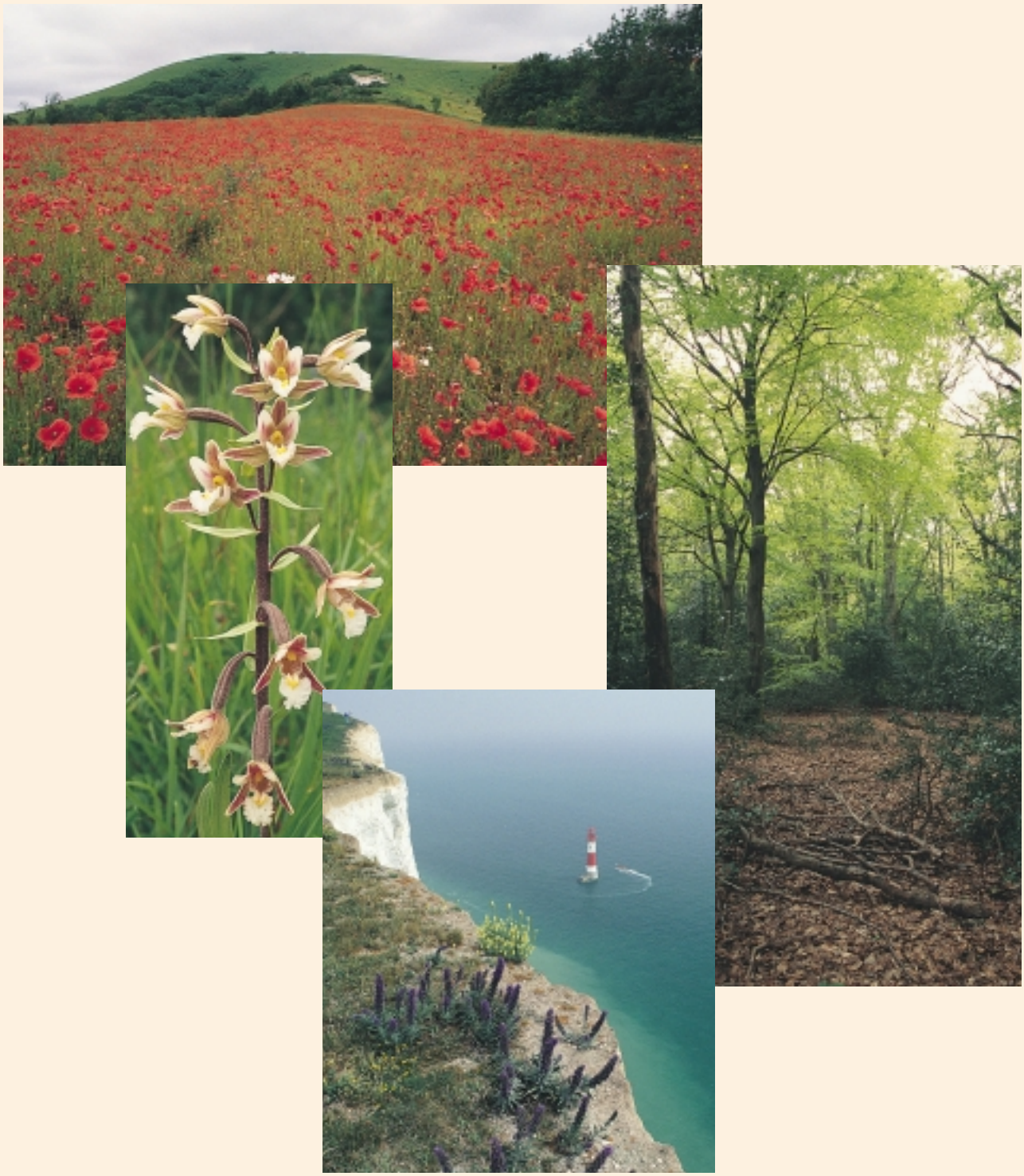
ENGLISH NATURE

Natural Areas in London and the South East 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.

Ebernoe Common, West Sussex. Peter Wakely/English Nature

Ditchling Beacon, Sussex. Peter Wakely/English Nature

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).

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 sevaral 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, with our key partners in the Region, identified the chief threats to, and opportunities for, nature conservation. Together, we have defined a range of issues, and set associated objectives that we believe provide a starting point for Regional action to protect and manage our biodiversity and geological assets. These objectives are set out in the sections which follow.

Objectives for sustainable development and nature conservation in London and the South East Region

London and the South East is a Region of dramatic, and often sharp contrasts. Dense urban populations are concentrated in and around the major conurbations, most notably London, with extensive motorway and rail links across a typical rural landscape where agriculture is the dominant land use.

The diversity of the Region supports a characteristic combination of wildlife and Earth heritage. It ranges from the open spaces of the arable farming which dominate the plateaux, to the river valleys and estuarine plains. The coast is almost entirely developed with the exception of some superb natural harbours and spectacular cliffs. Dense ancient woodland is found in many areas, whilst the chalk forms characteristic hills and escarpments. In some areas there are intimate patterns of small fields, hamlets and winding lanes. Areas like the High Weald, the Wealden Greensand and the South Downs 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 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 will continue to be, shaped through human activity which is driven by economic, social, and environmental forces.

Natural Areas covered in London and the South East Region report

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 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 London and the South East 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.

Box Hill, Surrey.
Peter Wakely/English Nature

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** important Earth heritage sites by:
  - **agreeing**, with extraction companies and landfill industries, the conservation of important features;
  - where necessary, **clearing** vegetation from rock faces;
  - **promoting** responsible fossil collecting from sensitive or vulnerable sites;
  - **ensuring** that Earth heritage interests are considered as part of coastal sea defences under a Shoreline Management Plan;
  - **avoiding** developments that interfere with the natural coastal processes of sedimentation and erosion.

Issue: underpromotion of Earth heritage

- **Promote** local Earth heritage by:
  - **encouraging** site interpretation, for example through sign boards, trail guides, leaflets;
  - **promoting** the links between geology and local habitats, landscape and archaeology;
  - **promoting** the educational and scientific value of Earth heritage sites.

The London and the South East Region is dominated by three geological features: the trough-like syncline of the London Basin, the dome-like structure of the Wealden anticline, and the Hampshire Basin to the west. The London Basin has extensive sediments, mostly of London Clay and older Tertiary sediments of river deposits (e.g. 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 northern edge of the London Basin is delimited by the major ridge of Cretaceous chalk that forms the Chilterns and the Berkshire and Marlborough Downs, a series of hills dissected by networks of dry valleys or coombes. The Berkshire and Marlborough Downs has the highest concentration of Quaternary Sarsen stones in England. During the Quaternary ice age these large stones were weathered and carried across the landscape as a result of the seasonal thawing of the permafrost.

The Thames and Avon Vales is a low-lying plain of Jurassic clays which surrounds the low Jurassic limestone hills of the Midvale Ridge. Both

Beachy Head, East Sussex. Peter Wakely/English Nature

Main Earth heritage features of key Natural Areas

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 with diverse faunas including reptile bones
- Quaternary glacial deposits
- Quaternary river terrace gravels with important fossil faunas

55. Cotswolds

- Cotswold scarp slope and clay vales
- Exposures of limestones in Cotswold scarp and valleys
- Cotswold stone buildings

63. Thames and Avon Vales

- Outcrops of Oxford and Kimmeridge Clays in brickpits
- Most northerly deposits of Wealden rocks in Britain
- Upper Jurassic 'Corallian' limestones and fossil remains in classic area
- Most northerly exposures of Portlandian rocks

64. Midvale Ridge

- Classic 'Corallian Group' localities, some internationally well-known with important ammonite fossils
- Important Kimmeridgian reptile 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

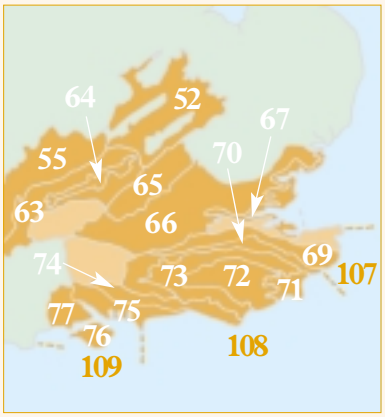
- Exposures of Tertiary sedimentary rocks and their fossil plant remains
- Exposures of Thames gravels and associated fossiliferous river terrace deposits
- Archaeological artefacts located in Quaternary deposits

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

69. North Downs

- Cretaceous stratigraphy
- Downs landscape of chalk escarpment and dry valleys
- Periglacial deposits and coombe rock along the foot slope of the Downs
- Coastal exposures showing the Cretaceous rocks and nature of the Alpine folding



70. Wealden Greensand

- Lower Greensand and Gault sequence in classical area
- Pleistocene deposits including loess
- Pleistocene landslip features; cambering and gullying

71. Romney Marshes

- Lower Cretaceous environments
- Flandrian coastal evolution

72. High Weald

- Uppermost Jurassic environments - Purbeck Group
- Lower Cretaceous stratigraphy and environments - Hastings Beds Group of Wealden Series
- Lower Cretaceous palaeontology

73. Low Weald and Pevensey

- Weald Clay Formation, Wealden Series
- Palaeontology of the Weald Clay Formation
- Upper Cretaceous Chalk stratigraphy and palaeontology

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areas have yielded abundant fossil remains, with the Midvale Ridge being particularly rich in ammonite fossils, with some reptile and dinosaur remains. Further west are the Cotswolds, prominent limestone hills with valleys floored by softer Jurassic clays. To the north-east is the West Anglian Plain of Jurassic marine clays and Quaternary rocks.

The Wealden anticline dominates the area to the south of the London Basin. At the core of this dome-like structure is the High Weald, a geologically complex area of Lower Cretaceous clays and sandstones that is locally fossiliferous, and has yielded a substantial vertebrate fossil fauna. The High Weald is surrounded by the low-lying Cretaceous Weald Clay formation of the Low Weald and Pevensey which is in turn surrounded by the Cretaceous Greensand escarpment. To the south-east lies Romney Marshes, formed of Flandrian coastal deposits that have accumulated over the last 9,500 years and which includes the extensive shingle foreland at Dungeness.

The outer edge of the Wealden anticline is of Cretaceous chalk, a pure limestone forming the North Downs and the North Kent Plain in the north, the South Downs in the south and the Hampshire Basin to the west. The chalk hills of the Downs have networks of dry valleys with ephemeral streams or 'winterbournes'.

Alum Bay, Isle of Wight. Peter Wakely/English Nature

Within the Hampshire Basin, the South Coast Plain and Hampshire Lowlands and the New Forest has a low relief of Tertiary sands, silts and clays. In contrast, the Isle of Wight is dominated by an east-west Cretaceous chalk ridge. To the south the eroding Lower Cretaceous coast of clays and sands provides Europe's most prolific source of Wealden fossil reptiles. To the north the island is dominated by richly fossiliferous Tertiary clays and sands.

The North Kent Coast has low cliffs of boulder clay and low, vertical chalk cliffs that extend into Pegwell Bay within the East Kent Coast. Here extensive deposits of Pleistocene chalk and flint rubble, wind-blown sands and river gravel deposits associated with the River Stour are also exposed, and from south of Pegwell Bay to Folkestone there are extensive chalk cliffs. The cliffs from Kingsdown to Dover are among the most active vertical cliffs in England and Wales, with many landslips. The coastline from Folkestone to Selsey Bill is varied, providing a cross-section though the Wealden anticline. There is an extensive shingle foreshore at Dungeness. Between Rye Bay and Eastbourne there are cliffs dominated by Lower Wealden sandstones and clays, and from Beachy Head to Brighton there are high, vertical chalk cliffs that include the scenic Seven Sisters and Beachy Head. The coast between Shoreham and Selsey Bill is low-lying and dominated by fossiliferous Tertiary clays and sands, which extend into Solent and Poole Bay. Here river terrace gravels, deposited by the ancient Solent and subsequently drowned by the rising sea, separate the Isle of Wight from the mainland and are rich in archaeological remains, with evidence of early human occupation.

74. South Downs

- Cretaceous stratigraphy
- South Downs landscape of chalk dry valleys and winterbournes
- Periglacial deposits and coombe rock at the foot of the Downs
- Coastal exposures of the chalk showing the nature of the Alpine folding

75. South Coast Plain and Hampshire Lowlands

- Upper Cretaceous stratigraphy and environments
- Lower Tertiary stratigraphy
- Lower Tertiary palaeontology
- Evolution of the River Solent and Pleistocene environments
- Modern coastal geomorphology

76. Isle of Wight

- Lower Cretaceous Wealden palaeontology, stratigraphy and palaeoenvironments
- Upper Cretaceous stratigraphy
- Tertiary palaeontology, stratigraphy and palaeoenvironments
- Coastal geomorphology

77. New Forest

- Tertiary stratigraphy
- Tertiary fossils including molluscs, vertebrates and plants
- Quaternary river gravels and associated Palaeolithic habitation

107. East Kent Coast

- Upper Cretaceous stratigraphy
- Lower Tertiary stratigraphy
- Lower Tertiary palaeontology
- Late Pleistocene periglacial erosion
- Modern coastal geomorphology, e.g. mass movement, chalk platforms

108. Folkestone to Selsey Bill

- Upper Cretaceous stratigraphy and environments - Hastings Beds Group and Weald Clay
- Lower Cretaceous palaeontology
- Upper Cretaceous stratigraphy and environments
- Lower Tertiary stratigraphy
- Lower Tertiary palaeontology
- Evolution of the River Solent and Pleistocene environments
- Flandrian coastal evolution
- Large shingle cuspate foreland of Dungeness
- Shingle spit (with series of sub-parallel ridges) at Pagham Harbour
- Geomorphologically important chalk cliffs of Beachy Head

109. Solent and Poole Bay

- Lower Cretaceous Wealden stratigraphy and palaeoenvironments (IoW)
- Lower Cretaceous Wealden palaeontology (IoW)
- Upper Cretaceous stratigraphy (IoW)
- Tertiary stratigraphy and palaeoenvironments
- Tertiary palaeontology
- Evolution of the River Solent and Pleistocene environments
- Coastal geomorphological features including Hurst Spit, Poole Harbour and the Needles

Freshwater

Key issues and objectives

Issue: water quality

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

Issue: water quantity/management

- When **planning** and **undertaking** abstraction and engineering work, **avoid** damaging sites of wildlife interest.
- **Promote** sustainable use of water resources.

Issue: recreation

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

Issue: lack of or inappropriate management

- **Manage** waterside habitats appropriately by:
  - **re-establishing** natural waterside and submerged habitats;
  - **restoring** dynamic river processes, especially in floodplains

London and the South East Region has a great diversity of rivers and streams that includes the large, slow-flowing rivers that drain the West Anglian Plain, and the extensive network of lowland rivers and streams in the London Basin, many of which are tributaries of the Thames. The Thames and Avon Vales has numerous calcareous rivers and a number of streams in Kent flow along clay-bottomed valleys, including the Beult which is a nationally important clay river. The New Forest is of particular interest as the river waters flow across acid and base-enriched rocks, giving rise to a diverse flora, such as in the Lymington River.

Chalk rivers feature prominently in this Region. The upper reaches are generally fast-flowing, spring-fed streams, with sections known as 'winterbournes' that dry out in summer. These winterbournes are characteristic of the Cotswolds, the

Lymington River. Peter Wakely/English Nature

Chilterns, Berkshire and Marlborough Downs, the North Downs and the South Downs. There are several nationally important chalk rivers in the Region, namely the Test, the Kennet and its tributary, the Lambourn, and, most importantly, the Avon and the Itchen which have international status as candidate Special Areas of Conservation (SAC).

The rivers and streams support a wealth of aquatic life and chalk

Starfruit.
Peter Wakely/English Nature

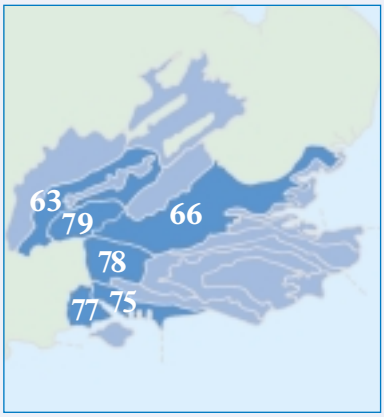
Characteristic habitats of key Natural Areas

63. Thames and Avon Vales

- Many clay-bottomed rivers, most forming tributaries of the Thames
- Canals, including Kennet and Avon, Oxford, and Grand Union Canals
- Extensive marl lake systems
- Extensive ditch systems

66. London Basin

- Extensive network of rivers and streams (the Thames and its tributaries)
- Numerous canals, including the Basingstoke, and Kennet and Avon Canals
- Series of flooded gravel pits and reservoirs
- Man-made lakes in Royal Parks



75. South Coast Plain and Hampshire Lowlands

- *Chalk rivers*, including the nationally important River Itchen and River Test
- Series of gravel pits around Chichester
- Many farm ponds

77. New Forest

- Many rivers and streams, including outstanding stretches of *chalk rivers*, e.g Avon
- Outstanding lowland rivers and streams, e.g. Lymington River
- Many ponds, including nutrient-poor (e.g. Hatchet Pond) and temporary ponds

78. Hampshire Downs

- *Chalk rivers*, including the nationally important River Itchen
- Ponds

79. Berkshire and Marlborough Downs

- Rivers and streams, including *chalk rivers*, e.g. Rivers Kennet and Lambourn
- Canal habitats, e.g. Kennet and Avon canal
- Ponds

NB Priority BAP habitats in italics

Candidate Special Areas of Conservation

- The New Forest (New Forest)
- River Avon (New Forest)
- River Itchen (Hampshire Downs; South Coast Plain and Hampshire Lowlands)

Special Protection Areas

- Stodmarsh (North Kent Plain)

Potential Special Protection Areas

- Arun Valley (Wealden Greensand)
- Avon Valley (New Forest)
- Lee Valley (London Basin)
- South West London Water Bodies (London Basin)
- Dungeness to Pett Levels (Romney Marshes)

rivers are particularly rich in species. The flora of the chalk rivers is characterised by water-crowfoots, water-starwort and lesser water-parsnip, with pondweeds and water lilies more prominent in some parts. River water-dropwort, a BAP species, occurs in some of the chalk rivers in the Region. The rivers and streams also have a diverse fauna, with invertebrates such as the white-clawed crayfish, the fine-lined pea mussel, important populations of the southern damselfly, and fish such as brook lamprey, river lamprey and salmon. The Region is also important for water voles, particularly the Wealden river catchments and otters are now recolonising some river systems.

Several canals cross the Region, including the Kennet and Avon Canal which runs through the Thames and Avon Vales, Berkshire and Marlborough Downs and London Basin. The London Basin has numerous canals including the Basingstoke Canal, which is nationally important for aquatic plants and invertebrates. It is botanically the most species-rich freshwater system in England, containing about half of Britain's native aquatic higher plant species, and has 24 dragonfly species. The waterside habitats along the soft banks of the Kennet and Avon Canal support strong populations of water vole.

An extensive series of flooded gravel pits and clay pits occurs in the river floodplains and, together with reservoirs, form significant landscape features in some areas, for example in West Anglian Plain and London Basin. These water

River Beult, Kent. Peter Wakely/English Nature

Arrowhead. Allan Drewitt/English Nature

bodies have a wide range of water and substrate types, with a corresponding variety of aquatic plants. Many of these large water bodies are important for breeding and wintering waterfowl and some, for instance Lee Valley in the London Basin, are potential Special Protection Areas (SPA) for internationally important populations of wildfowl such as gadwall and shoveler. Other artificial water bodies include ornamental lakes in London's Royal Parks in London Basin and in the parklands of Wealden Greensand.

There are few large natural lakes in the Region but ponds are widespread. The New Forest has ponds of international importance, including the nutrient-poor Hatchet Pond and a series of temporary ponds that dry out in summer. The latter are important for rare invertebrates such as the tadpole shrimp, which is found in only one temporary pool of the New Forest, and the fairy shrimp. The priority BAP species, starfruit and brown galingale, are only found in a small number of ephemeral ponds in the Region.

Many other ponds were formed through past human activity such as mining or marl extraction. In Wealden Greensand and High Weald there are a number of 'hammer ponds' which originated from the Wealden iron industry. A wide variety of water beetles and reed beetles occur in the hammer ponds of the Wealden Greensand, including the spangled water beetle (a BAP species). Many of the pools support important populations of amphibians, including the internationally threatened great-crested newt which is widespread in the Region.

Hatchet Pond, New Forest. Peter Wakely/English Nature

River Kennet, Berkshire. Peter Wakely/English Nature

Inland rock

Key issues and objectives

Issue: rock removal

- **Prevent** the removal of stone.

Issue: recreation

- **Protect** rock habitats and their vegetation, by **avoiding** disturbance through rock climbing.

Issue: agriculture

- Where **overgrazing** is causing erosion and abrasion of lichen and bryophyte communities, **reduce** stocking levels.
- **Avoid** spraying fertilisers and herbicides in areas adjacent to Sarsen stones.

Issue: management

- **Clear** rhododendron and vegetation that is overshadowing rocks with important lower plant communities, while retaining sufficient shelter and humidity.

Issue: public awareness

- **Develop** interpretation of Sarsen stones and important rock outcrops to raise awareness of their geological and nature conservation importance.

Exposures of rock habitat are not extensive in London and the South East Region but two Natural Areas have rock habitats that are of international importance: High Weald and the Berkshire and Marlborough Downs.

The High Weald has numerous scattered outcrops of sandstone rocks, some of which are large. Such outcrops are a distinctive feature of the countryside around Tunbridge Wells. Large outcrops of this sandstone occur within the steep, wooded ravines (known locally as 'gills') and support internationally important communities of lower plants, including some species which prefer more humid climates and have a predominantly western distribution in Britain. These sandstone rock habitats are characterised by two BAP species, the Tunbridge filmy-fern and hay-scented buckler-fern, and large numbers of liverworts including *Saccogyna viticulosa*, *Scapania umbrosa* and the veilwort *Pallavicinia lyelli* (a BAP species). Mosses include *Dicranum scottanum*, *Tetrodontium brownianum* and *Orthodontium gracile* (also a BAP species).

The important rock habitats within the Berkshire and Marlborough Downs are the world-famous 'Sarsen' stones. During the Quaternary ice age these large stones were weathered and carried across

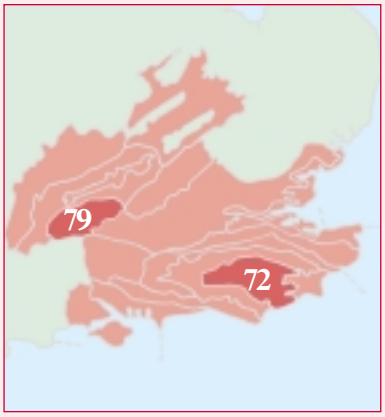
Hay-scented buckler-fern. Paul Sterry/Nature Photographers Ltd.

Sarsen stones. Peter Wakely/English Nature

the landscape as a result of the seasonal thawing of the permafrost, and deposited at a considerable distance from their original source area. Formed of sandstone, Sarsen stones provide one of the few natural exposures of hard, acidic rock in lowland Britain and they support a diverse relict lower plant flora of great importance. The communities at Ashdown Park, for example, have probably taken centuries to develop. Among the many lichen species present is *Buellia saxorum* which in Britain is found only on Sarsen stones, *Ramalina siliquosa* and *Candelariella coralliza* which are more usually found on rocky coasts, and *Rhizocarpon geographicum* and *Lecidea cyathoides* which typically have a north-western distribution. The Sarsen stones also support notable mosses, including the nationally scarce *Grimmia laevigata* and *Grimmia decipiens,* of which the latter occurs only on Sarsen stones in the Berkshire and Marlborough Downs, and the moss *Orthotrichum rupestre* which is rare in southern England and susceptible to shading.

Candidate Special Areas of Conservation
None

Special Protection Areas
None



Characteristic habitats of key Natural Areas

72. High Weald

- Sandstone rock outcrops in gill woodlands, with important lower plant communities

79. Berkshire and Marlborough Downs

- Sarsen stones, supporting important lower plant communities

NB Priority BAP habitats in italics

Bog, fen and swamp

Key issues and objectives

Issue: water quantity

- **Maintain** the hydrological integrity of wetlands by:
  - **avoiding** developments that impact adversely on groundwater;
  - **eliminating** over-abstraction of water to protect groundwater levels;
  - **restoring** water levels of valley mires and fens.

Issue: water quality

- **Restore** the water quality of wetlands by:
  - **eliminating** harmful run-off or other sources of nutrient enrichment;
  - **improving** sewage treatment works where necessary;
  - **encouraging** low-intensity agriculture in areas surrounding important wetland habitats.

Issue: habitat re-creation and management

- **Re-create** or **extend** areas of mires and swamps by:
  - **maintaining** or **enhancing** water level management;
  - **purchasing** land of low nature conservation interest for the creation of new fens and reedbeds.
- **Restore** grazing or reed-cutting to neglected tall fen habitats.

Valley mire is the most extensive type of bog in London and the South East Region. It forms along valley floors where drainage is impeded, resulting in the development of peat deposits. The New Forest is internationally important for valley mires, and has the largest area of this habitat in the whole of western Europe. These valley mires are dominated by *Sphagnum* bog mosses, sedges, rushes and insectivorous plants such as sundews and butterworts, and in places show a transition of vegetation from acid mire to calcareous fen. The mires support a rich flora and an important invertebrate fauna, including the BAP species marsh clubmoss, bog orchid, pillwort, the black bog ant and the southern damselfly. Smaller areas of valley mire are found in other parts of the Region, most notably in the West Anglian Plain, London Basin, Wealden Greensand, South Coast Plain and Hampshire Lowlands and the Isle of Wight. Most of these areas of valley mire occur in association with wet heath.

Fen vegetation is more widespread. Many of the fens in the Region have a rich flora and support nationally rare and scarce plants such as narrow-leaved marsh-orchid, fen pondweed, broad-leaved cottongrass, marsh helleborine and blunt-flowered rush. The Midvale Ridge has the greatest concentration of calcareous fens and flushes in southern England and the fens here are unique, as their characteristics are intermediate between the fens in north Wales and in East Anglia. Although scattered throughout Midvale Ridge, the flushes and fens are most extensive in the Cothill Fen area, which is a

Thursley NNR, Surrey. Peter Wakely/English Nature

candidate Special Area of Conservation (SAC). Elsewhere in the Region fen vegetation occurs in a variety of situations, including the river valleys and floodplains of the Hampshire Downs, London Basin, Berkshire and Marlborough Downs, South Coast Plain and Hampshire Lowlands, and Low Weald and Pevensey. They also occur with calcareous flushes along spring lines, such as in the South Coast Plain and Hampshire Lowlands.

Swamp vegetation is widespread and many of the river floodplains, for instance in the London Basin and Berkshire and Marlborough Downs, have mosaics of fens, rush pasture, wet grassland and swamp habitats. These areas support a diverse fauna with many rare invertebrates, including the BAP species marsh fritillary, marsh mallow moth, southern damselfly, large marsh grasshopper and Desmoulin's whorl snail. The New Forest and the River Itchen are candidate SACs for the southern damselfly, and the Kennet and Lambourn Floodplain is a candidate SAC for Desmoulin's whorl snail.

Reedbeds are widespread in the Region and they occur most extensively in river valleys and floodplains, for example at Stodmarsh in the North Kent Plain, in the South Coast Plain and Hampshire Lowlands, the Thames and Avon Vales and Wealden Greensand. Extensive reedbeds are also found in the tidal reaches of rivers, for example in the New Forest and the Greater Thames Estuary. Smaller areas of reedbed occur on the margins of clay and gravel pits, such as in Romney Marshes and West Anglian Plain. Reedbeds support a number of breeding birds that can include reed warbler, sedge warbler and bearded tit, and are important for wintering bittern.

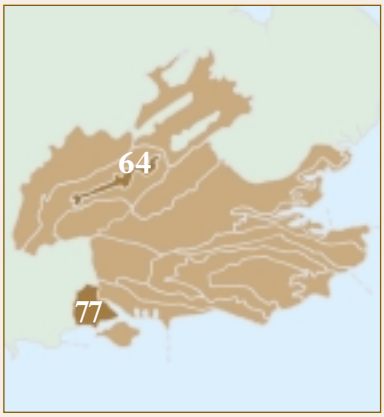
Common butterwort.
Peter Wakely/English Nature

Candidate Special Areas of Conservation

- Cothill Fen (Midvale Ridge)
- Kennet and Lambourn Floodplain (London Basin; Berkshire and Marlborough Downs)
- The New Forest (New Forest)
- Thursley, Ash, Pirbright and Chobham (Wealden Greensand; London Basin)

Special Protection Areas

- Stodmarsh (North Kent Plain)
- The New Forest (New Forest)



Characteristic habitats of key Natural Areas

64. Midvale Ridge

- Several relatively large areas of *fens*
- Unique *fen* vegetation, intermediate between the other main types in Britain
- Small, isolated areas of *purple moor-grass and rush pastures*
- Widespread springs and flushes

77. New Forest

- Many valley mires, some covering large areas
- Some areas of *fen* vegetation
- Numerous springs, especially on valleysides

NB Priority BAP habitats in italics

Woodland

Key issues and objectives

Issue: development

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

Issue: habitat fragmentation

- **Create** new semi-natural broadleaved woodland and scrub:
  - around **existing** blocks of woodland;
  - especially where it will **link** fragments;
- **Re-create** hedgerows, especially where this will **link** fragments.

Issue: management

- To **encourage** sustainable management of existing woods, **promote** the market for local woodland materials, especially coppice products.
- **Promote** restoration of coppicing and pollarding, where this will have benefits for wildlife.
- **Restore** suitable grazing practices to wood pastures and parkland.
- **Maintain** deer populations to reduce their impact in woods, particularly coppices.

Issue: conversion to plantation

- To **improve** the conservation value of plantations, **restore** native broadleaved trees in ancient woodland replanted with conifers.

London and the South East Region is one of the most heavily wooded areas in England and includes many of the largest continuous areas of ancient woodland, with only Romney Marshes and the Greater Thames Estuary have little woodland cover.

Of the wide variety of woodland types present, the Region is of particular note in containing the majority of lowland beech woodland in Britain. There are extensive stands of mature beech woods in London Basin, Low Weald and Pevensey, the Chilterns, North Downs, High Weald, Wealden Greensand, South Downs and the New Forest. Most of the beech woodland has been managed for many years and pollarded or coppiced beech woods, often replanted with sweet chestnut, occur frequently. Many of the British beech woods that are candidate Special Areas of Conservation (SACs) lie within this Region.

The Mens, West Sussex. Peter Wakely/English Nature

Characteristic habitats of key Natural Areas

52. West Anglian Plain

- Clusters of ancient woods, mostly lowland mixed deciduous woodland

55. Cotswolds

- *Lowland beech and yew woodland*
- Lowland mixed deciduous woodland on plateau
- Some large blocks of conifer plantations
- Some landscaped *parklands* on plateaux

65. Chilterns

- The most extensive area of native *lowland beech and yew woodland* in Europe
- *Yew* stands in understorey of lowland beech woods
- Some areas of lowland mixed deciduous woodland
- *Lowland wood pastures and parkland* (former deer parks) on plateaux

66. London Basin

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

69. North Downs

- Extensive areas of ancient *lowland beech and yew woods*
- Extensive areas of lowland mixed deciduous woodland, including large oak-hornbeam woods
- Box woodland
- Large areas of conifer plantation

70. Wealden Greensand

- Large areas of *lowland beech and yew woodland*
- Lowland mixed deciduous woodland
- *Wet woodland* in river valleys, mostly alder
- Some conifer plantations

72. High Weald

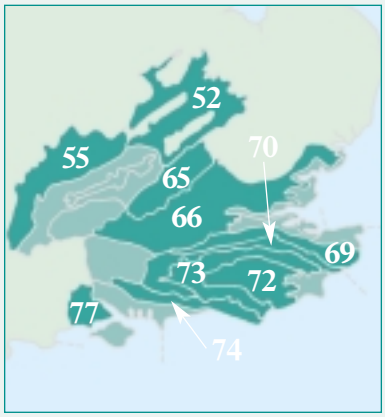
- Large areas of *lowland beech and yew woodland*
- Some *wet woodland*
- Lowland mixed deciduous woodland
- Some *lowland wood pastures and parklands* (some former deer parks)
- Occasional conifer plantations

73. Low Weald and Pevensey

- Extensive areas of *lowland beech and yew woodland*
- Many lowland mixed deciduous woods
- Some *wet woodland*, mostly alder, e.g. along River Ouse

74. South Downs

- Large area of *lowland beech and yew woodland*



- Extensive stands of *yew*, including the largest yew woodland in England
- Some lowland mixed deciduous woods, including large-leaved lime woodland
- Some plantation woodland

77. New Forest

- Extensive area of mature *lowland beech and yew woodland*
- Large areas of lowland mixed deciduous woodland
- Extensive areas of *wet woodland*
- Ancient *lowland wood pasture woodland* unique to the New Forest
- Forestry plantations

NB Priority BAP habitats in italics

Yew is relatively common in beech woods and in some circumstances it can form a distinctive woodland in which it completely dominates both the canopy and the woodland floor. The woods of the North Downs and the South Downs often contain stands of yew-dominated woodland, one of which (Kingley Vale candidate SAC) has the largest stand of yew in Europe. This Region also supports two nationally important box woods, in the North Downs and at Ellesborough in the Chilterns.

Large areas of lowland mixed deciduous woods occur across the Region and ancient oak woods are a feature of many areas, including the Wealden Greensand, High Weald, Low Weald and Pevensey, London Basin, North Kent Plain and the West Anglian Plain. Oak-hornbeam woodland is only well established in some parts of the Region and Blean Woods is a candidate SAC. Many of these ancient oak woods show evidence of a long history of management by coppicing, often as hazel coppice with oak and ash standards.

The Region is also of great importance for the large number of lowland wood pastures, traditionally in agricultural production for grazing and wood production, and parklands, which often had an additional amenity function (for instance the royal deer parks). Wood pastures and parklands are notable in the London Basin, Wealden Greensand, High Weald, Low Weald and Pevensey and the New Forest, and these are dominated by beech, oak and in some areas, hornbeam. The presence of many old, pollarded trees and a large number of veteran trees is a reflection of the traditional management of these woods. Several of them are candidate SACs.

Other woodland types in the Region include some areas of wet woodland, predominantly alder, for example along the river valleys of the New Forest, Hampshire Downs and Low Weald and Pevensey. A very rare type of wet woodland, of birch and willow with some alder, occurs over the valley bog of the New Forest, for which the site is a candidate SAC.

In many areas of the Region woodland has been converted to conifer plantations, with large areas occurring in North Kent Plain, North Downs and Wealden Greensand.

Hedgerows are common in parts of the Region and form important features of some areas, for example in the High Weald, the Chilterns, the Isle of Wight, the Low Weald and Pevensey, and the Thames and Avon Vales, although many former hedges have been lost by conversion to large-scale fields. However, the remaining hedges are generally well stocked with trees and many show a long history of pollard management; veteran trees are a feature of some.

The woods of the Region are rich in rare and uncommon plant species including the BAP species green hound's-tongue, many orchids such as the very rare ghost orchid, and the narrow-lipped helleborine which is especially found in beech woods. A wide range of epiphytic species also occur, such as knothole moss (a BAP species) and the Chilterns is one of only three localities in Britain where the liverwort *Metzgeria fruticulosa* grows on leaves of box. Several rare species of fungi are strongly associated with the beechwoods, including

Mole Gap, Reigate Escarpment, Surrey. Peter Wakely/English Nature

Windsor Forest and Great Park, Berkshire. Peter Wakely/English Nature

Candidate Special Areas of Conservation

- Blean Complex (North Kent Plain)
- Burnham Beeches (London Basin)
- Chilterns Beechwoods (Chilterns)
- East Hampshire Hangers (Hampshire Downs; Wealden Greensand)
- Ebernoe Common (Low Weald and Pevensey)
- Kingley Vale (South Downs)
- Mole Gap to Reigate Escarpment (North Downs)
- Rook Clift (South Downs)
- The Mens (Low Weald and Pevensey)
- The New Forest (New Forest)
- Windsor Forest and Great Park (London Basin)

Special Protection Areas

- The New Forest (New Forest)

Devil's bolete (a priority BAP species), old man of the woods and the very poisonous, red-staining inocybe.

The ancient woods and the wood pastures and parklands support a remarkable number of lichens, mosses, fungi and invertebrates. The fauna is very rich in beetles and includes many BAP species such as the stag beetle, the violet click beetle, and ten species of beetle associated with dead wood habitats on veteran trees in south-east England. A large number of butterflies and moths are also associated with woods in the Region, including the following BAP species: the square-spotted clay moth and the common fan-foot moth, for which the broadleaved woodland in the Region is a main stronghold; the waved carpet moth which prefers coppiced woodlands in the Region; the pearl-bordered fritillary; the olive crescent moth; and the dark crimson underwing, which in Britain is confined to mature oak woodland in the New Forest.

The ancient woods and parklands also support a notable range of breeding birds, including lesser-spotted woodpecker, nightingale, hawfinch and redstart. Firecrest and nightjars are found in a number of the conifer and broadleaved plantations. Populations of the dormouse occur in many ancient and coppiced woods in the Region and there is an important population of red squirrels in the woods on the Isle of Wight. The Region is also important for a number of bat species, such as the pipistrelle, serotine and Bechstein's bat, which use a range of habitats including woodland. The Region also includes one of only two known roost sites for the rare barbastelle bat.

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** existing areas or **links** fragments.
- **Create** wet grasslands:
  - by **increasing** groundwater levels on river floodplains;
  - by **restoring** appropriate flooding regimes on floodplains.

Issue: lack of appropriate management

- **Promote** appropriate management through:
  - extensive, low-intensity **grazing** on grasslands and heaths;
  - **scrub control** on heaths and grasslands, where appropriate;
  - **clearing** rhododendron where it has invaded.

London and the South East Region is of outstanding importance for lowland calcareous grasslands, particularly chalk grassland and limestone grassland. Chalk grasslands predominate in the Region and are distinctive features of the North Downs, the South Downs, the Isle of Wight, the Chilterns and the Berkshire and Marlborough Downs. Together these areas contain a large proportion of the total area of chalk grassland in Britain, and several sites in the Region are candidate Special Areas of Conservation (SACs). The Cotswolds and the Midvale Ridge support significant areas of limestone grassland, which has a distinct but nonetheless rich flora. Elsewhere there are fragments of chalk grassland in the South Coast Plain and Hampshire Lowlands and the North Kent Plain.

Chalk grassland is one of the richest plant habitats in Britain and those in London and the South East Region support a variety of rare and scarce species. These include the endemic early gentian which has its stronghold in south-east England, ground-pine which occurs predominantly on the North Downs, and the fringed gentian which in Britain is found only in the Chilterns. Several chalk grasslands are of outstanding importance for individual orchid species: Castle Hill in the South Downs has one of the largest populations in Britain of the early spider orchid and Lewes Downs (also in the South Downs) has one of the largest colonies of burnt orchid in Britain. The lower plant flora of chalk grassland is also outstanding, particularly for bryophytes and lichens, for instance on Butser Hill in the South Downs. The limestone grasslands of the Cotswolds and the Midvale Ridge are similarly rich in plant species.

The invertebrate fauna of the chalk and limestone grasslands includes notable populations of scarce and threatened butterflies such as the chalkhill blue, small blue, dingy

Lewes Downs, East Sussex. Peter Wakely/English Nature

Characteristic habitats of key Natural Areas

55. Cotswolds

- *Lowland calcareous grassland* (limestone grassland)
- Neutral unimproved grassland (species-rich meadows or pasture) on lower slopes
- Areas of remnant wet grasslands along river valleys

63. Thames and Avon Vales

- Wet neutral grasslands in river valleys
- Dry grasslands in clay vales
- Concentration of mostly small, species-rich *lowland hay meadows*

65. Chilterns

- *Lowland calcareous grassland* including important chalk grassland and chalk scrub
- Nationally important bryophytes in chalk grassland
- Some areas of *lowland heath*, including chalk heath

Shepherd's-needle.
Peter Wakely/English Nature

66. London Basin

- Notable areas of *lowland dry heath* and *lowland wet heath*
- Wet and acid grasslands
- Neutral grasslands in river valleys
- Extensive *floodplain and coastal grazing marshes*
- Small area of *lowland calcareous grassland*

69. North Downs

- *Lowland calcareous grasslands* including internationally important chalk grasslands
- Small fragments of *lowland heathland* on the Downs, particularly chalk heath

70. Wealden Greensand

- Large areas of dry and wet *lowland heath*, including internationally important sites
- Extensive *floodplain grazing marshes* in river valleys

72. High Weald

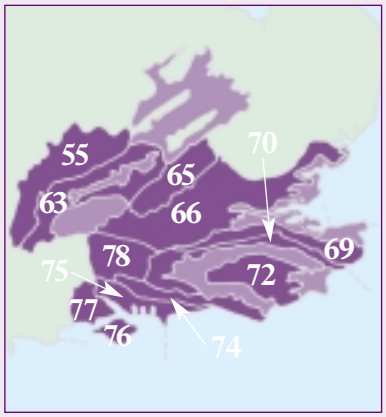
- Lowland wet grasslands on the Pevensey Levels
- Some of the most extensive areas of *lowland heath* in the Region

74. South Downs

- *Lowland calcareous grassland*, including internationally important sites
- Large populations of rare orchids
- Fragments of *lowland heath*, including chalk heath

75. South Coast Plain and Hampshire Lowlands

- *Lowland calcareous grasslands* (chalk grassland)



- Wet neutral grassland in river valleys
- Small fragments of *lowland heathland*, including chalk heath

76. Isle of Wight

- *Lowland calcareous grassland*, mostly chalk grasslands
- Some dry neutral grasslands on northern plain
- Fragments of well-developed *lowland heathland*
- *Coastal and floodplain grazing marshes* in river valleys

77. New Forest

- Neutral grasslands (often mosaics with grasslands and fens), including numerous enclosed meadows
- Lowland acid grasslands associated with grass heaths; isolated pockets within wet grasslands
- Extensive areas of *lowland heath*

78. Hampshire Downs

- *Lowland calcareous grasslands*, mostly chalk grasslands on steeper slopes
- Wet neutral grasslands in river valleys

NB Priority BAP habitats in italics

Lullington Heath, Sussex. Peter Wakely/English Nature

skipper, dark green fritillary and silver-spotted skipper. The Cotswolds are a national stronghold of the Duke of Burgundy fritillary butterfly. The hornet robberfly, a priority BAP species, occurs in chalk grassland within Berkshire and Marlborough Downs and the Chilterns. The remnant chalk grasslands of the Hampshire Downs are an important habitat for breeding stone curlews.

Neutral grasslands occur across the Region and the wet, unimproved neutral grasslands are of particular note, for these include extensive areas of floodplain and coastal grazing marshes. Significant wet neutral grasslands occur along river floodplains in the New Forest, South Coast Plain and Hampshire Lowlands, Thames and Avon Vales, London Basin, the Isle of Wight and the West Anglian Plain. The floodplain grasslands of the Thames and Avon Vales are notable for they support the only known colony of creeping marshwort in Britain. Wet grassland occurs along many streamsides and river valleys in other parts of the Region, for example in Wealden Greensand, and along the coast, including the significant grazing marshes of the Greater Thames Estuary and the North Kent Plain, on Romney Marshes and on the Pevensey Levels in the Low Weald and Pevensey. These wet grasslands are drained by a network of ditches and are of importance for their plant and invertebrate populations, and for breeding and wintering waterfowl. For example, the grazing marshes of the Arun Valley are the British stronghold for sharp-leaved pondweed and Pevensey Levels are the main British stronghold for the fen raft spider. Dry neutral grasslands are found across the Region but unimproved, species-rich examples occur mostly as scattered fragments.

Lowland acid grassland occurs in a number of areas in the Region. The New Forest, Wealden Greensand and Romney Marshes are important for lowland dry acid grassland. In the New Forest significant areas occur on gravel terraces, on areas of wind-blown sand along the Avon valley and on mature shingle deposits on the coast. Important areas are found on coastal shingle at Dungeness in Romney Marshes and within Wealden Greensand where small patches occur within the parklands. These grasslands can support a number of nationally scarce species such as mossy stonecrop and smooth cat's-ear. Elsewhere in the Region small areas of lowland acid grassland form mosaics with wet grassland, for example in the South Coast Plain and Hampshire Lowlands, or it occurs in association with lowland heath, such as in Wealden Greensand, North Kent Plain, London Basin and the New Forest.

The Region has relatively large areas of lowland heathland and outstanding examples occur in several Natural Areas. The New Forest has the most extensive tracts of lowland wet heath and dry heath in southern England, and is unusual in that it has a long history of grazing by ponies and cattle.

Wealden Greensand has a concentration of dry heathland with some wet heath, including Woolmer Forest and the Thursley, Ash, Pirbright and Chobham candidate SAC. Ashdown Forest in the High Weald has one of the most extensive lowland heaths in the Region. London Basin has significant areas of dry, wet and humid heath, for example at Greenham Common in Berkshire, with larger tracts of heathland in Surrey and north Hampshire. Many of these heathlands are potential Special Protection Areas (SPAs).

Smaller areas of lowland heath are scattered across the Region, and chalk heath, a rare habitat characterised by a mixture of both acid-loving and calcareous plants, is present in several areas. Notable fragments of chalk heath remain at Lullington Heath in the South Downs, and in the North Downs, the Chilterns and the Isle of Wight.

The lowland heathland and grass-heath support numerous invertebrates, many rare or threatened, including the BAP species: silver-studded blue butterfly and high brown fritillary, the lunar yellow underwing moth, the bee-flies *Thyridanthrax fenestratus* and *Bombylus minor*, and the hornet robberfly. Animals special to heathland, including smooth snakes, sand lizards, Dartford warblers, nightjars and woodlarks occur on some sites, and adders, grass snakes, slow-worms and common lizards are widespread. One of the few remaining heathland populations of the natterjack toad occurs in Woolmer Forest within Wealden Greensand.

The most extensive cereal farming occurs on the gently undulating land, coastal and riverine plains, for example in the West Anglian Plain, Hampshire Downs, South Coast and Hampshire Lowlands, Thames and Avon Vales, North Kent Plain and Wealden Greensand. In many areas small arable fields occur as part of mixed farming regimes. Species once associated with arable fields in the Region are now rare, but the cereal field margins occasionally still support uncommon BAP plants such as broad-leaved cudweed, red-tipped cudweed and shepherd's-needle. Farmland also supports the brown hare, and birds such as corn bunting, linnet and tree sparrow, all of which have suffered major declines in population as a result of habitat loss through changing agricultural practice.

Early spider orchid.
Peter Wakely/English Nature

Candidate Special Areas of Conservation

- Castle Hill (South Downs)
- Folkestone to Etchinghill Escarpment (North Downs)
- Isle of Wight Downs (Isle of Wight)
- Lewes Downs (South Downs)
- Lydden and Temple Ewell Downs (North Downs)
- Oxford Meadows (Thames and Avon Vales)
- Queendown Warren (North Downs)
- The New Forest (New Forest)
- Thursley, Ash, Pirbright and Chobham (Wealden Greensand; London Basin)
- Wye and Crundale Downs (North Downs)

Special Protection Areas

- Ashdown Forest (High Weald)
- The New Forest (New Forest)
- Wealden Heaths (Wealden Greensand)

Potential Special Protection Areas

- Arun Valley (Wealden Greensand)
- Avon Valley (New Forest)
- Thames Basin Heaths (London Basin)

Maritime

Key issues and objectives

Issue: sea level rise/global warming

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

Issue: maintenance of coastal processes

- **Allow** natural, dynamic coastal processes to operate by:
  - **avoiding** developments that interfere with natural sedimentation and erosion;
  - **minimising** dredging;
  - **mitigating** harmful impacts of necessary dredging.

Issue: water quality

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

Issues: fisheries

- **Ensure** exploitation of marine wildlife resources is sustainable.

Issue: recreation and tourism

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

Chalk cliffs are a characteristic feature of many parts of the coastline of London and the South East Region. Thanet has long stretches of chalk cliff and there are high, vertical chalk cliffs at Dover. There are extensive chalk cliffs between Brighton and Eastbourne, which includes the scenic Seven Sisters coastline and Beachy Head, and on the south-eastern and south-western coasts of the Isle of Wight. Significant stretches of soft cliffs occur in the Region, including Folkestone Warren where the impressive series of landslides support nationally important plant communities; at Fairlight Cove in Folkestone to Selsey Bill which has also been subject to landslides; at Selsey Bill; and on the northern coast of the Isle of Wight. The cliffs on the south coast of the Isle of

Dungeness, Kent. Peter Wakely/English Nature

Wight form one of the longest lengths of naturally-developing soft cliffs on the British coastline. These are important for a number of lower plants such as the moss *Philonotis marchica* and the liverwort *Southbya nigrella*, both of which are extremely rare and characteristic of these cliffs and landslips. Together with the adjacent chalk cliffs, the south coast of the Isle of Wight is a candidate Special Area of Conservation (SAC).

There are few sand dunes in the Region, and fewer still are extensive. The most notable dunes are at Sandwich Bay at the mouth of the River Stour. This area is a candidate SAC for several types of dune vegetation, including the only large area of fixed dune grassland in south-east England. These dunes are extremely species-rich and include a number of rare and scarce species such as fragrant evening-primrose, bedstraw broomrape and sand catchfly, as well as Britain's largest population of lizard orchid. There is also a population of lizard orchid on the dunes near Rye.

Dungeness is the most outstanding of the numerous shingle beaches in the Region. It is the largest shingle beach in Britain and has the most diverse and extensive shingle vegetation in Europe. There are also important vegetated shingle beaches at Rye Harbour, Pagham Harbour, at Browndown at the mouth of the Solent and at St Helen's, Duver on the Isle of Wight. Many of these beaches support large populations of scarce plants such as sea pea and sea kale, and Dungeness is the only site in Britain where stinking hawk's-beard is found. Dungeness supports an outstanding diversity of invertebrates, including six moths, two flies, one bug and two spiders

Characteristic habitats of key Natural Areas

67. Greater Thames Estuary

- Several *vegetated shingle* spits
- Large areas of *saltmarsh* within estuaries
- Numerous *saline lagoons*, mostly within saltmarsh
- Intertidal *mudflats* within estuaries
- *Sabellaria spinulosa reefs*

106. North Kent Coast

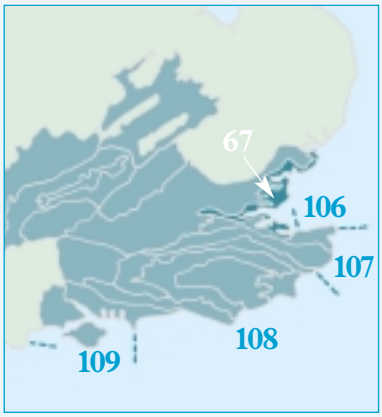
- Chalk *cliffs* on Isle of Thanet
- Subtidal and intertidal *chalk reefs*
- Small *vegetated shingle* beach at Coldharbour

107. East Kent Coast

- Extensive chalk *cliffs*
- Intertidal *mudflats* and sandflats in Pegwell Bay
- *Saltmarsh* along banks of River Stour
- *Sand dunes* at mouth of Pegwell Bay
- *Shingle* beach at Kingsdown
- *Subtidal* and *intertidal chalk reefs*

108. Folkestone to Selsey Bill

- Soft clay *cliffs* at Folkestone with significant undercliff vegetation
- Chalk *cliffs* from Brighton to Beachy Head
- Several small *sand dune* sites
- Numerous *shingle* beaches dominated by the internationally important site at Dungeness
- Small areas of *saltmarsh* within estuaries
- Several brackish water *lagoons* including Widewater lagoon



- Extensive intertidal *chalk reefs*
- Some subtidal rock including sandstone, limestone and *chalk reefs*

109. Solent and Poole Bay

- Extensive stretches of *cliffs*, especially chalk cliffs and soft cliffs of sand and clay
- Small number of *sand dune* sites
- Several shingle beaches and spits, including *vegetated shingle* at Browndown
- Numerous *saline lagoons* around the Solent and Isle of Wight
- Large areas of *saltmarsh* in large, shallow enclosed estuaries and embayments of the Solent
- Large areas of intertidal *mudflats* in estuaries and embayments
- Intertidal and subtidal rocky reefs on the Isle of Wight, including *chalk reefs*

NB Priority BAP habitats in italics

that are known nowhere else in Britain. Rye Harbour supports a similar but less diverse fauna. Several of the shingle sites in the Region support breeding colonies of seabirds, such as little terns, lesser black-backed gulls, Mediterranean gulls and Sandwich terns.

The Region has a large number of mostly small saline lagoons. The marshes of the Greater Thames Estuary have numerous lagoons and saline pools (mostly the result of former sand and gravel extraction), and there are many lagoons in the marshes and behind seawalls on the coast of the Solent and the Isle of Wight. Saline lagoons have a characteristic fauna and flora and those in the Region support relatively large populations of a number of rare and scarce species, including the starlet sea anemone, lagoon sand shrimp, the lagoon sandworm and the tentacled lagoon worm. The lagoons of the Solent and the Isle of Wight have a particularly rich fauna and some are within a candidate SAC. Elsewhere in the Region there are other small saline lagoons within shingle and saltmarsh.

Saltmarshes are widespread, with the largest areas occurring in the Greater Thames Estuary and within the estuaries and embayments of the Solent. The saltmarshes in the estuaries of the Solent are of international importance and include populations of the rare smooth and small cord-grasses. Elsewhere in the Region there are isolated areas of saltmarsh in the generally small and narrow estuaries along the coast, and in some localities the natural transitions from saltmarsh to terrestrial vegetation have survived. Birds such as oystercatcher, redshank and shelduck breed on saltmarshes in the Region and black-headed gulls, common terns, Sandwich terns and little terns breed on saltmarshes associated with shingle spits.

There are extensive sections of both intertidal sediment and intertidal rock around the coastline. Large areas of intertidal mudflats and sandflats occur within the estuaries of the Greater Thames, in the embayments of the Solent, and there are intertidal sandflats within Pegwell Bay in the East Kent Coast. At some locations, for example in the Solent, large beds of seagrasses grow on the intertidal flats, forming a priority BAP habitat. Intertidal shingle dominates large stretches of the shore within Folkestone to Selsey Bill. The extensive intertidal habitats are of outstanding importance for wintering and migrating waterfowl and support internationally important populations of brent goose, grey plover, redshank, knot, oystercatcher, dunlin and curlew. Many of these areas are Special Protection Areas (SPAs).

Intertidal rock is dominated by chalk platforms, which are often at the foot of chalk cliffs. The chalk foreshore of Thanet, that runs from the North Kent Coast into the East Kent Coast, is of international importance and is especially rich in algae, being the only location for some species. There are also long stretches of chalk shores at Dover, between Brighton and Eastbourne, and on the south-eastern and south-western coasts of the Isle of Wight. Elsewhere in the Region, outcrops of sandstone and limestone form rocky

Chichester Harbour, West Sussex. Peter Wakely/English Nature

Lymington-Keyhaven, Hampshire. Peter Wakely/English Nature

intertidal habitats, for example the sandstone rock platform at Hastings, and the limestone reefs off Selsey Bill and around the Isle of Wight. Rocky coastlines are important habitats for wintering waders such as turnstone.

Around most of the Region's coast large areas of the sea bed are covered by mixed sediments of sands and gravels. However, in many areas the intertidal rocky shores extend into the subtidal where they form some of Britain's most important reefs. Chalk reefs, a priority BAP habitat, occur at Thanet and along the southern shore of the Isle of Wight, and there is a variety of reef types and associated communities off the coast of Folkestone to Selsey Bill and the Isle of Wight. These include limestone, sandstone and chalk reefs. Two areas in the Region, Thanet Coast and South Wight Maritime, are candidate SACs for their reef habitats.

Candidate Special Areas of Conservation

- Dungeness (Folkestone to Selsey Bill; Romney Marshes)
- Sandwich Bay (North Kent Coast)
- Solent and Isle of Wight Lagoons (Solent and Poole Bay)
- Solent Maritime (Solent and Poole Bay)
- South Wight Maritime (Solent and Poole Bay)
- Thanet Coast (North Kent Coast)

Special Protection Areas

- Benfleet and Southend (Greater Thames Estuary)
- Chichester and Langstone Harbours (Solent and Poole Bay)
- Dungeness to Pett Level (Folkestone to Selsey Bill; Romney Marshes)
- Medway Estuary and Marshes (Greater Thames Estuary)
- Pagham Harbour (Folkestone to Selsey Bill)
- Portsmouth Harbour (Solent and Poole Bay)
- Solent and Southampton Water (Solent and Poole Bay)
- The Swale (Greater Thames Estuary)
- Thanet Coast and Sandwich Bay (North Kent Coast; East Kent Coast)

Potential Special Protection Areas

- Thames Estuary Marshes (Greater Thames Estuary)

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

Brownie Group at Thursley, Surrey. Peter Wakely/English Nature

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 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?

Marsh helleborine.
Peter Wakely/English Nature

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 2: Sources of information

Each Natural Area has an associated profile which contains the issues and objectives specific to that ecological unit. These have already been passed on to our key partners, including local authorities. The complete set of profiles for England is available from English Nature's local teams on a CD-ROM.

National overviews of habitats, species and earth heritage

Brown, A.E., Burn, A.J., Hopkins, J.J. and Way, S.F. (Editors). 1997. The Habitats Directive: selection of Special Areas of Conservation in the UK. *Joint Nature Conservation Committee Report No. 270.* Joint Nature Conservation Committee, Peterborough.

Drake, M., Clements, D., Eyre, M., Gibbs, D. and Kirby, P. 1998. Invertebrates and their habitats in Natural Areas. Volume 1: Midland and Northern Areas. *English Nature Research Report No. 298.* English Nature, Peterborough.

Drake, M., Clements, D., Eyre, M., Gibbs, D. and Kirby, P. 1998. Invertebrates and their habitats in Natural Areas. Volume 2: Southern Areas. *English Nature Research Report No. 298.* English Nature, Peterborough.

Drewitt, A.L., and Manley, V.J. 1997. The vegetation of the mountains and moorlands of England. *English Nature Research Report No. 218.* English Nature, Peterborough.

English Nature 1997. *Wildlife and fresh water, an agenda for sustainable management.* English Nature, Peterborough.

English Nature. In prep. *Overview of coastal habitats by Natural Area.* English Nature, Peterborough.

Gardiner, A.J. 1996. Freshwater wetlands in England. A Natural Areas approach. *English Nature Research Report No. 204.* English Nature, Peterborough.

Grice, P.V., Brown, A.F., Carter, I.C. and Rankine, C.A. 1994. Birds in England: a Natural Areas approach. *English Nature Research Report No. 114.* English Nature, Peterborough.

Jefferson, R.G. 1997. Lowland grassland in Natural Areas. National assessment of significance. *English Nature Research Report No. 171.* English Nature, Peterborough.

King, A., Glasser, N., Larwood, J., Littlewood, A., Moat, T. and Page, K. 1996. Earth heritage conservation in England: a Natural Areas perspective. *English Nature Research Report No. 158.* English Nature, Peterborough.

Kirby, K. and Reid, C. 1997. Preliminary nature conservation objectives for Natural Areas. Woodland and forestry. *English Nature Research Report No. 239.* English Nature, Peterborough.

Michael, N. 1996. Lowland heathland in England. A Natural Areas approach. *English Nature Research Report No. 170.* English Nature, Peterborough.

Mitchell-Jones, A.J. and Gent, A.H. 1997. Priority Natural Areas for mammals, reptiles and amphibians. *English Nature Research Report No. 242.* English Nature, Peterborough.

Porley, R. and McDonnell, A. 1997. Rare and scarce vascular plants and bryophytes in Natural Areas. *English Nature Research Report No. 267.* English Nature, Peterborough.

Reid, C.M., Kirby, K.J. and Cooke, R.J. 1996. A preliminary assessment of woodland conservation in England by Natural Areas. *English Nature Research Report No. 186.* English Nature, Peterborough.

Sanderson, N.A. 1998. A review of the extent, conservation interest and management of lowland acid grassland in England. Volume I: Overview. *English Nature Research Report No. 259.* English Nature, Peterborough.

Sanderson, N.A. 1998. A review of the extent, conservation interest and management of lowland acid grassland in England. Volume II: County Descriptions. *English Nature Research Report No. 259.* English Nature, Peterborough.

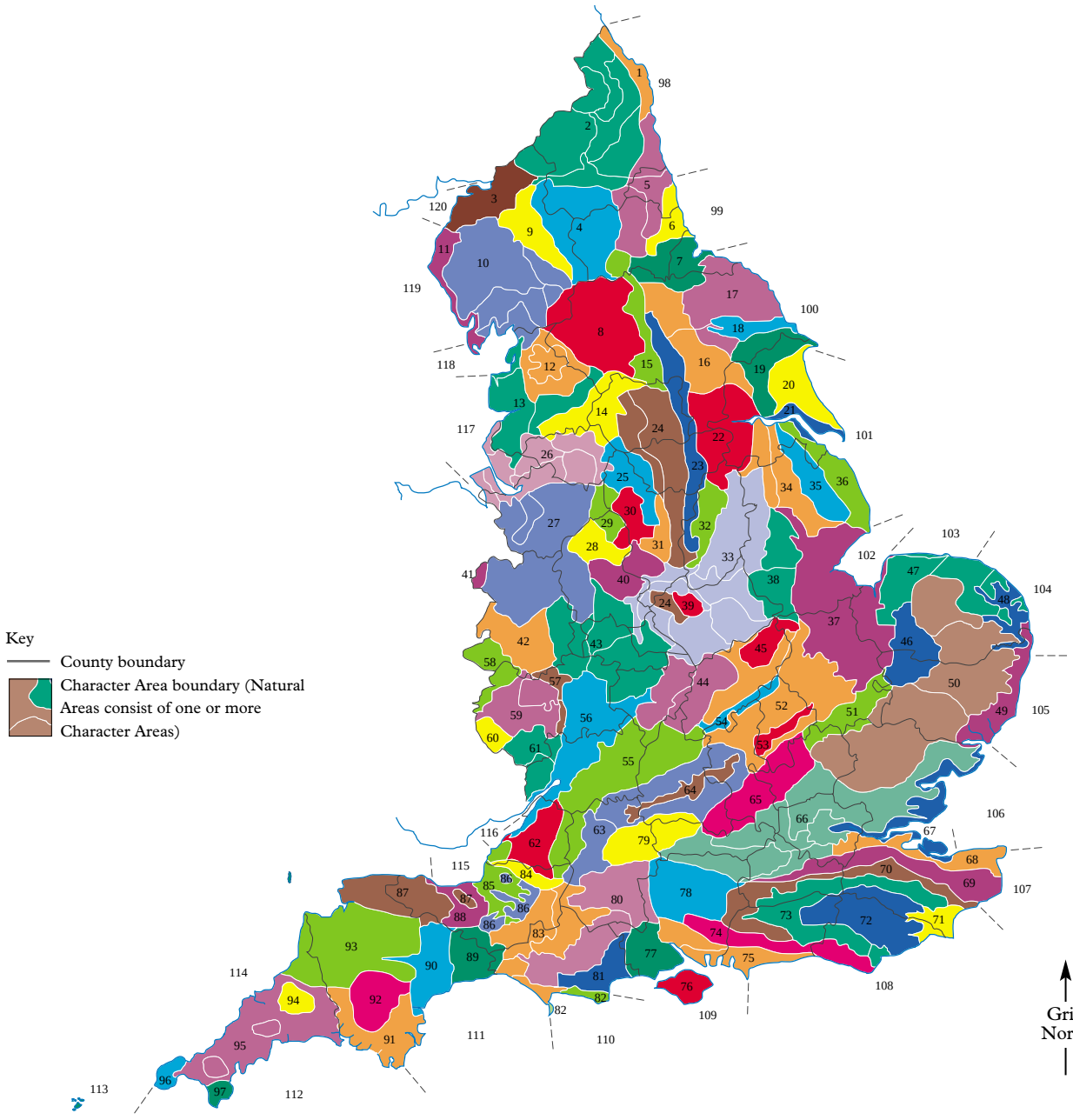
All available free from the Enquiry Service, English Nature, Northminster House, Peterborough PE1 1UA Tel. 01733 455101 Fax. 01733 568834.

Natural Areas CD-ROM.

Available, priced £15, from Telelink Ltd., PO Box 100, Fareham, Hampshire PO14 2SX Tel. 01329 331300 Fax. 01329 330034.

Natural Area Profiles

The individual profiles used in this report are available from the Local Team, address and telephone number shown on the back cover, or can be found on English Nature's web page at www.english-nature.org.uk.



1	North Northumberland Coastal Plain	25	Dark Peak	49	Suffolk Coast and Heaths	73	Low Weald and Pevensey	97	The Lizard
2	Border Uplands	26	Urban Mersey Basin	50	East Anglian Plain	74	South Downs	98	Northumberland Coast
3	Solway Basin	27	Meres and Mosses	51	East Anglian Chalk	75	South Coast Plain and Hampshire Lowlands	99	Tyne to Tees Coast
4	North Pennines	28	Potteries and Churnet Valley	52	West Anglian Plain	76	Isle of Wight	100	Saltburn to Bridlington
5	Northumbria Coal Measures	29	South West Peak	53	Bedfordshire Greensand Ridge	77	New Forest	101	Bridlington to Skegness
6	Durham Magnesian Limestone Plateau	30	White Peak	54	Yardley-Whittlewood Ridge	78	Hampshire Downs	102	The Wash
7	Tees Lowlands	31	Derbyshire Peak Fringe and Lower Derwent	55	Cotswolds	79	Berkshire and Marlborough Downs	103	Old Hunstanton to Sheringham
8	Yorkshire Dales	32	Sherwood	56	Severn and Avon Vales	80	South Wessex Downs	104	Sheringham to Lowestoft
9	Eden Valley	33	Trent Valley and Rises	57	Malvern Hills and Teme Valley	81	Dorset Heaths	105	Suffolk Coast
10	Cumbria Fells and Dales	34	North Lincolnshire Coversands and Clay Vales	58	Clun and North West Herefordshire Hills	82	Isles of Portland and Purbeck	106	North Kent Coast
11	West Cumbria Coastal Plain	35	Lincolnshire Wolds	59	Central Herefordshire	83	Wessex Vales	107	East Kent Coast
12	Forest of Bowland	36	Lincolnshire Coast and Marshes	60	Black Mountains and Golden Valley	84	Mendip Hills	108	Folkestone to Selsey Bill
13	Lancashire Plain and Valleys	37	The Fens	61	Dean Plateau and Wye Valley	85	Somerset Levels and Moors	109	Solent and Poole Bay
14	Southern Pennines	38	Lincolnshire and Rutland Limestone	62	Bristol, Avon Valleys and Ridges	86	Mid Somerset Hills	110	South Dorset Coast
15	Pennine Dales Fringe	39	Charnwood	63	Thames and Avon Vales	87	Exmoor and the Quantocks	111	Lyme Bay
16	Vale of York and Mowbray	40	Needwood and South Derbyshire Claylands	64	Midvale Ridge	88	Vale of Taunton and Quantock Fringes	112	Start Point to Land's End
17	North York Moors and Hills	41	Oswestry Uplands	65	Chilterns	89	Blackdowns	113	Isles of Scilly
18	Vale of Pickering	42	Shropshire Hills	66	London Basin	90	Devon Redlands	114	Land's End to Minehead
19	Yorkshire Wolds	43	Midlands Plateau	67	Greater Thames Estuary	91	South Devon	115	Bridgwater Bay
20	Holderness	44	Midland Clay Pastures	68	North Kent Plain	92	Dartmoor	116	Severn Estuary
21	Humber Estuary	45	Rockingham Forest	69	North Downs	93	The Culm	117	Liverpool Bay
22	Humberhead Levels	46	Breckland	70	Wealden Greensand	94	Bodmin Moor	118	Morecambe Bay
23	Southern Magnesian Limestone	47	North Norfolk	71	Romney Marshes	95	Cornish Killas and Granites	119	Cumbrian Coast
24	Coal Measures	48	The Broads	72	High Weald	96	West Penwith	120	Solway Firth

Revised to December 1996

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74. South Downs
108. Folkestone to Selsey Bill

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76. Isle of Wight
77. New Forest
78. Hampshire Downs
109. Solent and Poole Bay

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69. North Downs
71. Romney Marshes
106. North Kent Coast
107. East Kent Coast

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