Forest of Bowland Natural Area

A Nature Conservation Profile

Prepared for English Nature North West Team

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March 1997

Foreword

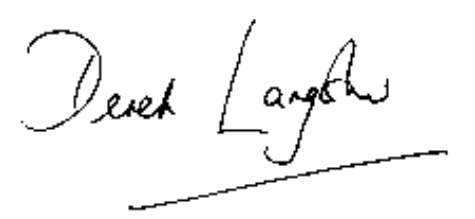
One of the key components of English Nature's *Strategy for the 1990s* has been the Natural Areas approach. We examined the local distinctiveness of each part of England, to identify their characteristic wildlife and natural features, and used this to define a comprehensive series of Natural Areas. Their boundaries are based on the distribution of wildlife and natural features, and on the land use pattern and human history of each area, and thus offer a more effective framework for the planning and achievement of nature conservation objectives than do administrative boundaries. They are **not** designations.

Wildlife is not restricted to designated and protected sites such as nature reserves or SSSIs; it occurs throughout the countryside, coast and built up areas of England. No part of the country is without some wildlife interest. The Natural Areas approach gives us a way of determining priorities for nature conservation areas with ecological and landscape integrity, and to set objectives which reflect these priorities. Together, all Natural Areas provide a powerful vision for nature conservation right across England.

The achievement of the objectives described for each Natural Area will be a key part of or new strategy *Beyond 2000*. The objectives will guide our work over the coming years, and we hope Natural Areas will allow us to help others in achieving what is best for nature conservation locally.

This Natural Area profile is one of a series of 120, one for each Natural Area. In it we describe the wildlife and natural features of the area, and what makes it special and distinctive. Each Natural Area profile is different, since it describes and reflects the local distinctiveness of the area, and therefore includes nature conservation objectives which are particular to that area. The profiles have been written after a wide range of local consultations, both on the boundaries of the Natural Areas themselves and on these profiles.

We hope you will find this document useful, and look forward to working with you to maintain and enhance the wildlife and natural features of England.



Dr Derek Langslow
Chief Executive

Summary

The development of the Natural Area concept is a key part of English Nature's determination to conserve wildlife in England. A Natural Area is not a designation, but an area of countryside, identified by its unique combination of physical attributes, wildlife, land use and culture. Natural Areas provide a framework for securing public support for wildlife and geological conservation. The development of the Natural Area concept will greatly improve the ability to deliver effective nature conservation.

The production of this Natural Area Profile is a first step towards securing local agreement on priorities for nature conservation within the Forest of Bowland Natural Area. It describes and evaluates the wildlife and geology of the area and proposes key nature conservation objectives for discussion.

The Bowland Fells consist of an upland area of heather moorland with deep wooded river valleys within north-east Lancashire. Together with the Bowland Fringe and outlying Pendle Hill they form an area of considerable conservation interest.

The Bowland Fells are dominated by blanket bog and heather moorland with areas of upland pasture, especially on lower slopes below the fell wall. They are incised by rapid flowing rivers giving rise to steep cloughs with occasional trees and lush wooded valleys on lower slopes. The valleys and cloughs provide a transition between the exposed moorland fells and the rural lowlands and include an attractive mosaic of woodland, unimproved meadows, rush-dominated pastures, and flushed grassland slopes, with marshes and streams at lower levels. The surrounding Bowland Fringe has a diverse landscape of undulating herb-rich hay meadows and lush pastures, broad-leaved woodlands, parkland and water bodies, such as Stocks Reservoir, set against the dramatic backdrop of the Bowland Fells. The Pendle Hill outlier forms a discrete topographical unit, geologically linked to the main upland block, but separated from it by the broad valley of the River Ribble. Grouse moor management and sheep farming have had a major influence the vegetation and landscape of the Forest of Bowland.

The Forest of Bowland supports a considerable area of semi-natural vegetation forming important wildlife habitats. The upland massif with its vast expanses of unenclosed heather moorland and blanket bog is of international importance for breeding bird populations. This is recognised by its designation as a Special Protection Area (SPA) under the European Community Birds Directive. The in-bye grasslands and herb-rich hay meadows are important features of the Bowland Fringe, and semi-natural clough woodlands survive where they are inaccessible to sheep. The Bowland Fells are designated SSSI on account of the heather moorland blanket bog which supports important upland breeding bird populations. The best woodlands (Roeburndale) and surviving herb-rich hay meadows are also SSSI but the marginal grasslands (ie. marshy pastures) which are of important for breeding waders, are generally outside the areas of statutory protection.

In this document, the status, characteristic wildlife and special species of each of the six key wildlife habitats found within the Natural Area are described, the current factors affecting them are identified and nature conservation objectives are proposed. The Natural Area profile is fully consistent with the UK Biodiversity Action Plan and in particular, with the UK Steering Group report on biodiversity submitted to Government in 1995. It is intended that this profile will form the basis of Local Biodiversity Action Plans for Lancashire.

The Forest of Bowland Natural Area

A vision for the future

Looking ahead into the next century, we would like the Forest of Bowland to be a landscape as rich in wildlife and geological features as it is now. It should support a full range of characteristic semi-natural habitats and their associated native plant and animal species.

Rock exposures and natural landforms that are important to our understanding of Bowland's origins should remain available for study and appreciation. The natural processes that have shaped the land surface should also be allowed, wherever possible, to continue unrestrained.

This vision should go further than just retaining what we have now - we would like to see the reversal of some recent losses or declines in quantity and quality of certain upland and marginal habitats. Where wildlife habitats are in poor condition, we would like to see them restored. Habitats that are rare or highly fragmented like wooded cloughs, herb-rich meadows and wet marshy grasslands should be extended, and where possible, re-created to link existing habitats.

Our vision is for those parts of the Bowland heather moorland and blanket bog, which have become degraded during recent times, to become vibrant once more; for upland deciduous woodlands which have been grazed by stock, to be fenced and thereby allow regeneration; and for those ancient woodlands which have been planted with conifers, to be restored by including native species. Where farming practices have led to the decline of native plant and animal species, we would like to see the use of more traditional methods which would allow them to return. We would like to see dilapidated hedges and stone walls repaired.

We must ensure that all species of native plants and animals currently found within the Natural Area survive into the future, both common species as well as rarities. We must conserve skylarks as well as hen harriers, primroses as well as orchids. In this way we should be sure of maintaining the biodiversity of the Forest of Bowland for future generations to enjoy. Where species have been lost through habitat deterioration, we will encourage their re-colonisation or reintroduce them once favourable conditions have been restored. However, we must also recognise that some changes, such as climate change and genetic evolution, are beyond our control.

To achieve this vision, the Natural Area must continue to be sensitively managed by people. Rural communities must be retained and supported. There must be understanding between those who live and work in the Forest of Bowland, those visiting the area, and respect for the requirements of wildlife. The essential part of this vision is that all people within Bowland, residents and visitors alike, enter the next century understanding and appreciating, the value and intricacies of Bowland's landscape and wildlife. If this happens our environment will sustain us and continue to enrich our quality of life.

Contents

1. The Natural Area concept

The development of the Natural Area concept is a key part of English Nature's drive to conserve wildlife in England. English Nature believes that Natural Areas provide a framework for securing public support for wildlife and geological conservation and as such, will greatly improve our ability to work closely with others to deliver effective nature conservation.

A Natural Area is not a designation, but an area of countryside identified by its unique combination of physical attributes, wildlife, land use and culture. These features give a Natural Area a 'sense of place' and a distinctive nature conservation character which we can seek to sustain. The concept relies on wide participation and enables us to 'Think globally, act locally'.

Natural areas not only set the context for special sites such as nature reserves and Sites of Special Scientific Interest, but just as importantly help promote action to conserve wildlife and geological features throughout the wider countryside. We hope to interest people in looking after plants and animals throughout the Forest of Bowland, including those that are still common place as well as those that are rare.

Overall, England has been divided into some 120 Natural Areas, including coastal and terrestrial Natural Areas. These include the Forest of Bowland in NW England. Natural Areas are also being developed for the marine environments of the seas around England.

Our understanding of England's countryside is also aided by the identification of 181 'Countryside Character Areas' across the country. These complement Natural Areas. Descriptions of the historical character, landscape and natural history of each area have been prepared by the Countryside Commission and English Nature, in association with English Heritage. *The Character of England: landscape, wildlife and natural features* Map published in 1997, should provide a useful, strategic framework to meet the needs of those organisations who have an interest in the English landscape, its wildlife and natural features. Throughout England, Countryside Character Areas form the sub-divisions of a Natural Area. Within the Forest of Bowland Natural Area, these include a central core area, *The Bowlands Fells*, which is surrounded by a *Bowlands Fringe and Pendle Hill*.

2. The role of this profile

This profile describes and evaluates the wildlife and geological features of the Forest of Bowland Natural Area, and identifies the most meaningful areas of action to take. Important habitats, species, and physical features within the Natural Area are identified and described, and objectives set for their conservation.

Although this document has been prepared by English Nature, the profile is written for everyone with an interest in nature conservation living in and around the Forest of Bowland Natural Area. Hopefully, it will serve to bring conservation bodies and local people closer together, in working towards shared objectives that address the top priorities for nature conservation within the Natural Area.

This document is fully consistent with recent UK thinking on the conservation of biodiversity, a process initiated in Rio de Janeiro in 1992 when the Prime Minister, together with over 150 world leaders, signed the Biodiversity Convention. In particular, the profile draws heavily on *Biodiversity : The UK Steering Group Report*, a document submitted to Government in December 1995, which develops several of the prime objectives laid out in *Biodiversity : The UK Action Plan* (1994). The Steering Group report, to which the Government is due to respond shortly, includes lists of species of conservation concern within the UK, as well as costed action plans for some 14 key habitats and 116 key species. It also covers the production of Local Biodiversity Action Plans as a means of implementing the UK plans at the local level.

This profile has been written in a style and format which will allow it to be used as a basis for production of local Biodiversity Action Plan for Lancashire including the Forest of Bowland Natural Area. the profile presents a vision for nature conservation within the Natural Area through the implementation of a number of objectives. These are not prescriptive, but in seeking to achieve this vision for the Forest of Bowland Natural Area, the action of all should be guided by the content and overall direction of the profile.

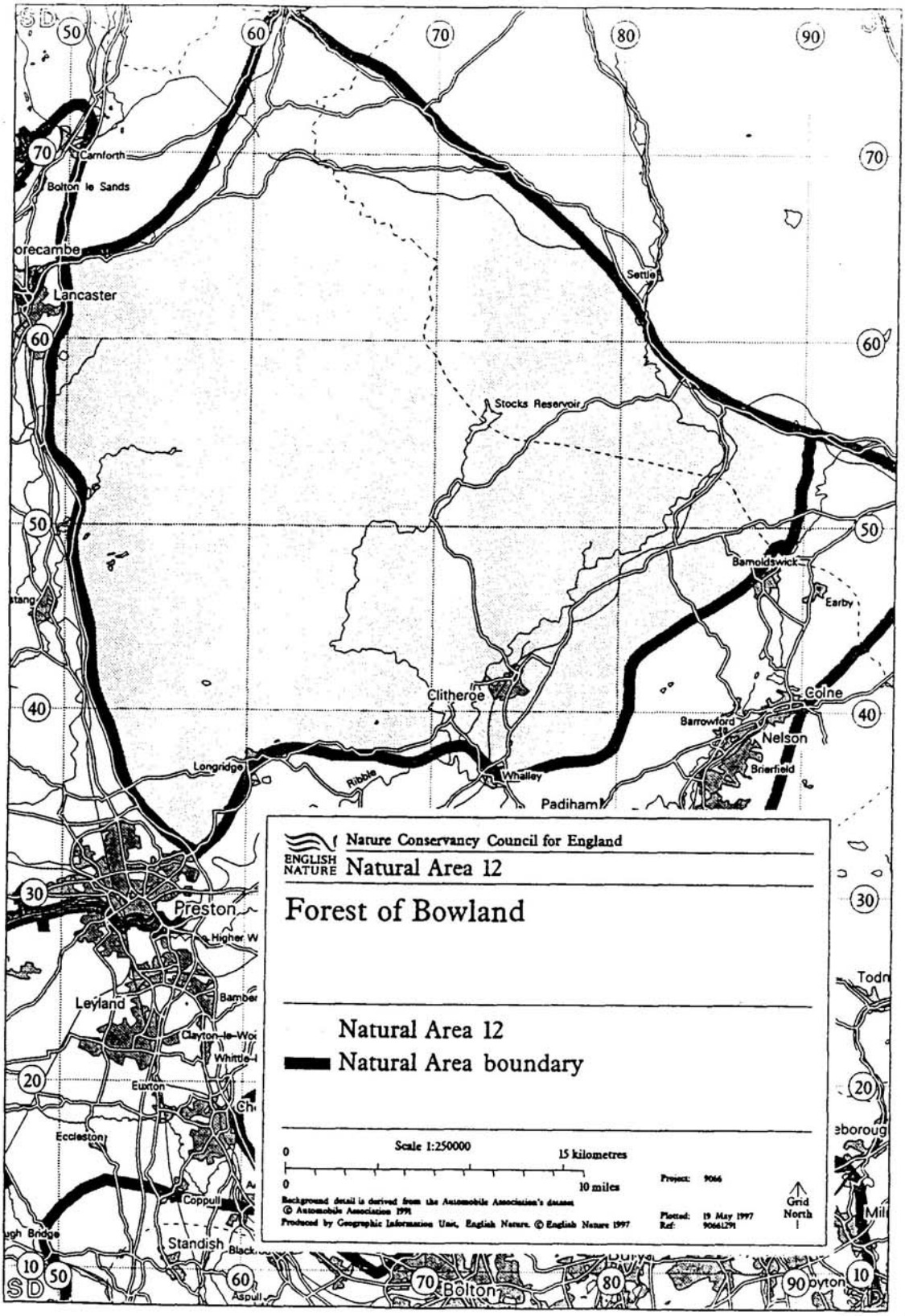
3. The Natural Area boundary

The Bowland Fells form a distinct and almost circular upland dome of moorland, with gritstone outcrops and deep wooded river valleys lying within north-east Lancashire. The Trough of Bowland, a pass connecting the valleys of the Marshaw Wyre and Langden Brook, divides the upland core into two main blocks. To the north of the Trough, an east-west ridge of moorland rises to 560m at Ward's Stone, the highest point within the Natural Area. To the south of the Trough, a more deeply incised hill mass rises to a summit of 510m at Fair Snape Fell on the southern most part of an escarpment edge. Pendle Hill is a distinctive outlier having a steep scarp slope and flat summit rising to 557m at the Beacon.

The rocks of this upland area are entirely from the Carboniferous period. Thick layers of Millstone Grits form the summits of Pendle Hill and the Bowland Fells, outcropping as summit tors, such as Ward's Stone. Thinner layers of sandstone and shales from the Bowland Series form softer eroding slopes. Calcareous bands within the shales give rise to base-rich flushes in some places. Limestone occurs around the southern side of the Bowland Fells and the north side of Pendle Hill, outcropping conspicuously as 'reef knolls', which are an important feature of the Ribble Valley.

The Bowland Fringe forms a transitional landscape between the dramatic upland core of Bowland Fells and the flat Lancashire and Amounderness Plain to the west, the Yorkshire Dales to the east, and the Lancashire Valleys to the south-east.

Map showing the boundaries of the Forest of Bowland Natural Area



Although the Forest of Bowland Natural Area is similar to the Area of Outstanding Natural Beauty designated in 1964, the boundary is not quite the same. The Natural Area adheres more closely to the upland features, which distinguish it from the Lancashire Plain and Valleys Natural Area. Thus the following features around the Bowland Fells are excluded: the lower part of the Lune Valley, the lowland extension to Clapham and Austwick, the Ribble Valley extension to Gisburn in the south-east, and along the south side, the Loud valley. For the detached unit of Pendle Hill the Natural Area extends further north-east than the AONB, to Barnoldswick. The Natural Area lies between the Lancashire Plain and Valleys Natural Area to the west, and the Yorkshire Dales Natural Area to the east, whilst the Pendle Unit touches the Southern Pennines Natural Area at Foulridge.

Major land uses in the Forest of Bowland Natural Area

- Grouse Moor
- Sheep Farming
- Forestry
- Water Catchment
- Beef and dairy herbs
- Quarrying (especially within the Clitheroe and Claughton areas)
- Recreation

4. Geology and landform features

The Forest of Bowland Natural Area is dominated by Carboniferous rocks forming an open and wild upland area. The Bowland fells are formed from hard Millstone Grit of Upper Carboniferous age, while softer alternating bands of shale and sandstone have eroded to create the lower undulating areas that are broken by low scarps, valleys and cloughs that radiate from the moorland tops. The broad gritstone plateau is interrupted only by occasional outcrops of sandstone strata and Millstone Grit, such as those found at Ward's Stone and Clougha Pike. Glaciation has been responsible for the smooth outline of the fells, distinctive drumlins within the river valleys to the north and east, outwash channels north of Clougha Pike and river drainage features in the Langden valley. To the east, the Namurian rocks of Pendle Hill are included as an outlier of the Natural Area and these are separated from the main portion by the Ribble Valley.

The transition from the hard Millstone Grit of the fells to the soft glacial deposits of the coastal plain is rapid and reflects the existence of a substantial fault. Glacial erosion and thick deposits have softened this fault line. In the south, where the Brock and Calder cross the Natural Area, the transition is less sharp where the Millstone Grit gives way to the underlying softer calcareous mudstones of the Bowland Shale and limestone bands. The southern flanks of the Bowland Fells are drained by the streams running into the rivers Ribble and Hodder. Within these broad valleys 'reef knolls' and limestone beds create distinctive landscape features. Further west, extensive areas of sand and gravel can be found along river courses. These are associated with the area's characteristic drumlins and wooded knolls. The northern fells are drained by the fast flowing Roeburn and Hindburn across short and steeply inclined transitions giving rise to narrowly incised and intimate river valleys.

4.1 Geological history

The Carboniferous rocks have been historically divided by geologists into the following sequence: Carboniferous Limestone (Lower Carboniferous, 350-333 Ma), Bowland Shale and Millstone Grit (Lower to Upper Carboniferous, 333-318 Ma), and Coal Measures (Upper Carboniferous 'Westphalian', 318-303 Ma). Of these rocks, the limestones and grits are primarily responsible for the character of the Natural Area. The Lower Carboniferous rocks include the knoll reefs (formed as mud mounds in the Carboniferous seas) famous for their rich echinoderm faunas. Pendle Hill forms a distinctive landform with a steep escarpment capped by Millstone Grit. Lower levels include the Bowland Shale, famous for its goniatite fossils, (an extinct group of squid with coiled shells) which are important in the stratifgraphic correlation of these rocks across the area. During the Quaternary (the last 2 million years), successive glaciations have left variable thicknesses of glacial sands, gravels and clays spread across the older bedrock. The present day surface streams contain important information about post-glacial (the last 10,000 years) environmental changes in the area, and also the development of drainage patterns in upland area.

Key geological features:

- Exposures of the Lower Carboniferous limestone and Bowland Shale and Millstone Grit (Lower to Upper Carboniferous)
- Global Stratotype Section and Reference Point for the Pendleian Stage of the Carboniferous
- Internationally important fossil locations in Carboniferous Limestone reef knolls
- Development of upland river systems
- Physiography and the expression of the underlying geology in the landscape.

Special Sites

The Natural Area contains ten sites covering key geological features, which are recognised as being of national importance through their inclusion in the Geological Conservation Review (GCR). The majority of the SSSIs are those showing the nature and structure of the Carboniferous (Namurian) rocks exposed on the flanks of Pendle Hill. Light Clough SSSI is recognised globally as defining the Pendleian Stage division of the Carboniferous. Cock Wood Gorge SSSI is renowned for marine fossils within marine bands which are used in correlation of Namurian rocks. These include bivalves such as *Sanguinolites*. Sites such as Clitheroe Knoll Reefs SSSI, Coplow Quarry SSSI and Salthill and Bellmanpark Quarries SSSI are particularly noted for their exposures of Carboniferous knoll reef limestones with exceptionally rich fossil echinoderm faunas. Bowland Fells SSSI is important for its fluvial geomorphology, showing the recent development of alluvial fans, river bank erosion and channel changes since deglaciation, such as those which are conspicuous in the Langden valley.

4.2 Key geological and land form management issues

- **Exposures** need to be safeguarded and maintained in man-made quarries and cuttings.

- **Extraction industry**: There is potential conflict between the mineral extraction industry, landfill companies and geological conservation.

- **Education**: The geological heritage of the Natural Area needs to be promoted.

- **Afforestation**: of physiographical features, notably Clitheroe Knoll Reefs and the Langden Valley, could obscure landscape features of particular conservation interest.

4.3 Key geological and landform objective:

To maintain the integrity of geological and geomorphological features within the Natural Area and enhance their value for interpretation, education and visual amenity.

Rationale

This objective aims to promote the protection of the most important geological and geomorphological features of the Natural Area through protective designation, appropriate management, development control and by encouraging the maintenance or restoration of natural processes.

Key Geological and Landform Objectives

1. Maintain and where possible enhance existing geological exposures by agreeing management plans with owners and occupiers.

2. Negotiate the long-term conservation of geological exposures with mineral extraction companies at key geological sites.

3. Ensure that all the remaining sites of geological and geomorphological importance within the Natural Area which are not already designated as Sites of Special Scientific Interest or Regionally Important Geological/Geomorphological sites (RIGS) are adequately documented and put forward for designation, if appropriate.

4. Encourage the creation and recording of temporary and permanent exposures in the area as part of road schemes and other developments.

5 Encourage responsible fossil collecting at vulnerable sites

5. Key wildlife habitats

5.1 Comparative importance and extent

The Forest of Bowland supports a diverse range of wildlife habitats. The six Key Wildlife Habitats that occur in the Natural Area are listed in Table 1 below, where they are ranked according to current thinking on their importance in international, national or regional contexts.

Table 1 Key habitats within the Forest of Bowland Natural Area - importance and extent

Key Habitat	UK BAP habitats	Component vegetation types	Extent in Natural Area	Significance
Moorland and mire	Blanket Bog*	Blanket bog and wet heath	Extensive	International
	Upland Heath*	Dry heath	Extensive	International
Semi-natural woodland	Upland oak* and mixed ash* woodlands	Upland clough Woodlands	Local	National
	Lowland mixed woodlands	River valley woodlands	Frequent	National
Coniferous plantations	Planted coniferous woodland		Local	Regional
Species-rich grasslands	Upland hay* meadows	Unimproved meadows	Scarce	National
	Calcareous grasslands	Limestone grassland	Scarce	Regional
Rushy pasture	Upland Damp* Pastures		Frequent	National
Rivers and water bodies	Oligotrophic rivers of mountains. Rivers on sandstone and hard limestone		Frequent	Regional

The North West Biodiversity Audit, identifies species and habitats of importance in North West England by Natural Area and Local Authority. This should facilitate the conservation of such habitats. The audit, which was launched in January 1999, includes information on the key habitats and species listed in *Biodiversity: The UK Steering Group Report* (December 1995). Together, this Natural Area profile can be used to inform the development of local targets for important habitats and species within a Biodiversity Action Plan for Lancashire.

5.2 Habitat descriptions and specific conservation objectives

The status, characteristic wildlife, species of importance, of each habitat are described in the sections that follow. **Key species**, identified in **Annex 1**, are highlighted in **bold**, whilst definitions of 'key species' are provided below.

The main factors currently affecting each habitat are also given, together with nature conservation objectives. These are visionary, although hopefully realistic in the long term, and are "unconstrained". They do not include specific targets since these are to be provided within a Local Biodiversity Action for Lancashire. The themes underlying the objectives for individual key habitats are brought together in the form of six key goals for wildlife conservation throughout the Natural Area, as listed in Section 5.3.

The Latin names of all plants and animals referred to in the text are given in Annex 2.

Key species

The Natural Area supports a number of plant and animal species which are highly valued, both by active conservationists and by the general public. This is especially the case for a range of bird species including both raptors and waders. Bowland contains more than 1% of the national estimated populations of all wader species, with the possible exception of snipe. (The 1% threshold is recognised to be the level of national significance.) In addition, Bowland Fells supports the only regularly used breeding locality in England for hen harrier, as well as 3.2% of the merlin population in the UK.

Limited financial and human resources make it difficult to focus conservation actions on all species and habitats found within the Natural Area. However, we must therefore identify those which are considered priorities for action by virtue of the criteria listed below. Habitat conservation measures will help conserve the great majority of the remaining species within the Natural Area.

Selection criteria for key species

- Species that are endemic to the UK, or which are threatened on a global or European scale, and which have significant populations in the Forest of Bowland Natural Area.
- Species which are rapidly declining throughout the UK and which have a national stronghold in the Forest of Bowland Natural Area.
- Species which are threatened in Great Britain, being listed in the relevant Red Data Book, and which are on the extreme edge of their normal distribution range within the Forest of Bowland Natural Area.
- Species which are highly characteristic of the Forest of Bowland Natural Area, seldom found in such numbers elsewhere in England, and/or which are popular with the general public.
- Species listed in UK Biodiversity Group Action Plan Reports.

Some account has also been taken of the desirability of ensuring that all the important taxa in the Natural Area are represented and that the species selected are spread across the key habitats present.

Each of the Key species listed in Annex 1 described in terms of its status and distinction within the **Species of** Importance sections of the profile (see Sections 5.2.1 – 5.2.6).

5.2.1 Moorland and mire

Status

Bowland Fells support the largest expanse of blanket bog and heather moorland in Lancashire and provide habitat for a diverse upland breeding bird community.

Expansive open rolling heather moorland and blanket bog are dominant features of the Bowland Fells. Substantial areas of heather managed for grouse are occasionally interrupted by rocky outcrops and boulders of sandstone and gritstone, especially on the highest summits of Ward's Stone, High Stephen's Head and Wolfhole Crag.

The moorland summits experience conditions of high rainfall, poor drainage and low temperatures, which inhibit decay of organic material, which in the past, has led to formation of peat (blanket bog), filling hollows and capping the fells. Deep accumulations of peat occur on the high plateau, but in places the peat has been severely eroded leaving peat haggs above exposed millstone grits and bedrock.

Pendle Hill rises sharply from the broad lush valley of the river Ribble as a characteristic landscape feature within the south eastern most part of the Natural Area, south of Clitheroe. Its steep hillsides are dominated by acid grassland whilst its broad, flat, and gently sloping summit plateaux supports degraded blanket bog and sparse heather moorland plant communities resulting from long term over-grazing, trampling and past atmospheric pollution. Scattered stands of bracken along Ogden Clough and the west facing slopes of Apronfall Hill are frequent, whilst numerous springs and large areas of flushed vegetation occur on the lower most slopes of Worston and Pendleton Moors. These provide a locus for some of the richest vegetation and plant communities of nature conservation interest on Pendle Hill.

Part of the Natural Area falls within the County of North Yorkshire. Albeit it small in extent, this supports a few important examples of raised bog and valley mire habitats. Crocket Moss is a valley bog important for its species-rich mire communities, whilst Helsey Moss, Austwick and Lawkland Mosses are basin raised mires, of particular importance for their bog moss communities. In Lancashire, White Moss near Wigglesworth, is an important example of a basin valley mire.

Characteristic wildlife

The most extensive plant communities within the Bowland Fells are dry heathland dominated by heather and bilberry. These are generally found on the steep valley slopes, whilst blanket bog dominated by heather and cottongrass, tends to cover the tops of the ridges and shallow slopes of the Fells. Cranberry and crowberry are also characteristic species. Fir club-moss is a notable feature of the crags and scree. Acid grasslands within the moorland mosaic are characterised by wavy hair grass, mat grass, heath rush and sheeps sorrel. On lower ground, bracken forms extensive stands on valley slopes. Dense growths of Bracken suppresses the ground flora but where it is less dense bilberry commonly grows beneath, along with other species more usually associated with woodland, such as wood-sorrel and climbing corydalis. Bracken areas provide an important habitat for whinchat.

The maintenance of heather moorland over much of the site has provided an excellent habitat not only for red grouse, for which the moors are primarily managed, but also for other species of upland birds such as breeding raptors requiring the presence of heather for nesting cover and as a feeding habitat supporting their prey. The open heathland and blanket bog communities support other moorland birds such as golden plover, meadow pipit, skylark, whinchat and wheatear. The fast-flowing upland streams are the typical habitat of common

sandpiper, oystercatcher, dipper and grey wagtail while the presence of tree cover adjacent to open moorland is ideal for woodcock, redstart and spotted flycatcher and ring ouzel.

Escarpments, crags, quarries and rock scree form distinctive landscape features based on the gritstones of the Bowland shales and sandstone Series. They support a mixture of semi-natural moorland vegetation on the upper slopes with bracken and unimproved acid grassland favoured by whinchat and wheatear.

Special species

The moorland areas of the Bowland Fells hold internationally important populations of **hen harrier, peregrine, red grouse** and **lesser black-backed gull**. The natural area is of national significance for populations of **merlin, golden plover** and **curlew**. The area is also important regionally for **short-eared owl** and **ring ouzel**. Wet flushed grasslands around the moorland fringe are important for breeding wader populations, notably **redshank, lapwing, curlew and snipe.**

The **hen harrier** is a key species for this moorland habitat. The Bowland Fells represent the only regularly-used breeding locality in England and thus supports a very important breeding nucleus for this species which is in decline nationally. The Bowland Fells are also of considerable importance for **merlin** and **peregrine**, both of which occur in significant numbers, made possible by the extensive areas of open moorland managed for grouse.

The Bowland Fells holds one of the five largest breeding colonies of **Lesser black-backed gulls** in Britain which probably contains over 10% of the British and 6.3% of the European population. The birds nest on Mallowdale and Tarnbrook Fells during the summer when large numbers of individuals may be found ranging over a wide area.

The population of **curlew** breeding in the Forest of Bowland is of particular significance, supporting more than 3% of the UK total. **Curlew** is a Red Data Book bird of international significance.

Black Grouse, another Red Data Book bird also occur in small numbers. The black grouse population in Bowland is thought to be on the brink of extinction. The few remaining birds present in Bowland are on the southern most extent range of their distribution range in England.

Other key species breedingon Bowland Fells include the **golden plover**, which are generally on open moorland areas of fairly short vegetation**,** and **short-eared owls**, which are usually on open moorland, marginal land and recently afforested areas.

Large heath butterfly has one of only two Lancashire colonies on blanket bog in north Bowland.

Key plant species include cloudberry and chickweed wintergreen which are prevalent within the Natural Area, and also bog rosemary, which has previously been considered nationally scarce. Flushes and springs are not common, but where they occur, they provide a habitat for the Lancashire rarities lesser twayblade, broad-leaved cottongrass, bog pimpernel and **pale forget-me-not** - a nationally scarce species. A number of interesting ferns, bryophytes and lichens grow on the crags and scree, where they are protected from grazing and burning;

these include **Scottish filmy-fern** and hayscented buckler-fern at their only location in Lancashire, as well as **rigid buckler fern**, a nationally scarce species. Stag's horn clubmoss is also locally frequent. Keasden moss is important for its populations of the nationally scarce **marsh gentian**.

Protected sites

Bowland Fells SSSI/ SPA (Special Protection Area) is of exceptional nature conservation importance within Britain as well as the European region for a range of bird species associated with upland blanket bog and heather moorland. It qualifies by supporting (between 1986 and 1990) an average of at least 12 pairs of hen harrier (2.4% of the national population), and 21 pairs of Merlin (3.2%) as well as breeding populations of peregrine, golden plover and short-eared owl. Additional pairs of breeding merlin and hen harrier breed adjacent to the site and use the Bowland Fells for feeding. The site also supports populations of other bird species, including oystercatcher, lapwing, snipe, curlew, redshank, common sandpiper and ring ouzel which breed within the Natural Area.

Bowland Fells SSSI/SPA	-	moorland and blanket bog
Keasden Moor SSSI	-	wet heathland with marsh gentian
Austwick and Lawkland Mosses SSSI	-	raised mire
Hesley Moss SSSI	-	basin raised mire
Crocket Moss SSSI	-	valley bog
White Moss SSSI	-	valley bog

Current factors affecting the habitat

- **Burning and grazing of blanket bogs**: Within some blanket bog communities, bog mosses are sparse due to the effects of past burning practices and drainage. Some areas of bog have been heavily burnt and this, coupled with greater numbers of grazing sheep, has resulted in the loss of heather leaving areas of bog dominated by bilberry and cottongrass. In some areas the dwarf shrub component has been reduced still further producing a cottongrass-dominated degraded blanket bog community, or in some drier areas, acid grassland. In places there is active and extensive erosion leaving peat haggs surrounded by shallow peat and stony mineral soils.

- **Burning and grazing of dry moorland**: Uncontrolled fires and high levels of sheep grazing have resulted, in some areas, in the loss of heather and its replacement by bilberry and wavy hair-grass. Where grazing has been heavier still, the dwarf shrubs have been replaced by species-poor acid grassland, dominated by mat-grass or, to a lesser extent, heath rush and purple moor grass, especially in wetter areas.

- **Bracken spraying**: In some areas the control of bracken with herbicides has led to degradation of vegetation and in some cases soil exposure leading to erosion, especially on steep slopes, leaving some areas in need of restoration.

- **Recreation and access**: There are limited recreational opportunities in the uplands of Bowland. The lack of tourist provision concentrates the activities of visitors to a few popular locations. Access to open country is discouraged by private landowners across 10,000 ha of the central upland block, coinciding with the major grouse moors. The desire to protect the breeding grounds of grouse and other upland birds from

disturbance conflicts with the strong desire of many ramblers, including local people, to have freedom to roam across open country. Some new concessionary paths have been negotiated, but there are still demands for more access.

- **Raptor persecution**: Nest protection and monitoring is advisable for some rare breeding species, whose annual productivity and distribution seem restricted.

- **Culling of lesser black-backed gull**: The gullery is believed by North-West Water Ltd., to have been implicated in the high bacterial counts within Tarnbrook Wyre which forms part of the catchment for Lancaster's water supply. That led to culling in the 1970s, which has been continued since due to concerns over water quality issues and habitat degradation caused when numbers build up, as well as predation of grouse. Concern still remains in respect of the potential impact of an expanding colony on water quality and the issue is under review.

Key nature conservation objectives

1. Maintain moorland as a habitat for breeding birds, especially raptors, by encouraging appropriate management of heather moorland; in particular good burning practice, favouring healthy grouse and other quarry species populations, and discouraging over-grazing.

2. Encourage the restoration of degraded moorland by appropriate management, for example reducing sheep stocking rates, and restoring heather cover by fencing and reseeding.

3. Reconcile the interests of nature conservation, grouse management, farming and recreation by enhancing existing communication processes between the various interest groups.

4. Resist large scale proposals for afforestation and ensure that any new woodland creation proposals "add value" to the moorland and mire habitats of the Bowland Fells, using native species.

5. Resist moor gripping, reclamation and improvement of moorland and marginal grassland.

6. Restore, where possible, natural drainage patterns on moorland where drainage/gripping has taken place.

7. Ensure the protection of breeding birds of prey which are protected by national and European legislation.

8. Prevent disturbance to breeding raptors at traditional breeding sites, especially from inappropriate recreational activities and incompatible moorland management practices.

9. Discourage pollution, drainage and damage of flushes by unsympathetic land management practices and recreational activities.

10. Encourage land owners to adhere to the North West Water Code of Practice on Bracken Spraying and to address the issue of moorland regeneration in areas which have been damaged.

11. Protect crags, quarries, rock and scree from damage and reconcile potentially conflicting activities, eg. rock climbing and stream-scrabbling.

5.2.2 Semi-natural Woodlands

Status

The deeply-incised wooded cloughs and river valleys that radiate out from the central upland core of the Bowland Fells are a particular feature of the Bowland landscape. Dense broad-leaved woodlands cling to steep valley sides on lower fells. The composition of these woods varies with altitude and the degree of flushing. At higher levels they are dominated by oak and birch, with transitions to more mixed oak-dominated woodland lower down, with Alder in wetter places and mixed Ash woodland where the soils are base-rich.

More extensive areas of predominantly ancient semi-natural woodland are concentrated on the ridges, slopes and valley sides of the many rivers present throughout the Bowland Fringe area, namely the Hindburn, Roeburn, Wyre, Calder, Ribble and Hodder. Such woodlands are dominated by oak, ash and birch with extensive amounts of wych elm and wild cherry, especially along the Ribble, with alder and willow beside the Brock, Wyre and Calder. In the Clitheroe area, field maple forms a component of the woodlands on more base-rich soils. On the lower land, woodlands combine with hedges and hedgerow trees. These make a significant contribution to the landscape.

Characteristic wildlife

On higher ground, tree cover in the form of sessile oak scrub, with occasional rowan, is fragmented and occurs on the steep slopes of the fells and in the cloughs. Many of the trees are of great age, supporting a variety of lichens, and provide shelter for the growth of carpets of tall ferns. Oak and Birch woodlands are found within the steep, narrow valleys of Roeburndale, Hindburndale, Artledale and Littledale. These are typically dominated by sessile oak, with birch, ash, alder, bird cherry and rowan, over an understorey of hazel, hawthorn and holly. The ground flora frequently includes bilberry, bluebell, wood anemone, wood-sorrel and ramsons. A rich flora of ferns, mosses and liverworts also occurs in narrow valley woodlands, reflecting the sheltered humid conditions. The woodlands on the northernmost side of the Fells are particularly important in this respect, supporting a rich assemblage of mosses, liverworts and lichens.

Lower down the valleys around the margins of the uplands, woodlands are dominated by oak and ash, together with birch, wild cherry, alder and rowan, although many also have introduced sycamore and beech. These river-valley woodlands generally have a richer ground flora with dog's mercury, rRamsons, woodruff, enchanter's nightshade, primrose, bluebell, wood anemone, wood-sorrel, and broad buckler fern. Steep wet flushes within the woodland typically support great horsetail, great wood-rush, pendulous sedge, marsh hawk's-beard, yellow pimpernel, bugle and opposite-leaved golden saxifrage.

The valley woodlands provide food, shelter and breeding sites for many mammals, including badger, fox, and bats. Pied flycatchers, redstart, tree pipit, tawny owl, great spotted woodpecker and sparrow hawk are all characteristic bird species associated with these woodlands.

The woods also provide a habitat for a considerable variety of invertebrates, including those which depend on rotting wood and damp, shaded microclimates. A number of butterflies are

associated with woodland rides, clearings and edge habitats. Similarly the hedgerows of the valley bottoms are important habitat for nesting birds such as bullfinch, linnet, yellow hammer and reed bunting, which are all declining nationally.

Special species

The upland semi-natural woods in Bowland are of national significance **for lesser hairy-brome** and **wood barley** and locally important for **wood fescue**, beech fern and oak fern. Yellow star-of-Bethlehem is a nationally scarce species which occurs in the valley woodlands. Significant species of lower plants include ***Rhytidiadelphus subpinnatus, Leucobryum juniperoideum*, and *Jamesoniella autumnalis***. There are also two Red Data Book fungi ***Stobilomycetes stobilaceus, Theumenidium atropurpureum***.

The ash grey slug is a regionally scarce species found in Bowland whilst other notable invertebrate species include the glass snail, a rare cranefly ***Genophora niricornis***, the small chocolate and a rare sap beetle ***Epuroea angustula.*** Important bird species include redstart, woodcock, **bullfinch** and **spotted flycatcher**. **Red Squirrel** occurs in a few woods within the Natural Area.

Protected sites

Artle Dale SSSI - wooded gorge - nationally important for bryophytes.
Bowland Fells SSSI - upland woods.
Burton Wood SSSI - upland sessile oak woodland.
Roeburndale Woods SSSI - NCR site, nationally important for supporting red squirrels.

Current factors affecting the habitat

- **Grazing and Regeneration**: Heavy grazing, especially by sheep, reduces the diversity of ground flora and prevents regeneration. This is a particular problem in the unfenced upland woods of Bowland, which provide shelter for stock. They frequently lack an understorey of shrubs and saplings present in ungrazed woods.

- **Fragmentation**: Small copses in the agricultural landscape are particularly vulnerable to clearance. These pockets of woodland habitat may be of considerable value to wildlife, acting as refuges and 'stepping stones' between larger woodlands.

- **New planting**: Guidelines need to be developed and areas identified for new broadleaf plantings within the Natural Area which take account of existing habitats and wildlife.

- **Deer management**: Consideration should be given to the exclusion or control of deer populations throughout the Natural Area which may cause damage to trees, especially new planting. The work of the Bowland Deer Management Group should be supported.

Key nature conservation objectives

1. Encourage the positive management of all woodlands; including the removal of exotic species and stock-proofing to allow natural regeneration where appropriate.

2. Encourage the linking and extension of existing semi-natural woodlands by natural regeneration and appropriate planting.

3. Plant new woodlands of maximum benefit to wildlife by :
   - using native species appropriate to the area (altitude, soil & geology);
   - avoiding damage to existing wildlife habitats, eg flushes, species-rich grasslands, wet/damp grasslands used by breeding waders;
   - taking care to enhance conditions for key species.

5.2.3 Coniferous plantations

Status

Afforestation has taken place in the uplands, mostly within the Ribble Valley. Gisburn Forest contains some of the areas of conifer plantation within the Natural Area. Others occur on Longridge Fell, Grindleton Fell and Thrushgill on Greenbank Fell.

Characteristic wildlife

The main species planted within conifer plantations are Sitka spruce, Norway spruce, larches and pines. These have generally been planted in uniform, close-ranked, single-species blocks, which are now clear-felled and replaced according to Forest Design Plans which not only add diversity in terms of landscape but also species diversity and wildlife interests. As such Gisburn Forest comprises a mosaic of different habitat types including conifer and broadleaved plantations, ancient semi-natural woodland, open space, and unimproved pasture. These are managed according to a Forest Design Plan, which seeks to vary the age and the species of trees present as well as the overall structure of the Forest over future years. A sizeable proportion of the Forest has already been restocked with native species of broadleaves and further areas of spruce plantation are proposed for felling and replanting with broadleaves.

Young plantations generally have a more abundant and diverse fauna than areas of upland grazing which they often replace, although this is only temporary until the canopy closes. They are fenced to exclude grazing animals, which allows a dense growth of ground vegetation. This is accompanied by a rapid increase in small mammal populations, attracting birds of prey such as kestrel and short-eared owl. Meadow pipits and grasshopper warbler are also common during the early stages, and as the plantations develop they are succeeded by willow warbler, whitethroat, and linnet, and subsequently by blackbird, songthrush and chaffinch.

Mature plantations have a dense canopy, with low light levels and sparse ground flora. Larch plantations on the other hand may have a limited ground flora of bramble and wood-sorrel and may also support other species such as foxglove, bluebell and ferns. Although mature plantations support fewer birds and mammals than the broad-leaved woodlands, they do nevertheless support species such as goldcrest, coal tit, siskin and crossbill.

Special species

The conifer plantations support small but locally important populations of **crossbill** and **goshawk**, both of which are afforded special protection under Schedule 5 of the Wildlife and Countryside Act 1981. In addition young conifer plantations provide an important habitat for breeding pairs of **linnet**, which is a species in decline nationally as a result of changes in farming practice. Notably the use of herbicides and fertilisers, the switch from spring sown to autumn crops, and also the loss of winter stubbles for feeding, as well as the removal of breeding habitat such as gorse thickets and scrub woodland throughout the countryside, has lead to the decline of some populations.

Extinct species

During recent years the nightjar has not bred within Gisburn Forest, although habitat conditions would still appear to be ideal, especially open areas with bracken and young conifer plantations. The species has declined nationally for one reason or another and so long as forestry practice within Gisburn Forest continues to maintain a complex mosaic of young conifer plantations interspersed with open heathy areas, then it is hoped that the bird might return as a breeding species.

Protected sites

None.

Current factors affecting the habitat

- **Recreation**: A number of plantations are used for recreational purposes, including those on Beacon Fell, a Lancashire County Council Country Park, and also Gisburn Forest, leased by Forestry Commission.

- Forest Design: Considerable opportunities exist to modify the overall structure of conifer plantations through the Forest Design Plan process of Forest Enterprise, which should be supported.

Key nature conservation objectives

1 Encourage the diversification of conifer woodland by appropriate restocking and management for the benefit of wildlife, including the creation of a mosaic of age structure and species.

2. Encourage the creation and management of forest rides and glades to increase the diversity of vegetation and provide habitat for invertebrates

3. Encourage careful management of recreational use to prevent disturbance to wildlife.

4. Ensure that new planting is integrated with existing habitats and does not have an adverse effect on valuable features such as flushes, as part of a strategy for new planting within the Natural Area.

5.2.4 Species-rich grasslands

Status

The principal grassland interest in the Forest of Bowland relates to the enclosed northern hay meadows in the valleys and the limestone grasslands associated with the reef knolls of the Ribble Valley.

Old meadows and pastures which have not been intensively managed with fertilisers and herbicides are often rich in species of nature conservation interest. Although maintained by cutting or grazing, they are composed of wild flowers which form stable communities under traditional management practices. Herb-rich hay meadows have become increasingly scarce nationally. Around the fringe of the Forest of Bowland they appear to have persisted up to the 1950s. Since that time agricultural intensification has reduced the number of hay meadows to just a few isolated sites.

Herb-rich hay meadows are found in the limestone areas around Slaidburn, and along the river valleys of Tarnbrook and the Hindburn. There are also unimproved neutral hay meadows on the Bowland Fringe. Areas immediately adjacent to Bowland Fells are enclosed by stone walls, which become well maintained hedgerows within the valley bottoms and around settlements. Unimproved neutral pastures within the Natural Area are mostly found along river valleys notably the Wenning, Hodder and their tributaries, as well as other sites along the Tarnbrook and Wyre.

Limestone grasslands within the Natural Area occur in the Slaidburn and Clitheroe areas. The largest single area of limestone grassland is at Worsaw Hill near Clitheroe.

Road-side verges in Bowland can also be herb-rich and are important in providing a refuge for meadow and calcareous grassland flowers.

Characteristic wildlife

The meadows support a wide range of grasses together with wild flowers such as pignut, yellow rattle, great burnet, betony, common bistort, lady's mantle, knapweed, common spotted orchid, twayblade, ox-eye daisy and meadow buttercup. In wet areas, rushes, ragged-robin, meadowsweet, water avens, and sedges may grow. Less common species include melancholy thistle, globeflower, saw-wort and adder's-tongue fern. In the valleys, meadows are enclosed by hedgerows, in which oak, ash and alder are commonly present as hedgerow trees.

These herb-rich grasslands attract large numbers of butterflies and other insects, as well as breeding Curlews and other waders, whilst surrounding hedgerows in the valley bottoms support breeding pairs of linnet, bullfinch, yellow hammer and other species of farmland birds such as reed bunting (especially overgrown hedges associated with ditches).

Special species

The calcareous grasslands include a nationally scarce species of **eyebright *Euphrasia rostkoviana subsp. rostkoviana* and blue moor grass**, with **bird's eye primrose** in flushed areas. Hedgerows surrounding herb-rich pastures in the valley bottoms support breeding pairs

of **linnet, bullfinch** and **reed bunting** which are in decline nationally due to changes in farming practice and also the loss of habitat.

Protected sites

Many of the remaining examples are designated SSSI, including
Barn Gill Meadow
Bell Sykes Meadow
Clear Beck Meadows
Far Hole Meadow
Field Head Meadow
Langcliffe Cross Meadow
Myttons Meadows
New Ing Meadow
Standridge Farm Pasture
Tarnbrook Meadows

Current factors affecting the habitat

- **Lack of traditional management**: Traditionally meadows are grazed until late spring, then 'shut up' until late June or July when cutting takes place, followed by aftermath grazing. Only farmyard manure was used and this in limited quantity.

- **Agricultural improvement**: Many former herb-rich meadows and pasture have lost their species diversity and conservation value as a result of fertlizer and herbicide applications. Some have been reseeded. There are now a number of schemes offering financial incentives for farmers to continue traditional management, but support mechanisms available to farmers in Bowland have previously not provided sufficient payments to compensate for loss of production incurred through use of traditional methods.

Key nature conservation objectives

1. Maintain the current extent, range and diversity of species-rich semi-natural grasslands by encouraging sympathetic management of remaining examples and promoting the uptake of available support mechanisms.

2. Where appropriate encourage the restoration of species-rich grassland by linking and extending existing fragments.

3. Reconcile the interests of nature conservation and farming through the development of an integrated scheme for Bowland which leads to sustainable agriculure and the maintenance of more traditional management practices.

5.2.5 Rushy pastures

Status

The upland fringe areas support soils which are typically acid, coarse and loamy, often with impeded drainage. This poorer land has been converted to better grazing by drainage and the application of lime and fertilisers during more prosperous times, and has then been allowed to revert under harsher times, to rushy pasture. Their extent and condition therefore fluctuates. Species-poor rush-dominated marshy grassland is widespread on the lower fells and on outlying hills of the Forest of Bowland including Longridge Fell, Pendle Hill and Weets Hill. It is particularly abundant on the hills to the north and east of Slaidburn. Species-poor marshy grassland dominated by Purple Moor-grass is widespread on thin peat soils on the lower slopes and moors of the Bowland Fells. On lower ground, there are marshy pastures and occasional fen meadows.

Characteristic wildlife

On the periphery of the moorland, areas of reclaimed pasture are often dominated by rushes and Yorkshire fog. In other areas, wet ground is dominated by purple moor-grass. Localised areas are flushed and are often richer in species with sedges dominating. Marshy ground in the valleys include species such as marsh marigold, and there are also occasional fen meadows, which are botanically diverse.

Species-rich rush pastures may include cuckoo-flower, common marsh bedstraw, bog stitchwort, forget-me-not, ragged-robin, marsh pennywort, wild angelica and common spotted orchid. Within the uplands and on the upland fringe, marshy grasslands tend to be species-poor except in areas of base-rich flushing. Notable species-rich sites include Robert Hall Moor SSSI, which is particularly important for having a nationally uncommon purple moor-grass/blunt-flowered/ rush community, as well as sedge rich flushes with bird's eye primrose. In addition Pan Beck SSSI has a range of wetland communities.

These rushy pastures support a large number of insects, including many species of moths and flies. They also provide important breeding grounds for waders.

Special species

Important plant species occurring within the flushes and wet pasture include **bird's-eye primrose** and **pale forget-me-not**. Green figwort and the **narrow-leaved marsh orchid** are found in some fen meadows. However, the main importance of these areas is for waders. **Snipe, curlew** and **redshank** depend upon unimproved rough, wet ground, while lapwing requires a mosaic which includes unimproved and improved land. **Oystercatchers** are less dependent upon rough grazing, but are often found breeding on wet pastures, especially close to river tributaries.

Protected sites

Robert Hall Moor SSSI
Pan Beck Fen SSSI
Newby Moor SSSI
River Ribble (Long Preston Deeps) SSSI

Current factors affecting the habitat

- **Agricultural improvement**: Pasture improvement and the pushing back of the moorland edges has resulted in widespread landscape changes. Reductions in the proportion of wet, rough grazing fields, accompanied by increases in drier fields of a more uniform structure and composition, with higher numbers of stock and a more intensive management regime, have most likely had a significant impact on the population of breeding waders within the Forest of Bowland. Marshy grasslands continue to be threatened by attempts to drain them in order to improve their grazing quality. Heavy trampling by stock causes poaching of the ground which can lead to loss of plant species as well as damage to waders' nests. As in the case of the species-rich grasslands, there is a lack of support mechanisms to encourage appropriate management of these wet grasslands.

Key nature conservation objectives

1. Conserve rushy pastures of marginal land and damp fields of in-bye and unimproved grasslands, especially where they support breeding wader populations.

2. Reverse the trend for conversion of wet rough grazing pastures to drier fields of shorter uniform vegetation, by stopping up drains and reducing grazing pressure.

3. Ensure that no inappropriate tree planting is allowed in in-bye land.

4. Carry out surveys to record the extent and distribution of breeding wader populations, and their use of wet pastures, as input to a strategy for protecting important sites.

5.2.6 Rivers and water bodies

Status

Numerous rivers flow throughout the Natural Area, including the Hindburn, Roeburn, Lune, Hodder, Ribble, Calder and Wyre, together with their many tributaries. In many places, the rivers have developed steep banks and their inaccessibility has protected associated woodland and grassland from clearance and agricultural improvement. In addition to natural watercourses, there are a number of artificial water bodies. These range from large natural-looking lakes such as Stocks Reservoir and the one at Abbeystead to small upland valley reservoirs at Grizedale and the also the artificial lagoons at Barnacre, Barns Fold and Longridge.

Characteristic wildlife

Rivers make a significant contribution to the biological diversity of the area, supporting luxuriant bryophyte communities especially on river boulders, their banks and cliffs. The upper reaches of rivers and streams are oxygen-rich and pollution-free. These support a characteristic insect fauna including stonefly, blackfly, mayfly and caddis fly nymphs, as well as the species which feed on them. In particular fast flowing rivers provide a habitat for salmon, brown and sea trout whilst grayling and course fish populations are more typical of lower stretches especially those along the Rible, Calder, Wyre, Lune and Hodder, as well as some tributaries.

Characteristic bird species include **kingfisher, dipper**, grey wagtail, common sandpiper, **oystercatcher** and **ringed plover**. A number of reservoirs and disused gravel pits along the Wyre valley are also important as a habitat for breeding great crested grebe and wintering wildfowl, as well as **reed bunting** a species in decline nationally.

Barnacre Reservoirs near Garstang is important for breeding and wintering wildfowl and waders, whilst supporting important goosander and whimbrel roosts. Stocks reservoir is of very high value for breeding and wintering wildfowl and waders. Its draw-down zone supports nationally scarce plants, including **orange fox-tail**, **thread rush** and **mudwort**.

Special species

Upland streams have important bryophyte communities. **Thread rush** is a nationally scarce plant occurring around lake margins whilst **northern spike-rush** is an uncommon riverbank species. White-clawed crayfish occur in the calcareous waters of the Lune and Ribble catchments, whilst populations of the nationally scarce ground beetles ***Bembidion fluviatile, monticola*** and ***stomoides*** as well as the scarce river beetle ***Lathrobium angusticolle*** are present in undisturbed river sediments and areas of shingle. Streams and rivers also provide a habitat for **dippers** and **kingfishers** which breed in small numbers. These are found along the extensive river systems which hold good populations of prey species. Sand martins breed in river banks along the Lune. **Otters** are also present along rivers on the northern side of the Bowland Fells and also the upper catchment of River Ribble.

Protected sites

River Ribble (Long Preston Deeps) SSSI – wet rushy pasture.

Current factors affecting the habitat

- **Abstraction**: Bowland Fells are a major water catchment area; abstraction can affect the flow rate and levels of water in rivers downstream.

- **Pollution and Fertiliser run-off**: The plant and animal communities of open water habitats are strongly influenced by the nutrient status of the water. Changes in this status, usually by enrichment, leads to replacement of characteristic species and often reductions in species diversity. This is a particularly problem of lowland areas, where rivers run through intensive agricultural land or urban areas, but upland water bodies are particularly vulnerable because of their naturally low nutrient status.

- **Sheep grazing and erosion**: High stocking rates and the grazing of river banks have lead to degradation in the physical structure of river bank habitat and soil erosion. This has increased the silt loading for a number of rivers, increasing their erosive power resulting in the blanketing of fish spawning grounds with silt.

- **River engineering and bank management**: River management to improve channel flow and drainage can result in the loss of waterside vegetation and its associated fauna, as well as the loss of quiet shallow areas which are important for spawning fish. Care needs to be taken to minimise disturbance. Unofficial tipping to reinforce river banks has led to loss of habitat for breeding sand martins.

- **Recreation**: Recreational activities can cause disturbance to wildlife, in particular breeding birds which tend to avoid areas of water and stream banks regularly used for recreation.

Key nature conservation objectives

1. Maintain water quality and regulate the flow of rivers and streams, particularly those important for wildlife.

2. Encourage the sympathetic management of rivers and other watercourses to maintain and enhance their nature conservation interest, avoiding inappropriate bank treatment works and the removal of semi-natural vegetation.

3. Promote buffer zones along riversides to improve bank structure and alleviate the effects of agricultural run-off.

4. Promote the spatial and temporal zoning of recreational areas around reservoirs and rivers where there is public access, to minimize disturbance to waders, otters and flora.

Key wildlife conservation goals

Although key nature conservation objectives are given under each of the habitats covered above, this section combines these into six overall conservation goals for the Natural Area, to help prioritise action.

The key wildlife conservation goals (in no particular order) for the Natural Area are:

1. To retain or restore, as appropriate, the full diversity and extent of semi-natural habitat in the Natural Area. Particular attention and effort should be given to (again in no particular order):

    a) the maintenance of heather moorland and blanket bog, with restoration of degraded areas;
    b) the management of ancient woodlands, to ensure natural regeneration and replacement of introduced trees with native species;
    c) the maintenance and extension of the current extent, range of types and diversity of species-rich semi-natural grassland by encouraging the sympathetic management of the remaining examples;
    d) the maintenance of rushy pastures and damp unimproved grasslands which support wader populations, and their extension into improved areas;
    e) the maintenance of the quality and flow of rivers and streams, particularly those important for wildlife.
    f) the maintenance of geological features.

2. To maintain healthy populations of all internationally, nationally and regionally important breeding and wintering bird species using the Natural Area, and where appropriate to increase the size of these populations, by:

    a) the retention of extensive areas of open moorland as habitat for birds through appropriate management, in discouraging overgrazing, sympathetic burning regimes and the enhancing of areas of wet heath;
    b) the retention of existing areas of wet grassland and the expansion of this habitat through

habitat creation on adjacent land by stopping up drains, and establishing sympathetic management possibly through grant aid;

c) ensuring that protected species, especially raptors, remain free from persecution.

3. To ensure that recreational activity is effectively managed to minimal disturbance to wildlife, and preserve the conservation value of the Natural Area.

4. To promote interpretation of the landscape and wildlife so that local people and visitors are aware of the key interest and nature conservation priorities in the area.

5. To ensure that developments within the Natural Area do not conflict with wildlife and landscape features.

6. To maximise the potential for creation of geological exposures during mineral developments and to incorporate habitat creation schemes into site restoration works.

7. To ensure that habitat creation schemes do not result in the loss or degradation of any sites of conservation importance

8. To review the existing support mechanisms available for land management and ensure that they are sufficient to provide incentives to maintain traditional management. Promote the development of an integrated scheme for the Forest of Bowland which reconciles the interests of wildlife and farming leading to sustainable agriculture and the safeguard of nature conservation interests.

Acknowledgements

The text of this profile was written by Caroline Hallam, with the assistance of Rigby Jerram, under contract to the North West Team of English Nature, with input and advice from Jon Hickling, Conservation Officer for Lancashire.

We thank the following also provided invaluable assistance in the preparation of the draft Natural Area profile: Mark Beard, Heather Bingley, Kevin Page and Mike Bradburn of English Nature, Peter Jepson of Lancashire County Council, Kate Snow from North West Water, Tim Melling from RSPB, Amanda Elliott and Kate Cox of the Environment Agency, Kim Wisdom, Martyn Walker and Tim Mitcham from the Lancashire Wildlife Trust.

Representations on the draft profile were also received from the following organisations and individuals:

Countryside Commission
Duchy of Lancaster
Farming & Rural Conservation Agency (for MAFF Northern Region)
Forestry Authority (North West England Conservancy)
Forest Enterprise (Lakes Forest District)
Myerscough College
Ribble Valley Borough Council
The Honourable Ralphe Ashton

6. Bibliography

BROWN, A.F., & GRICE, P.V. 1993. Birds in England: context and priorities. Peterborough: *English Nature Survey Report*, No 62.

CHARLES, K. 1995. Ribble Otter Survey. Unpublished report by Environment Agency.

COOCH, S., & RODWELL, J. 1996. *A preliminary study of key issues in relation to Northern Hay Meadows*. Unit of Vegetation Science Report. Lancaster University.

DAYTON, N. 1997. Lancashire Neutral Grassland Survey 1997. Unpublished report for English Nature.

DAYTON, N., & T. RAFFERTY. 1997. A Management Plan for Pendle Common. Unpublished report for Lancashire County Council.

ENGLISH NATURE. 1994. Inventory of Ancient Woodlands (provisional) – Lancashire. L Phillips PM. Unpublished English Nature Report.

ENGLISH NATURE. 1995. Grassland Inventory, Lancashrie. Unpublished English Nature Report.

ENGLISH NATURE. 1995. Invertebrate Site Register: Summary Information: Lancashire. Unpublished report.

ENGLISH NATURE AND COUNTRYSIDE COMMISSION. 1996. Character of England: landscape, wildlife and natural features' map.

ENVIRONMENT AGENCY. 1998. Ribble Otter Survey. Kathrn Charles. English Nature unpublished report.

JEFFERSON, R. G. 1997. Lowland Grasslands in England. *English Nature Research Survey Report*, No. 171.

JNCC. 1992. Bowland Fells pSPA : Departmental Brief

JONES, M. 1990. Bird Species of County Importance in Lancashire: a contribution to the Lancashire Environmental Audit 1990. Unpublished report.

KELLY, P.G., & Harwood, T.R. 1993. *Wildlife Habitats in Lancashire*. Report of the Phase I Habitat Survey of Lancashire 1988 - 1992. Preston: Lancashire County Council.

KING, A., GLASSER, N., LARWOOD, J., LITTLEWOOD, A., MOAT, T., & PAGE, K. 1996. Earth Heritage Conservation in England: A Natural Area Perspective. *English Nature Research Reports*, No. 158.

LANCASHIRE COUNTY COUNCIL. 1991. Provisional Lancashire Red Data Book – Vascular Plants. Unpublished report. Preston: Lancashire County Council.

LANCASHIRE COUNTY COUNCIL. 1992. *'The Forest of Bowland Landscape'*

LANCASHIRE COUNTY COUNCIL. 1995. *'Forest of Bowland AONB Management Plan'*

LANCASHIRE COUNTY COUNCIL. 1990. *Lancashire, A Green Audit.* Preston: Lancashire County Council.

LANCASHIRE COUNTY COUNCIL. 1995. Lancashire County Heritage Sites Scheme: Biological Heritage Sites: Summary Listings. Unpublished LCC report.

LANCASHIRE ENVIRONMENT FORUM. 1993. *Lancashire Environment Action Programme.* A Local Agenda 21 for Lancashire. Preston: Lancashire County Council.

LANCASHIRE TRUST FOR NATURE CONSERVATION. Badger Survey 1984/85. Unpublished report.

LIVERMORE, L.A. 1987. *The flowering plants and ferns of North Lancashire.*

MOFFAT, A.M. 1997. Priorities for Habitat Conservation in England. *English Nature Research Survey Reports*, No. 97.

MORRIES, G. 1986. *Lancashire's Woodland Heritage.* Preston: Lancashire County Council.

NATURE CONSERVANCY COUNCIL. 1990. *'Rare Bryophytes in Lancashire'* M J Wigginton. Unpublished NCC.

NATURE CONSERVANCY COUNCIL. 1991. N W England Otter Survey. Cumbria and Lancashire 1984 - 1990. Unpublished NCC report.

NATURE CONSERVANCY COUNCIL. 1982. *Vegetation in British Rivers.* Vols I and II Haslam S M CST Notes No 32.

NATURE CONSERVANCY COUNCIL. 1987. *Invertebrate Site Register – Lancashire.* NCC Report by Mark Parsons.

NATURE CONSERVANCY COUNCIL. 1981. Woodland Survey of the Forest of Bowland. Unpublished Phase 2 Survey report of North West Region of NCC.

NEWMAN, J.R. 1998. A Botanical Survey of Limestone Grassland in Lancashire. Unpublished North West Region report of the Nature Conservancy Council.

NORTH WEST BIODIVERSITY FORUM. 1999. *Wild North West.* A North West Biodiversity Audit.

QUINN, J.L., & KIRBY, J.S. 1992. *An ornithological evaluationo f North West Water Reservoirs and implications for their future management.* Slimbridge: Wetlands Advisory Service Ltd.

RSPB. 1993. *Survey of breeding waders on agricultural land in the Forest of Bowland*

RSPB. 1998. *Survey of breeding waders on agricultural land in the Forest of Bowland.*

RSPB. 1990. Vulnerable bird species in Lancashire: a contribution to the Lancashire Environmental Audit 1990. Unpublished report.

RSPB. 1997. Surveys of selected species on North West Water Estate in the Forest of Bowland. Unpublished report.

SIVELL, L. 1998. Butterfly recording in Lancashire, Merseyside and Manchester. *Recording Report 1997*. Butterfly Conservation and Lancashire County Council.

SKELCHER, G. 1991. Ecological Survey of Red and Grey Squirrles at the Interface of their Present Ranges in North-West England. Interim Report. Unpublished report to Lancashire Wildlife Trust.

STEWART, A. 1994. Neutral Grassland Sites in Lancashire. Unpublished English Nature North West Region report.

STEWART, A., DONNISON, E., & DALTON, A. 1993. Woodland Surveys in North West England using the National Vegetation Classification. Unpublished English Nature report.

UK Biodiversity Steering Group 1995. Biodiversity: The UK Steering Group Report, Vols. 1 & 2. HMSO. London.

TAYLOR, I. 1986. A botanical survey of Mesotropic grassland in Lancashire. Unpublished North West Region Report of the Nature Conservancy Council.

TWIST, M. 1990. North West Otter Survey – Lancashire 1989-1990. Unpublished report to NCC.

UK BIODIVERSITY STEERING GROUP. 1995. *Biodiversity: The UK Steering Group Report, Vols 1 and 2.* London: HMSO.

UK BIODIVERSITY STEERING GROUP. 1998. *Tranche 2 Action Plans. Volume 1 – Vertebrates and Vascular Plants*. English Nature.

WAIN, M. 1997. The distribution of large heath butterfly in Lancashire. Unpublished report for the Lancashire Wildlife Trust.

WIGGINGTON, M.J. 1995. *Mosses and Liverworts of North Lancashire*. University of Lancaster.

Glossary

Biodiversity : The variety of life on Earth or any given part of it.

EC Birds Directive (79/409/EEC): This applies to birds, their eggs, nests and habitats. It provides for the protection, management and control of all species of naturally occurring wild birds in European territory, especially those species which are vulnerable and migratory as listed on Annex 4.1 and 4.2 of the Directive.

Endemic species: A species of plant or animal confined to a particular region and having, so far as is known, originated there.

Geological Conservation Review: A series of volumes published by the Joint Nature Conservation Committee, which reviews the current importance of key earth science sites in Great Britain.

Geomorphology: The study of the evolution of land forms or the arrangement and form of the Earth's crust.

Habitat: A place in which a particular plant or animal lives. Often used in a wider sense referring to major assemblages of plants or animals found together.

Habitats and Species Directive (92/43/EEC): This requires member states of the European Union to take measures to maintain or restore natural habitats and wild species at a favourable conservation status in the Community, giving effect to both site and species protection objectives.

Invertebrate Site Register: A database of invertebrate species of conservation importance and an evaluation of sites. Notable A known from 30 or fewer 10km squares; Notable B known from 100 or fewer 10km squares.

Nationally scarce species: A terrestrial species of plant or animal which occurs in between 16 and 100 ten km squares in Great Britain. Or, a marine species which occurs in between 9 and 55 of the ten km squares within the three mile limit of territorial seas for Great Britain.

Nationally rare species: A terrestrial species of plant or animal which occurs in 15 or less ten km squares in Great Britain. Or, a marine species which occurs in eight or fewer ten km squares within the three mile limit of territorial seas for Great Britain.

Red Data Book: Catalogues published by the International Union for the Conservation of Nature (IUCN) or by national authority listing species which are rare or in danger of becoming extinct either nationally or globally.

SSSI - Site of Special Scientific Interest: An area of land notified by English Nature under the Wildlife and Countryside Act 1981 (as amended) as being of special nature conservation interest.

Annex 1: Key species

Table 2 lists species which may be regarded as **key species** for the Forest of Bowland Natural Area which are a priority for action.

Table 2. Key species for conservation attention in the Forest of Bowland Natural Area

Common name	Latin name	Reasons for selection	Primary habitat in the NA
Otter	*Lutra lutra lutra*	UK, Globally threatened	River
Red Squirrel	*Sciurus vulgaris*	UK, Nationally threatened	Woodland
Black Grouse	*Tetrao tetrix*	RDB	Heather moorland Blanket bog
Curlew	*Numenius arquata*	RDB	Rushy pasture
Dipper	*Cinclus cinclus*	Candidate RDB	Upland streams
Golden plover	*Pluvialis apricaria*	RDB	Heather moorland
Hen Harrier	*Circus cyaneus*	RDB	Heather moorland
Kingfisher	*Alcedo attthis*	Candidate RDB Internationally threatened	Rivers
Lapwing	*Vanellus vanellus*	UK, declining nationally	Rushy pasture
Lesser black-backed Gulls	*Larus fuscus*	Internationally threatened	Heather moorland
Linnet	*Carduelis cannabina*	UK declining nationally	Conifer plantation
Bullfinch	*Pyrrhula pyrrhula*	UK declining nationally	Woodland, hedgerows
Reedbunting	*Emberiza scoeniclus*	UK declining nationally	Hedgerows water bodies
Merlin	*Falco columbarius*	Internationally threatened RDB	Heather moorland
Oystercatcher	*Haematopus ostralegus*	RDB	Flushes, wet pasture Upland streams
Peregrine	*Falco peregrinus*	Internationally threatened RDB	Heather moorland
Red Grouse	*Lagopus scoticus*	Internationally threatened RDB	Heather moorland
Redshank	*Tringa totanus*	RDB	Rushy pasture
Ring Ouzel	*Turdus torquatus*	Candidate RDB	Crags, Clough woods
Ringed plover	*Charadrius hiaticula*	RDB	Watercourses, rivers
Short-eared owl	*Asio flammeus*	RDB	Moorland/marginal hill land

Common name	Latin name	Reasons for selection	Primary habitat in the NA
Skylark	*Alauda arvensis*	UK declining nationally	Rough grassland
Snipe	*Gallinago gallinago*	RDB	Rushy pasture
Songthrush	*Turdus philomelos*	UK declining nationally	Hedges, woodland edge
Spotted Flycatcher	*Muscicapa striata*	UK declining nationally	Woodland
Wheatear	*Oenanthe oenanthe*	UK declining nationally	Moorland
Whinchat	Saxicola rubetra	UK declining nationally	Bracken, scrub woodland on moorland
White-clawed Crayfish	*Austropotamobius pallipes*	UK Globally threatened	Rivers and streams
Beetle	*Atomaria clavigera*	Notable	Rivers
Beetle	*Bembidion fluviatile*	Notable	Watercourses, rivers
Beetle	*Bembidion monticola*	Notable	Watercourses, rivers
Beetle	*Bembidion stomoides*	Notable	Watercourses, rivers
Beetle	*Lathrobium angusticolle*	RDB	Watercourses
Beetle	*Epurea angustula*	Nationally scarce	Woodlands
Crane fly	*Ctenophora nigricornis*	RDB	Woodland
Crane fly	*Limnophila fasciata*	RDB	Moorland/sphagnum flushes and mossy stream margins
Glass snail	*Vitrea subrimata*	Nationally scarce	Moorland/sphagnum flushes and mossy stream margins
Large heath butterfly	*Coenonympha tullia*	Regionally scarce	Blanket bog
Small chocolate tip moth	*Clostera pigra*	Nationally scarce	Woodland
Eyebright	*Euphrasia rostkoviana subsp. rostkoviana*	Nationally scarce	Limestone grassland
Bird's Eye Primrose	*Primula farinosa*	Nationally scarce	Flushes
Blue Moor Grass	*Seslaria caerulea*	Nationally scarce	Limestone grassland
Cotton Grass	*Eriophorum latifolium*	Nationally scarce	Blanket bog
Marsh Gentian	*Gentiana pneumonanthe*	Nationally rare	Wet heathland
Narrow-leaved Marsh Orchid	*Dactylorhiza traunsteineri*	Nationally scarce	Fen
Northern Spike-rush	*Eleocharis austriaca*	RDB	Lake margins

Common name	Latin name	Reasons for selection	Primary habitat in the NA
Pale forget-me-not	*Myosotis stonlonifera*	Nationally scarce	Moorland
Thread Rush	*Juncus filiformis*	Nationally scarce	Lake margins
Wood Barley	*Hordelymus europaeus*	Nationally scarce	Ancient woodland
Rigid Buckler Fern	*Dryopteris montana*	Nationally scarce	Moorland screes
Liverwort	*Haplomitrium hookeri*	Internationally threatened	Flushes
Liverwort	*Jungermannia paroica*	Internationally threatened	Streams
Liverwort	*Plagiochila spinosa*	Internationally threatened	Woodland
Liverwort	*Lophocolea fragrans*	Internationally threatened	Woodland
Liverwort	*Hygrobiella laxifolia*	Internationally threatened	Streams
Moss	*Andreaea mutabilis*	pRDB	Acid rocks
Moss	*Weissia rostellata*	pRDB (d)	Reservoirs/ponds
Moss	*Physcomitrium sphaericum*	pRDB	Pond edges
Moss	*Splachum ampullaceum*	Internationally threatened	Blanket bog
Moss	*Hygrohypnum luridum*	pRDB	Streams

Key: RDB = Listed in British Red Data Book
UK = Key species in UK Biodiversity Action Plan

Annex 2: Latin names of species mentioned in the report

Common Name	Latin Name
*A*dder's-tongue fern	*Ophioglossum vulgatum*
Alder	*Alnus glutinosa*
Ash	*Fraxinus excelsior*
Ash-grey slug	*Limax cinereoniger*
Badger	*Meles meles*
Beetle	*Atomaria clavigera*
Beetle	*Bembidion fluviatile*
Beetle	*Bembidion monticola*
Beetle	*Bembidion stomoides*
Beetle	*Lathrobium angusticolle*
Beetle	*Epura angustula*
Beech	*Fagus sylvatica*
Beech fern	*Phegopteris connectilis*
Betony	*Stachys officinalis*
Bilberry	*Vaccinium myrtilis*
Bird cherry	*Prunus padus*
Bird's-eye primrose	*Primula farinosa*
Black grouse	*Tetrao tetrix*
Blackbird	*Turdus merula*
Black-headed gull	*Larus ridibundus*
Bluebell	*Hyacinthoides non-scriptus*
Blue moor grass	*Seslaria caerulea*
Blunt-flowered rush	*Juncus subnodulosus*
Bog mosses	*Sphagnum species*
Bog pimpernel	*Anagallis tenella*
Bog rosemary	*Andromeda polifolia*
Bog stitchwort	*Stellaria alsine*
Bracken	*Pteridium aquilinum*
Broad buckler fern	*Dryopteris dilatata*
Broad-leaved cottongrass	*Eriophorum latifolium*
Bugle	*Ajuga reptans*
Bullfinch	*Pyrrhula pyrrhula*
Chaffinch	*Fringilla coelebs*
Chickweed wintergreen	*Trientalis europea*
Cloudberry	*Rubus chamaemorus*
Coal tit	*Parus ater*
Common bistort	*Polygonum bistorta*
Common cottongrass	*Eriophorum angustifolium*
Common marsh bedstraw	*Galium palustre*
Common sandpiper	*Actitis hypoleucos*
Common spotted orchid	*Dactylorhiza fuchsii*
Crane fly	*Ctenophora nigricornis*
Crane fly	*Limnophila fasciata*
Crossbill	*Loxia curvirostra*

Common Name	Latin Name
Cuckoo-flower	*Cardamine pratensis*
Curlew	*Numenius arquata*
Dipper	*Cinclus cinclus*
Dog's mercury	*Mercurialis perennis*
Downy oat grass	*Avenula pubescens*
Enchanter's nightshade	*Circaea lutetiana*
Eyebright species	*Euphrasia rostkoviana subsp. rostkoviana*
Fir clubmoss	*Huperzia selago*
Forget-me-not	*Myosotis species*
Fox	*Vulpes vulpes*
Glass snail	*Vitrea subrimata*
Globeflower	*Trollius europaeus*
Goldcrest	*Regulus regulus*
Golden Plover	*Pluvialis apricaria*
Goshawk	*Accipiter gentilis*
Grasshopper warbler	*Locustella naevia*
Great burnet	*Sanguisorba officinalis*
Great crested grebe	*Podiceps cristatus*
Great horsetail	*Equisetum telmateia*
Great spotted woodpecker	*Dendrocopus major*
Great wood-rush	*Luzula sylvatica*
Green figwort	*Scrophularia umbrosa*
Grey wagtail	*Motacilla cinerea*
Hare's tail Cottongrass	*Eriophorum vaginatum*
Hawthorn	*Crataegus monogyna*
Hayscented buckler-fern	*Dryopteris aemula*
Hazel	*Corylus avellana*
Heath rush	*Juncus squarrosus*
Heather	*Calluna vulgaris*
Hen harrier	*Circus cyaneus*
Holly	*Ilex aquifolium*
Jointed rush	*Juncus articulatus*
Kestrel	*Falco tinnunculus*
Kingfisher	*Alcedo attthis*
Lady's-mantle	*Alchemilla species*
Lapwing	*Vanellus vanellus*
Large heath butterfly	*Coenonympha tullia*
Lesser black-backed gull	*Larus fuscus*
Lesser hairy-brome	*Bromus benekenii*
Lesser twayblade	*Listera cordata*

Common Name	Latin Name
Linnet	*Carduelis cannabina*
Marsh gentian	*Gentiana pneumonanthe*
Marsh hawk's-beard	*Crepis paludosa*
Marsh pennywort	*Hydrocotyle vulgaris*
Mat grass	*Nardus stricta*
Meadow buttercup	*Ranunculus acris*
Meadow oat grass	*Avenula pratensis*
Meadow pipit	*Anthus pratensis*
Meadowsweet	*Filipendula ulmaria*
Melancholy thistle	*Cirsium helenioides*
Merlin	*Falco columbarius*
Narrow-leaved marsh orchid	*Dactylorhiza traunsteineri*
Nightjar	*Caprimulgus europaeus*
Northern spike-rush	*Eleocharis austriaca*
Norway spruce	*Picea abies*
Oak fern	*Gymnocarpium dryopteris*
Opposite-leaved golden saxifrage	*Chrysosplenium oppositifolium*
Ox-eye daisy	*Leucanthemum vulgare*
Oystercatcher	*Haematopus ostralegus*
Pale forget-me-not	*Myosotis stolonifera*
Pendulous sedge	*Carex pendula*
Peregrine	*Falco peregrinus*
Perennial rye grass	*Lolium perenne*
Pied flycatcher	*Ficedula hypoleuca*
Pignut	*Conopodium majus*
Pondweeds	*Potamogeton species*
Primrose	*Primula vulgaris*
Purple moor-grass	*Molinia caerulea*
Ragged Robin	*Lychnis flos-cuculi*
Ramsons	*Allium ursinum*
Reed bunting	*Emberia schoeniclus*
Red grouse	*Lagopus scoticus*
Red squirrel	*Sciurus vulgaris*
Red-breasted merganser	*Mergus serrator*
Redshank	*Tringa totanus*
Redstart	*Phoenicurus phoenicurus*
Rigid buckler fern	*Dryopteris submontana*
Ring ouzel	*Turdus torquatus*
Ringed plover	*Charadrius hiaticula*
Roe deer	*Capreolus capreolus*
Rowan	*Sorbus aucuparia*
Sand martin	*Riparia riparia*

Common Name	Latin Name
Saw-wort	*Serratula tinctoria*
Scottish filmy-fern	*Hymenophyllum wilsonii*
Sedges	*Carex species*
Sessile oak	*Quercus petraea*
Sharp-flowered rush	*Juncus acutiflorus*
Sheeps rorrel	*Rumex acetosella*
Short-eared owl	*Asio flammeus*
Siskin	*Carduelis spinus*
Sitka spruce	*Picea sitchensis*
Skylark	*Alauda arvensis*
Small chocolate tip moth	*Closters pigra*
Snipe	*Gallinago gallinago*
Soft rush	*Juncus effusus*
Songthrush	*Turdus philomelos*
Sparrowhawk	*Accipiter nisus*
Spotted flycatcher	*Muscicapa striata*
Stag's horn clubmoss	*Lycopodium clavatum*
Sycamore	*Acer pseudoplatanus*
Tawny owl	*Strix aluco*
Thread rush	*Juncus filiformis*
Tree pipit	*Anthus trivalis*
Twayblade	*Listera ovata*
Water avens	*Geum rivale*
Wavy hair grass	*Deschampsia flexuosa*
Wheatear	*Oenanthe oenanthe*
Whimbrel	*Numenius phaeopus*
Whinchat	*Saxicola rubetra*
White-clawed crayfish	*Austropotamobius pallipes*
Whitethroat	*Sylvia communis*
Wild angelica	*Angelica sylvestris*
Willow warbler	*Acrocephalus trochilus*
Wood anemone	*Anemone nemorosa*
Wood barley	*Hordelynus europaeus*
Wood fescue	*Festuca altissima*
Woodcock	*Scolopax rusticola*
Woodruff	*Galium odoratum*
Wood-sorrel	*Oxalis acetocella*
Woodwarbler	*Phylloscopus sibilatrix*
Yellow archangel	*Galeobdolon luteum*
Yellow pimpernel	*Lysimachia nemorum*
Yellow rattle	*Rhinanthus minor*
Yellow-necked mouse	*Sylvaemus flavicollis*
Yellow star-of-Bethlehem	*Gagea lutea*
Yorkshire fog	*Holcus lanatus*