

# **The Humberhead Levels Natural Area**

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# 1. What are Natural Areas?

A Natural Area is unique. The combination of geology, wildlife, land use and cultural heritage make one Natural Area different from any other. Natural Areas link historical and cultural development of an area to its wildlife and natural features. This may mean cutting across administrative boundaries which sometimes arbitrarily divide areas of similar character.

The Natural Areas Project concentrates on local characteristics and issues whilst taking a wider overview to ensure national and international priorities are achieved. The project doesn't just concentrate on designated areas, such as Sites of Special Scientific Interest (SSSIs), and protected species but also on the more common wildlife with which we have contact in daily life.

This profile describes the key physical, wildlife and land use features of the Humberhead Levels Natural Area, outlines the major issues, both good and bad, affecting them and illustrates the need for action. It also identifies objectives through which the nature conservation value of the Natural Area can be maintained and enhanced and provides a vision for the future.

## 1.1 Background

### **Natural Areas and the *UK Biodiversity Action Plan***

In June 1992, the Prime Minister and over 150 other Heads of State signed the *Convention on Biological Diversity* at Rio de Janeiro. This followed increasing concern about the growing number of extinctions of species world wide. Biodiversity is all about the variety of life on the planet, not just variety between species but also the subtle variety within species and their habitats. A diverse environment is important for the health of all plants and animals, including humans. These concerns were reflected in the first *UK Biodiversity Action Plan* published in 1994.

The Plan represents a commitment from the Government to the convention but its success will depend on us all playing an active part in caring for our environment.

In 1995, the *Biodiversity Action Plan: UK Steering Group Report* identified 1,250 species which are of conservation concern as well as costed action plans for 14 key habitats and 116 key species. These costed action plans, for habitats and species under most threat, provide a shortlist so that efforts can be concentrated to ensure their future survival. The species on the Biodiversity Action Plan (BAP) shortlist, which are found in this Natural Area, are highlighted in the profile.

English Nature will need to play a key role in stimulating local action. The Natural Areas Project has been designed as an important component of the process. The project links with the Countryside Commissions' *Countryside Character* approach which has identified areas of unique landscape character. English Nature and the Countryside Commission have jointly produced a map of England which reflects the natural and cultural dimensions of the landscape and also joint summary statements for each area on the map *The Character of England*.

English Nature would like to thank the organisations and individuals who gave up their time to agree the list of issues and objectives contained in this profile. These include: Boothferry

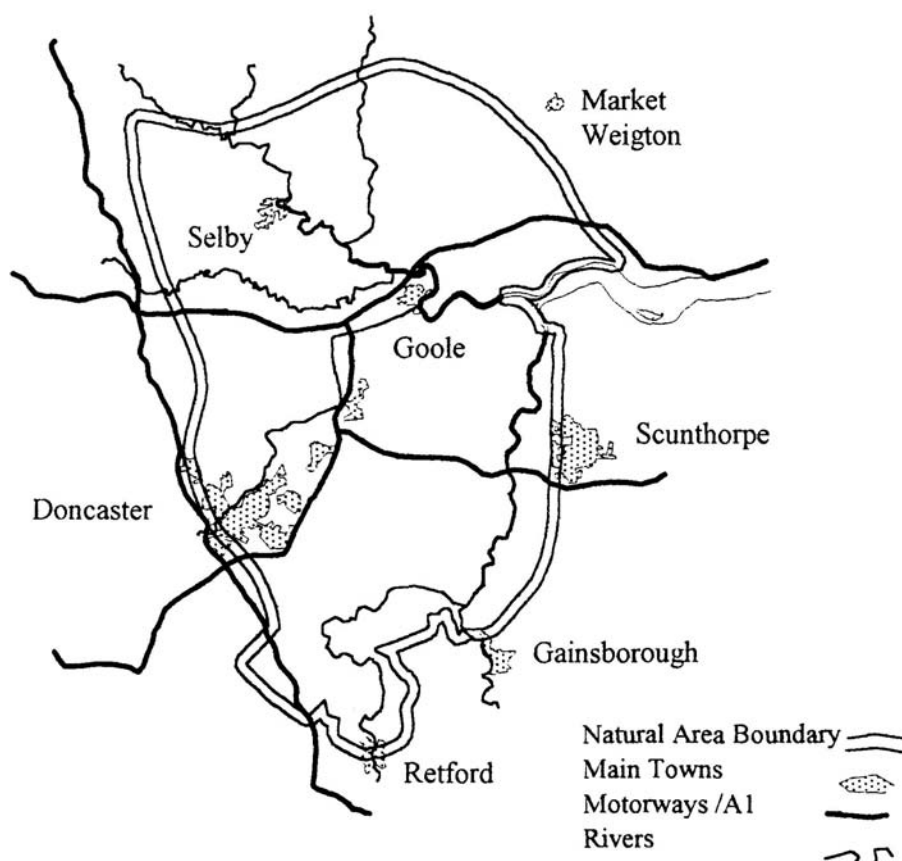
Borough Council, Ian Carstairs, Country Landowners Association, Countryside Commission, CPRE, Doncaster Museum Service, Environment Team, Internal Drainage Boards, Lincolnshire Trust for Nature Conservation, North Lincolnshire Council, RJB Mining, RSPB, Selby District Council, Sheffield University, Yorkshire Wildlife Trust.

## 2. Description

This totally lowland Natural Area encompasses the open flat plain dominated by the major river systems of the Ouse and Trent which feed the western end of the Humber Estuary. Parts are now below sea-level, and are maintained as agricultural land by pumping. The Isle of Axholme, as the name suggests, stands uniquely out above the otherwise flat land. The Natural Area contains a patchwork of fields, some small, some large, bounded by dykes and occasionally by hedgerows. At the heart there is a peaty wilderness, internationally important for its nature conservation features, and renowned for its specialised plants and animals.

Doncaster, Selby and Goole are the main urban areas, the remainder of the Natural Area being sparsely populated with small towns, villages and isolated farmhouses. The cooling towers of the power stations provide a strong visual impact above the flat ground.

### Map



## 3. Physical features

### 3.1 Geology

Geology is the study of the Earth and the processes which have given rise to its present form. Here, in explaining the present-day features, geological history really began for the Humberhead Levels about 350 million years ago when the area was covered by a tropical sea. Then a coastal plain developed where the rivers flowed into the sea; luxuriant swamps became established, and the remains of these plants later formed coal. This period was followed by an arid one in which the Natural Area resembled the Sahara desert. It became covered by river-borne sands and later by a finer material which subsequently formed mudstone.

About 2 million years ago, the climate cooled to Arctic conditions, and the area was in the grip of the Ice Ages. During the ultimate ice age, about 18,000 years ago, a glacier blocked the Humber Gap (which was roughly where the Humber Bridge now is), beyond which the inland rivers flowed into the North Sea. Trapped water created a huge area of open water, Lake Humber, which filled with sediment to later form a huge plain - the Humberhead Levels. As the climate warmed and the ice retreated, the plain was initially colonised by a large forest, but 3000 years ago, rising sea levels pushed the Humber Estuary further inland, causing rivers to back up and overflow into the forest. The waterlogging of the soil killed the trees and much of the Humberhead Levels became covered in reed swamps.

These special waterlogged conditions prevented the usual biological processes of decay, so when any plants died, they did not decompose completely. The fen plants formed the peat deposits which enabled acidic conditions to develop; these, together with certain areas of waterlogged heathland, gave rise to raised peat bogs, of which Thorne Moors and Hatfield Moors are the two largest remaining examples. In addition to the fen plants and acid bog plants such as Sphagnum mosses, the peat has also preserved trees from the original forest, Mesolithic boats and leather sandals, and pollen grains. All these enable us to develop a fascinating insight into local trade, agriculture, climate and the changes occurring in the vegetation over thousands of years.

#### **Issues - geology**

There is a lack of information collected for the Holocene period (dating from around 10,000 years ago).

### 3.2 Archaeology

Recent research by the Humber Wetlands Survey has been able to reconstruct the history of the rivers of the area, and the Thorne and Hatfield Moors peat bogs. Over 100 archaeological sites from 8,500 years ago to the Roman period have been uncovered. The oldest plank boats in the world, outside Egypt, were found in peat deposits near Thorne, and a rare Bronze Age pathway was unearthed by archaeologists in the 1970's, laid through Thorne Forest about three thousand years ago, when water levels were rising and the ground was becoming too boggy to walk upon.

The way in which we have exploited, developed and cultivated these basic geological features give us the landscape we recognise today. The coal forests providing the reason for building the power stations; rich soils for farming from silt deposition and the accumulation

of organic materials; the retreat of aquatic plants and animals from large bodies of open water into the ditches used to drain the land; the wilderness of the peatlands, drained and mined for horticultural peat.

## **4. Nature Conservation Features**

### **4.1 A Boggy Wilderness**

The peatlands of Thorne, Crowle and Goole Moors and of Hatfield Moors form over three thousand hectares of wilderness - land which is not tamed for agriculture and provide us with an insight into how the Humberhead Levels Natural Area once looked.

#### **What is peat?**

The peat which forms bogs and fens is composed of partially decomposed plants. It accumulates where the site is permanently waterlogged. Many of the bacteria and larger creatures, such as worms, that decompose organic matter cannot survive here and so animal and plant remains are partly preserved. The difference between bog and fen lies in the chemistry of the water supply. When this is almost entirely from rainfall, solutes are minimal, and acidic, nutrient-poor conditions develop in association with a flora composed of cotton grasses, *Sphagnum* mosses, and ericaceous plants. On the other hand, where solutes are relatively plentiful, due to the mineralogy of the local rocks or soils, fen plants such as reed and tall herbs predominate. Over the course of time, the accumulation of fen peat elevates the surface above the solute-enriched water, making it more dependent on rainfall. At some point in this sequence the growing conditions change enough for raised bog plants to take over from those of fen.

#### **The Humberhead Peatlands - origins and importance**

There are other small peatland fragments in the Humberhead Levels, such as at Epworth and Haxey turbaries, but the two larger examples contain the most important nature conservation resource.

Thorne and Hatfield Moors are classed as lowland raised mires, contrasting with the types of peat which clothe the plateaux and slopes of our uplands, known as blanket peat.

Evidence suggests that the development of Thorne Moors commenced with reed fen, but that Hatfield Moors started to accumulate peat when the preceding heathland became increasingly waterlogged. Before this wet period, both had a cover of woodland, the large horizontal trunks exposed where the peat has been removed provide the evidence of this. The field patterns and distribution of peaty soil around these remaining peatlands reveal that a cover of peat was once far more extensive in the Humberhead Levels. As the peat component of the present-day deeply drained soils dries and oxidises, the level of the land falls, and is now significantly below sea level in parts. While kept well in check by farming and pumped drainage systems today, the Moors are an important reminder of conditions which were once far more widespread.

Because of their value as sources of peat for historically animal litter, and now horticulture, most of the lowland raised mires in Britain and western continental Europe have been damaged. The scale of damage varies, but England has very few examples which still retain an original surface. Most are stripped of all but one or two metres of peat, and the edges, which would normally support a type of fen vegetation, have been taken into cultivation. The

drainage, stripping of surface, and removal of the edge have affected the way in which water can be retained, so that in many cases the conditions necessary for peat to form are no longer present.

Some of our most severely damaged lowland raised bogs are considered important as our only remaining examples, and as a home to the types of plants and animals they support, some of which are not found anywhere else. Their importance is recognised locally, nationally, and in Europe. A biodiversity costed action plan has been prepared for fen habitats due to their increasing rarity.

Thorne Moors is the largest expanse of lowland raised peat remaining in this country. There are only a very few similar areas left in lowland England and of them Thorne and Hatfield Moors are collectively as large as all the rest put together. The Humberhead Levels Peatlands National Nature Reserve, which encompasses parts of Thorne and Hatfield Moors, is the largest area of land in lowland England that is not crossed by telegraph poles or public rights of way.

More than four thousand species of plants and animals, including 25 of Britain's rarest, live on Thorne Moors. It is the only place in Britain where the Mire Pill Beetle occurs and the only location in northern England for the Giant Raft Spider. Two hundred species of birds feed or breed here; it is a place where species of northern and southern ranges mix. The numbers of nesting nightjar is acknowledged as being a significant proportion of the western European population.

### **Humberhead Peatlands - recent history**

Peat has been cut from these moors ever since medieval times when it was used for fuel. The people who lived here survived by hunting, fishing, collecting berries and grazing cattle. This low intensity of cutting allowed the moor to regenerate and didn't alter its waterlogged nature. In the seventeenth century ambitious plans for draining the area, which at this time was still a wetland wilderness of peat bogs, reed beds and water meadows, were put forward. Although the drainage plans were only partly successful, they began a succession of drainage schemes and a change to the conversion of land to agriculture. Very little of the original 'wasteland' remained.

Where the mire had escaped attempts to drain it, its valuable peat became the object of commercial interest. Commercial peat cutting, for animal bedding, began in the 1880s. Before the peat was cut, that area had to be drained. The methods used were such that large areas were left undrained between the cutting episodes. This allowed plants and animals to recolonise.

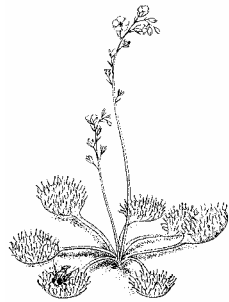
It wasn't until the widespread use of peat in gardening that things changed significantly. Advances in technology allowed efficient drainage and machines were able to strip the peat down to the underlying clay over large areas.

### **Humberhead Peatlands - the experience**

In the northern hemisphere, *Sphagnum* mosses are one of the major components of bog peat. When living, different types of *Sphagnum* create a patchwork of rich colours, and this is a striking feature of intact raised bog surfaces, especially in autumn and winter. The high water content means that the surface is insecure and demands extra care from the would-be visitor. A nineteenth century naturalist described Thorne as "trembling in waves when you

jumped on its surface, till the undulations were lost in the distance or at the edge of the nearest ditch”, due to the amount of water it contained. At this time it is alleged by some that Thorne Moors stood 6-8 feet taller in the winter than in summer.

Unfortunately, there are very few parts of the Humberhead Peatlands where these conditions can be experienced today. Although some of the cuttings have been reflooded, most of the ground is still compacted as a result of the drainage carried out in preparation for peat cutting.



Sundew

With over four thousand animals and plants found on these mires, it is impossible to mention them all individually. Amongst the *Sphagnum* in those cuttings rewetted tens of years ago it is possible to find heather, cranberry with its edible berries, cross-leaved heath and the white tufted flowers of cotton-grass. Round leaved sundew is extremely well adapted to nutrient-poor conditions. It gains extra nourishment by catching small insects on its sticky leaves and digesting them. Bog rosemary, and bog myrtle, which has aromatic leaves, are also found.

A huge range of uncommon invertebrates (animals without backbones) thrive in the waterlogged conditions and in those created by drainage and peat cutting. Water beetles, wolf spiders, dragonflies, crane flies and the oddly named hairy canary fly are all found here. The scarce large heath butterfly is found, and is here at the southern edge of its range in Britain, feeding on the flowers of the heather. The adder lurks amongst the vegetation, preying on small mammals and lizards.

The birds that depend on the moors are equally diverse, with about seventy five species breeding. They include the elusive nightjar, which makes use of open areas with scattered trees. Their churring call is heard only at dusk, as this bird is nocturnal. Normally active at night, the short eared owl may also be seen hunting by day. Nightingale, curlew and teal also breed. Birds of prey include the hobby, which hunts for dragonflies, hen harrier and merlin.

These fragmented remains of raised mire and fen give us an indication of what the Natural Area used to be like, when losing your step into a quaking mire meant death and residents crossed the marshes on stilts. What is left is internationally very rare, and in contrast to its bleakness, contains a huge number of plants and animals which are highly specialised to live in this fascinating but harsh environment.

#### Issues – fen

Surface run-off is diverted down drains, reducing the amount of water in fens.

Land drainage has dried former fens promoting change to alder carr woodland.

Wet areas formed by coal subsidence are pumped dry from a collection point to create agricultural land. This results in a general lowering of the water table, leading to the drying out of fens.

Legislation assumes land drainage is always desirable; it needs a re-examination.

There was a large loss of fen in the Eighties. Remaining fen exists as fragments which need to be increased in size and be joined together.

Natural succession proceeds when fen is unmanaged.

Water quality, especially nutrient enrichment can lead to a change in vegetation



### **Issues - peatlands**

They are an irreplaceable nature conservation resource which contains important records of the past; this is not reflected in the low price of peat. There is a lack of value and appreciation of them. Peatland can not be recreated.

Peat cutting/milling on Thorne Moors is continuing to reduce the extent of the natural habitat.

Special Area of Conservation status has implications for how the mineral planning review is applied.

Acid deposition and precipitation from air pollution may affect vegetation

The present climate may be warmer and drier than before, exacerbating drying out of the mires.

Decrease in water table at Hatfield Moor may be due to underground leakage into a depleted aquifer.

Fire as a management tool can be both constructive and destructive when resulting from vandalism.

The Holocene record has no protection after removal of vegetation.

Mining subsidence beneath peatlands will cause the surface to be deeply inundated.

Public access needs to be managed to prevent damage to the fragile habitat.

Vulnerable endemic species should be propagated.

Genetic purity needs to be maintained during the translocation of species.

### **Issues-reedbeds estuarine**

Too much emphasis on saltmarsh and mudflats benefiting on managed retreat. Need to consider reedbed creation

The edge of reed beds is particularly important especially for invertebrates.

Reed beds can filter pollution, especially from boat effluent, and can improve water quality. They have a use as treatment beds.

### **freshwater**

There is a lack of management due to the decline in the economic value of reed products. Marketing may conflict with the needs of invertebrates. A strategic approach to management is needed.

Wetting of reed beds is needed to keep habitat and water levels high.

There has been an extinction of invertebrate species in this Holocene period and there has been little research as to why.

Need for research into the relationship between cutting methods and reed quality

## 4.2 The farmed landscape

Farming patterns develop according to the geology, shape of the land and climate. While climate and shape of the land is reasonably uniform, with the possible exception of the Isle of Axholme, the varying distribution of the Lake Humber clays and the alluvial deposits provide the loose division between grasslands and arable fields. There is a broad north-south split in which grasslands and small hedge-lined fields are more common in the northern half. To the south, fields are larger, hedges few, and cash-crops are grown.

### **Flood meadows, or Washlands**

Winter flooding of the rivers has been an important event in the maintenance of fertility in the grasslands, or 'Ings' as they were known in past centuries. This was a process known as warping and it left behind a layer of silt which increased fertility and gradually raised the height of the ground.

Where these flood meadows have not been treated with inorganic fertilizer or pesticides they produce a colourful display of flowers. In at least one meadow it begins in the spring time with the nationally scarce snake's head fritillary. These inverted cup-shaped flowers have a chequered pattern of pink and purple. Where abundant, they form a dazzling sight. In summer, great burnet, adder's tongue, saw-wort, common meadow-rue and pepper saxifrage all come into bloom. These rest amongst the tussocks of grass of Yorkshire fog, tufted hair grass and swathes of soft rush. These rushy areas are full of invertebrates which provide food for breeding birds.

A variety of wading birds take advantage of these fertile grasslands to rear their chicks. Snipe and redshank use their long bills to probe the damp ground for insects and worms. Redshank chicks take midges and flies from the edges of shallow pools which remain on the pasture. Teal, a small duck, also breed in the tussocky grass. These birds have declined in number due to drainage, so what remains of this habitat in the Natural Area is very important.

These alluvial grasslands are traditionally grazed, and this maintains the rich array of plant species. Where cattle are used, it produces the different heights and structure of grass that breeding birds need. If there are too many animals however, they may trample the nests of the birds, crushing the eggs. Cattle footprints may provide wet hollows which are attractive to midges, an additional food for hungry chicks.

Birds also flock to the flooded grassland in winter. The largest and most graceful are the Bewick and whooper swans who migrate here from breeding in Iceland and the Arctic. Wigeon, a dabbling duck, and golden plover also spend the winter here before returning to more northern breeding grounds, a long journey fuelled by the flood meadows of the Natural Area.

In some places, due to the tidal nature of some rivers, land is often flooded by saltwater, giving rise to saltmarsh.



Fritillary

**Issues - saltmarsh and washlands**

The containment of rivers prevents annual cycle of flooding of washlands.

Increasing sea levels will lead to increased control of tidal spread.

There is little remaining and what we have may suffer lack of management.

The extension of Thorne colliery tip may eliminate the adjacent saline marsh.

Cessation of colliery pumping may starve the marsh of saline water.

The constraining of tidal rivers in narrow corridors between flood banks will restrict the tidal influence.

Silt and sediment loads in the water are important for the maintenance of the habitat.

**Hay meadows**

Away from the floodplain where the grassland is drier, it has traditionally been managed as hay meadows, which are full of attractive flowers. Cowslips produce sunny yellow flowers in the spring; the green winged orchid is unfortunately a rarity nowadays but many fields were once full of their purplish spikes of flowers, mingling with the cowslips. In summer great burnet, saw-wort, knapweed and meadow vetchling continue the floral display. The yellow rattle also flowers in summer, its large seeds rattling in the seed head when ripe. Butterflies gracefully flit from one flower to another taking advantage of any sunshine during their short life. The buzzing of bees and other insects abound.

Hay meadows need to be cut after the plants have set seed, otherwise there will be no new plants and species may be lost. The stubble was often grazed which also benefited the plants by the action of hooves creating small bare patches of ground, creating germination sites. Many hay meadows have been ploughed up, 'improved' by fertilizers, reseeded, or given over to silage, badly affecting wildlife.

Common quail and grey partridge hunt for the rich insect life which is found in the meadows to feed their growing young. The grey partridge lives here throughout the year but the common quail migrates somewhere warmer over the winter months. Both of these birds were once often heard, rather than seen, on farmland but due to changes in the way the land is farmed they are now much rarer. The whinchat is another summer visitor which nests here. It has a red throat, similar to a robin.

At night time the barn owl hunts over these grasslands, its ghostly white shape swooping silently through the night, or its blood curdling screech piercing the blackness. It is also rarer than it once was, possibly due to the loss of old buildings, such as barns.

### **Issues – neutral grassland**

A change in periodicity in flooding and land drainage as a consequence of improved outfall can lead to a reduction in nature conservation value.

There is a lack of information about old pastures and common land.

There has been coal mining subsidence especially in the north west corner of the Natural Area which has led to a loss of habitat. What remains is small and fragmented due to farming policy and agricultural economics. Legislation associated with subsidence does not currently recognise or protect the habitat.

Failure to get the grazing right can damage the wildlife resource.

The rise in the ownership of horses (horsiculture) has led to deterioration of the grassland for nature.

Market forces do not favour the retention of permanent pasture.

House building and development on or near these areas can lead to an increase requirement for flood defences. There is inadequate planning guidance on this issue, a holistic approach to planning is needed, creating integrated management plans.

### **Heathland**

Small patches of heathland can still be found in the Natural Area. Autumn carpets of heather flowers attract large numbers of bees. The yellow flowers of common gorse may be seen throughout the year but the smaller dyer's greenweed produces only a summer display amongst the beautiful slender leaves of wavy hair grass. The blue delicate flowers of harebell complement the white flowers of heath bedstraw and the yellows of tormentil.

On areas where drainage is poorer, the beautiful bright blue flowers of marsh gentian may be seen flowering from January through to early summer. Cross-leaved heath also grows on these wetter areas. It has summer flowering rose pink flowers.

The vivid green tiger beetle, a fierce carnivore, is fond of sunning itself on bare ground. Its larvae make little burrows in the sandy soil in which they lie in wait for prey. The adder also enjoys basking in the sunshine. The uncommon nightjar nests on the ground amongst the heather.

Heathland is perpetuated by a combination of grazing and controlled burning. Without this the scrub begins to take over and the characteristic plants are lost. Other reasons for the loss of heathland include conversion to more productive agriculture, and pressure from development including minerals. The free-draining sands and gravels on which it develops are a valuable resource for the aggregate and building industry. Heathland has decreased in extent to the point of rarity nationally, and what remains in the Natural Area has its part to play in its wider survival. A biodiversity costed action plan has been prepared for this habitat.

### Issues – heathland

Controlled burning is not used enough for management.

Grazing by inappropriate sheep breeds which do not maintain heath structure, and scrub encroachment may occur where grazing is at too low a level.

There are threats from development and remaining fragments of heathland have not been sufficiently protected.

Ploughing of heathland leads to pressures for extraction from the mineral industry. Where heathland is lost to mineral extraction, a strategy to restore the heathland as the after use is needed.

### The hedgerows

Hedgerows once formed a chequerboard pattern across the open landscape. Many of these have now been removed as they impede the progress of large machines and are expensive to maintain. However, they are still fairly common north of Doncaster on the Lake Humber clays, where the landscape is on a smaller scale and has a more enclosed feel. The hedges are generally of hawthorn, which provide a welcome fragrant display of creamy white flowers in springtime. This provides an important early nectar source for insects such as bees. A crop of red berries follows which supplement the diet of some birds in autumn and winter. They provide corridors along which little owls and barn owls hunt in search of voles and mice.

Those hedgerows that remain provide an important addition to the Natural Area, particularly as woodland is scarce. In prehistoric times, the Humberhead Levels would have been largely covered in trees before sea levels rose and the ground became waterlogged. Thereafter, woodland would have occurred as the carr component of fen, until the drainage of the seventeenth century. The economics of forestry do not compare well with those of arable farming on such a rich soil, and there are few plantations. Small patches of carr woodland do occur made up of scrubby grey willow, birch and alder and older patches of ash, field maple and oak. Alder woodland is quite rare nationally, making the few local examples of greater importance.



Alder

### **Issues – hedgerows**

There has been a loss of hedgerows and hedgerow trees in the past due to agricultural economics. There have been grants available for hedgerow removal.

Planting of new hedgerows may use inappropriate species.

There is lack of survey information on hedgerows.

Existing hedgerows are often not managed in a way that benefits wildlife, and there has been a loss of traditional skills such as hedge laying. Many have become neglected.

Field margins and headlands are now being encouraged and aided by countryside stewardship.

### **Woodlands and pasture woodlands**

There are no markets for the products of coppicing and pollarding, so these practices have fallen into decline.

There needs to be re-education about use and appropriate planting of trees.

Fragmented alder stands are nationally rare and important.

Encourage use of declining species e.g. crack willow, and Scots pine on Hatfield moor.

Government legislation for tax breaks, the future for the Forest Authority and Northern Forest all have a bearing on the woodland cover in the area.

Old trees killed by adjacent land uses should be replaced.

There needs to be a balance between recreation and inappropriate planting.

### **Arable farming**

Unimproved grasslands, with their flowers and birds, and blossom covered hedgerows are now rare. It is arable farming which dominates, taking advantage of the fertile alluvial soils. These fields are now well drained as a result of extensive pumped drainage systems. The methods used to cultivate these fields offer little space or time for the survival of wildlife. What remains is largely confined to the drainage channels and ditches, providing water is present throughout the year and that the management is favourable.

The brown hare continues to survive in the arable fields of the Natural Area, preferring areas of cereal growing and traditional ley farming to provide a continuity of food throughout the year. Unlike rabbits, hares do not live under ground, and often spend the day under hedgerows and in woods. Because farming has become less diverse and, especially in the Natural Area, hedgerows scarce, this mammal is on the BAP shortlist. The skylark, song thrush and grey partridge are three once common birds that are also rapidly disappearing from our farmland due to changes in farming practices. They are also on the BAP shortlist.

## **4.3 Life in the water**

As a low-lying, poorly drained region, the Humberhead Levels once had abundant pools, ponds, small watercourses and rivers. Over the centuries the water levels have been lowered,

and the rivers contained within banks; some have been given new straightened courses, such as the River Don

### Ditches

The ditches are home for aquatic and 'emergent' creatures. They are often sufficiently shallow to enable fen plants to grow, and these spread outwards and upwards onto the banks, and sometimes into the uncultivated zone left free for machinery to maintain the ditch. The plants are conspicuous during spring and summer along a minority of the drains.

Fragrant meadowsweet carpets the ditch banks. Great burnet, bog pimpernel and purple loosestrife also grow on the moist banks. Three rare ferns take advantage of the damp environment - the marsh fern, the crested buckler fern and pillwort. Along the watery margins grow reed canary-grass, common reed, greater pond-sedge and soft rush. Pondweeds are common, creating carpets of green under the water. Arrowhead, water-crowfoot and fine leaved water-dropwort are all water plants which flower during summer. Grass snakes hunt for toads and frogs through the vegetation. These harmless reptiles can grow up to 2 metres long and are strong swimmers

Rare water snails and beetles thrive both in and out of the water. Dragonflies dart across the surface, whilst their fierce looking larvae hunt for tadpoles and other prey beneath. The marsh carpet moth can occasionally be seen at dusk or first light. It does not usually occur this far north; its caterpillars feed on the ripening seeds of the meadow-rue.

The shiny ram's-horn snail lives in the ditches of the Natural Area, grazing on the water plants. It is on the BAP shortlist due to its rarity. Not enough is known about its ecology to say exactly why but it is probably to do with extensive ditch clearance, ditches drying out completely and pollution.

The health of the wildlife in the ditches is dependent on a number of factors, few of which can be guaranteed. Firstly, there must be a permanent presence of water, of a quality which does not preferentially support the growth of filamentous green algae. The management practices must ensure that enough plants and animals remain to reproduce.

### Issues - Ditches and drains

The management regime needs to take into account of their nature conservation value. Invasive species need to be controlled - chemicals are sometimes favoured because cutting aids dispersal eg *Crassula* species.

Nutrient enrichment can cause changes leading to the loss of some plants and their associated invertebrates.

The water level throughout year can be variable between summer and winter which effects wildlife and sometimes the ditches may become dry. Pumping schemes can adversely effect wildlife; their operation is a result of the economics of Internal Drainage Boards and their constitution.

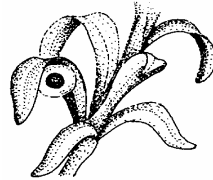
Culverting and filling leads to a loss of habitat.

There is a debate about the propriety of species reintroduction eg otters

### **Ponds and lakes**

Ponds are particularly important for amphibians, especially the great crested newt. The adult newt spends most of its time hunting for insects on the land but needs water to lay its eggs. These are laid on the leaves of pondweed such as alternate water-milfoil and various leaved pondweed. The rarer horned pondweed and whorled water milfoil are also found within the ponds of the Natural Area.

The great crested newt is the largest of our newts and is included on the BAP shortlist because it has become increasingly uncommon, both here and internationally, due to the loss of suitable breeding ponds. The hibernate away from open water, often in piles of rubble or under logs.



Newt-spawn

The few lakes to be found in the Humberhead Levels, which include flooded gravel pits, are important for birds, especially wildfowl and waders. The little ringed plover is a summer visitor and can be seen looking for food around the lake edge. The shelduck may be present throughout the year, this large duck breeds in burrows. Oystercatcher also breed around our lakes, these striking birds have long orange bills and bright pink legs. Their bills change shape during the year to enable the birds to feed on different things.

Gadwall and shovelers, types of dabbling duck, sometimes breed here, but flocks also migrate from central Europe to take advantage of our relatively mild winters. The numbers of all these birds have dropped internationally over recent years, mainly due to loss of breeding and wintering grounds. It is therefore important that they have the right conditions within the Natural Area to help ensure their international survival.

The beautifully coloured kingfisher may move away from its summer stream side home to spend the winter next to ponds and lakes. It dives into the water after small fish in a flash of metallic blue.

Some lakes in the Natural Area are known by the term mesotrophic, which means the water is low in nutrients. These lakes are very important for wildlife as one type of plant, such as algae, cannot dominate. Such lakes are becoming increasingly rare nationally and in the Natural Area because of additional nutrients, often from fertilizers or sewage effluent, getting into the water. Because of this, this habitat has had a costed action plan prepared for it.



Shelduck



**Issues -ponds and lakes**

Water abstraction, quality and quantity all affect the nature conservation value.

Fish introduction can lead to a loss of wildlife.

Drying out of ponds leads to a loss of species and reduction in amphibian sites.

Recreational access can damage the nature conservation resource. There needs to be a balance. Infilling leads to a loss of habitat.

Economic damage can be caused on commercially stocked lakes from predation by cormorants.

There is often inadequate design of new lakes and ponds with their sides too steep for access by wildlife.

Bare ground caused by trampling by cattle on the edge of ponds is missing due to a reduction in the number of cattle in the Natural Area.

The management and maintenance of lakes needs to take into account nature conservation.

There have been lost opportunities from coal measures subsidence when another after use has been created

The rivers of the Humberhead Levels Natural Area (Derwent, Ouse, Aire, Went, Don, Tourne, Idle and Trent) drain one fifth of England, through the Humber and provide dominant feature in the landscape. Their present day drainage pattern is important for our understanding of fluvial geomorphology.

**Issues – rivers**

Water quality, quantity and abstraction are all very important. Drought orders can lead to water being drawn straight from the rivers.

Past engineering works have led to unnatural channels, a reduction in wildlife value and loss of the important Holocene record in abandoned meanders. Rehabilitation after engineering works should occur where possible.

Recreation and navigation can cause disturbance.

Boats can take commercial traffic off the roads.

Angling is important and has led to the introduction of fish and problems of discarded tackle.

The management of land in the catchment has a subsequent effect on rivers which is difficult to control.

There is an effect on the rivers caused by a large concentration of thermal power stations increasing water temperature.

The present-day ditches and drains provide the last refuge for many of the plants and animals which were formerly more widespread. The ponds and lakes also enhance the richness of wildlife within the Natural Area. It is strange to think how the abundant wildlife found in this

once naturally water rich region has had to come to rely so much on the artificial structures of man.

## 5. General issues

This profile has described the nature conservation features of the Natural Area and why they are so special. The issues which are faced by particular habitats have also been listed. In addition, there are issues which effect the nature conservation value of the Natural Area as a whole. These are listed below.

Acid deposition from air pollution can affect the mix of plants found in the component habitats. It is a particular problem on raised mires as it can add nutrients to the system when the characteristic and rare plants require nutrient poor conditions.

Rising sea level may cause increased salinity of the ground water and may impair effective drainage of the land.

Decreased water levels due to water abstraction may be affecting raised mires and fens and also the amount of water in ditches and drains.

Adjacent land use may affect the nature conservation interest of particular features, in particular where raised mire and fen, which need high water tables, is surrounded by farmland which is actively drained. This may make it more difficult to maintain the requisite amount of water on site.

Water quality effects wildlife, for example water polluted with fertilizers can increase the amount of nutrients in mires, with adverse effects.

There is a less than full appreciation of the importance of the habitats, wildlife and the preserved environmental record in the Natural Area amongst some decision-makers.

There is a lack of an appropriate body to take responsibility for palaeoecological interests.

There is a common consensus to plant trees which are not appropriate to the Natural Area.

## 6. Vision for Humberhead Levels Natural Area

We have described the issues which affect the nature conservation value of the Natural Area, and if these issues remain unresolved, many animals, plants and geological features may be lost both here and nationally. But we have a vision of what the Humberhead Levels could be like if we all worked in partnership with one another. This vision provides us with a long-term aim to work towards and everybody can play their part, no matter how small it appears to be.

### **Vision:**

**Into the 21st century the balance between natural and derived features will be redrawn. The Levels will once more become known for the prominence of freshwater, and be able to sustainably support its historical mixture of natural assets, such as saturated peat bog, reeds, heath, woodland, and the creatures which would normally frequent them.**

Despite the way in which the land has been changed in response to modern demands, the Natural Area has retained many of those features which make up its essential character.

Some of the wildlife and geological features are already protected, but some of these sites are isolated fragments of what was once more widespread. By making efforts now, to maintain and enhance the wider countryside as well as protected sites, we will be doing much towards retaining and reinvesting in the distinctive spirit of the Humberhead Levels Natural Area. The nature conservation objectives set out below, produced in consultation with our partners, provide a way in which landowners, industry, other organisations and the local community can work together to achieve this vision for the Natural Area.

## Objectives

### **1. To re-establish the wetlands and other natural features of the Natural Area in locations chosen to enhance existing sites, and which correspond to natural wetland succession.**

Our wetlands are of international importance, and support rare plants and animals. Other types of natural habitat, such as the hay meadows, are also very important for the survival of species of both local and national importance. These areas have become much reduced in size and fragmented, leading to a gradual loss of ability to support the full range of wildlife. Endeavours to replace what has been lost should ideally be concentrated around existing sites of acknowledged importance.

- 1.1 Produce a plan in partnership with the relevant bodies and individuals to manage the water resource with due regard given to nature conservation, geology, archaeology and the record of the past environment, alongside other well-established parameters.
  - 1.2 Produce a plan in partnership with relevant bodies for the re-creation of habitats, with guidance where helpful from the prehistoric and historic environmental record found in peat.
  - 1.3 As part of this planning, identify needs and shortfalls in funding mechanisms (e.g. Environmentally Sensitive Areas, Countryside Stewardship), and pursue appropriate action to make good any deficit in what is available to ensure Natural Area objectives are met.
- ### **2. To ensure the survival and prosperity of characteristic habitats (e.g. wetlands, heathlands, woodlands, grasslands), and plants and animals found in the Natural Area, both the rare and the common.**

Due to their rarity, the semi natural habitats of this Natural Area, and their associated wildlife need to be maintained as part of the British and European resource. There are several mechanisms available to help do this and they should be used effectively to ensure sustainability for the natural features and wildlife of the Natural Area.

- 2.1 Objectives 1.1-1.3 apply.
- 2.2 Make maximum use of local and national habitat and species Biodiversity Action Plans (BAPs) to guide action.

- 2.3 Use Local BAPs to protect sites, species, and Holocene record, and involve Local Authorities in species protection and management through these and Local Agenda 21.
- 2.4 Fully consider local genetic distinctiveness in planning habitat restoration and creation. That is, use local rather than imported material when creating or repairing sites.
- 3. Promote, secure and enhance the geological, palaeoecological and archaeological archive found in the Levels.**

The records of our past culture and the past environment give us a fascinating insight into our history and the changes which have occurred locally. Much can be deduced from the plant remains and pollen preserved in peat and 'fossil' soils. It is at risk from any activity which disturbs the strata in which they were laid down.

- 3.1 Objective 1.3 applies.
- 3.2 Peat must be preserved undisturbed *in situ*. Persuade consumers to make wise and informed choices between growing media.
- 3.3 Objective 2.3 applies.
- 3.4 The Holocene record is unprotected and outside the remit of any statutory body. This omission needs to be addressed.
- 3.5 Promote the value of geological resource through education, interpretation and make clear the link with habitats and cultural development.
- 4. Promote the use of funding opportunities and other designations to protect and enhance the natural features of the Humberhead Levels.**

Money is available to help conserve the natural features. It comes via a number of publicly-funded incentive schemes, only some of which are applicable to the Humberhead Levels.

- 4.1 Objective 1.3 applies.
- 4.2 Raise awareness and use education to highlight what help and support is available.
- 4.3 There is an imbalance in the way public funding is used to support agriculture compared to nature conservation. A balance needs to be achieved to enable achievement of biodiversity goals..
- 4.4 The benefits of having an absolute 'stop order' on agricultural improvement grants should be reviewed, and pursued if deemed to be essential.
- 4.5 Review the ability of existing incentive schemes to achieve the NA objectives, and advise scheme administrators of potentially beneficial changes.

**5. Achieve sustainable use of water, at levels which enable wetlands to survive and prosper.**

Water is essential for our survival, and that of the wildlife in the Natural Area. A sustainable use of water is required to ensure our own supplies whilst taking into account the needs of wildlife and the fragile wetlands.

- 5.1 Include environmental enhancement in considering options for subsidence areas. It may require changes to the Coal, and Drainage Acts, a requirement for cost-benefit analysis, and mandatory environmental assessment.
- 5.2 The management of sea level rise should include a consideration of the interests of natural habitats when producing the strategies mentioned in objectives 1.1 and 1.2.
- 5.3 Through the water strategy (1.1) return the water table to a state in which it is able to support wetlands, and then manage it sustainably.

**6. Encourage landowners, users and others of influence to be proud and protective of the natural features for which the area is so special.**

The view of natural features as being important is not always shared by those that play a part in their survival. This may lead to misunderstandings and loss of wildlife by avoidable actions. The natural resource of the Humberhead Levels is unique and special, and requires consideration from most forms of land use.

- 6.1 Influence the often-held local perception that drainage is a desirable end in itself, to a more balanced and sustainable outlook, which includes a place for natural features. The change can be brought about through positive images and education.
- 6.2 In promoting a vision of naturalness, draw from the palaeoecological record, and landscapes from other parts of the world in which wetlands are important.
- 6.3 Integrate the Humberhead Levels vision and objectives with Local Agenda 21 documents.
- 6.4 Produce Codes of Conduct, 'best practice' guides and other incentives for agriculture and other types of development.
- 6.5 Ensure that tourism and recreation is developed sustainably and does not disturb wildlife eg wintering waterfowl.

## 7. Core habitat and species information

The pages that follow include a summary of information relevant to the habitats of the Natural Area. The information provides a ‘snap shot in time’ and cannot be regarded as either a comprehensive or static list. It would be impossible to list all the species associated with each habitat, and species composition, and their populations, are likely to alter over time. However, the information provides a useful guide to habitats and species, and also whether a species is listed under legislation and what, if any, status it holds under the 1995 *Biodiversity Action Plan: UK Steering Group Report*.

The following notes should aid interpretation of the information:

**General character** – the vegetation communities which make up the habitat feature, classified in terms of the National Vegetation Classification.

**Significant species groups** – a species group is significant if an assemblage of these species is an important factor in the value of a habitat.

**Characteristic species** – species considered characteristic to the habitat feature within the Natural Area.

**Notable** – A species is notable if it is listed under international or national legislation (see abbreviations at the end of the section).

**Extinct/declining** – as a rule of thumb, any species that might be considered for a species recovery/reintroduction programme.

Species may be listed under more than one category if they are for example notable but also declining. Those which are dependent on more than one habitat will similarly have duplicate entries under the relevant habitats.

<b>Natural Area:</b> Humberhead Levels		<b>Habitat/Feature:</b> Triassic sand and mudstones
<b>General Character:</b>	GCR11	Permo-Triassic Stratigraphy sites
<b>Phase 1:</b>	GCR11B	Permian-Triassic
<b>NVC:</b>		
<b>Characteristic Features:</b>		
<b>Significant Species Groups:</b>		
<b>Characteristic Species:</b>		
<b>Notable Species:</b>		
<b>Extinct/Declining Species:</b>		

<b>Natural Area:</b> Humberhead Levels		<b>Habitat/Feature:</b> East Pennine Coalfield
<b>General Character:</b>	GCR10	Carboniferous stratigraphy sites
<b>Phase 1:</b>	GCR10E	Westphalian
	GCR10D	Namurian of England & Wales
<b>NVC:</b>		
<b>Characteristic Features:</b>		
<b>Significant Species Groups:</b>		
<b>Characteristic Species:</b>		
<b>Notable Species:</b>		
<b>Extinct/Declining Species:</b>		

<b>Natural Area:</b> Humberhead Levels		<b>Habitat/Feature:</b> Lake Humber Clays
<b>General Character:</b>	GCR15	Quaternary stratigraphy sites
<b>Phase 1:</b>	GCR15J	Quaternary of the Pennines
<b>NVC:</b>		
<b>Characteristic Features:</b>		
<b>Significant Species Groups:</b>		
<b>Characteristic Species:</b>		
<b>Notable Species:</b>		
<b>Extinct/Declining Species:</b>		

<b>Natural Area:</b> Humberhead Levels	<b>Habitat/Feature:</b> Peatlands
<b>General Character:</b> <b>Phase 1:</b> <b>NVC:</b>	
<b>Characteristic Features:</b>	
<b>Significant Species Groups:</b>	
<b>Characteristic Species:</b>	
<b>Notable Species:</b>	
<b>Extinct/Declining Species:</b>	

<b>Natural Area:</b> Humberhead Levels	<b>Habitat/Feature:</b> Neutral Grassland
<b>General Character:</b> <b>Phase 1:</b> B21 Grassland: neutral, unimproved <b>NVC:</b> MG1a <i>Arrhenatherum elatius</i> grassland: <i>Festuca rubra</i> subcommunity MG1e <i>Arrhenatherum elatius</i> grassland: <i>Centaurea nigra</i> subcommunity MG4 <i>Alopecurus pratensis</i> - <i>Sanguisorba officinalis</i> grassland MG5a <i>Cynosurus cristatus</i> - <i>Centaurea nigra</i> grassland: <i>Lathyrus pratensis</i> subcommunity MG9 <i>Holcus lanatus</i> - <i>Deschampsia cespitosa</i> grassland MG10 <i>Holcus lanatus</i> - <i>Juncus effusus</i> rush-pasture	
<b>Characteristic Features:</b>	
<b>Significant Species Groups:</b> Lepidoptera Invertebrates Wintering wildfowl Migrating waders Breeding waders Higher plants	
<b>Characteristic Species:</b> <i>Thalictrum flavum</i> common meadow-rue <i>Silaum silaus</i> pepper-saxifrage <i>Serratula tinctoria</i> saw-wort <i>Primula veris</i> cowslip <i>Ophioglossum vulgatum</i> adder's tongue <i>Sanguisorba officinalis</i> great burnet	



Natural Area: Humberhead Levels		Habitat/Feature: Neutral Grassland
<b>Notable Species:</b>		
<i>Rhinanthus angustifolius</i>	greater yellow-rattle	WCA8 RDB E BAPL
<i>Fritillaria meleagris</i>	fritillary	NS
<i>Anas penelope</i>	wigeon	WCA2k WCA3iii MD BAPL
<i>Anas crecca</i>	teal	WCA2i WCA3iii ENHP2(NA) MD BAPL
<i>Aythya ferina</i>	pochard	WCA2i WCA3iii ENHP1(NA) BAPL
<i>Tringa totanus</i>	redshank	NoB(NA) MD BAPL
<i>Perdix perdix</i>	grey partridge	ENHP2(NA) RD BAPS BAPL
<i>Tyto alba</i>	barn owl	BC2 WCA1i WCA3i ENHP2(NA) MD BAPL
<i>Pluvialis apricaria</i>	golden plover	BoC2 ECB WCA2i WC3iii EX(NA) ENHP2 MD BAPL
<i>Cygnus columbianus</i>	bewick's swan	BC2 BoC2 ECB WCA1i EX(NA)/VR(NA)
<i>Cygnus cygnus</i>	whooper swan	BC2 BoC2 ECB WCA1i EX(NA) NoB(NA) MD BAPL
<i>Coturnix coturnix</i>	common quail	BoC2 WCA1i WCA4 EX(NA) / VR(NA) RRHD BAPL
<i>Lymnaea glabra</i>	mud snail	RDB V BAPL
<b>Extinct/Declining Species:</b>		
<i>Gallinago gallinago</i>	snipe	WCA2i WCA3iii NoB(NA) BAPL
<i>Vanellus vanellus</i>	lapwing	ENHP2(NA) MD BAPL
<i>Saxicola rubetra</i>	whinchat	BC2 NoB(NA) BAPL
<i>Calandra miliaria</i>	corn bunting	NoB(NA) RRHD
<i>Perdix perdix</i>	grey partridge	ENHP2(NA) RD BAPS BAPL
<i>Numenius arquata</i>	curlew	ENHP2(NA) MD BAPL
<i>Tringa totanus</i>	redshank	NoB(NA) MD BAPL
<i>Oturnix coturnix</i>	common quail	BoC2 WCA1i WCA4 EX(NA) / VR(NA) RRHD BAPL
<i>Orchis morio</i>	green-winged orchid	CITES2

Natural Area: Humberhead Levels		Habitat/Feature: Lowland Raised Mire
<b>General Character:</b>		
<b>Phase 1:</b>	E13	Mire: lowland raised bog
<b>NVC:</b>	M2b	<i>Sphagnum cuspidatum/recurvum</i> bog pool community: <i>Sphagnum recurvum</i> subcommunity
	M3	<i>Eriophorum angustifolium</i> bog pool community
	M18	<i>Erica tetralix-Sphagnum papillosum</i> raised & blanket mire
	M20	<i>Eriophorum vaginatum</i> blanket & raised mire
<b>Characteristic Features:</b>		
<b>Significant Species Groups:</b> Odonata		
		Coleoptera
		Diptera
		Bryophytes
		Higher plants
		Birds
		Pteridophytes
<b>Characteristic Species:</b>		
<i>Molinia caerulea</i>		purple moor-grass
<i>Erica tetralix</i>		cross-leaved heath
<i>Eriophorum angustifolium</i>		common cottongrass
<i>Sphagnum tenellum</i>		bog moss
<i>Sphagnum recurvum</i>		bog moss
<i>Sphagnum cuspidatum</i>		bog moss
<i>Sphagnum auriculatum</i>		bog moss
<i>Drosera rotundifolia</i>		round-leaved sundew
<i>Vaccinium oxycoccos</i>		cranberry
<i>Betula</i> spp		birch
<i>Pteridium aquilinum</i>		bracken
<i>Calluna vulgaris</i>		heather
<i>Lacerta vivipara</i>		common lizard
<i>Vipera berus</i>		adder

Natural Area: Humberhead Levels		Habitat/Feature: Lowland Raised Mire
<b>Notable Species:</b>		
<i>Asio flammeus</i>	short-eared owl	BC2 ECB NoB(NA) MD BAPL
<i>Anas crecca</i>	teal	WCA2i WCA3iii ENP2(NA) MD BAPL
<i>Numenius arquata</i>	curlew	ENHP2(NA) MD BAPL
<i>Falco columbarius</i>	merlin	BC2 BoC2 ECB WCA1i EX (NA) NoB(NA) RRHD BAPL
<i>Circus cyaneus</i>	hen harrier	BC2 BoC2 ECB WCA1i EX(NA) NoB(NA) RRHD BAPL
<i>Caprimulgus europaeus</i>	nightjar	BC2 ECB ENHP1(NA) RRHD BAPM BAPL
<i>Sphagnum balticum</i>	baltic bog moss	ECH5 WCA8 BAPL
<i>Andromeda polifolia</i>	bog-rosemary	
<i>Bembidium humerale</i>	beetle	RDB 1 BAPL
<i>Curimopsis nigrata</i>	mire pill beetle	WCA5 RDB 1BAPL
<i>Blethisia multipunctata</i>	water beetle	
<i>Bembidion gilvipes</i>	water beetle	
<i>Bembidion obliquum</i>	water beetle	
<i>Acupalpus dorsalis</i>	water beetle	
<i>Phalacrocer replicata</i>	crane fly	RDB 3
<i>Phaonia jaroschewskii</i>	hairy canary fly	
<i>Agonum ericeti</i>	ground beetle	
<i>Pirata piscatorius</i>	wolf spider	
<i>Coenonympha tullia</i>	large heath butterfly	WCA5 BAPL
<i>Sympetrum danae</i>	black darter dragonfly	
<b>Extinct/Declining Species:</b>		
<i>Scheuchzeria palustris</i>	rannoch-rush	RDB V BAPL
<i>Sphagnum imbricatum</i>	bog moss	ECH5
<i>Sphagnum magellanicum</i>	bog moss	ECH5
<i>Carex limosa</i>	bog-sedge	
<i>Rhynchospora alba</i>	white beak-sedge	
<i>Drosera anglica</i>	great sundew	
<i>Narthecium ossifragum</i>	bog asphodel	
<i>Myrica gale</i>	bog myrtle	
<i>Carduelis flavirostris</i>	twite	BC2 WCA3i EX(NA) MD BAPL
<i>Saxicola rubetra</i>	whinchat	BC2 NoB(NA) BAPL

Natural Area: Humberhead Levels		Habitat/Feature: Fen
<b>General Character:</b>		
<b>Phase 1:</b>	F12	Swamp: tall fen vegetation
<b>NVC:</b>	S2	<i>Cladium mariscus</i> swamp and sedge beds
	S4	<i>Phragmites australis</i> swamp and reedbeds
	S5	<i>Glyceria maxima</i> swamp
	S8a	<i>Scirpus lacustris</i> ssp. <i>lacustris</i> swamp: <i>Scirpus lacustris</i> ssp. <i>lacustris</i> subcommunity
	S12	<i>Typha latifolia</i> swamp
	S13	<i>Typha angustifolia</i> swamp
	S19a	<i>Eleocharis palustris</i> swamp: <i>Eleocharis palustris</i> subcommunity
	S24	<i>Phragmites australis</i> - <i>Peucedanum palustris</i> tall-herb fen
	S25	<i>Phragmites australis</i> - <i>Eupatorium cannabinum</i> tall-herb fen
<b>Characteristic Features:</b>		
<b>Significant Species Groups:</b>		
Coleoptera		
Diptera		
<b>Characteristic Species:</b>		
<i>Cladium mariscus</i>	Great Fen-sedge	
<i>Phragmites australis</i>	Common reed	
<i>Carex acuta</i>	Slender tufted-sedge	
<i>Carex elata</i>	Tufted-sedge	
<i>Oenanthe fistulosa</i>	Tubular water-dropwort	
<i>Typha latifolia</i>	Bulrush	
<i>Juncus subnodulosus</i>	Blunt-flowered rush	
<i>Lathyrus palustris</i>	Marsh Pea	
<i>Acrocephalus scirpaceus</i>	reed warbler	
<i>Acrocephalus schoenobaenus</i>	sedge warbler	

Natural Area: Humberhead Levels		Habitat/Feature: Fen
<b>Notable Species:</b>		
<i>Dromius sigma</i>	ground beetle	RDB 2 BAPM BAPL
<i>Dromius longiceps</i>	ground beetle	RDB 2
<i>Philonthus rotundicollis</i>	rove beetle	
<i>Hydroporus rufifrons</i>	water beetle	BAPM BAPL
<i>Stenomicra cogani</i>	fly	RDB 1
<i>Libellula fulva</i>	scarce chaser dragonfly	RDB 3 BAPL
<i>Chaetarthria seminulum</i>	water beetle	
<i>Lymnebius nitidus</i>	water beetle	
<i>Curimopsis nigrita</i>	mire pill beetle	
<i>Emberiza schoeniclus</i>	reed bunting	BC2 WCA3i RD BAPM BAPL
<b>Extinct/Declining Species:</b>		
<i>Hottonia palustris</i>	water-violet	
<i>Rumex hydrolapathum</i>	water dock	
<i>Ranunculus lingua</i>	greater spearwort	
<i>Hippuris vulgaris</i>	mare's-tail	
<i>Viola persicifolia</i>	fen violet	WCA8 RDB E BAPL
<i>Peucedanum palustre</i>	milk-parlsey	NS

Natural Area: Humberhead Levels		Habitat/Feature: Ponds and Lakes	
General Character:			
Phase 1:	G12	Open water: standing, mesotrophic	
NVC:	A1	Lemna gibba community	
	A2	Lemna minor community	
	A3	Spirodela polyrhiza-Hydrocharis morsus-ranae community	
	A4	Hydrocharis morsus-ranae-Stratiotes aloides community	
	A9	Potamogeton natans community	
	A11	Potamogeton pectinatus-Myriophyllum spicatum community	
	A12	Potamogeton pectinatus community	
	A13	Potamogeton perfoliatus-Myriophyllum alterniflorum community	
Characteristic Features:			
Significant Species Groups:			
	Wintering wildfowl		
	Breeding wildfowl		
	Migrating waders		
Characteristic Species:			
Myriophyllum alternifolium	alternate water-milfoil		
Potamogeton gramineus	various-leaved pondweed		
Apium inundatum	lesser marshwort		
Charadrius dubius	little ringed plover		
Alcedo atthis	kingfisher		
Notable species:			
Myriophyllum verticillatum	whorled water milfoil	BC2 BoC2 NoB(NA) MD BAPL	
Anas strepera	gadwall	WCA2i ENHP1(NA) MD BAPL	
Anas clypeata	shoveler	WCA2i WCA3iii ENHP2(NA) MD BAPL	
Haematopus ostralegus	oystercatcher	NoB(NA) MD	
Triturus cristatus	great crested newt	BC2 ECH2 ECH4 WCA5 BAPS BAPL	
Extinct/Declining species:			
Libellula fulva	scarce chaser dragonfly	RDB 3 BAPL	
Hippuris vulgaris	mare's tail		
Zannichellia palustris	horned pondweed		

<b>Natural Area:</b> Humberhead Levels		<b>Habitat/Feature:</b> Ditches and drains
<b>General Character:</b>		
<b>Phase 1:</b>	G11	Open water: standing, eutrophic
<b>NVC:</b>	A1	<i>Lemna gibba</i> community
	A2	<i>Lemna minor</i> community
	A9	<i>Potamogeton natans</i> community
	S4	<i>Phragmites australis</i> swamp and reedbeds
	S22	<i>Glyceria fluitans</i> water-margin vegetation
	S26	<i>Phragmites australis-Urtica dioica</i> tall-herb fen
	S28	<i>Phalaris arundinacea</i> tall-herb fen
<b>Characteristic Features:</b>		
<b>Significant Species Groups:</b>		
Odonata		
Coleoptera		
Lepidoptera		
Pondweeds		
<b>Characteristic Species:</b>		
<i>Phragmites australis</i>		common reed
<i>Carex riparia</i>		greater pond-sedge
<i>Lythrum salicaria</i>		purple-loosestrife
<i>Filipendula ulmaria</i>		meadowsweet
<i>Sanguisorba officinalis</i>		great burnet
<i>Lemna minor</i>		common duckweed
<i>Juncus effusus</i>		soft rush
<i>Phalaris arundinacea</i>		reed canary-grass
<i>Potamogeton natans</i>		broad-leaved pondweed
<i>Glyceria fluitans</i>		floating sweet-grass
<i>Calopteryx splendens</i>		banded agrion damselfly
<i>Aeshna grandis</i>		brown hawker dragonfly
<i>Libellula quadrimaculata</i>		our spotted chaser dragonfly
<i>Natrix natrix</i>		grass snake
<i>Bufo Bufo</i>		common toad
<i>Rana temporaria</i>		common frog

Natural Area: Humberhead Levels		Habitat/Feature: Ditches and drains
<b>Notable Species:</b>		
<i>Coenagrion pulchellum</i>	variable damselfly	
<i>Brachytron pratense</i>	hairy dragonfly	
<i>Sympetrum sanguineum</i>	ruddy darter dragonfly	
<i>Perizoma sagittata</i>	marsh carpet moth	RDB 2 BAPL
<i>Rhantus grapii</i>	water beetle	
<i>Cercyon convexiusculus</i>	water beetle	
<i>Cercyon ustulatus</i>	water beetle	
<i>Hydraena testacea</i>	water beetle	
<i>Anthomyza bifasciata</i>	fly	RDB 2
<i>Segmentina nitida</i>	freshwater snail	BAPS BAPL
<i>Lymnaea glabra</i>	freshwater snail	BAPL
<i>Agabus nebulosus</i>	beetle	
<i>Acilius canaliculatus</i>	beetle	
<i>Hydroporus incognitus</i>	beetle	
<i>Haliphus favicollis</i>	beetle	
<i>Agabus chalconatus</i>	beetle	
<i>Daphnia magna</i>	water flea	
<i>Planorbis laevis</i>	mollusc	
<i>Thelypteris palustris</i>	marsh fern	NS
<i>Myriophyllum verticillatum</i>	whorled water-milfoil	NS
<i>Pilularia globulifera</i>	pillwort	NS BAPL
<b>Extinct/Declining Species:</b>		
<i>Hottonia palustris</i>	water-violet	
<i>Anagallis tenella</i>	bog pimpernel	
<i>Dryopteris cristata</i>	crested buckler-fern	RDB V BAPL
<i>Viola persicifolia</i>	fen violet	WCA8 RDB E BAPL
<i>Eleocharis acicularis</i>	needle spike-rush	
<i>Hippuris vulgaris</i>	mare's-tail	
<i>Sagittaria sagittifolia</i>	arrowhead	
<i>Potamogeton friesii</i>	flat-stalked pondweed	
<i>Ranunculus baudotii</i>	brackish water-crowfoot	
<i>Zannichellia palustris</i>	horned pondweed	
<i>Thalictrum flavum</i>	Common meadow-rue	
<i>Ranunculus circinatus</i>	fan-leaved water-crowfoot	
<i>Callitriche hamulata</i>	intermediate water-starwort	



<b>Natural Area:</b> Humberhead Levels		<b>Habitat/Feature:</b> Ditches and drains
<i>Myriophyllum alternifolium</i>	alternate water-milfoil	
<i>Potamogeton polygonifolius</i>	bog pondweed	
<i>Potamogeton lucens</i>	shining pondweed	
<i>Oenanthe aquatica</i>	fine-leaved water-drop wort	
<i>Potamogeton pusillus</i>	lesser pondweed	
<i>Potamogeton berchtoldii</i>	small pondweed	
<i>Lemna gibba</i>	fat duckweed	
<i>Eleogiton fluitans</i>	floating club-rush	
<i>Carex elata</i>	tufted-sedge	
<i>Carex acuta</i>	slender tufted-sedge	

<b>Natural Area:</b> Humberhead Levels		<b>Habitat/Feature:</b> Hedgerows
<b>General Character:</b>		
<b>Phase 1:</b>	J23	Boundaries, hedge with trees
<b>NVC:</b>		
<b>Characteristic Features:</b>		
<b>Significant Species Groups:</b>		
<b>Characteristic Species:</b>		
<i>Crataegus monogyna</i>	Hawthorn	

<b>Natural Area:</b> Humberhead Levels		<b>Habitat/Feature:</b> Hedgerows
<b>Notable Species:</b>		
<i>Tyto alba</i>	barn owl	BC2 WCA1i WCA3i ENHP2(NA)MD BAPL
<i>Miliaria calandra</i>	corn bunting	NoB(NA) RRHD BAPM BAPL
<i>Emberiza citrinella</i>	yellow hammer	BC2 WCA3i BAPL
<i>Carduelis cannabina</i>	linnet	BC2 WCA3i RD BAPM BAPL
<b>Extinct/Declining Species:</b>		

<b>Natural Area:</b> Humberhead Levels	<b>Habitat/Feature:</b> Rivers
<b>General Character:</b> <b>Phase 1:</b> GCR1 Active Process sites <b>Significant Habitats</b> GCR1B Fluvial geomorphology of England	
<b>Characteristic Features:</b> <b>Significant Species Groups:</b>	
<b>Characteristic Species:</b>	
<b>Notable Species:</b> <b>Extinct/Declining Species:</b>	

## Natural Areas Profile

### Notable Species

A species is notable if it is listed in one or more of the following International or National Legislations:

<b>Title</b>	<b>Code</b>
Berne Convention (Appendix I, II, III)	BC1 BC2 BC3
Bonn Convention (Appendix I and II)	BoC1 BoC2
Convention on International Trade in Endangered Species (Appendix I, II, III)	CITES 1 CITES 2 CITES 3
Conservation of Seals Act	CSA
Deer Act (1991)	DA
European Birds Directive (1991)	ECB
European Habitat and Species Directive (1995) (Annex II, IV, V)	ECH2 ECH4 ECH5
Protection of Badgers Act	PBA
Red Data Books      Mammals (1993) Plants (1983)  Insects (1987) and Invertebrates (1991)	RDB RDB Ex      Extinct RDB E      Endangered RDB V      Vulnerable RDB R      Rare RDB 1      Endangered RDB 2      Vulnerable RDB 3      Rare
Scarce Plants Atlas (1994)	NS
Wildlife and Countryside Act (1981) and Amendments (1992)	WCA1i      Schedule 1 Part i WCA2i      Schedule 2 Part i WCA2ii      Schedule 2 Part ii WCA3i      Schedule 3 Part i WCA3iii      Schedule 3 Part iii WCA4      Schedule 4 WCA4      Schedule 5 WCA6      Schedule 6 WCA8      Schedule 8
UK Biodiversity Action Plan (1995)	BAPS      Short List BAPM      Middle List BAPL      Long List

A species is also notable if it has been identified as being one of the following by *English Nature Research Reports* No. 114 (Birds in England: A Natural Areas Approach 1994):

Status	Code
Core Area Species	CASP(NA)
English Nature High Priority (Lists 1 and 2)	ENHP1(NA) ENHP2(NA)
Extinct	EX(NA)
Internationally Important	INTIMP
Notable Birds	NoB(NA)

**NB: (NA)** Denotes where a species is specifically notable to that Natural Area

A species is also notable if it has been identified as being one of the following by JNCC (Birds of Conservation Importance 1996):

Status	Code
Moderately Declining	MD
Rapidly Declining	RD
Rare and Rapidly or Historically Declining	RRHD