



# Getting wetter for wildlife

Guidance on habitat restoration and creation by  
the Wetland HAP Steering Group



working today  
for nature tomorrow



*Sphagnum recurvum*. Peter Roworth

# Contents

<b>1</b>	<b>Who we are, and what we can do for you</b>	<b>3</b>
<b>2</b>	<b>What type of wetland should you choose?</b>	<b>4</b>
<b>3</b>	<b>What are the wetland HAP types?</b>	<b>4</b>
<b>4</b>	<b>Things to consider in wetland restoration and creation</b>	<b>5</b>
<b>5</b>	<b>Detailed considerations for conserving the main lowland wetland types</b>	<b>6</b>
	5.1. Raised Bog	6
	5.2. Fen	6
	5.3. Reedbed	7
	5.4. Grazing Marsh	7
	5.5. Wet woodland	7
<b>6</b>	<b>What the Steering Group would like to see</b>	<b>8</b>
	6.1. National Biodiversity targets met	8
	6.2. Progress towards achieving favourable condition	8
	6.3. Priorities determined by national values	8
	6.4. Geographical targeting	9
	6.5. The restoration or creation of large wetland complexes	9
<b>7</b>	<b>What is likely to be involved in your project?</b>	<b>10</b>
	7.1. A strategy	10
	7.2. Land acquisition	10
	7.3. Site management	10
	7.4. Tourism and economic development	10
	7.5. Public access and enjoyment	11
	7.6. Economic benefits and sustainable practices	11
<b>8</b>	<b>What to do now</b>	<b>11</b>
	<b>Appendix: 1</b>	<b>12</b>

## 1 Who we are, and what we can do for you

- 1.1 The Wetland HAP Steering Group has been set up by English Nature to oversee the implementation of part of the UK Government's commitments to the 1992 Earth Summit in Rio de Janeiro. The group is responsible for the Habitat Action Plans (HAPs) for reedbed, coastal and floodplain grazing marsh, fen and lowland raised bog. The group is chaired by English Nature and its membership includes many of the main statutory and NGO bodies with a role in wetland conservation.
- 1.2 The Steering Group does not hold funds for projects, but wants to help others **achieve HAP targets** for habitat repair and creation in the UK. We think we can do this by setting out what we see as **the priorities** and what a **good application** for funding should include. We also operate a process of **'support'**, in which designers of projects can send details to us for comment. Our response will be based on the **principles** set out in these guidelines. Please note, however, that Steering Group support does not prejudice the funding decisions of the bodies/organisations represented on the Steering Group.
- 1.3 We hope this guidance will also be helpful for **funding bodies** when they do not have all the required expertise to judge the projects with the best potential for meeting the biodiversity targets. The Group's support for a project will give greater confidence to applicants, who can say they have the support of the national Steering Group, made up of specialists from a wide range of organisations.

- 1.4 In particular, we see this as being of value to **Local BAP groups, community-led partnerships, and wildlife trusts**. The type of project may include, for example, the restoration of mineral sites and the management of Local Nature Reserves or county wildlife trust reserves.
- 1.5 Details of funding sources can be found on a joint Defra-JNCC website, at [www.chm.org.uk](http://www.chm.org.uk).
- 1.6 While some readers may only be interested in the process of project support, we feel it is important to include background information about wetlands and what to consider when planning their enhancement or creation. So, the paper explains what gives character to the various types of wetland included in these HAPs, what each is dependent on, and how considerations such as size can be important. It also comments on what points could helpfully be emphasised in writing your project outlines.
- 1.7 The purpose of this guidance is to increase and improve the sum of wetland achievement in the UK. We will not use it to discourage or disadvantage potential projects, but to suggest how each might be more successful. We acknowledge the importance of all types of project, from the enhancement of existing wetlands, to the creation of new ones, for example, following minerals extraction.
- 1.8 Members of the Wetland HAP Group who represent country-level organisations (such as CCW and SNH) will be pleased to receive comments on the usefulness of the guidance and also to discuss any aspect of your proposed project.

## 2 What type of wetland should you choose?

- 2.1 A wetland is a wetland is a wetland....or is it? Not so, as even the titles of the individual HAPs reveal. While some, such as reedbed, provide an adequate description of what they encompass, others, such as fen, do not. Fen includes a whole range of wetland types, from moss-dominated springs to the tall impenetrable vegetation beside rivers. If we are to make the most of our creative opportunities, we must be sure to choose the most appropriate wetland type for each location. Some types can only develop under a very limited set of circumstances.
- 2.2 We are blessed with a range of rainfall patterns and topography in the UK, the northwest being wettest and hilliest, and parts of the southeast the driest and flattest. We have mountains and floodplains, and a varied geology. All these influence the distribution and rarity of wetland types. Several thousand years of habitation, cultivation and population growth have changed those that formed naturally.

Titichfield Haven SSSI. Paul Glendell/English Nature





Common reed at Cantley Marsh. Chris Gomersall/RSPB

2.3 Important wetlands are found across the UK, though some are more common in particular geographical locations. Different types often inter-grade with another, and with other habitats such as wet heathland and wet woodland, and attention should be focused on the integrated whole rather than the part. A 'site' is often made up of a mixture of related habitats.

### 3 What are the wetland HAP types?

3.1 The four HAPs under the Steering Group are in the lowlands, that is, below the altitudinal limit of cultivation, usually between 200 and 300 metres. Those above, such as blanket bog and upland flushes, are beyond the scope of this group.



3.2 If we are to conserve the full diversity of our wetland flora and fauna, we need to consider what each requires and set out to create the most appropriate type of wetland. This is why making the right choice requires some understanding of hydrological principles.

3.3 Fens comprise a diverse range of wetland types fed by ground and/or surface waters as well as rainfall. The ecological character of a fen is strongly influenced by the landform in which it occurs, and by the chemistry of its water supply. Consequently, fens in limestone areas differ markedly from those in gritstone catchments. **Reedbed** is a type of fen, but is composed mainly of the common reed *Phragmites australis*, and provides a particularly important habitat for several BAP priority species, including the bittern. This is why it has its own separate HAP.

3.4 The continued build-up of partly decayed plant material and the accretion of silt raises the surface of the fen and eventually isolates it from the groundwater. It is then fed only by rainwater, becoming nutrient-poor and acidic. The plant cover changes to *Sphagnum* mosses, cotton grasses and heathers, and the peat continues to build up. After many hundreds of years the whole assumes a gently domed profile, with all the other structural attributes associated with raised bog. Many **raised bogs** are currently used for peat extraction, afforestation, and then conversion to agriculture either before or after all the peat has been removed. Where a reversal of fortunes is still feasible they may take years to restore.



Ha Mire spring fed fen. Roger Meade/English Nature

3.5 The lowering and straightening of watercourses converted the fens to fertile agricultural land. While much of this is now arable, livestock farming meant that some was managed as pasture. Fertility was maintained by allowing sediment-bearing water to seasonally inundate the pasture. These are the **coastal and floodplain grazing marshes**, which now have an intricate matrix of open water in the ditches, tall fen fringes, and wet grassland.

Grazing marsh ditch at Braunton. Roger Key/English Nature



3.6 Before major historic drainage schemes were undertaken, river and coastal plains were covered by fen, much of it being impenetrable fen carr – or **wet woodland**. Although not under the remit of the Wetland HAP Steering Group, wet woodland is a priority BAP habitat that frequently occurs in mosaic with open habitats such as fen. Other BAP habitats associated with the lowland wetland quartet include purple moor-grass and rush pasture, lowland (wet) heathland, mesotrophic lakes and eutrophic standing waters, and saltmarsh. The complete mosaic of wetland/associated wetland habitats will be taken into account by the Steering Group when considering applications for support of wetland creation and restoration projects.



Tay Reedbeds. Andy Hay/RSPB

4.2 It follows that fragmentation, which has occurred as a result of land ownership patterns and agriculturalisation, has had a major impact on all these wetlands. It can be very difficult to restore suitable hydrological regimes on small fragmented sites, and projects should aim where possible to **reverse fragmentation**.

4.3 In setting out to restore or re-create wetlands it is important to understand what has happened to them, and what they were like originally. This means understanding the key mechanisms of **water supply**, and how these may now be affected by **human activities**.

## 5 Detailed considerations for conserving the main lowland wetland types

### 5.1 Raised bog

5.1.1 The surface of a damaged raised bog is likely to have been lowered by peat removal and drainage. It must be kept free of 'enriched' external water if immediate restoration to raised bog is to be

attempted. The water that collects on the surface from rainwater must not normally fall more than about 20 cm below the surface at its driest. Being able to achieve this is dependent on hydrological variables, such as the diameter and shape of the bog, the degree to which its surface has been drained and distorted due to wasting, and the elevation of the surface above the surrounding land. Consequently, for many sites, effective conservation of the peatland is dependent on what happens around its edge as well as within.

5.1.2 Opportunities for raised bog restoration may follow in the wake of agricultural use, forestry or peat extraction. While some progress may be made under statutory processes, such as the review of minerals planning consents under the Environment Act, 1995, it is unlikely that all requirements can be encompassed. For example, agricultural land may have to be acquired and rewetted, timber may have to be removed from afforested sites and compensation agreed for the cessation of peat extraction in order to achieve the ideal restoration surface by leaving sufficient quantities of peat in the ground. Hydrological advice will be needed in deciding what is required, and where.

Round-leaved sundew, a carnivorous plant, well adapted to life on the bog. Roger Key/English Nature



Wet woodland at Solway Moss, Cumbria. Roger Meade/English Nature

## 4 Key issues to consider in developing wetland restoration and creation projects

4.1 In the past, different types of wetland would have been found together, within what might be termed a hydrological unit. For example, raised bog may have developed within a large area of fen, which would continue to surround it even after the development of a peat dome. It is likely that the fen has been claimed for deep-drained agriculture, up to the edge of what remains of the raised bog.

5.1.3 There are a number of reasons why statutory processes do not always deliver the desired suite of restoration measures and other sources of funding are, in practice, essential.



Swallowtail butterfly *Papilio machaon* is a fen species now restricted to the Norfolk Broads. Roger Key/English Nature

## 5.2 Fen

5.2.1 The character of a fen is very much influenced by the chemical composition of its feeding waters, and the way in which this water enters the fen.



Groundwater-fed fen at Ha Mire, North Yorkshire. Roger Meade/English Nature

The topographic location of the fen within the landscape also plays a key influence in determining its ecological character. An individual fen may comprise a number of different zones, with distinct mechanisms of water supply. For example, parts may be dependent on groundwater seepage, others on overland flooding. Some may have stagnated and be developing into transition mire. Changes in river flow and water quality, land drainage and aquifer abstraction can all change the nature of the fen. Hydrological advice will be needed in deciding what is required, and where.

5.2.2 Expert advice may be needed to assess, *inter alia*, the opportunities for hydrological repair and thus the range of possible restoration outcomes. For example, it would be very difficult to create a nutrient-poor fen affected by flooding from a lowland river, or a 'rich fen' requiring calcareous water other than where the local geology can provide it. Work out what is appropriate from what there already is, or from historical records. Hydro-geological advice may be helpful in putting forward a realistic proposal that makes best use of local conditions.

## 5.3 Reedbed

5.3.1 The focus of reedbed creation should be on land of low nature conservation interest, including land use for intensive agriculture, disused industrial land and abandoned gravel works. Nutritionally enriched situations, such as in borrow-pits alongside lowland rivers, are particularly appropriate for reedbed creation.

5.3.2 Although common reed will grow on a wide range of substrates, the establishment of reedbeds requires suitable hydrology and topography for the establishment of a high water table and/or water level management. Similarly as with fen, the quality of a reedbed is affected by changes in river flow and water quality, land drainage and aquifer abstraction. Hydrological advice should be sought at an early stage of planning.

5.3.3 The Reedbed HAP includes targets for the restoration and creation of reedbeds based on the habitat requirements of the bittern. It is estimated that each booming male bittern requires approximately 20 hectares of reedbed. Bitterns only breed where there are limited levels



Radipole Reserve. Andy Hay/RSPB



Bittern *Botaurus stellaris* – Lee Valley. Andy Hay/RSPB

of disturbance, therefore many urban sites may not be suitable. However, reedbeds are also important for other wildlife, including many invertebrates and other notable bird species with less exacting requirements.

## 5.4 Grazing marsh

5.4.1 Although essentially a historical agricultural landscape, modern farming practices have much reduced the conservation interest of significant areas of grazing marsh in the UK lowlands. Key factors include extensive drainage and embankment to prevent or reduce seasonal flooding, reseeding with agricultural grass cultivars, and enrichment caused by inorganic fertilisers.

The great silver water beetle *Hydrophilus piceus* is the UK's largest insect. It is common only in grazing marsh ditches in more southerly regions. Roger Key/English Nature





An adult musk beetle, *Aromia moschata*, feeding on hemp agrimony, *Eupatorium cannabinum*. The larvae are dead wood feeders on middle-aged osier branches. The adults feed on nectar and pollen. Roger Key/English Nature

5.4.2 Grazing marsh, fen and reedbed can all be found adjacent to the coast and estuaries. This means there are opportunities for habitat creation associated with ‘managed realignment’, in which the line of flood defence is moved landward in response to sea level rise and the deterioration of existing flood defence structures.

## 5.5 Wet woodland

5.5.1 Scrub and even mature woodland develops naturally on most types of wetland, even on raised bog, especially when damaged. It is recognised as ‘bog woodland’ (Habitats Directive) in precisely defined circumstances on a few raised bogs, mostly in Scotland, and alongside the central stream of a few New Forest valley fens.

5.5.2 Wet woodland is a valuable component of many wetlands and there is a HAP target for increasing its area. However, it can naturally spread to the exclusion of other types and the species they support. Much effort has been put into the removal of scrub, for example, from around some of the Norfolk Broads.

5.5.3 It is important for wet woodland to figure, where appropriate, as a component

of habitat restoration and re-creation schemes. The Group will support its creation around raised bogs where it does not act as a drain on the bog’s water resources, but not within them. It must not detract from the quality of existing fen, or with any being created, including reedbed. Its positioning within grazing marsh is less exacting, and it provides an important part of the habitat matrix for birds and invertebrates.

## 6 What the Steering Group would like to see

### 6.1 National biodiversity targets met

6.1.1 Projects should ideally demonstrate a significant and **measurable contribution to Biodiversity Action Plan (habitat and species) targets, as well as local targets developed as part of LBAP initiatives.**

6.1.2 The English Nature website ([www.english-nature.org.uk](http://www.english-nature.org.uk)) displays targets by Natural Area in England summarily quantified by region. Geographical constraints and opportunities are explained in more detail below. In Wales, guidance on target-setting at the geographical scale of LBAPs has recently been published (CCW, 2003).

6.1.3 Many projects will need to embody a survey, monitoring or research component, often to define the detail of an application or underpin its practicality. The Wetland HAP Steering Group will welcome projects that include preparatory work enabling resources to be targeted to greatest effect.

### 6.2 Progress towards achieving favourable condition

6.2.1 Guidance on management objectives for wetland habitats can be found in the conservation objectives and favourable condition tables for all European and other statutory sites (Special Areas of Conservation; Special Protection Areas; Sites of Special Scientific Interest; Areas of Special Scientific Interest; Ramsar Sites).

6.2.2 Guidance on how to assess favourable condition, and how progress towards it can be assessed, is available from the Environment & Heritage Service (Northern Ireland), Scottish Natural Heritage, the Countryside Council for Wales and English Nature. Contact details are provided below. Common standards for monitoring can be found on the Joint Nature Conservation Committee website ([www.jncc.gov.uk](http://www.jncc.gov.uk)).

6.2.3 Contact details

Country Agency	Contact name	Telephone/Email
Scottish Natural Heritage	Andrew McBride	01738 458640 andrew.mcbride@snh.gov.uk
Countryside Council for Wales	Peter Jones	01248 385631 peter.jones@ccw.gov.uk
English Nature	Roger Meade	01733 455425 roger.meade@english-nature.org.uk
Environment & Heritage Service	Richard Weyl	02890 546589 richard.weyl@doeni.gov.uk



### 6.3 Priorities determined by national values

6.3.1 It would be difficult to argue that targets in a particular HAP should take precedence over another, but where there is a choice, preference should be given to the most exacting restoration or creation scenario provided it is (i) geographically appropriate and (ii) ecologically 'relevant' to that particular location.

6.3.2 For example, restoration of lowland bog on a cutover site should take precedence over creating a reedbed within it because reedbeds can be created in a wide range of contexts, whereas the re-creation of raised bog can only be successfully implemented on such sites in the short-medium term.

### 6.4 Geographical targeting

6.4.1 Geographical strongholds can be defined for each of the wetland priority habitats, and regional differences become more pronounced in the detail of the plant communities each contains. Local distinctiveness may be a consequence of topography, geology, climate, or land use. For example, rich fen (alkaline fen *sensu* Habitats Directive) can only develop where there is lime-rich groundwater.

6.4.2 This gives us two important principles. It is important to restore and reverse the fragmentation of large wetlands in the centre of their geographical range, and also to repair or re-create even small outliers, far from the main concentration.

6.4.3 For example, lowland bog used to extend much further southeast in England than at

present. Re-establishing its former range where climatically feasible should be a priority. 'The Fens' of Cambridgeshire and Lincolnshire used to be as the name suggests, but have almost entirely been claimed for agriculture. Reversing the historical trend is a priority.

6.4.4 To assist in the assessment of applications according to the principles outlined above, Appendix 1 contains a series of maps for England and Wales that show the importance of particular areas for the four main wetland types.

### 6.5 The restoration or creation of large wetland complexes

6.5.1 The Group particularly favours the repair or creation of previous large wetland complexes containing a mix of wetland types. Glimpses of their former character and extent can often be deduced from historical records and sound ecological principles. For example, both the Humberhead Levels in England, and the lower floodplain of the River Dyfi in Wales, were once a mix of saltmarsh, brackish marsh, reedbed, fen, fen carr (a wet woodland) and raised bog. Both of these regions offer significant opportunities for habitat expansion. This approach is encouraged by Article 10 of the EU Habitats and Species Directive, which requires member states to promote "habitat corridors" such as river corridors and strings of lakes so as to facilitate species migration and genetic exchange.

6.5.2 The conservation of larger areas of countryside also results in a less intensely managed landscape and this

has benefits for a wider mix of wetland and other habitats. The territories of birds and mammals often span several habitats. Perhaps one is used for breeding, others for feeding. Nightjars, for example, nest on wooded or scrubby fringes associated with bogs or heathland, but may feed over semi-natural grasslands.

6.5.3 Projects should wherever possible seek to redress fragmentation and look to linking valuable habitats of all types to provide larger areas or corridors for species proliferation and overall benefits to biodiversity. Linking sites is of particular benefit to wetlands because water management (for example maintaining a higher water table) is often far easier if spread over large areas rather than when confined to a series of small sites within drained farmland.

## 7 What is likely to be involved in your project?

### 7.1 A strategy

7.1.1 Context is important. There is little point in proposing to create or improve a wetland that is doomed because of plans for destructive developments nearby. The Group encourages the development of area 'visions' based on good principles of ecology and land-use planning, supported by a wide range of land use interests.

### 7.2 Land acquisition

7.2.1 Maps and aerial photographs show that for many raised bog and fen sites the wetland once extended out into what are now agricultural fields. Control over water levels on

these lands is likely to be essential if the whole wetland is to be successfully restored. As the water management required by the wetland would differ from that required by agriculture, the ideal solution in many cases, particularly for fields right next to the peatland, would be to purchase and manage as fen, reedbed or grazing marsh.

7.2.2 Large-scale projects will generally need to be founded upon a broad ‘consensus’ for the project’s objectives held by a range of bodies and individuals, including landowners and agricultural tenants.

### **7.3 Site management**

7.3.1 Existing wetlands lying within nature reserves or other protected areas may be in sub-optimal condition. They may benefit from water management, tree and scrub removal, or the introduction of grazing. The Group will encourage such projects, and may be able to suggest ways in which the project could be improved.

7.3.2 Some sites may be valuable for particular BAP priority species, and projects aimed at their conservation and/or recovery will be encouraged.

### **7.4 Tourism and economic development**

7.4.1 Several of the published plans embody actions to publicise wetlands and enhance the experience of visitors and local communities. In some parts of the country, such as the Avalon Marshes initiative in Somerset, wetland attributes are captured in the promotion of tourism and environmental quality for the establishment of businesses. Other examples are to be

found with the Wildfowl and Wetlands Trust and the RSPB. These demonstrate the coming together of many of the societal values associated with wetlands, including culture, heritage and archaeology.

7.4.2 Where appropriate, projects should include the provision of safe access (for example boardwalks) and special requirements of the disabled such that all can enjoy and learn about wetlands, but much thought will have to be given to meeting the ongoing costs, and the long-term viability of the project.

### **7.5 Public access and enjoyment**

7.5.1 This is a very important subject for some potential sponsors. Conflict between public access and wetland management or creation can generally be minimised by ensuring that access is properly and safely managed. This may involve imaginative schemes, such as the provision of a narrow gauge mineral railway at Peatlands Park, Dungannon (a raised bog in Northern Ireland), where the public are either transported or walk between stations.

### **7.6 Economic benefits and sustainable practices**

7.6.1 Projects contributing to sustainable development are encouraged by the Group. Wetlands such as grazing marshes, fens and reedbeds can double as washlands for flood alleviation, while reedbeds can act as a biological filter to treat polluted water. Project plans should explain how they form a link between the wise use of water resources and achieving wetland HAP targets.

## **8 What to do now**

- 8.1 If you would like the support of the Steering Group when submitting a project proposal to a potential funding body, then please contact the steering group representative most appropriate to your country (see section 6.2.3), who will outline the procedure and the level of support the Steering Group can offer.
- 8.2 An existing project proposal may require amendment or additional detail in order to meet the requirements of this guidance. It would be advisable to make contact with the appropriate steering group member in your country for specialist comment and advice at the inception of your project.
- 8.3 Once you have developed your project proposal, you will be asked to complete a simple proforma. This will ensure that certain criteria have been met, which will be passed to the Steering Group. The Steering Group will support all projects offering wetland creation and restoration benefits, however it will be those projects that best meet the set criteria and national/local habitat action plan targets for fens, lowland raised bog, coastal and floodplain grazing marsh and reedbeds, that will enable the group to give its strongest support.
- 8.4 The Wetland HAP Steering Group hopes you will find this guidance helpful. Please contact us if you would like clarification of any of the points made. We would also welcome feedback from you, to help us improve the guidance.

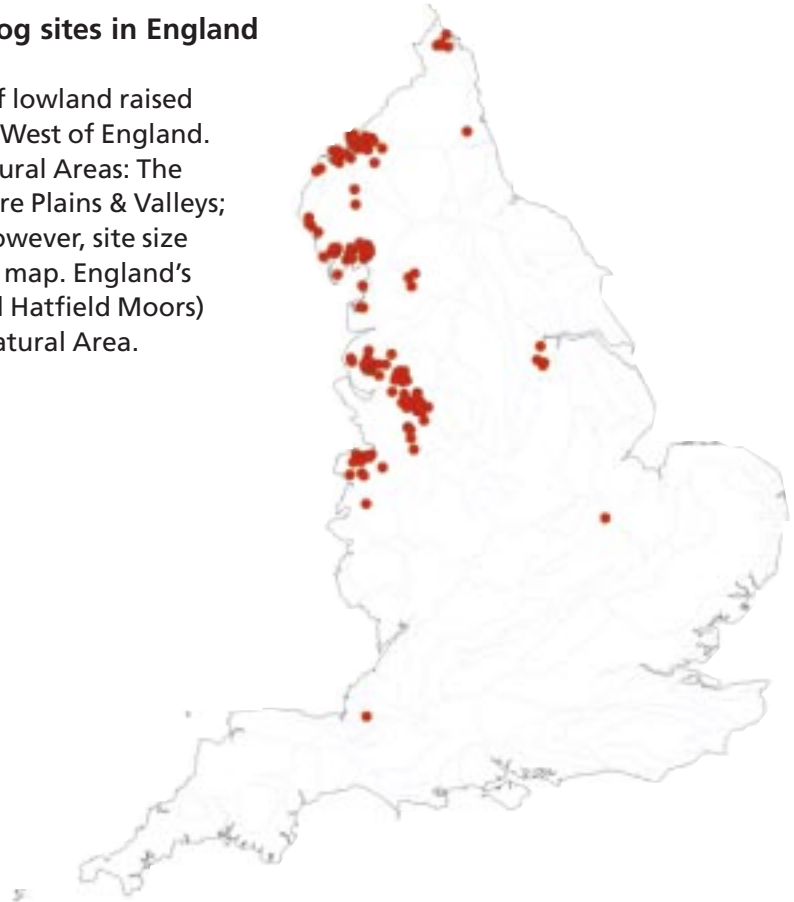
# Appendix 1

## MAP 1: Distribution of lowland raised bog sites in England

The above map shows that the distribution of lowland raised bog sites is mainly concentrated in the North West of England. Sites are particularly concentrated in five Natural Areas: The Solway Basin; Cumbria Fells & Dales; Lancashire Plains & Valleys; Urban Mersey Basin; and Mosses & Meres. However, site size cannot be detected on this point distribution map. England's largest peat bogs (Thorne, Goole, Crowle and Hatfield Moors) are located within the Humberhead Levels Natural Area.

- Lowland raised bog sites
- English Nature Natural Area boundaries

Data source: England Raised Bog Survey, 1998

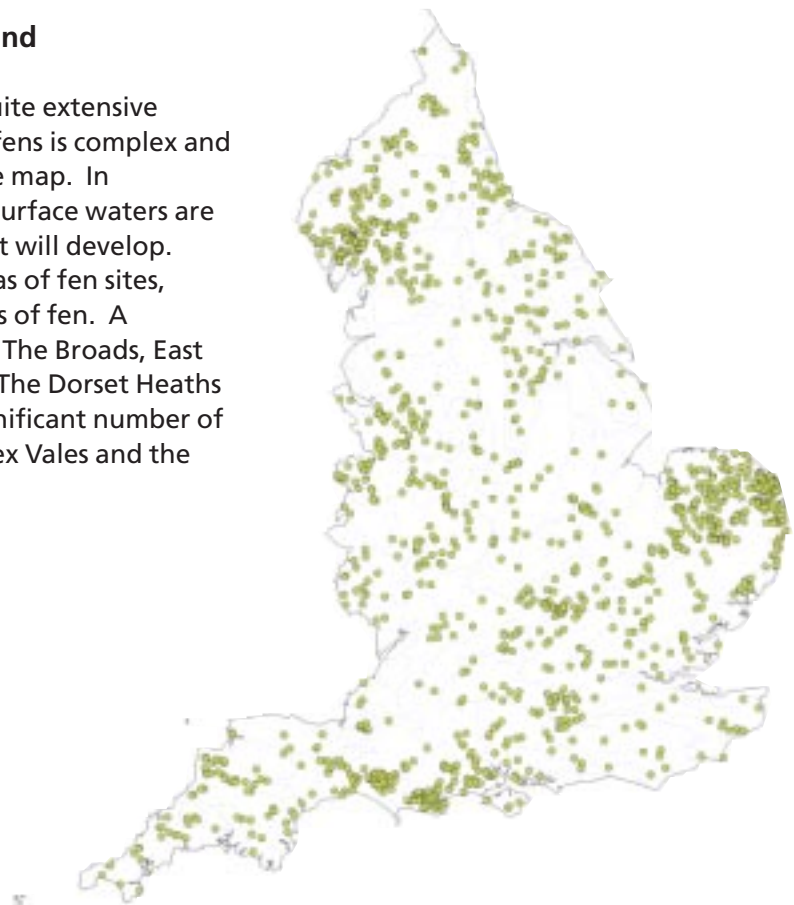


## MAP 2: Distribution of fen sites in England

The distribution of fen sites is shown to be quite extensive across England. However, the vegetation of fens is complex and all types of fen are encompassed in the above map. In particular, the properties of the ground and surface waters are important in determining the type of fen that will develop. There are a number of particularly dense areas of fen sites, which may be reflective of a few certain types of fen. A particularly dense area covers North Norfolk, The Broads, East Anglian Plain, and Breckland Natural Areas. The Dorset Heaths and the Cumbria Fells & Dales also have a significant number of sites, as does an area cutting across the Wessex Vales and the South Wessex Downs Natural Areas.

- Fen sites
- English Nature Natural Area boundaries

Data source: England Fen Inventory, 1999



### MAP 3: Area of grazing marsh in England

The above distribution map shows the extent of grazing marsh/lowland wet grassland in England. However, the Lowland Wet Grassland Inventory (1995) excludes Lincolnshire and blocks whose extent was <10 ha. The Severn & Avon Vales and Somerset Levels & Moors Natural Areas contain large expanses of this habitat type. Other Natural Areas with a considerable proportion of grazing marsh include Cumbria Fells & Dales, Lancashire Plain & Valleys, Solway Basin and The Broads. A significant amount of grazing marsh is also to be found in the region of the Thames Estuary.

- Area of grazing marsh
- English Nature Natural Area boundaries

Data source: Lowland Wet Grassland Inventory, 1995



### MAP 4: Area of reedbed in England

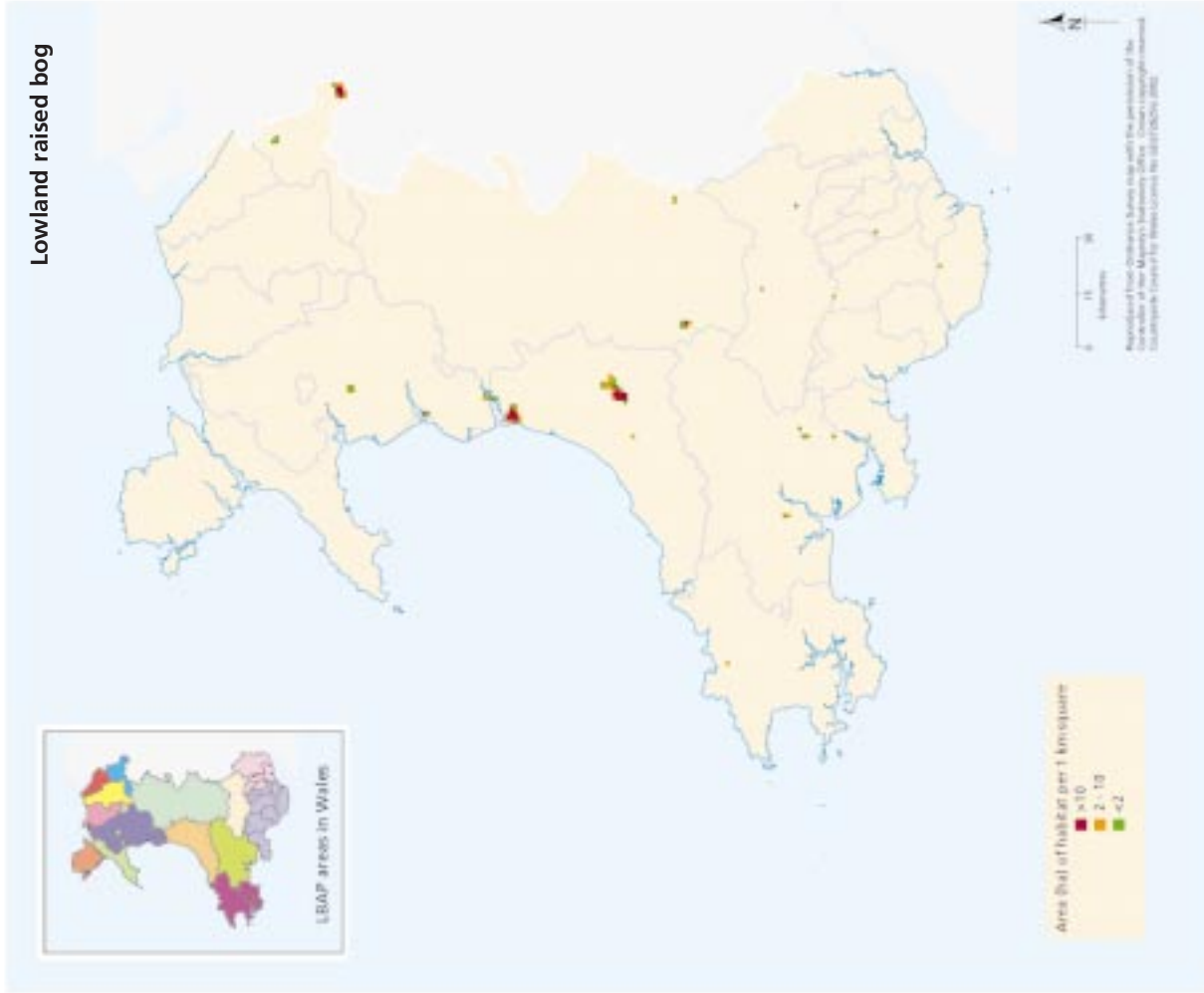
Areas of reedbed are distributed all around England. However, The Broads and Suffolk Coast & Heaths Natural Areas contain a significantly high proportion of reedbed area. The UK has a HAP target of 1,200 ha of reedbed habitat to be re-created by 2010. The recent 2002 BAP Reporting Round showed progress towards this target to be ahead of schedule - 825 ha have already been achieved across the UK.

- Area of reedbed
- English Nature Natural Area boundaries

Data source: RSPB Reedbed Inventory, 1993

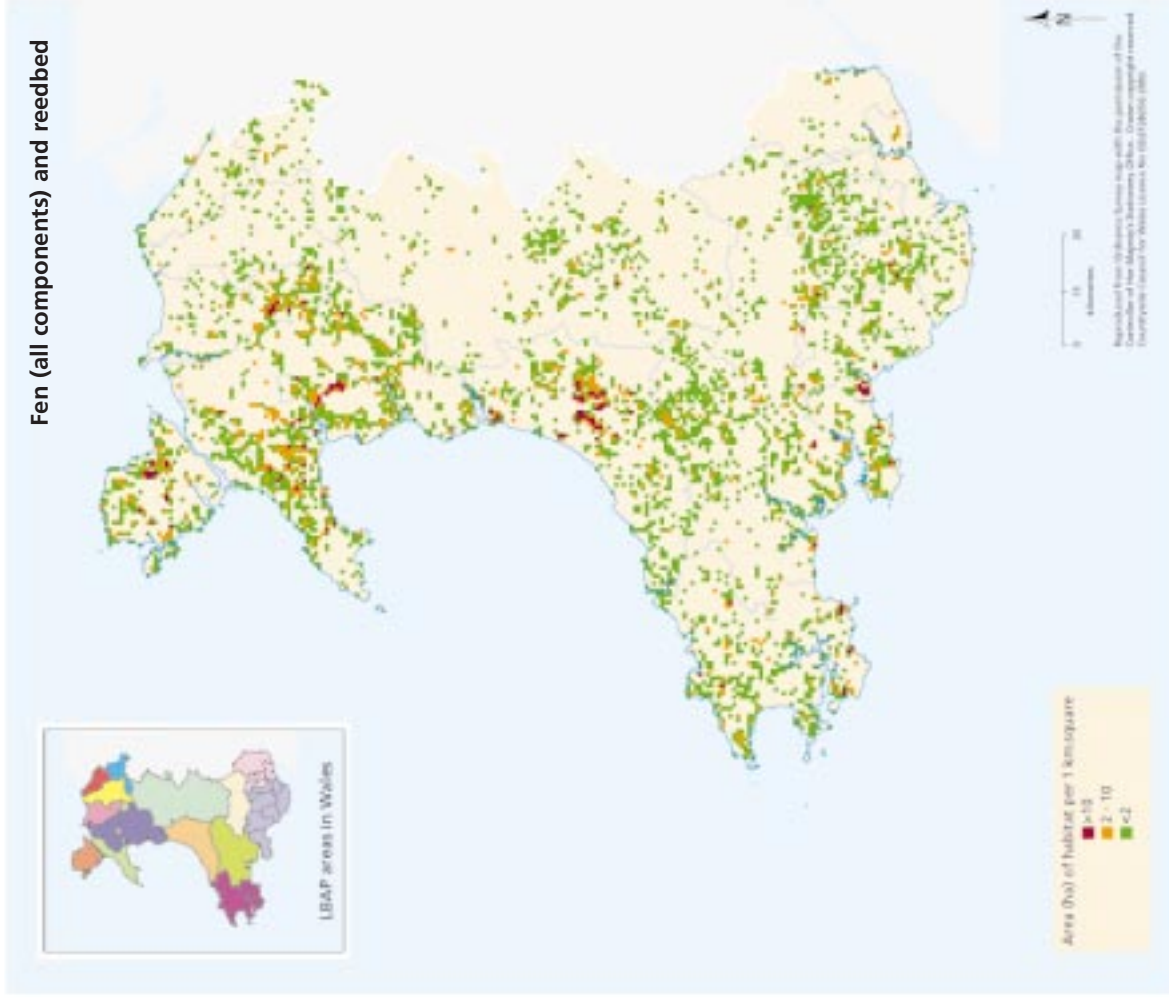


**MAP 5: Area of lowland raised bog in Wales**



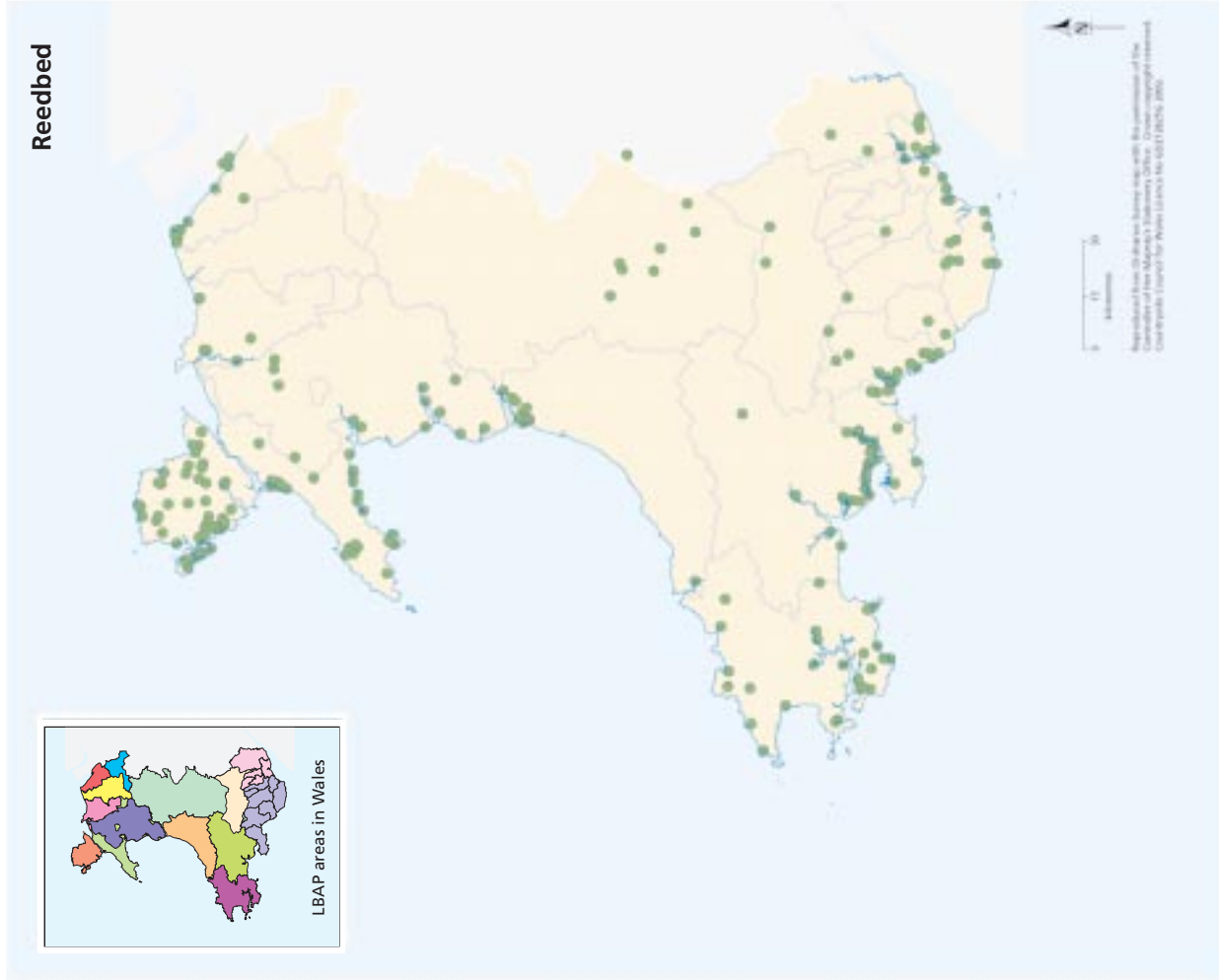
Distribution of 1 km squares with lowland raised bog within Welsh LBAP areas. Data are summarised from the NCC/CCW Lowland Habitat Survey of Wales (1987-1997) and comprise raised bog and areas of modified bog assignable to this priority type.

**MAP 6: Area of fens (all components) and reedbed in Wales**



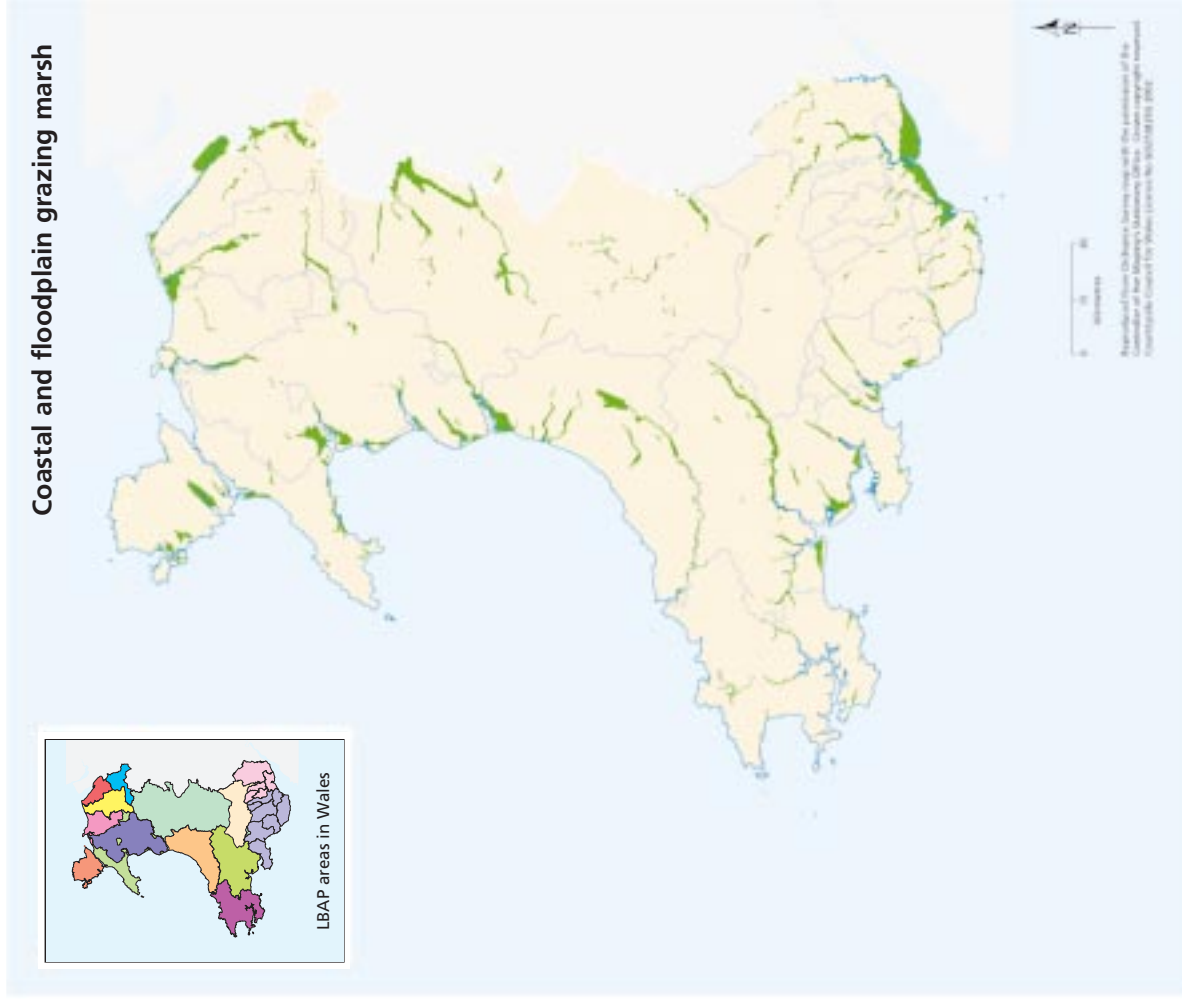
Distribution of 1 km squares with habitats referable to the fen and reedbed HAPs within Welsh LBAP areas. Data comprise lowland examples of the three Phase I categories of fen (basin, valley and floodplain mire), flush and swamp and are summarised from the NCC/CCW Lowland Habitat Survey of Wales (1987-1997).

MAP 7: Area of reedbed in Wales



Distribution of sites with reedbed within Welsh LBAP areas. Data are summarised from the RSPB survey of Welsh reedbeds (Tyler, 1993).

MAP 8: Area of coastal and floodplain grazing marsh in Wales



Distribution and extent of sites with coastal and floodplain grazing marsh habitat within Welsh LBAP areas. Data are summarised from the CCW Inventory of Coastal and Floodplain Grazing Marshes (Dargie & Dargie, 1998), based largely upon the NCC/CCW Lowland Habitat Survey of Wales (1987-1997)



English Nature is the Government agency that champions the conservation of wildlife and geology throughout England.

This is one of a range of publications published by:  
External Relations Team  
English Nature  
Northminster House  
Peterborough PE1 1UA

[www.english-nature.org.uk](http://www.english-nature.org.uk)

© English Nature 2005

Printed on Evolution Satin,  
75% recycled post-consumer waste  
paper, elemental chlorine free.

ISBN 1 85716 874 7

Catalogue code IN17.3

Designed and printed by  
Status Design & Advertising, 2M.

Front cover photograph:  
Thursley, Hankley and Frensham Commons SSSI.  
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