

## **CATFIELD FEN: A Response to the AMEC Technical Note: Notes on the Management of Catfield Fen.**

### **SUMMARY**

The AMEC Technical Note has been prepared without any discussion with the owners and managers of Catfield Fen Units 3 and 11 (Butterfly Conservation Land and Catfield Hall Fen), and this has resulted in numerous errors and incorrect assumptions being made:

- **The report's authors have made no attempt to consult the Owners and Managers of Catfield Hall Fen (nor of the Butterfly Conservation land) with regard to current and past management. The assumptions within the report with regard to fen management at this site appear to be based on communications with Mr Starling and Mr Alston, neither of whom have ever had any personal involvement in the management of Catfield Hall Fen.**
- **The report's authors have made no attempt to use widely available literature describing how fen management in The Broads impacts upon vegetation.**
- **The report appears to lack fundamental understanding of fen management practices and the response of vegetation to such management.**
- **The report assumes that the entire site area was previously managed for commercial reed and sedge. This is not the case.**
- **The report assumes that, on the change of ownership in the early 1990s, that there was a change in management from commercial cutting to nature conservation management. This is not the case.**
- **It ignores the fact that the site had been managed with nature conservation as a high priority both before and after statutory notification.**
- **The description of past management is incorrect.**
- **The report focusses almost entirely upon the management methods typically used on a commercial reed bed. This has no relevance to Catfield Hall Fen, which is not and never has been, a purely commercial reedbed.**
- **Although reed is no longer cut for sale from the internal fen system, all of the Catfield Hall Fen land is regularly cut on rotation and the arisings removed from site for the past 20 years, in accordance with best-practice management advice from Natural England.**
- **There has been continuity of vegetation and water level management at Catfield Hall Fen for over 50 years, and the conclusion that a change in management practice is responsible for the spread of Sphagnum in this part of the internal fen system is incorrect.**
- **There has been an increase in long-rotation conservation management at other sites in the Broads, as well as at Catfield Fen, and there has been no recorded increase in Sphagnum at these other sites.**
- **There is some uncertainty as to where the AMEC report is commenting solely on the past and present management of Catfield Hall Fen and where it also considers management of the Butterfly Conservation land.**

**In view of the above, we do not consider that the AMEC report is suitable for use as part of the evidence base for the Appropriate Assessment**



David Weaver is quoted on Page 1 of the AMEC report as saying that the internal fen system is now largely managed for nature conservation rather than for commercial production and that this requires a different approach to management. David Weaver has clarified this comment by saying that the cutting rotation is now longer than on reedbeds which are cut for sale of reed. Commercial reed and sedge cutting and conservation management are not mutually exclusive, and it is erroneous to say that management for nature conservation requires a different approach to management for reed and sedge production. Commercial harvesting of reed and sedge takes place on numerous sites where nature conservation is the primary management objective, for example at Hickling Broad and Martham Broad. It is believed that over 60% of commercial reed harvested in the UK is cut on statutory conservation sites<sup>2</sup>.

Catfield Hall Fen was notified as an SSSI as part of the Ant Marshes SSSI in 1971. The previous landowners, Lord William Percy and Mr Douglas MacDougall were both keen natural historians who managed their marshes for nature conservation in tandem with the harvest of reed and sedge. Management for nature conservation has been a prime objective at least since the ownership of Lord William Percy and has been part of the required statutory management process since the original notification as an SSSI. The suggestion that management changed from commercial to nature conservation when the land changed hands in 1994 is therefore completely incorrect.

The introductory section of the AMEC report suggests that a decision to change the management of the fen from "*commercial*" to "*conservation*" was taken by Mr and Mrs Harris upon their acquisition of the land. This is incorrect. There was no change in management practice following their acquisition of the land in 1994. Some reed continued to be cut by Elliott and Satchell for several more years, but cutting for sale eventually ceased in the late 1990s, because the vigour of the reed had declined so markedly that it was no longer a commercial proposition to cut it. Management continuity, however, was maintained, with the cutting of the fen on a rotational basis in summer or winter, depending upon the vegetation community type, as directed by Natural England and other fen management experts, with the cut material being removed from the site or in some cases being burnt on tin sheets. For example the former commercial reedbeds have been cut in winter, on rotation, as they were when cut commercially.

## **2. Historic Management**

The AMEC report correctly reports that the internal fen system has been subject to a range of different management prescriptions over the past 200 years. Indeed, this management diversity is one of the reasons why the present day fen vegetation within the internal system is so heterogeneous and of such high nature conservation value.

Management of fen as rough summer grazing land does not necessarily require the land to be drained, but it is considered unlikely that Catfield Fen would have been grazed in the past, and we can find no evidence of grazing management ever having taken place. Traditionally, fen vegetation had a significant value, and grazing is not compatible with production of fen litter, reed or sedge. Drier areas of fen were commonly cut for fen litter (marsh hay) in mid summer, rather than being grazed; litter being a valuable crop which enabled animals to be kept through the winter rather than slaughtered in the autumn.

It should further be noted that drainage of the internal system was of brief duration, and the fen may have been actively drained for only c40-50 years. The erection of the windpump can be dated with reasonable confidence to between c1825 and 1840 (the pump is absent from Bryant's map of 1824, but appears on the later Tithe Apportionment Map of 1840). The windpump was in use at least until the time of the 1st edition of 6":1mile Ordnance survey map of the 1880's but marked as disused on the 2nd edition map of 1907). Prof. Tom Williamson (pers. comm.) states that the usual reason for abandonment of the fen pumps was that they were constructed with inadequate knowledge of fenland hydrology and that the investors typically failed to take account of, or underestimated, groundwater flow. It is uncertain whether the windpump was erected to drain the fens for grazing, or whether the intention was to allow closer water level control to facilitate, for example, turbary, or harvest of reed or sedge.

The AMEC report then states that the "*following sub-sections discuss how the area would have been managed for commercial reed production*". The author of the AMEC report appears to be under the impression that the majority of the internal system was managed for commercial cutting of reed. As stated

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<sup>2</sup> Hawke, C.J & Jose, PV 1996 *Reedbed Management for Commercial and Wildlife Interests*. RSPB

above, this is incorrect, and therefore much of Sections 2.1 – 2.5, including the general discussion of water level management within commercial reedbeds and the direct quotations from the Reedbed Management Handbook (RSPB 2009) are irrelevant.

No attempt has been made to utilise widely available published sources on the way in which various management treatments impact upon fen vegetation. The way that management treatment affects fens, including information specific to Catfield Fen, is described in some detail in Giller & Wheeler<sup>3</sup> Wheeler and Shaw<sup>4</sup>, Shaw and Wheeler<sup>5</sup>. A Broadland context is provided in George<sup>6</sup>, Tolhurst<sup>7</sup> and Moss<sup>8</sup>. Only one of these references is cited in the AMEC report on Practical Management March 2014.

## 2.1 Water level management.

This section of the AMEC report concentrates upon water management of commercial reedbed, and thus is not particularly relevant to Catfield Fen as explained above. The following information concerning water management at the site is provided below for clarity.

The central feature of the management of water in the internal system now and in the past has been the use of the two sluices to maintain water levels on the fen. The current water management regime is as proposed by Natural England, on the advice of Dr Bryan Wheeler, and reflects previous water management by earlier owners.

Commercial reed management requires the maintenance of water level in the summer and allows draw-down if required to facilitate access for cutting purposes. It should be noted that lowering water levels in mid-winter is often not possible at Catfield due to high water in the external system. The current water management policy, which was validated by the 2002 HSI report, allows water to leave the site by overtopping of the five bar gate sluice when levels are too high (and formerly through the sluice prior to repairs being made), which permits a degree of through-flow and water movement. The author of the AMEC report suggests that stagnation will result from the water management regime which has been practiced at Catfield for many years. It is evident from this comment that he does not know the site nor has he consulted the site managers. Stagnation is not a problem at any location within the internal system and this is likely to be because of the through-flow of water. There is a natural lowering of water levels during late summer due to evapotranspiration.

In the last sentence of para 2 on page 3 of the note the author indicates his lack of knowledge of the site. The internal system has been isolated from the river for around 200 years, and it is essential to hold water on the site during the winter to ensure that there is sufficient water availability during periods of high evapotranspiration in the summer. It is neither desirable (due to high nutrient levels in the River Ant), nor practicable (due to low summer flow in the river) to let water onto the site from the river during the summer months.

The final paragraph in this section is not relevant, because, as noted previously, the focus of management within the internal system is not, and has never been, solely for commercial management. The inclusion of a statement by Mr Alston that "*the fen ground surface is 250-500mm above the maximum water level height achievable*" is also incorrect. The entire internal system floods to above the level of the ground surface in most winters and in summer, the fen is often surface wet, although it dries in drought years.

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<sup>3</sup> Giller & Wheeler, 1988 Past peat cutting and present vegetation patterns in an undrained fen in the Norfolk Broadland. *J Ecol* **74**, 219-247

<sup>4</sup> Wheeler, B.D. & Shaw, S.C. (1987). *Comparative Survey of Habitat Conditions and Management Characteristics of Herbaceous Rich-fen Vegetation Types*. Contract Survey NO. 6, Nature Conservancy Council.

<sup>5</sup> Shaw, S.C. & Wheeler, B.D. (1991). *A Review of The Habitat Conditions and Management Characteristics of Herbaceous Fen Vegetation Types in Lowland Britain*. Report to Nature Conservancy Council.

<sup>6</sup> George, M 1992 *The Land Use, Ecology and Conservation of Broadland*. Packard.

<sup>7</sup> Tolhurst, A 1997 *Fen management strategy: a strategy for environmentally sustainable management of the Broadland fens*. Broads Authority.

<sup>8</sup> Moss, B 2001 *The Broads*. New Naturalist Series. Collins.

## 2.2 Cutting and Burning

This section of the AMEC report again focusses primarily upon reedbed management, which, as has been explained above, is not particularly relevant to the management of the Catfield Hall Fen or Butterfly Conservation land; and further, appears to suggest that it is common practice to burn reedbeds on a wholesale basis after cutting.

The AMEC report suggests that the expansion of Sphagnum on Middle Marsh and 'other areas of managed reedbed' is due to the cessation of burning'. It should firstly be noted that Middle Marsh is not, nor has ever been, managed reedbed (see Section 1 above). Burning has never been part of the management regime for Middle Marsh nor the Mill Marshes (pers. comm. Keith MacDougall, former owner of Catfield Hall Fen and the Butterfly Conservation land).

There are two ways in which burning is employed in reedbed management. The first is to carry out a wholesale burn of the reedbed, when water levels are high (so as to prevent the underlying peat from combusting and to avoid damage to the reed rhizomes and young 'colts'), and this is used as a restoration tool, to remove litter and poor quality reed, and promote the growth of commercial quality reed. This approach would be used very occasionally, at best.

More typically, however, the use of burning on reedbeds comprises the targeted burning, in piles, of cleanings, litter and non-commercial reed, which is cut and raked off following a commercial cut.

Burning is thus unlikely to have controlled Sphagnum within the internal system, in part because much of the internal system, including the majority of the areas in which Sphagnum now occurs, was never managed for reed, and in part because those areas which were managed for reed in the past would only very occasionally have been subject to a wholesale burn. Further, there is no evidence for wholesale burning ever having taken place at Catfield Hall Fen.

The final paragraph within this section refers to the expansion of Sphagnum within the reedbeds of the Butterfly Conservation land. The Fenside Marsh was in part formerly commercially managed for reed, and some management by burning cannot be ruled out (although as noted in the previous paragraphs, this is not likely to have been a regular occurrence). The AMEC report states that "*As this area was also managed as a reedbed using traditional approaches when owned by Mr MacDougall, it is possibly not surprising that Sphagnum 'boils' were noted in 1993 once this management approach had ceased over much of the Butterfly Conservation area.*" Given that this land was sold to Butterfly Conservation by the MacDougall family in 1992, and that Sphagnum boils might be expected to take at least a few years to develop, the logic within this paragraph is significantly flawed. Moreover, following their purchase of the land, Butterfly Conservation continued to undertake some commercial reed and sedge cutting, and worked to restore other parts of the reedbed for a number of years. It is understood that reed, and sedge, continued to be cut for sale until c2000 (Mandy Gluth, Butterfly Conservation, pers. comm.). Sedge cutting continues at the present time.

## 2.3 Fen Level Manipulation

The reported observation by Mr Alston that the level of Catfield was reduced through 'turfig-out' in the 1920's is of little value in that no location for the turfig-out is suggested: it is not known to which compartments, or parts of the fen, it was applied, or even if it applied at all to the fens of the Catfield Hall Estate<sup>9</sup>. North Marsh (north) and Rose Fen have both been turf-stripped within the last 20 years by the current landowner, but without a significant increase in the vigour of the reed.

Middle Marsh, as previously noted, has never been managed for reed (commercial cutting or otherwise) and thus most of the discussion in this section of the AMEC report is irrelevant.

The suggestion that a topographical survey would indicate if ground surface levels had risen in Middle Marsh is of no value because there are no records of earlier levels.

It should be noted that all the marshes at Catfield are mown on a rotational basis and the litter removed.

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<sup>9</sup> Wheeler, B.D. 2013 *Catfield Fen Comments. Some Ecological and Telmatological Considerations*. Unpublished report, June 2013

Parmenter (The Broadland Fen Resource Survey (1995)<sup>10</sup>: Unpublished survey data) notes that the percentage of litter on Middle Marsh in 1991 averaged 25% while in 2013 it averaged 10% which would indicate that the current management practice is much more successful in removing litter than the previous regime and thus would tend to slow the rate of terrestrialisation.

## 2.4 Management Pre-dating Reed Production.

It should be noted that the attempt to drain part of Catfield Fen in the 19<sup>th</sup> century was a failure due in part to the high volume of groundwater throughflow (Prof Tom Williamson pers. comm. to Jo Parmenter). The mill is first mapped in 1840 (although it is likely to have been constructed following completion of the Commissioners Rond) and is recorded as disused by 1905 (it may have fallen into disuse shortly before or after production of the 1st edition 6":1mile Ordnance Survey map in 1890)<sup>11</sup>. Maps dating from 1816 (C. Budgen) and 1837 (Ordnance Survey 1":1mile map) indicate the current area of the Catfield Hall land as being rough pasture, although the first and second edition of the Ordnance Survey 6":1mile map show only the land at North Marsh as rough grassland; the remainder of the land being fen and turbarry.

The suggestion in the AMEC report that the mill fell into disuse around 1920 is therefore clearly erroneous and it seems more likely that effective drainage of the land took place for only a brief period in the early-middle part of the 19<sup>th</sup> century. This view is supported by Dr Parmenter's stratigraphy survey in 2013<sup>12</sup> which showed a minimal amount of oxidised peat (<10cm depth) close to the fen surface in the extreme east of Middle Marsh. There is no evidence of humification elsewhere on Middle Marsh. Typical fertility levels from Catfield Fen range from 2.5 to 31.2<sup>13</sup>. Middle Marsh has a range of 10.3 to 16.6 which does not indicate a very significant lift in fertility.

## 2.5 Summary of the effect of Historic Management.

Although no commercial reedbed management is carried out within the internal fen system, management practice at Catfield continues to follow traditional methods of cutting and removing the cut material, thus reducing the rate of succession and elevation of the fen surface/terrestrialisation. As noted above, only a small part of the internal fen system was formerly managed commercially for reed, and so the statement about water level management in the second paragraph is irrelevant.

The suggestion that in the past, water management allowing regular flushing took place at Catfield would appear doubtful because the river levels in the Ant are not conducive to flooding the internal system with river water (see above). It is known that there were frequent disputes between Mr MacDougall and Mr Neave (commercial sedge cutter) over water management, possibly due to the latter wanting to reduce levels to cut sedge in the summer months. Reedbeds where flushing takes place, for example Ranworth Flood, have the benefit of differential water levels in adjacent watercourses. This does not apply at Catfield.

The postulated connection between cessation of burning and Sphagnum growth has been discussed above. Historic drainage of the fen would have led to acidification of the surface peat layers upon re-wetting, which would create conditions suitable for Sphagnum, however soil conditions would theoretically have been suitable for Sphagnum growth for at least 100 years, following cessation of drainage at this site whilst the growth and expansion of Sphagnum has been shown to have been both very recent and dramatic<sup>14</sup>, which strongly suggests that some other factor is at work.

The statement by Mr Alston that "*the fen ground surface is 250-500mm above the maximum water level height achievable*" is incorrect and thus the remainder of para 4 in this section is irrelevant. The entire internal system floods to above the level of the ground surface in most winters. Given that management practice at Catfield continues to follow traditional methods of cutting and removing the cut material, as noted above, significant elevation in the fen surface is highly unlikely.

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<sup>10</sup> Parmenter, Jo. 1995 *The Broadland Fen Resource Survey: volumes I-5 - report of the 1991-94 Broadland Fen Resource Survey*. Broads Authority.

<sup>11</sup> Wheeler, B.D. 2013 *Catfield Fen Comments. Some Ecological and Telmatological Considerations*. Unpublished report, June 2013.

<sup>12</sup> The Landscape Partnership 2013 *Ecological/Stratigraphic Review. Catfield Fen*. Unpublished report May 2013.

<sup>13</sup> Parmenter, Jo. 1995 *The Broadland Fen Resource Survey: volumes I-5 - report of the 1991-94 Broadland Fen Resource Survey*. Broads Authority.

<sup>14</sup> Mason, R.A. 2014 *An assessment of sphagnum moss and Fen orchid on Mill Marsh West and Mill Marsh East at Butterfly Conservation Catfield Fen*. Unpublished, Royal Society For The Protection of Birds, 2014

Water levels are currently controlled by the existing water management policy. The present water management policy is consistent with that practiced in the past although the level of vandalism of the sluices is now reduced. It should be noted that there are not elevated bunds around the whole of the Middle Marsh and there is flow from the dyke to the north onto and off Middle Marsh. There is no evidence of stagnation of water on Middle Marsh nor is it completely isolated from the dykes. It should be further noted that the old decoy in the centre of the marsh (which dates from the 1940's) provides further connectivity with the groundwater.

### **3 Current Management**

The management of Middle Marsh is based on a rotational management regime with cuttings being removed from the fen. The average rotation is one year in three. An ideal cutting regime for litter (rush dominated) fen is 2-3 years, and for tall herb fen it is 3-7 years. Longer rotations of 7-10 years are the minimum required to prevent excessive litter build up and scrub invasion, but are not conducive to the retention or development of species rich S24 vegetation.

#### **3.1 Management targets.**

The recent NE condition assessment recorded litter levels at Catfield Hall Fen as being well below the 25% level required under Favourable Condition guidelines. A survey by Dr Parmenter in 2013<sup>15</sup> found levels of litter on Middle Marsh averaging 10%, and 16% for the Catfield Hall Fens as a whole. Parmenter (The Broadland Fen Resource Survey (1995)<sup>16</sup>: Unpublished survey data) notes that the percentage of litter on Middle Marsh in 1991 averaged 25% which would indicate that the current management practice is much more successful in removing litter than the previous regime and thus would tend to slow the rate of terrestrialisation.

The cut height used for the management of Catfield Hall Fens is set at around 5cm above ground level, which is similar to the cut height used for commercial reed management.

#### **3.2 Water Quantity and Quality**

It is not clear how this section relates to the remainder of the AMEC report nor to management of the internal system.

#### **3.3 Practical Management Actions**

The author of the AMEC report fails to understand that there is no conflict in management of water levels for nature conservation and management of water levels for reed cutting. He also appears to base his argument on the assumption that the entire internal fen system at Catfield could feasibly be managed as commercial reed and sedge beds, which is not the case. The poor vigour of the reed precludes their management for pure reed management, and the majority of the fen is mixed calcareous mire and not reedbed. The preoccupation of the author with commercial reed management is irrelevant.

The inundation of the internal system by base rich river water has only ever happened on very infrequent occasions and is undesirable because of the elevated nutrient status of the river water. Moreover, the internal fen system has evolved in the absence of river water from the early 19th century, until the present day; a period of around 200 years. Much of the internal fen system lies over shallow 19th century turbaries. Many of the turbaries at Catfield Fen are mapped on the 1880s 6":1mile map. Tom Williamson (1997: *The Norfolk Broads, a Landscape History*) has postulated that the turbaries from this period are likely to post-date Inclosure; and certainly the margins of the turbaries are rectilinear and closely follow the modern fen parcel boundaries, which also largely post-date Inclosure. Williamson observes that the Catfield turbaries,

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<sup>15</sup> The Landscape Partnership 2013 *Vegetation survey for Catfield Fen on behalf of Mr & Mrs Harris*. Unpublished report. October 2013

<sup>16</sup> Parmenter, Jo. 1995 *The Broadland Fen Resource Survey: volumes I-5 - report of the 1991-94 Broadland Fen Resource Survey*. Broads Authority.

which include Mill Marsh and the Butterfly Conservation Land, date from the mid 19th century; no turf ponds are shown on the 1840's Tithes Award maps but by 1880, rectilinear turbaries, which appear to be terrestrialising, occupied much of the fen. Williamson also notes that some of the turbaries at Catfield are atypically deep (up to 2m), and cut down into the brushwood peat, and it is therefore possible that the internal fen system was enclosed within an embankment and pump-drained not only to facilitate grazing/harvesting of a fen litter or hay crop, as at North Marsh and Middle Marsh, but perhaps also deep turbaries. Wheeler<sup>17</sup> also agrees with this theory. To summarise, it can be demonstrated that the turbaries within the internal system at Catfield were created slightly after the erection of the rond and drainage pump in the early part of the 19th century, which effectively ensured that the internal fen system was no longer greatly influenced by river water; and that development of the calcareous fen vegetation over the turbaries within the internal system therefore took place in the absence of regular irrigation by river water.

Notwithstanding the above paragraph, in any event, the internal system at Catfield is widely acknowledged to be a groundwater fed system<sup>18</sup>. The recent groundwater summary report produced by the Environment Agency notes that the hydrochemical data is consistent with an upward flow of base-rich groundwater to the Fen and that *"groundwater is able to flow directly into the peat at the eastern margin of Catfield Fen where the underlying clay layer is thought to be thin or not present."* There should be a supply of base-rich groundwater available to the fen by upwelling of groundwater from the Crag but this supply is vulnerable to abstraction, which is why Natural England have categorised the site as being vulnerable to hydrological threat.

The suggestion that there are elevated bunds around the fen margins is incorrect. Rose Fen, Long Fen and North Marsh are all connected to the dyke system by footdrains and pipes. Middle Marsh is not isolated from the dykes by a continuous bund.

It is considered that Middle Marsh, which is regularly mown, is already under optimal management for the vegetation type.

#### **4 Conclusions**

The conclusion of the AMEC report that the increase in Sphagnum on the Butterfly Conservation land and at Catfield Hall Fen is due largely to a supposed change in management practice is incorrect. There has been no major change in management at Catfield Hall Fen and commercial reed and sedge management continued for almost a decade following purchase of Fenside and Sedge Fen by Butterfly Conservation; the fens are still cut on a regular rotational system and the majority of the internal fen system, including all but one of the areas in which Sphagnum now occurs, has never been managed as commercial reed. Burning is thus unlikely to have controlled Sphagnum within the internal system.

It is notable that there has been an increase in long-rotation conservation management at other sites in the Ant valley, including Reedham Marshes, as well as at Catfield Fen. Reedham Marshes also has areas of Sphagnum dominated vegetation, however these areas are only recorded as expanding at Catfield.

Contrary to the statement in the AMEC report, increased summer rainfall only leads to a significant change in water chemistry if there is a loss of base rich groundwater at the same time as a consequence of abstraction.

It is also worth noting that recent Condition Assessments of both Unit 3 and 11 have not identified any deficiency in the current management of the internal fen system. An Integrated Site Assessment visit in 2012 found the site to be well managed, in compliance with Natural England's management prescriptions, and meeting many of the Indicators of success for reedbed and fen maintenance specified for the site.

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<sup>17</sup> Wheeler, B.D. 2013 *Catfield Fen Comments. Some Ecological and Telmatological Considerations*. Unpublished report, June 2013.

<sup>18</sup> Environment Agency 2014 *Groundwater Summary Report: Groundwater Report: Assessment of the Acceptable Level of Abstraction within the Ludham-Catfield Area in the Vicinity of the Ant Broads and Marshes SSSI*. Unpublished report.