

An Ecological assessment of the Effect of Water Extraction for Irrigation Purposes on the Flora and Fauna of the Fens at Catfield Hall.

By Alec Bull

Introduction

Following relatively sudden drying out of the fens at Catfield Hall between 2007 and 2010, the author has been asked to comment at length on studies that have been carried out over a number of years, giving dates of visits and the state of wildlife seen during those visits, and making a comparison with the study period which was mainly between 2005 and 2007 and the situation as it is today.

This assessment will be looking mainly at Vascular plants, Bryophytes and certain Fungi which are associated with the fen and bog habitat and are often nationally scarce. No attempt has been made to comment on invertebrates other than to point to the obvious fact that many of these require the habitat provided by their local environment. E.g. Milk Parsley (*Peucedanum palustre*) and the Swallowtail butterfly (*Papilio machaon*).

It is possible that there may be objections to the suggestion that irrigation extraction is to blame for the lowering of the water table, so an appendix has been included which gives the rainfall at East Tuddenham from April to September inclusive from 2005–2010 clearly demonstrating that, though the rainfall at the two sites were undoubtedly different, in fact, Catfield being nearer the coast, the rainfall is likely to be higher than an area which has consistently less rainfall than the Broads area generally. Thus this table clearly demonstrates that any fluctuations in water levels at Catfield Hall Fens have not been influenced by general rainfall.

Discussion

June 15th 1993. On the invitation of Keith McDougall, I took my "Wildlife on your doorstep" to Catfield Hall Fens in the evening, where we found mosquitoes to be the most abundant insects.

The fens appeared somewhat different to local similar areas as the Flora indicated a somewhat acid type of groundwater, with much *Sphagnum* moss. Heath Spotted Orchids (*Dactylorhiza maculata* ssp. *ericetorum*) were abundant in places as was Cotton Grass (*Eriophorum angustifolium*) and Meadow Thistle (*Cirsium dissectum*) Lesser Spearwort (*Ranunculus flammula*), Alder Buckthorn (*Frangula alnus*) and dyke plants such as Greater Water Parsnip (*Sium latifolium*), Cowbane (*Cicuta virosa*), Frogbit (*Hydrocharis morsus-ranae*) Water Soldier (*Stratiotes aloides*) Greater Bladderwort (*Utricularia vulgaris*) and Blunt-leaved Pondweed (*Potamogeton obtusifolius*). Milk Parsley was frequent in the fens themselves, as was Marsh Stitchwort (*Stellaria palustris*).

I was not actually part of the survey team which carried out a research project on selected areas of the Catfield Hall Fens in 2000/2001, but I did visit with the Bryological group on October 21st 2000, which concentrated on the area of Middle Marsh but, as is frequently the case on autumn moss meetings, fungi were collected instead. Forty species were named including *Hypholoma elongatum* which only grows in thick beds of *Sphagnum* moss.

The Norfolk & Norwich Naturalist's Society Research Committee survey, of which I was the Chairman and co-ordinator started on August 8th 2005 with the aim of covering the whole of the Catfield Hall Estate fens, carrs and woodlands by the end of 2006 but in fact held our last meeting on November 5th 2007.

The areas covered by the 2000/1 survey were North Marsh South, Middle Marsh, the two parts of Mill Marsh and Rose Fen and Long Fen. The last named had had foot drains put in the and Rose Fen had been peat stripped in 2003/2004 and Mr Harris asked that a resurvey should be done to gauge the effect on these two areas in particular.

Being relatively 'new' to the area, Notes on the first date only detailed the key species seen and at the same time we were also looking at North Marsh North, the

Alder Carr nearby, South Marsh and areas of fen south of Rose Fen and round the Broad, and also wet woodland areas such as The Heronry and Church Wood.

Some of us struggled through the reeds to the flight pond in the middle of Middle Marsh and it was obvious even then that Common Reed (*Phragmites australis*) was encroaching steadily into the open water. It must be admitted that this was the only time that I have visited the flight pond as the going gets very difficult and perhaps even dangerous over the last 50 metres to the edge of the open water.

On September 19th 2005, Bob Ellis went to the west side of Mill Marsh across the notorious aluminium ladder, thankfully now replaced by a wooden bridge, to do population estimates for the Crested Buckler Fern (*Dryopteris cristata*) and found this to be thriving and most probably one of the strongest colonies in Broadland. The mown fen area of Middle Marsh was nice and wet and produced considerable numbers of the fungi *Hypholoma elongatum* and *Galerina paludosa* the latter also being a *Sphagnum* specialist.

More fungi were collected on October 10th 2005 including, on Mill Marsh west, numbers of *Mycena belliae* which only grows on dead reeds at the point of emergence from standing water. *Marasmius limosus* was also found growing on dead leaves of reed. On this occasion, Mrs Harris also made a collection which included *Cortinarius uliginosus* from the mown fen area of Middle Marsh.

On November 10th when members of the Bryology group paid a return visit to the estate and visited Mill Marsh west, discovering a number of common heathland mosses growing on top of tussocks of *Sphagnum*, 5 species of the latter being identified.

In the event of the marsh drying out, such species as *Pleurozium schreiberi* and *Plagiothecium undulatum* could soon become dominant at the expense of the *Sphagnum*.

On December 14th 2005 a winter visit was made with a view to taking habitat photographs. On this occasion, Trevor Dodson was reed cutting on North Marsh North which was ankle deep in water, and I was amazed to discover that the reed stubble, cut just above the water level, had literally thousands of *Mycena belliae* mentioned earlier.

The first visit of 2006 was on March 27th when Snipe were abundantly leaving the areas mown by Trevor at the beginning of winter and we also disturbed 4 Woodcock more or less together.

This was a general meeting day with experts on Spiders (P. Nicholson and P. Collyer) and Lepidoptera, (Andy Beaumont who lives in Catfield and was planning light trapping for moths during the summer.) joining the Botanical party to familiarise themselves with the site.

On April 24th we were joined by Stuart Paston, an expert on Hoverflies. Plants noted especially on that date were Climbing Corydalis (*Ceratocarpus claviculata*) an acid loving plant of heathy ground and drier spots on the edges of reed beds, and good quantities of Tufted Sedge (*Carex elata*) which is on the scarce plants register, though common in Broadland.

May 29th saw an enhanced party, with Roy Baker, Keith Clarke and Derek Howlett heading for Catfield Broad which they found to be heavily infested with blanket weed. As there was also algae in neighbouring dykes, the general consensus was that there must be some nitrogen enhancement coming from nearby.

Nine species of Dragon and Damselfly were listed on this date and large numbers of a medium/large Hoverfly were everywhere. Stuart Paston was not with us that day and I have never seen that species either before or since.

Large quantities of Cotton Grass were blowing in the wind on the mown fen area of Middle Marsh where I also found two plants of the rare Slender Sedge (*Carex lasiocarpa*).

The visit on June 26th was cut short by heavy rain, but Greater Spearwort (*Ranunculus lingua*) and Greater Bladderwort were both flowering in the Rose Fen/Long Fen area. In spite of the peat stripping about three years earlier, the shallow pools among scattered Reed on Rose Fen had many flowering plants of the Bladderwort as well as those which were flowering in the dykes.

The visit on July 31st was mainly concerned with butterflies and dragonflies, but the heads and tails of two partly eaten decomposing Pike were found near the Broad and Andy had a close encounter with an Otter. We also photographed some of the large numbers of Heath Spotted Orchids then flowering on the mown fen area of Middle Marsh, just as they had been in 1993.

August 28th and October 2nd were mainly taken up with recording fungi and on the latter date, whilst foraging in very wet sallow carr at the south west corner of North Marsh South, with much *Sphagnum* under foot, two species were found (*Naucoria sphagneti* and *Lactarius trivialis*) which are normally only found in similar situations in Scotland. Several other fungi of very wet sites were found in sallow carr at the head of Rose Fen.

Thirty eight species of fungi were added to the Catfield Hall Estate list on October 30th, whilst on the final visit of 2006, on November 27th, the wet sallow carr mentioned on October 2nd provided us with *Russula laccata* described in the Kew Checklist as 'rare in sallow swamps'.

February 19th 2007 was just a stroll round the fens following a committee meeting with Mr & Mrs Harris.

A solo visit on March 15th and an attempt to penetrate the reeds on Mill Marsh west was foiled as the water level was just about to the top of my wellingtons.

On that visit Broadland birds were to the fore and also deer as three species were seen, Roe, Chinese Water Deer and Muntjac, the latter being the only one I have seen there.

On June 25th a small party did transects of North Marsh South and South Marsh, neither of which had been traversed before. A single plant of Crested Buckler Fern was found on North Marsh South and a nice clump of Royal Fern (*Osmunda regalis*) was found on South Marsh where Bob Ellis also found a plant of Slender Sedge and Mary Ghullam discovered *Psathyrella typhae* a rare little fungus which grows on the waterline on dead stalks of Reedmace (*Typha latifolia*).

An extra Bryophyte meeting was arranged for September 25th to look at some sites not previously visited.

On this occasion, Bob Ellis found the strange white Liverwort *Cryptothallus mirabilis* deep beneath an area of very wet *Sphagnum squarrosum* in a corner of the Alder Carr. This was a new record for East Norfolk. Nearby the rare fungus of boggy Alder carr, *Hypholoma myosotis* was found.

Later the party ventured across the aluminium ladder and had an hour among the treasures of Mill Marsh west where we found an abundance of clumps of Crested Buckler Fern, Cotton Grass was found there for the first time and a colony of Adder's Tongue Fern (*Ophioglossum vulgatum*) was discovered as new to the site. Richard Fisk also found the Liverworts *Pellia neesiana* and *Moerckia hibernica* both rare in Norfolk. Two more *Sphagnum* specialist fungi were added to the tally, these being *Cortinarius tubarius* and *Russula sphagnophila*.

The highlight of a fungus foray on October 17th came when a loud bellow behind me caused me to jump round and face a rutting Red Deer stag less than 20 metres away - fortunately across the other side of the old course of the River Ant.

More fungi were added with the help of Andy Beaumont on November 5th.

Due to other commitments, I was only able to visit Catfield once during 2008, this being on August 15th when I noted that there was still some Cotton Grass showing on Mown Fen. I also added, in my notes, after I had walked down the side of South Marsh to Mill Marsh East and to the new bridge into Mill Marsh West, that I had never seen the marshes as dry as I had found them that day and that there was no standing water at all on Mill Marsh West, instead of being ankle deep as it had been in all the previous years.

Dry land plants were already taking advantage of the conditions as, along the edge of South Marsh, almost to the Mill Marsh bridge, I spotted a Dog Rose (*Rosa canina*) seedling no more than six inches high as it was sporting two bright red Robinn's Pincushion galls.

Whilst admitting that rainfall amounts at East Tuddenham are not necessarily the same as at Catfield, the appendix consists of a rainfall chart for the months April to September for the years 2005-2010 and from this it becomes obvious that 2005, 06

and 2010 can be regarded as 'average' whilst 07 and 08 were much wetter in those months than average in spite of April 2007 only providing half a mm of precipitation for the whole month. This being the case, it confirms that the drying of the Catfield Fens must be due to an outside source, in this case irrigation nearby. This is having a very serious effect of the plant communities, the Bryophytes and also on the rarer fungi, and also by inference, on all the invertebrate communities reliant on the fen habitat.

This was proved on my next visit on June 5th 2009, when I found the mown Fen area parched and with just a stalks of Cotton Grass and no Orchids or Meadow Thistle or emergent Devil's Bit Scabious (*Succisa pratensis*)

A Fungus Foray on November 12th revealed that, despite recent rains, there was now no standing water in the Alder Carr, the Sallow Carr or the area of Sallows known as The Heronry or Church Wood whilst the depth marker in the boathouse dyke was registering minus one. In fact, a fungus new to the site was found, dry shod, in the middle of one of the 'usual' pools in the Heronry, growing on the underside of a dead Sallow branch where it would normally have been submerged *Bulbilomyces farinosus*)

On June 4th 2010 I visited Rose Fen where Greater Bladderwort was flowering in teaspoonfuls of shallow water which was fast drying up and a visit to Mill Marsh West revealed -and I quote 'the best area on Mill Marsh was a sorry sight with all the *Sphagnum* tussocks bleached and browning and little signs of other life.'

A further sign of drying out was noted down the edge of South Marsh, when several plants of Knotted Figwort (*Scrophularia nodosa*) were flowering 30 metres down the side of the marsh from the wooded area.

In addition, all the carrs were bone dry and I would doubt whether the *Cryptothallus* under the *Sphagnum* in the Alder Carr could survive such prolonged drying out.

August and September were relatively wet this year, though comparable wet periods were recorded in the same two months in most years under consideration, and when I visited last on October 25th, I was amazed to find the water levels back to normal, i.e. over my ankles on Mill Marsh West, suggesting that that the irrigation equipment nearby had been turned off for the year.

I would suggest however, that the damage done to the Fens over the past two or more years may not be reversible in the short term. A search for *Sphagnum* associated fungi revealed less than half a dozen specimens in total from Mill Marsh West and Mown Fen and no other fungi at all.

In spite of the suddenly abundant water, much of the *Sphagnum* on Mill Marsh West was still either of scorched appearance or bleached and though one or two crowns of Crest Buckle Fern were belatedly shooting, they were all puny and dwarfed.

Neither could I find a single *Mycena belliae* on the reed stems either on Mill Marsh West or on North Marsh South where Trevor Dodson was busy reed cutting.

Conclusion

Unless urgent steps are taking to control water extraction at Catfield, one of the most important sites in this part of Broadland is likely to degenerate into an area of mediocre reed bed with little other botanical or invertebrate interest.

Reference

Checklist of the British and Irish Basidiomycota
Legon N.W. and Henrici A. 2005 Kew.

Appendix A

Rainfall at Hillcrest East Tuddenham for the six months April to September inclusive for the years 2005-2010.

	2005	2006	2007	2008	2009	2010
Apr.	46.25	26.5	0.5	46.5	26.25	24.0
May	59.5	68.0	140.5	63.0	49.25	31.75
Jun	70.25	22.75	178.75	54.0	72.5	44.0
Jul	72.25	22.25	104.25	67.5	112.75	56.0
Aug.	50.75	171.5	114.25	94.5	14.25	124.0
Sep	56.5	72.25	64.5	83.5	16.5	82.75
Tot.	355.5	383.25	602.75	409.0	286.0	362.5

HILLCREST
MAIN ROAD
TUDDENHAM
NORWICH

7-11-10

Dear *Peter*

CATFIELD FEN

Thank you for showing me the report prepared by Clive Doarks comparing the results of two vegetation surveys ,one from the early 1990's ,the other from 2009. The report uses broad based surveys not designed to provide the critical detail required to assess the drying of the site.

My observations over a ten year period suggest that the site is drying and that the process has been gathering pace during the last two years.

I notice that:-

The royal Fern is declining

In S7 there has been one of the best colonies of crested buckler fern in Norfolk, in June 2010 the drying out of the sphagnum appeared to be threatening the whole population

Populations of the following species are all declining suggesting drier conditions

soft hornwort,
marsh stitchwort
round leaved sundew
marsh cinquefoil
cowbane
milk parsley
greater bladderwort
frogbit
cotton grass
slender sedge
heath spotted orchid

sphagnum papillosum
~~cryptothallus mirabilis~~
moerckia hibernica

This suggests that the site is under severe pressure and that the decline will be cumulative. My last visit to the site was on Monday the 24th October and that visit confirms my view that the site is drying out

Yours sincerely
Alec

ALEC BULL

Alec Bull
Hillcrest
East Tuddenham
Dereham
Norfolk NR20 3JJ
Tel 01603 880278

30 05 10

Dear Tim,

I had been intending to come over to Catfield this spring to see how the fens were recovering from last summers severe drying out which, for instance, left the *Sphagnum* in the mown fen part of Middle Marsh looking bleached and dead, though of course, mosses recover rapidly once it rains again. I have also been wondering how the prolonged dry weather this spring has affected water levels, with earlier than usually extraction for irrigation taking place quite widely.

However, I have not been able to do as much as I had hoped over the past six weeks due to an eye problem which thankfully seems to be settling down though I have another hospital visit due next month. It was then my intention to come over on Bank Holiday Monday, but last Friday afternoon we had to be brought home by breakdown truck and, of course, my local garage was then closing until Tuesday.

There are a number of reasons for concern with regard the fens drying out for potentially long periods during the summer due to climate change/ increased irrigation extraction use nearby and these are not all botanical. Plant species likely to be adversely affected include Milk Parsley (*Peucedanum palustre*) the food plant of the Swallowtail butterfly, which is quoted in the New Atlas of the British and Irish Flora (2002) as only being in 24 hectads (10 km squares) in Britain and, I quote "Mostly on Nature Reserves". Two other umbellifers are also likely to be threatened. Namely Great Water Parsnip (*Sium latifolium*) (62 hectads in Britain) and Cowbane (*Cicuta virosa*) (70 hectads). All three need to have 'their feet in the water'.

There are a number of other species in a Norfolk context that are threatened by drying out where they have occurred within the standing water in the fens themselves, such as Bladderwort (*Utricularia vulgaris*) and Frogbit (*Hydrocharis morsus-ranae*), but the greatest threat of all would seem to be to the Red Data Book Crested Buckler Fern (*Dryopteris cristata*) which occurs in mildly acidic 'floating fens' in only 6 hectads in Britain. The Catfield Hall fens have probably one of the biggest extant populations (or did have when we carried out our survey). In addition to the above, drying out is likely to result in the invasion of the fen margins by such undesirables as Nettles and scrub. Not just Sallow and Alder, but wind borne seeds like Ash and Sycamore.

As soon as I get things sorted out, I shall hope to come over to see for myself if there has been any marked deterioration in the state of the fens. Thank you for your Easter card. It looks as if you had a good lamb crop.

Yours sincerely,

Alec

Alec Bull