Broads Authority
20 November 2015
Agenda Item No 9

Fen Habitat, Strategic Priorities, Opportunities and the Fen Survey
Report by Senior Ecologist

Summary: Fen habitats are internationally important as well as providing the richest wildlife areas in the Broads (Broads Biodiversity Audit, 2013). The strategic priorities for fens are supported by the guiding Biodiversity and Water Strategy. The opportunities to deliver these strategic priorities are set out. These opportunities include bidding for funding for 'Managing Multifunctional Peatland Landscapes for Everyone' (Multi-PLE – Interreg, North Sea Region) (Section 4) and a targeted repeat of the fen survey to track the reported decline in biodiversity value of some areas and success of fen management in other areas (Section 5).

Recommendation:

That members note the contents of the report and in particular:

(i) the strategic priorities for fens set out in Section 2;
(ii) the proposed programme of work under the Managing Multifunctional Peatland Landscapes for Everyone (multi-PLE) Interreg North Sea Region bid;
(iii) the indicative conclusions of the draft Fen Survey Scoping Report; and
(iv) the need to continue to work with partners to agree a programme of work for the fen survey and seek the necessary funding.

1 Broads Authority's Role in Caring for Fens

1.1 Over the past 25 years, the agri-environment support has provided direct payments for active fen management and restoration. This has retained the largest expanse of species-rich calcareous fen in lowland Britain as open landscapes, with around 50% of this owned by private landowners and probably over 50% owned or managed by conservation organisations. In addition conservation organisations, including the Broads Authority, have funded major restoration (e.g. creation of hundreds of hectares of new reedbed and fen at Hickling, Buttle Marsh, South and Mown Fen), turf ponding (e.g. Burgh Common, Woodbastwick, Broad Fen), and large-scale scrub clearance to restore fen (e.g. in the Bure and Yare valley fens), as well as developing wetland harvester and conservation grazing schemes.

1.2 Since 1995, two major fen surveys funded by Broads Authority and Natural England and predecessors, have been undertaken (Fen Resource Survey 1991-1994 and Fen Ecological Survey 2007-2010) aiding understanding of

their biodiversity, geodiversity and management, as well as the impact of salinity and water level changes on freshwater fen wildlife (particularly the unique vegetation and invertebrate communities). These studies demonstrate how the mosaic of different management in the Broads, including turf ponding, long rotation conservation cutting, grazing and commercial cutting, provides both varied and dynamic conditions essential for Broads wildlife. Many of the fen sites are designated for nature conservation value and the Environment Agency's review of abstraction and discharge consents has assessed that the majority of fens have the right amount and quality of water to support the unique Broads wildlife. There are several groundwater dependent fens in the Broads. The Broads Biodiversity Audit (2013) concluded that fen habitat supports the greatest biodiversity (both species number and number of conservation priority species) in the Broads.

1.3 The Broads Authority role since the mid-nineties has been working with partners to formulate the evidence and strategy for fen management and as a statutory consultee for water abstraction consultations, providing advice to the Environment Agency. The Authority provides advice to Natural England on Stewardship schemes for fens as well as supporting the reed and sedge cutters with equipment and skills. In addition the Authority owns and manages a large area of fen habitat and has specialised equipment, including grazing ponies and expert officers.

1.4 The Authority uses an 'adaptive management' process, designed to review policy and decisions, with an aim to reducing uncertainty over time, using a scientific, evidenced based approach.

2 Strategic Priorities for Fen Habitat in the Broads

2.1 These strategic priorities for fens are set out in accordance with the structure of the Biodiversity and Water Strategy (2013) and help explain the focus for the next five years in terms of 'why work on fens', 'how to achieve biodiverse fens' and 'what to focus on' as expanded on below:

2.2 Why work on fens?

- Broadland fens support the richest biodiversity of all Broads habitats and are an international priority habitat

- Clear evidence of negative change, for example:

    a. loss of pioneer swamps and upland transition habitat
    b. loss in species richness to sites dominated by common reed
    c. increase of scrub at the expense of high quality fen
    d. fewer wet fen areas, shown by the loss of important turf-pond communities
    e. strong evidence of nutrient enrichment, partly due to the succession to woodland and partly as a result of general water quality and quantity

f. increasing salinity on the ronds and fen sites, which will form a new pressure for change arising from shifts in climate

- Fens provide vital multiple benefits (ecosystem services) such as flood protection, water storage, carbon capture and storage which benefit people.

- Broads Authority has a leading strategic and operational role for adaptive fen management.

2.3 How to achieve biodiverse fens?

- **Creating and enhancing**
  Create more healthy populations of priority species of conservation concern, by translocation and enhancing environmental conditions to improve and create fen habitat in the context of the multiple benefits. Maintain a mosaic of structural diversity within fen sites to maximise species variety and their resilience to climate change. Each site is considered on its own merits.

- **Protecting**
  Achieve optimal water quality and quantity for a healthy fen habitat, by sustainable land and water management both at and around the site as well as the wider river catchment. Adapt management based on the best evidence. Protecting peat forming processes by hydrological management to retain and capture carbon to help mitigate the effect of climate change.

- **Understanding**
  Incorporate high quality scientific evidence into decision making on all operational, policy and strategic levels. Identify the gaps in knowledge and seek to gain further evidence for improved management, protection and adaptation of fen habitat and species overall and on a prioritised site by site basis.

- **People engagement**
  Demonstrate and communicate the outcomes of successful integrated protection, management and understanding. Relate messaging to multiple benefits (ecosystem services) such as health, flood protection, water storage, carbon capture and storage.

2.4 What to focus on?

- **Continued monitoring of vegetation and invertebrates** to assess change

- **Better understanding of water supply** and the effect of water management on fens, focusing on groundwater dependant sites

- **Better understanding and control of nutrient and other pollutant inputs** for fens and relationship with the water catchment

- **Understand impacts** on freshwater fens and reedbed and on species (e.g. fen orchid, swallowtail butterfly) **from drought, flooding and salt tides**

- **Reducing the isolation of fen sites** to create space for adaptation and a range of adjoining habitats to support diversity, both within and between river valleys – creation of connected habitats at upland and water body edges

- Create opportunities for **management and creation of new fen** sites by demonstrating multi benefit outcomes

- **Sustainable management of fen** through reed and sedge cutting; removal of cut material from long-rotation management; conversion of cut material to biomass and soil improvers;

- **Continue to adapt fen management**, including cutting and grazing, informed by new ecological evidence collected in a standard way

3 Opportunities

- The majority of fen designated for nature conservation and under **Stewardship** schemes creates opportunity for effective protection and enhancement

- Wetland habitat remains a **national priority** for the government with obligations to deliver targets set by the Water Framework Directive and the outcomes set out in the Government's England Biodiversity Strategy

- **Working with universities** to achieve better understanding of pressures on fen habitat and priority species

- **Developing specialised volunteers** to support survey and monitoring

- Learning from the Department of Energy and Climate Change funded **'Wetland Biomass to Bioenergy project'** and gaining the final results from each of the end-to-end systems trialled

- Supporting the application to **Princes Trust Countryside Fund** for the Broads Reed and Sedge Cutters Association, to support the self-sustaining and sustainable development of thatching reed production in the Broads, to allow the Broads Reed and Sedge Cutters to continue to improve the management of reed and sedge habitats

- **Managing Multifunctional Peatland Landscapes for Everyone (Multi-PLE) Interreg North Sea Region bid**

    - Four year project working across the UK, Belgium, The Netherlands and Germany will seek to achieve a better balance between human activity and the natural environment, focusing on the sustainable management and use of water. Tackling some of the most pressing threats to the unique lowland peatland landscapes of the North Sea Region and the ecosystem services they provide, this project will aim to ensure balance between the many changing demands on water resources including climate change across the low lying peat landscapes and work towards new agreements on how this balance can be maintained in the long-term.

    - This bid is an opportunity to fund some of the priority work from the fen survey scoping report. An expression of interest was submitted in May 2015. Partners are expected to hear on options for submitting a full application for a four year project in early November 2015. Broads Authority work packages include:

        - Lake enhancement – Hickling island/reedswamp development
        - Schools wetland curriculum – developing educational materials to increase knowledge of peatland ecosystems
        - Fen survey with volunteers – skills development for vegetation survey to help monitor change
        - Natural capital project – business and landowner multiple benefit local opportunity assessment
        - Water community – clear communication about the state of the water environment in the Broads

    - Other partners in the Broads are the RSPB, who will be acting as the lead partner, and the Norfolk Rivers Trust.

- Partners to find funding for core surveys to inform management and habitat quality of owned sites, including partners pooling their survey plans and so lessen costs and working in partnership

- Species or habitat focused projects, such the ‘Million Ponds’ project and ‘fen raft spider project’ can be effective as funders are often interested in finding funds for projects with charismatic species or clear outcomes

- New investments from private companies and developer contributions

4 Fen Survey

4.1 During the period 2005-2009, the Broads Authority and Natural England commissioned a comprehensive survey of fen vegetation of Broadland, together with a survey of fen invertebrates (OHES, 2010 and Lott et al, 2010). The results were used to describe the fen resource in National Vegetation Classification terms, provide an overview of environmental and management

factors and assess the conservation importance of the fens in their current state. The results were then used to produce a Condition Assessment report for each river valley (OHES, 2012 (2015 revision)), taking into consideration the designated features for each site.

4.2 As these surveys are now approaching 10 years old for some sites, consideration is currently being given (and funding sources being considered) for commencing a repeat of the Broads Fen Ecological Survey in 2016/17. The method best suited to repeating this survey, and the outcomes which can realistically be achieved, need careful consideration. Firstly, because of the nature of the baseline data and how it can be interpreted, and secondly because of the considerable cost of repeating such a survey. The 2007-2010 survey cost around £250,000 for the vegetation survey element alone.

4.3 Following a meeting between officers of the Broads Authority, Natural England, RSPB, Environment Agency and other interested parties, it was concluded that this would best be approached by undertaking a scoping study (Appendix 1) which sought to answer the following questions:

(a) What information/conclusions could be drawn from a repeat of the Fen Ecological Survey?
(b) Which fen sites should be prioritised for vegetation or invertebrate surveys?
(c) What methods could be used for undertaking a repeat survey (including advantages and disadvantages of the various approaches)?
(d) How should the data be analysed and stored?
(e) How can the data be linked into other sources of information in order to expand our understanding of how to achieve best condition for Broadland fen sites?

The scoping report sets out objectives of a repeat survey and the options for the most effective way to deliver robust data. This report is with partners for comment.

4.4 Initial feedback from partners includes that the focus should be on assessing the following questions for the following reasons:

- Are certain species/communities in decline/problematic?
- Are SAC features (or communities of interest) still present in the same quantities/condition?

There is support for targeted, fixed point monitoring of both a representative suite of samples, with a focus on some of the key Broadland species that are under threat locally and where targeted management can help – i.e. lesser water plantain, fen orchid, fen pondweed, intermediate bladderwort, grasswrack pondweed.

- How are certain priority sites responding to external factors (e.g. abstraction, eutrophication, tidal surges)?

It would be useful to have site specific evidence of these processes and useful to provide evidence to tackle threats to site condition, with NE condition assessment also having a role.

- Are certain management practises more suited to specific communities?

This would be a high priority; however partners feel that there may be low confidence that this analysis could tell us anything new.

4.5 It is clear that prioritisation of efforts on key sites will be required as a result of declining resources. The scoping report suggested different methods for prioritising sites and the partners have yet to agree on the best approach.

4.6 Partners will meet to finally agree the priority questions and approach set out in the draft scoping report. They will consider the indicative costs and determine what contribution can be found from partners for the financial year 2016/17 and into the future. The scoping report will be finalised in January 2016.

5 Conclusions

5.1 As set out in the guiding Biodiversity and Water Strategy, fen is the most wildlife rich habitat in the Broads and has shown recent loss and change and requires ongoing protection, enhancement and understanding from a sound evidence base.

5.2 The Broads Authority has a leading role in setting the strategic direction for evidence based management and undertakes a significant amount of fen management in the Broads area.

5.3 The recommendations of the draft Fen Survey Scoping Report inform the detail of the programme of work for fen survey and evidence gathering. Finding resource to deliver the priority elements of these recommendations is going to be a challenging next step.

5.4 It is hoped that there will be an opportunity to undertake some of these recommendations and further value fen habitats as part of the multi-PLE Interreg North Sea Region bid. If this bid is not successful further funding will be required to deliver these work programmes.

References:	Panter C, et al (2013). Broads Biodiversity Audit, Broads Authority Report. Lott, D.H., Drake, C.M. and Lee, P. (2010). Broads Fen invertebrate Survey: Final Report. Aracne. OHES (2010). Broadland Fens Vegetation Survey, Broads Authority Report OHES (2012, revised 2015). Broadland Fens Condition Assessment 2011-Ant Valley Fens, Broads Authority Report
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Date of report:	6 November 2015
Broads Plan Objectives:	BD1, BD4, BD5
Appendices:	APPENDIX 1 – Project Brief: Scoping report for the repeat of the Broadland Fen Ecological Survey

APPENDIX 1

Project Brief: **Scoping report for the repeat of the Broadland Fen Ecological Survey.**

Context:
Consideration is currently being given (and funding sources being considered) for commencing the repeat of the Broads Fen Ecological Survey in 2016/17. This will track community change against environmental parameters and management which have occurred since 2007-10. However, the method best suited to repeating this survey, and the outcomes which can realistically be achieved, need careful consideration. Firstly, because of the nature of the baseline data and how it can be interpreted, and secondly because of the considerable cost of repeating such a survey.

Following a meeting between the Broads Authority, Natural England, RSPB, Environment Agency and other interested parties, it was concluded this would best be approached by undertaking a scoping study.

Aims:
The aims of the study would be to answer the following questions;

1. What information/conclusions could be drawn from a repeat of the Fen Ecological Survey?
2. Which fen sites should be prioritised for vegetation or invertebrate surveys?
3. What methods could be used for undertaking a repeat survey (including advantages and disadvantages of the various approaches)?
4. How should the data be analysed and stored?
5. How can the data be linked into other sources of information (such as hydrological data and Lidar) in order to expand our understanding of how to achieve best condition for Broadland fen sites?

Method:
Data collation:
A number of sources of information have been identified which can be used for the scoping exercise. They include:

- The Fen Ecological Survey 2007-10
- The Fen Invertebrate Survey 2007-10
- Vegetation data from monitoring plots/repeat surveys on up to 10 Broadland sites since 2007
- Fen site condition from NE
- Fen meadow sites that require invertebrate and vegetation assemblage data from BA, NE
- Data on fen management sourced from RSPB, BA and NE
- Hydrological data
- Rainfall data

This would be supported by other documents held by the BA such as the;

- Broadland Fens Site Hydrology Assessment and WETMEC development (September 2011)
- Fen Condition Survey (2011)
- Biodiversity Audit (2011)
- Analysis of Vegetation Change at Sutton and Catfield Fens between 2007 and 2012 (2013)
- Summary data from Jo Parmenter's vegetation survey of 1991-93

Data assessment:

The datasets listed above will be used to assess how a repeat survey might best be undertaken and what the outcomes might be. For this purpose, the repeated surveys of the 10 Broadland sites will be a particularly useful source of information. Due to time/budget constraints it will not be possible to perform a detailed analyse of all 10 sites in terms of vegetation change since the 2007 survey. Instead, five or six of the ten sites will be selected, which best reflect a range of conditions, management histories and water supply mechanisms. These sites will then be analysed to ascertain the possibilities and limitations of different repeat survey/analysis methods.

The assessment will need to be specifically geared to the questions listed in the Aims.

Context Section:

1. **Information/conclusions that could be drawn from a repeat of the Fen Ecological Survey**
2. **Methods that could be used for undertaking a repeat survey (including advantages and disadvantages of the various approaches)**

   Repeat survey:

   The Fen Ecological Survey methodology was set up with a view to several objectives. These objectives included not only to provide a baseline of the current condition of the fen resource but also to provide an overview of the relationship between fen types in the Broads (within National Vegetation Classification terms). The objectives of a repeat survey may be somewhat different (largely concerning tracking community change against environmental parameters and identifying effective management practises). The nature of the existing data will be suited to answering certain questions but may be of limited value in respect to others. This will necessarily be dependent on what additional information has been gathered in the intervening years. For example, it would be difficult to assess the effect of changes in water level management if rainfall data did not exist for the relevant years. This is because a shift in floristic composition towards a wetter community might be the result of atypically wet summers when the vegetation was recorded.

   Repeating the Fen Ecological Survey in an identical fashion to that used in 2007-10 is unlikely to be able to show detailed changes of individual species in direct response to management because it will not be possible to relocate the 2007 plots exactly. This can only be achieved through setting up permanent monitoring plots (which has already been undertaken on some sites). However, a Broad scale fen survey is necessary to complement this detailed monitoring and is the only way to provide an overview of the fen resource, which can then be linked into permanent monitoring plot data.

   Methods:

   Any methodology proposed will need to be directly comparable both between sites and years, with an ability to reflect wider changes in Broadland. Any difference in methodology (for example, in sample density) risks the two datasets being devalued. Consistency of skill and effort levels for recording is also imperative so that variations between sites and recording periods exclude significant recorded variation. This is likely to require training and a shared approach. For example, would it be feasible to use a volunteer base for repeat surveys? Would it be possible to integrate repeat surveys with ISA or are the methodologies not sufficiently compatible?

Main report sections

3. **Which fen sites should be prioritised for vegetation or invertebrate surveys?**

   Several factors would seem to be relevant with regard to prioritising sites for repeat surveys. These include whether i) a site was missed in the last survey, ii) the site has permanent monitoring plots, iii) the site requires an ISA, iv) the site is known to have

undergone management / hydrological change, v) the site contains hydrological monitoring data, or vi) site condition status.

Fen sites subject to consistent succession management tend not to change rapidly in ways which can easily be picked up by NVC surveys and therefore may be low priority. However, there is also an argument for recording some sites where conditions are believed to be very stable in order to put other site data in context. Furthermore, it could be argued that sites should be selected across a range of conditions (based on, for example, their water supply mechanism) and the full range of vegetation types. All these issues will need to be considered, and a protocol established for prioritising repeat surveys.

Since the invertebrate ordination carried out in 2007-10 gave many answers it does not need repeating. However a lack of data on some sites of site condition relating to invertebrates may be required.

The only variant on this would be on fen meadow, where some extra survey might be useful to better place the assemblages there. But this is likely to be rather peripheral to the main fen argument.

This issues will need to be considered in terms of repeat invertebrate and vegetation surveys, together with the timescales such approaches would require.

4. **How should the data gathered be analysed and stored?**
   In the previous 2007-10 survey, the data was rigorously analysed using a combination of ordination, assessment by eye and ecological tools, but this was in part to assess the distinctiveness of the Broadland fen vegetation. The scoping study will need to address whether this process needs to be repeated in full, or whether other methods/simplified processes would be equally as valid. For example, by using the floristic tables generated in the 2007-10 survey to classify subsequent vegetation survey data rather than sending it through an ordination process.

   The scoping study will need to consider whether it is possible to analyse the data in a way which identifies what is a significant change and what is merely natural stand variation. Furthermore, issues which developed during the 2007-10 surveys relating to data storage and management should also be identified here, so that complications with future surveys can be avoided.

GAP assessment and limitations:

This section should identify whether there are any gaps in the data available and how those gaps will affect the conclusions which can be drawn from a repeat survey. For example, to interpret fen survey and monitoring, site management needs to be recorded comprehensively, though this has implications for resources and partner organisations. Similarly, with the support of EA with regard to ROC monitoring, would it be worthwhile to continue hydrological monitoring at certain sites and if so, how can we tell which sites those are?

Consideration of the gaps in assessment of the fen meadows plant and invertebrate data also need to be considered.

Conclusions/recommendations:

The scoping study will need to bring together the conclusions of the trial analysis described above and generate a series of recommendations for the way forward. The recommendations can then be taken forward to a second phase of the scoping study (following this project) which should consist of

stakeholder consultations and assessment of funding resources. This would ensure whatever is proposed in survey terms is sustainable and within the resources of the partner organisations. Primarily by starting with a smaller number of schemes which have been prioritised in a logical fashion and then expanding the number of sites as resources become available.

Timescales:
To be drafted by October 2015 (with recommendations for funding actions in 2016)
To be completed January 2016