

Summary of Natural England Ecological Report of Evidence and Advice to the Environment Agency for Ant Broad and Marshes SSSI Part 4

19 September 2013

This is a summary report of the 4th evidence and advice report that Natural England has provided to the EA to help in the development of their appropriate assessment.

This report collates

- Section A: NE's comments on Dr Bryan Wheeler report
- Section B: Summary of Condition Assessments of Catfield Fen units 11 and 3

SECTION A: Natural England's Comments on Dr Bryan Wheeler's report

Natural England comments on Dr Bryan Wheeler paper Catfield Fen Comments. Some Ecological and Telmatological Considerations. A report for the Environment Agency. July 19 2013

This note

1. Summarises points made by Dr Wheeler which confirms the advice NE has provided to the EA to date. Notes points not specifically mentioned by NE in their advice to the EA.
2. Provides some detail behind the summary

Summary

The report confirms NE advice provided to the EA to date.

In relation to SAC vegetation features:

- 1.1 There have been recent changes in the vegetation of Catfield Fen.
- 1.2 The key change demonstrated is the expansion in the extent of *Sphagnum*.
- 1.3 These changes have happened since the 1980s (at least).
- 1.4 Other reported changes in the occurrence of individual species, e.g. *Eriophorum angustifolium* ascribed to hydrological change due to abstraction are not persuasive.
- 1.5 There is no evidence of changes at the community level though there may be trends:
 - the expansion of *Sphagnum* and associated hydrochemical changes in S27 might be expected to lead to development of M5/M4. However, as far as the SAC is concerned the feature would still be SAC type "transition mire".
 - The increase in *Sphagnum* in the M24 (*Molinia* meadows annex 1 habitat) has pushed it towards M25, although all the other species typical and associated with M24 are believed to be present.
- 1.6 The key changes noted, i.e. increase in extent of *Sphagnum* cannot be linked to drying. Such changes indicate the continued maintenance of sufficiently wet conditions for *Sphagnum* growth and spread.
- 1.7 There may be a number of mechanisms for such changes which may act alone or in combination. These include: the process of terrestrialisation of former turf ponds; increased influence of rainfall over that of groundwater (which may be as a consequence of turf pond terrestrialisation and/or autogenic succession on solid peat areas); site management with an increased emphasis on summer mowing.
- 1.8 The process of turf pond terrestrialisation may lead to a change in the balance of water sources favouring the influence of rainfall over that of groundwater.

1.9 Wetland communities are vulnerable to drying which may be extreme and/or long term, i.e. outside the range of water levels with which they are associated and which pertain for a long time.

1.10 Management of the site meets the requirements of the HLS agreement.

1.11 Repetition of past quadrats using the same methodology would strengthen the picture of the nature of change

1.12 Some changes noted should be considered Broadland wide. ELP (2010) reports various changes across the Broads, including an overall loss of all fen types to scrub, and the loss of the full range of successional stages within sites. In particular, they note a reduction in the extent and quality of S24 fens, and the possible loss of the *Peucedano-Phragmitetum caricetosum*, one of the richest and most highly valued of the Broads fens.

In relation to hydrology

1.13 The key water inputs to the site are rainfall and groundwater but the relative influence of these inputs vary spatially across the site

1.14 There are “windows” in the peat – crag interface notably via ditches cut into the crag. In some cases there may well be “windows” beneath the compartments which may provide opportunities for water input as well as output?

1.15 Against the general hydrological picture it is important to consider local hydrological changes which may result from turf pond terrestrialisation.

Points not considered in NE advice to EA to date

1.16 What is the trigger for *Sphagnum* colonisation since the 1980s given pH values do not appear to have changed.

1.17 The EA should note that there are additional points of advice which NE has provided in reports 1-3

2. Detail behind summary

2.1 Water level fluctuations and sensitivity to small changes

2.1.1 Fenspec has synthesised characteristic water table levels (and other associated parameters) which are associated with fen communities and species.

2.1.2 Recent publications for the Environment Agency and statutory nature conservation agencies (e.g. Wheeler, Shaw and Tanner, 2009; Wheeler et al., 2004) also highlight that communities can be characterised by a range of water table levels.

2.1.3 Therefore, statements about the degree of sensitivity of communities to small water table changes requires qualification.

2.1.4 What is not known is how often and for what length of time would water table conditions at the drier end and conversely wetter end of the spectrum (and outside the spectrum) result in change and the significance of such change on the condition of fen SAC communities in relation to conservation objectives.

2.2 Changes to vegetation

Reports of changes to the vigour and frequency of individual species as a consequence of drying in the light of *Sphagnum* expansion are not strongly persuasive. There is conflicting evidence.

2.2.1 *Sphagnum* colonisation and condition

The cover of *Sphagnum* has expanded since the 1980s especially but not only in Middle Marsh. This in itself indicates suitable hydrological conditions for *Sphagnum* growth, i.e. wet conditions. It also indicates that there is associated low pH and nutrient status at the fen surface, because either irrigating water has low pH, as in Middle Marsh, or the fen surface is elevated above influence of base-rich water.

2.2.2 There are a number of reasons summarised by Dr Wheeler as to what may have triggered such a change given that this area was known to have a comparably low pH in the 1980s. Terrestrialisation of turf ponds leading to increasing reliance on rainfall and / or changes in management to summer mowing are put forward as possible explanations. Ascribing such changes to drying does not logically follow.

2.2.3 Significantly these changes are resulting in an expansion of the Transition mire and quaking bogs SAC feature. In the context of the Broads as a whole, this is an uncommon habitat and the development of such vegetation as part of a natural successional process is of scientific interest in its own right.

2.2.4 Whilst summer bleaching of *Sphagnum* has been noted, NE agrees with Dr Wheeler that this is not an unknown phenomenon and its significance has to be seen in the light of *Sphagnum* expansion and the prevailing hydrological conditions at the time it was observed. 2010, for example, was a very dry year being the UK's driest year in the previous 35 (CEH UK Hydrological Review of 2010).

2.2.5 Changes to other species

Similar to Dr Wheeler, NE is not doubting the value of Mr Bull's observations on certain plant species both as individuals and as a group. However, we question changes to species associated with transition mire and transition mire appears to have increased in area.

In the case of changes to *Phragmites* there are a number of reasons to explain its poor vigour including

- management changes to a summer mowing regime as opposed to winter cutting for reed (this in accordance with HLS);
- inundation with brackish water (not known to have happened);
- increased reliance on rainfall; decline in nutrients; decreased pH (which may have happened as a consequence of turf pond terrestrialisation (especially as reed population at Catfield is
- largely associated with turf ponds) and / or changes in site hydrology with an increased influence of rainfall over that of groundwater.

2.2.6 FenSpec analysis

This provides a useful comparison of the vegetation found in the quadrats. Its utility is limited by the time of year of survey which may have influenced cover values and the potential absence of late-emerging species, however, those involved are highly skilled botanists and wetland ecologists. Recent condition assessments may well prove a useful check. Analysis of the results of Jo Parmenter's resurvey (July 2013 and not available to date) using a similar approach might yield useful information on any change in the character of the wetland vegetation.

2.3 Hydrology

2.3.1 Dr Wheeler's report has highlighted the additional complexity of the hydrological dynamics of terrestrialising turf ponds (40-60% having been cut over) in addition to the relationship between Catfield Fen and ground water.

2.3.2 NE agrees that the influence of the hydrological dynamics of terrestrialising turf ponds and of autogenic succession on SAC features adds complexity to the underpinning influence of groundwater in certain parts of the Fen.

2.3.3 The influence of hydrology is both in relation to degree "wetness" as well as hydro chemistry as influenced by the balance between rainfall and telluric water. Changes in the balance are likely to

reflect hydrological dynamics of terrestrialising turf ponds as well as the relative influence of ground water.

3. References

- B.D. Wheeler, D.J.G. Gowing, S.C. Shaw, J.O. Mountford, and R.P. Money, 2004. Ecohydrological Guidelines for Lowland Wetland Plant Communities (Eds. A.W. Brooks, P.V. Jose, and M.I. Whiteman,). Environment Agency (Anglian Region)
- Wheeler, B.D., Shaw, S.C. and Tanner, K. 2009. A wetland framework for impact assessment at statutory sites in England and Wales. Integrated Catchment science programme. EA Science report: SC030232
- ELP (2010). Fen Plant Communities of Broadland. Results of a comprehensive survey 2005-2009. Report to Broads Authority and Natural England. 6

SECTION B: Summary of condition assessment of Ants Broads and Marshes units 3 and 11 carried out by Rick South wood and Adrian Gardiner July 2nd -3rd 2013

Unit 3 Summary of condition

- The condition of unit 3 from the features assessed on July 3rd 2013 is **unfavourable recovering**. The reason for recording this condition, rather than favourable, is due to the recovery of the whole unit resulting from actions taken to address unacceptable levels of scrub across the site.
- This is the same as the Common Standards Monitoring (CSM) condition following the assessment of fen condition in 2009, based on Broads' Fen survey data from 2007. The recorded condition on ENSIS in 2009 was **unfavourable no change**, due to the presence of remedies on the unit.
- It is recommended that in line with current NE policy relating to the use of remedies and threats, the unit is recorded as **unfavourable recovering**, with the threat categories of **changes in species distributions** and **hydrological changes**. These threats reflect the observations that a number of species have changed in parts of the internal Catfield fens, and that this may be related to hydrological changes (either natural or external). The profile of threats (the successor to risks) now ensures that concerns recorded as threats will be addressed by the relevant organisations.
- All fen communities appeared to have good summer water levels consistent with their eco-hydrological requirements; this was particularly encouraging given the long-term dry conditions and the drying out currently taking place in some parts of the Broads. RS commented that water levels were better than he observed in 2009.
- The range and quality of the vegetation communities on the site was impressive. The *Sphagnum*, *Drosera rotundifolia*, *Dryopteris cristata* community, often inter-mixed with calcareous fen species is outstanding and very poorly represented in the Broads. The value of this community is recognised by Wheeler (2013), and we would support this view.
- One location on unit 3 (samples 11 and 12) was particularly interesting in supporting Wheeler's view that the *Sphagnum* community represents a late stage terrestrialisation stage of succession. This community with *Drosera* and *D. cristata* and *Eriophorum* surrounded a block of birch scrub with *Sphagnum* in the ground layer but not the other species. The community contained very few of the more calcareous species. This suggests that as the succession progresses the community becomes more acidic and if unmanaged colonises with scrub.
- This unit is under-managed in parts, but clearance of scrub from the fens is in the process of being addressed previously through the ESA agreement and now the HLS agreement.

Unit 11 Summary of condition

- The condition of unit 11 from the features assessed on July 2nd 2013 is **favourable**.

- This is the same as the Common Standards Monitoring (CSM) condition following the assessment of fen condition in 2009. The recorded condition on ENSIS in 2009 was **unfavourable no change**, due to the presence of remedies on the unit.
- It is recommended that in line with current NE policy relating to the use of remedies and threats, the unit is recorded as **favourable**, with the threat categories of **changes in species distributions** and **hydrological changes**. These threats reflect the observations that a number of species have changed in parts of the internal Catfield fens, and that this may be related to hydrological changes (either natural or external). The profile of threats (the successor to risks) now ensures that concerns recorded as threats will be addressed by the relevant organisations.
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- The turf-stripped area of North Marsh appeared to be developing into a reasonable quality S24 community, with 6 positive indicator species of S24 present. The succession of the turf-stripped area of Rose Fen appears to be still at an early stage, keying out as S4, with standing water and an aquatic community of *Hydrocharis morus-ranae*, *Utricularia vulgaris* and *Chara globularis*.
- This unit is well managed. The scrub component in the fens is low (with some impacts on particular invertebrates and birds), but in the context of other Broad's fens as a whole this is not of concern.