

Norfolk Fens Assessment

2005 – 2006

S U M M A R Y

An assessment of non-SSSI fen sites outside the Broads



CWS 282 Beck Meadow, Hellington

Norfolk Wildlife Trust
July 2006

Contents

1. Norfolk Fens Assessment Project
 - 1.1 Background
 - 1.2 Rationale and Aims
 - 1.3 Project Partners
 - 1.4 Acknowledgements
2. Summary of Recommendations
3. Constraints and Limitations
4. Methodology
 - 4.1 Desk Study
 - 4.2 Field Work
5. Outputs
 - 5.1 Access Database
 - 5.2 Digital Map
6. Results
 - 6.1 Statistics
 - 6.2 Prioritising Sites for Restoration
7. Summary
 - 7.1 Overview
 - 7.2 Site Condition
 - 7.3 Major Threats
8. Recommendations
 - 8.1 Fen Assessment Project Outputs
 - 8.2 Fen Restoration Project (Phase 2)
 - 8.3 Further Projects

1. NORFOLK FENS ASSESSMENT

1.1 Background

The UK is believed to possess a large proportion of the fen surviving in Europe¹. Fen vegetation has declined significantly in the last century, both nationally and across Europe, and fens are now a UK Priority Biodiversity Action Plan habitat.

Norfolk is considered to have the best representation of fen types in England, particularly valley head and floodplain fens. A large number of fen sites within the county are SSSI / candidate SAC (cSAC) / Ramsar sites, while many others are designated County Wildlife Sites (CWS). In addition, there may be other fen sites throughout the county which are not yet formally recognised.

A number of factors may adversely affect fens, causing long term damage and sometimes destroying the habitat completely. These typically include lack of management, which allows scrub and woodland to develop; inappropriate management, such as drainage and cultivation; excessive water abstraction from aquifers and surface sources which alters hydrology, lowering water tables and reducing spring line flows; and enrichment, often from run-off of poor quality water, leading to changes in vegetation composition.

While all fen sites are potentially vulnerable to harmful influences, some are at less risk than others: for example, one of the Government's Public Service Agreement (PSA) targets requires 95% of SSSI sites to be in favourable condition by 2010²; and a management strategy for fens is now in place within the Broads area, following a recent assessment of the Broads fen resource³. CWS fens however receive no statutory protection, and since the majority are privately owned and managed, many are potentially at risk from neglect and inappropriate management. Sites where ownership is unknown may be at particular risk, as there is no opportunity for management advice to be given, and site condition cannot be monitored.

The need therefore is to identify as many fen sites as possible outside the Broads and the SSSI / European site system to

- create a Norfolk inventory of sites
- establish those most at risk
- identify sites where remedial action is most urgently needed

1.2 Rationale and Aims

The Biodiversity Action Plan (BAP) for fens in Norfolk requires that a list of the county's fens requiring remedial action is agreed by 2005; and that restoration and sustainable management is initiated on non-SSSI fen sites⁴. The Norfolk BAP also outlines the need to 'ensure that development schemes do not affect the integrity or the conservation interest of fens'⁵.

The Norfolk Fens Assessment Project commenced in January 2005 with the following objectives:

- a) to assess the management status and condition of non-SSSI fen sites outside the Broads Authority Executive area, using the CWS system as the principle framework
- b) to identify additional, undesignated fen sites
- c) to identify and prioritise sites in need of restoration and management advice

¹ UK Fens Biodiversity Action Plan. See <http://www.ukbap.org.uk/UKPlans.aspx?ID=18>

² Government PSA Target 3. See http://www.defra.gov.uk/corporate/dep/dep/2005/appendix_4.pdf

³ The Fen Management Strategy was prepared in 1997 by the Broads Authority and English Nature, and updated in 2004 with the Supplement to the Fen Management Strategy. This includes the Fen Audit which identifies practical management options available for each fen site. See <http://www.broads-authority.gov.uk/managing/land/fen/strategy.html>

⁴ Norfolk Fens Biodiversity Action Plan, Actions 5.2.4 and 5.2.5. See <http://www.norfolk-biodiversity.org/actionplans/habitat/fens.asp>

⁵ Norfolk Fens Biodiversity Action Plan, Action 5.2.3. See <http://www.norfolk-biodiversity.org/actionplans/habitat/fens.asp>

- d) to identify sites requiring management statements and conservation plans
- e) to identify potentially drying sites within a 5km radius of approximately 30 SSSI sites that have been identified by the Environment Agency in their Restoring Sustainable Abstraction (RSA) programme¹ as of concern
- f) to produce a digital map showing the distribution of non-SSSI fen sites outside the Broads area, particularly within Breckland District, for use within the planning system

The purpose of the project was not to undertake detailed ecological surveys of individual sites, but to draw up a distribution map of non-SSSI fen sites, and to gain an overview of the management and condition of individual sites as a means of identifying sites most in need of restoration.

An additional aim of the project was to assess the distribution and status of pingo sites in Norfolk. Due to time constraints, it has not been possible to include this element in the work done so far, and a separate project to cover pingos forms part of the recommendations for future work. All other objectives have been met, and this report details the various outputs from the project.

1.3 Project Partners

The project has been given financial support by the Environment Agency, Breckland District Council, and the Norfolk Biodiversity Partnership. Each funding partner has required different outputs from the project, and the main focus of the work has to some extent been steered by these individual requirements.

1.4 Acknowledgements

A number of people from various organisations have offered advice and help with this project. Particular thanks are due to Sandie Tolhurst (Broads Authority) and Bob Ellis (BSBI Vice-county recorder for East Norfolk); and to Steve Henson (Conservation Officer (Rivers and Wetlands), Norfolk Wildlife Trust), who also undertook some of the field work.

2. SUMMARY OF RECOMMENDATIONS

Below is a summary of recommendations resulting from the project. These are set out in full in Section 8.

- To make the outputs from this project available to conservation partners and planning authorities in Norfolk to encourage their use in grant scheme applications and for planning purposes in such a way as to protect and enhance the fen resource in Norfolk
- To raise the profile of the outputs from this project as a means of increasing awareness of the status and vulnerability of the fen resource in Norfolk
- To obtain funding for a follow-on Fen Restoration Project as a vehicle for commencing restoration work on identified high priority fen sites, and to generate a work programme for action on lower priority sites
- As part of the follow-on project, to refine the digital fen map to improve accuracy both of fen extent and distribution
- To upgrade and improve the database as further information becomes available for listed and new sites

¹ The Environment Agency's Restoring Sustainable Abstraction programme, commenced in 1999, examines the impacts of authorised abstraction on the environment. See <http://www.environment-agency.gov.uk/subjects/waterres/564321/449556/?version=1&lang=e>

- To draw up a detailed proposal for a pingo project, to identify, map and assess the condition of pingo sites within Norfolk, and to obtain funding
- To draw up detailed proposals for a wet woodland project, to identify, map and assess the condition of these sites within Norfolk, with estimated funding requirements
- To draw up detailed proposals for a BAP habitat mapping project, to map key habitats in Norfolk and to help identify opportunities for habitat creation
- To prioritise these new project proposals in liaison with other conservation bodies, and to obtain the necessary funding.

3. CONSTRAINTS AND LIMITATIONS

The project has been limited by the following factors:

- The large scale of the work involved, covering non-SSSI fen sites in all areas of Norfolk outside of the Broads Authority area and the short timescale in which to complete the work
- the lack of ownership data for many sites, preventing access to potentially key sites
- the difficulty of defining habitat from aerial photographs, making all data derived in this way subject to further verification
- the difficulty of identifying fen in some borderline and patchy areas without NVC survey
- the presence of livestock on some sites, limiting access
- the extent of some sites listed in FenBASE and the Grassland Survey has not been clear, and this has therefore been estimated using aerial photographs.

4. METHODOLOGY

4.1 Desk Study

4.1.1 Data Sources

County Wildlife Site System

A list of approximately 400 sites with fen and potential fen vegetation was compiled using the Norfolk CWS database, citations and original survey data. Wet woodland CWS were also included where they appeared to include areas of open fen.

Aerial Survey

A further list of 400 potential, but undesignated, fen sites was compiled, using the 1988 aerial survey¹ of Norfolk. Potential areas were identified by vegetation colour and texture (as an indicator of semi-natural vegetation), and listed by grid reference. CWS and SSSI sites were excluded from this list.

FenBASE

Nine further sites have been obtained from FenBASE 6.0². This database of English lowland bogs and fens lists over 200 fen sites in Norfolk, but the majority of these are notified SSSI sites and fall outside the scope of this project.

Norfolk Grassland Survey

61 fen sites were listed in the Norfolk Grassland Survey³ and identified by their NVC code (see 4.2.3 and 6.1.3 below).

¹ 1988 Colour Aerial Survey of Norfolk commissioned by Norfolk County Council, County Hall, Norwich

² FenBASE v. 6.0, developed by Dr Bryan Wheeler, Department of Animal and Plant Sciences, University of Sheffield

³ Norfolk Grassland Survey, 1987-1988 (1990), Nature Conservancy Council (East Anglia Region)

4.1.2 Soil Mapping

All sites in the resulting lists with unconfirmed fen habitat were compared with a soil map of Norfolk¹. Any sites not located on peat soils were discarded.

Sites with confirmed fen habitat may occur on mineral soils where springs and flushes occur, or where drainage is impeded, resulting in the formation of lenses of peat which may not be obvious at the surface. All sites with known fen vegetation on such soils have therefore been included, but other, unconfirmed sites on non-peat soils have, for the purposes of this project, been excluded.

4.2 Fieldwork

4.2.1 Prioritising sites

Given the limited time available to complete the project, it was necessary to prioritise sites for assessment. For practical reasons, priority was given to sites that were either of known ownership or publicly accessible *and* fitted one or more of the following criteria:

- designated as a CWS
- within 5km of key wetland SSSI sites identified by the Environment Agency as potentially threatened by water abstraction
- located in areas of particular interest to funding partners
- on soils with significant peat content

Sites were sorted by grid reference to allow geographical clustering and maximise the number that could be visited.

In addition, many undesignated sites were viewed from publicly-accessed vantage points (as no ownership data was available for any of the sites compiled using the aerial survey). For these sites, priority was given to sites located on the most favourable soils; or in locations with a high density of known fen sites, such as the Waveney valley, Harling/Quidenham and Stow Bedon; or within 5km of wetland SSSI sites, as outlined above.

4.2.2 Access

In most cases, site access was subject to landowner permission. Where possible, further information was obtained regarding the site, including in particular

- past and present management
- agri-environment agreements currently in place
- likely attitude to future management / restoration proposals.

Where sites have public access, landowner permission was not always sought, and a few sites have been assessed from an adjacent lane or path.

4.2.3 Site Survey

Paperwork

A 1:10k map showing the site boundary and, where relevant, a copy of the CWS citation were prepared for each site visit. A standard site condition monitoring form was also completed for each site. The form is similar to that introduced in 2005 by The Wildlife Trusts as a means of assessing the condition/management of local wildlife sites, and identifying key threats.

When possible, key botanical species for each site were also noted, using a species list based on the ten fen/mire NVC communities believed to be found in Norfolk², namely

¹ Soil Survey of England and Wales, 1:100K 1973, Rothamsted Experimental Station, Harpenden, Herts

² Data derived from NVC distribution maps, Rodwell, J S (Ed). British Plant Communities, Vol 2. Heaths and Mires. Cambridge University Press (1991).

M13	<i>Schoenus nigricans</i> - <i>Juncus subnodulosus</i> Mire
M22	<i>Juncus subnodulosus</i> - <i>Cirsium palustre</i> Fen-meadow
M24	<i>Molinia caerulea</i> - <i>Cirsium dissectum</i> Fen-meadow
M27b	<i>Filipendula ulmaria</i> - <i>Angelica sylvestris</i> Mire <i>Urtica dioica</i> - <i>Vicia cracca</i> sub-community
M9b	<i>Carex rostrata</i> - <i>Calliergon cuspidatum</i> Mire
S24	<i>Phragmites australis</i> - <i>Peucedanum palustre</i> Tall-herb fen
S25	<i>Phragmites australis</i> - <i>Eupatorium cannabinum</i> Tall-herb fen
S26	<i>Phragmites australis</i> - <i>Urtica dioica</i> Tall-herb fen
S27b	<i>Carex rostrata</i> - <i>Potentilla palustris</i> Tall-herb fen <i>Lysimachia vulgaris</i> sub-community
S28	<i>Phalaris arundinacea</i> Tall-herb fen

Site assessment

Visits consisted of a rapid walk-over survey to assess:

- extent of the fen area
- site quality
- site condition
- management status
- main threats

Site quality was assessed on:

- the range of plant species present ie certain species may be taken as indicators of 'good quality' habitat, while other species, including coarse grasses and ruderals, may indicate drying, or a general decline in site quality
- hydrology, or water levels within the site, indicated by surface water levels, water flows in drainage channels and vegetation present
- the potential for restoration if brought into appropriate management ie an assessment of the likelihood that some or all of the original botanical interest of a site can be restored if appropriate action (eg raising water levels, removing scrub, commencing a grazing/cutting regime) is undertaken.

Condition assessment was made (by compartments where necessary) using the following standard condition categories used in the CWS condition monitoring form:

- Favourable
- Recovering
- Declining
- Unfavourable
- Destroyed

The main threats to each site were identified. Typical categories include:

- Neglect/scrub encroachment
- Drying
- Inappropriate management
- Under- / over-grazing
- Succession
- Recreational pressure

5. OUTPUTS

5.1 Access Database

The list of sites resulting from these searches were compiled into a database (Microsoft Office Access 2003) of 678 fen and wet woodland sites.

Of these 504 are open or mosaic sites, and 174 are wooded. These categories have been allocated either on the basis of citations/survey data, or on an assessment made 'by eye' where aerial footage has been used (ie >50% open = open, >50% wooded = wooded). Where there is a

clear distinction between wooded and open areas within the same site, these have been mapped and listed separately.

The database gives 20 fields of data for each site. These are listed and explained in Appendix 6.

Rationale for including wet woodland

Wet woodland has been included in the map and database as

- it frequently occurs in mosaic with fen habitat
- many wet woodlands were at one time open fen
- wet woodland is itself a Priority BAP habitat which needs to be considered in its own right when selecting suitable fen sites for restoration.

The majority of wet woodland sites have been derived from the CWS database so are well-documented, but additional woodland sites which, from maps and aerial surveys, appear to be wet (ie indicated by presence of drains), have also been mapped. Not all are on peat, and wooded sites were not prioritised for visit, so the habitat for the majority of undesignated wooded sites remains unverified.

5.2 Digital Map

5.2.1 GIS layer

A digital map (MapInfo v. 5.5) has been produced showing the extent of each site listed in the database. The map and database are linked, so that key data is displayed for each mapped site.

Wooded and open sites have been differentiated by colour, with woodland sites shown in green and open sites in yellow.

5.2.2 Area of resource

Where the extent of the fen or woodland habitat is known within each site, this has been mapped as accurately as possible. Where habitat extent is not known, the entire site (which may contain other habitats) has, for the time being, been mapped. [This is the case for both open and wooded sites because, although woodland extent can be quantified using aerial survey, differentiation between wet and dry areas within the same woodland can only be assessed on the ground.]

The digital map will therefore be subject to further refinement as additional sites are visited and assessed.

6. RESULTS

6.1 Statistics

As the database is too large to be included in this report, an overview of some of the datasets is given in the tables below.

6.1.1 Generic data

Site designations

The project has concentrated on CWS since the habitat for these is documented, and CWS are recognised for their high conservation and wildlife value. These sites therefore account for over two-thirds of the sites listed.

Most of the undesignated sites remain unvisited and the habitat therefore unverified. Actions to assess the habitat and quality of unvisited sites form part of the recommendations of this project, as part of a follow-up project.

Site Designation	No of sites	% of total
Designated County Wildlife Sites	468	69
Undesignated sites	208	31
SSSI (wet woodland)	2	<1

Ownership

Ownership for one third of sites is currently unknown. This is significant because some of these may be high quality sites in a state of decline which should be prioritised for restoration. Furthermore, it is probable that the owners are receiving no management advice which in some cases may be hastening decline. Action to establish the ownership of sites in this category forms part of the recommendations of this project.

For the remaining sites, private ownership (including estates) is by far the largest category, accounting for at least half (and potentially over 80%) of sites. By contrast, all other categories of ownership are small, as shown below.

Ownership	No of sites	% of total
Private	296	44
Estate	37	5
Corporate	28	4
Charitable / Parish Trust	18	3
Conservation Body	14	2
Government Dept/Agency (eg MoD/FC))	13	2
Local Council	15	2
Multiple ownership	20	3
Parish council	9	1
Unknown (to NWT)	228	34
Total:	678	100

6.1.2 SSSI data

Proximity to wetland SSSI sites

The database identifies sites within a 5km radius of 65 named wetland/fen SSSI sites (including 29 sites identified by the Environment Agency as of particular concern), and indicates where they are adjacent to these sites.

Non-statutory sites adjacent to high quality wildlife sites (ie SSSIs, European sites) are regarded as particularly important for buffering, helping to protect them from potentially harmful external influences (eg run-off containing contaminants, spray drift etc). Sites adjacent to and within a small radius of SSSIs are also important within the context of an ecological network, improving connectivity between wildlife-rich areas, and aiding the dispersal of species. They may also be valuable indicators of underlying localised problems, such as drying caused by excessive abstraction, which may also be affecting the SSSI and may cause long-term damage if not rectified. For these reasons, the condition of sites in close proximity to SSSIs is of particular concern.

The table below shows condition data for 25% of sites (18 sites) adjacent to SSSIs. (Condition data are not available for the remaining 54 adjacent sites.) The figures indicate that 84% of the assessed sites (ie 21% of all adjacent sites) are either declining or in unfavourable condition, compared with just 16% that are favourable or recovering. Of sites identified as specifically threatened by drying, three sites are adjacent to SSSIs and 24 sites are within 5km of SSSIs.

A more detailed summary of this information is at Appendix 8.

Proximity to wetland SSSI sites	No of sites (CWS*)	% of total
Fen sites within 5km of wetland SSSI sites	379 (262)	56
Fen sites adjacent to wetland SSSI sites	72 (64)	11
Of sites adjacent to wetland SSSI sites:	No of sites	% of total
Those in unfavourable condition	7 (7)	10
Sites in decline	8 (7)	11
Recovering sites	1 (1)	1

Sites in favourable condition	2 (2)	3
Sites where condition/ownership is unknown	54 (48)	75
Proximity of drying sites to SSSI sites	No of sites	-
Drying sites within 5km of SSSIs	24 (16)	-
Drying sites adjacent to SSSIs	3 (3)	-

* The number of CWS represented within the statistics is given in brackets

6.1.3 Habitat data

The basis on which sites have been categorised as open or wooded is explained in section 5.1 above. Sites with fen or wet woodland habitat have been verified through existing documentation/by visit, or remain unverified. In addition, some wet woodland sites which are not on peat have been included in the database.

Many fen sites are in the process of succeeding to wet woodland, or are already entirely wooded. Since both are priority BAP habitats, careful consideration needs to be given to which sites should be felled to restore fen habitat, and which retained as wet woodland. Informal guidance regarding the retention of wet woodland on peat has recently been developed by English Nature and the Broads Authority for use in the Broads area, particularly with regard to the targeting of land for Higher Level Stewardship applications, and these guidelines could be applied to wooded fen sites across Norfolk where relevant.

Action to verify the habitat on all sites where this is not known form part of the recommendations of this project.

Category	No of sites	% of total
Predominantly open sites	464	68
Mosaic sites	40	6
Predominantly wooded sites	174	26
Habitat	No of sites	% of total
Unverified fen sites	123	18
Wooded sites not on peat	16	2
Woodland with unverified habitat	20	3

Vegetation classification

NVC community data are available for only 61 sites (and these may no longer be accurate as they are taken from the Norfolk Grassland Survey, undertaken in the late 1980s¹). Only six of the ten fen/mire NVC communities believed to occur in Norfolk² are represented in this small sample. For over 90% of the sites listed, no NVC community data are currently available.

A break-down of the NVC communities represented by sites in the database is given below.

NVC Community	No of sites
M13 <i>S nigricans</i> - <i>J subnodulosus</i> mire	0
M22 <i>J subnodulosus</i> - <i>C palsutre</i> fen-meadow	38
M24 <i>M caerulea</i> - <i>C dissectum</i> fen-meadow	2
M27b <i>F ulmaria</i> - <i>A sylvestris</i> mire	0
M9b <i>C rostrata</i> - <i>C cuspidatum</i> mire	0
S24 <i>P australis</i> - <i>P palustre</i> tall-herb fen	0
S25 <i>P australis</i> - <i>E cannabinum</i> tall-herb fen	9
S26 <i>P australis</i> - <i>U dioica</i> tall-herb fen	4
S27b <i>C rostrata</i> - <i>P palustris</i> tall-herb fen	3
S28 <i>P arundinacea</i> tall-herb fen	15
NVC community unknown	617 (91%)

¹ Norfolk Grassland Survey, 1987-88 (1990), Nature Conservancy Council (East Anglia Region)

² Data derived from NVC distribution maps, Rodwell, J S (Ed). British Plant Communities, Vol 2. Heaths and Mires. Cambridge University Press (1991).

6.1.4 Agri-Environment Scheme data

Agri-Environment schemes

Data relating to agri-environment schemes was obtained from Defra (RDS), but information for schemes that have commenced since 2004, including Environmental Stewardship (and Higher Level Stewardship in particular), are not included.

Data relating to other schemes, such as the Woodland Grant Scheme (WGS) has been obtained in a few instances through discussion with landowners.

It is not clear how many actual fen sites are covered by these schemes (ie the schemes may cover all or only part of the landholding to which the site belongs, and may not specifically include the fen area). However, these data are useful in helping to identify sites where no agri-schemes are currently in place, and which could therefore be targeted for entry into suitable funding agreements. Agri-environment schemes are seen as a key delivery mechanism for Government PSA targets for SSSIs¹, and, used appropriately, are likely to be the principle vehicle for delivering restoration management on key, non-SSSI fen sites.

Scheme Type	No of sites	% of total sites
ESA (current)	168	25
ESA (expired)	4	<1
Countryside Stewardship (current)	61	9
Countryside Stewardship (expired)	9	1
CSS and ESA agreements on landholding	34	5
Applying/about to apply for HLS	2	<1
WGS	1	<1
Not believed to be in a scheme	14	2
Unknown	385	57
Total:	678	100

Joint Character Areas (JCAs)

Joint Character Areas describe the differences in landscape character at a national scale, and provide a framework for the targeting of agri-environment schemes such as Environmental Stewardship.

There are nine JCAs in Norfolk, and the recorded sites occur in all but one. (As the parameters of the project exclude SSSI fen sites and all sites within the Broads Authority area, the data given below are not a complete representation of fen distribution in Norfolk.)

Joint Character Area	No of sites	% of total sites
Breckland	103	15
Broads	41	6
Central North Norfolk	121	18
Fens	21	3
Mid-Norfolk	182	27
North East Norfolk	26	4
North West Norfolk	47	7
South Norfolk High Suffolk Claylands	137	20

6.1.5 Site assessment data

Site condition and management

Approximately 31% of the sites listed have been visited and assessed since 1998. Of these, 206 were visited in the period 2004-2006, and 194 sites were visited in 2005-2006. As time to visit sites was limited, those selected for visit in 2005-6 were prioritised on the basis of the required outputs of the funding partners (explained in section 4.2.1 above).

An analysis of site condition compared with site management is given in the table below. This shows that:

¹ Government PSA Target 3. See http://www.defra.gov.uk/corporate/dep/2005/appendix_4.pdf

- approximately half of the sites in the declining and unfavourable categories (total 48%), and one third of the destroyed/partly destroyed sites, are unmanaged.
- 62% of favourable and 60% of recovering sites are grazed or part grazed, compared with 25% for declining and 23% for unfavourable sites.

CONDITION CATEGORIES

	Favourable	Recovering	Declining	Unfavourable	Destroyed	Condition Variable	Unknown (unvisited)
No and % of visited sites	56 (26%)	10 (5%)	80 (38%)	48 (23%)	6 (3%)	12 (5%)	466
Grazed / part grazed	35 (62%)	6 (60%)	20 (25%)	11 (23%)	2 (33%)	5 (42%)	5 (1%)
Cut / part cut	4 (7%)	-	5 (6%)	10 (21%)	-	3 (25%)	-
Part cut / part grazed	1 (2%)	-	4 (5%)	-	-	3 (25%)	-
Grazing about to start	-	-	4 (5%)	1 (2%)	-	-	-
Managed by Conservation gp	2 (4%)	4 (40%)	1 (1%)	-	-	-	-
Managed for amenity	2 (4%)	-	-	-	-	-	-
Commercial activity*	-	-	2 (3%)	-	2 (33%)	1 (8%)	1 (>1%)
Unmanaged	9 (16%)**	-	41 (51%)	23 (48%)	2 (33%)	-	-
Unknown	3 (5%)	-	3 (4%)	3 (6%)	-	-	460 (98%)
	Total assessed sites: 212						Unassessed sites: 466

* eg fishery, pheasant rearing, cropping

** all these are wooded sites where management consists of non-intervention

Main Threats

Many sites are at risk from several factors, which may be inter-related (eg, under-grazing and scrub encroachment are often related). The major threats appear to be related to lack of management, resulting in scrub encroachment, while drying is also a significant problem at many sites.

Main Threats to Sites	No of sites	% of visited sites
Unknown	470	-
Scrub encroachment/succession	60	28
Neglect	51	24
Drying (drainage / abstraction)	37	17
No threat identified	34	16
Over-grazing / poaching	19	9
Inappropriate management (unspecified)	15	7
Litter build-up	14	7
Recreational pressure	9	4
Under-grazing	7	3
Under-management	5	2
Pollution and enrichment	4	2
Building development	3	1

6.2 Prioritising Sites for Restoration

6.2.1 Allocating priorities

Priority codes

95% of sites in the database have been targeted for specific action, and each has been allocated a priority rating on a scale from 1-5 (1 = high priority, 5 = low priority), based on site quality, current condition and management, proximity to wetland/fen SSSI sites and rate of decline.

High priority sites (rating 1, 1)*

The highest priority sites have been allocated a score of 1*, and important but less urgent sites a score of 1. There are approximately 160 sites in these two categories, which broadly cover:

- high quality sites (mainly CWS) which are in decline or unfavourable
- all sites which are either adjacent to wetland SSSIs; or within 5km of those SSSIs which the Environment Agency has identified as of concern
- potentially good quality fen sites where ownership is unknown and visits have not been possible
- unvisited CWS which are known to contain fen habitat

The rationale in prioritising these sites is to reverse decline on high quality sites while restoration is still possible and practical; to ensure that sites which act as buffer zones to SSSIs are in favourable condition and, in so doing, to increase their value and effectiveness as 'stepping stones' within the context of Norfolk's ecological network; and to identify as quickly as possible any other high quality sites which may be in rapid decline.

Mid-priority sites (rating 2, 3)

There are approximately 400 sites in these two categories. They include

- sites of potential high quality which require survey as potential CWS
- declining or unfavourable CWS of secondary importance due to size or habitat quality
- unvisited sites which have potential but unverified fen communities
- wooded sites which are within 5km of SSSI sites

Low priority sites (rating 4, 5)

There are 78 sites in these lowest categories, which have been reserved in the main for undesignated sites with unverified habitats and those which are not close to SSSI sites. Code 5 has also been used for administrative actions, such as where the status or boundary of an existing CWS needs to be reviewed.

No priority allocated (rating 0)

There are 37 sites where condition is favourable or recovering, current management is appropriate and effective, and no action is specified.

6.2.2 Action categories

Individual actions and priorities have been recommended for 95% of sites. Specified actions have deliberately been kept brief and generic (see table below), rather than detailed and site-specific.

Where more detailed recommendations are required, sites have been identified as needing management advice or management statements. Individual assessments for most sites in this category have already identified the main threats, and the management work that is needed to alleviate them.

The table below lists the categories of action, the types of sites for which the actions are recommended, and an analysis of sites within each category by priority.

No of Sites by Priority Category

Category of action	Type of site	Total sites	1*	1	2	3	4	5	0
Prepare management statement	Mainly for more complex CWS which are in decline or being inappropriately managed	40	9	19	12	-	-	-	-
Apply for HLS	Proposed for CWS where HLS payments would facilitate appropriate management such as grazing	32	8	14	9	1	-	-	-
Facilitate restoration management	For CWS where owners are keen to manage appropriately but may need help eg with finding graziers	15	5	3	4	2	1	-	-
Provide restoration advice	Mainly CWS currently in decline or unfavourable	69	3	25	30	7	4	-	-
Resurvey	For CWS where the original survey is out of date or no longer accurate	2	1	-	-	1	-	-	-
Assess condition of CWS	For CWS not visited since 2004	316	-	82	181	52	1	-	-
Establish ownership	For all sites where ownership is unknown, usually as a precursor to further action (eg assess condition)	223	-	34	42	76	71	-	-
Assess for inclusion as CWS	For undesignated sites potentially of CWS standard	29	-	11	16	2	-	-	-
Assess habitat	Mostly for undesignated sites which have not been visited at all (identified from aerial survey)	147	-	1	5	71	70	-	-
Provide ongoing advice	For CWS where conservation advice is already being given but where further input is desirable	19	-	-	-	19	-	-	-
Review CWS boundary/status	For CWS which may no longer be of appropriate quality	9	1	1	1	4	-	2	-
Undertake more detailed condition assessments	Where earlier visit has been inconclusive, mainly due to inability to access site properly	3	-	-	2	-	1	-	-
Manage recreational usage	On CWS where public access could damage site quality	1	-	-	-	1	-	-	-
No action required	For sites which are already in favourable condition and/or in appropriate management	37	-	-	-	-	-	-	37

7. SUMMARY

7.1 Overview

Many of the larger fen sites, such as Barnham Broom and Garboldisham Old Fen, are used for shooting, or have shooting rights rented out to tenants. In many cases, these sites are deliberately left 'undisturbed' by those responsible for them, which is resulting in their rapid decline. Overcoming such attitudes will potentially be a major hurdle to initiating restoration work, particularly as the potential botanical quality of the site is often not a major concern to the managers who are likely to value the economic return more.

A few sites, such as Hackford Marshes and Wicklewood Mere, are too wet to be managed easily and are becoming invaded by scrub and carr.

By contrast, a few potentially excellent sites, often located on large estates, are used as pasture, sometimes on a commercial scale, and are heavily drained to facilitate cattle access. Over-grazing and drying on these sites are the major issues, and may, again, be difficult to overcome where the land is of economic importance. There also appear to be cases where land not in agricultural production (including fen sites) is being exploited under agri-schemes for options such as cover crops and bird seed mixes, posing yet another threat to such sites, particularly where the crops are 'enhanced' by the use of fertilizers.

External influences, such as peat and sand extraction, appear to have seriously affected water levels on some sites, such as the CWS adjacent to Boughton Fen SSSI/Boughton Fen CWS; while water abstraction appears to be affecting other sites, such as those in the Carbrooke area.

The importance of CWS and other semi-natural sites in helping to buffer SSSIs and improve the connectivity between the most wildlife-rich areas is well-recognised, and particular attention has been given wherever possible to those sites within 5km of wetland/fen SSSIs. Unfortunately, it has not been possible to visit a significant number for a variety of reasons, but sites within 5km of SSSIs have been given a high priority for follow-up work.

One major difficulty in carrying out the project has been the inability to visit many potentially good quality sites, because ownership is unknown and permission to access cannot be obtained. Identifying ownership for these sites has also been established as a high priority for follow-up work, so that condition can be assessed, and appropriate advice or help with restoration management put in place.

7.2 Site Condition

Of the 212 sites visited, nearly two thirds (64%) are classified as either in decline (80 sites; 38%), unfavourable (48 sites; 23%) or destroyed/partly destroyed (6 sites; 3%).

Only one quarter of sites visited (56 sites; 26%) appeared in favourable condition, although a further 6% (12 sites) were in partly favourable and partly unfavourable condition.

Approximately half of the sites in each of the declining and unfavourable categories, and one third of the destroyed/partly destroyed sites, are unmanaged. By contrast, the nine sites in favourable condition that are classified as unmanaged are all woodland sites, where management consists of non-intervention.

7.3 Major Threats

7.3.1 Neglect/scrub encroachment

The greatest overall threats to sites are the related problems of neglect and scrub encroachment/succession. This was considered a significant threat on 97 sites (46% of those visited). Litter build-up was evident in 14 sites (7%), 13 of which were unmanaged.

7.3.2 Drying

Drying, through inappropriate drainage, abstraction or as a result of tree planting, was found to be a threat at 39 of the visited sites (18% of those seen). In two cases, peat extraction on neighbouring land has seriously affected water levels. In other cases, land has been deeply drained to facilitate cattle-access or other management, and abstraction may be the cause of drying in several sites.

Nearly two thirds of these sites (24, or 62%) are within 5km of a SSSI.

Twelve of the SSSI sites listed in the database have two or more fen sites within a maximum distance of 5km which are suffering the effects of drying, and a total of 22 SSSIs have drying sites within 5km.

7.3.3 Inappropriate management

Inappropriate management is a significant threat to 31 sites (15% of visited sites).

This includes, for example, topping without removing arisings; inappropriate stocking densities; use of the land for pheasant or geese rearing; planting of trees in previously open sites.

7.3.4 Over-grazing

This affected 19 of the visited sites (9%), in some cases causing such serious poaching that this was also considered to be a threat to the site. By contrast, inadequate grazing was a problem in only 10 sites.

7.3.5 Other threats

Other smaller threat categories included recreational pressure, affecting nine sites; pollution or enrichment, affecting four sites; and building development, affecting three sites.

8. RECOMMENDATIONS

The recommendations below take forward the work initiated during this project; put in place management work needed to restore declining and unfavourable fen sites; and outline proposals for a number of new, related projects.

8.1 Fen Assessment Project Outputs

Recommendation 1: To encourage the use of the fen digital map and data for planning purposes, grant scheme applications and other land management uses, in such a way as to protect and enhance the fen resource in Norfolk.

To achieve this, outputs from this project need to be distributed to conservation agencies responsible for giving land management advice, and to planning authorities in Norfolk.

Target groups : Planning authorities, Norfolk County Council, Natural England, Environment Agency (EA), Internal Drainage Boards (IDBs), FWAG, Forestry Commission (FC), RSPB, Countryside Projects, land agents, consultancies (as appropriate).

Recommendation 2: To raise the profile of the work that has been undertaken so far, and to increase awareness of the importance and vulnerability of the fen resource in Norfolk.

Target groups: as above.

8.2 Fen Restoration Project (Phase 2)

The purpose of this 'second phase' fen project will be to refine the outputs generated by the Fens Assessment Project, and to implement recommended actions on prioritised fen sites.

Recommendation 3: To draw up a detailed proposal for a Fen Restoration Project, and to obtain funding from potential project partners (see table in 8.3 below)

Recommendation 4: To undertake restoration work and other specified actions for Priority 1* sites, and Priority 1 sites, in liaison with relevant partners.

Recommendation 5: To generate a work programme for the 478 sites which have been allocated lower priority actions.

Recommendation 6: To refine the digital fen map as further site visits are made to improve accuracy both of fen extent and distribution.

Recommendation 7: To upgrade and improve the database as further information becomes available for both listed and new sites.

8.3 Further Projects

The Fens Assessment Project has highlighted the need for a number of other projects, which are detailed in the table below.

- Recommendation 8:* To draw up detailed proposals for a pingo project, to identify, map and assess the condition of pingo sites within Norfolk, with estimated funding requirements
- Recommendation 9:* To draw up detailed proposals for a wet woodland project, to identify, map and assess the condition of these sites within Norfolk, with estimated funding requirements proposals for a further project to map key BAP habitats in Norfolk, using the outputs to inform the ecological network project and help to identify suitable opportunities for habitat creation
- Recommendation 10:* To prioritise these project proposals in consultation with other conservation partners, and to obtain funding.

Project	Aims	Outputs	Related BAPs	Potential Funding Partners
FEN RESTORATION PROJECT	<ul style="list-style-type: none"> - To put in place management on high priority sites - To establish work programme for action on lower priority sites - To further refine digital outputs from Fen Assessment Project 	<ul style="list-style-type: none"> - Improved digital fen map showing more accurate extent of fen resource - More accurate fen database - Work programme for actions resulting from Fen Assessment Project 	<ul style="list-style-type: none"> - Water Vole - Otter - Fen orchid - Black poplar - Wet woodland - Rush pasture 	<ul style="list-style-type: none"> - Norfolk Biodiversity Partnership - Local councils - Environment Agency - Plantlife - Natural England - IDBs
PINGO PROJECT	<ul style="list-style-type: none"> - To identify, map and assess the condition of pingos in Norfolk - To identify sites in need of restoration 	<ul style="list-style-type: none"> - Digital map showing distribution of pingos - Pingo database - List of priority sites for restoration - Management statements for key sites 	<ul style="list-style-type: none"> - Fen - Water vole - Great crested newt - Fen orchid - Wet woodland - Rush pasture 	<ul style="list-style-type: none"> - Norfolk Biodiversity Partnership - Herpetological Trust - Ponds Conservation Trust - Breckland District Council - Environment Agency - British Geological Survey - IDBs
WET WOODLAND PROJECT	<ul style="list-style-type: none"> -To identify, map and assess the extent and condition of wet woodland sites in Norfolk outside the Broads area - To identify high quality sites in need of remedial action -To identify potential sites for new habitat creation 	<ul style="list-style-type: none"> - Digital map showing distribution of wet woodland sites - Wet woodland database - Management statements for key sites - Database of proposed sites for new habitat creation 	<ul style="list-style-type: none"> - Fen - Black poplar - Otter - Great crested newt - Barbastelle/pipistrelle - various invertebrate species 	<ul style="list-style-type: none"> - Norfolk Biodiversity Partnership - Forestry Commission - Woodlands Trust - NCC - Essex and Suffolk Water
BAP HABITAT MAPPING PROJECT	<ul style="list-style-type: none"> - To use existing data sources to produce digital maps of key/BAP habitats across Norfolk - To use these data to help to identify potential sites for habitat creation and to the econet project 	<ul style="list-style-type: none"> - Digital maps showing distribution of habitats - Databases of sites by habitat - Database of potential sites for new habitat creation 	<ul style="list-style-type: none"> - Heath and acid grassland - Lowland grassland - Lowland woodland 	<ul style="list-style-type: none"> - Norfolk Biodiversity Partnership - Local councils - NCC
RSA PROJECT	<ul style="list-style-type: none"> - To identify all fen sites throughout Norfolk at risk of decline or long term loss as a result of drying - To distinguish between sites where drying is caused by abstraction, and where it is caused by drainage - To work with EA and the IDBs to draw up proposals for the long term management of these sites, including restoration plans where necessary 	<ul style="list-style-type: none"> - Database of fen sites in Norfolk at risk of decline or long term loss as a result of abstraction or drainage - Digital map showing distribution of such sites and proximity to key SSSI sites - Management statements for worst affected sites 	<ul style="list-style-type: none"> - Fen - Black poplar - Wet woodland - Rush pasture 	<ul style="list-style-type: none"> - Environment Agency - IDBs