. The intertidal flats of the Wash and Old Hunstanton to Sheringham are an important area for common seals, having the only significant population in England. There is very little intertidal rock in the Region, apart from the rocky shore at Hunstanton, the small chalk platforms at Sheringham and West and East Runton in Norfolk, and Harwich foreshore, each of which extend into the subtidal.

The subtidal zone is dominated by sediments, with a mixture of gravel, muds and sands. The Wash has one of the largest expanses of subtidal sandbanks in Britain and is a

How the contents of the report may be applied

Specific application	Relevant contents
Sustainable development	We have sought to set biodiversity and Earth heritage in the context of sustainable development - and to define the latter as a process of integration.
Providing context	Descriptive text which outlines the natural character of the Region.
Identifying issues and objectives	Specific issues and objectives written for direct inclusion in policy documents and/or distillation into policy to protect and enhance nature.
Links to international site designations and biodiversity	Key Natural Areas are named in each section in order to ensure that national priorities for habitat conservation are taken into account. They are identified as supporting nationally important concentrations of a habitat or Earth heritage feature and/or international sites (Special Protection Areas and Special Areas of Conservation) and biodiversity habitats and species.
Benchmarks for nature	A checklist is provided (Annex 1) to make an assessment of the contribution of policies, projects and programmes to the delivery of sustainability in relation to nature.
Key contact points	The English Nature contact addresses are provided for the Region, including the Regional Lead Team, together with a list of sources of information (Annex 2).

Glossary

BAP: Biodiversity Action Plans for habitats and species.

Biodiversity: Simply means the variety of life on earth. It covers everything from human beings to oak trees, bacteria to blue whales. Many Regions have already produced or are working on Biodiversity Audits and Action Plans which begin to catalogue and summarise their wealth of wildlife. This document complements these and other initiatives, including work on Local Agenda 21 and Local Biodiversity Action Plans, and existing Nature Conservation Strategies.

Earth heritage: We have a rich and diverse heritage of rocks, fossils, minerals and land forms. The protection and management of these features is an integral part of nature conservation.

European Union Habitats and Birds Directives requires the Government to designate and protect some of the most important areas for wildlife. They are or will be classified as Special Protection Areas (SPAs) and/or Special Areas of Conservation (SACs). These sites are also Sites of Special Scientific Interest (SSSIs) but meet specific criteria for international importance. In the case of marine SACs the SSSI designation only applies down to the low water mark.

Habitat: is the natural home of any plant, and where animals feed, breed and rest.

Statutory guidance from the Secretary of State to the Regional Development Agencies (RDA) includes: Sustainable Development; Rural Policy; Regional Economic Strategies. **White Papers** include: Building Partnerships for Prosperity; The United Kingdom Sustainable Development Strategy; Rural White Paper; Urban White Paper.

Sustainable development: was defined by the 1987 World Commission Report on Environment and Development as “development which meets the needs of the present without compromising the ability of future generations to meet their needs”. It is often described as a ‘three legged stool’ whose legs comprise environmental, economic and social. If any one of them is missing as a consideration in decisions, the stool will topple.

Earth heritage

Key issues and objectives

Issue: maintenance of existing resource

- **Maintain** existing important geological sites by **agreeing**, with extraction companies, the conservation of exposures in working and disused quarries and pits.

Issue: maintenance of coastal processes

- **Allow** natural, dynamic coastal processes to operate by:
 - **avoiding** hard sea defences, where these would interrupt the natural flow of sediments;
 - **avoiding** dredging, where possible, and mitigate harmful impacts on coastal processes.

Issue: education

- **Promote** local Earth heritage by using initiatives to **strengthen** links between geology, scenery, habitats and archaeology.

The Fens and the Wash lie within a basin that is the result of scouring during glaciation. Both areas are underlain by Jurassic clays that are rich in fossils, and overlying these clays are thick deposits of Quaternary sands, gravels and clays. Further inland, accumulations of peat give The Fens its character. The only prominent landform in this area is the Cretaceous sandstone and chalk cliffs at Hunstanton. To the east, North Norfolk is formed of mudstones, sandstones and chalk and has one of the most complete sequences of late Jurassic to late Cretaceous rocks in Britain. However, this is exposed only in coastal cliffs and quarries, as it is

covered by thick deposits of Pleistocene sands, clays and gravels. These deposits in north-east Norfolk are of international renown for they have yielded important vertebrate fossils. More recent geological processes are apparent along the low-lying coastline from Hunstanton to Sheringham, which is the finest barrier coastline in Britain with a complex of shingle spits, barrier islands, dunes and saltmarshes.

Further inland, the West Anglian Plain is formed of Jurassic clays and limestones that are covered by vast quantities of sand, gravels and clays, with extensive gravel terraces in the river valleys. This Natural Area is rich in fossils and has yielded some



Mammoth tooth, Clacton Cliffs and Foreshore SSSI, Essex. Chris Gibson/English Nature

lagoons in the shingle bank adjacent to shore of the Ore Estuary. As lagoons are a priority habitat under the EC Habitats Directive, a number of the lagoons in the East of England are candidate Special Areas of Conservation (SACs). Many lagoons are also within Special Protection Areas (SPAs) and are important for breeding and wintering waterfowl, including nationally important populations of avocet.

There are large areas of saltmarsh in the Region, mostly within the estuaries and embayments. The Wash has the largest continuous area of saltmarsh in Britain, with extensive saltmarshes extending along the North Norfolk Coast.

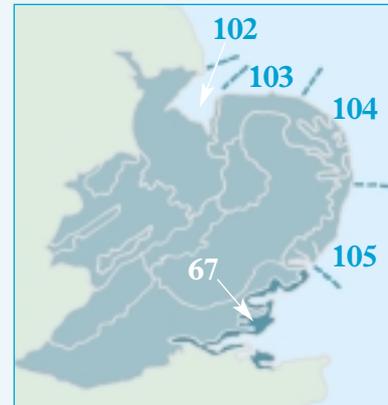
Characteristic habitats of key Natural Areas

102. The Wash

- Calcareous *sand dunes*
- *Shingle* spit at Snettisham
- Extensive areas of *saltmarsh*
- Very large area of intertidal sandflats
- *Sabellaria spinulosa* reefs
- *Seagrass beds*

103. Old Hunstanton to Sheringham

- Greensand and chalk (hard rock) *cliffs* at Hunstanton
- Extensive system of *sand dunes*
- Large *shingle* spit at Blakeney Point



- Series of small *lagoons*
- Extensive *saltmarshes* with great diversity of vegetation
- Intertidal sand and *muds*

104. Sheringham to Lowestoft

- Extensive soft rock cliffs
- Large area of acidic dunes and dune heath

105. Suffolk Coast

- Some stretches of low (soft rock) *cliff*
- Numerous *shingle* beaches, e.g. Kessingland, Orfordness
- *Lagoons* within or behind shingle beaches
- *Saltmarshes* in estuaries
- Intertidal *mudflats* within estuaries

67. Greater Thames Estuary

- Several *shingle* spits, e.g. Colne Point
- Large areas of *saltmarsh* within estuaries, with adjacent grazing marshes
- Intertidal *mudflats* within estuaries
- Lagoons
- *Sabellaria spinulosa* reefs

NB Priority BAP habitats in italics

Candidate Special Areas of Conservation

- Benacre to Easton Bavent Lagoons (Suffolk Coast)
- Essex Estuaries (Greater Thames Estuary)
- Minsmere to Walberswick Heaths and Marshes (Suffolk Coast)
- North Norfolk Coast and Gibraltar Point Dunes (The Wash; Old Hunstanton to Sheringham)
- Orfordness-Shingle Street (Suffolk Coast)
- The Wash and North Norfolk Coast (The Wash; Old Hunstanton to Sheringham)
- Winterton-Horsey Dunes (Sheringham to Lowestoft)

Special Protection Areas

- Alde-Ore Estuary (Suffolk Coast)
- Benacre to Easton Bavents (Suffolk Coast)
- Benfleet and Southend Marshes (Greater Thames Estuary)
- Breydon Water (Sheringham to Lowestoft)
- Deben Estuary (Suffolk Coast)
- Great Yarmouth North Denes (Sheringham to Lowestoft)
- Hamford Water (Greater Thames Estuary)
- Mid Essex Coast (Greater Thames Estuary)
- Minsmere-Walberswick (Suffolk Coast)
- Orfordness-Havergate (Suffolk Coast)
- North Norfolk Coast (Old Hunstanton to Sheringham)
- Stour and Orwell Estuaries (Suffolk Coast)
- The Wash (The Wash)

Maritime

Key issues and objectives

Issue: sea level rise

- **Plan** for continued coastal erosion and sea level rise by:
 - ▶ **ensuring** that a sustainable sea defence strategy is in place;
 - ▶ **preventing** development on areas subject to coastal erosion or flooding;
 - ▶ **creating** suitable maritime habitats to landward, where habitats have been lost to erosion.

Issue: maintenance of coastal processes

- **Allow** natural, dynamic coastal processes to operate by:
 - ▶ **avoiding** hard sea defences where these would interrupt the natural flow of sediments;
 - ▶ **minimising** dredging where possible, and **developing** ways of retaining dredged sediment within the system;
 - ▶ **mitigating** harmful effects of necessary dredging on coastal processes.

Issue: water quality

- **Maintain** high water quality by:
 - ▶ **reducing** inputs of untreated sewage effluents;
 - ▶ **reducing** contamination from industrial discharges and agricultural run-off.

Issue: recreation and tourism

- **Avoid** detrimental impacts on key wildlife features by **promoting** recreation and tourism that is environmentally sensitive.
- **Avoid** development of tourism infrastructure that would result in demand for unsustainable sea defences.

The most extensive stretches of coastal cliffs in the East of England Region occur in north-east Norfolk, within the Sheringham to Lowestoft Natural Area. As they are composed of soft rock, these cliffs are prone to erosion. Apart from at Hunstanton in Norfolk, there are no large areas of hard rock cliffs in the Region.

The most notable sand dunes occur along the North Norfolk Coast and at Winterton and Great Yarmouth in Norfolk. The extensive dune system along the North Norfolk Coast is mostly calcareous, with the more mobile vegetation types forming large components of the vegetation. In contrast, the dunes at Winterton are acidic and support a fixed dune vegetation that has abundant lichens. These dunes have the only significant area of dune heath on the east coast of England. The dunes in the Region support several rare and scarce plants, including bedstraw broomrape (a BAP species), and important populations of the natterjack toad (also a BAP species).

Shingle occurs at numerous locations along the Norfolk and

Suffolk coastline and several sites are of international importance for their specialised vegetation that includes sea-kale and the scarce sea pea. The shingle spit at Blakeney Point extends for almost 12 km and this dynamic feature is interlinked with its fringing dunes and saltmarsh. The sandy shingle ridges that stretch from Minsmere to Walberswick have a well-developed strandline vegetation and at Orfordness the vegetation is a good illustration of the natural transition between saltmarsh and shingle habitats. A number of sand and shingle beaches in the Region are important breeding areas for seabirds and hold nationally important populations of little terns, Sandwich terns and common terns.

Numerous natural lagoons occur along the coast, many of which result from the percolation of seawater through shingle beaches. From Old Hunstanton to Sheringham there are saline lagoons between the shingle ridges and saltmarsh at Salthouse; the Suffolk Coast has a series of mostly small lagoons that have formed behind the shingle barriers; and there are



Black-tailed godwits. Chris Gibson/English Nature

Main Earth heritage features of key Natural Areas

37. The Fens

- Upper Jurassic clays and associated deposits with important fossil faunas
- Upper Jurassic fossil-rich limestones including coral reefs and associated deposits at Upware
- Complex sequences of Holocene deposits representing varied environments and recording recent sea level and climatic changes

47. North Norfolk

- Lower and Upper Cretaceous stratigraphy and palaeoenvironments
- Pleistocene stratigraphy, palaeontology and palaeoenvironments
- Modern coastal geomorphology (including saltmarsh development and landslips)

49. Suffolk Coast and Heaths

- Inland and coastal exposures of Crag sediments containing fossil faunas
- Inland and coastal exposures of glacial sediments and boulder clays
- Coastal geomorphological features

50. East Anglian Plain

- Late Cretaceous fossiliferous chalk
- Quaternary stratigraphy, including glacial and interglacial deposits
- Quaternary river gravel deposits, including cold-climate mammal remains

52. West Anglian Plain

- Formerly economically important ironstone deposits

- Middle Jurassic limestones and clays showing a great variety of environments
- Oxford Clay exposures in brickpits of importance for palaeontology and stratigraphy
- Fossil-rich limestones and clays at the junction of the Oxford and Ampthill clays with rich faunas
- Exposures of well known fossiliferous Cambridge Greensand (Cretaceous) with diverse faunas including reptile bones
- Quaternary glacial deposits
- Quaternary river terrace gravels with important fossil faunas

65. Chilterns

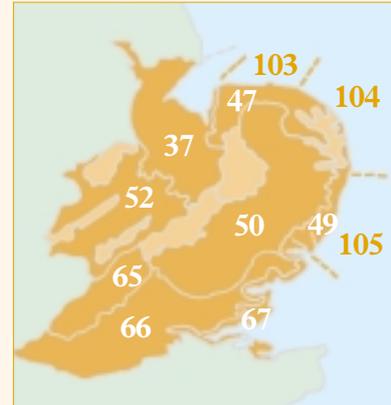
- Ancient Thames river gravels exposures in pits and quarries
- Chalk dry valleys and periglacial landforms
- Chalk escarpment and landscape, clay capping and associated exposures

66. London Basin

- Exposures of Tertiary sedimentary rocks and their fossil plant remains
- Exposures of Thames gravels and associated fossiliferous river terrace deposits
- Archaeological artefacts located in Quaternary deposits

67. Greater Thames Estuary

- Exposures of Tertiary sedimentary rocks and fossils
- Exposures of Thames gravels and associated fossiliferous river terrace deposits
- Archaeological artefacts in Quaternary deposits
- Low-lying 'soft' coastline indented by major estuaries and scattered with islands
- Two of the best saltmarsh morphology sites in Britain



- Isle of Sheppey has some of the best examples of modern mass movement in Britain

103. Old Hunstanton to Sheringham

- Coastal exposures of Pleistocene sediments
- Major barrier coastline, important for demonstrating modern coastal processes

104. Sheringham to Lowestoft

- Exposures of Pleistocene deposits and glacial sediments in coastal cliffs
- Pleistocene vertebrates and other fossils
- Sand and clay cliffs showing mass movement
- Sand dunes at Winterton
- Predominant littoral drift to the south, transporting material from eroding cliffs in the north

105. Suffolk Coast

- Exposures of Pliocene and Pleistocene Crag deposits and glacial sediments in coastal sections
- Complex shingle formation of Orfordness (one of only three similar structures on the English coast)
- Rapidly retreating cliffs in areas such as Covehithe



Hunstanton Cliffs, Norfolk. Chris Gibson/English Nature

important vertebrates and invertebrates. Lying within the West Anglian Plain is the Bedfordshire Greensand Ridge, a low escarpment of Lower Greensand and Gault Clay, and the Yardley-Whittlewood ridge, which is formed of Jurassic rocks and has heavy clay soils.

To the east, a low-lying plateau of Cretaceous chalk underlies the East Anglian Plain, East Anglian Chalk

and Breckland. Breckland is covered by a thin layer of glacial drift deposits, which have been re-worked to form a continuous cover of wind-blown sand. In contrast, the chalk of the East Anglian Plain and East Anglian Chalk is covered by substantial quantities of glacial sands, gravels and clays (boulder clays). These deposits demonstrate the sequence of changes in climate and environment from both cold

(glacial) and temperate (interglacial) periods in the Quaternary period.

Both the Broads and Suffolk Coast and Heaths are underlain by muddy and sandy deposits known as the Crag, which was laid down in the North Sea basin. These are generally covered by glacial sands and gravels. The Crag has abundant marine fossils, which indicate the climatic conditions before glacial times. Crag

Coast and Heaths has extensive areas of a heathland type that is more characteristic of the western parts of Britain. The largest areas of heathland in both Breckland and Suffolk Coast and Heaths are candidate SACs. In the London Basin the mostly small areas of lowland heath around Camberley form part of an extensive complex of international importance, and North Norfolk has significant wet and dry heathland, most notably in association with mires. Elsewhere in the Region the remaining Natural Areas have only very small fragments of lowland heath, or none at all.

The lowland grasslands and heaths support a variety of uncommon plants including many BAP species. The Rex Graham Reserve in Breckland supports the largest population of military orchid in Britain (more than 95%) and the Devil's Dyke in the East Anglian Chalk is the only known British dry grassland site where lizard orchid occurs. The calcareous grassland in the Chilterns is very important for plant species and is the only location of the fringed gentian. Acid grassland in Breckland supports the thatch moss, a moss usually found on roof thatch.

Heathland in the Suffolk Coast and Heaths supports the red-tipped cudweed, and Breckland has an endemic sub-species of perennial knawel. The mosaics of grasslands and heaths are particularly rich in butterflies and moths, including the BAP species lunar yellow underwing moth, marbled clover moth and tawny wave moth. The heaths in the Region, especially within Breckland and the Suffolk Sandlings, are nationally important for breeding populations of three BAP bird species: woodlark, nightjar and stone curlew.



Pingo grassland, Narborough, Norfolk. Peter Wakely/English Nature

used as grazing marshes. Of particular importance are the floodplain marshes of the Thames, and the ‘washlands’ of the Nene, Ouse and Cam rivers in The Fens, where areas of permanent grassland are deliberately flooded to prevent rivers over-topping. Grazing marshes also dominate the coast of the Greater Thames Estuary, which has one of the most extensive networks of coastal grazing marshes in England. There are also coastal grazing marshes in North Norfolk. These floodplain and coastal grazing marshes are important for the flora and invertebrate fauna of both the wet grasslands and their associated ditches, and they support

internationally important populations of wintering waterfowl.

Large areas in the Region are used for arable farming, particularly on the flat or undulating land of The Fens, East Anglian Plain, West Anglian Plain, East Anglian Chalk and Breckland. The rich soils here are intensively cultivated and large cereal fields are a major feature of the landscape. The cereal field margins within this Region occasionally still support uncommon BAP plants such as cornflower, broad-leaved cudweed, corn cleavers and shepherd’s-needle, and the arable fields within the East Anglian Chalk are the only mainland site

where grass-poly grows. Farmland in the East of England supports the majority of the English population of brown hare, together with birds such as corn bunting, linnet, tree sparrow and grey partridge, species that have suffered major declines in population on intensively farmed land.

In the Region lowland heathland occurs most extensively in Breckland, Suffolk Coast and Heaths, North Norfolk and the London Basin. Breckland has significant areas of dry heathland, that have developed under a semi-continental climate, which form mosaics with acid and calcareous grasslands. Unusually, Suffolk



Minsmere-Walberswick Heaths and Marshes, Suffolk. Peter Wakely/English Nature



Red Crag, The Naze SSSI, Essex. Chris Gibson/English Nature

deposits are exposed on the foreshore in places from Sheringham to Lowestoft, and in cliffs on the Suffolk Coast, with London Clay becoming more prominent to the south.

To the south the landscape is dominated by the syncline (trough-like) formation of the London Basin, which is fringed by more resistant Cretaceous chalk such as the major chalk ridge of the Chilterns. The

London Basin has extensive sediments, mostly of London Clay and older Tertiary sediments of river deposits (e.g. the Reading Beds), which have yielded many fossils and archaeological remains. To the east, the Greater Thames Estuary is a continuation of the London Basin syncline. Here sand and clays form a low-lying coastline that is indented by major estuaries, including the Thames, the Blackwater and the Stour.

Freshwater

Key issues and objectives

Issue: water quality

- **Maintain** or, where appropriate, **restore** high water quality by:
 - ▶ **improving** sewage treatment where necessary;
 - ▶ **safeguarding** lakes and ponds from agricultural and urban run-off.

Issue: water management/engineering

- When **planning** and **undertaking** abstraction and engineering work:
 - ▶ **avoid** damaging sites of wildlife interest;
 - ▶ **maintain** appropriate water levels in all water bodies.
- **Restore** natural dynamic river processes, especially in floodplains.

Issue: recreation

- **Avoid** detrimental impacts on habitats and species by **managing** the recreational use of rivers, canals and lakes appropriately.

Issue: inappropriate management

- **Manage** waterside habitats appropriately by **re-establishing** natural waterside habitats.

A complex of rivers and streams flow across the East of England Region, many of which have been modified for flood alleviation or drainage. Parts of three rivers are prominent examples of their type. A stretch of the River Wensum, that flows across North Norfolk into the East Anglian Plain, and part of the Old Bedford River in The Fens, are outstanding lowland rivers with a range of aquatic plant communities. In addition, the slow-flowing complex of the Rivers Bure, Yare and Waveney and their tributaries and lake systems form the

Broads, one of Britain's finest and most extensive wetlands. Elsewhere in the Region large rivers, drains and watercourses are characteristic of the low-lying areas, for example the Rivers Nene and Ouse in West Anglian Plain and The Fens; the Rivers Wensum and Waveney in East Anglian Plain; and the River Thames in the London Basin. Part of the River Nar, which flows from North Norfolk into The Fens, is the best example of a chalk river in the Region. It has riffles and pools and many active springs in its upper and middle courses. Chalk rivers



Yare Broads and Marshes, Norfolk. Peter Wakely/English Nature

Fragments of lowland calcareous grasslands occur across several other Natural Areas in the Region and these include some individual sites of international importance such as the orchid-rich grasslands of Devil's Dyke in the East Anglian Chalk. Unimproved neutral grasslands occur on calcareous clays and alluvial deposits, with species-rich hay meadows present in West Anglian Plain and East Anglian Plain, notably at Portholme which is a candidate Special Area of Conservation (SAC). Fragments of acid grasslands occur most commonly in association with heathland, for example in North Norfolk, Breckland and Suffolk Coast and Heaths.

Wet grasslands feature prominently in the Region, the largest of which are the flood meadows on the plains of major river systems in The Fens, East Anglian Plain, The Broads, London Basin and Suffolk Coast and Heaths. Many of these areas are

Characteristic habitats of key Natural Areas

37. The Fens

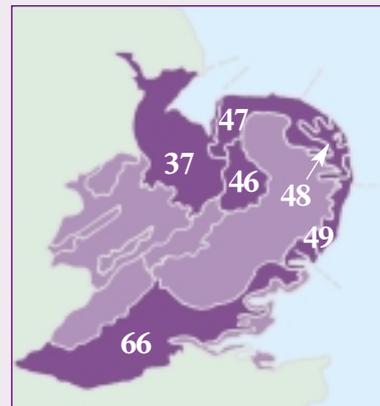
- Wet neutral grassland including washlands and *floodplain grazing marsh*
- Ditches and drains within wet grasslands, some of botanical significance, e.g. Ouse Washes
- Some improved neutral grassland

46. Breckland

- Extensive areas of dry *lowland heathland*
- Significant areas of *lowland calcareous grassland* and *lowland dry acid grassland*
- Inland sand dunes with grassland vegetation

47. North Norfolk

- Significant areas of wet and dry *lowland heathland*



- Small areas of *lowland calcareous (chalk) grassland*
- Small fragments of acid grassland
- *Coastal grazing marshes* important for birds and some invertebrates

48. The Broads

- Extensive high quality lowland wet grassland along river valleys
- Internationally important network of ditch systems within the *grazing marshes*

49. Suffolk Coast and Heaths

- Extensive areas of dry *lowland heathland*
- Fragments of *lowland dry acid grassland* on Sandlings Heaths
- Wet grassland and *grazing marsh* alongside floodplains of rivers and estuaries

66. London Basin

- Notable areas of *lowland dry heath* and *lowland wet heath*
- Areas of acid grasslands
- Wet neutral grasslands in river valleys
- Dry neutral grasslands
- Small area of *lowland calcareous grassland*

NB Priority BAP habitats in italics

Candidate Special Areas of Conservation

- Breckland (Breckland)
- Devil's Dyke (East Anglian Chalk)
- Minsmere to Walberswick Heaths and Marshes (Suffolk Coast and Heaths)
- Portholme (West Anglian Plain)
- Rex Graham Reserve (Breckland)

Special Protection Areas

- Broadland (The Broads)
- Breydon Water (The Broads)
- Ouse Washes (The Fens)
- Nene Washes (The Fens)
- Minsmere-Walberswick (Suffolk Coast and Heaths)

Potential Special Protection Areas

- Breckland (Breckland)
- Suffolk Sandlings (Suffolk Coast and Heaths)

Lowland grassland and heath

Key issues and objectives

Issue: pressure for agricultural intensification

- **Avoid** further agricultural intensification by:
 - ▶ **encouraging** traditional, low-intensity agriculture;
 - ▶ **promoting** agri-environment schemes, where changes in farming practice would benefit wildlife.

Issue: opportunities for habitat creation

- **Create** or **restore** grassland and heaths, especially where this **extends** or **links** existing fragments.
- **Create** wet grasslands by **restoring** appropriate flooding regimes on floodplains.
- **Promote** and **encourage** the creation of conservation field margins in cereal fields.

Issue: lack of appropriate management

- **Promote** appropriate management through:
 - extensive, low-intensity **grazing** and **mowing** on grasslands and heaths;
 - appropriate scrub **control** on heaths.

Across the East of England Region extensive areas of grassland have been drained and agriculturally improved, but some grasslands of conservation importance remain. The mosaic of acid and calcareous soils in Breckland supports an outstanding mix of grassland vegetation types and some of these are of international importance. These include the most extensive surviving area in Britain of a rare grassland

that is typical of dry, winter-cold continental areas, which is characterised by sheep's fescue, mouse-ear hawkweed and wild thyme (including Breckland thyme, a distinct sub-species that is found only in Breckland). Breckland also has one of the most significant areas in England of inland dunes, which support a lichen-rich grassland that includes two species, sand sedge and grey hair-grass, that are normally found only on the coast.



Sand catchfly, Lakenheath, Suffolk. Chris Gibson/English Nature

are particularly rich in species and chalk rivers and streams are significant features of Breckland, East Anglian Chalk and the Chilterns.

The rivers support a varied aquatic and emergent flora and scarce plants present include the water soldier, whorled water milfoil, broad-leaved pondweed, Loddon pondweed and fen pondweed. The Broads also support the only British populations of the holly-leaved naiad and the Norfolk hawker dragonfly. A number of BAP animal species occur

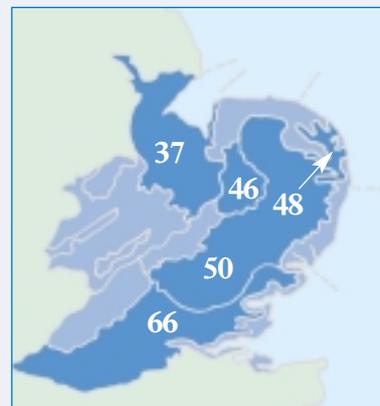


Frogbit with greater bladderwort, Woodwalton Fen, Cambridgeshire. Chris Gibson/English Nature

Characteristic habitats of key Natural Areas

37. The Fens

- Large, slow-flowing rivers and drains
- Ditches and drains within wet grasslands, some of botanical significance, e.g. Ouse Washes
- Ponds and borrow pits (some *mesotrophic standing waters*)
- Many flooded gravel pits (some *mesotrophic standing waters*)



46. Breckland

- Network of *chalk streams*
- Unique series of *aquifer-fed naturally fluctuating water bodies*
- Some large gravel pits
- Extensive series of pingos

48. The Broads

- Internationally important network of rivers and associated lakes (broads)
- *Eutrophic standing waters* (lakes, broads and ditches)
- Internationally important network of ditch systems within the grazing marshes

50. East Anglian Plain

- Long stretches of slow-flowing rivers and drains
- Series of flooded gravel pits and reservoirs
- Small ponds and shallow lakes; many of which are *eutrophic standing waters*

66. London Basin

- Extensive network of rivers and streams (the Thames and its tributaries)
- Series of flooded gravel pits and reservoirs
- Man-made lakes in Royal Parks

NB Priority BAP habitats in italics

Candidate Special Areas of Conservation

- Breckland (Breckland)
- Orton Pit (West Anglian Plain)
- Ouse Washes (The Fens)
- The Broads (The Broads)

Special Protection Areas

- Abberton Reservoir (London Basin)
- Broadland (The Broads)
- Ouse Washes (The Fens)
- Nene Washes (The Fens)

Potential Special Protection Areas

- London Reservoirs and Gravel Pits (London Basin)
- Lee Valley (London Basin)



River Wensum, Norfolk. Peter Wakely/English Nature

in the rivers, including the freshwater pea mussel, the compressed river mussel, the white-clawed crayfish, otters and water voles. The spined loach occurs in the River Ouse and its tributaries and the Ouse Washes is a candidate Special Area of Conservation (SAC) for this species. The rivers also provide rich hunting grounds for many of the ten species of bat recorded in the Region.

There are many flooded gravel pits, clay pits and reservoirs in the Region and these form significant landscape features in the West Anglian Plain, East Anglian Plain, The Fens and the London Basin. This series of artificial water bodies has a wide range of water and substrate types, with a corresponding variety of aquatic plants. The freshwater habitats in the Region are of outstanding importance for wintering waterfowl. The Broadland Special Protection Area (SPA) holds internationally important populations of Bewick's and whooper swans, wigeon, gadwall and shoveler and the reservoirs and gravel pits of the London Basin, including Abberton Reservoir SPA, are of international importance for wintering wigeon, gadwall and shoveler.

Most natural bodies of open water in the Region are eutrophic (rich in nutrients) or mesotrophic/eutrophic (medium-rich in nutrients). The shallow eutrophic lakes and ditch systems of the Broads support relict vegetation of the original freshwater flora, and these are some of the richest areas for scarce plants in the Region. Breckland has a unique series of lakes and pools, including fluctuating meres that occasionally dry out as a result of natural fluctuations in groundwater levels.

The ancient woods and parklands in the Region support a notable range of breeding birds, including green woodpecker, great spotted woodpecker, lesser spotted woodpecker, spotted flycatcher, tree pipit and firecrest, and large populations of woodlark and nightjar are found in the clearfell and young conifer plantations in Breckland and the Suffolk Sandlings in the Suffolk Coast and Heaths. Populations of the dormouse occur in a number of woods in the Region and there is an isolated population of red squirrels in Thetford Forest in Breckland. The woods are also important habitats for the ten species of bat found in the Region; many of the recent British records of the rare barbastelle are from Breckland.



Primroses at Bradfield Woods, Suffolk. Chris Gibson/English Nature



East Grove, Essex. Chris Gibson/English Nature



Woodland ground flora, Epping Forest, Essex.
Chris Gibson/English Nature

pasture woodland and parkland is reflected in the presence of many old, pollarded trees. These ‘veteran’ trees support many lichens, deadwood beetles, and provide roosts for bats and birds. Several of these woods are candidate SACs.

Clusters of ancient oak-ash woods, some of which are large, also occur in the West Anglian Plain and Bedfordshire Greensand Ridge and oak woodland dominates the Yardley-Whittlewood Ridge. Oak, ash and beech woods occur in East Anglian Chalk, and there is a fairly even scatter of relatively small ancient woods and parklands through the East Anglian Plain. These include hornbeam at the northernmost edge of its range, and a small-leaved lime wood at Hockering. The largest conifer plantations in the Region are in Thetford Forest in Breckland and the Sandling plantations in Suffolk

Coast and Heaths. Towards the coast woodland is scarce but includes some important individual sites, such as the internationally important alder woods of The Broads, and the ancient oak wood of Staverton Park and the Thicks in the Suffolk Coast and Heaths.

Ancient species-rich hedgerows are a common feature in parts of the Region, although many hedges were lost with conversion to the large-scale arable fields that dominate parts of the landscape. In this Region most hedges have hawthorn as a major component, and can vary in form, from the high hedgerows of North Norfolk to the low hedges of the East Anglian Chalk.

The woods of the Region are rich in uncommon plant species including green hound’s-tongue (a BAP species), and many orchid species such as the very rare ghost orchid, the narrow-lipped helleborine

(which is found especially in beech woods) and red helleborine. A wide range of epiphytic species (i.e. growing on other plants) also occur including knothole moss; the Chilterns is one of only three localities in Britain where the liverwort *Metzgeria fruticulosa* grows on box leaves. Several rare species of fungi are strongly associated with the calcareous beechwoods, including Devil’s bolete (a priority BAP species), old man of the woods and the very poisonous, red-staining inocybe.

The ancient woods also support nationally important communities of deadwood invertebrates that include rare beetles such as the stag beetle and violet click beetle. A large number of butterflies and moths are also associated with woodland in the Region, including the BAP species fan-foot moth, olive crescent moth, common fan-foot moth and pearl bordered fritillary.

These fluctuating meres support several rare plants including the moss *Physocomitrium eurystomum*, which occurs largely around the Breckland pool margins, and these meres are the only location in Britain for a species of water flea. Breckland also has an extensive systems of pingos, shallow glacial depressions that sometimes fill with water. The pingos support an unusual fauna with a remarkable range of invertebrates, including water beetles that are more typical of colder, more northern climates.

Other small ponds and lakes are abundant across the Region and are notable for their populations of great-crested newts, toads and common frogs. Although artificial in origin (former clay pits), the series of ponds at Orton Pit supports the largest known population of great-crested newts in Britain and is a candidate SAC for this species.



Common frog. Chris Gibson/English Nature



Old Bedford River, Cambridgeshire. Peter Wakely/English Nature

Bog, fen and swamp

Key issues and objectives

Issue: water quantity/quality

- **Maintain** or, where necessary, restore the hydrological integrity of wetlands by:
 - ▶ **avoiding** policy and planning decisions that interfere with hydrology;
 - ▶ **restoring** water levels of degraded bogs and fens, or impeding drainage.
- **Restore** the quality of fens and flushes by:
 - ▶ **eliminating** harmful run-off or other sources of nutrient enrichment and other pollution;
 - ▶ **improving** sewage treatment where necessary.

Issue: habitat loss

- **Extend** the areas of fens and reedbeds by **raising** water levels, especially to **link** existing fragments.

Issue: habitat management

- **Restore** the quality of degraded bog, fen and swamp habitats by:
 - ▶ **removing** degraded peat, scrub, or reeds where necessary;
 - ▶ **grazing** or **reed-cutting** on neglected tall fen habitats.

Although areas of fen vegetation are scattered throughout Britain, the main concentrations of lowland fen occur in the East of England Region. The floodplain of the Broads has the largest expanse of species-rich fen in lowland Britain, with a mosaic of vegetation types that includes alkaline fen (short fens composed mainly of

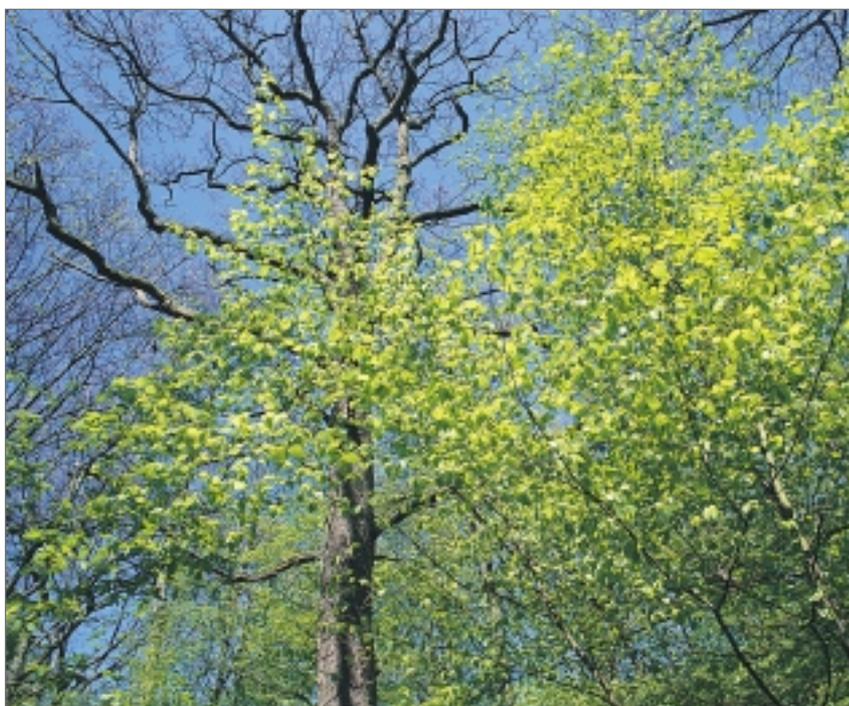
sedges), transition mire (characteristic between acid bog and alkaline fen) and the largest example in Britain of calcareous fens with great fen-sedge. Breckland, East Anglian Plain and North Norfolk each have internationally important fens in the heads of valleys and which are fed by groundwater springs, a type that is rare in the lowlands.



Ant Broads and Marshes, Norfolk. Peter Wakely/English Nature

the Chiltern beechwoods are important associated habitats such as yew woods and box woods.

The woodland of the London Basin is dominated by beech, oak and hornbeam. Some of these woods are former pasture woodland, where grazing as well as wood production was practised. There are also a number of parklands, where the grazing animals were often deer, such as in the old royal parks. The traditional management of the

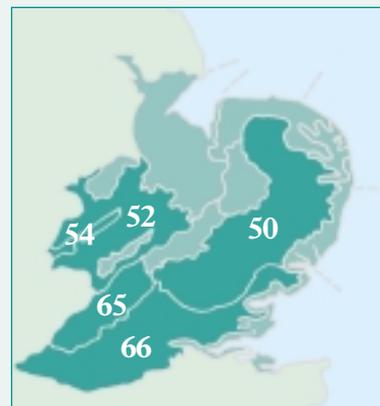


Wormley Hoddesdonpark Woods, Hertfordshire. Chris Gibson/English Nature

Characteristic habitats of key Natural Areas

50. East Anglian Plain

- Numerous ancient lowland oak and mixed deciduous woods
- Hornbeam woods at northern edge of their range
- Ancient *lowland wood pasture and parkland* with veteran trees



52. West Anglian Plain

- Lowland oak and mixed deciduous woods
- Numerous ancient coppice woods

54. Yardley-Whittlewood Ridge

- Dominated by lowland mixed deciduous woodland
- Ancient *lowland wood pasture and parkland* with veteran trees

65. Chilterns

- Extensive areas of *lowland beech and yew* woodland
- Some areas of lowland mixed deciduous woodland
- Box woodland

66. London Basin

- Extensive areas of *lowland beech and yew* woodland
- Significant areas of lowland mixed deciduous woodland and oak-hornbeam woods
- Small areas of *wet woodland* (mostly alder) in wet gullies
- Numerous large *lowland wood pastures and parklands*

NB Priority BAP habitats in italics

Candidate Special Areas of Conservation

- Epping Forest (London Basin)
- Staverton Park and The Thicks, Wantisden (Suffolk Coast and Heaths)
- The Broads (The Broads)
- Wormley Hoddesdonpark Woods (London Basin)

Special Protection Areas

None

Woodland

Key issues and objectives

Issue: development

- When planning development, **avoid** the loss of ancient and semi-natural woodland.

Issue: habitat fragmentation

- **Create** new broadleaved woodland:
 - ▶ around **existing** blocks of woodland;
 - ▶ where this will **link** ancient woods.
- **Re-create** hedgerows, especially where this will **link** fragments.

Issue: management

- To **encourage** management of existing woods, **develop** local markets for timber and wood, especially coppice products.
- **Promote** restoration of coppice and pollard management, particularly where it will have benefits for wildlife.
- **Encourage** agricultural policies and practice that **allow** the spread of woodlands onto adjacent land.

Issue: plantation

- To **improve** the conservation value of plantations:
 - ▶ **restore** native broadleaved trees in ancient woodland replanted with conifers;
 - ▶ undertake appropriate **felling** or **replanting** to benefit heathland birds.

The Chilterns and London Basin are some of the most heavily wooded areas in England and a significant proportion of these woods are of ancient origin. The Chilterns have the most extensive area of native beech

woodland in England, ranging from beech woods on acid soils, through oak-beech woods on heavy clays to beech woods on thin, chalky soils. A number of the Chilterns woods are candidate Special Areas of Conservation (SACs). Also within



Hornbeam coppice, Thrift Wood, Essex. Chris Gibson/English Nature

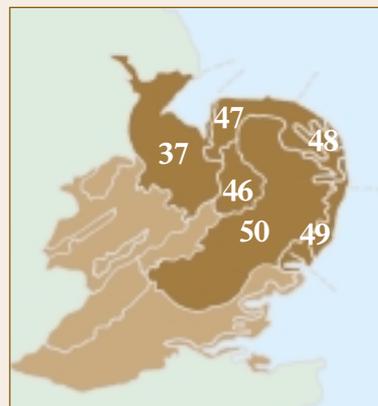
Other, mostly small areas of fen vegetation occur across the Region, mainly associated with small streams and springs. Some of these form individual sites of importance.

Although dominated by sedges and rushes most fens have a rich flora that includes numerous rare and scarce plants. The areas of fen vegetation in the Region support the main British populations of scarce plants such as fibrous tussock-sedge, marsh orchid

Characteristic habitats of key Natural Areas

37. The Fens

- Small, scattered areas of relict *fen*
- *Purple moor-grass and rush pastures*
- Small areas of marsh, fen-sedge swamp and *reedbed* habitats



Fen violet, Woodwalton Fen, Cambridgeshire. Peter Wakely/English Nature

46. Breckland

- Spring-fed valley *fens* in headwaters and tributaries of rivers
- Some *reedbeds* along riversides and on margins of lakes

47. North Norfolk

- Series of spring-fed valley *fens* in headwaters of rivers
- Areas of *purple moor-grass and rush pastures*

48. The Broads

- Largest expanse of species-rich lowland *fen* in Britain
- Swamps and *reedbeds* along riversides
- Some areas of *purple moor-grass and rush pastures*

49. Suffolk Coast and Heaths

- Extensive *reedbeds*, including largest continuous *reedbed* in England
- Significant swamp habitats
- *Fen* vegetation in floodplains

50. East Anglian Plain

- Series of spring-fed valley *fens* in headwaters of rivers
- Some areas of *purple moor-grass and rush pastures*

NB Priority BAP habitats in italics

Candidate Special Areas of Conservation

- Fenland (The Fens; East Anglian Chalk)
- Norfolk Valley Fens (North Norfolk; East Anglian Plain; Breckland)
- Roydon Common and Dersingham Bog (North Norfolk)
- The Broads (The Broads)
- Waveney and Little Ouse Valley Fens (East Anglian Plain; Breckland)

Special Protection Areas

- Broadland (The Broads)
- Minsmere-Walberswick (Suffolk Coast and Heaths)



Waveney-Little Ouse Valley Fens, Suffolk. Peter Wakely/English Nature



and milk parsley. A number of BAP plant species grow predominantly in fen habitats, e.g. fen violet, and the Region has populations of a number of priority BAP species including slender green feather moss, the only English populations of fen orchid, and one of only two English populations of Norfolk flapwort.

Another important type of fen occurs on moist, peaty soils in the Region. Dominated by purple moor-grass, this fen meadow vegetation is often species-rich and occurs in a number

Fen orchid at Catfield Fen, Norfolk.
Peter Wakely/English Nature

of Natural Areas in the Region, including The Fens, The Broads and East Anglian Plain. Some of these sites, namely Fenland, and Waveney and Little Ouse Valley Fens, are of international importance and are candidate Special Areas of Conservation (SACs).

A rich mix of other habitats occur in association with fens, including swamps, reedbeds and carr woodland. Swamps and reedbeds occur across the Region in river valleys, on the edges of lakes and in old clay and gravel pits, and the largest reedbeds in England are in Suffolk Coast and Heaths.



Silver barred moth. Chris Gibson/English Nature

Mosaics of wetland habitats are very rich in invertebrates and the fens and reedbeds in the Region support populations of two priority BAP species, the leaf beetle *Cryptocephalus exiguus* and the longhorn beetle *Obera oculata*. Several colonies of the narrow-mouthed whorl snail and many of the English colonies of Desmoulin's whorl snail, both priority BAP species, also occur in the fens of the Region. Populations of numerous butterflies and moths have also been recorded in the fens and reedbeds, including the silky wave moth, marsh moth, white-mantled wainscot moth, silver barred moth and sword-grass moth.

The reedbeds and swamps support significant populations of breeding and wintering birds. The reedbeds and swamps within Broadland Special Protection Area (SPA) and Minsmere-Walberswick SPA hold internationally important populations of breeding bittern (a priority BAP species), marsh harrier and bearded tit, and are important for other rare breeding species such as Cetti's warbler and Savi's warbler.



Purple loosestrife, Woodwalton Fen, Cambridgeshire. Allan Drewitt/English Nature