Communities and Local Government

eco-towns

Draft Sustainability Appraisal and Habitats Regulations Assessment of the Draft **Eco-towns Planning Policy Statement**

Annex: Profile of European sites

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Prepared by Scott Wilson for Communities and Local Government

Annex: Profile of European sites

November 2008

Scott Wilson Ltd

Department for Communities and Local Government

Communities and Local Government
Eland House
Bressenden Place
London
SW1E 5DU
Telephone: 020 7944 4400
Website: www.communities.gov.uk

Communities and Local Government Publications
PO Box 236
Wetherby
West Yorkshire
LS23 7NB
Tel: 0300 123 1124
Fax: 0300 123 1125
Email: communities@capita.co.uk
Online via the Communities and Local Government website: www.communities.gov.uk

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The structure of the eco-towns SA/HRA publications

The Sustainability Appraisal (SA) and Habitats Regulations Assessment (HRA) of the draft Eco-towns Planning Policy Statement and Programme have been prepared by Scott Wilson Ltd for Communities and Local Government.

As the SA and HRA has been undertaken at a strategic level, it is necessarily broad in its assessment, conclusions, and recommendations. It takes a 'snapshot' of locations and proposals in September 2008, recognising that the proposals are continuing to be developed, and constitutes the first of a series of successive assessments that will be required as eco-town proposals are taken forward. Planning applications for eco-towns will also need to include a detailed Environmental Impact Assessment (EIA) and possibly HRA which may, in turn, also identify mitigation measures.

The SA and HRA should be read in four parts and an Annex:

I) The SA of the draft Eco-towns PPS

II) The SA/HRA of the Programme – Introduction

III) The SA/HRA of the Programme – Locational chapters

- Pennbury
- Middle Quinton
- Whitehill-Bordon
- Weston Otmoor and Cherwell
- Ford
- St Austell (China Clay Community)
- Rossington
- Hanley Grange and Cambridgeshire
- Marston
- North East Elsenham
- Rushcliffe
- Greater Norwich
- Curborough
- Manby
- Leeds City Region

IV) The SA/HRA of the Programme – Conclusions

Annex: Profile of European Sites

The sections above are accompanied by a Non-Technical Summary which summarises the findings of the SA and HRA of the draft Eco-towns PPS and Programme.

All documents are available on the Communities and Local Government website at www.communities.gov.uk/ecotowns

If you have comments on issues raised in the SA or HRA please respond as part of the consultation on the PPS, details of which are set out at www.communities.gov.uk/ecotowns. If you would like further information on any of the above please contact the Eco-Towns Team at Zone 2/G9, Eland House, London, SW1E 5DU or by email to: ecotowns@communities.gsi.gov.uk

1 Rutland Water SPA & Ramsar site

1.1.1 Part of the site is managed as a nature reserve by the Leicestershire and Rutland Wildlife Trust, in association with Anglian Water. The establishment of this large modern reservoir has created a major wetland area which combines extensive sheets of open water with a complex of wetland and lakeside habitats, including lagoons, islands, mudflats, reedswamp, marsh, old meadows, pastures, scrub and mature woodland. The diversity and management of terrestrial, marsh and aquatic habitats at Rutland Water have made it one of the richest reservoir locations for wintering and passage wildfowl in Britain being particularly notable for its numbers of mallard, shoveler, gadwall, teal, wigeon, pochard, tufted duck and goldeneye. The diversity of waders using the site on passage is outstanding for an inland site, while the diversity of the population of breeding waterfowl is of increasing significance.

1.1.2 The site is designated as an SPA and Ramsar site for:

- Gadwall *Anas strepera*, 1,156 individuals representing at least 3.9 per cent of the wintering Northwestern Europe population (5 year peak mean 1991/2 – 1995/6)
- Shoveler *Anas clypeata*, 526 individuals representing at least 1.3 per cent of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 – 1995/6)
- The area also qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting 23,501 individual waterfowl.

1.1.3 During the 2007 Condition Assessment Process 92 per cent of the SPA was found to be in unfavourable recovering condition. The unfavourable condition had been ascribed to a combination of inappropriate grazing/ management and poor water quality due to high phosphate levels. Disturbance was generally not regarded as an issue.

1.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SPA & Ramsar site are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Maintenance of grazing regime in certain areas
- Minimal disturbance

2 Humber Estuary SAC

2.1.1 The Humber is the second-largest coastal plain estuary in the UK, and the largest coastal plain estuary on the east coast of Britain. It is a muddy, macro-tidal estuary, fed by the Rivers Ouse, Trent and Hull, Ancholme and Graveney. Suspended sediment concentrations are high, and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast. This is the northernmost of the English east coast estuaries whose structure and function is intimately linked with soft eroding shorelines. Upstream from the Humber Bridge, the navigation channel undergoes major shifts from north to south banks, for reasons that have yet to be fully explained. This section of the estuary is also noteworthy for extensive mud and sand bars, which in places form semi-permanent islands.

2.1.2 The site is designated as an SAC for:

- Estuaries
- Mudflats and sandflats not covered by seawater at low tide
- Sandbanks which are slightly covered by sea water all the time
- Coastal lagoons
- Salicornia and other annuals colonising mud and sand
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Embryonic shifting dunes
- Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`)
- Fixed dunes with herbaceous vegetation (`grey dunes`)
- Dunes with *Hippophae rhamnoides*
- Sea lamprey
- River lamprey
- Grey seal

2.1.3 During the 2007 Condition Assessment Process 94 per cent of the SPA was found to be in favourable condition, with the remainder recovering.

2.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC are:

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- No dredging or land-claim of coastal habitats
- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Maintenance of freshwater inputs
- Balance of saline and non-saline conditions
- Minimal disturbance of seal populations
- Minimal activities that alter sediment characteristics

3 Humber Flats, Marshes & Coast SPA and Ramsar site

3.1.1 The site is designated as an SPA for:

3.1.2 During the breeding season:

- Little Tern *Sterna albifrons*, 63 pairs representing at least 2.6 per cent of the breeding population in Great Britain
- Marsh Harrier *Circus aeruginosus*, 11 pairs representing at least 6.9 per cent of the breeding population in Great Britain (Count as at 1995)

3.1.3 Over winter:

- Bar-tailed Godwit *Limosa lapponica*, 1,593 individuals representing at least 3.0 per cent of the wintering population in Great Britain (5 year peak mean 1991/2 – 1995/6)
- Bittern *Botaurus stellaris*, 2 individuals representing at least 2.0 per cent of the wintering population in Great Britain (5 year mean 91/2-95/6)
- Golden Plover *Pluvialis apricaria*, 29,235 individuals representing at least 11.7 per cent of the wintering population in Great Britain (5 year peak mean 1991/2 – 1995/6)
- Hen Harrier *Circus cyaneus*, 20 individuals representing at least 2.7 per cent of the wintering population in Great Britain (5 year peak mean 1984/5-1988/9)
- Dunlin *Calidris alpina alpina*, 23,605 individuals representing at least 1.7 per cent of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean 1991/2 – 1995/6)
- Knot *Calidris canutus*, 33,848 individuals representing at least 9.7 per cent of the wintering Northeastern Canada/Greenland/Iceland/ Northwestern Europe population (5 year peak mean 1991/2 – 1995/6)
- Redshank *Tringa totanus*, 4,452 individuals representing at least 3.0 per cent of the wintering Eastern Atlantic – wintering population (5 year peak mean 1991/2 – 1995/6)
- Shelduck *Tadorna tadorna*, 4,083 individuals representing at least 1.4 per cent of the wintering Northwestern Europe population (5 year peak mean 1991/2 – 1995/6)

3.1.4 On passage:

- Redshank *Tringa totanus*, 5,212 individuals representing at least 2.9 per cent of the Eastern Atlantic – wintering population (5 year peak mean 1991/2 – 1995/6)
- Sanderling *Calidris alba*, 1,767 individuals representing at least 1.8 per cent of the Eastern Atlantic/Western & Southern Africa – wintering population (2 year mean May 1993 – 1994)

3.1.5 The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting 187,617 individual waterfowl.

3.1.6 As well as its bird assemblage, the Humber Estuary is designated as a Ramsar site for:

- The site is a representative example of a near-natural estuary with the following component habitats – dune systems and humid dune slacks, estuarine waters, intertidal mud and sand flats, saltmarshes, and coastal brackish/saline lagoons;
- The Humber Estuary supports a breeding colony of grey seals *Halichoerus grypus* at Donna Nook. It is the second largest grey seal colony in England and the furthest south regular breeding site on the east coast. The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*.
- The Humber Estuary acts as an important migration route for both river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus* between coastal waters and their spawning areas.

3.1.7 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SPA & Ramsar site are:

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- No dredging or land-claim of coastal habitats
- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Maintenance of freshwater inputs
- Balance of saline and non-saline conditions
- Minimal disturbance
- Minimal activities that alter sediment characteristics

4 Saltfleetby-Theddlethorpe Dunes & Gibraltar Point SAC

4.1.1 The dune system on the composite site Saltfleetby–Theddlethorpe Dunes and Gibraltar Point contains good examples of shifting dunes within a complex site that exhibits a range of dune types. At this site the *Ammophila*-dominated dunes are associated with lyme-grass *Leymus arenarius* and sand sedge *Carex arenaria*. The humid dune slacks at this site are part of a successional transition between a range of dune features, and some have developed from saltmarsh to freshwater habitats after becoming isolated from tidal inundation by sand deposition. There is a range of different communities present, many of which are species-rich. The species present depend on the wetness of the slack, its location within the system and the management history. Some of the drier slacks support a very wide range of species; this has been encouraged by management. The wetter slacks often have more permanent standing water and are composed of stands of sedges and rushes.

4.1.2 The site was designated as a Special Area of Conservation for its:

- Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`)
- Fixed dunes with herbaceous vegetation (`grey dunes`)
- Dunes with *Hippophae rhamnoides*
- Humid dune slacks
- Embryonic shifting dunes

4.1.3 During the 2007 Condition Assessment process 100 per cent of the SAC was found to be in favourable condition.

4.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC are:

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- No dredging or land-claim of coastal habitats
- Absence of non-native species

5 River Mease SAC

5.1.1 The River Mease is a good example of a riverine population of spined loach *Cobitis taenia*. It is a small tributary of the River Trent and has retained a reasonable degree of channel diversity compared to other similar rivers containing spined loach populations. It has extensive beds of submerged plants along much of its length which, together with its relatively sandy sediments (as opposed to cohesive mud) provides good habitat opportunities for the species. The Mease is an example of bullhead *Cottus gobio* populations in the rivers of central England. Bed sediments are generally not as coarse as other sites selected for the species, reflecting the nature of many rivers in this geographical area, but are suitable in patches due to the rivers retained sinuosity. The patchy cover from submerged macrophytes is also important for the species.

5.1.2 The site is designated as an SAC for:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
- Spined loach *Cobitis taenia*
- Bullhead *Cottus gobio*
- White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*
- Otter *Lutra lutra*

5.1.3 During the 2007 Condition Assessment Process 100 per cent of the SAC was found to be in unfavourable condition as a result of water abstraction, the presence of invasive species and water pollution from both agriculture and discharges.

5.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC site are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Maintenance of grazing regime in certain areas
- Minimal disturbance
- Sufficient water resources (including appropriate flow rates)

6 Cannock Chase SAC

6.1.1 The area of lowland heathland at Cannock Chase is the most extensive in the Midlands, although there have been losses due to fragmentation and scrub/woodland encroachment. The character of the vegetation is intermediate between the upland or northern heaths of England and Wales and those of southern counties. Dry heathland communities belong to NVC types H8 *Calluna vulgaris – Ulex gallii* and H9 *Calluna vulgaris – Deschampsia flexuosa* heaths. Within the heathland, species of northern latitudes occur, such as cowberry *Vaccinium vitis-idaea* and crowberry *Empetrum nigrum*. Cannock Chase has the main British population of the hybrid bilberry *Vaccinium intermedium*, a plant of restricted occurrence. There are important populations of butterflies and beetles, as well as European nightjar *Caprimulgus europaeus* and five species of bats. Birch and pine scrub, much of the latter from surrounding commercial plantations, is continually invading the site and has to be controlled.

6.1.2 The site is designated as an SAC for:

- Dry heathland
- Wet heathland with *Erica tetralix*

6.1.3 During the 2007 Condition Assessment process almost 98 per cent of the SAC was found to be in unfavourable condition partly as a result of water abstraction and inappropriate scrub control.

6.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC site are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Maintenance of grazing regime
- Minimal disturbance
- Sufficient water resources

7 Cannock Extension Canal SAC

7.1.1 Cannock Extension Canal in central England is an example of anthropogenic, lowland habitat supporting floating water-plantain *Luronium natans* at the eastern limit of the plant's natural distribution in England. A very large population of the species occurs in the Canal, which has a diverse aquatic flora and rich dragonfly fauna, indicative of good water quality. The low volume of boat traffic on this terminal branch of the Wyrley and Essington Canal has allowed open-water plants, including floating water-plantain, to flourish, while depressing the growth of emergents.

7.1.2 The site is designated as an SAC for:

- Floating water plantain

7.1.3 During the 2007 Condition Assessment Process 100 per cent of the SAC was found to be in unfavourable condition as a result of poor water quality caused in particular by surface water runoff from roads.

7.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC site are:

- Balanced levels of boating activity – If the canal is not used, the abundant growth of other aquatic macrophytes may shade-out the *Luronium natans*. However, a substantial increase in boating activity would be to the detriment of *Luronium natans*
- Unpolluted water
- Absence of non-native species
- Sufficient water levels (including flows)

8 Bredon Hill SAC

8.1.1 Bredon Hill is an area of pasture woodland and ancient parkland providing habitat for the violet click beetle *Limoniscus violaceus*, which was recorded at Bredon Hill in 1989, although there is a 1939 record from 'Tewkesbury', which may refer to Bredon Hill. It has been found in each of several years since. It is a very important site for fauna associated with decaying timber on ancient trees, including many Red Data Book and Nationally Scarce invertebrate species.

8.1.2 The site is designated as an SAC for:

- Violet click beetle

8.1.3 During the 2007 Condition Assessment Process 85 per cent of the SAC was found to be in unfavourable condition partly as a result of the lack of a replacement generation of trees for the current ancient trees over much of the hill, as many of the younger trees have been removed to increase stock grazing areas; the overall number of ancient trees suitable for *Limoniscus violaceus* is therefore relatively small.

8.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC site are:

- Preservation of trees until they become over-mature
- Preservation of dead wood (both standing and partially buried)

9 Dixton Wood SAC

9.1.1 Dixton Wood is an area of pasture woodland providing habitat for the violet click beetle *Limoniscus violaceus*, which was discovered at Dixton Wood in 1998 and it has been found at the site on a single occasion subsequently. It is a small site with large number of ancient ash *Fraxinus excelsior* pollards, and supports a rich fauna of scarce invertebrate species associated with decaying timber on ancient trees.

9.1.2 The site is designated as an SAC for:

- Violet click beetle

9.1.3 During the 2007 Condition Assessment Process 100 per cent of the SAC was found to be in unfavourable condition as a result of the lack of a replacement generation of trees for the current ancient trees over much of the hill, as many of the younger trees have been removed to increase stock grazing areas or are being overgrazed by deer; the overall number of ancient trees suitable for *Limoniscus violaceus* is therefore relatively small.

9.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC site are:

- Preservation of trees until they become over-mature
- Preservation of dead wood (both standing and partially buried)

10 Woolmer Forest SAC

10.1.1 Within Woolmer Forest, Cranmer Pond is a southern example of a dystrophic pond in an area of Northern Atlantic wet heaths with *Erica tetralix* and depressions on peat substrates of the *Rhynchosporion*. The 8 ha pond is thought to originate from peat-cutting, and has an average depth of 1m. The aquatic flora is comprised of bulbous rush *Juncus bulbosus* var. *fluitans*, which grows submerged and forms dense mats at the margins, and bog-mosses *Sphagnum* spp. which grow in shallower areas. To the north and south of Cranmer Pond are areas of transition mires and quaking bogs.

10.1.2 Woolmer Forest contains the largest and most diverse area of lowland heathland in Hampshire, outside the New Forest, representing a transition between this and the Surrey heaths. Dry heaths in Woolmer Forest include examples of NVC type H1b *Calluna vulgaris – Festuca ovina* heath, *Hypogymnia physodes – Cladonia impexa* sub-community, dominated by heather *Calluna vulgaris* and *Cladonia* lichens. Most of the dry heath is H2 *Calluna vulgaris – Ulex minor*, characterised by dwarf gorse *Ulex minor*. Woolmer Forest is the only site in Britain that supports all six native reptiles (including the Annex IV species sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*) and all six native amphibians (including great crested newt Triturus cristatus). It also supports an outstanding invertebrate fauna and bird assemblage, including European nightjar *Caprimulgus europaeus*, wood lark *Lullula arborea*, Dartford warbler *Sylvia undata*, Eurasian hobby *Falco subbuteo*, hen harrier *Circus cyaneus* and merlin *Falco columbarius*.

10.1.3 In this west Wealden site, seepage mires and other waterlogged areas are a minor feature amongst predominantly wet heath habitat. Seepages are fed from a mix of acidic and calcareous sources, and give rise to a series of pool and hummock structures within the mire. The *Rhynchospora alba* occurs within NVC type M21 *Narthecium ossifragum – Sphagnum papillosum* mire. It includes a range of bog-mosses *Sphagnum* spp., cottongrasses *Eriophorum angustifolium* and *E. vaginatum*, bog asphodel *Narthecium ossifragum*, cranberry *Vaccinium oxycoccos* and the rare marsh clubmoss *Lycopodiella inundata*.

10.1.4 The site is designated as a SAC for its:

- Natural dystrophic lakes and ponds
- European dry heaths
- Depressions on peat substrates of the *Rhynchosporium*
- Northern Atlantic wet heaths with *Erica tetralix*
- Transition mires and quaking bogs.

10.1.5 During the 2005 Condition Assessment process, only 4 per cent of the site was judged to be in favourable condition, with most of the remainder unfavourable recovering, largely from inadequate grazing or inappropriate vegetation cover.

10.1.6 The key environmental conditions that support the features of European interest are:

- Careful management of water levels
- Maintenance of grazing
- Minimal air pollution – nitrogen deposition may cause reduction in diversity, sulphur deposition can cause acidification
- Absence of direct fertilisation

11 Wealden Heaths Phase 2 SPA

11.1.1 Wealden Heaths Phase 2 SPA comprises four Sites of Special Scientific Interest:

- Devil's Punch Bowl
- Bramshott and Ludshott Commons
- Broxhead and Kingsley Commons
- Woolmer Forest

11.1.2 Wealden Heaths Phase 2 SPA qualifies under Article 4.1 of the Birds Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

- During the breeding season:
  - Nightjar *Caprimulgus europaeus*: 1.3 per cent of the breeding population in Great Britain (5-year mean, 1989-1993)
  - Woodlark *Lullula arborea*: 2.5 per cent of the breeding population in Great Britain (1997)
  - Dartford warbler *Sylvia undata*: 1 per cent of the breeding population in Great Britain (5-year mean, 1989-1993).

11.1.3 During the 2004 and 2005 Condition Assessment process, 77 per cent of the Woolmer Forest SSSI, and 66 per cent of Bramshott and Ludshott Commons was judged to be unfavourable recovering, largely relating to inadequate grazing, inappropriate woodland management, or lack of scrub control. The majority (67 per cent) of Broxhead and Kingsley Commons was unfavourable declining for the same reasons. Approximately 50 per cent of the Devil's Punch Bowl SSSI was favourable, the remainder recovering from bracken encroachment.

11.1.4 The following key environmental conditions were identified for this site:

- Appropriate management
- Management of disturbance during breeding season (March to July)
- Minimal air pollution
- Absence or control of urbanisation effects, such as fires and introduction of invasive non-native species
- Maintenance of appropriate water levels
- Maintenance of water quality

12 East Hampshire Hangers SAC

12.1.1 At Noar Hill, which forms part of this composite site, CG2 *Festuca ovina – Avenula pratensis* grassland (semi-natural dry grassland) has developed in an area of ancient quarries. The site supports an outstanding assemblage of orchids, including one of the largest UK populations of the nationally scarce musk orchid *Herminium monorchis*. Other orchid species that have been recorded include pyramidal orchid *Anacamptis pyramidalis*, frog orchid *Coeloglossum viride*, common spotted-orchid *Dactylorhiza fuchsii*, bee orchid *Ophrys apifera* and autumn lady's-tresses *Spiranthes spiralis*.

12.1.2 East Hampshire Hangers represents *Asperulo-Fagetum* beech forests in south-east England. The site is extremely rich in terms of vascular plants, including white helleborine *Cephalanthera damasonium*, violet helleborine *Epipactis purpurata*, green-flowered helleborine *E. phyllanthes* and Italian lords-and-ladies *Arum italicum*. The woods include areas with old pollards on former wood-pasture as well as high forest. There are also transitions to *Tilio-Acerion* forests of slopes, screes and ravines.

12.1.3 East Hampshire Hangers, with Rook Clift, represents an unusual occurrence of *Tilio-Acerion* forests in the south of England. It has areas of small-leaved lime *Tilia cordata* on the steepest parts of the Upper Greensand scarp, associated with low sandstone cliffs and scree slopes, which are locally calcareous. The bryophyte flora is richer than on the chalk examples and includes several species that are rare in the lowlands, such as *Campylostelium saxicola*, which has its strongest population in England here. The site is ecologically similar to sites selected in the Welsh Borders, despite its geographic location.

12.1.4 The site is designated as a SAC for its:

- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (important orchid sites)
- *Asperulo-Fagetum* beech forests
- *Tilio-Acerion* forests of slopes, screes and ravines
- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)
- *Taxus baccata* woods of the British Isles
- Early gentian

12.1.5 During the most recent Condition Assessment process, the majority of the SAC was in favourable condition.

12.1.6 The key environmental conditions that support the features of European interest are:

- Low nutrient runoff from surrounding land – being steep and narrow, the Hanger woodlands are vulnerable to nutrient run-off leading to eutrophication
- Maintenance of grazing
- Minimal air pollution – nitrogen deposition may cause reduction in diversity, sulphur deposition can cause acidification
- Absence of direct fertilisation
- Well-drained soils

13 Shortheath Common SAC

13.1.1 A valley mire forms the focal point of this site in the western Weald which also embraces a wide range of heathland habitats and woodland. The northern strip of the mire is the most mesotrophic and has much grey willow *Salix cinerea* but also a rich ground-flora with abundant sedges *Carex curta* and *C. rostrata*, soft rush *Juncus effusus*, marsh cinquefoil *Potentilla palustris* and the bog-moss *Sphagnum recurvum*. An oligotrophic area to the south is dominated by *S. recurvum* with cross-leaved heath *Erica tetralix*, common cottongrass *Eriophorum angustifolium*, purple moor-grass *Molinia caerulea* and round-leaved sundew *Drosera rotundifolia*. It is notable for its high cover of cranberry *Vaccinium oxycoccos*. Other bog-mosses such as *Sphagnum capillifolium* and *S. papillosum* are also present, and the whole forms a floating raft over much of the mire.

13.1.2 The site is designated as a SAC for its:

- Transition mires and quaking bogs
- European dry heaths
- Bog woodland

13.1.3 During the most recent Condition Assessment process, 88 per cent of the site was unfavourable recovering, largely through clearance of excessive scrub and bracken.

13.1.4 The key environmental conditions that support the features of European interest are:

- Balanced hydrological regime – the mire components of the site derive water from a small groundwater catchment to the north of the site[1], in hydrological continuity with the Folkestone beds[2]
- Minimal nutrient inputs
- Appropriate grazing pressure
- High air quality

[1] Hydrological study carried out for Hampshire County Council by Ron Allen in 2003. A summary is available at www.soilandwater.co.uk/index.php?id=4&click=0

[2] South East Water, personal communication

14 Thursley, Ash, Pirbright and Chobham SAC

14.1.1 This site represents lowland northern Atlantic wet heaths in south-east England. The wet heath at Thursley is NVC type M16 *Erica tetralix – Sphagnum compactum* and contains several rare plants, including great sundew *Drosera anglica*, bog hair-grass *Deschampsia setacea*, bog orchid *Hammarbya paludosa* and brown beak-sedge *Rhynchospora fusca*. There are transitions to valley bog and dry heath. Thursley Common is an important site for invertebrates, including the nationally rare white-faced darter *Leuccorhinia dubia*.

14.1.2 This south-east England site contains a series of large fragments of once-continuous heathland. It is selected as a key representative of NVC type H2 *Calluna vulgaris – Ulex minor* dry heathland. This heath type has a marked south-eastern and southern distribution. There are transitions to wet heath and valley mire, scrub, woodland and acid grassland, including types rich in annual plants. The European dry heaths support an important assemblage of animal species, including numerous rare and local invertebrate species, European nightjar *Caprimulgus europaeus*, Dartford warbler *Sylvia undata*, sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*.

14.1.3 This site contains examples of Depressions on peat substrates of the *Rhynchosporion* in south-east England, where it occurs as part of a mosaic associated with valley bog and wet heath. The vegetation is found in natural bog pools of patterned valley mire and in disturbed peat of trackways and former peat-cuttings.

14.1.4 The site is designated as a SAC for its:

- European dry heaths
- Depressions on peat substrates of the *Rhynchosporium*
- Northern Atlantic wet heaths with *Erica tetralix*

14.1.5 During the most recent Condition Assessment process, much of the SAC was in unfavourable condition. 83 per cent of Ash to Brookwood heaths SSSI was unfavourable recovering from inappropriate cutting/mowing regimes or scrub, 59 per cent of Colony Bog and Bagshot Heaths SSSI was unfavourable declining through scrub levels, military use and undergrazing, only 15 per cent of Chobham Common SSSI was favourable, and around 50 per cent of Thursley, Hankley and Frensham Commons SSSI was unfavourable recovering.

14.1.6 The key environmental conditions that support the features of European interest are:

- Traditional management, including grazing, bracken control and scrub clearance
- Water levels
- Managed recreational disturbance
- Absence or management of urbanization effects, eg fires, fly tipping, introduction of non-native species (eg Shallon)
- Minimal atmospheric or direct pollution (there are problems with unconsented diffuse discharges from agricultural fertilization causing eutrophication)
- Water quality

15 Thursley, Hankley and Frensham Commons SPA

15.1.1 Thursley, Hankley and Frensham Commons together incorporate a heath and valley mire complex. Much of the site is in secure tenure. Thursley Common is a National Nature Reserve managed by English Nature. Frensham and Witley Commons are managed by the National Trust and a large part of the site is owned by the MoD (Hankley Common and Ockley Common), being regularly used for military activities and informal recreation.

15.1.2 Thursley, Hankley and Frensham Commons SPA qualifies under Article 4.1 of the Birds Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

- During the breeding season:
  - Nightjar *Caprimulgus europaeus*: 0.6 per cent of the breeding population in Great Britain (5-year mean, 1985-1990)
  - Woodlark *Lullula arborea*: 1.8 per cent of the breeding population in Great Britain (1994)
  - Dartford warbler *Sylvia undata*: at least 1.3 per cent of the breeding population in Great Britain (1984).

15.1.3 During the most recent Condition Assessment process, around 50 per cent of Thursley, Hankley and Frensham Commons SSSI was unfavourable recovering, through improved scrub control, and grazing.

15.1.4 The key environmental conditions that support the features of European interest are:

- Maintenance of grazing and other traditional management practices
- Acid soils
- Minimal air pollution (nitrogen deposition can cause compositional changes over time)
- Unpolluted water
- Unfragmented habitat
- Minimal recreational pressure and a low incidence of wildfires.

16 Thames Basin Heaths SPA

16.1.1 The Thames Basin Heaths SPA comprises 13 SSSIs:

- Bramshill
- Castle Bottom to Yateley and Hawley Commons
- Hazeley Heath
- Eelmoor, Bourley and Long Valley
- Ash to Brookwood Heaths
- Whitmoor Common
- Ockham and Wisley Commons
- Horsell Common
- Chobham Common
- Broadmoor to Bagshot Woods and Heaths
- Colony Bog and Bagshot Heaths
- Sandhurst to Owlsmoor Bogs and Heaths

16.1.2 Thames Basin Heaths SPA qualifies under Article 4.1 of the Birds Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

- During the breeding season:
  - Nightjar Caprimulgus europaeus: 7.8 per cent of the breeding population in Great Britain (1998-1999)
  - Woodlark Lullula arborea: 9.9 per cent of the breeding population in Great Britain (1997)
  - Dartford warbler Sylvia undata: 27.8 per cent of the breeding population in Great Britain (1999).

16.1.3 During the most recent Condition Assessment process, the following proportions of the constituent SSSIs were favourable:

- Bramshill (0 per cent)
- Castle Bottom to Yateley and Hawley Commons (28 per cent)
- Hazeley Heath (1 per cent)
- Eelmoor, Bourley and Long Valley (55 per cent)

- Ash to Brookwood Heaths (13 per cent)
- Whitmoor Common (0 per cent)
- Ockham and Wisley Commons (0 per cent)
- Horsell Common (17 per cent)
- Chobham Common (15 per cent)
- Broadmoor to Bagshot Woods and Heaths (5 per cent)
- Colony Bog and Bagshot Heaths (0.5 per cent)
- Sandhurst to Owlsmoor Bogs and Heaths (100 per cent)

16.1.4 The remaining areas were designated as being in unfavourable condition, recovering, no change or declining. Reasons for this include inadequate grazing, scrub control, or inappropriate management (cutting/mowing/ woodland).

16.1.5 The key environmental conditions that support the features of European interest are:

- Maintenance of grazing and other traditional management practices
- Unfragmented habitat
- Minimal recreational pressure and a low incidence of wildfires.

17 Ebernoe Common SAC

17.1.1 Ebernoe Common has an extensive block of beech *Fagus sylvatica* high forest and former wood-pasture over dense holly *Ilex aquifolium*, and has a very rich epiphytic lichen flora, including *Agonimia octospora* and *Catillaria atropurpurea*. It represents Atlantic acidophilous beech forests in the south-eastern part of the habitat's UK range. The beech woodland is associated with other woodland types, open glades and pools, which contribute to a high overall diversity. The woods are important for a number of bat species, in particular Bechstein's bat *Myotis bechsteinii* and barbastelle *Barbastella barbastellus*.

17.1.2 The site is designated as a SAC for its:

- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*)
- Barbastelle bat
- Bechstein's bat

17.1.3 During the most recent Condition Assessment process, 43 per cent of the site was in favourable condition with most of the rest unfavourable recovering. Reasons for unfavourable status involve inappropriate woodland management.

17.1.4 The key environmental conditions that support the features of European interest are:

- Appropriate management
- Minimal atmospheric pollution – may increase the susceptibility of beech trees to disease and alter epiphytic communities
- In a wider context, bats require good connectivity of landscape features to allow foraging and commuting.

18 Pagham Harbour SPA

18.1.1 Pagham Harbour comprises an extensive central area of salt marsh and tidal mudflats, with surrounding habitats including lagoons, shingle, open water, reed swamp and wet permanent grassland.

18.1.2 Pagham Harbour SPA qualifies under Article 4.1 of the Birds Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

- Little tern *Sterna albifrons*: 0.3 per cent of the breeding population in Great Britain (5 year mean, 1992-1996);
- Common tern *Sterna hirundo*

18.1.3 Over winter the area supports:

- Ruff *Philomachus pugnax*: 1.4 per cent of the wintering population in Great Britain (5 year mean, 1991/92 – 1995/96)

18.1.4 During the most recent Condition Assessment process, 92 per cent of Pagham Harbour SSSI was deemed to be in favourable condition.

18.1.5 The key environmental conditions that support the features of European interest are:

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- Unpolluted water
- Absence of nutrient enrichment of water
- Absence of non-native species
- Maintenance of appropriate hydrological regime.

19 Singleton and Cocking Tunnels SAC

19.1.1 These two disused brick railway tunnels, located in rural Sussex, once formed part of the Chichester to Midhurst railway line. The tunnels constitute the most important sites for hibernating bats in south-east England, including significant numbers of Bechstein's *Myotis bechsteinii* and Barbastelle *Barbastella barbastellus* bats, which use the tunnels for both late summer/autumn swarming and hibernation.

19.1.2 The site is designated as a SAC for its:

- Barbastelle bat
- Bechstein's bat

19.1.3 During the most recent Condition Assessment process, the whole site was in favourable condition.

19.1.4 The key environmental conditions that support the features of European interest are:

- Absence of disturbance; tunnel entrances covered by bat grill to prevent disturbance.
- In a wider context, bats require good connectivity of landscape features to allow foraging and commuting

20 Arun Valley SPA and Ramsar site

20.1.1 The Arun Valley consists of three component Sites of Special Scientific Interest (Amberley Wild Brooks, Waltham Brooks and Pulborough Brooks). Together these sites comprise an area of wet meadows on the floodplain of the River Arun between Pulborough and Amberley. The neutral wet grassland which is subject to winter, and occasional summer, flooding, is dissected by a network of ditches, several of which support rich aquatic flora and invertebrate fauna. The area is of outstanding ornithological importance notably for wintering wildfowl and breeding waders.

20.1.2 The site qualifies under Article 4.1 of the Birds Directive (79/409/EEC) by supporting over-wintering populations of European importance of the following species listed on Annex I of the Directive:

- Bewick's swan *Cygnus columbianus bewickii*: 1.6 per cent of the over-wintering population in Great Britain (5 year mean, 1992/93-1996/97)

20.1.3 The Arun Valley Ramsar site qualifies on three of the nine Ramsar criteria (Table 1).

Table 1: Criteria under which the Arun Valley SPA qualifies as a Ramsar site

Ramsar criterion	Description of Criterion	Arun Valley SPA
2	A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.	The site holds seven wetland invertebrate species listed in the British Red Data Book as threatened. One of these, *Pseudamnicola confusa*, is considered to be endangered. The site also supports four nationally rare and four nationally scarce plant species.
3	A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.	In addition to the Red Data Book invertebrate and plant species, the ditches intersecting the site have a particularly diverse and rich flora. All five British duckweed *Lemna* species, all five water-cress *Rorippa* species, and all three British water milfoils (*Myriophyllum* species), all but one of the seven British water dropworts (Oenanthe species), and two-thirds of the British pondweeds (*Potamogeton* species) can be found on site.

Table 1: Criteria under which the Arun Valley SPA qualifies as a Ramsar site *(continued)*

Ramsar criterion	Description of Criterion	Arun Valley SPA
5	A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.	Assemblages of international importance: Species with peak counts in winter: 13774 waterfowl (5 year peak mean 1998/99-2002/2003)

20.1.4 During the most recent Condition Assessment process, 75 per cent of Puborough Brooks SSSI was in favourable condition, while 98 per cent of Amberley Wild Brooks was unfavourable recovering. Unfavourable areas on both sites related to insufficient water levels. Waltham Brooks was in unfavourable condition (no change or declining) due to pollution and undergrazing.

20.1.5 The key environmental conditions that support the features of European interest are:

- Water level
- Water flow
- Unpolluted water
- Absence of nutrient enrichment of water
- Appropriate management: grazing

21 Duncton to Bignor Escarpment

21.1.1 *Asperulo-Fagetum* beech forests occur here on steep scarp slopes and on more gently-sloping hillsides in mosaic with ash *Fraxinus excelsior* woodland, scrub and grassland. Much of the beech woodland is high forest but with some old pollards. Rare plants present include the white helleborine *Cephalanthera damasonium*, yellow bird's nest *Monotropa hypopitys* and green hellebore *Helleborus viridis*. The woods also have a rich mollusc fauna.

21.1.2 The site is designated as a SAC for its:

- *Asperulo-Fagetum* beech forests

21.1.3 During the most recent Condition Assessment process, almost 90 per cent of the area was in favourable condition.

21.1.4 The key environmental conditions that support the features of European interest are:

- Minimal atmospheric pollution – may increase the susceptibility of beech trees to disease
- Appropriate management

22 Cothill Fen SAC

22.1.1 This lowland valley mire contains one of the largest surviving examples of alkaline fen vegetation in central England, a region where fen vegetation is rare. The M13 *Schoenus nigricans – Juncus subnodulosus* vegetation found here occurs under a wide range of hydrological conditions, with frequent bottle sedge *Carex rostrata*, grass-of-Parnassus *Parnassia palustris*, common butterwort *Pinguicula vulgaris* and marsh helleborine *Epipactis palustris*. The alkaline fen vegetation forms transitions to other vegetation types that are similar to M24 *Molinia caerulea – Cirsium dissectum* fen-meadow and S25 *Phragmites australis – Eupatorium cannabinum* tall-herb fen and wet alder *Alnus* spp. wood.

22.1.2 The site is designated as an SAC for:

- Alkaline fens
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*

22.1.3 During the 2007 Condition Assessment Process over 34 per cent of the SAC was found to be in unfavourable condition (albeit recovering) as a result of inappropriate historical management.

22.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC site are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Maintenance of grazing or cutting regime
- Minimal trampling
- Balanced hydrological regime

23 Oxford Meadows SAC

23.1.1 Together with North Meadow and Clattinger Farm, also in southern England, Oxford Meadows represents lowland hay meadows in the Thames Valley centre of distribution. The site includes vegetation communities that are perhaps unique in the world in reflecting the influence of long-term grazing and hay-cutting on lowland hay meadows. The site has benefited from the survival of traditional management, which has been undertaken for several centuries, and so exhibits good conservation of structure and function. Gravel extraction is taking place adjacent to one of the component parts. Safeguards and monitoring are in place to minimise the risk of damage to the site due to groundwater changes arising from this activity. Port Meadow is registered Common Land with common grazing rights administered by the Freemen of Oxford and Wolvercote Commoners' Committee. Stocking levels are high and grazing takes place throughout the year.

23.1.2 The site is designated as an SAC for:

- Lowland hay meadows
- Creeping marshwort (specifically at the Port Meadow SSSI component)

23.1.3 The SAC consists of four component Sites of Special Scientific Interest. During the 2007 Condition Assessment Process only one management unit of one component SSSI (Port Meadow) was judged to be in unfavourable condition as a result of agricultural activity.

23.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC site are:

- Balanced hydrological regime (including sufficient groundwater and regular inundation)
- Absence of nutrient enrichment
- Maintenance of grazing regime but without overgrazing
- Minimal recreational trampling

24 Pagham Harbour SPA

24.1.1 Pagham Harbour is located on the south coast of England in West Sussex. It is an estuarine basin that comprises an extensive central area of saltmarsh and intertidal mudflats surrounded by lagoons, shingle, open water, reed swamp and wet permanent grassland. The mud-flats are rich in invertebrates and algae, and provide important feeding areas for birds. The lower saltmarsh is dominated by Common Cord-grass *Spartina anglica*, with patches of Glasswort *Salicornia* spp. The area supports breeding Little Tern *Sterna albifrons* in summer, as well as wintering concentrations of Ruff *Philomachus pugnax* and Pintail *Anas acuta*.

24.1.2 The site is designated as an SPA for:

- Little Tern *Sterna albifrons*, 12 pairs representing 0.5 per cent of the breeding population in Great Britain (Count as at 1995)
- Ruff *Philomachus pugnax*, 160 individuals representing at least 22.9 per cent of the wintering population in Great Britain
- Pintail *Anas acuta*, 628 individuals representing at least 1.0 per cent of the wintering Northwestern Europe population (5 year peak mean 1991/2 – 1995/6)

24.1.3 During the 2007 Condition Assessment process Pagham Harbour was judged to be in 96 per cent favourable condition with the remainder unfavourable as a result of treated sewage effluent discharge.

24.1.4 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SPA site are:

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- No dredging or land-claim of coastal habitats
- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Maintenance of freshwater inputs
- Balance of saline and non-saline conditions
- Minimal disturbance
- Minimal activities that alter sediment characteristics

25 Chichester and Langstone Harbours SPA

25.1.1 The SPA comprises two large, sheltered estuarine basins on the central south coast of England. Langstone Harbour is fringed by urban and industrial development, whereas Chichester is surrounded mainly by high grade farmland.

25.1.2 The site qualifies under Article 4.1 of the Birds Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

- Little tern *Sterna albifrons*: 4.2 per cent of the breeding population in Great Britain (5 year mean, 1992-1996)
- Common tern *Sterna hirundo*: 0.3 per cent of the breeding population in Great Britain (5 year mean, 1992-1996)
- Sandwich tern *Sterna sandvicensis*: 0.2 per cent of the breeding population in Great Britain (5 year mean, 1993-1997)

Over-winter the site qualifies with:

- Bar-tailed godwit *Limosa lapponica*: 3.2 per cent of the over-wintering population in Great Britain (5 year mean, 1991/92-1995/96)

25.1.3 During the most recent Condition Assessment process, 57 per cent of Chichester Harbour SSSI was in favourable condition, but 90 per cent of Langstone Harbour was unfavourable declining. Water pollution and coastal squeeze were the major problems on both sites.

25.1.4 The key environmental conditions that support the features of European interest are:

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- Unpolluted water
- Absence of nutrient enrichment of water
- Absence of non-native species eg from shipping activity
- Maintenance of appropriate hydrological regime, eg freshwater flows at heads of channels are important for birds to preen, drink and feed
- Short grasslands surrounding the SPA are essential to maintaining interest features as they are now the key foraging resource for Brent goose.

26 Hatfield Moor SAC

26.1.1 Hatfield Moors is a remnant of the once-extensive bog and fen peatlands within the Humberhead Levels, and is still the second-largest area of extant lowland raised bog peat in England. Moraines of sand occur beneath the peat, the largest of which forms Lindholme Island, in the centre of the bog. Little, if any, original bog surface has survived the massive extraction of peat over the last few decades. Peat-cutting has now ceased, and the bog is being restored over its remaining minimum average depth of 0.5 m of peat.

26.1.2 Refugia of vegetation have survived as rather dry heathland and as birch woodland. Plants include the dwarf shrubs *Calluna vulgaris, Erica tetralix, Eriophorum angustifolium, E. vaginatum, Vaccinium oxycoccos*, bog-rosemary *Andromeda polifolia*, bog-myrtle *Myrica gale*, and the bog-mosses *Sphagnum cuspidatum, S. recurvum, S. papillosum, S. subnitens* and *S. tenellum*. The bog is also notable for its invertebrate fauna, which includes the mire pill beetle *Curimopsis nigrita*.

26.1.3 It is designated as an SAC for:

- Degraded raised bogs still capable of natural regeneration

26.1.4 During the most recent Condition Assessment process, 80 per cent of the SAC was found to be in recovering condition. The remainder was in unfavourable condition as a result of excessive abstraction from the underlying aquifer.

26.1.5 The key environmental conditions that support the features of European interest are:

- Balanced grazing regime
- High water table
- Minimal trampling or other recreational damage
- Good air quality.

27 Thorne Moor SAC

27.1.1 Thorne Moor is England's largest area of raised bog, lying a few kilometres from the smaller Hatfield Moors, both within the former floodplain of the rivers feeding the Humber estuary (Humberhead Levels), and includes the sub-components Goole Moors and Crowle Moors. Although recent management has increased the proportion of active raised bog at Thorne Moors, the inclusion of Goole Moors, where peat-extraction has now ceased, means that the site is still predominantly degraded raised bog. The restored secondary surface is rich in species of active raised bogs with bog-mosses *Sphagnum* spp., cottongrasses *Eriophorum angustifolium* and *E. vaginatum*, heather *Calluna vulgaris*, cross-leaved heath *Erica tetralix*, round-leaved sundew *Drosera rotundifolia*, cranberry *Vaccinium oxycoccos* and bog-rosemary *Andromeda polifolia*.

27.1.2 It is designated as an SAC for:

- Degraded raised bogs still capable of natural regeneration

27.1.3 During the most recent Condition Assessment process, 70 per cent of the SAC was found to be in recovering condition. The remainder was in unfavourable condition as a result of excessive abstraction from the underlying aquifer.

27.1.4 The key environmental conditions that support the features of European interest are:

- Balanced grazing regime
- High water table
- Minimal trampling or other recreational damage
- Good air quality.

28 Thorne & Hatfield Moors SPA

28.1.1 Thorne and Hatfield Moors SPA is an extensive lowland raised mire system adjacent to the Humber estuary on the north-east coast of England and is the largest remaining lowland peatland in England. Despite a long history of extensive peat extraction since the late nineteenth century, the site retains substantial areas of Sphagnum bog, which has been changed by succession to wet scrub woodland dominated by Birch *Betula* sp., sallows and Alder *Alnus glutinosa*. Where the peat surface has been removed, subsequent restoration of active bog has depended upon shallow flooding to allow Sphagnum and other bog plants to re-colonise.

28.1.2 The mire communities are dominated by Hare's-tail *Eriophorum vaginatum* and Common Cottongrass *E. angustifolium*, Cross-leaved Heath *Erica tetralix*, Soft-rush *Juncus effusus* and *Sphagnum* mosses, and include a variety of scarcer bog plants such as Bog-rosemary *Andromeda polifolia* and Cranberry *Vaccinium oxycoccos*. Drier heath is dominated by Heather *Calluna vulgaris*, Bracken *Pteridium aquilinum* and Purple Moor-grass *Molinia caerulea*. Birch *Betula* sp. scrub, some of it dense, occurs throughout both moors. The diverse mosaic of habitats contributes greatly to the ornithological interest, which comprises breeding species, notably Nightjar *Caprimulgus europaeus*.

28.1.3 It is designated as an SPA for:

- Nightjar *Caprimulgus europaeus*, 66 pairs representing at least 1.9 per cent of the breeding population in Great Britain

28.1.4 The key environmental conditions that support the features of European interest are:

- Balanced grazing regime
- Well-drained soils
- Minimal trampling or other recreational damage
- Low cat populations
- Good air quality.

29 Kingley Vale SAC

29.1.1 Kingley Vale is one of the sites representing yew *Taxus baccata* woods on chalk, in the central southern part of its UK range. It has been selected primarily because of its size, as it is the largest area of yew woodland in Britain. It also shows excellent conservation of the full range of habitat structure and function.

29.1.2 The site is designated as a SAC for its:

- *Taxus baccata* woods of the British Isles
- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)

29.1.3 During the most recent Condition Assessment process, 57 per cent of the site was in favourable condition, with the majority of the remainder recovering from unfavourable grazing or scrub levels.

29.1.4 The key environmental conditions that support the features of European interest are:

- Maintenance of grazing
- The long-term conservation of the yew forest requires the maintenance of nurse scrub habitat and the regulation of numbers of resident deer.
- Minimal air pollution – nitrogen deposition may cause reduction in diversity, sulphur deposition can cause acidification
- Absence of direct fertilisation
- The site is vulnerable to spray-drift (ie eutrophication) from surrounding intensive arable land.
- Low recreational pressure.

30 Devil's Dyke SAC

30.1.1 Devil's Dyke consists of a mosaic of CG3 *Bromus erectus* and CG5 *Bromus erectus – Brachypodium pinnatum* calcareous grasslands. It is the only known UK semi-natural dry grassland site for lizard orchid *Himantoglossum hircinum*. It is designated as an SAC for:

- Calcareous grassland

30.1.2 During the most recent Condition Assessment process, the SAC was found to be in 100 per cent favourable or recovering condition.

30.1.3 The key environmental conditions that support the features of European interest are:

- Balanced grazing regime
- Well-drained soils
- Minimal trampling or other recreational damage
- No direct fertilisation; and
- Good air quality.

31 Eversden & Wimpole Woods SAC

31.1.1 This site lies approximately 5km to the south-east of Huntingdonshire. Eversden Wood is an important ancient semi-natural woodland of a type now localised in extent, and rare in lowland England. The habitats present also support a nationally important summer maternity roost for the barbastelle bat, *Barbastella barbastellus*. These trees are used as a summer maternity roost where the female bats gather to give birth and rear their young. Most of the roost sites are within tree crevices. The bats also use the site as a foraging area. Some of the woodland is also used as a flight path when bats forage outside the site. All of the most important foraging areas are within the site boundary however.

31.1.2 The site is designated as an SAC for:

- Barbastelle

31.1.3 During the most recent Condition Assessment process, the SAC was found to be in 100 per cent favourable condition.

31.1.4 The key environmental conditions that support the features of European interest are:

- Maintenance of sufficient woodland foraging and roosting habitat
- Maintenance of necessary established commuting routes.

32 Portholme SAC

32.1.1 This area lies within Huntingdonshire and holds grassland communities of the alluvial flood meadow type. It is the largest surviving traditionally-managed meadow in the UK, with an area of 104 ha of alluvial flood meadow (7 per cent of the total UK resource). Watercourses on the periphery of the site have populations of some uncommon invertebrates, including one dragonfly, which is of a nationally restricted distribution. The meadow is surrounded by channels of the River Ouse, and the Alconbury Brook is close by. In winter and early spring Portholme is inundated by floodwaters. This provides natural fertilising of the soil and it is this seasonal flooding coupled with the traditional management that maintains the diversity of the natural plant communities.

32.1.2 The site is designated as an SAC for:

- Lowland hay meadows.

32.1.3 During the most recent Condition Assessment process, the entire SSSI was classified as 'unfavourable no change' or 'unfavourable declining' due to a lack of appropriate management.

32.1.4 The key environmental conditions that support the features of European interest are:

- Restoration of appropriate grazing/cutting regime
- Low levels of trampling
- Maintenance of appropriate water levels and good water quality
- Minimal air pollution – nitrogen deposition may cause reduction in diversity, sulphur deposition can cause acidification; and
- Absence of direct fertilisation.

33 Ouse Washes SAC, SPA & Ramsar site

33.1.1 The Ouse Washes are located in eastern England on one of the major tributary rivers of The Wash. It is an extensive area of seasonally flooding wet grassland ('washland') lying between the Old and New Bedford Rivers (which are hydraulically connected to the River Great Ouse) and acts as a floodwater storage system during winter months. The cycle of winter storage of floodwaters from the river and traditional summer grazing by cattle, as well as hay production, have given rise to a mosaic of rough grassland and wet pasture, with a diverse and rich ditch fauna and flora.

33.1.2 The washlands support both breeding and wintering waterbirds. In summer, there are important breeding numbers of several wader species, as well as Spotted Crake *Porzana porzana*. In winter, the site holds very large numbers of swans, ducks and waders. During severe winter weather elsewhere, the Ouse Washes can attract waterbirds from other areas due to its relatively mild climate (compared with continental Europe) and abundant food resources. In winter, some wildfowl, especially swans, feed on agricultural land surrounding the SPA.

33.1.3 The site is designated as an SPA for its:

- Populations of European importance of the following migratory species: Ruff, Spotted Crake, Bewick's Swan, Hen Harrier, Whooper Swan, Black-tailed Godwit, Gadwall, Shoveler, Pintail, Pochard and Wigeon. The site also supports a bird assemblage of international importance by regularly supporting 64,392 waterfowl.

33.1.4 As well as its bird assemblage, the Ouse Washes are designated as a Ramsar site for:

- Being one of the most extensive areas of seasonally-flooding washland of its type in Britain;
- Supporting several nationally scarce plants, including small water pepper *Polygonum minus*, whorled water-milfoil *Myriophyllum verticillatum,* greater water parsnip *Sium latifolium*, river waterdropwort *Oenanthe fluviatilis*, fringed water-lily *Nymphoides peltata*, long-stalked pondweed *Potamogeton praelongus*, hair-like pondweed *Potamogeton trichoides*, grass-wrack pondweed *Potamogeton compressus*, tasteless water-pepper *Polygonum mite* and marsh dock *Rumex palustris*; and
- Supporting a relict fenland invertebrate fauna, including the British Red Data Book species large darter dragonfly *Libellula fulva* and the rifle beetle *Oulimnius major*.

33.1.5 The site is designated as an SAC for its:

- Spined loach

33.1.6 During the most recent Condition Assessment process the majority (87 per cent) of the site was found to be in unfavourable condition primarily as a result of inappropriate water levels and water pollution from a combination of agricultural run off and effluent discharge.

33.1.7 With respect to water quality discharge consents, it is clear from the Environment Agency Review of Consents process that high phosphorus concentrations are currently the main issue for the Ouse Washes leading to eutrophication in the main watercourses and internal ditches and degradation of the wet grassland habitat. From all of the available evidence, phosphorus levels are above the desired target level, in some cases by a considerable amount. The modelling work that has been undertaken has shown that the main contribution to the phosphorus load comes from consented point source discharges of sewage effluent.

33.1.8 According to the Environment Agency Review of Consents, the key hydrological factors affecting the target wet grassland and swamp habitats are the frequency, duration and depth of flooding above the ground surface and the depth of the water table below the ground surface. The predominant control to meeting the conditions required for target communities is the occurrence of prolonged and deep winter flooding which can last well into the spring and also some summer flooding events.

33.1.9 The key environmental conditions that support the features of European interest are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Maintenance of freshwater inputs
- Minimal disturbance
- Minimal activities that alter sediment characteristics

34 The Wash and North Norfolk Coast SAC/SPA & Ramsar site

34.1.1 The Wash is located on the east coast of England and is the largest estuarine system in the UK. It is fed by the rivers Witham, Welland, Nene and Great Ouse that drain much of the east Midlands of England. The Wash comprises very extensive saltmarshes, major intertidal banks of sand and mud, shallow waters and deep channels.

34.1.2 The eastern end of the site includes low chalk cliffs at Hunstanton. In addition, on the eastern side, the gravel pits at Snettisham are an important high-tide roost for waders. The intertidal flats have a rich invertebrate fauna and colonising beds of Glasswort *Salicornia* spp. which are important food sources for the large numbers of waterbirds dependent on the site. The sheltered nature of The Wash creates suitable breeding conditions for shellfish, principally Mussel *Mytilus edulis*, Cockle *Cardium edule* and shrimps. These are important food sources for some waterbirds such as Oystercatchers *Haematopus ostralegus*. The Wash is designated as a Special Area of Conservation for supporting the following features of European importance:

- Subtidal sandbanks
- Intertidal mudflats and sandflats
- Shallow inlets and bays
- Reefs
- Mediterranean saltmarsh scrub
- Lagoons
- Common seal
- Otter

34.1.3 The Wash is of outstanding importance for a large number of geese, ducks and waders, both in spring and autumn migration periods, as well as through the winter. The SPA is especially notable for supporting a very large proportion (over half) of the total population of Canada/ Greenland breeding knot *Calidris canutus islandica*. In summer, the Wash is an important breeding area for terns and as a feeding area for marsh harrier *Circus aeruginosus* that breed just outside the SPA. The Wash was designated as a Special Protection Area for supporting supporting a bird assemblage of international importance by regularly supporting 400,273 waterfowl and for supporting populations of European importance of the following migratory species:

- Common Tern
- Little Tern
- Marsh Harrier
- Avocet
- Bar-tailed Godwit
- Golden Plover
- Whooper Swan
- Ringed Plover
- Sanderling
- Black-tailed Godwit
- Curlew
- Dark-bellied Brent Goose
- Dunlin
- Grey Plover
- Knot
- Oystercatcher
- Pink-footed Goose
- Pintail
- Redshank
- Shelduck
- Turnstone

34.1.4 The key environmental conditions that support the features of European interest are:

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- No dredging or land-claim of coastal habitats
- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Maintenance of freshwater inputs

- Balance of saline and non-saline conditions
- Minimal disturbance of seals and otter populations
- Minimal activities that alter sediment characteristics.

35 The Mens SAC

35.1.1 The Mens is an extensive area of mature beech *Fagus sylvatica* woodland rich in lichens, bryophytes, fungi and saproxylic invertebrates, and is one of the largest tracts of Atlantic acidophilous beech forests in the south-eastern part of the habitat's UK range. It is developing a near-natural high forest structure, in response to only limited silvicultural intervention over the 20th century, combined with the effects of natural events such as the 1987 great storm.

35.1.2 The site is designated as a SAC for its:

- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*)
- Barbastelle bat

35.1.3 During the most recent Condition Assessment process, 100 per cent of the site was in favourable condition.

35.1.4 The key environmental conditions that support the features of European interest are:

- Appropriate management.
- Low recreational pressure (because management is minimum intervention).
- Minimal air pollution – may increase the susceptibility of beech trees to disease and alter epiphytic communities.
- In a wider context, bats require good connectivity of landscape features to allow foraging and commuting.

36 Lee Valley SPA & Ramsar site

36.1.1 The Lee Valley comprises a series of embanked water supply reservoirs, sewage treatment lagoons and former gravel pits along approximately 24 km of the valley. These waterbodies support internationally important numbers of wintering gadwall and shoveler, while the reedbeds support a population of bittern.

36.1.2 The Lee Valley SPA consists of four Sites of Special Scientific Importance, of which Turnford and Cheshunt Pits SSSI, Rye Meads SSSI and Amwell Quarry SSSI which lie along the river Lee, on the Hertfordshire/Essex border. Walthamstow Reservoirs SSSI lies within Greater London. The Special Protection Area is managed by the Lee Valley Regional Park Authority.

36.1.3 The Lee Valley comprises a series of embanked water supply reservoirs, sewage treatment lagoons and former gravel pits along approximately 24 km of the valley. These waterbodies support internationally important numbers of wintering gadwall and shoveler, while the reedbeds support a population of bittern.

36.1.4 The site was designated as being of European importance for the following interest features:

- Bittern *Botaurus stellaris*, 6 individuals representing at least 6.0 per cent of the wintering population in Great Britain (5 year peak mean, 1992/3-1995/6)
- Gadwall *Anas strepera*, 515 individuals representing at least 1.7 per cent of the wintering Northwestern Europe population (5 year peak mean 1991/2 – 1995/6)
- Shoveler *Anas clypeata*, 748 individuals representing at least 1.9 per cent of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 – 1995/6)

36.1.5 The Lee Valley Ramsar site qualifies on two of the nine Ramsar criteria (Table 2).

Table 2. Criteria under which the Lee Valley SPA qualifies as a Ramsar site

Ramsar criterion	Description of Criterion	Lee Valley SPA
2	A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.	The site supports the nationally scarce plant species whorled water-milfoil *Myriophyllum verticillatum* and the rare or vulnerable invertebrate *Micronecta minutissima* (a water-boatman).
6	A wetland should be considered internationally important if it regularly supports 1 per cent of the individuals in a population of one species or subspecies of waterbird.	Species with peak counts in spring/ autumn: Shoveler *Anas clypeata*, 287 individuals, representing an average of 1.9 per cent of the GB population (5 year peak mean 1998/9-2002/3) Species with peak counts in winter: Gadwall *Anas strepera strepera*, 445 individuals, representing an average of 2.6 per cent of the GB population (5 year peak mean 1998/9- 2002/3)

36.1.6 During the most recent condition assessment process, 100 per cent of Turnford and Cheshunt Pits SSSI, Amwell Quarry SSSI and Walthamstow Reservoirs SSSI were judged to be in favourable condition. The Rye Meads SSSI was assessed as part favourable and part recovering. Although the site currently experiences high levels of visitor pressure, it is not currently deemed to be at levels that threaten the SPA/ Ramsar site[3]

36.1.7 The following key environmental conditions were identified for this site:

- Minimal disturbance
- Maintenance of grazing/mowing regimes
- Consistent freshwater flows and volumes
- Consistent water quality
- Good air quality
- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- The maintenance of adequate supporting habitat outside the boundaries of the European site

[3] JNCC (2000) Information Sheet on Ramsar Wetlands – Lee Valley http://www.jncc.gov.uk/pdf/RIS/UK11034.pdf

37 Wormley-Hoddesdonpark Woods SAC

37.1.1 The Wormley-Hoddesdonpark Woods SAC consists of two SSSI's – Wormley-Hoddesdonpark Wood North SSSI and Wormley-Hoddesdonpark Wood South SSSI. A series of discreet woodland blocks lying mainly on acid gravel deposits over the London Clay, these, woods have developed from ancient wood-pasture and heaths, and retain many large oak and hornbeam pollards along the boundaries. Nationally the woods are regarded as the best remaining example of the south-east Sessile Oak-Hornbeam woods with associated flora and fauna. The Pedunculate Oak-Hornbeam variant is also represented, adding variety to the site.

37.1.2 The site is designated as an SAC for its:

- Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*

37.1.3 During the 2006 Condition Assessment process, some areas of the northern woods SSSI were noted to be recovering from unauthorised 'war games' and four-wheel drive vehicle usage. However, the tone of the comments is that these are exceptional circumstances. 98.65 per cent of the site was in "favourable" condition. One part of the south woods was noted as being subject to an ongoing problem of abandoned cars, although this compartment was nonetheless judged to be in favourable condition indicating that the car dumping, while undesirable, is not actually having an adverse effect on the interest features of the site. 75 per cent of this SSSI was in favourable condition.

37.1.4 The key environmental conditions that support the features of European interest are:

- Minimal air pollution – nitrogen deposition may cause reduction in diversity, sulphur deposition can cause acidification
- Balanced hydrological regime – Meandering high-quality streams run eastward along the shallow valleys (Wormleybury Brook and Spital Brook). There are several ponds, especially in Westfield Grove
- Absence of direct fertilisation; and
- Well-drained soils.

38 Blackwater Estuary SPA & Ramsar site

38.1.1 The Blackwater Estuary is the largest estuary in Essex and is one of the largest estuarine complexes in East Anglia. It forms the tidal basin of the River Blackwater and is approximately 40km southeast of Elsenham. The site was designated as an SPA for supporting populations of European importance of the following migratory species:

- Avocet
- Golden plover
- Hen Harrier
- Ruff
- Ringed plover
- Back-tailed godwit
- Dark-bellied Brent goose
- Dunlin
- Grey plover
- Redshank
- Shelduck

38.1.2 The site also supports a bird assemblage of international importance by regularly supporting 109,815 waterfowl. The Blackwater Estuary Ramsar site qualifies on five of the nine Ramsar criteria (Table 3).

Table 3. Criteria under which the Blackwater Estuary qualifies as a Ramsar site

Ramsar criterion	Description of Criterion	Lee Valley SPA
1	A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.	The site qualifies by virtue of the extent and diversity of saltmarsh habitat present. This site, and the four others in the Mid-Essex Coast complex, includes a total of 3,237 ha that represent 70 per cent of the saltmarsh habitat in Essex and 7 per cent of the total area of saltmarsh in Britain.

Table 3. Criteria under which the Blackwater Estuary qualifies as a Ramsar site *(continued)*

Ramsar criterion	Description of Criterion	Lee Valley SPA
2	A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.	The invertebrate fauna is well represented and includes at least 16 British Red Data Book species.
3	A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.	This site supports a full and representative sequences of saltmarsh plant communities covering the range of variation in Britain.
5	A wetland should be considered internationally important if it regularly supports assemblages of waterbirds of international importance.	The site supports a wintering waterbird assemblage of international importance
6	A wetland should be considered internationally important if it regularly supports 1 per cent of the individuals in a population of one species or subspecies of waterbird.	Species occurring at levels of international Importance: • Dark-bellied brent goose • Grey plover • Dunlin • Black-tailed godwit • Common shelduck • European golden plover • Common redshank

38.1.3 During the most recent condition assessment process, 60 per cent of Blackwater Estuary SSSI was judged to be in unfavourable declining condition primarily due to coastal squeeze.

38.1.4 The following key environmental conditions were identified for Blackwater Estuary:

- Minimal disturbance
- Maintenance of grazing/mowing regimes
- Freshwater inputs are of value for providing a localised increase in prey biomass for certain bird species, specific microclimatic conditions and are used for preening and drinking

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Continuance of existing pattern of hydrodynamics and sediment movements
- Balance of saline and non-saline conditions

39 Essex Estuaries SAC

39.1.1 The Essex Estuaries SAC includes the Blackwater Estuary in addition to the other Essex Estuaries and covers all non-avian reasons for designation of these sites as of international importance. The site was designated as an SAC for:

- Estuaries
- Intertidal mudflats and sandflats
- Glasswort and other annuals colonising mud and sand
- Cord-grass swards
- Atlantic salt meadows
- Mediterranean saltmarsh scrub
- Subtidal sandbanks

39.1.2 The following key environmental conditions were identified for the Mid-Essex Estuaries SAC:

- Minimal disturbance
- Maintenance of grazing/mowing regimes
- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Continuance of existing pattern of hydrodynamics and sediment movements;
- Balance of saline and non-saline conditions

40 South Pennine Moors SAC

40.1.1 The site is representative of upland dry heath at the southern end of the Pennine range, the habitat's most south-easterly upland location in the UK. Dry heath covers extensive areas, occupies the lower slopes of the moors on mineral soils or where peat is thin, and occurs in transitions to acid grassland, wet heath and 7130 blanket bogs. The upland heath of the South Pennines is strongly dominated by heather *Calluna vulgaris*. Its main NVC types are H9 *Calluna vulgaris – Deschampsia flexuosa* heath and H12 *Calluna vulgaris – Vaccinium myrtillus* heath. More rarely H8 *Calluna vulgaris – Ulex gallii* heath and H10 *Calluna vulgaris – Erica cinerea* heath are found. On the higher, more exposed ground H18 *Vaccinium myrtillus – Deschampsia flexuosa* heath becomes more prominent. In the cloughs, or valleys, which extend into the heather moorlands, a greater mix of dwarf shrubs can be found together with more lichens and mosses. The moors support a rich invertebrate fauna, especially moths, and important bird assemblages.

40.1.2 The site is designated as an SAC for its:

- European dry heaths
- Blanket bogs
- Old sessile oak woods with Ilex and Blechnum in the British Isles
- North Atlantic wet heaths with *Erica Tetralix*;
- Transition mires and quaking bogs.

40.1.3 During the 2006 Condition Assessment process, almost 100 per cent of the site was judged to be in unfavourable condition (albeit 24 per cent was improving) largely as a result of poor air quality and overgrazing.

40.1.4 The key environmental conditions that support the features of European interest are:

- Minimal air pollution – nitrogen deposition may cause reduction in diversity;
- Balanced hydrological regime
- A balanced grazing regime
- Minimal trampling and other impacts associated with recreational activity
- Absence of direct fertilisation; and
- Well-drained soils.

41 North Pennine Moors SAC

41.1.1 The North Pennine Moors (along with the North York Moors) hold much of the upland heathland of northern England. At higher altitudes and to the wetter west and north of the site complex, the heaths grade into extensive areas of blanket bogs. The most abundant heath communities are *Calluna vulgaris – Deschampsia flexuosa* heath and *Calluna vulgaris – Vaccinium myrtillus* heath. There are also examples of *Vaccinium myrtillus – Deschampsia flexuosa*, *Calluna vulgaris – Erica cinerea* and *Calluna vulgaris – Vaccinium myrtillus – Sphagnum capillifolium* heaths.

41.1.2 The North Pennine Moors includes one major stand of juniper scrub in Swaledale as well as a number of small and isolated localities. The Swaledale site grades into heathland and bracken *Pteridium aquilinum* but the core area of juniper is of *Juniperus communis – Oxalis acetosella* woodland with scattered rowan *Sorbus aucuparia* and birch *Betula* spp. The North Pennine Moors also hold the major area of blanket bog in England. A significant proportion remains active with accumulating peat, although these areas are often bounded by sizeable zones of currently non-active bog, albeit on deep peat. The main NVC type is *Calluna vulgaris – Eriophorum vaginatum* blanket mire, but there is also representation of *Erica tetralix – Sphagnum papillosum* blanket mire and some western localities support *Scirpus cespitosus – Eriophorum vaginatum* blanket mire. Forms of *Eriophorum vaginatum* blanket mire predominate on many areas of non-active bog.

41.1.3 The site was designated as an SAC for:

- European dry heaths
- *Juniperus communis* formations on heaths or calcareous grasslands
- Blanket bogs
- Petrifying springs with tufa formation (Cratoneurion)
- Siliceous rocky slopes with chasmophytic vegetation
- Old sessile oak woods with Ilex and Blechnum in the British Isles
- Northern Atlantic wet heaths with *Erica tetralix*
- Calaminarian grasslands of the *Violetalia calaminariae*
- Siliceous alpine and boreal grasslands
- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)

- Alkaline fens
- Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)
- Calcareous rocky slopes with chasmophytic vegetation
- Marsh saxifrage *Saxifraga hirculus*

41.1.4 During the 2006 Condition Assessment process, 77 per cent of the constituent SSSI nearest to Leeds (West Nidderdale, Barden & Blubberhouses Moors) was judged to be in favourable or recovering condition. The remaining areas were classified as being in unfavourable condition largely as a result of overgrazing.

41.1.5 The key environmental conditions that support the features of European interest are:

- Minimal air pollution – nitrogen deposition may cause reduction in diversity
- Balanced hydrological regime
- A balanced grazing regime
- Minimal trampling and other impacts associated with recreational activity
- Absence of direct fertilisation; and
- Well-drained soils.

42 South Pennine Moors SPA and North Pennine Moors SPA

42.1.1 The South Pennine Moors SPA (including the proposed extension to encompass Eastern Peak District Moors SSSI) includes the major moorland blocks of the South Pennines from Ilkley in the north to Leek and Matlock in the south. It covers extensive tracts of semi-natural moorland habitats including upland heath and blanket mire. The site is of European importance for several upland breeding species, including birds of prey and waders. Both Merlin *Falco columbarius* and Golden Plover *Pluvialis apricaria* spend some of their time feeding outside the SPA on adjacent areas of in-bye land. The northern end of the South Pennine Moors SPA is within 10 km of the North Pennine Moors SPA which supports a similar assemblage of upland breeding species.

42.1.2 The North Pennine Moors was designated as an SPA for supporting internationally important populations of breeding:

- Golden plover
- Hen harrier
- Merlin
- Peregrine falcon
- Curlew
- Dunlin

42.1.3 The South Pennine Moors was designated as an SPA for supporting internationally important populations of breeding:

- Golden plover
- Merlin
- Peregrine falcon
- Short-eared owl
- Dunlin

42.1.4 The key environmental conditions that support the features of European interest are:

- Minimal air pollution – nitrogen deposition may cause reduction in diversity

- Balanced hydrological regime
- A balanced grazing regime
- Minimal disturbance, trampling and other impacts associated with recreational activity
- Absence of direct fertilisation
- Well-drained soils.

43 Kirk Deighton SAC

43.1.1 Great crested newts *Triturus cristatus* breed in a large pond set in a depression in grazed pasture. This main breeding pond has a water level that fluctuates widely, sometimes leading to pond desiccation. As a result, there is relatively little aquatic vegetation but egg-laying occurs and recruitment is successful intermittently; however, a large population is present, demonstrating this species' ability to thrive in temporary pond sites. Newts range across an area comprising pasture with old hedgerows. Kirk Deighton is subject to variable water levels, which means the ponds do not hold water some years. The situation will need to be kept under review. The ponds are situated in a heavily grazed pasture. While this is not a problem in itself the pond edges tend to be heavily poached and there is little aquatic vegetation.

43.1.2 The site was designated as an SAC for:

- Great crested newt

43.1.3 During the 2006 Condition Assessment process, 100 per cent of the site was judged to be in favourable condition.

43.1.4 The key environmental conditions that support the features of European interest are:

- Low recreational pressure
- Suitable foraging and refuge habitat within 500m of newt breeding ponds
- Maintenance of hydrological regime
- Relatively unpolluted water of roughly neutral pH
- Some ponds deep enough to retain water throughout February to August at least one year in every three
- In a wider context, great crested newts require good connectivity of landscape features (ponds, hedges etc) as they often live as metapopulations in a number of ponds.

44 Birklands and Bilhaugh SAC

44.1.1 Birklands and Bilhaugh is the most northerly site selected for old acidophilous oak woods and is notable for its rich invertebrate fauna, particularly spiders, and for a diverse fungal assemblage, including *Grifoa suphurea* and *Fistulina hepatica*. Both native oak species, *Quercus petraea* and *Quercus robur*, are present, with a mixture of age-classes, so there is good potential for maintaining the structure and function of the woodland system and a continuity of dead-wood habitats.

44.1.2 The site is designated as a SAC for its:

- Old acidophilous oak woods with *Quercus robur* on sandy plains

44.1.3 During the most recent Condition Assessment process, around 80 per cent of the site was unfavourable, but recovering, the remainder being unfavourable no change, due to public access/disturbance.

44.1.4 The key environmental conditions that support the features of European interest are:

- Appropriate woodland management, including retention of sufficient dead wood for invertebrate communities
- Low recreational pressure
- Minimal air pollution – lichen communities are susceptible.

45 Norfolk Valley Fens SAC

45.1.1 The fens on this site are a series of valley-head spring-fed fens. Such spring-fed flush fens are very rare in the lowlands. Most of the vegetation at this site is of the small sedge fen type, mainly referable to *Schoenus nigricans – Juncus subnodulosus* mire, but there are transitions to reedswamp and other fen and wet grassland types. The individual fens vary in their structure according to intensity of management and provide a wide range of variation. There is a rich flora associated with these fens, including species such as grass-of-Parnassus *Parnassia palustris*, common butterwort *Pinguicula vulgaris*, marsh helleborine *Epipactis palustris* and narrow-leaved marsh-orchid *Dactylorhiza traunsteineri*.

45.1.2 Norfolk Valley Fens represents narrow-mouthed whorl snail *Vertigo angustior* in East Anglia, but this is restricted to Flordon Common SSSI.

45.1.3 Norfolk Valley Fens is one of several sites representing Desmoulin's whorl snail *Vertigo moulinsiana* in East Anglia. Within Norfolk Valley Fens there are a number of marginal fens around pingos – pools that formed in hollows left when large blocks of ice melted at the end of the last Ice Age. These are very ancient wetlands and several support strong populations of *V. moulinsiana* as part of a rich assemblage of Red Data Book and Nationally Scarce species in standing water habitat.

45.1.4 The Norfolk Valley Fens were designated as a Special Area of Conservation for the following features:

- Alkaline fens
- Northern Atlantic wet heaths with *Erica tetralix*
- European dry heaths
- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)
- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)
- Narrow-mouthed whorl snail *Vertigo angustior*
- Desmoulin's whorl snail *Vertigo moulinsiana*

45.1.5 During the most recent Condition Assessment process, the following proportions of the constituent SSSIs were favourable:

- Swangey Fen (48 per cent)
- Thompson Water, Carr & Common (38 per cent)
- Great Cressingham Fen (0 per cent)
- Foulden Common (24.7 per cent)
- East Walton & Adcock's Common (0 per cent)
- Buxton Heath (0 per cent)
- Booton Common (0 per cent)
- Holt Lowes (0 per cent)
- Sherringham & Beeston Regis Commons (0 per cent)

45.1.6 The remaining areas were designated as being in unfavourable condition, recovering, no change or declining. Reasons for this include inadequate grazing, but also, in the case of Great Cressingham Fen, Buxton Heath, Booton Common, Sherringham & Beeston Regis Commons and East Walton & Adcock's Common, abstraction of water.

45.1.7 The key environmental conditions that support the features of European interest are:

- Appropriate grazing regimes
- Low recreational pressure
- Minimal air pollution
- Balanced hydrological regime.

46 Broadlands SPA & Ramsar site

46.1.1 Broadland is a low-lying wetland complex straddling the boundaries between east Norfolk and northern Suffolk in eastern England. The Broads are a series of flooded medieval peat cuttings. They lie within the floodplains of five principal river systems, known as Broadland. The area includes the river valley systems of the Bure, Yare and Waveney and their major tributaries. The distinctive open landscape comprises a complex and interlinked mosaic of wetland habitats including open water, reedbeds, carr woodland, grazing marsh and fen meadow, forming one of the finest marshland complexes in the UK. The differing types of management of the vegetation for reed, sedge and marsh hay, coupled with variations in hydrology and substrate, support an extremely diverse range of plant communities. The area is of international importance for a variety of wintering and breeding raptors and waterbirds associated with extensive lowland marshes. The estuary at the mouth of Broadland is Breydon Water SPA, and the two sites adjoin each other at Halvergate Marshes. Breeding and wintering raptors, and wintering waterbirds spend time on feeding areas outside the SPA boundary.

46.1.2 The site was designated as an SPA for:

- During the breeding season:
  - Bittern *Botaurus stellaris*, 3 individuals representing up to 15.0 per cent of the breeding population in Great Britain (Count as at 1998)
  - Marsh Harrier *Circus aeruginosus*, 21 pairs representing up to 13.1 per cent of the breeding population in Great Britain (Count as at 1995)
- Over winter:
  - Bewick's Swan *Cygnus columbianus bewickii*, 320 individuals representing up to 4.6 per cent of the wintering population in Great Britain (5 year peak mean 1991/2 – 1995/6)
  - Bittern *Botaurus stellaris*, 6 individuals representing up to 6.0 per cent of the wintering population in Great Britain
  - Hen Harrier *Circus cyaneus*, 22 individuals representing up to 2.9 per cent of the wintering population in Great Britain (5 year peak mean 1987/8-1991/2)
  - Ruff *Philomachus pugnax*, 96 individuals representing up to 13.7 per cent of the wintering population in Great Britain (5 yr peak mean 87/8-91/2)

- Whooper Swan *Cygnus cygnus*, 133 individuals representing up to 2.4 per cent of the wintering population in Great Britain (5 yr peak mean 93/4-97/8)
- Gadwall *Anas strepera*, 605 individuals representing up to 2.0 per cent of the wintering Northwestern Europe population (RSPB: Count 99/00)
- Pink-footed Goose *Anser brachyrhynchus*, 3,290 individuals representing up to 1.5 per cent of the wintering Eastern Greenland/ Iceland/UK population (5 yr peak mean 94/5-98/9)
- Shoveler *Anas clypeata*, 401 individuals representing up to 1.0 per cent of the wintering Northwestern/Central Europe population (RSPB: Count 99/00)

46.1.3 The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting 22,603 individual waterfowl. The Broadlands Ramsar site qualifies on two (numbers 2 and 6) of the nine Ramsar criteria for the same reasons it qualifies as an SAC and SPA.

46.1.4 During the most recent Condition Assessment process, the following proportions of the constituent SSSIs were favourable:

- Alderfen Broad (8.4 per cent)
- Ant Broads and Marshes (21.1 per cent)
- Barnby Broad and Marshes (50 per cent)
- Broad Fen, Dilham (0 per cent)
- Bure Broads and Marshes (12.5 per cent)
- Burgh Common and Muckfleet Marshes (21.9 per cent)
- Calthorpe Broad (0 per cent)
- Cantley Marshes (0 per cent)
- Crostwick Marsh (0 per cent)
- Decoy Carr, Acle (31.2 per cent)
- Ducans Marsh, Claxton (0 per cent)
- Geldeston Meadows (0 per cent)
- Hall Farm Fen, Hemsby (0 per cent)
- Halvergate Marshes (31.8 per cent)
- Hardley Flood (0 per cent)
- Limpenhoe Meadows (0 per cent)

- Ludham-Potter Heigham Marshes (0 per cent)
- Poplar Farm Meadows, Langley (100 per cent)
- Priory Meadows, Hickling (0 per cent)
- Shallam Dyke Marshes, Thurne (1.2 per cent)
- Smallburgh Fen (0 per cent)
- Sprat's Water and Marshes, Carlton Colville (13.6 per cent)
- Stanley and Alder Carrs, Aldeby (0 per cent)
- Upper Thurne Broads and Marshes (40.5 per cent)
- Upton Broad and Marshes (4.9 per cent)
- Yare Broads and Marshes (11.1 per cent)

46.1.5 The remaining areas were designated as being in unfavourable condition, recovering, no change or declining. Reasons for this include inadequate grazing, but also abstraction of water and poor water quality caused by high nutrient levels.

46.1.6 The key environmental conditions that support the features of European interest are:

- Appropriate grazing regimes
- Low recreational pressure
- Minimal air pollution
- Balanced hydrological regime
- High water quality

47 The Broads SAC

47.1.1 The Broads is the richest area for charophytes in Britain. Twenty species have been recorded, which represents over 65 per cent of the British flora. The core of this interest is the Thurne Broads and particularly Hickling Broad which is the richest site in the UK. Sixteen species have been recorded within Hickling Broad, a large shallow brackish lake. Within the Broads examples of Chara vegetation are also found within fen pools (turf ponds) and fen and marsh ditch systems. The Broads supports a number of rare and local charophyte species.

47.1.2 The Broads contain several examples of southern natural eutrophic lakes. Although artificial, having arisen from peat digging in medieval times, these lakes and the ditches in areas of fen and drained marshlands support relict vegetation of the original Fenland flora, and collectively this site contains one of the richest assemblages of rare and local aquatic species in the UK. Some Broads, such as Martham North, Martham South and Upton Broad, have escaped the problem of enrichment that has so affected the flora and fauna on many of the other Broads. Others, such as Hickling Broad, are recovering from these effects as a result of remedial measures.

47.1.3 The Broads also contain examples of transition mire in a flood plain in the south-eastern part of the UK, where the habitat is rare. The areas of transition mire are relatively small, having developed in re-vegetated peat-cuttings as part of a complex habitat mosaic of fen, carr and open water. The Broads is one of two sites selected for alkaline fens in East Anglia. There are complex zonations present and many differences exist between the individual fens that comprise the site. The fens are principally of the flood plain mire type. The complex of sites in the Broads contains the largest blocks of alder wood in England. Within the complex complete successional sequences occur from open water through reedswamp to alder woodland, which has developed on fen peat. There is a correspondingly wide range of flora. The Broads is the main stronghold of Desmoulin's whorl snail. Several large populations are known, associated with standing and flowing water and ditch systems.

47.1.4 The Broads was designated as an SAC for its:

- Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
- Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation
- Transition mires and quaking bogs

- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
- Alkaline fens
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- Desmoulin`s whorl snail *Vertigo moulinsiana*
- Fen orchid *Liparis loeselii*
- Otter *Lutra lutra*

47.1.5 During the most recent Condition Assessment process, the following proportions of the constituent SSSIs were favourable:

- Alderfen Broad (8.4 per cent)
- Ant Broads and Marshes (21.1 per cent)
- Barnby Broad and Marshes (50 per cent)
- Broad Fen, Dilham (0 per cent)
- Bure Broads and Marshes (12.5 per cent)
- Burgh Common and Muckfleet Marshes (21.9 per cent)
- Calthorpe Broad (0 per cent)
- Cantley Marshes (0 per cent)
- Crostwick Marsh (0 per cent)
- Decoy Carr, Acle (31.2 per cent)
- Ducans Marsh, Claxton (0 per cent)
- Geldeston Meadows (0 per cent)
- Hall Farm Fen, Hemsby (0 per cent)
- Halvergate Marshes (31.8 per cent)
- Hardley Flood (0 per cent)
- Limpenhoe Meadows (0 per cent)
- Ludham-Potter Heigham Marshes (0 per cent)
- Poplar Farm Meadows, Langley (100 per cent)
- Priory Meadows, Hickling (0 per cent)

- Shallam Dyke Marshes, Thurne (1.2 per cent)
- Smallburgh Fen (0 per cent)
- Sprat's Water and Marshes, Carlton Colville (13.6 per cent)
- Stanley and Alder Carrs, Aldeby (0 per cent)
- Upper Thurne Broads and Marshes (40.5 per cent)
- Upton Broad and Marshes (4.9 per cent)
- Yare Broads and Marshes (11.1 per cent)

47.1.6 The remaining areas were designated as being in unfavourable condition, recovering, no change or declining. Reasons for this include inadequate grazing, but also abstraction of water and poor water quality caused by high nutrient levels.

47.1.7 The key environmental conditions that support the features of European interest are:

- Appropriate grazing regimes
- Low recreational pressure
- Minimal air pollution
- Balanced hydrological regime
- High water quality

48 Paston Great Barn SAC

48.1.1 Paston Great Barn is the only known example of a maternity roost of barbastelles Barbastella barbastellus in a building. The Barn is a 16th century thatched barn with associated outbuildings. A maternity colony of barbastelles utilises a range of cracks and crevices in the roof timbers for roosting. Barbastelles are considered to be sensitive to disturbance throughout their range. Paston Great Barn is used by a maternity colony between May and September, but their whereabouts at other times is not known. They roost in the main barn, but also utilise some of the outbuildings when entering and leaving. The Great Barn is a medieval building which is scheduled as an ancient monument.

48.1.2 Paston Great Barn was designated as an SAC for its:

- Barbastelle *Barbastella barbastellus*

48.1.3 During the most recent Condition Assessment process, 100 per cent of the site was judged to be in favourable condition.

48.1.4 The key environmental conditions that support the features of European interest are:

- Lack of disturbance
- In a wider context, bats require good connectivity of landscape features to allow foraging and commuting.

49 River Wensum SAC

49.1.1 Although the River Wensum is extensively regulated by weirs, *Ranunculus* vegetation occurs sporadically throughout much of the river's length. Stream water-crowfoot *R. penicillatus ssp. pseudofluitans* is the dominant Ranunculus species but thread-leaved water-crowfoot *R. trichophyllus* and fan-leaved water-crowfoot *R. circinatus* also occur. The Wensum is a chalk-fed river in eastern England, and is an eastern example of riverine white-clawed crayfish *Austropotamobius pallipes* populations. As with most of the remaining crayfish populations in the south and east of England, the threats from non-native crayfish species and crayfish plague are severe. Designation of the river as a SAC provides as much protection as can be afforded to such vulnerable populations.

49.1.2 A stepped profile, with alternating fast- and slow-moving reaches, was imposed on the river with the construction of water-mills. Habitat diversity has been reduced by the modification of the channel form.

49.1.3 The input of silt and agricultural chemicals as a result of arable farming practices are a concern and the reversion of arable fields to low-input grassland should be encouraged. A strategy should be devised for silt management in the river and catchment to minimise disturbance to the channel and bankside. Further development on the flood plain might alter the flow regime of the river.

49.1.4 More detailed studies on groundwater resources should be carried out so as to determine suitable flow objectives to ensure that the river's ecology is not threatened by water abstraction. At adjacent sewage treatment works, phosphorous removal will be a statutory requirement by 2004. However, a holistic strategy is needed to identify further mechanisms for the control of eutrophication.

49.1.5 Any increase in the distribution of *Pacifastacus leniusculus* within the catchment would threaten the long-term viability of *Austropotamobius pallipes*. Populations of *Lampetra planeri* and *Cottus gobio* are dependent on the maintenance of riffle habitats and might also be vulnerable to the introduction of non-native fish species. Populations of *Vertigo moulinsiana* are susceptible to interference with the emergent bank-side vegetation in which they occur.

49.1.6 The River Wensum was designated as an SAC for its:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
- White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*

- Desmoulin`s whorl snail *Vertigo moulinsiana*
- Brook lamprey *Lampetra planeri*
- Bullhead *Cottus gobio*

49.1.7 During the most recent Condition Assessment process, 41.2 per cent of the constituent SSSI was recorded as being in favourable condition. The remainder of the site was unfavourable due to inappropriate scrub control.

49.1.8 The key environmental conditions that support the features of European interest are:

- Appropriate grazing regimes and scrub control
- Low recreational pressure
- Minimal air pollution
- Balanced hydrological regime (both in terms of water levels and flows)
- High water quality

50 Skipwith Common SAC

50.1.1 The northern Atlantic wet heath at Skipwith Common is the most extensive of its type in the north of England. The M16 *Erica tetralix – Sphagnum compactum* wet heath is dominated by cross-leaved heath *Erica tetralix* and purple moor-grass *Molinia caerulea*. There is a small population of marsh gentian *Gentiana pneumonanthe*. The wet heath is part of transitions from open water, fen, reed and swamp to 4030 European dry heaths and other habitats. The site has great ornithological and entomological importance.

50.1.2 Skipwith Common is one of the only two extensive areas of open heathland remaining in the Vale of York, the other being Strensall Common. The dry heath element is an example of H9 *Calluna vulgaris – Deschampsia flexuosa* heath dominated by heather *Calluna vulgaris*. The area has entomological and ornithological importance, with nearly 80 species of birds recorded, including European nightjar *Caprimulgus europaeus*.

50.1.3 Skipwith Common is in private ownership but has open public access. The site is peripheral to any commercial farming enterprise and consequently has suffered a lack of management over the last decade, which has resulted in scrub encroachment at the expense of heathland communities. English Nature are currently working with the owners of the site to ensure that appropriate management is put in place to maintain the existing interest of the site. A management agreement is in place and a large-scale heathland regeneration project for the site is being pursued.

50.1.4 Skipwith Common was designated as an SAC for its:

- Northern Atlantic wet heaths with *Erica tetralix*
- European dry heaths

50.1.5 During the most recent Condition Assessment process, 17.2 per cent of the constituent SSSI was recorded as being in favourable condition. The remainder of the site was unfavourable recovering.

50.1.6 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC site are:

- Unpolluted water
- Absence of non-native species
- Sufficient water resources
- Traditional management, including grazing, bracken control and scrub clearance.

51 Lower Derwent Valley SAC

51.1.1 The Lower Derwent Valley in north-east England contains a greater area of high-quality examples of lowland hay meadows than any other UK site and encompasses the majority of this habitat type occurring in the Vale of York. The abundance of the rare narrow-leaved water-dropwort *Oenanthe silaifolia* is a notable feature. Traditional management has ensured that ecological variation is well-developed, particularly in the transitions between this grassland type and other types of wet and dry grassland, swamp and fen vegetation.

51.1.2 The site is important as a habitat for a wide range of breeding wetland bird species. Breeding wildfowl include shoveler, shelduck, mallard, teal, pintail, gadwall and garganey. Breeding waders include snipe, lapwing, redshank and curlew. Other breeding birds include quail, barn owl, kingfisher, yellow wagtail and reed, sedge and grasshopper warblers.

51.1.3 Lower Derwent Valley was designated as an SAC for its:

- Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)
- Otter *Lutra lutra*

51.1.4 During the most recent Condition Assessment process, 80.45 per cent of the constituent SSSI was recorded as being in favourable condition, with the remainder of the site being recorded as unfavourable.

51.1.5 The key environmental conditions that must be maintained in equilibrium in order to avoid an adverse effect on the interest features of the SAC site are:

- Absence of nutrient enrichment
- Absence of non-native species
- Sufficient water resources
- Careful management of water levels
- Absence of direct fertilisation
- Water quality
- Balanced hydrological regime
- Maintenance of grazing regime but without overgrazing.

52 Kirk Deighton SAC

52.1.1 Kirk Deighton is located on the outskirts of the village of Kirk Deighton, situated just north of Wetherby. The main feature is a shallow pond, which is seasonal in nature and varies in size from year to year and is surrounded by sheep grazed pasture and hedgerows which provide essential feeding and hibernating sites for the great crested newts. The pond also supports a small population of smooth newts *Triturus vulgaris* and common frogs *Rana temporaria*. In addition the site contains a smaller drainage pond also known to be used by the newts.

52.1.2 Kirk Deighton was designated as an SAC for its:

- Great crested newt *Triturus cristatus*

52.1.3 During the most recent Condition Assessment process, 100 per cent of the constituent SSSI was recorded as being in favourable condition.

52.1.4 The key environmental conditions that support the features of European interest are:

- Suitable foraging and refuge habitat within 500m of newt breeding ponds
- Maintenance of hydrological regime
- Controlled grazing regime
- Relatively unpolluted water of roughly neutral pH
- In a wider context, great crested newts require good connectivity of landscape features (ponds, hedges etc) as they often live as metapopulations in a number of ponds.

53 Fenland SAC

53.1.1 Fenland contains, particularly at Chippenham Fen, one of the most extensive examples of the tall herb-rich East Anglian type of M24 *Molinia caerulea – Cirsium dissectum* fen-meadow. It is important for the conservation of the geographical and ecological range of the habitat type, as this type of fen-meadow is rare and ecologically distinctive in East Anglia.

53.1.2 The individual sites within Fenland cSAC each hold large areas of calcareous fens, with a long and well-documented history of regular management. There is a full range from species-poor *Cladium*-dominated fen to species-rich fen with a lower proportion of *Cladium* and containing such species as black bog-rush *Schoenus nigricans*, tormentil *Potentilla erecta* and meadow thistle *Cirsium dissectum*. There are good transitions to purple moor-grass *Molinia caerulea* and rush pastures, all set within a mosaic of reedbeds and wet pastures.

53.1.3 The fenland grasslands are dependent upon traditional management practices of cutting and grazing by livestock. In recent decades scrub and woodland have spread at the expense of fen vegetation. The three constituent sites are all National Nature Reserves and the site management plans include actions to address this problem.

53.1.4 Chippenham Fen NNR has suffered from a changed hydrological regime due to abstraction from the underlying chalk aquifer. This problem is being addressed through supply of supplementary water together with a programme of vegetation and invertebrate population monitoring. This project is being taken forward by English Nature, the Environment Agency and Anglian Water Services plc.

53.1.5 Fenland was designated as an SAC for its:

- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
- Spined loach *Cobitis taenia*
- Great crested newt *Triturus cristatus*

53.1.6 During the most recent Condition Assessment process, 36.10 per cent of the constituent SSSI was recorded as being in favourable condition. Of the remaining area 10.98 per cent is unfavourable no change, and 52.92 per cent unfavourable declining due to inappropriate scrub and water levels.

53.1.7 The key environmental conditions that support the features of European interest are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Minimal disturbance
- Minimal activities that alter sediment characteristics
- Minimal air pollution
- Maintenance of grazing regime
- Balanced hydrological regime.

54 Wicken Fen Ramsar Site

54.1.1 This site is a marginal remnant of the original peat fenland of the East Anglian basin. It has been preserved as a flood catchment area and its water level is controlled by sluice gates. The vegetation has a strongly mosaic character due to extensive peat-cutting and different systems of crop exploitation. Areas of the site subjected to frequent cutting have a greater species diversity including many sedges, rushes, spike rushes and marsh orchids with corresponding insect associations. Vegetation invasion by bushes resulting in closed *Frangula* carr, has occurred in the absence of mowing. The dykes, abandoned clay pits and the main lode support many aquatic angiosperms. Wildfowl interests include, mallard, teal, wigeon, shoveler, pochards and tufted duck.

54.1.2 To the north of Wicken Lodge is the original peat fen. Here the site supports fen communities of carr and sedge. The carr scrub is largely of alder buckthorn *Frangula alnus*, buckthorn *Rhamnus cathartica* and sallow over a sparse vegetation of fen plants including the marsh fen *Thelypteris palustris*. The more open areas of sedge fen are typically of tall grasses, saw sedge *Cladium mariscus*, purple moor-grass *Molinia caerulea*, sedges *Carex* spp. and rushes *Juncus* spp. A large number of herbs are associated with this community such as milk parsley *Peucedanum palustre* and yellow loosestrife *Lysimachia vulgaris*. To the south of Wicken Lodge, the area is of rough pastureland, reedbed and pools subject to winter flooding. The dykes, abandoned clay-pits and other watercourses are rich in aquatic plants.

54.1.3 Wicken Fen was designated as a Ramsar site because its:

- One of the most outstanding remnants of the East Anglian peat fens. The area is one of the few which has not been drained. Traditional management has created a mosaic of habitats from open water to sedge and litter fields.
- The site supports one species of British Red Data Book plant, fen violet *Viola persicifolia*, which survives at only two other sites in Britain. It also contains eight nationally scarce plants and 121 British Red Data Book invertebrates.

54.1.4 During the most recent Condition Assessment process, 36.10 per cent of the constituent SSSI was recorded as being in favourable condition. Of the remaining area 10.98 per cent is unfavourable no change, and 52.92 per cent unfavourable declining due to inappropriate scrub and water levels.

54.1.5 The key environmental conditions that support the features of European interest are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Minimal disturbance
- Minimal air pollution
- Balanced hydrological regime.

55 Chippenham Fen Ramsar Site

55.1.1 The site is of international importance for its wide range of wetland habitats and associated flora, birds and insects. Areas of tall and often rich fen, fen grassland and basic flush have developed over shallow peat soils. The site also contains calcareous grassland, neutral grassland, woodland, mixed scrub and open water.

55.1.2 Chippenham Fen lies in a shallow peat-filled depression underlain by a thick layer of chalky marl which rises to the surface in places. The fen is fed by rainfall and springs arising from the chalk aquifier. There are several ponds on the site and a system of dykes take water from the springs, in the south of the reserve, to the Chippenham River, near its northern boundary.

55.1.3 Large areas of tall fen dominated by a mosaic of saw sedge *Cladium mariscus* and reed *Phragmites australis* are present with abundant purple moor-grass *Molinia caerulea*. A rich fen has developed in mown areas, supporting the nationally rare Cambridge milk parsley *Selinum carvifolia*. In one area this merges into a species-rich basic flush, where black bog-rush *Schoenus nigricans* becomes abundant. Dense and scattered scrub has developed. There are areas of chalk grassland that grade into the fen grassland. The damp neutral grassland meadows are developing a fen meadow flora. The site is fed by chalk springs. The water levels are controlled within a series of ditches which support a rich aquatic flora. Much of the woodland was planted in the 1790s and alder and sallow carr have established in the wetter areas.

55.1.4 Chippenham Fen was designated as a Ramsar site for its:

- A spring-fed calcareous basin mire with a long history of management, which is partly reflected in the diversity of present-day vegetation.
- The invertebrate fauna is very rich, partly due to its transitional position between Fenland and Breckland. The species list is very long, including many rare and scarce invertebrates characteristic of ancient fenland sites in Britain.
- The site supports diverse vegetation types, rare and scarce plants. The site is the stronghold of Cambridge milk parsley *Selinum carvifolia*.

55.1.5 During the most recent Condition Assessment process, 65.36 per cent of the constituent SSSI was recorded as being in favourable condition. Of the remaining area 20.05 per cent is unfavourable recovering and 14.59 per cent unfavourable no change.

55.1.6 The key environmental conditions that support the features of European interest are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Minimal disturbance
- Minimal activities that alter sediment characteristics
- Minimal air pollution
- Balanced hydrological regime.

56 Orton Pit SAC

56.1.1 Orton Pit's extensive pond system, occupying the disused ridge-and-furrow created as a result of clay extraction for the brick-making industry, contains alkaline water low in nutrients. The site supports a total of ten species of charophyte including the main English population of bearded stonewort *Chara canescens. C. canescens* is an early coloniser of ponds at the site and is rarely found in ponds over 20 years old. It favours brackish conditions, which at Orton Pit are thought to be provided by the release of salts out of the top few millimetres of the clay that becomes oxidised over a period of time. Other nationally scarce stonewort species present include *Chara aspera*, *C. contraria*, *C. pedunculata* and *Tolypella glomerata*. The distribution of *Chara* species across the site varies according to the age and stage of succession of the ponds, with few being found in ponds greater than 25 years old.

56.1.2 The site contains the largest known population of great crested newts in the UK. It forms part of extensive, now disused, brick-clay workings dug over the past 50-55 years. A large number of ponds have formed in the hollows between the parallel clay spoil-heaps which are at various stages of succession. Rough grassland has developed over much of the terrestrial area and, together with a deciduous shelter-belt to the north and a 17 hectare oak/ash woodland to the south-west of the site, forms an important habitat for juvenile and overwintering newts.

56.1.3 Orton Pit was designated as an SAC for its:

- Hard oligo-mesotrophic waters with benthic vegetation of *Chara spp.*
- Great crested newt *Triturus cristatus*

56.1.4 During the most recent Condition Assessment process, 100 per cent of the constituent SSSI was recorded as being in favourable condition.

56.1.5 The key environmental conditions that support the features of European interest are:

- Low recreational pressure
- Minimal air pollution
- Balanced hydrological regime
- Suitable foraging and refuge habitat within 500m of newt breeding ponds

- Some ponds deep enough to retain water throughout February to August at least one year in every three
- In a wider context, great crested newts require good connectivity of landscape features (ponds, hedges etc) as they often live as metapopulations in a number of ponds.

57 Polruan to Polperro SAC

57.1.1 This site on the south coast of Cornwall represents a range of cliff habitats influenced by the complex lithological variation and tectonic structure at this location. The cliff habitats are particularly important for their assemblage of plants and the site also supports the Annex II species 1441 shore dock *Rumex rupestris*. The cliffs and slopes support a variety of maritime rock crevice and ledge communities, with maritime and sub-maritime grasslands and flushes. In places the lower cliffs, backshore and cliff crevices are influenced by freshwater seepages, flushes and springs. The maritime grasslands are found alongside or amongst areas of scrub and bracken *Pteridium aquilinum*, and the species composition reflects the variation in the calcareous influence of the underlying strata. Extensive areas of unimproved grassland are present on the cliff tops and headlands. The exposure at this site is less than that experienced on the north coast of Cornwall, and provides an important contrast to the other Cornish sites selected for this feature.

57.1.2 The site is also an important rocky-shore site for shore dock *Rumex rupestris*, near to the centre of its UK distribution. In 1999 the site supported 13 widely scattered colonies and at least 30 plants, along with numerous small pockets of additional suitable habitat.

57.1.3 Polruan to Polperro was designated as an SAC for its:

- Vegetated sea cliffs of the Atlantic and Baltic coasts
- European dry heaths
- Shore dock *Rumex rupestris*

57.1.4 During the most recent Condition Assessment process, 67.38 per cent of the constituent SSSI was recorded as being in favourable condition. Of the remaining area 23.94 per cent is unfavourable recovering and 8.69 per cent is unfavourable no change.

57.1.5 The key environmental conditions that support the features of European interest are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Managed recreational disturbance.

58 Newlyn Downs SAC

58.1.1 Newlyn Downs has the largest area in Cornwall of heath rich in Dorset heath *Erica ciliaris*. A significant proportion of the *E. ciliaris* occurs in wetter situations than at Carrine Common. The sites selected for *E. ciliaris* heath in Cornwall, where the habitat type is rarer and more fragmented than in Dorset, are important for the representation of the full geographical distribution of Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*.

58.1.2 The steeper valley sides are vegetated by dry heathland, characterised by abundant heather *Calluna vulgaris*, western gorse *Ulex gallii*, frequent bell heather *Erica cinerea* and occasional purple moor-grass *Molinia caerulea* and bristle bent *Agrostis curtisii*. Scattered stands of European gorse *U. europaeus*, bracken *Pteridium aquilinum* and bramble *Rubus* sp. occur. Patches of the nationally rare Dorset heath are also present. Where the drier areas of mine spoil occur the colonising vegetation mainly consists of scattered clumps of Heather.

58.1.3 The wetter parts of the site adjacent to streams and springs support mire or wet heath communities. Here purple moor-grass dominates the vegetation, forming tussocks with locally frequent species including cross-leaved heath and bog myrtle *Myrica gale*, occasional western gorse and, less frequently, bog asphodel *Narthecium ossifragum*, common fleabane *Pulicaria dysenterica*, creeping willow *Salix repens*, saw-wort *Serratula tinctoria* and Royal fern *Osmunda regalis*. Dorset heath occurs in greater abundance in these wetter areas and black bog-rush *Schoenus nigricans* characterises the more mineral-rich flushes.

58.1.4 The wettest areas support quaking mats of vegetation with pools of standing water. Additional species here include pondweed Potamogeton sp., bog pimpernel Anagallis tenella, common cottongrass Eriophorum angustifolium, lousewort Pedicularis sylvatica and bog mosses Sphagnum spp.

58.1.5 Newlyn Downs was designated as an SAC for its:

- Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*
- European dry heaths

58.1.6 During the most recent Condition Assessment process, 100 per cent of the constituent SSSI was recorded as being in favourable condition.

58.1.7 The key environmental conditions that support the features of European interest are:

- Absence of nutrient enrichment
- Absence of non-native species
- Sufficient water resources
- Minimal air pollution
- Traditional management, including grazing, bracken control and scrub clearance
- Managed recreational disturbance
- Water quality
- Balanced hydrological regime.

59 River Camel SAC

59.1.1 The Camel represents bullhead *Cottus gobio* in the extreme south-west of its range in England. The river encompasses a range of ecological conditions with both upland and lowland characteristics. The clean, fast-flowing, relatively oligotrophic waters with their stony bottoms are particularly suitable for bullhead, which forms an important part of the total fish biomass.

59.1.2 The Camel also represents otter Lutra lutra in its main stronghold in England in the south-west of the country. Surveys have indicated a dense population along this river. Records show that these populations persisted even during the period when the otter was in serious decline over much of the rest of its range in England, and this area has acted as a nucleus for recolonisation of other parts of England. The river and its tributaries represent the more upland as well as lowland habitat types utilised by otters, satisfying requirements for adequate food supply throughout the year. The wooded lower reaches of the river provide excellent habitat for resting and breeding.

59.1.3 The River Camel was designated as an SAC for its:

- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
- European dry heaths
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)
- Bullhead *Cottus gobio*
- Otter *Lutra lutra*
- Atlantic salmon *Salmo salar*

59.1.4 During the most recent Condition Assessment process, 0.69 per cent of the constituent SSSI was recorded as being in favourable condition. Of the remaining area 98.63 per cent is unfavourable no change and 0.68 per cent is unfavourable declining due to water abstraction and pollution.

59.1.5 The key environmental conditions that support the features of European interest are:

- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species

- Managed recreational disturbance
- Water quality
- Balanced hydrological regime.

60 Fal and Helford SAC

60.1.1 This is a sheltered site on the south-west coast of England, with a low tidal range and a wide range of substrates resulting in biologically one of the richest examples of sandbanks in the UK. Sublittoral sandbanks are present throughout much of the ria system and Falmouth Bay. There are particularly rich sublittoral sand invertebrate communities with eelgrass Zostera marina beds near the mouth of both the Fal and Helford and in some channels of the rias, such as the Percuil River and Passage Cove. Of particular importance are the maerl (Phymatolithon calcareum and Lithothamnion corallioides) beds that occur in the lower Fal on St Mawes Bank, and the extensive areas of maerl gravel which extend throughout the Carrick Roads and Falmouth Bay. These are the largest beds in south-west Britain and harbour a rich variety of both epifaunal and infaunal species, including some which are rarely encountered, such as Couch's goby Gobius couchi.

60.1.2 This area supports examples of sheltered intertidal mudflats and sandflats representative of south-west England, and is particularly recognised for the importance of the species living in the sediments, including amphipods, polychaete worms, the sea cucumber Leptopentacta elongata and bivalve molluscs. Most of the shores of the Fal and Helford rias, and their upper reaches, are fringed by sandflats and mudflats. Owing to the sheltered nature of the site, the sediments are stable as well as being diverse, and include muds, muddy sand and clean sand. These support particularly rich and nationally important sediment communities in the Fal/Ruan estuary, Percuil River and in Passage Cove, including beds of dwarf eelgrass Zostera noltei and diverse invertebrate communities.

60.1.3 This site is a ria system in south-west England that supports a wide range of communities representative of marine inlets and shallow bays. The rias of the Fal and Helford have only a low freshwater input and as a result the area contains a range of fully marine habitats from extremely sheltered in the inlets to the wave-exposed, tide-swept open coast. There is a particularly diverse algal flora and a number of warm-water species are present. The area supports extensive and rich sediment communities, which include the largest and most south-westerly maerl Phymatolithon calcareum bed in the UK.

60.1.4 The Fal and Helford is an example of saltmarsh vegetation in a ria (drowned river valley), a physiographic type restricted to south-west England and west Wales. There is a narrow saltmarsh zonation typical of rias, from pioneer to upper marsh, and transitions to woodland where the fringing trees overhang the tidal river, an unusual juxtaposition of vegetation in the UK.

60.1.5 The rocky-shore supports a large, dispersed population of shore dock Rumex rupestris near to the centre of its distribution in south-west England. Three sections of open coastline are included within the site, which when last surveyed (in 1999) supported 12 colonies and at least 34 plants. The site also holds extensive additional areas of suitable habitat.

60.1.6 Fal and helford were designated as an SAC for its:

- Sandbanks which are slightly covered by sea water all the time
- Mudflats and sandflats not covered by seawater at low tide
- Large shallow inlets and bays
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Estuaries
- Reefs
- Shore dock *Rumex rupestris*

60.1.7 During the most recent Condition Assessment process, 100 per cent of the constituent SSSI was recorded as being in favourable condition.

60.1.8 The key environmental conditions that support the features of European interest are:

- Minimal disturbance
- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze
- Unpolluted water
- Absence of nutrient enrichment
- Absence of non-native species
- Continuance of existing pattern of hydrodynamics and sediment movements
- Balance of saline and non-saline conditions.