

Habitat Action Plan Annexes

Project Background and Overview

Habitat Action Plans have been prepared in two tranches with the second tranche being published in 1999. Plans vary in the degree of detail they contain, the second tranche having more than the first, but both follow a common format that includes an Introduction followed by sections for Targets and Actions. While this review is primarily about the targets, it is also an opportunity to look at the plans overall, to make sure they reflect contemporary understanding of the habitats, and also provide an appropriate context for the revised targets.

English Nature is lead agency for four wetland HAPs. These are: Lowland Raised Bogs, Fens, Reedbeds, and Coastal and Floodplain Grazing Marsh. These habitats may occur in wetlands singly or together, or in association with the 'wet' end of predominantly dry habitats, such as woodlands, grasslands, heathlands and coastal dunes. They also interface with the saline wetlands at the coast and with the uplands, in which the types identified in the lowlands are merged under broader upland categories.

The ten years since the publication of the second tranche of HAPs has been marked by advances in our approach to conservation. Although statutory designation is still site based, there is much greater consideration of landscape-scale issues, how the habitats occur within mosaics, successions in vegetation, and the way in which animal species are dependent on a mosaic rather than single habitats, and how we respond to climate change and sea level rise.

Planning for the implementation of the Water Framework Directive and the Review of Consents under the Habitats Directive has promoted a much more functional view of wetlands, based on aquifers, aquicludes, and the primary sources of water. This is soon to be published as the Wetland Framework and will feed into the more practically-focused Ecohydrological Guidelines¹. Progress has also been made with the definition of hydrologically important land around lowland bogs² and basin fens³ and with the recognition of bog extent and quality using satellite images.

The targets review must take account of these changes in thinking. It builds on the outcomes from the first set of targets and actions, in that it is possible to refer with greater confidence to what is needed on individual or groups of sites, especially where information has been collated such as through the first set of targets in the Lowland Raised Bog HAP. Though the numerical targets must be simply stated as area to be improved under the headings of 'maintain', 'achieve condition', 'restoration' or 'expansion', it is now possible to add site and geographical detail through descriptive annexes, and make links between plans. It becomes easier to identify where the large-scale wetlands should be, to give the greatest conservation gain. The information presented in these annexes has benefited greatly from a suite of local and regional visions already available, and will do so even more when those in production are completed. The scope of the analysis which follows is currently confined to England only.

Project Objectives

The project provides a series of amended targets for the HAPs for Lowland Raised Bog, Fen, Reedbed and Coastal and Floodplain Grazing Marsh. The targets are supported with maps and text indicating priority areas for each habitat, and site detail for lowland raised bogs in England. The information is provided to assist with five main lines of HAP implementation:

- Water regulation (consenting discharges and abstractions, flood alleviation).

¹ B.D. Wheeler, D.J.G. Gowing, S.C. Shaw, J.O. Mountford, and R.P. Money, 2004. Ecohydrological Guidelines for Lowland Wetland Plant Communities (Eds. A.W. Brooks, P.V. Jose, and M.I. Whiteman,). Environment Agency (Anglian Region).

² Milton, E.J, Hughes, P.D, Anderson, K, Schultz, J, Lindsay, R, K, (2005) Report 366 Remote Sensing of Bog Surfaces, JNCC.

³ G. Hawley, S. Ross, S. Shaw, K. Taylor, B. Wheeler and P. Worrall, 2005. Nutrient enrichment of basin fens: options for remediation. *English Nature Research Report*, No.610

- Town & Country Planning (Spatial Ecological Frameworks, Minerals Plans).
- Agri-environment (targeting of schemes to achieve favourable condition).
- Design and implementation of Local BAPs.
- The inspiration and guidance of statutory and non-statutory conservation bodies.

Project Outputs

Lowland Raised Bog

Purpose of LRB Annex

Lowland raised bogs have developed over a very long period of time. Without the careful artificial management of surface water as practised today, it is possible that new bogs could develop within wetland areas. However, drainage and flood control generally make the conditions unsuitable, and opportunities for the improvement of the resource are restricted to where such peat has accumulated in the past.

This is why the HAP for lowland raised bog has included targets for producing lists of sites in particular condition categories, and others that required detailed plans to be drawn up for remediation. The compilation of the lists has been accompanied by the collection of much site-specific information, to the extent that it is possible to provide a much more detailed picture of what needs to be done to meet BAP targets in England.

The annex makes the information available to those individuals or organisations in a position to take positive BAP action. The spreadsheet information is supplemented with maps providing a contextual portrayal of the English resource within a number of geographical groupings. These sometimes have a common historical and geomorphological thread, such as those that developed on the floodplain of the River Mersey, many at the beginning of the Atlantic Period of the Holocene. Other groupings have simply adopted a descriptive term, but have few common threads in their development. In all cases, the groupings are provided to indicate a degree of distinctiveness and linkage with particular regions and/or past developmental episodes to underpin the concept of a national series, made up of good quality representatives within each geographical grouping.

Rationale for Site Selection

The rationale for England, based on achieving favourable condition on quality representatives within each geographical grouping, is similar to that used in the selection of Sites of Special Scientific Interest, and Special Areas of Conservation. It aims to include adequate geographical representation from across the whole of the country, irrespective of whether the precise nature of the geographical differences is currently known.

LRB Site Dossier

The spreadsheet is derived from one prepared for English sites under HAP target 4.1.3 (target citation relevant prior to 2005 review). It prioritises sites listed in the FenBase 6 database according to their condition class, and brings together information, for example, about extant planning consents for peat extraction and opinions about the type of management required to restore them as lowland raised bogs.

Key Annex Outputs

The key outputs for England are:

- A spreadsheet providing details of each LRB.
- Maps of lowland raised bog sites within named major groupings.
- Priority sites identified within major groupings.
- Clusters of sites with potential for additional wetland creation within NW Vision⁴.

Major LRB Groupings for Action

⁴ Developing a strategic approach to wetland conservation in the lowlands of the north west of England: a pilot study in three Natural Areas. Penny Anderson Associates, 2004, for English Nature.

The distribution map of lowland raised bog sites from FenBase 6 shows how LRBs are concentrated within certain parts of England. The north west is particularly well-endowed, where the bogs are concentrated on floodplains, around estuaries and occasionally over isolated basins within otherwise contrasting types of topography. There are parts of the country where peat bogs were once an important component of the lowland landscape, such as in Merseyside, Greater Manchester, the Lancashire Plain and the Cumbrian fringe, and others where they were more scattered. The total resource is a mix of condition categories, from slightly damaged to those that have been converted to agricultural use and present a particular challenge for restoration.

The strategy for action is twofold. It aims to restore appropriate areas of sustainable bog in its former heartlands, and also improve the condition of outliers, providing an important facet to the natural character of each region, though dominated by other types of habitat. While this might seem to be a catch-all approach, it does provide a framework for prioritisation. For example, it advocates the restoration of the hydrological integrity of some fragmented bog complexes in the heartlands – rather than all – and makes sure that those standing alone, separated from the large complexes by several tens of kilometres, are also improved for the benefit of a country-wide network and for favourable conservation status of the habitat.

Hydrological sustainability is important for all bogs, and adequately wet conditions need to be provided around the edges of all examples. There is more opportunity for new wetland creation within larger bog complexes when bringing neighbouring bog fragments into remedial management than for isolated examples.

The differences between wetland types recognised in classification schemes are often fuzzy rather than distinct. This is particularly true of the distinction between lowland raised bogs and transition mires, so that some sites appear on lists of lowland raised bogs and of transition mires with equal validity. Some of the lowland raised bogs included on these maps may be more appropriately included in the transition mire category, and hence fall within the Fen HAP, or in the Upland HAPs when above about 300 m in altitude or the upper limit of agricultural enclosure. The zoning used on the maps is influenced by the position of sites that are unequivocally lowland raised bog, and not by the transitional wetlands. The edge of each major grouping on the map is very approximate, and simply encompasses land within which the sites are clustered. No tests for randomness have been used to establish the validity of the clusters, and they simply provide a manageable break down of the English raised bog resource, referring as they do to geographical and hydro-morphological features.

It is tempting to also indicate where sites come together in a way that might allow for the establishment of common sustainable hydrology. The use of the JNCC's method for determining Hydrological Protection Zones is still in its infancy, so it is not yet possible to make anything other than inspired guesses for most sites as to whether there is hydrological connectivity within clusters. Generic buffer zone widths have been used by Penny Anderson Associates in their Vision for Wetlands in the Northwest of England, and these have been transposed onto the maps.

HAP Annex Map Reference	Major grouping	Joint Character Area	Rationale
1.	Cheviot Fringe Mosses	Cheviot Fringe. Northumberland Sandstone Hills	A small cluster in the rain-shadow of the Cheviot Hills.

2.	South Solway Estuarine Mosses	Solway Basin	Mainly comprised of the four large cSAC Mosses, but also including a few smaller ones, such as Oulton Moss formed over smaller basins, and needing to achieve favourable condition. Hydrological connectivity is only likely to be valid for Bowness Common and Glasson Moss.
	Solway Lower Catchment Mosses	Solway Basin	These are at a lower altitude than those of the Upper Catchment and are scattered amongst an undulating topography. The largest area of contiguous peat is Solway Moss (undesignated) and its quasi-contiguous smaller sites.
	Solway Upper Catchment Mosses	Solway Basin	Dominated by the two large sites, Bolton Fell Moss and Walton Moss. Conceptually close to blanket mire, where peat forms over a sloping terrain as well as on plateaux and in basins. Known as Intermediate Mire.
3.	North East Pennine Fringe Mosses	South east Northumberland Coastal Plain	The only surviving example is Prestwick Carr.
4.	West Cumbrian Coastal Fringe Mosses	Western Cumbria Coastal Plain.	Scattered examples in a variety of topographical situations, but primarily within glacial outwash deposits. Important as individual representatives of LRB, and Black Moss, Egremont is a prime example.
5.	South Cumbrian Estuarine and Floodplain Mosses	West Cumbria Coastal Plain, South Cumbria Low Fells, Morecambe Bay Limestones.	These bogs are formed along topographically constrained estuaries and floodplains close to the estuaries. The main series in which bog peat is sometimes contiguous are: Duddon Mosses (SAC), Rusland Valley Mosses, Roudsea Mosses (SAC), Witherslack Mosses (SAC) and the Lyth Valley Mosses, most of which have been claimed for agriculture.
6.	Yorkshire Dales Mosses	Yorkshire Dales	The extant examples are at the upper altitudinal limit within which lowland raised bog is recognised. They include Tarn Moss, Malham (within the Craven Limestone Complex SAC), and Swarth Moor.
7.	North Lancashire Plain Mosses	Lancashire & Amounderness Plain, north.	The original LRB resource is probably more diminished here than in any other part of England. The only large remaining example is Winmarleigh Moss, augmented by the much smaller (though once extensive) Heysham Moss, and the very small Fenton Cottage remnant. Rehabilitation of these peatlands should centre on

			Winmarleigh Moss.
8.	Alt carr Coastal Plain Mosses	Sefton Coast	Another very large area of fen carr and raised bog peat in former Lancashire, now almost totally lost. Focus rehabilitation on the small remnants.
	Mersey Floodplain Mosses (Merseyside)	Lancashire & Amounderness Plain, south	Still some large extant areas of LRB peat, but most under peat extraction and others severely drained and consequently dry. Use the Simonswood complex as the centre for restoration.
	South Pennine Fringe Outwash Mosses (North)	Lancashire Coal Measures, Shropshire, Cheshire and Staffordshire Plain.	Isolated but once extensive Mosslands formed on watersheds, plains and hollows within a topography formed from Post Glacial outwash and downwasting ice. Includes Red Moss. Lindow Moss and Danes Moss. Ashton Moss is severely affected by built development.
9.	Mersey Floodplain Mosses (Manchester)	Lancashire Coal Measures	Historically, some very large extents of LRB peat, many small remnants surviving, but need bringing together in hydrologically sustainable groups, such as Chat Moss and Risley Moss.
	South Pennine Fringe Outwash Mosses (north, south and central)	Lancashire Coal Measures, Shropshire, Cheshire and Staffordshire Plain.	Isolated but once extensive Mosslands formed on watersheds, plains and hollows within a topography formed from Post Glacial outwash and downwasting ice. Includes Red Moss. Lindow Moss and Danes Moss. Ashton Moss is severely affected by built development.
10.	Humberhead Mosses	Humberhead Levels	Two very large sites and two small outliers. The former now under conservation management, but all the bog edges require attention.
11.	Shropshire Mosses	Shropshire, Cheshire and Staffordshire Plain.	The Fenn's & Whixall Mosses SAC is the largest example in the group and the potential for improvement in this area beyond the National Nature Reserve lies more with lagg fen.
12.	Fenland Mosses	The Fens	Holme Fen, a former LRB, is the only large extant area of raised bog peat Restoration work has already commenced with the diversion of 2 of the 4 large ditches dividing and draining the bog.
13.	Somerset Mosses	Somerset Levels & Moors	The proportion of LRB to fen peat is low, and this limits the potential for bog rehabilitation. Options have been described in the report "Somerset Levels, bogs and fens: assessing the potential for restoration" PAA for EN 2002.

Fen

Purpose of Fen Annex

The Fen HAP includes all types of freshwater fen in the lowlands, excluding only those largely strongly dominated by reed and of recognised avifaunal potential or interest. In nature, it is made up of very diverse sub-categories. It is important for the UKBAP to recognise this and ensure that all types of fen are adequately conserved. The Fen Annex provides dot maps of amalgamated sub-categories, and shows that each is not distributed randomly throughout England. For example, the distribution of rich fen fed by groundwater follows geological features made up of (mostly) calcareous rocks or fragments, and where aquifers within the deposits discharge.

English Regional Government provides the focus for influencing some of the activities through which fens are affected. Others include catchments, Joint Character Areas, and Local BAP areas. It is important for those concerned with an area, however defined, to know about its characteristics and potential. The necessary information is provided by these maps, in conjunction with the publication "Getting Wetter for Wildlife".

Rationale for Site Selection and Fen Sub-Types

Priority sites for action in England were listed within the 1997 review document "Fen Action Plan: Prioritisation of sites requiring restoration" (Shaw & Wheeler, 1997). Site information was added to FenBase, a database developed by Dr Bryan Wheeler at the University of Sheffield using Microsoft Access, and attribute scores used to generate priority rankings. The strength of the approach lies in the ability to change attribute inclusion and weighting, but perhaps the weakness is being able to have the confidence that the output is the right one under all circumstances. The report also contains much useful site-specific detail about the management required. This report is the nearest the process has got to a list of sites requiring management in England. It concentrates on sites already designated as Sites of Special Scientific Interest, and thus already targeted by English Nature under the Public Services Agreement to bring 95% of SSSIs into favourable (or unfavourable recovering) condition by 2010.

The maps in this Annex do not identify sites. Rather, the distribution of sites of known fen type, as deduced from the recorded NVC plant communities, are used to pick out areas that are particularly important for that type of fen. Also, which areas are particularly important for fen overall. For example, Cumbria, Norfolk, the West Midlands, Hampshire, Surrey, Dorset and the West Country are all exceptionally important for fen, and it is possible to say what type of fen each is particularly renowned for.

The groundwater-fed fens are restricted to a relatively small area, as shown by the clusters. A number of inferences can be drawn, not least, that it is important to conserve these features where they occur, as there is no widespread potential for them. Conversely, the eutrophic fen is widely distributed along rivers and associated floodplains, and there is a widespread potential to create more of them. Even so, the map shows areas such as the Fens, where eutrophic fen might be expected, but is largely absent as far as recognised 'sites' are concerned.

Sites should be prioritised for action according the rarity and specificity of what they have potential to support, the quality of what they already have, and what opportunities exist for action.

Major Fen Groupings for Action

The diversity of fen types stems from such factors as topography, geology, climate and hydrology. The distribution of the factors clusters geographically, and consequently there is a similar clustering of fen types. For example, tall fen dependent on a high nutrient input is likely to be found alongside the lower reaches of rivers and interfacing with saltmarsh. Spring fens occur where aquifers discharge to the land surface.

The description of fen HAP targets needs to take account of geographical variability, so that Government Regions and LBAPs know why their area is notable for fens, and can concentrate on restoring or creating what is most appropriate.

The following distribution maps of existing sites are constructed from the locations of known sites listed on FenBase. They are sifted and selected according to the NVC plant communities accredited to them, and the most likely fen type affinities of those communities. The NVC records do not exist for all sites, and a proportion is likely to be incorrect, so the maps are indicative rather than totally complete and accurate.

The distribution maps are presented on an overlay of Regional and LBAP boundaries, and a summary table is supplied to indicate what is particularly important in a given area.

The principles on which SSSIs were selected also have to be considered. Although a particular part of the UK may contain a large proportion of the total resource, and is therefore extremely important for it, outliers of other wetland types for which the area is not noted are also valuable, as representative of possible local variation in the type. So, it is important to understand why an area is notable and where the major effort should be focused; also, when something unusual to the area is encountered, so that it can be appropriately valued and conserved.

		Poor Fen		Rich Fen		Eutrophic Fen
		Sub-Type 1: Sumps & hollows	Sub-Type 2: Ground water fed	Sub-Type 3: Ground water fed	Sub-Type 4: Petrifying springs	Sub-Type 5: Eutrophic fen
Cumbria	Upland	✓	✓	✓	✓	
	Lowland	✓	✓	✓	✓	
West Midlands		✓				
North East		✓		✓		
Norfolk		✓		✓		✓
Surrey Heaths		✓	✓			
New Forest		✓	✓	✓		
Dorset		✓	✓	✓		
Devon/Cornwall		✓	✓	✓		
Yorkshire Dales		✓	✓	✓		
White Peak				✓	✓	
Norfolk/Suffolk coast						✓

Inclusion as ✓ within the table means that a significant element of the resource is found in this geographical area. It highlights the fact that several parts of England are not listed at all – much of the south east, including Essex, and that part known as the Fens, but particularly lacking in contemporary fen. There is a general scattering of tall eutrophic fen throughout the country, following river floodplains, and this is a general characteristic of most areas.

There is a surprising lack of eutrophic fen around the coast (including reedbed) with the exception of Norfolk and Suffolk. It is not clear whether this is a function of how data has been collected for FenBase, or if it is real. It would normally be expected in all flat estuarine areas, and it is of some concern that Alverstone Marshes in the Isle of Wight is not included. The site has a large extent of eutrophic fen. It is possible that the niche naturally occupied by fen has been converted to grazing marsh on many sites. Such known omissions raise the possibility of others, though FenBase 6 still provides a good estimate of how fen types are distributed

⁵ Fens can be subdivided in many ways, but here they are split according to pH, base status, and nutrient status. They are further split on whether the water supply determining the type of fen is from groundwater (seepages, springs), or from ponded up surface water (sumps and hollows). The eutrophic category can cut across all types, but under natural circumstances are mostly associated with the lower reaches of river floodplains and the coastal interface.

around the country. It should also be pointed out that the occurrence of a fen type away from its main centre of distribution is also of considerable interest, and should be valued.

The maps and tabulation show that certain parts of the country are important for certain types of fen and these should become a priority in the achievement of HAP targets:

- New Forest – base-rich and acidic groundwater-fed fen.
- Dorset – base-rich and acidic groundwater-fed fen.
- Cumbria – base-rich and acidic groundwater-fed fen and basin fens.
- Devon and Cornwall – base-rich and acidic groundwater-fed fen and basin fens.
- North Norfolk – base-rich and acidic groundwater-fed fen.
- White Peak – base-rich groundwater-fed fen and petrifying springs.
- Norfolk and Suffolk coast – eutrophic tall herb fen.

Key Annex Outputs

The key outputs in the Annex are:

- Maps showing the distribution of aggregations of fen types.
- A 1997 Report in which prioritises designated sites for action under HAP.
- Explanation of how to use this information in prioritising HAP action for fens.