

33 Upland Road  
Ipswich  
Suffolk  
IP4 5BT

tel/fax: 01473 723848  
email: [mike.harding@eco-land-people.demon.co.uk](mailto:mike.harding@eco-land-people.demon.co.uk)

**PLANT COMMUNITIES OF  
THELNETHAM FEN SSSI,  
SUFFOLK**

**KIRSTY SMITH  
MIKE HARDING  
JONNY STONE**

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**On behalf of:  
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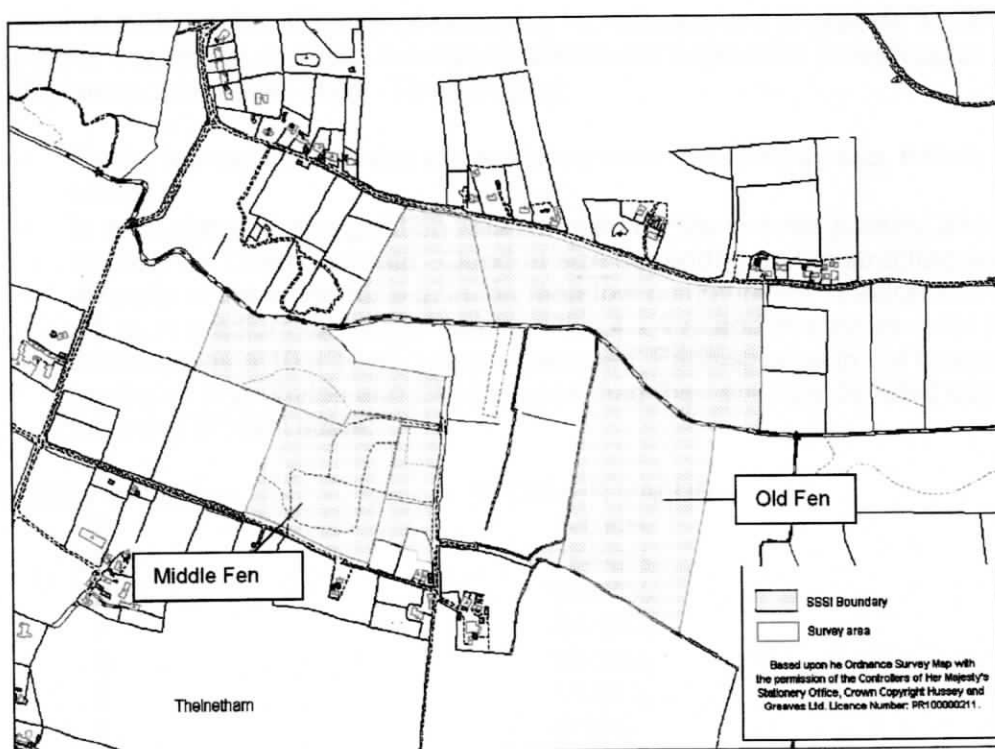
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## 1. INTRODUCTION

Thelnetham Fen (TM 272434) is one of a sequence of calcareous valley fens which run along the Little Ouse AND Waveney Rivers on the Norfolk/Suffolk border<sup>1</sup>. It is approximately 8.3ha in size and consists of two parts. Both areas (Middle and Old fen) fall within the Blo’Norton and Thelnetham fens SSSI, first notified in 1959 for their plant communities associated with open fen (English Nature, 2003). Old fen is situated on the southern edge of the River Ouse, while Middle fen is set back approximately 130m from the river’s edge (Figure 1).

The site is owned by the Thelnetham Poors Trust and is currently on a long term lease to Suffolk Wildlife Trust (who undertake the management of the site).

**Figure 1: Location Of Thelnetham Fen**



<sup>1</sup> Other fens in the sequence include Redgrave and Lopham Fen (on the Waveney), Hinderclay Fen, Blo Norton Fen and Hopton Fen.

## 2. AIMS

A detailed botanical description of the site was conducted in 1991 (Ausden and Harding 1991) using National Vegetation Classification standard procedures. The aims of the 2003 survey are:

- To provide a description of the plant communities of the Fen, twelve years on from the last botanical survey.
- To indicate the conservation value of the various communities and the site as a whole.
- To assess how the plant communities have changed since 1991 and where possible to relate these to the hydrology, management and other factors affecting the fen.
- To provide guidance on the management of the fen in relation to the requirements of the plant communities found.

## 3. METHODS

In order to maintain consistency of surveying techniques, and to provide an effective method of vegetation analysis, the standard National Vegetation Classification (NVC) methodology was used. This involved:

- Firstly, homogenous areas of vegetation were identified by eye, known as stands.
- In each stand, the vegetation was sampled for the species present and their abundance using quadrats. Quadrat size depended on the structure and diversity of the stand for e.g. in fen meadow communities, quadrat size was 2 x 2 m, in medium-tall sedge communities 4 x 4 m and in species-poor reed communities a 10 x 10 m quadrat was used. Each species in the quadrat (including bryophytes and Charophytes) had their abundance rated using the following DOMIN scale:

DOMIN VALUE	% COVER VALUE
10	1-100%
9	76-90%
8	51-75%
7	34-50%
6	26-33%
5	11-25%
4	4-10%
3	Many individuals (scattered)
2	A few individuals (clumped)
1	1-2 individuals

- Significant species that were recorded outside of the quadrat but within the stand were recorded at the foot of the floristic tables. Percentage cover of leaf litter, bare ground and open water (including the depth of water) was recorded for each quadrat.
- Floristic tables were prepared for each homogenous stand. Where five quadrats or more were recorded, the frequency of each species over the quadrats as a whole was calculated and indicated in the last column of the table:



Frequency	Range
V	81-100%
IV	61-80%
III	41-60%
II	21-40%
I	1-20%

- The community types were compared with the data in the NVC handbooks (Rodwell 1990, 1992, 1995) and allocated an NVC community. This community is preceded by a code e.g. "M22" or "S26", and is given a name based on the most common species e.g. M22 is a *Juncus subnodulosus*-*Cirsium palustre* fen meadow as these two plants are typical of the community. The communities are divided into sub-communities, a particularly distinctive type of the main community. They are preceded by a letter, e.g. M22(a), and are also given a name based on characteristic species.
- Botanical names are given according to Stace, 1991. A list of all plants found on the site is given in Section 8, with both botanical and English equivalents.

Two other forms of survey were conducted in 2003 of which some of the results are incorporated within this report. They include a broad soil survey within the Little Ouse valley and a topographical survey of the same area using a LaserPlane. The levels shown are all recorded at Ordnance Datum.

## 4. RESULTS

### 4.1 Presentation of Results

Figures 2-5 show the location of quadrats, stands and NVC communities at Thelnetham fen. Data are presented in Appendix 1, where each stand of vegetation is briefly described, followed by a floristic table showing the data recorded within the quadrats.

### 4.2 Overview Of The Wetland Communities Present

12 NVC fen, grassland and woodland plant communities were found in the study area, in a total of 18 stands of vegetation. The communities are:

MG1 *Arrhenatherum elatius* grassland

(c) *Filipendula ulmaria* sub-community (0.31ha – Old Fen)

M13 *Schoenus nigricans*-*Juncus subnodulosus* mire

(c) *Caltha palustris*-*Galium uliginosum* sub-community (0.07ha – Old Fen, 0.58ha – Middle Fen)

M22 *Juncus subnodulosus*-*Cirsium palustre* fen meadow

(a) Typical sub-community (0.22ha – Middle Fen)

M22 *Juncus subnodulosus*-*Cirsium palustre* fen meadow

(c) *Carex elata* sub-community (0.34ha – Old Fen)

M22 *Juncus subnodulosus*-*Cirsium palustre* fen meadow

(d) *Iris pseudacorus* sub-community (0.67ha – Middle Fen)

M24 *Molinia caerulea-Cirsium dissectum* fen meadow

(a) Typical sub-community (0.03ha – Old Fen)

S24 *Phragmites australis-Peucedanum palustre* fen

(c) *Symphytum officinalis* sub-community (0.35ha – Middle Fen, 0.3ha – Old Fen)

S25 *Phragmites australis-Eupatorium cannabinum* tall-herb fen

(c) *Cladium mariscus* sub-community (0.2ha – Old Fen)

S26 *Phragmites australis-Urtica dioica* fen (0.64 – Old Fen, 0.17ha – Middle Fen)

W2 *Salix cinerea-Betula pubescens-Phragmites australis* woodland

(a) *Alnus glutinosa-Filipendula ulmaria* sub-community (0.94ha – Middle Fen)

W5 *Alnus glutinosa-Carex paniculata* woodland

(a) *Phragmites australis* sub-community ( 2.55ha – Old Fen)

W10 *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland (0.24ha – Old Fen)

In addition there were several intermediate communities:

Intermediate between

M22 *Juncus subnodulosus-Cirsium palustre* fen-meadow

(c) *Carex elata* sub-community

M13 *Schoenus nigricans-Juncus subnodulosus* mire (Total: 0.1ha – Middle Fen)

Intermediate between

M24 *Molinia caerulea-Cirsium palustre* fen meadow

(a) Typical sub-community

M22 *Juncus subnodulosus-Cirsium palustre* fen-meadow (Total: 0.36ha – Old Fen)

In both sites there were small amounts of ruderal communities that were not surveyed (marked on the maps as \*). These areas were approximately 0.09ha on Old Fen and 0.07ha on Middle Fen).

## 5. DISCUSSION

### 5.1 Environmental Changes Since the Previous Survey

Since the 1991 survey, relocation of the chalk groundwater borehole at Redgrave has resulted in the fen being noticeably wetter now than when surveyed twelve years ago. This is despite the survey taking place in a particularly dry summer. There were no other changes in environmental factors affecting the site since the 1991 report (Harding, 1991).

Section 5.2 summarises both the information provided in that report and initial results from the soil and topographical surveys recently conducted.

### 5.2 Geology, Soils and Hydrology

Thelnetham Fen has developed on a shallow shelf of sand that extends over the flanks of the Little Ouse valley to the river. The fen owes its origin to a seepage line of calcium-rich waters, which rise through the pervious Glacial Sands and Gravels along the valley margins forming a series of diffuse seepages. The rising groundwater combined with rainfall maintained the surface of the ground permanently wet, leading to development of a peat layer above the sand.

The natural surface of the fen has been affected several factors:

- the embankment of the river, which has tended to impede soil drainage (Bellamy and Rose, 1961),
- drainage of adjacent peat areas, (particularly the deep dredging of the Little Ouse river in the 1960's)
- lowering of the water table by abstraction in the chalk aquifer at Redgrave
- the subsequent recovery of the local water table since the 1999 relocation of the borehole
- historical peat-digging, which is believed to have produced the hummocky surface of much of the fen.

Monitoring of the response of the chalk aquifer since the borehole was moved has demonstrated significant rises in the groundwater table beneath Thelnetham.

Figure 6 shows a cross-section of Old Fen. This was compiled by the soil coring undertaken in 2003. It shows a layer of watery organic mud lying over a layer of saturated sands and gravels, and covered on the surface by a layer of raw peat. Towards the river, a plug of peat (which is partially humified) exists where the layer of sands and gravels drop away.

When Figure 6 is compared with Bellamy and Rose's diagram (1961) it appears that the body of watery marl present in 1959 has decreased in depth from approximately 1m to its current depth of 30-35cm. This would suggest the surface of the fen has also been lowered due to its floating nature and ties in with observations during the survey of the roots of Alder trees being clearly visible above the fens current surface.

The marl within the watery mud which Bellamy and Rose recorded has all but disappeared. It is likely this has been reduced by a combination of drainage by

deepening of the Little Ouse plus reduced inputs from groundwater due to abstraction.

Coring on Middle Fen shows that it has a similar structure to Old Fen, with more watery organic mud, especially in the central areas of the fen where the surface is particularly unstable.

Surface levels taken on the fen-meadow/mire communities in the centre of Middle fen appear to be varying very little (see Figures 7). Here the ground heights initially fall from 22.83m at the Fen Lane, down to around 22.0m in the southern half of the fen, then drop very gradually another 10cm to 21.90m AOD before reaching the river. Across the site, the base of the peat diggings can be as low as 21.62m but most are approximately 21.9m and concentrated in the south of the site. When the levels were taken in December the freeboard between the northern ditch and the fen surface was only 16cm.

Within Old Fen, surface levels of the fen/mire communities are marginally higher (Figure 8) than was recorded at Middle fen, but within the site itself once again show little variation. At the entrance to the site surface levels begin at 23.0m but rapidly drop down to the fen surface at 22.20m to 22.50m AOD. Height of the peat diggings is generally around 22.18m AOD. Ground levels within the Alder woodland are especially variable however the Oak-Birch woodland is more consistent at 22.70m to 22.90m AOD.

The freeboard between the woodland ground height and the water level in the Little Ouse was approximately 55cm. Water levels in the side ditches surrounding the site were higher than the river and it was observed that there was a substantial flow of water within the ditch on the western boundary of Old Fen. This is of particular significance because where the ditch begins, prior to entering Old fen, the flow is almost non-existent. This would suggest that some other source of water, possibly one or more springs coming in off the sandy terrace somewhere within the alder woodland is discharging into the ditch at a considerable rate. We believe that this ditch is a significant factor and may be draining the site.

### **5.3 Management**

In the 1991 survey, it was recommended that mowing regimes were increased within several of the fen-meadow/mire communities on both Old and Middle fen. In recent years some parts of the fen have been mown more regularly than advised in order to simplify mowing regimes into larger units of management. In general, all of Old fen is mown annually, with the exception of the *Cladium* area being cut on a four year rotation. On Middle Fen approximately 2/3's of the open area is cut annually, with the rest being cut biannually. Scrub clearance has also recently taken place on Middle Fen close to the entrance of the site.

On both sites the paths are mown regularly.

A series of piezometers have also recently been installed across both Old and Middle fen to monitor water levels within the various geological layers.

### **5.4 Ecological Relationships Between Plant Communities**

#### **5.4.1 Patterns in the Plant Communities.**

On Middle Fen, there is a central area of M13c *Schoenus* mire. This has been traditionally referred to as the "spring flush" area, approximating to the probable

location of maximum groundwater seepage. To the west is a small area of M13-M22 mire over peat cutting. This is where the vegetation forms the thinnest, unstable mat over watery mud. Arranged around the M13 and related communities are a number of stands of M22 *Juncus* fen-meadow. Arranged around the M22 is a band of reed dominated fen. This concentric arrangement of communities around the core seepage zone was noted in Ausden and Harding (1991) and has persisted despite changes to management, indicating communities may be principally derived from the hydrological relationship.

Woodland frames the site on three sides.

Old Fen has a similar pattern, with a core central stand of M13 (much reduced in size compared to Middle Fen) surrounded by fen meadows and tall herb fen. Here, however, much of the vegetation is closer to M24 *Molinia* fen-meadow rather than M22 *Juncus* fen-meadow, although the separation is not always straightforward. Old Fen also has a stand of *Cladium* dominated fen deliberately maintained by a four year mowing regime. The site is also surrounded by woodland, this time mostly Alder.

Where the vegetation rises around the margins of old fen, the ground becomes progressively drier. So, Stand 8 on the fen slope has a drier and grassier sward than the adjacent Stand 10, which is on the flat fen surface. Meanwhile, Stand 12 is a very dry and comparatively species-poor *Molinia* grassland. Middle Fen does not exhibit these trends.

On the highest areas of Old Fen, where the substrate becomes markedly more sandy, the vegetation can progress to either W10 *Quercus-Betula-Pteridium* woodland or, where the site is more open, coarse MG1 *Arrhenatherum* grassland. On Middle fen the ground level does not vary sufficiently to produce such communities.

#### **5.4.2 Trends in the Vegetation**

##### Changes Since the 1991 Survey

Since the 1991 survey, the fen/mire communities of Middle fen have shown a gradual improvement in the frequency and abundance of rich-fen species. Most marked of these changes is the development of a richer bryophyte layer, with dry fen species such as *Brachythecium rutabulum* and *Eurhynchium praelongum* being replaced by *Calliargon cuspidatum*, *Campylium stellatum* and a range of rarer fen species. The M13 areas have shown the most marked improvement.

In the M13c-M22 stand on Middle Fen, pools of calcareous oligotrophic water have now been colonised by Charophytes and mosses such as *Drepanocladus revolvens* and *Calliargon giganteum*. In addition the stand now contains flowering *Epipactis palustris* and has shown a substantial increase in overall species-richness.

On Old fen in Stand 9, where the site also now holds pools of water for much of the year, the vegetation is marginally less diverse, but the RWPFSS has increased a little. The area of M24a surveyed in 1991 (now Stand 8) is showing signs of a shift towards an intermediate M24-M13 community. This is especially significant in the light of the borehole relocation.

Those areas where woodland clearance took place approximately 12 years ago have now developed a relatively rich-fen community.



As expected, there has been little floristic change in the woodland communities represented on either Middle or Old Fen. However, the area of W5 woodland on Old Fen is gradually increasing through scrub invasion into the *Phragmites* dominated tall-herb communities.

#### Effects of Mowing

Differences in the frequency of mowing mark out the ranker areas of fen-meadow, which are clearly less floristically diverse. However these areas often contain their own rare species such as *Ophioglossum vulgatum* which do not occur elsewhere on the site. This suggests maintaining some variation in mowing regimes on the site ensures the different preferences of species are being accommodated.

Annual mowing of much of the fen-meadow area on Middle fen appears to have caused a convergence between the stand divisions that were present in the 1991 survey into a single form of M22 *Juncus subnodulosus*-*Cirsium palustre* community. Often this has been accompanied by a decline in the sward of nutrient demanding species such as *Cirsium arvense* and *Galium aparine*.

#### Surface Levels

Within Old Fen, the effects of surface levels (affecting the distance of vegetation from the water table) is shown in the distribution of M24 on the higher ground, M22 on the flat lower ground and M13 where there are hollows from old peat cuttings (see Table 1). It is particularly interesting that there is so little difference in the ground level of M22, and M13 communities on Middle Fen.

**Table 1: Approximate surface level within fen-meadow/mire communities at Thelnetham Fen**

NVC Communities:	Approximate Surface Height		
	M13	M22	M24
Middle Fen	22.07m	22.00m	-
Old Fen	22.26m	22.38m	22.6m

#### Evaluation of Fen Stands for Quality

To obtain an objective method of gauging the quality of wetland communities present the rarity-weighted principal fen species score (RWPFSS), a method developed by Wheeler (1988), was used. This method uses those species that are mostly dependent upon fens for their conservation (as identified by Wheeler) and assigns a score to each species depending on that species rarity. A weighting was devised so that the least frequent species had the highest weighting. Thus the rarity-weighted principal fen species score provides a single number for each stand indicating how important that stands is for fen conservation. The higher the score, the more important the stand is. Table 2 shows the RWPFSS assigned to the stands during the 2003 and 1991 vegetation surveys. Note that non-fen communities are not allocated a score but are recorded in Table 2 for comparisons of species richness between stands.

The following comments can be concluded from this method of evaluation:

- The best scores were achieved in the M13c community of Stands 1 and Stand 3 in Middle fen and Stand 8 (M22c-M13) in Old Fen.

- Highest species-richness was recorded in those stands mown annually.
- *Phragmites* dominated stands received poor RWPFS scores and were floristically species-poor.
- Most stands show improvement in RWPFS over past 12 years, especially mire and fen-meadow communities.
- The data shows that the quality of M13 in terms of RWPFS at Thelnetham Fen is similar to the M13 found at Chippenham Fen but is not as rich as the M13 of Market Weston Fen.

Any evaluation for management purposes must of course take wider factors into account other than value for fen species, such as habitat diversity and value for fauna.

### 5.5 Management Recommendations

Annual cutting of the fen/mire vegetation on both Middle and Old Fen appear to be facilitating the restoration of the plant communities in conjunction with the raising of the water level since the relocation of the borehole. It is essential that cutting continues no less frequently than this in order to maintain low levels of leaf litter and sufficient levels of light for some of the smaller fen species.

Within the taller vegetation in Stands 5, 6, 14 and 16 it appears that leaf litter is steadily accumulating and in some cases species richness declining so that these areas would benefit from more regular cutting. However, this is a minor consideration compared to the mire areas and improved mowing should not deprive the mires of management resources.

The fen-meadow communities of Stand 9 and 10 also show an increase in the quantity of *Juncus subnodulosus* and it may be that an additional cut here in early spring would check this species and allow a richer flora to develop. Stand 12 also has problems with leaf litter density to the point where *Molinia caerulea* dominates the stand so heavily the species richness is especially low. This stand would also benefit from increased management if possible.

Scrub encroachment within the fen-meadow/mire communities is being sufficiently controlled by the current management regime. Observations that Stand 10 (where scrub clearance took place several years ago) has now recovered to a moderately rich fen-meadow community suggests that further scrub/woodland clearance on land at approximately 21.90m to 22.20m AOD on Middle fen and 22.10m to 22.50m AOD on Old fen should also be favourable to fen-meadow reversion as long as annual mowing is implemented after scrub clearance.

Where very dense woodland is cleared, the remaining peat may not support good quality fen because of the action of roots on the peat, the additional aeration and the surface nutrient inputs from leaf fall. We would recommend the surface peat and root layer be scrapped off to a level of 22.07m AOD in Middle Fen and 22.26m AOD in Old Fen. This is the level of M13 on both sites. It is considered from the results of the survey that scrub removal is likely to be most successful on Old Fen.

Table 2: Conservation Assessment of Fen Communities at Theinetham Fen According to the RWPFFS (Wheeler 1988).

Rank	RWPFFS (2003)	Stand Number	Stand Type:	Average no. of sp. per quadrat (2003)	1991 Stand Number	RWPFFS (1991)	Average no. of sp. per quadrat (1991)	Notable species (from 2003 NVC survey)
1	10.07	1	M13c	36	Stand D - M13c	6.95	28	<i>Sch.nig.</i> , <i>Camp stel.</i> , <i>Call gig.</i> , <i>Chilo</i> , <i>Pedic.</i> , <i>P.elat.</i> , <i>Ctenid.</i> , <i>Drepan.</i> , <i>Sang.</i> , <i>C.leip.</i> , <i>Fis ad.</i> , <i>Dact.prae.</i> , <i>Bryum.</i> , <i>Campeloa</i> , <i>C.elat.</i> , <i>C.pulic.</i> , <i>Erio.</i> , <i>C.nigra.</i> , <i>Epip.</i> , <i>Ran flam.</i>
2	7.87	3b	M22c-M13	23	Stand F - M13-M22	7.62	25	<i>Pedic.</i> , <i>Call gig.</i> , <i>C.elat.</i> , <i>Camp stel.</i> , <i>Chara.</i> , <i>Scheo.</i> , <i>Ran flam.</i> , <i>Sang.</i> , <i>Drep.</i> , <i>Clad.</i> , <i>Camp elod.</i> , <i>Dact.prae.</i> , <i>Epip.</i>
3	7.13	8	M24-M13	31	Stand 8 - M24 5 - M22	7.57	26	<i>Camp stel.</i> , <i>Scheo.</i> , <i>Sang.</i> , <i>Fiss ad.</i> , <i>Ctenid.</i> , <i>P.elat.</i> , <i>Dact.prae.</i> , <i>Parnas.</i> , <i>Aneu.</i> , <i>Bryum.</i> , <i>Camp elod.</i> , <i>C.elat.</i> , <i>C.pulic.</i> , <i>Clad.</i>
4	6.75	10	M22-M24	26	Stand 4 - M22	5.45	23	<i>Camp stel.</i> , <i>Clad.</i> , <i>C.elat.</i> , <i>C.lepid.</i> , <i>Fiss ad.</i> , <i>Ranu flam.</i> , <i>Sang.</i> , <i>Anag.</i> , <i>Ctenid.</i> , <i>P.elat.</i>
5	6.72	11	M22c	21	Stand 9 - X1	3.85	17	<i>Bryum.</i> , <i>P.elat.</i> , <i>Sang.</i> , <i>Camp stel.</i> , <i>Clad.</i> , <i>C.elat.</i> , <i>C.lepid.</i> , <i>Fis ad.</i> , <i>Ran flam.</i>
6	6.65	2	M22d	27	Stands J.G - M22a 1 - M27b	7.64 3.12	23 16	<i>C.elat.</i> , <i>Epip.</i> , <i>Pedic.</i> , <i>Chil.</i> , <i>Clad.</i> , <i>Schoe.</i> , <i>Sang.</i> , <i>Dact.prae.</i>
7	6.53	4	M22a	27	Stand E - M22a	5.2	26	<i>Clad.</i> , <i>Sang.</i> , <i>C.elat.</i> , <i>Ophiog.</i> , <i>Schoe.</i> , <i>Camp stel.</i> , <i>Chilo.</i> , <i>Riccar.</i>
8	6.33	3a	M22c-M13	19	Stand F - M13-M22	7.62	25	<i>C.elat.</i> , <i>Chara.</i> , <i>Call gig.</i> , <i>Pedic.</i> , <i>Camp stel.</i> , <i>Ran flam.</i> , <i>Schoe.</i> , <i>Drep.</i> , <i>Cald.</i> , <i>Sang.</i>
9	5.71	9	M13c	21	Stand 7 - M13c	5.68	23	<i>Camp stel.</i> , <i>Scheo.</i> , <i>C.elat.</i> , <i>Clad.</i> , <i>Fiss ad.</i> , <i>Bryum.</i> , <i>P.elat.</i> , <i>Cten.</i> , <i>Ran flam.</i> , <i>Sang.</i>
10	3.94	5	S24c	19	Stand K - M27b M - S26	3.49 2.38	18 10	<i>C.elat.</i> , <i>Sang.</i> , <i>Pedic.</i>
11	3.79	13	S25c	13	Stand 9 - X1	3.85	17	<i>Sang.</i> , <i>Clad.</i> , <i>Schoe.</i>
12	2.96	14	S24c	12	Stand 9 - X1	3.85	17	<i>Clad.</i>
13	2.28	6	S26a	12	Stand H - S26a	2.41	14	-
14	1.46	16	S26a	10	Stand 11 - S26	na	na	<i>C.elata</i>
15	1.37	12	M24a	16	Not surveyed	-	-	<i>Sang.</i> , <i>Clad.</i> , <i>Schoe.</i>

Where a 2003 Stand straddles two previous stands no comparison between surveys has been made unless one of the previous stands formed the main component of the present 2003 stand (indicated by \*)



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## 7. SPECIES LIST

<i>Acer campestre</i>	Field Maple
<i>Acer pseudoplatanus</i>	Sycamore
<i>Agrostis stolonifera</i>	Creeping bent
<i>Alnus glutinosa</i>	Alder
<i>Anagallis tenella</i>	Bog pimpernel
<i>Angelica sylvestris</i>	Angelica
<i>Anthriscus sylvestris</i>	Cow parsley
<i>Arrhenatherum elatius</i>	False oat-grass
<i>Betula pendula</i>	Silver birch
<i>Betula pubescens</i>	Downy birch
<i>Briza media</i>	Common quaking-grass
<i>Calamagrostis canescens</i>	Purple small-reed
<i>Caltha palustris</i>	Marsh marigold
<i>Calystegia sepium</i>	Hedge bindweed
<i>Cardamine pratensis</i>	Cuckoo-flower
<i>Carex acutiformis</i>	Lesser pond sedge
<i>Carex disticha</i>	Brown sedge
<i>Carex elata</i>	Tufted sedge
<i>Carex flacca</i>	Glaucous sedge
<i>Carex nigra</i>	Common sedge
<i>Carex panicea</i>	Carnation sedge
<i>Carex paniculata</i>	Greater tussock sedge
<i>Carex pulicaris</i>	Flea sedge
<i>Carex riparia</i>	Greater pond sedge
<i>Carex sylvatica</i>	Wood sedge
<i>Carex viridula ssp brachyrrhyncha</i>	Long-stalked yellow sedge
<i>Centaurea nigra</i>	Black knapweed
<i>Cerastium fontanum</i>	Common mouse-ear
<i>Cirsium arvense</i>	Creeping thistle
<i>Cirsium dissectum</i>	Meadow thistle
<i>Cirsium palustre</i>	Marsh thistle
<i>Cirsium vulgare</i>	Spear thistle
<i>Cladium mariscus</i>	Saw sedge
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Dactylis glomerata</i>	Cocksfoot
<i>Dactylorhiza praetermissa</i>	Southern marsh orchid
<i>Deschampsia cespitosa</i>	Tufted hair-grass
<i>Dryopteris carthusiana</i>	Narrow buckler fern
<i>Dryopteris dilatata</i>	Broad buckler fern
<i>Epilobium hirsutum</i>	Great willowherb
<i>Epilobium montanum</i>	Broad leaved willowherb
<i>Epilobium parviflorum</i>	Hoary willowherb
<i>Epipactis palustris</i>	Marsh helleborine
<i>Equisetum palustre</i>	Marsh horsetail
<i>Eriophorum angustifolium</i>	Common cotton-sedge
<i>Eupatorium cannabinum</i>	Hemp agrimony

<i>Festuca arundinacea</i>	Tall fescue
<i>Festuca rubra</i>	Red fescue
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Fraxinus excelsior</i>	Ash
<i>Galeopsis tetrahit</i>	Common hemp-nettle
<i>Galium aparine</i>	Cleavers
<i>Galium palustre</i>	Marsh bedstraw
<i>Galium uliginosum</i>	Fen bedstraw
<i>Geranium robertianum</i>	Herb Robert
<i>Geum urbanum</i>	Wood avens
<i>Glechoma hederacea</i>	Ground ivy
<i>Glyceria maxima</i>	Reed sweet-grass
<i>Hedera helix</i>	Ivy
<i>Heracleum sphondylium</i>	Hogweed
<i>Holcus lanatus</i>	Yorkshire fog
<i>Humulus lupulus</i>	Hop
<i>Hydrocotyle vulgaris</i>	Marsh pennywort
<i>Hypericum tetrapterum</i>	Square-stalked St John's-wort
<i>Iris pseudacorus</i>	Yellow iris
<i>Juncus subnodulosus</i>	Blunt-flowered rush
<i>Lathyrus pratensis</i>	Meadow vetchling
<i>Lotus pedunculatus</i>	Greater birds-foot-trefoil
<i>Luzula multiflora</i>	Heath wood-rush
<i>Lychnis flos-cuculi</i>	Ragged-robin
<i>Lycopus europaeus</i>	Gipsywort
<i>Lysimachia nummularia</i>	Creeping-jenny
<i>Lythrum salicaria</i>	Purple-loosestrife
<i>Mentha aquatica</i>	Water mint
<i>Molinia caerulea</i>	Purple moor-grass
<i>Oenanthe lachenalii</i>	Parsely water-dropwort
<i>Ophioglossum vulgatum</i>	Common adder's-tongue
<i>Parnassia palustris</i>	Grass-of-parnassus
<i>Pedicularis palustris</i>	Marsh lousewort
<i>Phalaris arundinacea</i>	Reed canary-grass
<i>Phragmites australis</i>	Common reed
<i>Poa trivialis</i>	Rough meadow-grass
<i>Polygala serpyllifolia</i>	Common milkwort
<i>Potentilla erecta</i>	Tormentil
<i>Prunus spinosa</i>	Blackthorn
<i>Pteridium aquilinum</i>	Bracken
<i>Quercus robur</i>	Pedunculate oak
<i>Ranunculus flammula</i>	Lesser spearwort
<i>Ranunculus repens</i>	Creeping buttercup
<i>Rhamnus catharticus</i>	Buckthorn
<i>Ribes uva-crispus</i>	Gooseberry
<i>Rosa canina</i> agg.	Dog rose
<i>Rubus fruticosus</i> agg.	Bramble
<i>Salix cinerea</i>	Grey willow
<i>Sanguisorba officinalis</i>	Great burnet
<i>Schoenus nigricans</i>	Black bog-rush
<i>Scutellaria galericulata</i>	Skullcap

*Solanum dulcamara*  
*Sonchus arvensis*  
*Sonchus asper*  
*Stellaria media*  
*Succisa pratensis*  
*Taraxacum officinale agg*  
*Typha latifolia*  
*Urtica dioica*  
*Valeriana dioica*  
*Valeriana officinalis*  
*Vibumum opulus*  
*Vicia cracca*

Flowering plants = 110

*Chara vulgaris longibracheata*

*Aneura pinguis*  
*Brachythecium rutabulum*  
*Bryum pseudotriquetrum*  
*Calliergon cuspidatum*  
*Calliergon giganteum*  
*Campylium elodes*  
*Campylium stellatum*  
*Chiloscyphus polyanthus*  
*Cratoneuron commutatum*  
*Drepanocladus revolvens*  
*Eurhynchium praelongum*  
*Eurhynchium speciosum*  
*Fissidens adianthoides*  
*Fissidens taxifolius*  
*Lophocolea bidentata*  
*Plagiomnium affine*  
*Plagiomnium elatum*  
*Plagiomnium undulatum*  
*Pseudoscleropodium purum*  
*Riccardia chamedryfolia*  
*Rhytidiadelphus squarrosus*

Bryophytes = 21

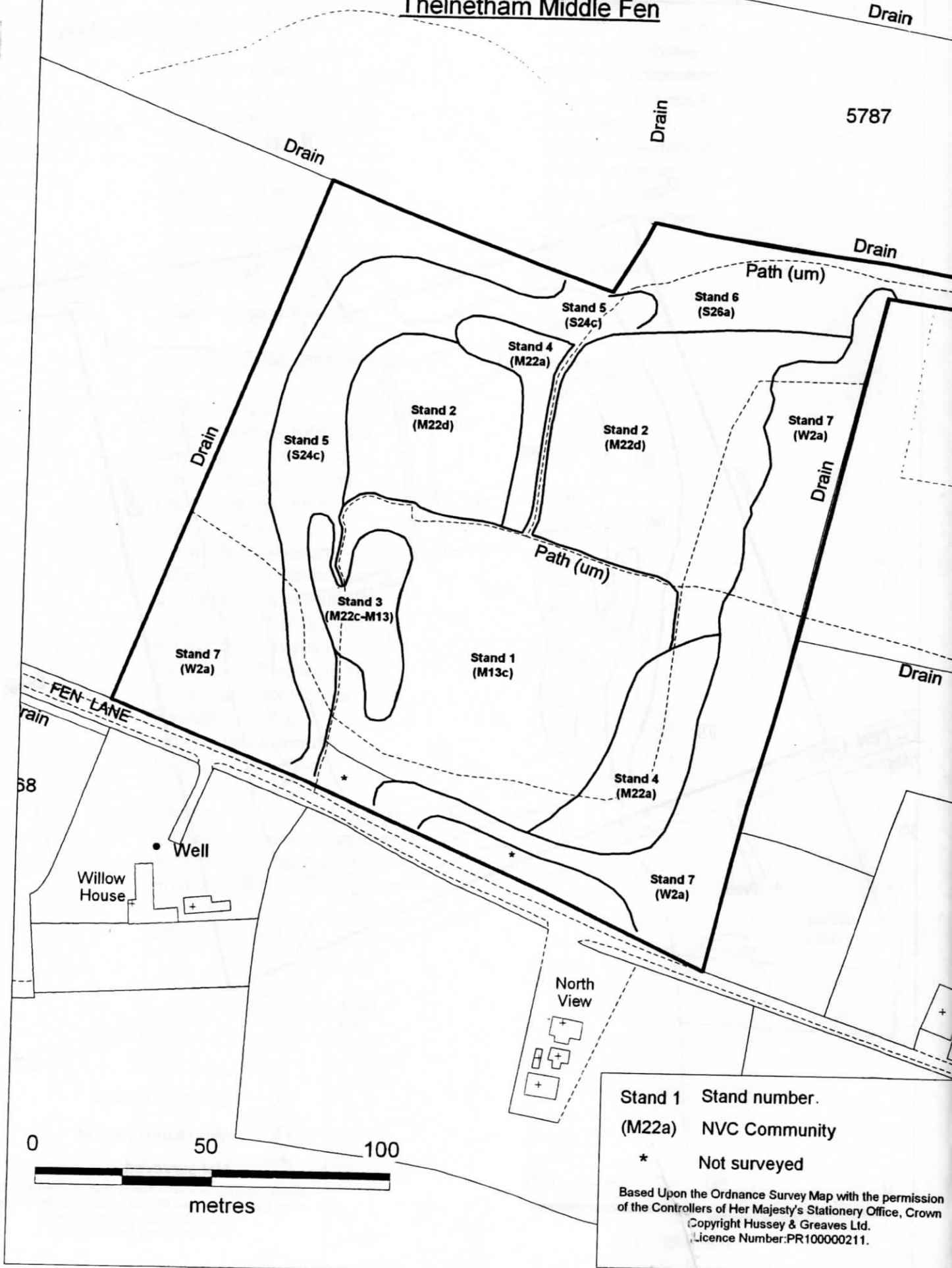
Bittersweet  
Smooth sow-thistle  
Prickly sow-thistle  
Common chickweed  
Devil's-bit scabious  
Dandelion  
Common reedmace  
Common nettle  
Marsh valerian  
Common valerian  
Guelder-rose  
Tufted vetch

Stonewort

Figure 2: Distribution of Quadrats on Theltenham Middle Fen



**Figure 3: Distribution of Stands and NVC Communities at Thelthetham Middle Fen**



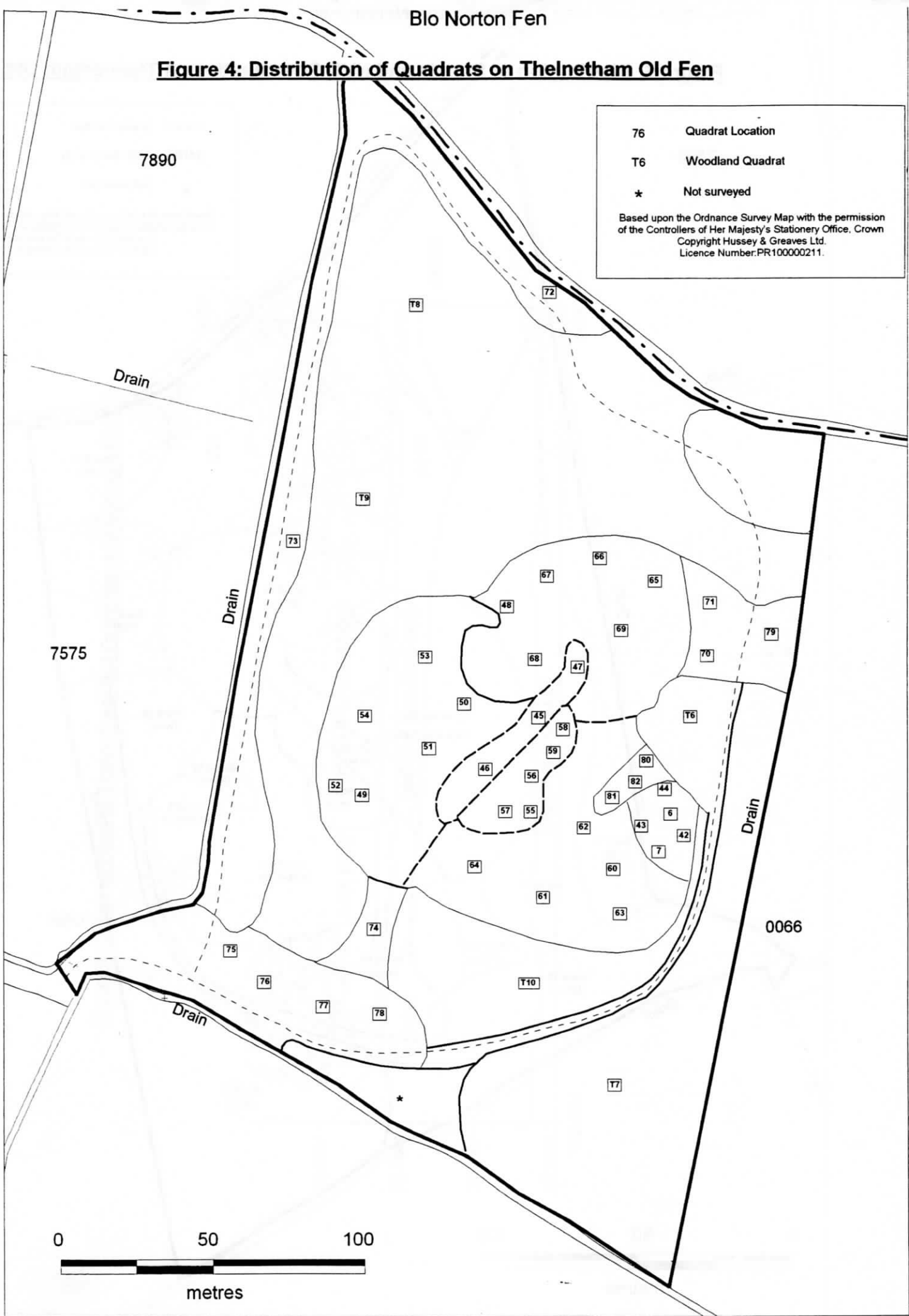
Stand 1 Stand number.  
(M22a) NVC Community  
\* Not surveyed

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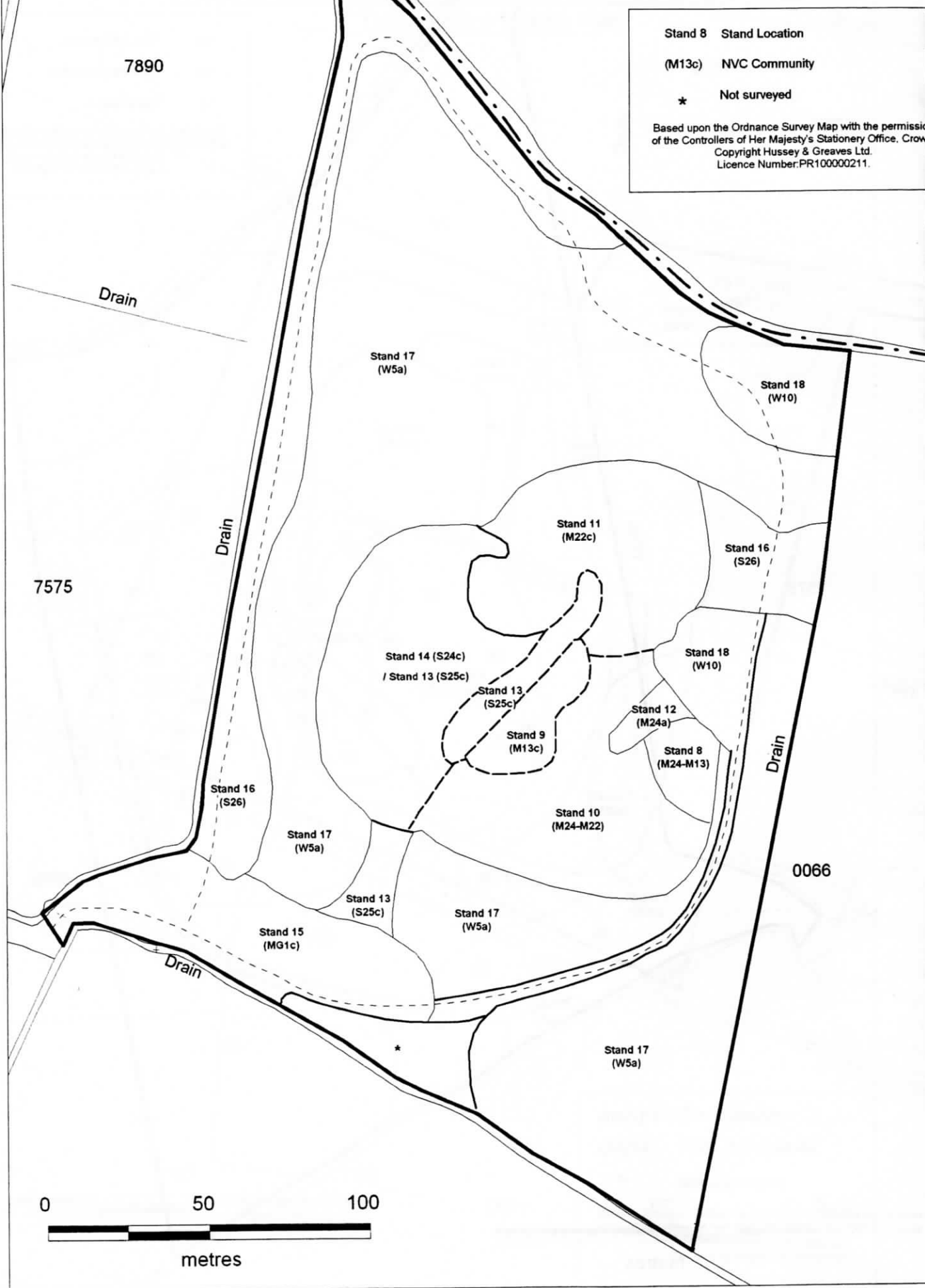
**Figure 4: Distribution of Quadrats on Thelneham Old Fen**

- 76 Quadrat Location
- T6 Woodland Quadrat
- \* Not surveyed

Based upon the Ordnance Survey Map with the permission of the Controllers of Her Majesty's Stationery Office, Crown Copyright Hussey & Greaves Ltd. Licence Number: PR100000211.

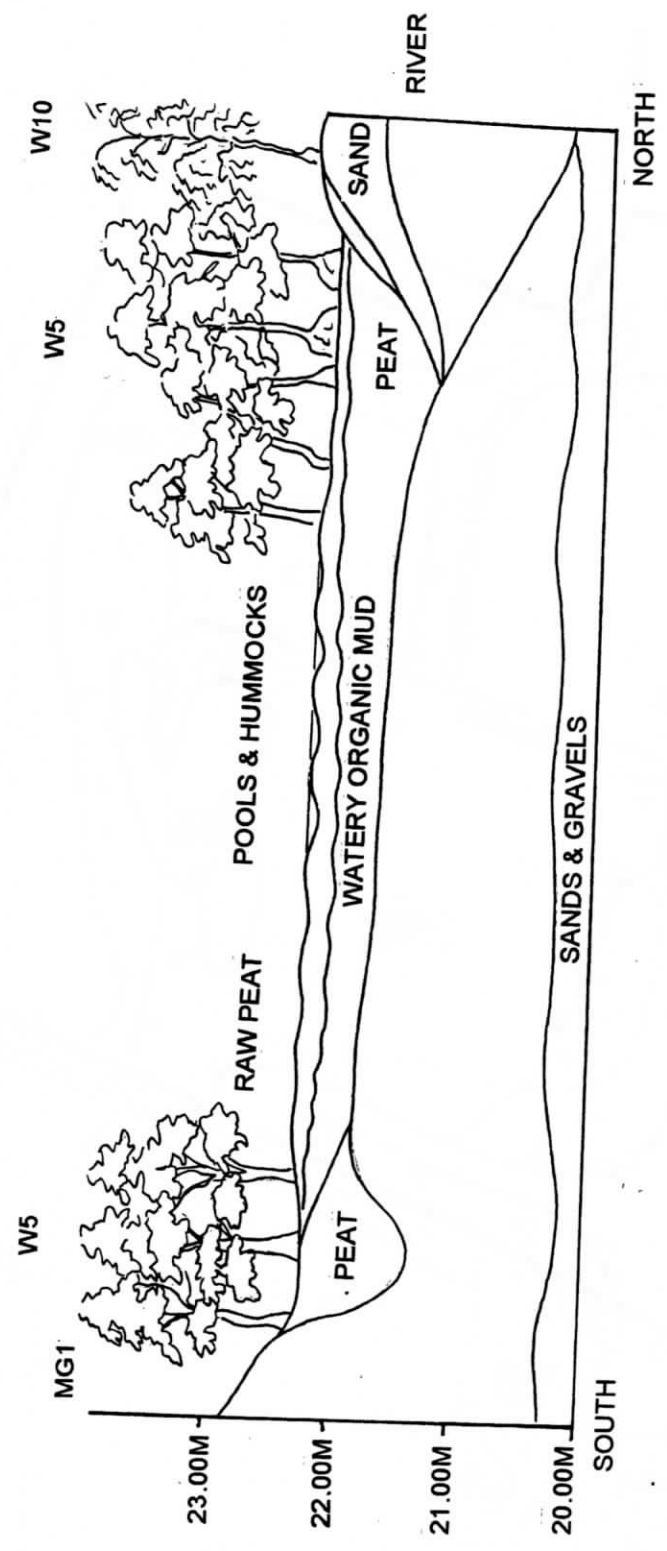


**Figure 5: Distribution of Stands and NVC Communities on Thelneham Old Fen**



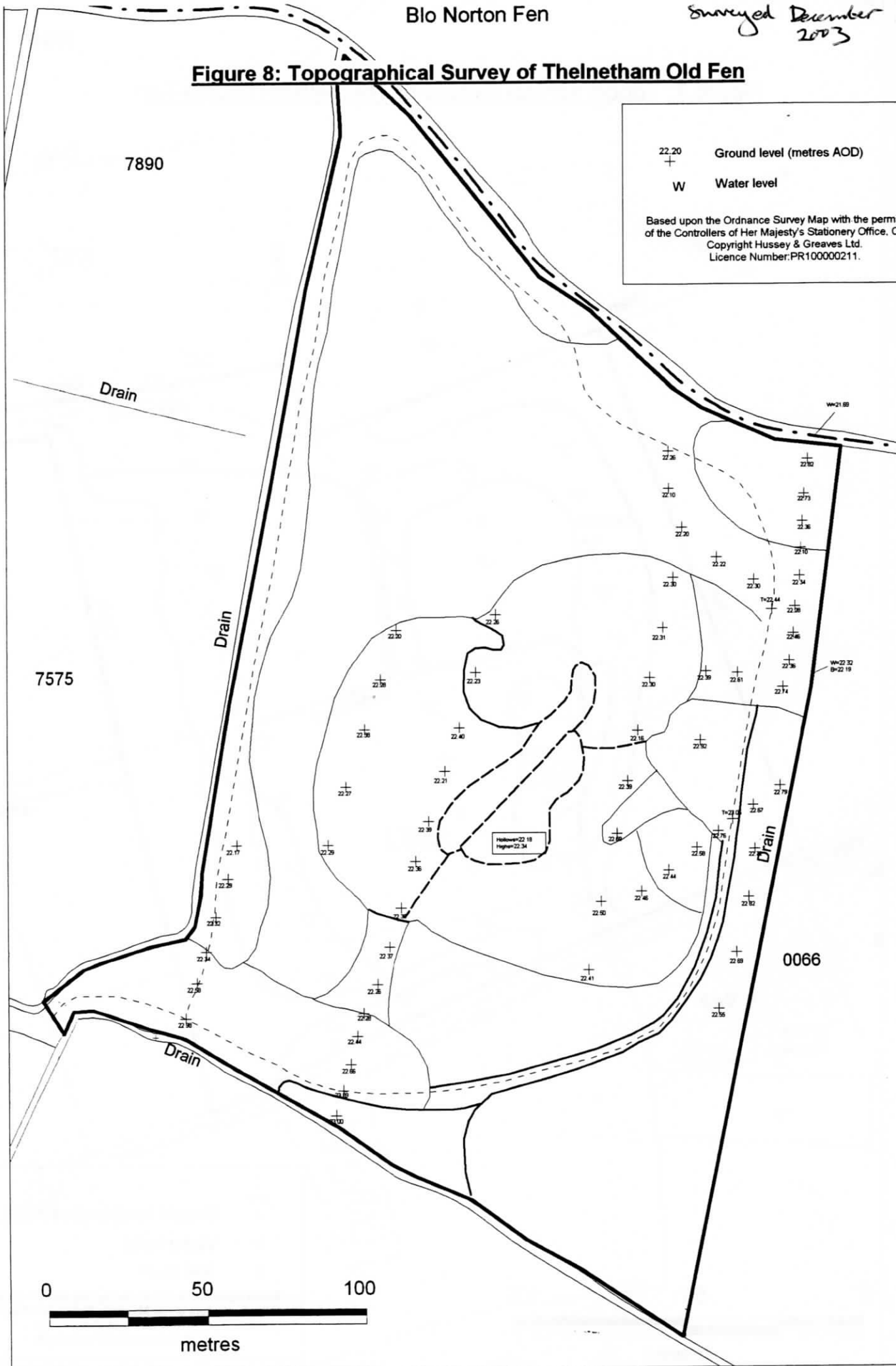


**Figure 6: Cross-section of Thelnetham Old Fen (from soil survey of 2003)**

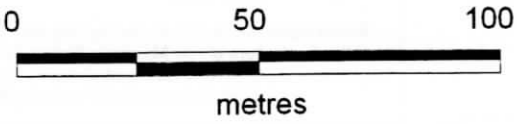




**Figure 8: Topographical Survey of Thelneham Old Fen**



22.20 + Ground level (metres AOD)  
 W Water level  
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**Appendix 1:**

**STAND DESCRIPTIONS & FLORISTIC TABLES**

Thelnetham SSSI: Middle Fen	Stand 1	Date: June - July 2003
<p>M13 <i>Schoenus nigricans</i>-<i>Juncus subnodulosus</i> mire  (c) <i>Caltha palustris</i>-<i>Galium uliginosum</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>This stand represents one of the main fen-meadow compartments on Middle Fen. The substrate is a very moist peat and the topography is mostly flat with small localised depressions (2-20% of ground cover) especially in the southern end of the stand. These shallow depressions contain base-rich, calcareous water. The ground is approximately 22.11m AOD, dropping to 21.93m AOD in the base of the hollows.</p>		
<p><u>Structure:</u></p> <p>The vegetation in Stand 1 is cut annually and consequently has a uniform structure approximately 40cm high. Both leaf litter and bare ground were scarce. No scrub was present.</p>		
<p><u>Composition:</u></p> <p>Stand 1 has a very rich and colourful sward. The field layer is dominated by <i>Schoenus nigricans</i> and <i>Juncus subnodulosus</i> but <i>Molinia caerulea</i> is also a constant here. These monocots are usually accompanied by a variety of herbs of moderate height (such as <i>Succisa pratensis</i>, <i>Valeriana dioica</i>, <i>Filipendula ulmaria</i>, <i>Pedicularis palustris</i>, <i>Angelica sylvestris</i> and <i>Lythrum salicaria</i>). Sprawling plants including <i>Vicia cracca</i> and <i>Galium uliginosum</i> add to the structural diversity of the stand. In addition, a wide range of sedges are usually present including <i>Carex panicea</i>, <i>C. nigra</i>, <i>C. flacca</i>, <i>C. viridula ssp brachyrrhyncha</i>, <i>C. elata</i>, <i>C. disticha</i> and <i>C. pulicaris</i>. This stand is one of the few communities on Thelnetham fen which contains <i>Dactylorhiza praetermissa</i> and <i>Epipactis palustris</i>.</p> <p>The low quantities of leaf litter and very moist conditions here coincide with a diverse bryophyte community, with <i>Calliergon cuspidatum</i> and <i>Campylium stellatum</i> as the dominant species. Other bryophytes characteristic of species-rich fens such as <i>Calliergon giganteum</i>, <i>Chiloscyphus polyanthus</i> and <i>Plagiomnium elatum</i> are all constant associates, supplemented by smaller amounts of <i>Drepanocladus revolvens</i>, <i>Ctenidium molluscum</i>, <i>Bryum pseudotriquetrum</i> and <i>Campylium elodes</i>.</p> <p>Further north in this stand, the reduced frequency of depressions is accompanied by a poorer bryophyte community with no <i>Chiloscyphus polyanthus</i>, <i>Lophocolea bidentata</i>, <i>Pseudoscleropodium purum</i>, <i>Ctenidium molluscum</i>, <i>Drepanocladus revolvens</i> or <i>Fissidens adianthoides</i>. Herbs such as <i>Sanguisorba officinalis</i> and <i>Dactylorhiza</i> are also less frequent here.</p>		
<p><u>Community Affinities:</u></p> <p>The constancy and abundance of <i>Schoenus</i>, accompanied by <i>Molinia</i>, <i>J. subnodulosus</i> and a range of calcicolous sedges, indicate that this stand is a form of MG13 <i>Schoenus nigricans</i> mire. High frequencies of <i>Valeriana dioica</i> and <i>Filipendula ulmaria</i>, in conjunction with the absence of <i>Briza media</i>, <i>Centaurea nigra</i>, <i>Parnassia palustris</i> and <i>Carex hostiana</i>, classify the vegetation as M13c <i>Caltha palustris</i>-<i>Galium uliginosum</i> sub-community. This is a community which can often contain pools of water colonised by <i>Eriophorum angustifolium</i>, <i>Chara</i> sp and <i>Caltha palustris</i>, as was found here. Other semi-aquatic species which can occur in M13c such as <i>Utricularia vulgaris</i> and <i>Potamogeton coloratus</i> were not recorded.</p>		

The diverse bryophyte layer found in stand 1 is a good fit for M13c. Even so, some of the smaller herb species which can occur within the community such as *Anagallis tenella* were not recorded here and consequently, though this stand is species-rich compared to other communities at Thelnetham, it is not as diverse as M13c stands found on other fens such as Market Weston or Chippenham.

Distribution & Conservation Value:

M13c is a community of widespread but local distribution across lowland England and Wales (Rodwell, 1991) and is recognised in the Species and Habitats Directive as having international importance. Though this stand is slightly less species-rich than is typical for M13c, it still contains many species of note, including:

*Schoenus nigricans*, *Sanguisorba officinalis*, *Carex viridula* ssp *brachyrhyncha*, *Carex pulicaris*, *Carex elata*, *Dactylorhiza praetermissa*, *Eriophorum angustifolium*, *Oenanthe lachenalii*, *Chara* sp, *Epipactis palustris*, *Ranunculus flammula*, *Campylium stellatum*, *Chiloscyphus polyanthus*, *Plagiomnium elatum*, *Ctenidium molluscum*, *Drepanocladus revolvens*, *Fissidens adianthoides*, *Bryum pseudotriquetrum*, *Campylium elodes*.

This stand scored the top RWPFS at Thelnetham and is clearly of high conservation value.

Condition & Changes Since 1991 Survey:

In the 1991 survey this stand (D) was also recorded as M13c. Since this time there appears to have been moderate changes in the field layer. Firstly previously unrecorded species including *Eriophorum angustifolium*, *Carex pulicaris*, *Chara*, *Carex nigra* have appeared. Furthermore species such as *Pedicularis palustris* are more abundant now and *Epipactis palustris* was observed flowering here for the first time.

The bryophyte layer has changed through the decline of species preferring drier conditions such as *Brachythecium rutabulum* and *Eurhynchium praelongum*. These have been replaced by rich-fen species such as *Drepanocladus revolvens*, *Ctenidium molluscum*, *Calliergon giganteum* and *Campylium elodes*.

This change in floristic composition indicates that conditions are now considerably wetter than were present in 1991. In 1991 the stand was not particularly typical of M13c due to large amounts of *Cladium* and *Valeriana officinalis* and the lack of *Epipactis palustris*, *Caltha palustris* and *Equisetum palustris*. As the abundance of these species has changed, so the stand is now becoming a better fit with M13c. Species-richness has increased from 28 species per quadrat in 1991 to 36 species in 2003. Thus through continued annual mowing and increased water levels, this stand is in good condition and has shown considerable improvement over the past 12 years.

Quadrat number (2m x 2m)	1	2	3	4	5		30	31
<i>Calliergon cuspidatum</i>	7	7	8	7	6	V (6-8)	8	9
<i>Schoenus nigricans</i>	7	7	6	7	7	V (6-7)	6	6
<i>Juncus subnodulosus</i>	7	6	7	7	7	V (6-7)	8	8
<i>Campylium stellatum</i>	8	8	8	5	6	V (5-8)	6	5
<i>Succisa pratensis</i>	4	6	6	4	4	V (4-6)	4	5
<i>Carex panicea</i>	4	5	5	4	4	V (4-5)	5	5
<i>Molinia caerulea</i>	4	5	4	4	3	V (3-5)	3	4
<i>Calliergon giganteum</i>	4	3	3	2	2	V (2-4)	4	3
<i>Valeriana dioica</i>	3	4	4	4	3	V (3-4)	3	3
<i>Chiloscyphus polyanthos</i>	2	3	3	2	3	V (2-3)		
<i>Filipendula ulmaria</i>	3	3	3	3	2	V (2-3)	3	2
<i>Galium uliginosum</i>	2	3	3	3	2	V (2-3)	1	1
<i>Lophocolea bidentata sl</i>	2	3	3	5	2	V (2-5)		
<i>Pedicularis palustris</i>	3	2	4	2	3	V (2-4)	1	
<i>Plagiomnium elatum</i>	2	3	2	2	2	V (2-3)	1	
<i>Pseudoscleropodium purum</i>	2	1	2	4	1	V (1-4)		
<i>Angelica sylvestris</i>	3	2	2	1	1	V (1-3)		
<i>Lythrum salicaria</i>	1	2	2	1	2	V (1-2)	2	2
<i>Mentha aquatica</i>	2	3	2	2	1	V (1-3)	2	2
<i>Vicia cracca</i>	2	3	3	3	1	V (1-3)		1
<i>Carex nigra</i>	2	2		3	3	IV (2-3)	2	2
<i>Cirsium palustre</i>	2	2		2	1	IV (1-2)	1	
<i>Cladium mariscus</i>		2	3	1	2	IV (1-3)		
<i>Ctenidium molluscum</i>	1		4	3	4	IV (1-4)		
<i>Drepanocladus revolv</i>	4	2		2	4	IV (2-4)		
<i>Equisetum palustre</i>	2		3	3	2	IV (2-3)		
<i>Festuca rubra</i>	3	3		4	1	IV (1-4)	2	2
<i>Dactylorhiza majalis praetermissa</i>	1	2	2		1	IV (1-2)		
<i>Hydrocotyle vulgaris</i>	3	3	2		3	IV (2-3)		2
<i>Phragmites australis</i>		3	3	1	1	IV (1-3)	2	2
<i>Sanguisorba officinalis</i>	3	3	3			III (3)		
<i>Carex flacca</i>	2	2	2			III (2)		3
<i>Carex lepidocarpa</i>	2		3		2	III (2-3)		
<i>Fissidens adianthoides</i>	3	3	3			III (3)		
<i>Fraxinus excelsior seedling</i>	2	1		1		III (1-2)		
<i>Bryum pseudotriquetrum</i>		2	2		1	III (1-2)		
<i>Campylium eloides</i>	1		2	1		III (1-2)		1
<i>Carex elata</i>		3			2	II (2-3)	3	
<i>Fissidens taxifolius</i>				2	2	II (2)		
<i>Plagiomnium affine</i>		2	2			II (2)		
<i>Acer pseudoplatanus seedling</i>				1	1	II (1)		1
<i>Carex disticha</i>		2				I (2)	2	2
<i>Carex pulicaris</i>					1	I (1)		
<i>Deschampsia cespitosa</i>	1					I (1)		
<i>Epilobium parvifolium</i>				1		I (1)		1
<i>Eriophorum angustifolium</i>		3				I (3)		
<i>Holcus lanatus</i>				2		I (2)		
<i>Oenanthe lachenalii</i>				1		I (1)		
<i>Quercus robur seedling</i>					1	I (1)		
<i>Sanguisorba officinalis</i>				2		I (2)		
<i>Valeriana officinalis</i>					1	I (1)		
<i>Salix seedling</i>							1	1
<i>Agrostis stolonifera</i>								1
<i>Lathyrus pratensis</i>							1	
Total species:	35	37	33	36	38		23	25

<i>Lathyrus pratensis</i>					
Total species:	35	37	33	36	38

1	
23	25

Vegetation height (cm)	40	40	40	50	40
Vegetation cover (%)	90	90	90	90	85
Bryophyte cover (%)	95	90	95	90	75
Bare ground (%)	2	10	5	2	5
Leaf litter (%)	5	3	5	5	0
Open water (%)	5	10	0	2	20

40	50
90	95
70	90
20	5
1	5
0	0

Also recorded in this community:

*Chara* spp  
*Epipactis palustris*  
*Eupatorium cannabinum*  
*Festuca arundinacea*  
*Hypericum tetrapterum*

*Iris pseudacorus*  
*Lotus uliginosus*  
*Lychnis flos-cuculi*  
*Ranunculus flammula*  
*Viburnum opulus*



Thelnetham SSSI: Middle Fen	<b>Stand 2</b>	Date: June - July 2003
<p>M22 <i>Juncus subnodulosus-Cirsium palustre</i> fen-meadow (d) <i>Iris pseudacorus</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>Stand 2 represents the other main area of fen-meadow on Middle fen. It is divided into two areas by a thin, linear stand of taller vegetation running alongside the footpath. Both halves of Stand 2 lie on moist peaty soil, with the eastern area being somewhat uneven underfoot. Occasionally the ground is low enough to contain open water but only to a depth of 1-3cm. The ground ranges from 21.80m to 22.07m AOD.</p>		
<p><u>Structure:</u></p> <p>This is a moderately tall (60cm) and uniform stand with 100% vegetation cover. Approximately 25% of the ground is bare and leaf litter accounts for a further 40%.</p>		
<p><u>Composition:</u></p> <p><i>Juncus subnodulosus</i> is the dominant species within the stand, with constant associates of <i>Carex panicea</i>, <i>C. acutiformis</i>, <i>C. disticha</i> and <i>Phragmites australis</i>. <i>Carex elata</i> is also a prominent element of the vegetation. The most abundant herbaceous species found were generally a mix of moderately tall species (e.g. <i>Filipendula ulmaria</i>, <i>Lythrum salicaria</i>, <i>Oenanthe lachenalii</i>, <i>Angelica sylvestris</i>) and tall species (e.g. <i>Eupatorium cannabinum</i>, <i>Iris pseudacorus</i>). This, combined with the abundance of sprawling species such as <i>Galium uliginosum</i> and <i>G. palustre</i>, gives the sward a more untidy appearance than was seen in Stand 1.</p> <p>Rarer species recorded in Stand 1 (such as <i>Pedicularis palustris</i>, <i>Epipactis palustris</i> and <i>Schoenus nigricans</i>) occur much less frequently in this stand. The bryophyte layer is heavily dominated by <i>Calliergon cuspidatum</i>, with small amounts of more shade-tolerant species such as <i>Plagiomnium affine</i>, <i>P. undulatum</i> and <i>Fissidens taxifolius</i>. Consequently species-richness is considerably less here.</p>		
<p><u>Community Affinities:</u></p> <p>The dominance of <i>Juncus subnodulosus</i> accompanied by <i>Molinia caerulea</i> and <i>Filipendula ulmaria</i> is typical of M22 <i>Juncus-Cirsium</i> fen-meadow. Classification down to sub-community is more difficult due to the absence here of many of the characteristic species of the sub-communities. However the presence in the stand of <i>C. elata</i>, accompanied by <i>C. acutiformis</i>, <i>Iris pseudacorus</i> and <i>Valeriana officinalis</i> bears most resemblance to the Iris sub-community M22d. The floristic composition of M22d is very similar to the middle tier of vegetation which is found in <i>Phragmitetalia</i> fen. It is likely that the mowing which takes place annually here is preventing this stand from succeeding to <i>Phragmites australis</i> tall-herb fen (as is seen in Stand 5).</p>		

Quadrat number (2m x 2m)	14	15	16	17	18	22	23	
<i>Juncus subnodulosus</i>	9	9	9	9	9	9	9	V (9)
<i>Calliergon cuspidatum</i>	8	6	6	7	6	6	7	V (6-8)
<i>Carex panicea</i>	6	6	5	6	5	4	4	V (4-6)
<i>Carex acutiformis</i>	6	5	4	5	4	5	4	V (4-6)
<i>Filipendula ulmaria</i>	4	5	4	5	4	4	3	V (3-5)
<i>Phragmites australis</i>	4	3	3	3	3	3	3	V (3-4)
<i>Carex disticha</i>	4	2	2	2	2	2	2	V (2-4)
<i>Mentha aquatica</i>	3	2	2	3	3	2	2	V (2-3)
<i>Lythrum salicaria</i>		2	2	2	2	2	2	V (2)
<i>Oenanthe lachenalii</i>	2	3	3	3	1		2	V (1-3)
<i>Valeriana officinalis</i>	1	2	3	3	2	2	1	V (1-3)
<i>Galium uliginosum</i>	1	1	2	2	2	3	2	V (1-3)
<i>Vicia cracca</i>	2	1	2	2	3	3	3	V (1-3)
<i>Angelica sylvestris</i>	1	1	1	2	1	2	1	V (1-2)
<i>Plagiomnium affine</i>	3		1	2	2	1		IV (1-3)
<i>Succisa pratensis</i>		1	2	2	1	3		IV (1-3)
<i>Cirsium palustre</i>	1	1		1		2	2	IV (1-2)
<i>Festuca arundinacea</i>			2			2	2	III (2)
<i>Galium palustre</i>	3	3	2					III (2-3)
<i>Eupatorium cannabinum</i>	2		3	2	1			III (1-3)
<i>Agrostis stolonifera</i>			2	1			2	III (1-2)
<i>Carex elata</i>	2	1		1				III (1-2)
<i>Hydrocotyle vulgaris</i>		1	2		2		2	III (1-2)
<i>Iris pseudacorus</i>	1	2		2			2	III (1-2)
<i>Salix cinerea</i>		2		2			1	III (1-2)
<i>Scutellaria galericulata</i>	1	1	1				2	III (1-2)
<i>Valeriana dioica</i>	2	1		2		2		III (1-2)
<i>Holcus lanatus</i>	1			1	1		1	III (1)
<i>Equisetum palustre</i>	3	3						II (3)
<i>Cardamine pratensis</i>	3			2				II (2-3)
<i>Acer pseudoplatanus seedling</i>	2					1		II (1-2)
<i>Epipactis palustris</i>				1	2			II (1-2)
<i>Plagiomnium undulatum</i>	2					1		II (1-2)
<i>Pedicularis palustris</i>	1	1						II (1)
<i>Epilobium parvifolium</i>				1	1			II (1)
<i>Arrhenatherum elatius</i>								I (1)
<i>Betula pubescens seedling</i>						1		I (1)
<i>Chiloscyphus polyanthos</i>					1			I (1)
<i>Cladium mariscus</i>		1						I (1)
<i>Festuca rubra</i>		1						I (1)
<i>Fissidens taxifolius</i>					3			I (3)
<i>Fraxinus excelsior seedling</i>	1							I (1)
<i>Galium aparine</i>	2							I (2)
<i>Hypericum tetrapterum</i>							1	I (1)
<i>Lophocolea bidentata sl</i>					2			I (2)
<i>Molinea caerulea</i>						2		I (2)
<i>Populus seedling</i>						1		I (1)
<i>Quercus robur seedling</i>						1		I (1)
<i>Sanguisorba officinalis</i>	3							I (3)
<i>Schoenus nigricans</i>			1					I (1)
<i>Viburnum opulus</i>					2			I (2)
Total species:	30	27	23	28	25	24	23	

Vegetation height (cm)	50	60	60	60	60	60	60
Vegetation cover (%)	100	100	100	100	100	100	100
Bryophyte cover (%)	50	30	40	40	30	30	40
Bare ground (%)	30	20	20	20	30	20	20
Leaf litter (%)	20	50	40	40	35	50	30
Open water (%)	0	0	0	0	5	0	10
Water depth (cm)	0	0	0	0	1	0	3

Also recorded in this community:

*Dactylorhiza majalis praetissima*  
*Lotus uliginosus*  
*Lychnis flos-cuculi*

*Sonchus oleraceus*  
*Phalaris arundinacea*

Thelnetham Middle Fen SSSI	Stands 3a & b	Date: June - July 2003
<p>Intermediate between:  M22 <i>Juncus subnodulosus</i>-<i>Cirsium palustre</i> fen-meadow  (c) <i>Carex elata</i> sub-community and  M13 <i>Schoenus nigricans</i> mire</p>		
<p><u>Location &amp; Substrate:</u></p> <p>Stands 3a and b occur in a zone of uneven ground lying just to the east of the footpath in the southern half of the fen. In the depressions (Stand 3a) base-rich oligotrophic water covers much of the ground and is 6-10cm deep even in early summer. Between these pools (Stand 3b), standing water can still be present but is generally only 2-4cm deep. The ground is approximately 22.13m AOD, dropping to 21.84m AOD in the depressions.</p>		
<p><u>Structure:</u></p> <p>Within the pools of stand 3a, vegetation is rather patchy (50-90% of total cover) and uneven (averaging 40cm in height). There is no bare ground and very little leaf litter is visible due to water logging. In stand 3b the vegetation structure is also somewhat uneven but is only 20-40cm high. Once again there is little bare ground but small amounts of leaf litter are present.</p>		
<p><u>Composition:</u></p> <p><u>Within the pools (Stand 3a):</u>  The vegetation here is marked by an abundance of <i>Carex elata</i>, giving the community a distinctive bright green appearance. Small amounts of <i>C. disticha</i>, <i>Phragmites australis</i> and <i>Juncus subnodulosus</i> are also usually present. Tall herbs including <i>Lythrum salicaria</i>, <i>Filipendula ulmaria</i> and <i>Pedicularis palustris</i> occur here in small quantities around the pool margins. Beneath the surface of the water, <i>Chara vulgaris longibracheata</i> can be abundant and is often found growing with rich-fen bryophytes such as <i>Calliergon giganteum</i> and <i>Drepanocladus revolvens</i>. Sometimes a thin mat of filamentous algae is also present in small quantities.</p> <p><u>On higher ground between the pools (Stand 3b):</u>  Here the greater abundance of <i>Pedicularis palustris</i> and <i>Juncus subnodulosus</i> give the community a fen-meadow appearance. <i>Agrostis stolonifera</i>, <i>Equisetum palustris</i> and <i>Molinia caerulea</i> are much more abundant than Stand 3a and species found within the pools (such as <i>Chara vulgaris longibracheata</i> and Algae) are less frequent. Otherwise the two communities of Stand 3 are very similar.</p>		
<p><u>Community Affinities:</u></p> <p>Although Stands 3a and 3b have obvious differences in the floristic composition, both initially appear to be a form of M22c <i>Juncus-Cirsium</i> fen-meadow of the <i>Carex elata</i> sub-community. In particular, through the quantities of <i>C. elata</i>, <i>Phragmites australis</i>, <i>Lythrum salicaria</i> and <i>Hydrocotyle vulgaris</i>. However this is not an ideal match as certain elements of the stand, such as the well-developed bryophyte layer and presence of <i>Schoenus nigricans</i>, is more reminiscent of M13 <i>Schoenus</i> mire. Consequently this stand has been classified as an intermediate between M22c and M13.</p>		

Distribution & Conservation Value:

M22 has a widespread distribution across the lowlands of England and Wales. M13 has a more localised distribution and is recognised as internationally important in the Species and Habitats directive. Both versions of the stand contain the notable species including:

*Pedicularis palustris*, *Calliergon giganteum*, *Carex elata*, *Campylium stellatum*, *Chara vulgaris longibracheata*, *Schoenus nigricans*, *Ranunculus flammula*, *Drepanocladus revolvens*, *Cladium mariscus* and *Oenanthe lachenalii*.

However Stand 3b also contains *Campylium elodes*, *Dactylorhiza praetermissa* and *Epipactis palustris*. Consequently stand 3b receives a higher RWPFS than stand 3a. Both these sub-stands are of high conservation value.

Condition & Changes Since 1991 Survey:

In 1991 this area was recorded as M13-M22 (Stand F). During that survey, no standing water was present on the surface of the fen and no division was made between the vegetation of the pools and the higher ground. In the 2003 survey water levels had clearly risen, permitting the development of pools containing *Chara vulgaris longibracheata* and rich-fen bryophytes. The area is annually mown and there is much less litter here now than was recorded in 1991. Comparisons between species-richness over time suggest the sward has deteriorated since 1991 however this is likely to be due to no previous division between the pools and the higher ground.

It should be noted that the area of stand 3 has increased over the past 12 years.

Stand 3a  
Pools

Quadrat number (2m x 2m)	8	9	12	27	28	
<i>Calligon cuspidatum</i>	3	7	7	3	3	V (3-7)
<i>Calligon giganteum</i>	5	5	4	4	2	V (2-5)
<i>Carex disticha</i>	3	4	3	2	2	V (2-4)
<i>Phragmites australis</i>	3	3	2	4	3	V (2-4)
<i>Juncus subnodulosus</i>	4	4	2	2	1	V (1-4)
<i>Lythrum salicaria</i>	2	2	2	2	1	V (1-2)
<i>Mentha aquatica</i>	1	2	1	1	1	V (1-2)
<i>Filipendula ulmaria</i>	1	2	1	1	1	V (1-2)
<i>Hydrocotyle vulgaris</i>	1	2	1	2	1	IV (1-2)
<i>Succisa pratensis</i>	1	1	1	1	1	IV (1)
<i>Campylylum stellatum</i>	3	2	1	1	2	III (2-3)
<i>Schoenus nigricans</i>	2	2	1	1	1	III (1-2)
<i>Carex elata</i>	9	8	9	9	7	V (7-9)
Algal mat	2	3	3	3	3	V (2-3)
	6	7	6	6	8	V (6-8)
<i>Chara spp</i>	3	2	1	1	1	V (1-3)
<i>Pedicularis palustris</i>		1		1	1	II (1)
<i>Carex panicea</i>				1	1	I (1)
<i>Equisetum palustre</i>	1					I (1)
<i>Sanguisorba officinalis</i>						I (1)
<i>Agrostis stolonifera</i>						I (1)
<i>Mollinea caerulea</i>						I (1)
<i>Plagiominium affine</i>						I (1)
<i>Cirsium palustre</i>						III (1-2)
<i>Ranunculus flammula</i>		2	2	1	1	II (5)
<i>Drepanocladus revolvens</i>	5	1		5	1	II (1)
<i>Acer pseudoplatanus seedling</i>		1	1	1	1	II (1)
<i>Oenanthe lachenalii</i>		1				I (1)
<i>Carex acutiformis</i>		1				I (1)
<i>Cladium mariscus</i>		1				I (1)
<i>Epilobium parvifolium</i>		1		1	1	I (1)
<i>Galium palustre</i>				1		I (1)
<i>Iris pseudacorus</i>		1				I (1)
<i>Valeriana dioica</i>		1				I (1)
<i>Valeriana officinalis</i>		1				I (1)

Stand 3b  
Ridges

	10	11	13	26	29	
	3	2	4	4	4	IV (3-4)
	2	3	2	4	3	V (2-4)
	2	3	3	2	2	V (2-3)
	6	5	6	7	7	V (2-3)
	3	3	3	3	2	V (5-7)
	1	1	3	2	2	V (2-3)
	2	2	3	3	2	IV (1-3)
	1	1	1	3	2	V (2-3)
	5	6	5	5	3	V (1-3)
	4	3	2	4	4	IV (5-6)
	2	4	4	4	3	IV (2-4)
						V (2-4)
	5	3	4	2	2	I (2)
	6	7	6	6	5	IV (2-5)
		3	3	3	3	IV (3)
		3	2	1	4	IV (1-4)
	2	3	2	2	1	III (1-2)
	1	2	3	2	1	V (1-3)
		2	1	2	1	III (1-2)
		2	2	1	1	II (1-2)
			1	1	1	II (1)
	2	2	1	1	1	III (1-2)
	4	2	3	2		II (3-4)
	1	2	2	1	1	III (1-2)
						II (1)
	2		2			II (2)
			2	1	1	II (1-2)
						I (1)

<i>Calystegia sepium</i>							
<i>Campylopus eloides</i>							
<i>Carex acutiformis</i>							
<i>Dactyloctenium aegyptium</i>							
<i>Epipactis palustris</i>							
<i>Fissidens taxifolius</i>							
<i>Galium uliginosum</i>							
Total species:	18	25	17	19	16		

Vegetation height (cm)	40	40	40	40	50
Vegetation cover (%)	75	80	75	90	50
Bryophyte cover (%)	60	40	40	40	10
Bare ground (%)	0	0	0	0	0
Leaf litter (%)	2	0	0	2	2
Open water (%)	90	95	95	80	95
Water depth (cm)	6	8	10	10	10



			1				1 (1)
	1			1			1 (1)
	1						1 (1)
	1						1 (1)
				1			1 (1)
						1	1 (1)
22	21	27	26	20			

30	30	30	20	40
80	90	80	80	80
40	40	30	50	15
5	0	5	0	15
5	20	20	30	30
70	40	30	20	10
4	2	2	2	2

Also recorded in this community:  
*Lychnis flos-cuculi*



Thelnetham SSSI: Middle Fen	Stand 4	Date: June - July 2003
M22 <i>Juncus subnodulosus</i> - <i>Cirsium palustre</i> fen-meadow (a) Typical sub-community		
<p><u>Location &amp; Substrate:</u></p> <p>Consisting of two narrow strips bordering the fen-meadow and mire communities of Stands 1 and 2. Situated on relatively flat, moist soils with occasional pools of standing water (2-3cm deep). The ground height ranges from 21.91m to 22.19m AOD.</p>		
<p><u>Structure:</u></p> <p>A tall, closed sward approximately 60-70cm high, with moderate-heavy leaf litter (50-75%) and only small amounts of bare ground.</p>		
<p><u>Composition:</u></p> <p><i>Juncus subnodulosus</i> heavily dominates the sward of Stand 4, constantly accompanied by <i>Carex disticha</i>, <i>C. panicea</i> and tall herbs such as <i>Filipendula ulmaria</i>, <i>Angelica sylvestris</i> and <i>Valeriana dioica</i>. Grasses are generally not abundant (mainly <i>Molinia caerulea</i> and <i>Festuca rubra</i>) however bulky sedges such as <i>Cladium mariscus</i> and <i>Carex elata</i> are frequent. Small amounts of shade tolerant species such as <i>Lysimachia nummularia</i> and <i>Ophioglossum vulgatum</i> can also be found here.</p> <p>The rank appearance of the sward is due to the presence of sprawling species such as <i>Galium uliginosum</i>, <i>Vicia cracca</i>, <i>Lathyrus pratensis</i> and <i>Galium palustre</i>. Overtopping this, the whole of the stand contains a sparse layer of <i>Phragmites australis</i> and is dotted by <i>Salix</i> and <i>Fraxinus excelsior</i> seedlings and saplings.</p> <p>The bryophyte layer is dominated by <i>Calliergon cuspidatum</i> with very occasional <i>Campylium stellatum</i>, <i>Chiloscyphus polyanthus</i> and <i>Riccardia chamedryfolia</i> (where quadrates were recorded in the wetter areas).</p>		
<p><u>Community Affinities:</u></p> <p>The dominance of <i>Juncus subnodulosus</i> accompanied by a range of impoverished fen vegetation clearly gives this stand affinities to M22a <i>J. subnodulosus</i>-<i>Cirsium palustre</i> fen-meadow of the Typical sub-community. Stand 4 is perhaps slightly richer in species per quadrat than is typical of M22a due to the increased frequency of sedge species. In addition, this version has a greater frequency of tall herbs such as <i>Lythrum salicaria</i>, <i>Valeriana officinalis</i>, <i>Angelica sylvestris</i> as well as occasionals of note such as <i>Sanguisorba officinalis</i> and <i>Scutellaria galericulata</i> than is generally recorded.</p>		



Distribution & Conservation Value:

M22a is a widespread community within lowland Britain. This particular example contains several species of note including *Sanguisorba officinalis*, *Oenanthe lachenalii*, *Carex elata*, *Ophioglossum vulgatum*, *Schoenus nigricans*, *Campylium stellatum* and *Chiloscyphus polyanthus*. It is also the only stand where *Riccardia chamedryfolia* was recorded.

Consequently it is of moderate conservation value.

Condition & Changes Since 1991 Survey:

In 1991 this area was also recorded as M22a (Stand E). Over the past 12 years there appear to have been few floristic or geographical changes. Species-richness in both surveys is approximately 27 species per quadrat and the stand received a moderate RWPFSS on both occasions.

Comparisons between the rank appearance of this stand and adjacent, richer stands (1 and 2) suggest a difference in management history. Possibly Stand 4 has received less frequent cutting in the past which has allowed more competitive species to take hold. However the resulting increased shade appears to suit species such as *Ophioglossum vulgatum* which was absent elsewhere on the site.

Species of note which were recorded in this vegetation in 1991 but were not apparent in 2003 include the rich fen plants *Ranunculus flammula* and *Rhizomnium punctatum*.

Quadrat number (2m x 2m)	19	20	21	24	25	
<i>Juncus subnodulosus</i>	9	8	9	9	8	V (8-9)
<i>Calliargon cuspidatum</i>	5	4	6	6	6	V (4-6)
<i>Phragmites australis</i>	3	4	4	4	4	V (3-4)
<i>Galium uliginosum</i>	3	3	3	3	3	V (3)
<i>Carex disticha</i>	3	2	2	3	2	V (2-3)
<i>Carex panicea</i>	3	3	2	2	2	V (2-3)
<i>Filipendula ulmaria</i>	2	2	3	3	2	V (2-3)
<i>Cirsium palustre</i>	2	2	2	2	2	V (2)
<i>Mentha aquatica</i>	2	2	2	1	1	V (1-2)
<i>Valeriana dioica</i>	2	2	1	2	2	V (1-2)
<i>Vicia cracca</i>	2	2	1	2	2	V (1-2)
<i>Angelica sylvestris</i>	2	1	2	1	2	V (1-2)
<i>Carex nigra</i>		3	5	4	4	IV (3-5)
<i>Festuca rubra</i>	5	3	2		2	IV (2-5)
<i>Cladium mariscus</i>	3	3	2	2		IV (2-3)
<i>Hydrocotyle vulgaris</i>		3	2	2	2	IV (2-3)
<i>Succisa pratensis</i>	2	2	2		2	IV (2)
<i>Lythrum salicaria</i>	1		2	2	2	IV (1-2)
<i>Valeriana officinalis</i>		2	2	1	1	IV (1-2)
<i>Eupatorium cannabinum</i>	2		3		2	III (2-3)
<i>Iris pseudacorus</i>	2			2	2	III (2)
<i>Molinea caerulea</i>	5		1		2	III (1-5)
<i>Equisetum palustre</i>			1	2	2	III (1-2)
<i>Epilobium parvifolium</i>		1	1		1	III (1)
<i>Lathyrus pratensis</i>	3	2				II (2-3)
<i>Agrostis stolonifera</i>				2	3	II (2-3)
<i>Cardamine pratensis</i>			2	2		II (2)
<i>Salix cinerea</i>				2	2	II (2)
<i>Sanguisorba officinalis</i>	2	2				II (2)
<i>Carex acutiformis</i>			1	2		II (1-2)
<i>Oenanthe lachenalii</i>				2	1	II (1-2)
<i>Scutellaria galericulata</i>			1		2	II (1-2)
<i>Carex elata</i>				3		I (3)
<i>Lysimachia nummularia</i>			3			I (3)
<i>Ophioglossum vulgatum</i>					2	I (2)
<i>Plagiomnium affine</i>	2					I (2)
<i>Galium palustre</i>			2			I (2)
<i>Plagiomnium undulatum</i>					2	I (2)
<i>Schoenus nigricans</i>		2				I (2)
<i>Campylium stellatum</i>		2				I (2)
<i>Chiloscyphus polyanthos</i>		1				I (1)
<i>Equisetum fluviatile</i>				1		I (1)
<i>Eurhynchium praelongum</i>		1				I (1)
<i>Festuca arundinacea</i>				1		I (1)
<i>Fraxinus excelsior seedling</i>	1					I (1)
<i>Holcus lanatus</i>	1					I (1)
<i>Lotus uliginosus</i>			1			I (1)
<b>Total species:</b>	<b>24</b>	<b>25</b>	<b>29</b>	<b>27</b>	<b>29</b>	

Vegetation height (cm)	60	70	70	60	70
Vegetation cover (%)	100	100	100	100	100
Bryophyte cover (%)	20	20	25	30	35
Bare ground (%)	10	0	0	10	5
Leaf litter (%)	70	75	75	50	50
Open water (%)	0	5	0	10	10
Water depth (cm)	0	2	0	2	3

Thelnetham SSSI: Middle Fen	Stand 5	Date: June - July 2003
<p>S24 <i>Phragmites australis</i>-<i>Peucedanum palustre</i> tall-herb fen (c) <i>Symphytum officinale</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>This stand occurs as a fringe community between the fen-meadow and alder carr on the western edge of Middle fen. It is a transitional community on uneven ground where the substrate is soft, peaty and very wet in places. The ground height is generally between 21.87m to 22.05m AOD but can drop within the hollows to around 21.62m AOD, representing some of the lowest areas on the fen.</p>		
<p><u>Structure:</u></p> <p>The vegetation is approximately 110-120cm tall and has a heavy leaf litter with very few bryophytes. There is some scrub invasion from the adjacent woodland.</p>		
<p><u>Composition:</u></p> <p>This vegetation in Stand 5 is two tiered. The upper tier consists of <i>Phragmites australis</i> accompanied by <i>Carex riparia</i>, <i>C. acutiformis</i> and <i>Iris pseudacorus</i>. The lower tier is reminiscent of a fen-meadow community, containing <i>Juncus subnodulosus</i>, <i>Filipendula ulmaria</i>, <i>Lythrum salicaria</i>, <i>Mentha aquatica</i>, <i>Carex disticha</i> and <i>Valeriana officinalis</i>. The vegetation is knitted together by climbers of <i>Calystegia sepium</i>, <i>Vicia cracca</i>, <i>Solanum dulcamara</i> and <i>Galium spp.</i></p> <p>The only bryophyte to be recorded within the quadrats was <i>Calliergon cuspidatum</i>, which did not occur in large quantities.</p> <p>The floristic table for Stands 5 and 6 have been shown together for comparative purposes.</p>		
<p><u>Community Affinities:</u></p> <p>Stand 5 is closest to the S24 <i>Phragmites</i>-<i>Peucedanum</i> tall-herb community due to the dominance of reed accompanied by the presence of a lower fen-meadow tier of vegetation. Although the stand lacks <i>Symphytum officinalis</i>, the presence of other characteristic species such as <i>Phalaris arundinacea</i>, <i>Galium uliginosum</i> and <i>Carex acutiformis</i> indicate it belongs within the <i>Symphytum</i> sub-community. S24c is generally related to areas which have undergone disturbance of the peaty surface which suggests some activity (most likely peat digging) has occurred here. The stand's position as a transitional stage between the woodland and fen-meadow communities at Thelnetham is typical of the community as a whole.</p>		
<p><u>Distribution &amp; Conservation Value:</u></p> <p>Stand 5 contains very few notable species (only <i>Carex elata</i>, <i>Sanguisorba officinalis</i> and <i>Pedicularis palustris</i>) and received a relatively low RWPFS. It is a community which is most associated with Broadland but is also known to occur in areas such as Wicken and Woodwalton fen.</p> <p>It is of little botanical interest in its current state.</p>		

Condition & Changes Since 1991 Survey:

In 1991 this stand was recorded as M27b (Stand K) and S26. The combined area of these stands has changed very little over the past 12 years. However *Carex acutiformis* has shown a marked increase within the vegetation, in addition to an increase in rushes and herbs such as *Juncus subnodulosus*, *Equisetum palustre*, *Mentha aquatica* and *Lathyrus pratensis*. The sward can no longer be considered a form of M27 due to the reduction in the amount of *Filipendula ulmaria* and *Galium aparine*.

The conditions in the 2003 survey appear to be wetter than were recorded in 1991. However *Drepanocladus revolvens*, which was recorded here in 1991, was not recorded here in 2003.

Thelnetham SSSI: Middle Fen	Stand 6	Date: June - July 2003
<p>S26 <i>Phragmites australis-Urtica dioica</i> fen (a) <i>Filipendula ulmaria</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>Stand 6 is located in the north-eastern corner of Middle fen between the fen-meadow community of Stand 2 and the boundary drain. The substrate is peaty but dry and there is no standing water present at the time of survey. The ground is approximately 21.85m AOD and very uneven.</p>		
<p><u>Structure:</u></p> <p>This stand has a somewhat variable structure averaging around 180cm tall. It is dense and rank, with only a sparse bryophyte layer and heavy leaf litter.</p>		
<p><u>Composition:</u></p> <p>Stand 6 is similar to Stand 5 in the dominance of <i>Phragmites australis</i> accompanied by <i>Carex acutiformis</i>, <i>Filipendula ulmaria</i> and <i>Calystegia sepium</i>. However the two stands are separated due to the absence here of a lower tier of moderately tall herbs such as <i>Juncus subnodulosus</i>, <i>Lythrum salicaria</i>, <i>Mentha aquatica</i> and <i>Valeriana officinalis</i>. Instead, nutrient demanding species such as <i>Humulus lupulus</i>, <i>Urtica dioica</i> and <i>Galium aparine</i> are constants within the sward. This suggests the peat in this area has been sufficiently dried to release nutrients while lack of management has further added to nutrient availability. Consequently this stand has a lower species-richness than stand 5 (only 12 species per quadrat compared to 19 in Stand 5).</p> <p>The bryophyte layer is extremely sparse consisting of <i>Eurhynchium praelongum</i> only.</p>		
<p><u>Community Affinities:</u></p> <p>Stand 6 has most affinity to the <i>Phragmites-Urtica</i> fen community S26 due to the dominance of reed accompanied by a range of nutrient demanding species such as <i>Urtica dioica</i>, <i>Eupatorium cannabinum</i> and <i>Cirsium arvense</i>. The constancy of <i>Galium aparine</i> and <i>Filipendula ulmaria</i> clearly place the stand in the species-poor <i>Filipendula</i> sub-community (S26a). This is typically an unmown community of eutrophic situations and its position in mosaic with the S24 of stand 5 is not unusual.</p>		
<p><u>Distribution &amp; Conservation Value:</u></p> <p>S26 is a community represented throughout lowland Britain, particularly in Broadland. The <i>Filipendula ulmaria</i> sub-community is one of the rarer forms of S26 but is typically species-poor, as is found here. No species of note were recorded within the stand and the RWPFSS was one of the lowest to be recorded on Middle and Old fen. Consequently it is of low botanical interest.</p>		

**Condition & Changes Since 1991 Survey:**

In 1991 this stand was also recorded as S26a (Stand H). Since that time there has been slight increases in the abundance of some sedge species and also climbers such as *Humulus lupulus*. However, reductions in fen-meadow species such as *Angelica sylvestris*, *Valeriana officinalis* and *Lychnis flos-cuculi* has resulted in an overall reduction in species-richness over the past 12 years. It is therefore likely that the unmanaged nature of the stand is affecting the diversity of the stand.

Quadrat number (2m x 2m)	32	35	36	37	38	
<i>Phragmites australis</i>	5	6	7	8	4	V (4-8)
<i>Carex riparia</i>	2	2	4	3	1	V (1-4)
<i>Filipendula ulmaria</i>	2	2	3	3	2	V (2-3)
<i>Calystegia sepium</i>	1	3	2	2	1	V (1-3)
<i>Carex acutiformis</i>	8	6	7	6	8	V (6-8)
<i>Iris pseudacorus</i>	4	2	3	3	4	V (2-4)
<i>Juncus subnodulosus</i>	1	4	4	3	1	V (1-4)
<i>Equisetum palustre</i>	3	3	3	2	2	V (2-3)
<i>Lythrum salicaria</i>	3	1	2	2	2	V (1-3)
<i>Vicia cracca</i>	1	2	1	2	1	V (1-2)
<i>Mentha aquatica</i>	1	1	1	2	2	IV (1-2)
<i>Carex disticha</i>		2	2	2	1	IV (1-2)
<i>Galium uliginosum</i>		1	1	1	1	IV (1)
<i>Lathyrus pratensis</i>	3	1			1	III (1-3)
<i>Valeriana officinalis</i>	1	2	1			III (1-2)
<i>Galium palustre</i>	1	1	1		2	III (1-2)
<i>Humulus lupulus</i>		2				I (2)
<i>Galium aparine</i>	3		1			II (1-3)
<i>Urtica dioica</i>						
<i>Galeopsis tetrahit</i> agg	2					I (2)
<i>Phalaris arundinacea</i>	3	3	1			III (1-3)
<i>Eupatorium cannabinum</i>	1		1	1	2	III (1-2)
<i>Angelica sylvestris</i>	1	1			1	III (1)
<i>Cirsium arvense</i>	2	1				II (1-2)
<i>Polygonum amphibium</i>	2					I (2)
<i>Salix seedling</i>			1			I (1)
<i>Solanum dulcamara</i>	3				1	II (1-3)
<i>Arrhenatherum elatius</i>	2					I (2)
<i>Calliergon cuspidatum</i>				3		I (3)
<i>Carex nigra</i>	1					I (1)
<i>Lycopus europaeus</i>			2			I (2)
<i>Salix caprea</i>				1		I (1)
<i>Sanguisorba officinalis</i>				1		I (1)
<i>Rubus fruticosus</i> agg				1		I (1)
<i>Equisetum fluviatile</i>					1	I (1)
<i>Eurhynchium praelongum</i>						
<i>Glechoma hederacea</i>						
<i>Glyceria maxima</i>						
<i>Poa trivialis</i>						
<b>Total species:</b>	<b>23</b>	<b>19</b>	<b>18</b>	<b>19</b>	<b>18</b>	

	33	34	39	40	41	
	8	8	7	8	8	V (7-8)
	4	2	3	3	5	V (2-5)
	2	2	2	3	3	V (2-3)
	5	6	6	5	3	V (3-6)
	2		1	2	2	III (2)
			1		3	II (1-3)
			1		1	I (1)
	2		1		1	III (1-2)
		2			1	II (1-2)
	3	4	3	5	3	V (3-5)
	3	3	2	3	2	V (2-3)
	3	4	4			III (3-4)
	4	4	3			III (3-4)
	2				2	II (2)
	2				2	II (2)
			1			I (1)
	1					I (1)
	1			1		II (1)
			1			I (1)
					1	I (1)
				3		I (3)
			3			I (3)
			2			I (2)
			2			I (2)
	14	9	15	9	14	





Thelnetham SSSI: Middle Fen	Stand 7	Date: June - July 2003
<p>W2 <i>Salix cinerea</i>-<i>Betula pubescens</i>-<i>Phragmites australis</i> woodland  (a) <i>Alnus glutinosa</i>-<i>Filipendula ulmaria</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>This is a fringe community bordering Middle fen on three sides. At the time of survey there was no open water but the soil remains very moist throughout the summer. The ground height was not directly recorded but is expected to be around 21.94m AOD where it occurs next to the river.</p>		
<p><u>Structure:</u></p> <p>The canopy layer was relatively dense but not particularly high, with an understorey that was sparse. The structure of the field layer was very variable (60-100cm tall) and although total vegetation cover could reach 70% there were also large areas of bare ground. The general appearance was one of shady and moist at several stages of development.</p>		
<p><u>Composition:</u></p> <p>The canopy layer of Stand 7 consists of a mixture of <i>Salix cinerea</i> and <i>Fraxinus excelsior</i>. <i>Alnus glutinosa</i> and <i>Acer pseudoplatanus</i> were also present occasionally. The understorey was somewhat more diverse with mixtures of <i>Crataegus monogyna</i>, <i>Fraxinus excelsior</i>, <i>Corylus avellana</i>, <i>Betula pubescens</i> and <i>Prunus spinosa</i>.</p> <p>Within the field layer, no one species gained complete dominance but instead mixes of such species as <i>Carex elata</i> and <i>Phragmites australis</i> were usually abundant. <i>Poa trivialis</i>, <i>Filipendula ulmaria</i> and <i>Equisetum palustre</i> were also relatively frequent. Where the moisture levels of the soil were most variable (on areas of uneven ground) mixes of wetland species such as <i>Angelica sylvestris</i>, <i>Scutellaria galericulata</i> and <i>Mentha aquatica</i> could be found alongside drier species of <i>Geranium robertianum</i>, <i>Circaea lutetiana</i> and <i>Geum urbanum</i>. The bryophyte layer was typically dominated by <i>Calliergon cuspidatum</i>.</p>		
<p><u>Community Affinities:</u></p> <p>Canopy dominance of <i>Salix cinerea</i> with a field layer of <i>Phragmites australis</i> is typical of the W2 <i>Salix</i>-<i>Betula</i>-<i>Phragmites</i> woodland. The presence of <i>Carex acutiformis</i> in the stand fits in well with this classification. However the presence of <i>C. elata</i> is somewhat atypical, as is the frequency of <i>Equisetum palustre</i>, <i>Mentha aquatica</i> and <i>Iris pseudacorus</i>. This is probably due to the woodland not being wide enough at any point within the site to remove itself from edge effects of the tall herb fen.</p> <p>In one small corner to the south-east of Middle fen, <i>Alnus glutinosa</i> becomes the dominant species in the canopy so that stand begins to resemble W5 <i>Alnus glutinosa</i> woodland.</p>		

Distribution & Conservation Value:

W2 has a scattered distribution in the lowlands, especially in fens in East Anglia (Rodwell, 1991)

Condition & Changes Since 1991 Survey:

This stand was also recorded as W2 in 1991 (Stand P). The canopy has since developed a higher abundance of *Fraxinus excelsior* and *Acer pseudoplatanus*. The field layer appears to be drier as the woodland matures, through the increase in species such as *Poa trivialis*, *Geum urbanum*, *Cerastium fontanum* and *Crataegus monogyna*. However this difference may be related to differences in quadrat location.

As highlighted in the 1991 survey, margins of the fen may always have been drier than the centre of the site due to ground elevation. Reduced water levels and lack of management in the past have certainly enabled further encroachment of scrub into the fen. However now that the water level has been restored it would suggest that continued scrub clearance in conjunction with mowing could re-instate more tall-herb communities in parts of the woodland. Especially as species such as *Carex elata* still persist within the woodland field layer.

<b>Canopy T (50m x 50m)</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	
<i>Salix cinerea</i>	8	7	8	7	5	V (5-8)
<i>Fraxinus excelsior</i>	2	2	3	2	2	V (2-3)
<i>Alnus glutinosa</i>		3			7	II (3-7)
<i>Acer pseudoplatanus</i>	2				2	II (2)
<b>Shrub (50m x 50m)</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	
<i>Fraxinus excelsior</i>	2	2	3	2	2	V (2-3)
<i>Crataegus monogyna</i>	1	2	1	2	2	V (1-2)
<i>Salix caprea</i>	3	3		2	2	IV (2-3)
<i>Acer pseudoplatanus</i>	2		2		1	III (1-2)
<i>Hedera helix</i>	2	2	1			III (1-2)
<i>Corylus avellana</i>	1		2			II (1-2)
<i>Alnus glutinosa</i>					3	I (3)
<i>Humulus lupulus</i>	1					I (1)
<i>Buckthorn</i>	1					I (1)
<i>Betula pubescens</i>			1			I (1)
<b>Field layer Q (4m x 4m)</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	
<i>Carex elata</i>	2	5	4	3	5	V (2-5)
<i>Phragmites australis</i>	2	4	3	3	2	V (2-4)
<i>Poa trivialis</i>	3	1	2	3	2	V (1-3)
<i>Filipendula ulmaria</i>	1	3	2	2	2	V (1-3)
<i>Equisetum palustre</i>	1	1	1	1	2	V (1-2)
<i>Geranium robertianum</i>	3		2	2	2	IV (2-3)
<i>Iris pseudacorus</i>		2	3	3	2	IV (2-3)
<i>Mentha aquatica</i>		3	2	2	1	IV (1-3)
<i>Fraxinus excelsior seedling</i>		2	2	1	1	IV (1-2)
<i>Circaea lutetiana</i>	2		1	1	1	IV (1-2)
<i>Angelica sylvestris</i>		1	1	1	1	IV (1)
<i>Calliergon cuspidatum</i>		5	2	3		III (2-5)
<i>Epilobium parviflorum</i>	2	1			2	III (1-2)
<i>Geum urbanum</i>	1			1	1	III (1)
<i>Urtica dioica</i>	4		2			II (2-4)
<i>Galium palustre</i>			3	1		II (1-3)
<i>Hedera helix</i>	1				2	II (1-2)
<i>Cerastium fontanum</i>	2				2	II (2)
<i>Crataegus monogyna</i>				2	2	II (2)
<i>Galium aparine</i>	3					I (3)
<i>Rubus fruticosus agg</i>	3					I (3)
<i>Scutellaria galericulata</i>		2				I (2)
<i>Carex sylvatica</i>		1				I (1)
<b>Total species:</b>	<b>22</b>	<b>18</b>	<b>19</b>	<b>17</b>	<b>18</b>	

Vegetation height (cm)	50	80	90	70	70
Vegetation cover (%)	60	60	70	60	60
Bryophyte cover (%)	60	30	30	20	5
Bare ground (%)	10	60	60	75	75
Leaf litter (%)	30	2	2	5	20
Open water (%)	0	0	0	0	0

Also recorded in this community:

*Betula pubescens*  
*Dedshampsia cespitosa*  
*Ribes uva-crispa*  
*Dryopteris big*  
*Sanguisbora officinalis*  
*Glechoma hederacea*

ThelnethamSSSI: Old Fen	<b>Stand 8</b>	Date: June - July 2003
<p>Community intermediate between:  M24 <i>Molinia caerulea</i>-<i>Cirsium dissectum</i> fen-meadow  (a) Typical sub-community  M13 <i>Schoenus nigricans</i> mire  (c) <i>Caltha palustris</i>-<i>Galium uliginosum</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>A small stand situated on the eastern edge of the fen complex, on the gently rising ground abutting woodland. The substrate is moist but no standing water was recorded during the summer. The ground height ranges from 22.44m up to around 22.60m AOD.</p>		
<p><u>Structure:</u></p> <p>Stand 8 has a uniform sward approximately 45cm in height. It has a well developed bryophyte layer and generally very little leaf litter or bare ground. No invasion by scrub was recorded.</p>		
<p><u>Composition:</u></p> <p>The dominants of this sward are <i>Molinia caerulea</i> and <i>Juncus subnodulosus</i>. However Stand 8 is particularly distinctive by the large number of associate species constant throughout the stand. Of these, there are usually several sedge species (such as <i>Carex panicea</i>, <i>C. flacca</i> and <i>Schoenus nigricans</i>) as well as a strong grassy element consisting of <i>Festuca rubra</i>, <i>Agrostis stolonifera</i> and <i>Briza media</i>. Herbaceous species of moderate height are also well represented (such as <i>Succisa pratensis</i>, <i>Centaurea nigra</i>, <i>Cirsium palustre</i>, <i>Valeriana dioica</i>, <i>Sanguisorba officinalis</i> and <i>Filipendula ulmaria</i>). This gives the sward a colourful appearance which is further added to by frequent <i>Dactylorhiza praetermissa</i> and a range of sprawling species such as <i>Lathyrus pratensis</i>, <i>Lotus uliginosum</i> and <i>Potentilla erecta</i>.</p> <p>Beneath this vegetation, smaller herbs such as <i>Hydrocotyle vulgaris</i> and <i>Mentha aquatica</i> are able to persist. In fact this is the only stand at Thelnetham where <i>Parnassia palustris</i> was recorded.</p> <p>Finally, the species-richness of the stand is boosted by a bryophyte layer where the dominants (<i>Calliergon cuspidatum</i> and <i>Campylium stellatum</i>) are not so abundant as to exclude other species such as <i>Pseudoscleropodium purum</i>, <i>Fissidens adianthoides</i> and <i>Ctenidium molluscum</i>. In addition to which, small amounts of rarer fen species such as <i>Aneura pinguis</i> and <i>Bryum pseudotriquetrum</i> occur here.</p>		

### Community Affinities:

Within Stand 8, the abundance of *J. subnodulosus* and *Molinia caerulea*, accompanied by a wide range of colourful herbaceous species, small sedges and a strong grassy element is very reminiscent of M24 *Molinia caerulea*-*Cirsium dissectum* fen-meadow. Furthermore the stands location on the fringes of the fen-mire complex is typical of the distribution of M24 in East Anglia.

However as well as the absence of *Cirsium dissectum* in this stand, the extremely rich bryophyte layer is much more akin to the what typically occurs in the mire community M13 *Schoenus nigricans* mire. Particularly as *Schoenus* is constant throughout the stand. It cannot be described as a typical M13 community because it lacks the richness of small herbs such as *Anagallis tenella* and pools of standing water often found in this community which can contain species such as *Caltha palustris*, *Potamogeton coloratus* and *Chara* spp.

Consequently Stand 8 should be regarded as an intermediate community between M13 and M24.

### Distribution & Conservation Value:

Stand 8 is one of the most species-rich stands at Thelnetham (31 species per quadrat) and is the only stand on Old fen where *Parnassia palustris* and *Aneura pinguis* were recorded. Its affinities to M13 (which is a community recognised as internationally important) and M24 (which increasingly has only a local distribution) makes this stand of high conservation value. This is reflected in one of the top RWPFS to be achieved at Thelnetham (7.13).

Other notable species to be recorded in Stand 8 include:

*Schoenus nigricans*, *Sanguisorba officinalis*, *Dactylorhiza praetermissa*, *Carex pulicaris*, *Carex elata*, *Cladium mariscus*, *Campylium stellatum*, *Fissidens adianthoides*, *Ctenidium molluscum*, *Bryum pseudotriquetrum*, *Plagiomnium elatum* and *Campylium elodes*.

### Condition & Changes Since 1991 Survey:

In 1991 this stand was recorded as M24a (Stand 8). At that time there appears to have been less abundance in those species typical of M13 such as *Schoenus nigricans*, *Juncus subnodulosus* and bryophytes such as *Campylium stellatum* as is now visible in the sward. In addition, taller herbs such as *Eupatorium cannabinum* and *Cladium mariscus* have declined in favour of species of moderate height such as *Succisa pratensis* and *Centaurea nigra*.

As in 1991, the water table still remains below the surface of the stand. Species which were recorded in 1991 but which were not visible in 2003 include *Oenanthe lachenalii*, *Polygala serpyllifolia*, *Amblystegia riparia* and *Eurhynchium speciosum*. Species newly recorded in the stand in 2003 include *Briza media*, *Aneura pinguis*, *Lophocolea bidentata*, *Bryum pseudotriquetrum*, *Campylium elodes*, *Carex acutiformis*, *C. pulicaris*, *Holcus lanatus* and *Equisetum palustris*.

In summary, this stand is still in good condition, with sufficient water levels to permit a slight move floristically towards M13 mire but still retaining its M24 grassy element at this time.

Quadrat number (2m x 2m)	6	7	42	43	44	
<i>Juncus subnodulosus</i>	6	8	7	7	5	V (5-8)
<i>Molinia caerulea</i>	4	4	6	5	8	V (4-8)
<i>Carex panicea</i>	7	5	4	5	6	V (4-7)
<i>Calliergon cuspidatum</i>	5	6	7	7	3	V (3-7)
<i>Campyllum stellatum</i>	4	4	3	4	6	V (3-6)
<i>Pseudoscleropodium purum</i>	6	3	5	6	5	V (3-6)
<i>Schoenus nigricans</i>	4	3	5	4	4	V (3-5)
<i>Festuca rubra</i>	4	4	4	3	5	V (3-5)
<i>Potentilla erecta</i>	3	3	3	3	3	V (3)
<i>Succisa pratensis</i>	7	2	6	5	3	V (2-7)
<i>Carex flacca</i>	3	2	3	5	3	V (2-5)
<i>Briza media</i>	3	3	2	2	3	V (2-3)
<i>Centaurea nigra</i>	2	3	2	3	3	V (2-3)
<i>Cirsium palustre</i>	3	2	2	2	2	V (2-3)
<i>Agrostis stolonifera</i>	4	3	3	1	1	V (1-4)
<i>Galium uliginosum</i>	3	2	1	2	3	V (1-3)
<i>Valeriana dioica</i>	4	1	3	2	2	V (1-4)
<i>Vicia cracca</i>	3	1	3	2	3	V (1-3)
<i>Phragmites australis</i>	2	1	2	1	2	V (1-2)
<i>Hydrocotyle vulgaris</i>	3	4	3	3		IV (3-4)
<i>Sanguisorba officinalis</i>	3		3	3	3	IV (3)
<i>Fissidens adianthoides</i>	5		4	4	2	IV (2-5)
<i>Lotus uliginosus</i>	3	3	3	2		IV (2-3)
<i>Equisetum palustre</i>		1	1	1	2	IV (1-2)
<i>Filipendula ulmaria</i>	2	1		1	1	IV (1-2)
<i>Ctenidium molluscum</i>	3	2			1	III (1-3)
<i>Lathyrus pratensis</i>		2	2	2		III (2)
<i>Plagiomnium elatum</i>	2	2		1		III (1-2)
<i>Alnus glutinosa seedling</i>		1		1	1	III (1)
<i>Dactylorhiza praetermissa</i>	2			2		II (2)
<i>Holcus lanatus</i>	2				2	II (2)
<i>Mentha aquatica</i>		1		1		II (1)
<i>Fraxinus excelsior seedling</i>			1	1		II (1)
<i>Parnassia palustris</i>			1		1	II (1)
<i>Plagiomnium affine</i>	1	1				II (1)
<i>Rhytidiadelphus squarrosus</i>					4	I (4)
<i>Fissidens taxifolius</i>		4				I (4)
<i>Sanguisorba officinalis</i>		3				I (3)
<i>Aneura pinguis</i>		2				I (2)
<i>Lophocolea bidentata sl</i>	2					I (2)
<i>Bryum pseudotriquetrum</i>		2				I (2)
<i>Campyllum eloides</i>		1				I (1)
<i>Carex acutiformis</i>	1					I (1)
<i>Carex elata</i>			1			I (1)
<i>Carex pulicaris</i>			1			I (1)
<i>Festuca arundinacea</i>					1	I (1)
<i>Gymnadenia conopsea</i>		1				I (1)
<i>Angelica sylvestris</i>				1		I (1)
<i>Acer pseudoplatanus seedling</i>		1				I (1)
<b>Total species:</b>	<b>31</b>	<b>36</b>	<b>29</b>	<b>32</b>	<b>29</b>	

Vegetation height (cm)	40	40	50	50	40
Vegetation cover (%)	100	90	100	100	100
Bryophyte cover (%)	70	80	80	80	25
Bare ground (%)	0	2	0	0	5
Leaf litter (%)	6	20	20	20	70
Open water (%)	0	0	0	0	0

Also recorded in this stand:

*Cladium mariscus**Luzula multiflora*



Thelnetham SSSI: Old Fen	Stand 9	Date: June - July 2003
<p>M13 <i>Schoenus nigricans</i> mire (c) <i>Caltha palustris</i>-<i>Galium uliginosum</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>This stand is situated roughly in the centre of the fen/mire complex on Old fen where several areas appear to have been dug out for peat. It is bordered on the east by M22 and on the west by S25c. The substrate is very wet, with many shallow depressions still containing oligotrophic, calcareous water even in the early summer months. The height of the ground is approximately 22.34m AOD, dropping to 22.18m in the base of the depressions.</p>		
<p><u>Structure:</u></p> <p>The vegetation structure of the stand appears rather uneven due to the many hollows and ridges of the ground. However most of the vegetation is approximately 45cm tall with very little leaf litter and no scrub encroachment. Bare ground becomes increasingly visible in the late summer as the standing water evaporates away.</p>		
<p><u>Composition:</u></p> <p>Dominance is shared between <i>Juncus subnodulosus</i> and <i>Schoenus nigricans</i> in this stand, with <i>Molinia caerulea</i> present but generally subordinate in cover. Several other constants including <i>Phragmites australis</i> and <i>Cladium mariscus</i> as well as smaller species of <i>Lythrum salicaria</i>, <i>Mentha aquatica</i> and <i>Succisa pratensis</i> occur here. The sward is further supplemented by other species all of at least moderate stature such as <i>Cirsium palustre</i>, <i>Filipendula ulmaria</i>, <i>Lythrum salicaria</i> and <i>Valeriana dioica</i>. Occasionally less robust species such as <i>Ranunculus flammula</i> and <i>Oenanthe lachenalii</i> can also be present.</p> <p>The bryophyte layer is predominantly <i>Calliergon cuspidatum</i> and <i>Campylium stellatum</i>. However <i>Fissidens adianthoides</i>, <i>Bryum pseudotriquetrum</i>, <i>Plagiomnium elatum</i>, <i>Ctenidium molluscum</i> and <i>Plagiomnium affine</i> can also be present in small amounts.</p>		
<p><u>Community Affinities:</u></p> <p>Stand 9 clearly has most affinities to M13 <i>Schoenus nigricans</i> mire through the abundance of <i>J. subnodulosus</i>, <i>Schoenus</i> and a well developed bryophyte layer. The presence of both <i>Caltha palustris</i> and <i>Valeriana dioica</i> make it a good match for the <i>Caltha palustris</i>-<i>Galium uliginosum</i> sub-community (where pools of standing water are not uncommon). However Stand 9 is quite different from the kind of M13 seen in Middle Fen (Stand 3) where <i>Pedicularis palustris</i>, <i>Chara</i> spp, <i>Drepanocladus revolvens</i> occurred. Consequently Stand 9 is a little species-poor for typical M13 (only 21 species per quadrat instead of 30's that can be achieved in similar stands).</p>		

Distribution & Conservation Value:

M13 is a widespread but locally distributed community in lowland England which can typically contain a large number of rare wetland species. As an example of M13, Stand 9 contains several species of note including:

*Campylium stellatum*, *Schoenus nigricans*, *Carex elata*, *Cladium mariscus*, *Bryum pseudotriquetrum*, *Plagiomnium elatum*, *Ctenidium molluscum*, *Ranunculus flammula*, *Sanguisorba officinalis* and *Fissidens adianthoides*,

Therefore, although the stand is rather species-poor compared to a typical version of M13, it is considered to have significant conservation value.

Condition & Changes Since 1991 Survey:

This stand was previously recorded in 1991 as M13c (Stand 7). Over the past 12 years comparisons in the floristic tables suggest species-richness and distribution of the stand is much as it was in 1991. Most of the species present then are still present now, with the exception of very small amounts of *Parnassia palustris*, *Anagallis tenella* and *Carex pulicaris* which were not recorded this year.

Subtle changes include a small increase in the abundance of *Juncus subnodulosus*, *Carex elata* and *Agrostis stolonifera*. Evidence from the 1991 survey suggests that this area only contained standing water in the winter months prior to the relocation of the borehole (Harding pers comm.). It is therefore possible that although water levels have now risen sufficiently to allow further development of M13, the change has not been of sufficient duration for less competitive M13 species present on Middle Fen (such as *Pedicularis palustris*, *Drepanocladus revolvens* and *Chara*) to colonise the pools.



Quadrat number (2m x 2m)	55	56	57	58	59	
<i>Juncus subnodulosus</i>	8	8	8	8	7	V (7-8)
<i>Calliergon cuspidatum</i>	6	6	4	8	6	V (4-8)
<i>Campylium stellatum</i>	7	6	5	5	4	V (4-7)
<i>Schoenus nigricans</i>	6	5	5	4	4	V (4-6)
<i>Carex elata</i>	4	3	5	3	5	V (3-5)
<i>Succisa pratensis</i>	3	2	2	4	2	V (2-4)
<i>Carex panicea</i>	4	3	3	4	2	V (2-4)
<i>Molinia caerulea</i>	3	2	2	3	2	V (2-3)
<i>Cladium mariscus</i>	2	2	3	2	2	V (2-3)
<i>Phragmites australis</i>	1	2	3	1	2	V (1-3)
<i>Fissidens adianthoides</i>	3	1	2	2	3	V (1-3)
<i>Lythrum salicaria</i>	2	1	2	1	1	V (1-2)
<i>Mentha aquatica</i>	2	1	1	1	1	V (1-2)
<i>Agrostis stolonifera</i>	1	1	1	1	1	V (1)
<i>Galium uliginosum</i>	1	1		2	1	IV (1-2)
<i>Cirsium palustre</i>	1	1		1	1	IV (1)
<i>Filipendula ulmaria</i>		1	1	1	1	IV (1)
<i>Equisetum palustre</i>			1	1	1	III (1)
<i>Valeriana dioica</i>		1	1		1	III (1)
<i>Bryum pseudotriquetrum</i>	1				2	II (1-2)
<i>Plagiomnium affine</i>	2	1				II (1-2)
<i>Centaurea nigra</i>			1	1		II (1)
<i>Potentilla erecta</i>				1	1	II (1)
<i>Plagiomnium elatum</i>	1	1				II (1)
<i>Caltha palustris</i>					2	I (2)
<i>Campylium eloides</i>		1				I (1)
<i>Carex flacca</i>	2					I (2)
<i>Ctenidium molluscum</i>					2	I (2)
<i>Fraxinus excelsior seedling</i>		1				I (1)
<i>Oenanthe lachenalii</i>			1			I (1)
<i>Plagiomnium undulatum</i>	1					I (1)
<i>Ranunculus flammula</i>		1				I (1)
<i>Sanguisorba officinalis</i>					1	I (1)
Total species:	21	23	19	20	24	
Vegetation height (%)	40	40	50	50	50	
Vegetation cover (%)	90	90	90	100	90	
Bryophyte cover (%)	30	40	30	70	40	
Bare ground (%)	50	50	70	25	60	
Leaf litter (%)	20	5	0	5	0	
Open water (%)	3	5	5	0	0	

Also recorded in this stand:

*Lathyrus pratensis*

*Viburnum opulus*

*Vicia cracca*

Thelnetham SSSI: Old Fen	Stand 10	Date: June - July 2003
<p>Community intermediate between:  M24 <i>Molinia caerulea</i>-<i>Cirsium dissectum</i> fen-meadow  (a) Typical sub-community  M22 <i>Juncus subnodulosus</i>-<i>Cirsium palustre</i> fen-meadow</p>		
<p><u>Location &amp; Substrate:</u></p> <p>This stand lies between the M24 community of Stand 8 and the M13 mire community of Stand 9. It is situated on flat, peaty soil which is moist but not waterlogged at least during the summer months. The southern edge of the stand has been reclaimed from Alder woodland prior to the 1991 survey. The ground height varies between 22.41m – 22.50m AOD.</p>		
<p><u>Structure:</u></p> <p>A uniform sward approximately 40 cm tall, with a good bryophyte cover and moderate amounts of litter and bare ground. No scrub encroachment visible.</p>		
<p><u>Composition:</u></p> <p>This stand is heavily dominated by <i>Juncus subnodulosus</i>, accompanied to a lesser extent by constants of <i>Carex panicea</i> and <i>Phragmites australis</i>. Like Stand 8, there is a grassy element to the sward consisting of <i>Molinia caerulea</i>, <i>Festuca rubra</i>, <i>Agrostis stolonifera</i> and <i>Holcus lanatus</i>. However it is markedly less abundant here than can be seen in Stand 8 and <i>Briza media</i> in particular is much less frequent.</p> <p>Tall herbs such as <i>Centaurea nigra</i>, <i>Filipendula ulmaria</i>, <i>Lythrum salicaria</i> and <i>Sanguisorba officinalis</i> are typical of the sward, as are several sprawling species such as <i>Galium uliginosum</i>, <i>Potentilla erecta</i> and <i>Vicia cracca</i>. Smaller herbs such as <i>Mentha aquatica</i> and also occasionally <i>Anagallis tenella</i> and <i>Polygala serpyllifolia</i> can be found here. In addition, there is a wide range of sedge species present including <i>C. panicea</i>, <i>C. viridula</i> ssp <i>brachyrhyncha</i>, <i>C. elata</i> and <i>C. flacca</i>. The whole stand is overtopped by a sparse layer of <i>Phragmites australis</i> and <i>Cladium mariscus</i>.</p> <p><i>Calliergon cuspidatum</i> is the dominant bryophyte in Stand 10 and is supplemented by frequent <i>Campylium stellatum</i>, <i>Fissidens adianthoides</i>, <i>Plagiomnium</i> spp and <i>Lophocolea bidentata</i>.</p> <p>Woody seedlings are a constant feature of the sward, undoubtedly as a result of the relatively recent woodland clearance.</p> <p>The floristic table for Stand 10 is shown with Stand 11 for comparative purposes.</p>		

#### Community Affinities:

Stand 10 is classified here as an intermediate community between M24 *Molinia-Cirsium* fen-meadow and M22 *Juncus-Cirsium* fen-meadow. Mainly because, like Stand 8, this stand has a grassy element similar to M24, while containing a selection of herbs and monocots more consistent with M22 fen-meadow, including *Carex flacca*, *Festuca arundinacea* and *Succisa pratensis*. It is not akin to M13 due to the absence of species such as *Schoenus nigricans*, *Pedicularis palustris*, *Drepanocladus revolvens*, *Hydrocotyle vulgaris* and many others.

It is considered to show less resemblance to M24 than Stand 8.

#### Distribution & Conservation Value:

Stand 10 is a rather atypical example of M24 and somewhat species-poor for this kind of community. It is however still rich in several species of note including:

*Carex viridula ssp brachyrrhyncha*, *Carex elata*, *Anagallis tenella*, *Cladium mariscus*, *Campylium stellatum*, *Oenanthe lachenalii*, *Fissidens adianthoides*, *Ranunculus flammula*, *Ctenidium molluscum* and *Plagiomnium elatum*.

This stand achieved the fourth highest RWPFS at Thelnetham as a whole. It is therefore of moderate conservation value with further improvement possible as long as the increase in competitive species such as *Juncus subnodulosus* and *Agrostis stolonifera* can be controlled.

#### Condition & Changes Since 1991 Survey:

It appears that this stand has recovered extremely well from the scrub clearance more than 12 years ago, out of which a rich fen-meadow community has developed. In the 1991 survey the stand was recorded as M22-M24-M13 (incorporating Stand 4). Changes since 1991 are difficult to distinguish due to the compilation of various stands. However the most useful comparison is with the 1991 Stand 4 (recorded as M22). Although classified in 1991 as M22 it was at the time noted that the stand was particularly species-rich for M22 and had affinities to M24. The stand has now progressed further towards M22. Partly reflected through the change in bryophytes (from drier species such as *Brachythecium rutabulum* and *Eurhynchium praelongum* to wetter species such as *Calliergon cuspidatum*) and partly through the loss of species generally consistent with disturbance such as *Cirsium arvense* and *Eupatorium cannabinum* (which have been replaced by *Cladium mariscus*, *Briza media*, *Ranunculus flammula*, *Anagallis tenella*, *Juncus subnodulosus* and *Carex viridula ssp brachyrrhyncha*).

In summary, species-richness and RWPFS of the cleared area has slowly increased over time to converge with the surrounding fen-meadow.

Thelnetham SSSI: Old Fen	Stand 11	Date: June - July 2003
<p>M22 <i>Juncus subnodulosus</i>-<i>Cirsium palustre</i> fen-meadow (c) <i>Carex elata</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>This is the area of fen-meadow closest to the Little Ouse on Old Fen. The peat is not waterlogged in summer but becomes much wetter in winter months. Ground height ranges from 22.16m to 22.30m AOD.</p>		
<p><u>Structure:</u></p> <p>This is a closed, uneven sward averaging 60cm in height. There are small amounts of litter and bare ground allowing a moderate bryophyte layer to be present. No scrub was recorded.</p>		
<p><u>Composition:</u></p> <p>As in Stands 8 and 10, <i>Juncus subnodulosus</i> still dominates the sward, accompanied by the same tall herb species (<i>Filipendula ulmaria</i>, <i>Lythrum salicaria</i> etc). However the sward within Stand 11 is distinctive by a replacement of <i>Carex viridula</i> ssp <i>brachyrrhyncha</i> seen in Stand 10 by <i>Carex elata</i>. In addition, herbs such as <i>Oenanthe lachenalii</i>, <i>Equisetum palustre</i>, <i>Angelica sylvestris</i> and <i>Juncus articulatus</i> are much more abundant here. <i>Cladium mariscus</i> is rarely present and there is noticeably less <i>Campylium stellatum</i>, <i>Lophocolea bidentata</i> and <i>Ctenidium molluscum</i> (though <i>Calliargon cuspidatum</i> is very abundant). Consequently Stand 11 is not as species-rich as either Stands 8 or 10.</p>		
<p><u>Community Affinities:</u></p> <p>The clear dominance of <i>Juncus subnodulosus</i> in conjunction with lesser quantities of <i>Molinia caerulea</i> and fen-meadow herbs gives this stand most affinity to M22 <i>Juncus-Cirsium</i> fen-meadow. In particular the abundance of <i>Carex elata</i> with associate species of <i>J. articulatus</i> and <i>Equisetum palustre</i> suggests a classification of the stand within the M22c <i>Carex elata</i> sub-community.</p>		
<p><u>Distribution &amp; Conservation Value:</u></p> <p>M22 is a widespread community on wet, base-rich soils, of which the <i>C. elata</i> sub-community is generally one of the more scarce forms. This stand contains species of note including <i>Campylium stellatum</i>, <i>Cladium mariscus</i>, <i>Oenanthe lachenalii</i>, <i>Carex viridula</i> ssp <i>brachyrrhyncha</i>, <i>Fissidens adianthoides</i>, <i>Ranunculus flammula</i>, <i>Plagiomnium elatum</i> and <i>Bryum pseudotriquetrum</i>. Therefore it has moderate conservation value.</p>		

Condition & Changes Since 1991 Survey:

In 1991 this stand was recorded as S24c and Indeterminate Stand X1 (Stands 6 and 9 respectively). The stand is somewhat difficult to compare to 1991 records as the boundaries have changed considerably. However it appears that quantities of *Cladium mariscus* and *Calamagrostis canescens* have decreased to be replaced by more *Juncus subnodulosus* and *Molinia caerulea*, possibly as a result of increased mowing. Species newly recorded in the stand include *Carex viridula* ssp *brachyrhyncha*, *Potentilla erecta*, *Juncus articulatus*, *Oenanthe lachenalii*, and *Hydrocotyle vulgaris*. Bryophyte species have shifted away from the drier *Brachythecium rutabulum* and *Eurhynchium praelongum* to now favour *Calliergon cuspidatum*. This explains the higher RWPFSS achieved in 2003 and suggests that the stand is wetter than was apparent 12 years ago.



<i>Polygala serpyllifolia</i>		1								I (1)
<i>Epilobium parvifolium</i>		1								I (1)
<i>Eupatorium cannabinum</i>	1									I (1)
<i>Valeriana officinalis</i>					2					I (2)
<i>Valeriana dioica</i>		1								I (1)
<i>Plagiomnium affine</i>						1				I (1)
<i>Plagiomnium elatum</i>						1				I (1)
<i>Rubus fruticosus</i> agg						1				I (1)
<i>Salix</i> seedling										I (1)
<i>Bryum pseudotriquetrum</i>										
Total species:	28	25	24	29	24					

Vegetation height (cm)	40	40	40	40	50
Vegetation cover (%)	100	100	100	100	100
Bryophyte cover (%)	9	8	8	8	8
Bare ground (%)	3	4	4	4	4
Leaf litter (%)	4	5	5	4	5
Open water (%)	0	0	0	0	0

Also recorded in this stand:  
*Betula pubescens* seedling

1	1	1								III (1)
1	2									III (1-2)
	2	2			2					III (2)
	2	2			1					II (1-2)
	1									I (1)
										I (1)
										I (1)
	1	1								II (1)
										I (1)
1										
22	24	23	14	21						

50	60	60	70	50
100	100	100	100	100
8	8	7	6	8
4	4	4	4	3
5	5	6	7	5
0	0	0	0	0

Also recorded in this stand:  
*Hypericum tetrapterum*  
*Centaurea nigra*  
*Viburnum opulus*  
*Sanguisorba officinalis*



Thelnetham SSSI: Old Fen	Stand 12	Date: June - July 2003
<p>M24 <i>Molinia caerulea</i>-<i>Cirsium dissectum</i> fen-meadow (a) Typical sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>The stand is situated on a small raised sandy tongue which stretches out from the woodland bordering the eastern edge of Old Fen. The substrate is moist but is much more free-draining than the surrounding areas of fen-meadow. The height of the tongue is approximately 22.7m AOD.</p>		
<p><u>Structure:</u></p> <p>The vegetation here is roughly 30-40cm tall and consists of a dense sward which is heavy with leaf litter and contains very few bryophytes. No scrub encroachment was observed.</p>		
<p><u>Composition:</u></p> <p><i>Molinia caerulea</i> is the clear dominant in this stand, with <i>Festuca rubra</i>, <i>Holcus lanatus</i> and <i>Phragmites australis</i> as constant associates. Tall herbs such as <i>Sanguisorba officinalis</i>, <i>Cirsium palustre</i> and <i>Centaurea nigra</i> are always present here, in addition to a range of colourful sprawling species. Occasionally rushes including <i>J. subnodulosus</i> and <i>J. effusus</i> as well as a very little <i>Schoenus nigricans</i> can also occur. However the stand has a poor bryophyte layer consisting only of <i>Eurhynchium praelongum</i> and <i>Pseudoscleropodium purum</i>. Consequently this stand is much more species poor than the M24 of Stand 8.</p>		
<p><u>Community Affinities:</u></p> <p>Stand 12 is an extremely species-poor example of M24 <i>Molinia</i>-<i>Cirsium</i> fen-meadow. Although it has a grassy element it lacks many of the distinctive monocots such as <i>Briza media</i> which typically occur in the community. It is also missing many of the moderately tall herbs of <i>Cirsium dissectum</i>, <i>Valeriana spp</i>, <i>Filipendula ulmaria</i>, <i>Angelica sylvestris</i> and rarer fen species. The ground here is too high to include any of the M13 mire element seen in Stands 8, 9 and 10.</p>		
<p><u>Distribution &amp; Conservation Value:</u></p> <p>Although this stand contains the notable species <i>Sanguisorba officinalis</i> and <i>Schoenus nigricans</i> it is very species-poor, with a low RWPFSS and therefore is considered of low conservation value.</p>		
<p><u>Condition &amp; Changes Since 1991 Survey:</u></p> <p>No quadrats were taken in 1991 of this area so no comparisons are possible of floristic changes over the past 12 years. The stand is in poor condition due to the heavy dominance of <i>Molinia caerulea</i> choking out most other species. It is cut annually but its free-draining situation is sufficient to exclude most of the more interesting fen/mire species seen elsewhere on the site.</p>		

Quadrat number (2m x 2m)	80	81	82	
<i>Molinia caerulea</i>	10	9	9	V (9-10)
<i>Phragmites australis</i>	4	3	4	V (3-4)
<i>Festuca rubra</i>	3	4	3	V (3-4)
<i>Holcus lanatus</i>	1	4	4	V (1-4)
<i>Pseudoscleropodium purum</i>	3	3	2	V (2-3)
<i>Sanguisorba officinalis</i>	3	3	2	V (2-3)
<i>Potentilla erecta</i>	2	2	2	V (2)
<i>Cirsium palustre</i>	2	2	2	V (2)
<i>Centaurea nigra</i>	2	1	2	V (1-2)
<i>Lotus uliginosus</i>	1	2	1	V (1-2)
<i>Galium uliginosum</i>	1	1	1	V (1)
<i>Dactylis glomerata</i>		2	2	IV (2)
<i>Luzula multiflora</i>		2	1	IV (1-2)
<i>Vicia cracca</i>	1		1	IV (1)
<i>Cladium mariscus</i>	1		1	IV (1)
<i>Carex panicea</i>			2	II (2)
<i>Holcus mollis</i>		2		II (2)
<i>Juncus conglomeratus</i>		3		II (3)
<i>Succisa pratensis</i>		1		II (1)
<i>Taraxacum officinale agg</i>		1		II (1)
<b>Total species:</b>	<b>14</b>	<b>17</b>	<b>16</b>	

Vegetation height (cm)	30	30	40
Vegetation cover (%)	100	100	100
Bryophyte cover (%)	3	3	2
Bare ground (%)	2	3	4
Leaf litter (%)	9	9	8
Open water (%)	0	0	0

Also recorded in this stand:

*Juncus effusus*  
*Juncus subnodulosus*  
*Schoenus nigricans*

Thelnetham SSSI: Old Fen	<b>Stand 14</b>	Date: June - July 2003
S24 <i>Phragmites australis</i> - <i>Peucedanum palustre</i> tall-herb fen (c) <i>Symphytum officinalis</i> sub-community		
<u>Location &amp; Substrate:</u>		
This stand is situated on the western half of the central fen complex abutting the <i>Alnus glutinosa</i> woodland. It occurs in mosaic with Stand 13 on moist peat where there is generally no standing water during the summer months. The ground height ranges from 22.20m to 22.40m AOD.		
<u>Structure:</u>		
Stand 14 has a tall and rank structure (160-200cm in height), with moderately heavy leaf litter and occasional bare ground patches. Scrub encroachment is less than 5%.		
<u>Composition:</u>		
The contrast in this stand from Stand 13 is provided by the general increase in the dominance of <i>Phragmites australis</i> at the expense of <i>Cladium</i> . Once again <i>Calamagrostis canescens</i> is abundant, with some tall herbs such as <i>Filipendula ulmaria</i> and <i>Epilobium parviflorum</i> . However there is much less of the lower fen tier of vegetation than occurred in Stand 13 (such as <i>Juncus subnodulosus</i> , <i>Galium uliginosum</i> and <i>Lythrum salicaria</i> ). <i>Carex acutiformis</i> is also much more frequent in Stand 14.		
There is some indication that Stand 14 is more eutrophic than Stand 13 by the increase in nutrient demanding species such as <i>Phragmites australis</i> , <i>Humulus lupulus</i> and <i>Urtica dioica</i> .		
<u>Community Affinities:</u>		
The dominance of <i>Phragmites australis</i> , accompanied by <i>Calamagrostis canescens</i> , <i>Cladium mariscus</i> , <i>Lythrum salicaria</i> , <i>Eupatorium cannabinum</i> and <i>Filipendula ulmaria</i> are all consistent with S24 <i>Phragmites</i> - <i>Peucedanum</i> tall herb fen of the <i>Symphytum officinalis</i> sub-community. Stand 14 is a species-poor version of S24c which lacks not only <i>Peucedanum palustris</i> and <i>Symphytum officinale</i> but also <i>Molinia caerulea</i> , <i>Carex panicea</i> and other fen species which would typically reach 25 species per quadrat instead of 12 species per quadrat as was recorded here.		
<u>Distribution &amp; Conservation Value:</u>		
<i>Cladium mariscus</i> is the only notable species to be recorded in stand 14, which is generally of low species-richness and has a poor RWPFS. It is of low botanical interest in its current state.		

Condition & Changes Since 1991 Survey:

In 1991 this stand was recorded as S24c (part of Stand 9). Since then the reed has shown an increase in abundance, despite many of the species present in 1991 still being recorded now. *Juncus subnodulosus* is currently less frequent in the sward than 12 years ago and the litter is consistently heavy. This indicates an increase in mowing of the stand would improve the botanical interest here.

	45	46	47	48	49	74
<b>Quadrat number (2m x 2m)</b>	8	8	9	9	8	8
<i>Cladium mariscus</i>						V (8-9)
<i>Phragmites australis</i>	4	4	3	3	4	V (3-4)
<i>Calamagrostis canescens</i>	4	3	3	3	3	V (3-4)
<i>Eupatorium cannabinum</i>	1	2	2	2	1	V (1-2)
<i>Mentha aquatica</i>	3	2	1	2	1	V (1-3)
<i>Filipendula ulmaria</i>	3	3	2	2	2	IV (2-3)
<i>Juncus subnodulosus</i>	4	4	3	4	4	V (3-4)
<i>Equisetum palustre</i>	2	2	2	3	2	V (2-3)
<i>Galium uliginosum</i>	1	2	2	2	1	IV (1-2)
<i>Lythrum salicaria</i>		2	2	1	1	IV (1-2)
<i>Calliergon cuspidatum</i>	3	3	2			III (2-3)
<i>Carex acutiformis</i>		2	2			II (2)
<i>Epilobium adenocaulon</i>						
<i>Eurhynchium praelongum</i>	1	2	2	1		III (1-2)
<i>Angelica sylvestris</i>	1	2				II (1-2)
<i>Cirsium palustre</i>			1			I (1)
<i>Salix cinerea sapling</i>			1			I (1)
<i>Vicia cracca</i>	1					I (1)
<i>Sanguisorba officinalis</i>	1	1	2			II (1-2)
<i>Mollis caerulea</i>	1					I (1)
<i>Valeriana officinalis</i>			1			I (1)
<i>Schoenus nigricans</i>	1					I (1)
<i>Epilobium hirsutum</i>				1		I (1)
<i>Urtica dioica</i>						
<i>Viburnum opulus</i>						
<i>Humulus lupulus</i>						
<i>Alnus glutinosa sapling</i>						
<i>Dryopteris dilatata</i>						
<i>Lathyrus pratensis</i>						
<i>Calystegia sepium</i>						
<i>Rubus fruticosus</i> egg						
<b>Total species:</b>	12	15	13	15	11	11
<b>Vegetation height (cm)</b>	100	120	140	100	120	120
<b>Vegetation cover (%)</b>	100	100	100	100	100	100
<b>Bryophyte cover (%)</b>	5	5	3	1	1	0
<b>Bare ground (%)</b>	0	0	0	0	0	25
<b>Leaf litter (%)</b>	95	95	95	100	100	75
<b>Open water (%)</b>	0	0	0	0	0	0

	50	51	52	53	54	74
<i>Cladium mariscus</i>	3	3	4	4	3	8
<i>Phragmites australis</i>	8	9	8	9	9	4
<i>Calamagrostis canescens</i>	6	6	6	5	5	
<i>Eupatorium cannabinum</i>	3	2	4	2	4	
<i>Mentha aquatica</i>	2	1	3	2	2	
<i>Filipendula ulmaria</i>	3	2	3	3	2	3
<i>Juncus subnodulosus</i>			1	2		4
<i>Equisetum palustre</i>				1		3
<i>Galium uliginosum</i>		1	2			2
<i>Lythrum salicaria</i>		2	2			
<i>Calliergon cuspidatum</i>	4	4	4	3	4	4
<i>Carex acutiformis</i>	2	4	4	2		
<i>Epilobium adenocaulon</i>	1	1		1		
<i>Eurhynchium praelongum</i>	3	3				2
<i>Angelica sylvestris</i>			1			
<i>Cirsium palustre</i>				1		
<i>Salix cinerea sapling</i>	1				1	
<i>Vicia cracca</i>						
<i>Sanguisorba officinalis</i>						
<i>Mollis caerulea</i>						
<i>Valeriana officinalis</i>						
<i>Schoenus nigricans</i>						
<i>Epilobium hirsutum</i>						
<i>Urtica dioica</i>	1	1				
<i>Viburnum opulus</i>	2					1
<i>Humulus lupulus</i>					2	
<i>Alnus glutinosa sapling</i>					1	
<i>Dryopteris dilatata</i>	1					
<i>Lathyrus pratensis</i>	1					
<i>Calystegia sepium</i>						
<i>Rubus fruticosus</i> egg						
<b>Total species:</b>	15	12	13	12	10	11
<b>Vegetation height (cm)</b>	200	160	160	170	180	120
<b>Vegetation cover (%)</b>	100	100	100	100	100	100
<b>Bryophyte cover (%)</b>	10	10	5	5	10	0
<b>Bare ground (%)</b>	10	0	5	0	10	25
<b>Leaf litter (%)</b>	80	90	90	95	80	75
<b>Open water (%)</b>	0	0	0	0	0	0

Also recorded in this stand:



Also recorded in this stand:  
*Cirsium arvense*  
*Sanguisorba officinalis*

Thelnetnam SSSI: Old Fen	<b>Stand 15</b>	Date: June - July 2003
<p>MG1 <i>Arrhenatherum elatius</i> grassland (c) <i>Filipendula ulmaria</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>Located at the entrance to Old Fen on the higher ground of the south-western corner. The substrate is drier and sandier than occurs within the fen/mire complex in the centre of the site and there is no standing water present. The height of the ground ranges from 22.98 down to 22.34m AOD.</p>		
<p><u>Structure:</u></p> <p>A very rank and uneven sward (70-100cm tall), with moderate litter and bare ground but no bryophyte layer.</p>		
<p><u>Composition:</u></p> <p>Monocots of <i>Arrhenatherum elatius</i>, <i>Holcus lanatus</i> and <i>Phragmites australis</i> form the bulk of the sward in Stand 15. Tall herbs with a preference for eutrophic situations (such as <i>Urtica dioica</i>, <i>Heracleum sphondylium</i> and <i>Cirsium arvensis</i>) are abundant within the stand and are knitted together by a dense entanglement of <i>Galium aparine</i>, <i>Calystegia sepium</i>, <i>Vicia cracca</i> and <i>Humulus lupulus</i>. Although some fen species persist (such as <i>Filipendula ulmaria</i>, <i>Angelica sylvestris</i> and <i>Mentha aquatica</i>) this is clearly a nutrient-rich and species-poor community where management is generally absent.</p> <p><i>Rubus fruticosus</i> is encroaching into the stand in some areas.</p>		
<p><u>Community Affinities:</u></p> <p>The abundance of <i>Arrhenatherum elatius</i> and a suite of nutrient demanding species are typical of MG1 grassland. This community can become more species-rich with regular management but is unlikely in this raised situation to have supported fen meadow communities. The presence of occasional wetland herbs such as <i>Filipendula ulmaria</i>, <i>Lotus uliginosum</i> and <i>Angelica sylvestris</i> classify this stand as the <i>Filipendula</i> sub-community (MG1c).</p>		
<p><u>Distribution &amp; Conservation Value:</u></p> <p>Stand 15 contains no notable plant species and as MG1 is ubiquitous in the lowlands of Britain this stand is of low botanical interest.</p>		
<p><u>Condition &amp; Changes Since 1991 Survey:</u></p> <p>In 1991 this stand was recorded as MG1c (Stand 10). Over the past 12 years there has been a general increase in the abundance of <i>Phragmites australis</i>, as well as nutrient demanding species such as <i>Urtica dioica</i> and <i>Calystegia sepium</i>.</p>		



Quadrat number (2m x 2m)	75	76	77	78	
<i>Arrhenatherum elatius</i>	6	7	8	8	V (6-7)
<i>Calystegia sepium</i>	6	4	4	4	V (4-6)
<i>Galium aparine</i>	5	4	3	4	V (3-5)
<i>Urtica dioica</i>	4	4	4	3	V (3-4)
<i>Glechoma hederacea</i>	2	3	2	2	V (2-3)
<i>Phragmites australis</i>	3	3	3	2	V (2-3)
<i>Holcus lanatus</i>	3	1	3	3	V (1-3)
<i>Heracleum sphondylium</i>	1	2	1	2	V (1-2)
<i>Vicia cracca</i>	3	1		3	IV (1-3)
<i>Carex acutiformis</i>	3	2		1	IV (1-3)
<i>Cirsium arvense</i>		5		3	III (3-5)
<i>Centaurea nigra</i>			5	1	III (1-5)
<i>Humulus lupulus</i>	4			2	III (2-4)
<i>Lathyrus pratensis</i>	2		1		III (1-2)
<i>Agrostis stolonifera</i>		1	2		III (1-2)
<i>Alopecurus pratensis</i>		1		2	III (1-2)
<i>Galeopsis tetrahit</i> agg	4				II (4)
<i>Linaria vulgaris</i>			2		II (2)
<i>Achillea millefolium</i>			2		II (2)
<i>Elymus repens</i>			2		II (2)
<i>Filipendula ulmaria</i>				2	II (2)
<i>Lotus uliginosus</i>				2	II (2)
<i>Poa trivialis</i>		2			II (2)
<i>Rubus fruticosus</i> agg				2	II (2)
<i>Angelica sylvestris</i>				1	II (1)
<i>Polygonum amphibium</i>	1				II (1)
<i>Lamium album</i>	1				II (1)
<i>Mentha aquatica</i>				1	II (1)
<i>Cirsium palustre</i>			1		II (1)
<i>Conium maculatum</i>			1		II (1)
<i>Stellaria graminea</i>			1		II (1)
<b>Total species:</b>	<b>15</b>	<b>14</b>	<b>17</b>	<b>19</b>	
Leaf litter (%)	75	80	75	65	
Vegetation height (cm)	100	100	70	80	
Vegetation cover (%)	100	100	100	100	
Bryophyte cover (%)	0	0	0	0	
Bare ground (%)	25	20	25	35	
Open water (%)	0	0	0	0	

Thelnetham SSSI: Old Fen	<b>Stand 16</b>	Date: June - July 2003
S26 <i>Phragmites australis-Urtica dioica</i> fen.		
<p><u>Location &amp; Substrate:</u></p> <p>Stand 16 is a fringe community which runs adjacent to the perimeter footpath of Old fen. The substrate is often uneven and small pools of standing water are not uncommon even in the summer months. The ground height is very variable and ranges from 22.17m to 22.74m AOD.</p>		
<p><u>Structure:</u></p> <p>A very rank and variable stand with very heavy leaf litter and no bryophyte layer.</p>		
<p><u>Composition:</u></p> <p>This stand is dominated by <i>Phragmites australis</i> and is usually accompanied by other tall monocots of <i>Phalaris arundinacea</i>, <i>Carex acutiformis</i> or <i>Iris pseudacorus</i>. Herbaceous species are generally confined to species preferring high nutrient levels such as <i>Urtica dioica</i>, <i>Humulus lupulus</i>, <i>Eupatorium cannabinum</i> and <i>Cirsium spp.</i> The vegetation is not managed and as a consequence there is considerable scrub encroachment by <i>Alnus glutinosa</i> and <i>Salix cinerea</i> into the stand.</p>		
<p><u>Community Affinities:</u></p> <p>The prominence of both <i>Urtica</i> and <i>Phragmites</i> in the stand is consistent with the tall-herb community S26 <i>Phragmites-Urtica</i>. Similarly, the suite of sprawling species such as <i>Calystegia sepium</i> and <i>Galium aparine</i> found here match those of a S26 classification.</p>		
<p><u>Distribution &amp; Conservation Value:</u></p> <p>This is a widespread community in the lowlands and is characteristic of areas where the draining of peat has enabled a release of nutrients. It can occasionally contain notable remnant fen flora such as <i>Carex elata</i> but on the whole is species-poor and of low botanical interest.</p>		
<p><u>Condition &amp; Changes Since 1991 Survey:</u></p> <p>In 1991 this stand was recorded as S26 (Stand 11). It was not sampled using quadrats and therefore no comparison in floristic tables can be made. However it is presumed to have changed little over the past 12 years, with the exception of some areas of the stand now being classified as W5 woodland through the continued encroachment of scrub.</p>		

Thelnetham SSSI: Old Fen	Stand 17	Date: June - July 2003
<p>W5 <i>Alnus glutinosa</i>-<i>Carex paniculata</i> woodland  (a) <i>Phragmites australis</i> sub-community</p>		
<p><u>Location &amp; Substrate:</u></p> <p>This stand occupies approximately half of Old Fen. It is situated on uneven and often very wet peaty soils. Only a small section of the woodland was surveyed for levels. The range of heights was found to range from 22.10m to 22.70m AOD.</p>		
<p><u>Structure:</u></p> <p>The more established areas of Stand 17 have a heavy canopy cover which exerts considerable shade on the vegetation below. Understorey cover is moderate and the field layer is generally patchy (varying from 20-150cm in height). Leaf litter and bare ground both frequently occur, with the latter of these appearing in large amounts in the east of the site.</p>		
<p><u>Composition:</u></p> <p><i>Alnus glutinosa</i> is the dominant species within the dense canopy, usually accompanied by small amounts of <i>Acer pseudoplatanus</i>. The understorey consists mainly of young <i>Alnus</i>, <i>Fraxinus</i> and <i>Acer pseudoplatanus</i> saplings, many of which appear to have become established before the borehole relocation. The roots of several of the older <i>Alnus</i> trees in the northern edge of the site still stand exposed above the ground surface as evidence of previous drying of the peat soils.</p> <p>In the field layer there is much more variation. Those areas nearest the river are marked by an abundance of <i>Carex acutiformis</i> and <i>Phragmites australis</i> under which very few other species exist. These are mainly tall-herbs such as <i>Filipendula ulmaria</i>, <i>Eupatorium cannabinum</i> and <i>Mentha aquatica</i>.</p> <p>On the eastern edge of the fen, the field layer is sparser and contains a greater abundance of <i>Dryopteris dilatata</i>, <i>Carex sylvatica</i> and <i>Juncus effusus</i>, as well as a more diverse understorey which <i>Sambucus nigra</i>, <i>Crataegus monogyna</i> and <i>Prunus spinosa</i>. In all areas the bryophyte layer was very poor indeed.</p> <p>The floristic table of Stand 17 is shown with Stand 18 for comparative purposes.</p>		
<p><u>Community Affinities:</u></p> <p>Stand 17 is a slightly unusual form of W5 <i>Alnus-Carex paniculata</i> woodland of the <i>Phragmites australis</i> sub-community due to the large quantity of <i>Alnus</i>, <i>Acer</i> and <i>Fraxinus</i> saplings in certain areas of the stand. However the mixture of large monocots of <i>Carex acutiformis</i> and <i>Phragmites</i> supplemented by species such as <i>Dryopteris dilatata</i>, <i>Filipendula ulmaria</i>, <i>Eupatorium cannabinum</i> and <i>Lythrum salicaria</i> are all consistent with a somewhat species poor version of W5a Alder carr. Along the northern section of the woodland, where it borders the path, a thin strip of the woodland contains greater amounts of <i>Urtica dioica</i> in the field layer giving the woodland more affinity to W6d <i>Alnus-Urtica</i> community.</p>		

Distribution & Conservation Value:

W5 is a widespread community of the English lowlands which is becoming increasingly local in its distribution. W5a is the most common of the forms of *Alnus-Carex* woodland type. It is of moderate conservation value.

Condition & Changes Since 1991 Survey:

In 1991 this stand was also recorded as W5a (Stand 2). Over the past 12 years the substrate appears to have become much wetter and there has been a small increase in the abundance of *Carex acutiformis* and *Phragmites australis*. Otherwise there has been little change in the floristics of the stand.

Thelnetham SSSI: Old Fen	<b>Stand 18</b>	Date: June - July 2003
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W10 *Quercus robur*-*Pteridium aquilinum*-*Rubus fruticosus* wood.

Location & Substrate:

This stand occurs in two very small patches of drier, sandy ground around the eastern edge of Old Fen. Ground height was approximately 22.90m AOD.

Structure:

Mature forest with a well developed canopy and understorey but a typically sparse field layer and very few bryophytes. The stand contains moderate leaf litter and no standing water.

Composition:

Dominance is shared within the canopy between *Quercus robur* and *Betula pendula*. In the understorey there is more *Alnus glutinosa* and occasional *Crataegus monogyna* and *Sambucus nigra*.

The field layer is rarely more than 70% of the ground cover, of which *Holcus lanatus* and *Glechoma hederacea* are the most abundant species. These are supplemented by *Brachypodium sylvaticum*, *Rubus fruticosus*, *Pteridium aquilinum* and occasional bushes of *Ulex europaeus*.

Community Affinities:

The stand, although small, is a typical example of W10 *Quercus-Betula-Pteridium* woodland characteristic of free-draining soils. It is often very species poor, as is seen in Stand 18.

Distribution & Conservation Value:

W10 is widely distributed throughout lowland England and Wales. It is of conservation interest mainly because it is the only area of this community on the fen and illustrates the underlying changes in substrate and topography. Apart from this, no plant species of particular note were recorded.

Condition & Changes Since 1991 Survey:

In 1991 this stand was also recorded as W10 woodland and it has remained unchanged in both floristics and geographical distribution since that time.

Thelnetham NVC 2003		Stand 17					Stand 18		
<b>Canopy T (50m x 50m)</b>		<b>T8</b>	<b>T9</b>	<b>T10</b>	<b>T7</b>		<b>T6</b>		
<i>Alnus glutinosa</i>	8	8	8	8	V (8)				
<i>Acer pseudoplatanus</i>	3	2	2	1	V (1-3)				
<i>Salix cinerea</i>				2	II (2)				
<i>Quercus robur</i>							8		
<i>Betula pendula</i>							6		
<b>Shrub (50m x 50m)</b>		<b>T8</b>	<b>T9</b>	<b>T10</b>	<b>T7</b>		<b>T6</b>		
<i>Alnus glutinosa</i>	3	3	3	3	V (3)		3		
<i>Fraxinus excelsior</i>	1	2	3	1	V (1-3)				
<i>Acer pseudoplatanus</i>	3	2		3	IV (2-3)				
<i>Viburnum opulus</i>	1	1		1	IV (1)				
<i>Salix cinerea</i>			4		II (4)				
<i>Hedera helix</i>		2			II (2)		1		
<i>Sambucus nigra</i>				1	II (1)		1		
<i>Crataegus monogyna</i>				1	II (1)		1		
<i>Prunus spinosa</i>				1	II (1)				
<b>Field layer Q (4m x 4m)</b>		<b>T8</b>	<b>T9</b>	<b>T10</b>	<b>T7</b>		<b>T6</b>		
<i>Carex acutiformis</i>	10	10	9		IV (10)				
<i>Phragmites australis</i>	2	2	4		IV (2-4)				
<i>Dryopteris dilatata</i>	1		1	4	IV (1-4)				
<i>Filipendula ulmaria</i>	3	3	3		IV (3)				
<i>Carex sylvatica</i>			1	4	III (1-4)				
<i>Humulus lupulus</i>	2	1			III (1-2)				
<i>Eupatorium cannabinum</i>		1	2		III (1-2)				
<i>Fraxinus excelsior seedling</i>		1	1		III (1)				
<i>Eurhynchium praelongum</i>	3				II (3)		3		
<i>Juncus effusus</i>				2	II (2)				
<i>Acer pseudoplatanus</i>				2	II (2)				
<i>Mnium hornum</i>				3	II (3)				
<i>Alnus glutinosa seedling</i>			1		II (1)				
<i>Carex elata</i>			2		II (2)				
<i>Solanum dulcamara</i>		1			II (1)				
<i>Lythrum salicaria</i>	1				II (1)				
<i>Galium palustre</i>		1			II (1)				
<i>Mentha aquatica</i>		1			II (1)				
<i>Cirsium palustre</i>			1		II (1)				
<i>Lonicera periclymenum</i>				1	II (1)		2		
<i>Holcus lanatus</i>				1	II (1)		7		
<i>Poa trivialis</i>				2	II (2)		3		
<i>Rubus fruticosus agg</i>				1	II (1)		1		
<i>Glechoma hederacea</i>							5		
<i>Urtica dioica</i>							1		
<i>Ulex europaeus</i>							3		
<i>Brachythecium rutabulum</i>							3		
<i>Brachypodium sylvaticum</i>							1		
<i>Betula seedling</i>							16		
Total species:	11	13	12	16					
Vegetation height (cm)	70	75	90	20			5		
Vegetation cover (%)	100	100	100	30			70		
Bryophyte cover (%)	3	0	0	4			4		
Bare ground (%)	6	6	6	5			6		
Leaf litter (%)	7	6	7	8			7		
Open water (%)	5	5	5	0			0		
Also recorded in this community:								Also recorded in this community:	
<i>Glechoma hederacea</i>								<i>Phragmites australis</i>	
<i>Urtica dioica</i>								<i>Dryopteris dilatata</i>	
<i>Stellaria media</i>								<i>Circaea lutetiana</i>	
<i>Galeopsis tetrahit</i>								<i>Rumex obtusifolius</i>	
<i>Geum urbanum</i>								<i>Tamus communis</i>	
<i>Iris pseudacorus</i>									
<i>Carex obtrubae</i>									