

27<sup>th</sup> September 2014

The purpose of these notes is to respond to comments made in a meeting on 21st August at Dragonfly House, Norwich. At which The Environment Agency informed me that there were issues on Catfield Fen with acidification, Sphagnum moss, Fen Orchid and Fen Pondweed. These are my initial thoughts on the comments made to me by the Environment Agency but they do not represent my full list of concerns.

### **Acidification & Sphagnum moss**

When Applied Ecology Ltd visited the site on 17<sup>th</sup> September, their immediate reaction was that there was terrestrialisation occurring on the Catfield Fen site. This is caused by the reeds growing each year and getting larger especially the root mass. The plants cannot expand sideways or downwards and grow upwards. Traditional management would have been to harvest the reeds and burn the trash which helps to prevent this natural process. As the surface dries out as water struggles to access the central parts of the marsh water becomes stagnant and acidification takes place along with increased Sphagnum growth. The reed & sedge cutters say that the quickest way to prevent this is to allow water to flow over the surface and flush the site regularly. Both Wheeler and Parmenter agree that this is the correct strategy. In fact Parmenter is suggesting a shorter cutting rotation, cutting foot drains to allow water to access the more difficult to reach parts of the marshes (higher parts), cleaning out ditches to help water movement, removing the spoil so as to not produce higher areas and extending scraps and shallow ponds. She is also saying that a move to just relying on rainwater (poor in nutrients) might be having an effect on reed growth and the site would benefit from more nutrients from the river/Broad. The problem is that as terrestrialisation carries on, it becomes more difficult for water to access the centre of the marshes and improved site management is required. This is a site management problem and nothing to do with abstraction.

### **Fen Orchid**

The Fen Orchid's possible decline is linked to the change in management. Please see the following

link:<http://jncc.defra.gov.uk/ProtectedSites/SACselection/species.asp?FeatureIntCode=S1903>

The small plant does not like competition from larger plants and a longer cutting rotation appears to be detrimental. Parmenter's comments about a shorter cutting rotation should help the Fen Orchid.

### **Fen Pondweed- Potamogeton Coloratus**

The seeds of this plant appear to survive for many years until the land is disturbed at which point it grows rapidly. It has a rhizome system that allows it to persist brief periods when the habitat dries. However I have not been told the location of this plant and find it difficult to comment. We have asked for a map of the location but to date nothing has been sent.

I believe that this is the plant which appeared in two ponds dug on my farm around 2006. The Fen Pondweed grew strongly for 3 or 4 years but declined as other plants took over and shading/competition occurred.

## **Site management**

The main sluice on Catfield Fen is situated just inside the Commissioners' Rond and controls water level on the internal system. Traditionally the top board was removed to allow water to access the site then replaced to hold water inside. The aim was by allowing water levels to rise a few millimetres, water could access the surface of the marshes in the internal system.

The sluice was replaced with one which has a 15 inch by 4 inch hole and a rubber flap on the internal side. The aim was that this did not need daily attention and as Broad water levels rise in response to rainfall or tides, the hydraulic pressure of the external system opens the rubber flap and allows water into the internal system. When the water levels drop in the external system the flap closes.

For the water to enter the ditch on the RHS of the Rond, it has to cross about 200m of Great Fen as the ditch is not connected directly to the River/Broad. I believe that there are old ditches in Great Fen but they are now blocked. This was severely limiting the hydraulic pressure on the flap to the point that it really did not work as effectively as planned. Also with the external ditch in need of cleaning out up until February 2014, the water struggled to get to the sluice. Now the ditch has been cleaned out the water is still struggling to get across the Great Fen, consequently the rubber flap appears to have been removed but the boards with the hole in them are above water level, meaning that there is currently no water movement across the sluice.

In RSPB' 2013(b) paper, Richard Mason points out that there are ample opportunities when the external system is higher than the internal system to let water into the site and flush the system in a traditional manner. But there is no evidence to show that the sluice was opened or boards taken out. It seems to me that if this had happened there would have been a flow of water with nutrients which is what Parmenter is suggesting. Some of the Catfield Hall marsh surfaces are so high out of the water and as water cannot move uphill, it's almost impossible to achieve flushing except in flood conditions. Please refer to the EA Groundwater report February 2014 and figure 6.4 which shows the Conceptual Cross Section Through Middle Marsh. It shows that there are areas higher than the water and that water is struggling to reach the central parts of the marsh. This is backed up by Parmenter who is suggesting that foot drains are cut through these high areas to allow water to access the more difficult to reach areas.

I would also like to point out that the topographical survey that Natural England agreed to carry out and Environment Agency volunteered to be the contractor does not appear to have been completed.

## **Observations on 2<sup>nd</sup> September 2014**

Catfield Fen external gaugeboard 4.8

Catfield Fen internal gaugeboard 4.7 water 1 inch higher on internal side- no water movement. Flap had been removed and the board with the hole was above water level.

Shape St SSSI sluice: water pouring into marsh from river. About 3 inch difference in water levels.

## **Conclusion**

Assuming that the level in the Broad and the River are about the same (there must be a slight fall to let water down the river), either Sharp St marsh water level is about

5 inches below Catfield Fen or water is restricted from accessing the Catfield Fen sluice as it has to cross Great Fen to the West of the sluice. There is another possibility that the water level in the internal system of Catfield Fen is kept higher than surrounding SSSI marshes. This does make sense as water levels are higher now than say 15 years ago in surrounding arable land (see Amec report) Another possibility is that Catfield Fen water levels are kept higher than traditional levels were kept which is making flushing very difficult. This is probably in direct response to terrestrialisation and rising of the surface of the marshes as management tried to keep water levels up rather than tried to reduce the effects of terrestrialisation.

### **Water quality entering Catfield Fen**

In April 2013 I took some water quality tests from water entering Catfield Fen and compared them to samples from my boreholes. The main conclusions are that the Plumsgate Road bore has marginally acidic water (6.68). The ditch water from near Church Wood entering Catfield Fen had higher Calcium, Magnesium, Sulphur, Nitrate and Potassium levels than the Ludham road borehole and I put that down to the fact that lime applied to arable fields to maintain ph and hence optimum nutrient uptake was being picked up in the samples. Across the farm [REDACTED] lime annually. However I have no land drains from my Ludham Road land to the ditch near Church Wood, the only way this water could have got there is by surface lateral water movement above the clay layer.

The comparison of the Plumsgate Road bore water quality with water from Lodge Road (East of North Marsh) shows that the bore has high levels of Iron and Sulphur which are not picked up in the water samples entering Catfield Fen from Lodge Road ditch. If the water was coming from the groundwater it would have Iron at a similar level to my Plumsgate Road bore. The level of Iron in the sample was 0.22mg/l compared to my bore of 11mg/l. Some 2% of the level in my borehole. In addition there are no signs of Ochre in the ditches around Catfield Fen. This all indicates that the water entering Catfield Fen from the direction of my Plumsgate Road bore hole is from above the clay layer.

### **Spring 2013**

In the Spring of 2013 we had a unique set of circumstances. It was very cold with virtually no growth, the reeds were dormant and therefore no water used by plants in the Fen, there had been high rainfall during the winter which resulted in high groundwater levels and by the end of April there had been no rain for 4 weeks. The old sluice was shut, the new sluice did not have any water going through it and the water flowing over the low bund had stopped. The water level on the internal system was now at its maximum 6.4 on the gauge nearest the old mill but the external system was lower. If there was groundwater input into the Fen why was the water not flowing over the low bund? The amount of groundwater entering Catfield Fen must be minimal. The reason why the Commissioners' Rond was built in the first place was to drain the site with the windmill. This would have been impossible if there was any amount of groundwater entering the site.