



# **Important wetland types in England and the Broads: what are they and where are they?**

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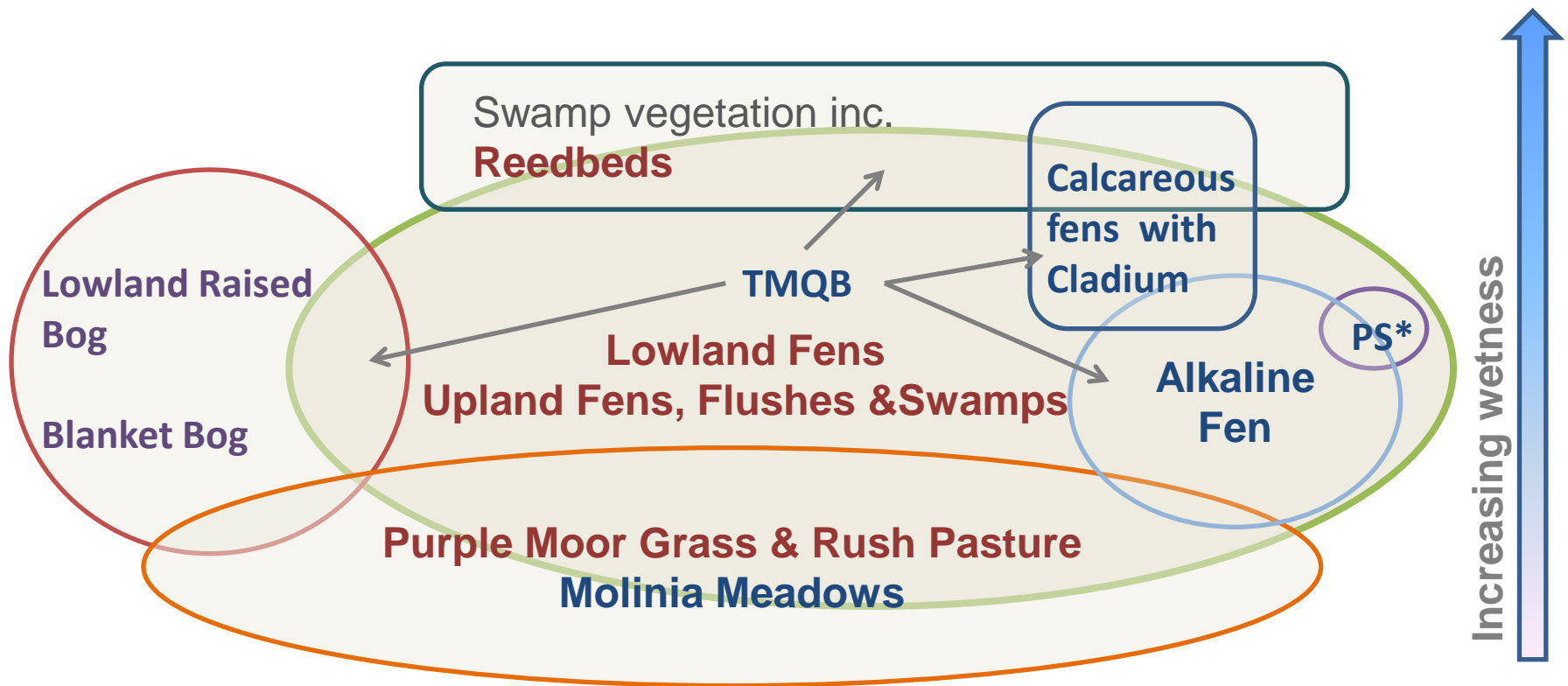
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# Priority Habitat Types

- Habitats of National and International conservation importance
  - European Commission (EC) Annex 1 habitats
  - Biodiversity Action Plan (BAP) habitats



Increasing pH



+ transitions to heath , acid grassland, neutral grassland , calcareous grassland, wet woodland , coastal and floodplain grazing marsh etc.

**BAP habitat name, Annex 1 habitat name or abbreviation, BAP & Annex 1**

\*PS = Petrifying Springs with tufa formation (*Cratoneurion*)

# Resource Assessment:

## Developing Inventories of Annex 1 habitats in wetlands

- 2012 - 2017 project commissioned by Natural England to create a GIS Inventory capturing the location and extent of vegetation qualifying as wetland Annex 1 habitats 'Alkaline Fen', 'Transition Mire & Quaking Bog', 'Calcareous Fens with Cladium', 'Molinia Meadows' and 'Rhynchosporion' in England.
- Desk-based project collating information from a wide variety of sources.
- Approximately 10000 records (points and polygons) captured from existing datasets. For many sites the most recent available survey data were pre-1990.
- Records will be added and updated as new survey datasets become available.
- The GIS Inventory will allow NE to plan survey, monitoring and management of these important habitats.

# Resource Assessment: Developing Inventories of PHTs in wetlands - issues

## Recognising PHTs

- NVC is better defined than Annex 1 habitat categories and BAP categories
- Approach to identifying PHTs needs to be robust enough to avoid double or triple accounting

Drier, mineral soils

Wetter, peaty soils

*Transitions  
and mosaics*

Alkaline Fens

**M10**

**M13**

Fen  
Meadows  
**M22**

Transition Mire & Quaking Bog

**M9-2, M9-3, S27, M5, M4, M2, M18**  
**M9-1, M14, M21**

Molinia  
Meadows  
**M24**  
**M26**  
*Wet grasslands*

Molinia  
Meadows  
**M24**  
**M26**  
*Fen  
Meadows*

Calcareous Fens  
with Cladium  
& Cds  
**S24**

*Increasing acidity*

**S25**  
**S2**  
**Cladio-  
Molinetum**

Rhynchosporion  
Occurs in base-  
poor, oligotropic,  
peaty habitats (inc.  
wet heath)

Grasslands

**Fens**



#### NVC classification

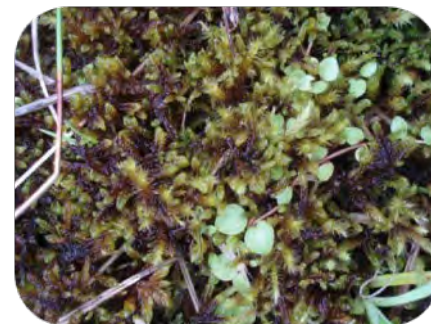
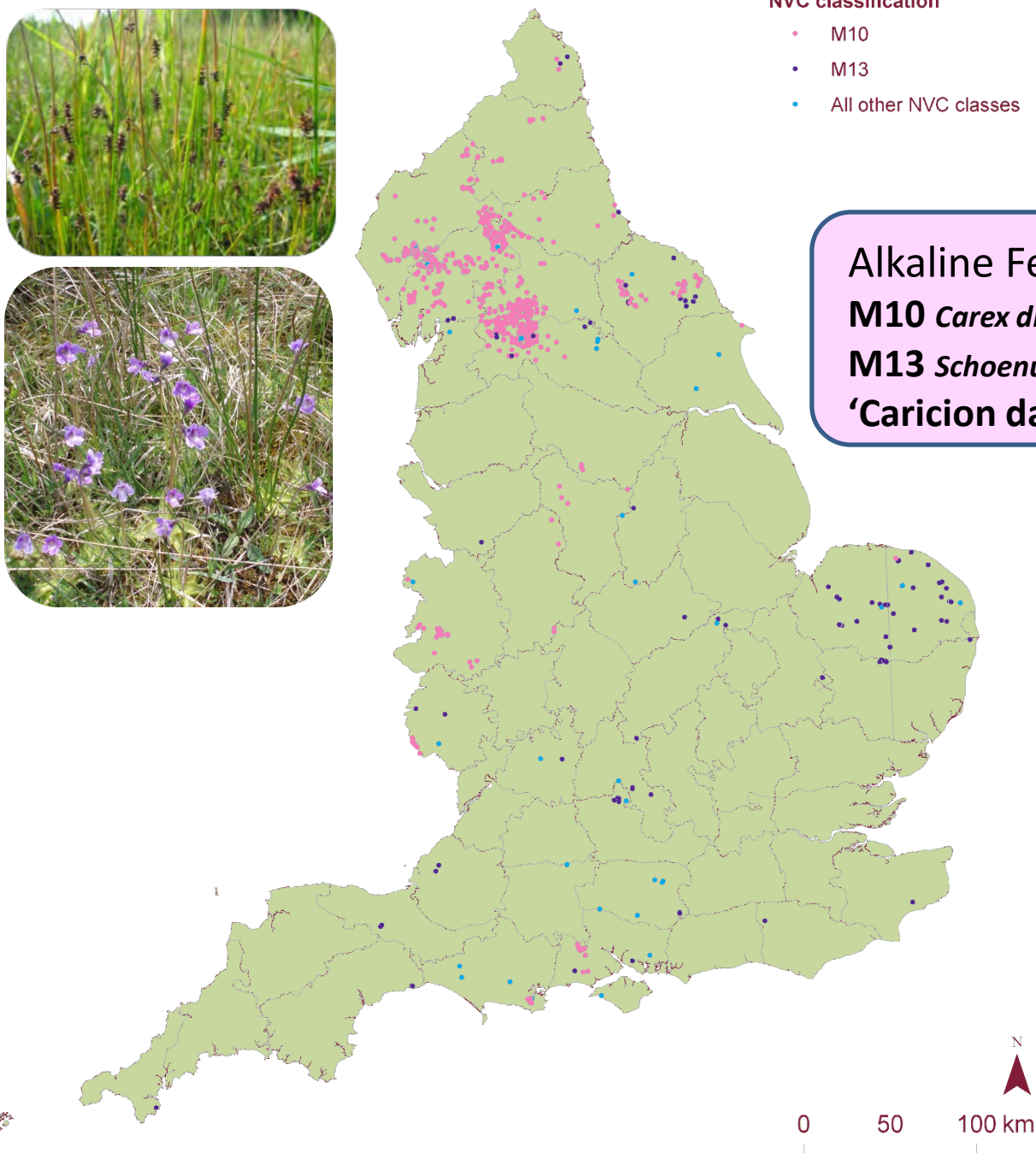
- M10
- M13
- All other NVC classes

## Annex 1 habitat:

### Alkaline Fens

**M10** *Carex dioica* – *Pinguicula vulgaris* mire

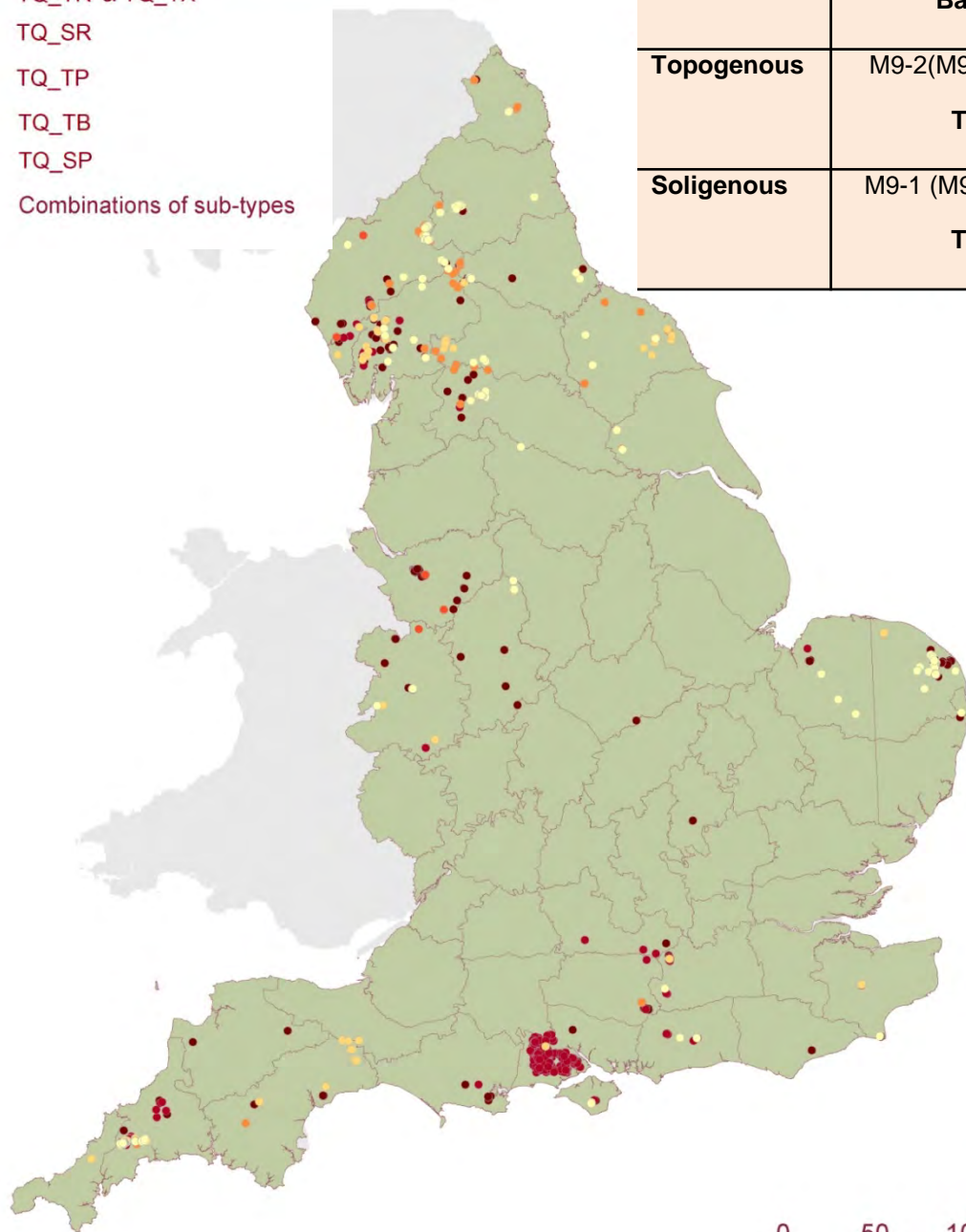
**M13** *Schoenus nigricans* – *Juncus subnodulosus* mire  
'*Caricion davallianae*'



## Transition Mire & Quaking Bog - sub-type

- TQ\_TR & TQ\_TX
- TQ\_SR
- TQ\_TP
- TQ\_TB
- TQ\_SP
- Combinations of sub-types

	Base-rich	Intermediate	Base-poor	
<b>Topogenous</b>	M9-2(M9b), M9-3,S27 <b>TQ_TR</b>	M5 [BDC] <b>TQ_TX</b>	M4 <b>TQ_TP</b>	M2, M18 <b>TQ_TB</b>
<b>Soligenous</b>	M9-1 (M9a), M14, M29 <b>TQ_SR</b>		M21 <b>TQ_SP</b>	



## Annex 1 habitat:

Transition Mire & Quaking Bog  
[BDC]  
M9-2, M9-3, S27, M5, M4, M2, M18  
M9-1, M14, M21

→  
*Increasing acidity*

Upton Broad Flight Pond – atypical M9



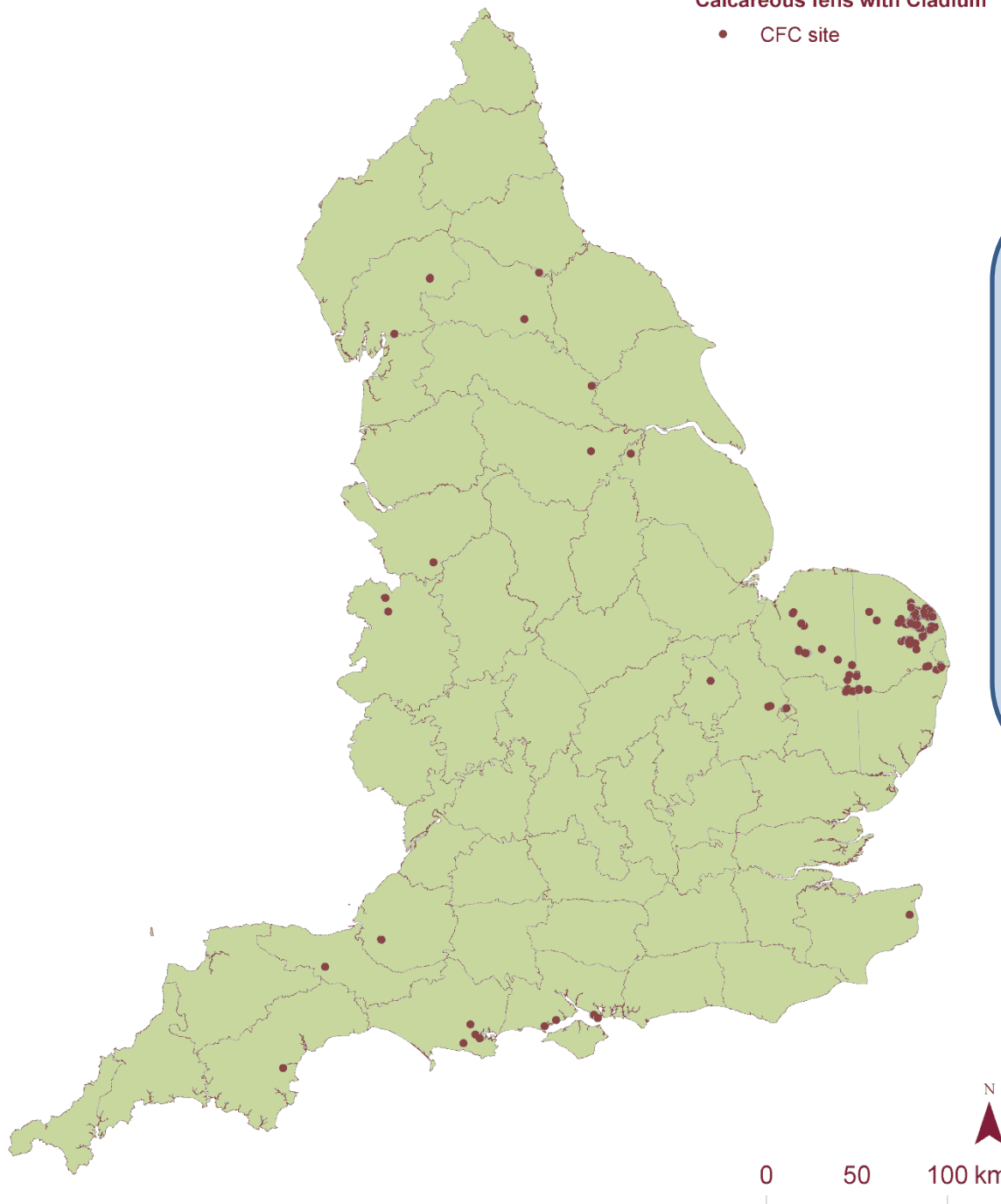


Catfield Fens –  
*Betulo-Dryopteridetum cristatae* (BDC)  
Wheeler, 1980c



Calcareous fens with *Cladium*

• CFC site



## Annex 1 habitat:

Calcareous Fens with  
*Cladium mariscus* & *Caricion  
davalliana* species (Cds)

### NVC communities:

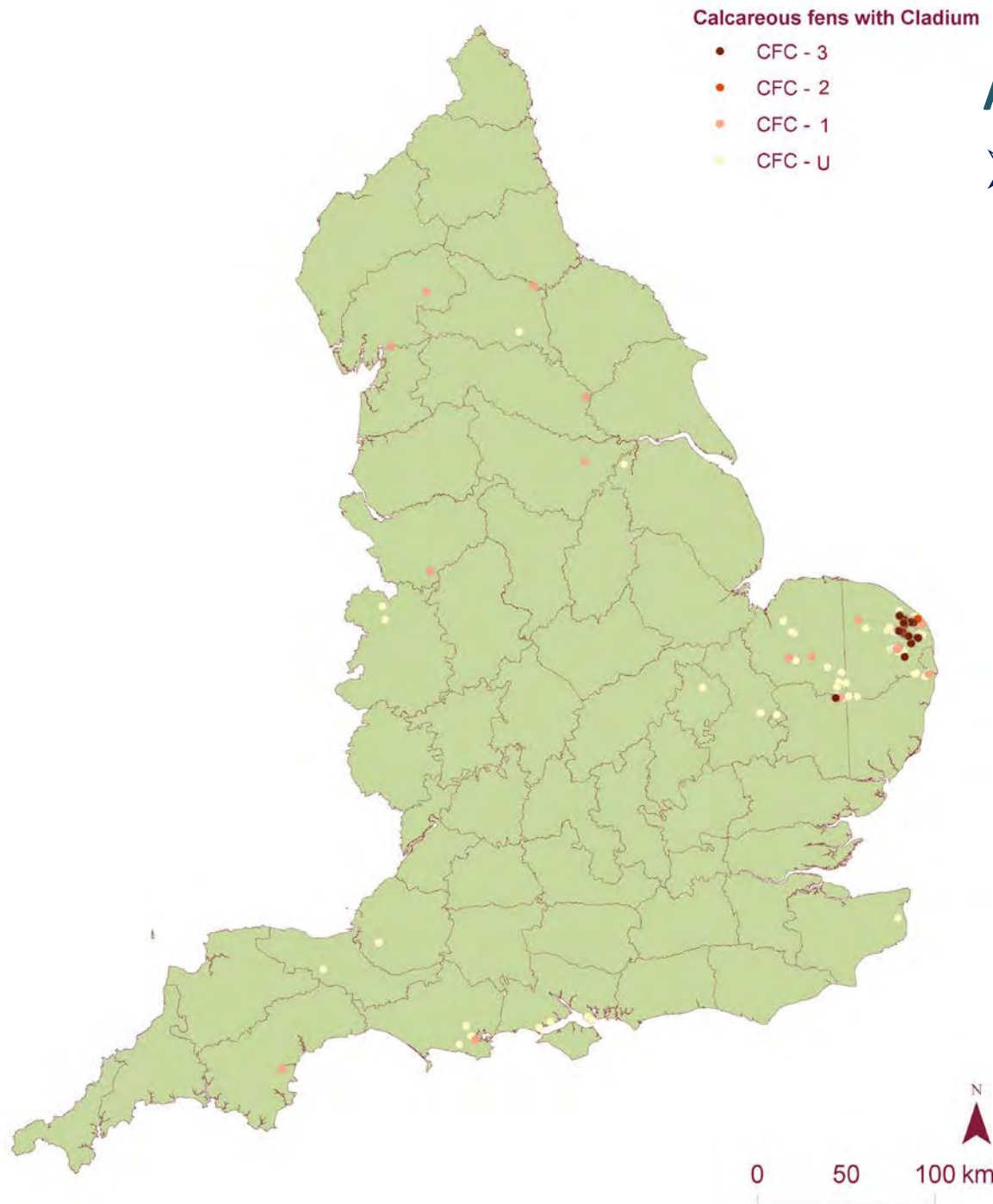
**S24** *Phragmites* – *Peucedanum* fen

**S25** *Phragmites* – *Eupatorium* fen

**S2** *Cladium mariscus* swamp

**[Cladio-Molinetum]**

**S24 and S25 are very  
variable in species-richness**



## Annex 1 habitat:

➤ Calcareous fens with *Cladium mariscus* and *Caricion davallianae* species

Sub-categories based on number of *Caricion davallianae* species (Cds) recorded in samples

**CFC-3:** 3 or more Cds

**CFC-2:** 2 Cds

**CFC-1:** 1 or fewer Cds

**CFC-U:** number of Cds unknown

**The most species-rich samples are found in East Anglia**

# Broadland - S24



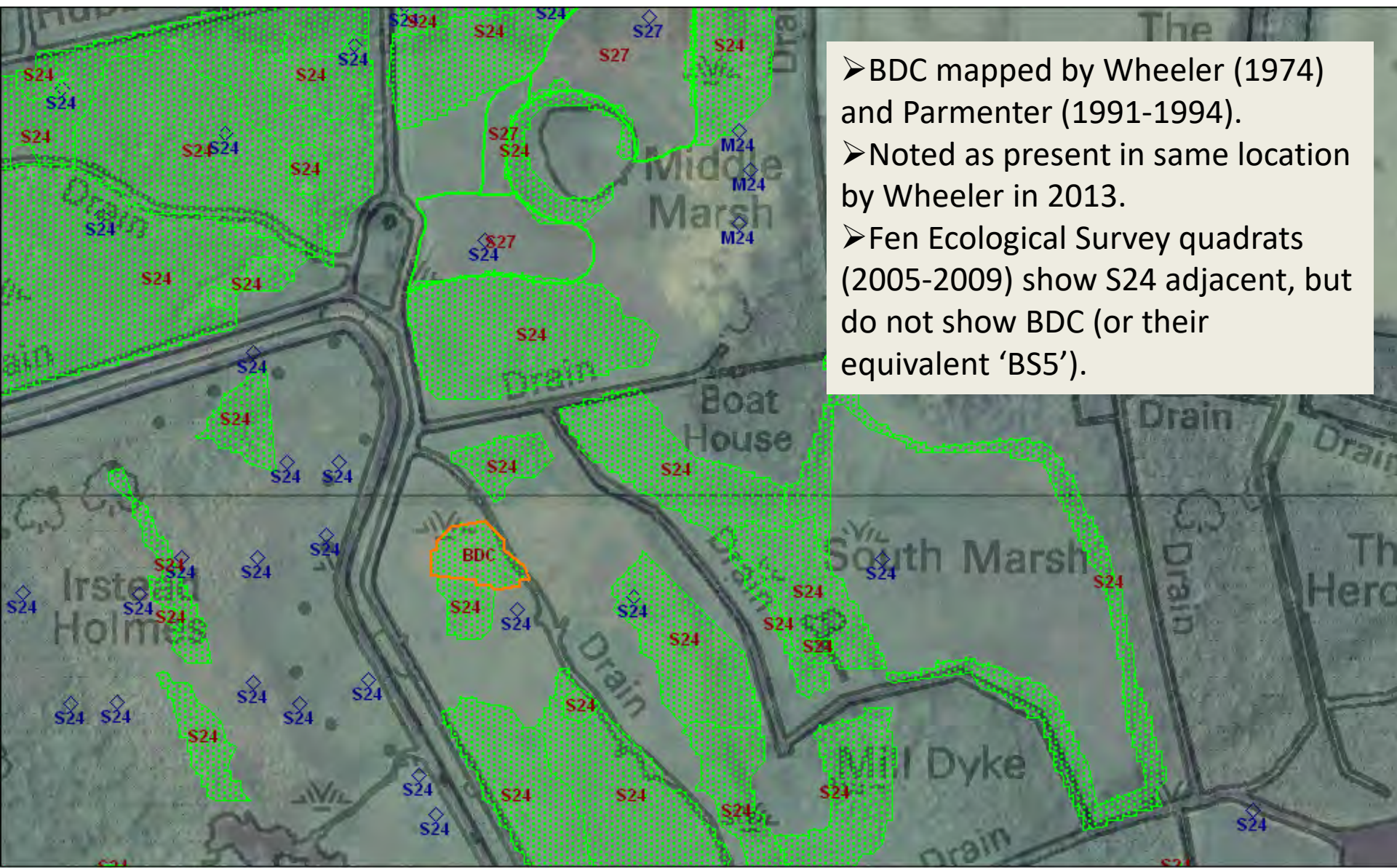
# The Broads SAC – key datasets

- Broadland Fen Ecological Survey 2005-2009 (points, not stands; only herbaceous vegetation)
- Fen Resource Survey 1991-1994 (stands mapped, quadrat data and target notes)
- Wheeler and Giller surveys 1970s and 1980s

# The Broads SAC – Annex 1 inventory

Annex 1 habitat and vegetation	Stands	Ha (indicative)
<b>Alkaline Fen</b>	<b>5</b>	<b>0.7</b>
M13 <i>Schoenus nigricans</i> - <i>Juncus subnodulosus</i> mire	2	0.6
M13 affinity	3	0.1
<b>Calcareous fens with <i>Cladium</i> &amp; <i>Caricion davallianae</i> species</b>	<b>3131</b>	<b>569.9</b>
CF_C3 ( <i>Cladium</i> + 3 or more Cds)	47	17.5
CF_C2 ( <i>Cladium</i> + 2 Cds)	38	13.8
CF_C1 ( <i>Cladium</i> + 1 or fewer Cds)	1	0.0
CF_CU ( <i>Cladium</i> , Cds unknown)	58	22.6
CF_UU ( <i>Cladium</i> unknown, Cds unknown)	2987	515.9
<b>Transition Mire &amp; Quaking Bog</b>	<b>146</b>	<b>19.7</b>
TQ_TR (topogenous base-rich)	59	9.1
M9-3 ( <i>Peucedano-Phragmitetum caricetosum</i> [PPC]) (Wheeler, 1980a)	8	4.5
S27 <i>Carex rostrata</i> - <i>Potentilla palustris</i> fen and swamp	51	4.6
TQ_TX (topogenous base-rich with <i>Sphagnum</i> )	87	10.6
BDC <i>Betulo-Dryopteridetum cristatae</i> (Wheeler, 1980c )	78	9.5
M5 <i>Carex rostrata</i> - <i>Sphagnum squarrosum</i> mire	5	0.2
M5_S27 mosaic	2	0.6
M9 <i>Carex rostrata</i> - <i>Calliergonella cuspidata</i> mire (atypical)	2	0.4
<b>Molinia Meadows</b>	<b>46</b>	<b>29.8</b>
M24 <i>Molinia caerulea</i> - <i>Cirsium dissectum</i> fen meadow	46	29.8
<b>not assigned to Annex 1 habitat</b>	<b>26</b>	<b>2.9</b>
not assigned (usually species-rich M22, or atypical but interesting tall herb fen)	6	0.4
W2 <i>Salix cinerea</i> - <i>Betula pubescens</i> - <i>Phragmites australis</i> woodland	20	2.4
<b>Grand Total recorded on Annex 1 inventory (current version)</b>	<b>3355</b>	<b>622.9</b>

# The Broads: Catfield



- BDC mapped by Wheeler (1974) and Parmenter (1991-1994).
- Noted as present in same location by Wheeler in 2013.
- Fen Ecological Survey quadrats (2005-2009) show S24 adjacent, but do not show BDC (or their equivalent 'BS5').

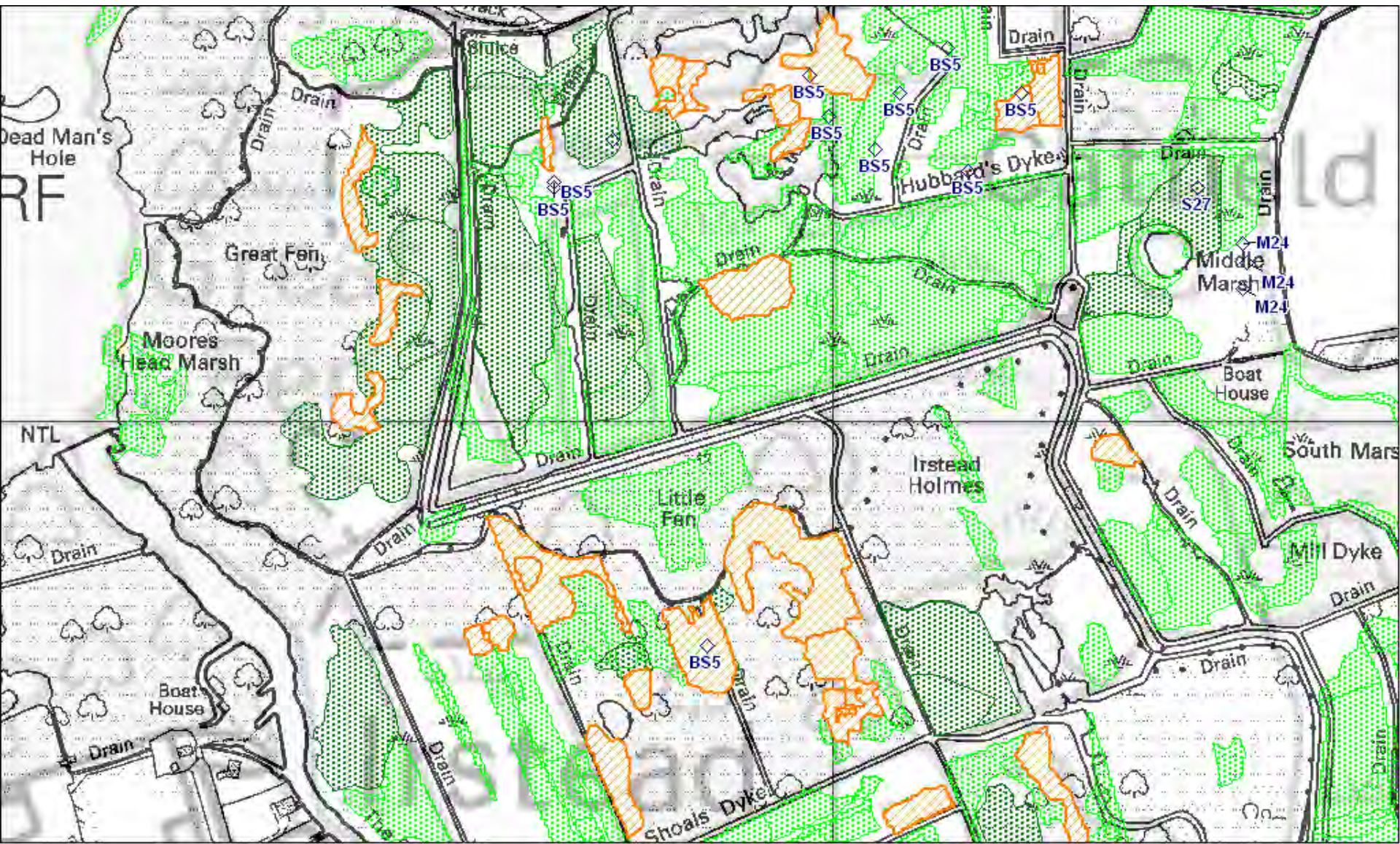
# Annex 1 inventory

- In the FES (2000s) BDC vegetation was allocated to community BS5.
- Some areas match up with the FRS (1990s) stands, others are not represented by FES quadrats.
- May be because FES specifically excluded scrub and woodland.



# Annex 1 inventory – map view

based on FES (2005-2009) and FRS (1991-1994)



# Giller & Wheeler, 1986

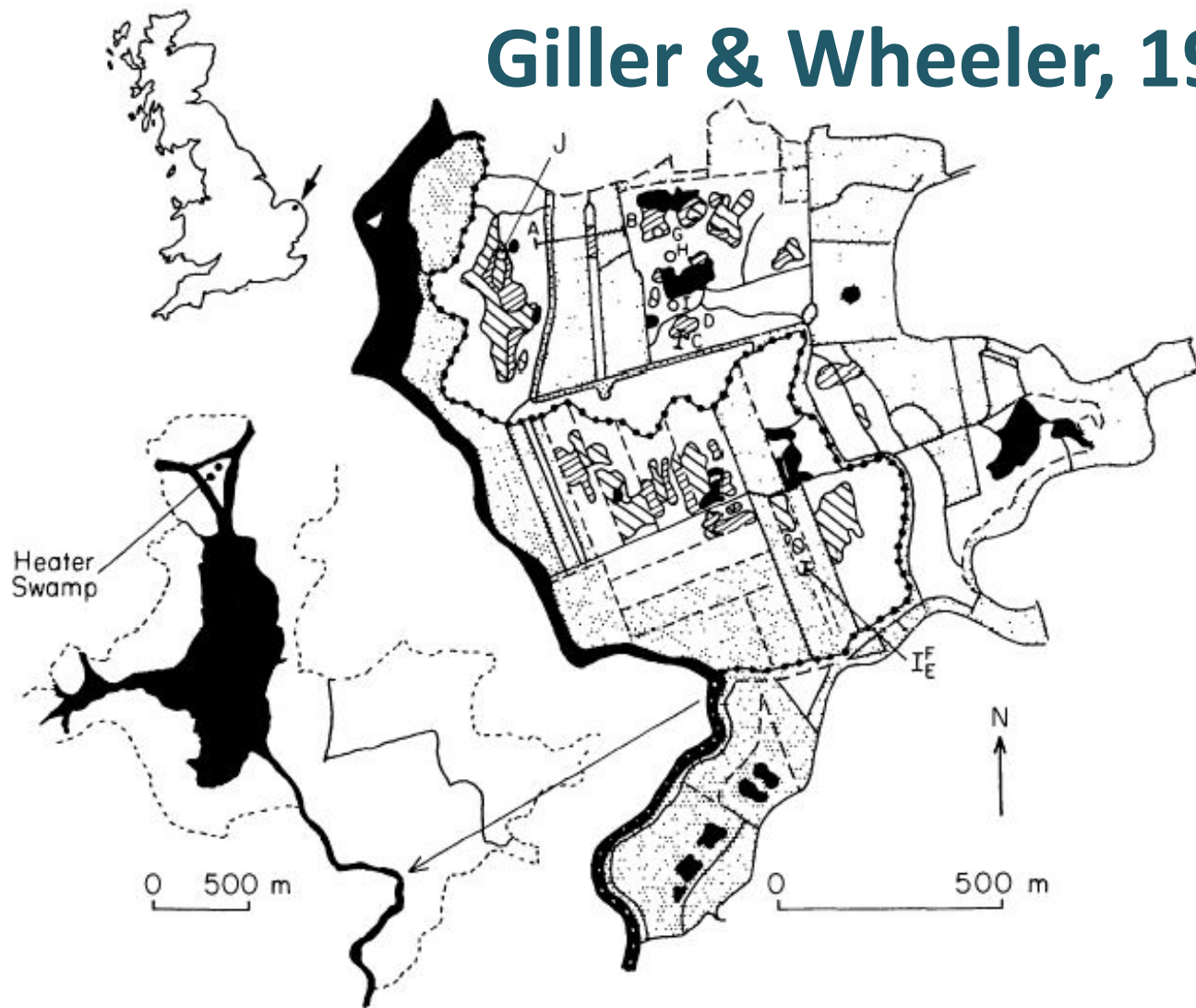
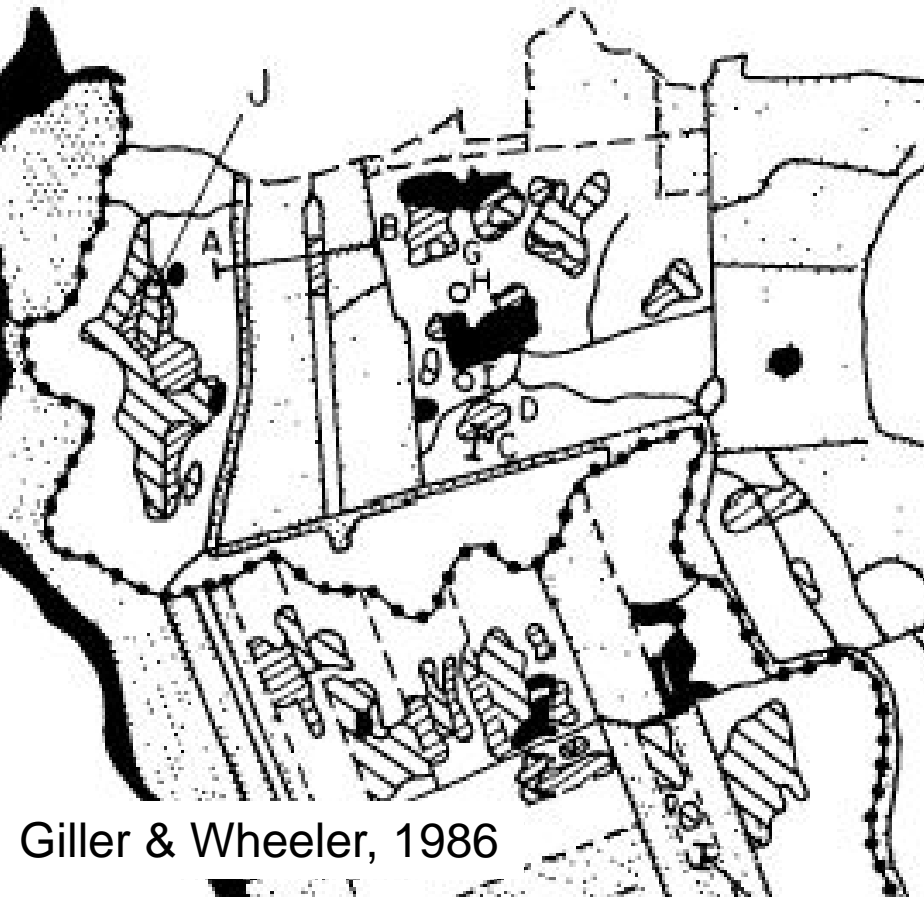


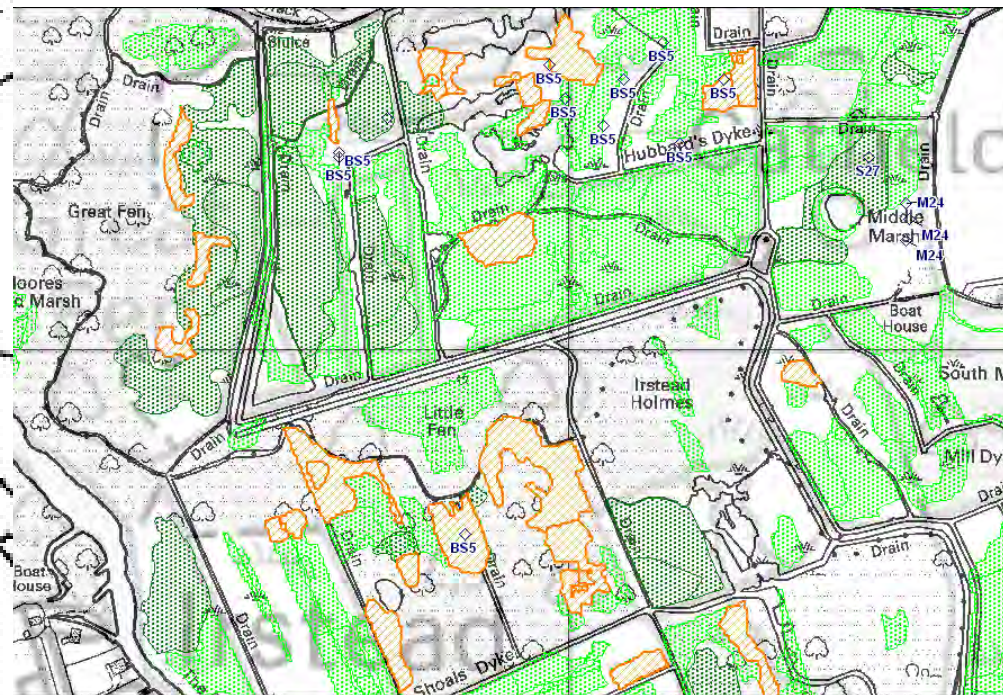
FIG. 2. Map of the Catfield and Irstead Fens. Black areas and lines represent open water and dykes. Dashed lines represent overgrown dykes. Stippled areas mark solid (i.e. uncut) peat surfaces; other portions are former turf ponds (Giller & Wheeler 1986a). Hatching shows distribution of *Sphagnum* stands: ▨, *Betulo-Dryopteridetum cristatae*, ▩, *Betulo-Myricetum gale*, ▤, *Sphagnum* variant. Letters mark location of transects and sampling sites investigated. Black dots show the position of the parish boundary (the former course of the River Ant) through the fens. Inset shows location of the fens alongside Barton Broad and position of Heater Swamp.

# Monitoring change in Broadland vegetation

- Community stability
- Successional change
- Diffuse pollution
- Hydrological regime



Giller & Wheeler, 1986



Annex 1 habitat inventory 2017

# Monitoring Strategy

- Use existing data and reports to map stands of PHTs and management.
- Carry out baseline surveys to check extent and quality of stands of vegetation of particular conservation importance e.g. BDc/BS5, PPc/M9-3.
- Set up vegetation monitoring transects in areas vulnerable to change.
- Record nodal communities and transitions along transects to monitor change.

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