Snipe Marsh- Public Abstraction consultation December 2014

Snipe marsh is surrounded by a ditch that varies from 0.4m to 1.8m deep. There is one water control structure near in the boundary ditch near to Catfield Lake which keeps water levels high. There are two access points for livestock from Sharp Street, both of which have two pipes beneath to allow water to move freely under the culvert. However the most Easterly one is blocked on both sides by vegetation (photos 1 & 2) and until it was cleared on 3rd December, it was impossible to see what was under the culvert. The ditch either side of this culvert has not been cleaned out for years, it appears that this is a deliberate act to allow the build-up of vegetation to act a barrier to water movement and keep water levels high. The remaining ditches have been cleaned out and are free of debris and mud which allows free movement of water.

3.12.2014 Photo 1.Easterly culvert input showing entrance blocked by vegetation.

3.12.2014 Photo 2).Easterly culvert output with just a small trickle of water.

The water entering Snipe marsh from Grove farm ditch mostly flows South West towards the water control structure (photo 3). Once past this structure or past both culverts the water flows very steadily around the perimeters diches of Snipe Marsh towards Crome's Broad.

3.12.2014 Photo 3.Water control structure on Snipe marsh which keeps Eastern end water levels higher than Western end.

BA/BESL 2008 Sluice at Jonny Crowe's Staithe

The water levels from the water control structure on Snipe marsh to the BA/BESL sluice at Jonny Crowe's staithe, through Crome's broad to a sluice between Pigeon wood marsh and Clayrack marshes are all the same. However there is another sluice to the North of Pigeon Wood Marsh but it does not appear to hold water back very efficiently and water levels are the same on both sides of the sluice.

There is a gauge Board (TG31/794 photo 5) on the edge of Crome's board next to an observation hide which is monitored by the Environment Agency.

3.12.2014 Photo 5.Environment Agency gauge TG31/794 on Crome's broad

As water flows all year into Snipe marsh from the land drains on Andrew Alston's land, from the ponds in Grove farm garden, from an overflow in Catfield Lake and from Summerhouse wood (also called Sharman's wood) and over the sluice between Pigeon Wood marsh and Clayrack marshes, it is difficult to see how water levels in Snipe marsh have ever been effected by abstraction. Water is maybe being held up across Pigeon Wood marsh as ditches are blocked to the Southern end of the marsh. There is a culvert below the sluices between Pigeon Wood Mash and Clayrack marshes which allows water to pass from Pigeon Wood Marsh to the ditch and continues round Clayrack marshes to the soke dyke. In effect Pigeon Wood marsh is acting to hold water up and keeps water levels stable across Crome's broad and Snipe marsh. Ultimately the sluice at Toad Hole cottage controls the minimum water level. See scan 1076 Maps of ditches, water flows and levels)

Photo 6. Sluice between Pigeon Wood Marsh and Clayrack marshes. Which controls all the water from Snipe marsh and Crome's Broad area.

BA/BESL Sluice at Catfield Staithe

This was constructed as part of BESL flood defence work in 2008. It was a replacement for a sluice constructed in 1988. Natural England assumed that it was a like for like change but there are some major differences that Natural England should have taken into account before they gave their consent. See Scan 1070 attached.

Photo 7. Position of 1988 sluice at Jonny Crowe's Staithe. 100m West of new BESL/BA sluice

The 1988 sluice leaked round the edges, between each board and two days after construction the water got underneath it. When Natural England (previously English Nature) gave their consent for the new sluice in 2008 they should have taken into account the Habitat Directive which they had started to work to in 1994. There should have been an assessment by the appropriate body of any affect to the integrity of the

European Site both alone and in-combination with other permissions such as Anglian Water and AW Alston's abstractions. This assessment was not carried out. If it had been, it is possible that an agreed management plan of the sluice's operation would have been put in place.

Photo 8. Sluice North of Pigeon Wood Marsh which leaks and as you can see from this photo had the same water levels on both sides.

We now find that the Broads Authority keep the BA/BESL sluice closed at all times because diffuse pollution water might access the site. But the planning permission for the sluice was for flood defence. On five visits to the sluice between August and December 2014, the river level has been between 4 and 12 inches higher than the internal level. In the current conditions this would not have made any difference to the water levels in Crome's Broad as the levels in Crome's broad are controlled by a sluice between Clayrack ,marshes and Pigeon Wood marsh. But on a hot summer's day when plants are transpiring at the rate of 3-4mm/day it is possible that this sluice could be restricting water access to the European site and is certainly keeping water levels in Snipe marsh lower than the naturalised level.

Water entering Snipe marsh

The largest input of water is from Andrew Alston's land drains in field to the North of Sharp Street. These were installed in 2000 and run all year. On 4th December 2014 this ditch and the pond in Clarke's field was 0.85m above the level in Snipe marsh. Water flows out of Grove farm ponds into the ditch besides the road and quickly enters Snipe marsh. On 4th December 2014 the level in highest pond at Grove farm was 0.83m above the level in the ditches at the East end of Snipe marsh.

The level in the lower pond at Grove farm was 0.46m above Snipe marsh.
As these ditches flow all year in to Snipe marsh, and Snipe marsh is sluiced between Clayrack marshes and Pigeon Wood marsh, it's difficult to see how abstraction is affecting the water levels in Snipe marsh.
Water enters Catfield Lake from below and over spills into the ditch below the water control structure. This is a fishing lake and has never had any issues with water levels or fish deaths as a result of water levels. See scan 1073 Edward Boardman letter.
Water also enters from Summerhouse Wood (or Sharman's wood) across How Hill road and enters Snipe marsh ditch system just behind Catfield Lake.
During August to mid November 2014 the water entering Snipe marsh was roughly equal to the water flowing over the sluice at Toad Hole Cottage. But since the heavy rain from mid-November the flow over Toad Hole Cottage sluice has increased markedly. This is probably due to water accessing the soke dyke besides the river and rain leaving the site.
Therefore it is highly unlikely that water flows into Snipe marsh from below.

Ditch depths in Snipe marsh

A ditch water depth survey was carried out on 3rd December 2014.
Generally the ditches were 0.25 meter below marsh surface on the Eastern end of Snipe marsh and between 0.25m and level on the Western end of Snipe marsh. The deepest ditches were the internal ditches whilst the boundary ditches were generally more shallow.
Around the culvert opposite Summerhouse farm, the ditch was blocked with vegetation but generally the ditches were well maintained with little mud in the bottom. See scan 1076 attached.
The ditch water level allowed good access of water into the Western end of the marsh surface via the foot drains.
There were no signs of any water percolating up through the ground. In fact the marsh surface was reasonably dry considering the heavy rain in the previous week. There were no signs of ochre water in any of the ditches, in fact most of the water was clear and the bottom of the ditch could be seen easily except in the deeper ditches. There were no signs of any sediment movement in the bottom of the ditches that would indicate groundwater input.

ph testing of Snipe marsh

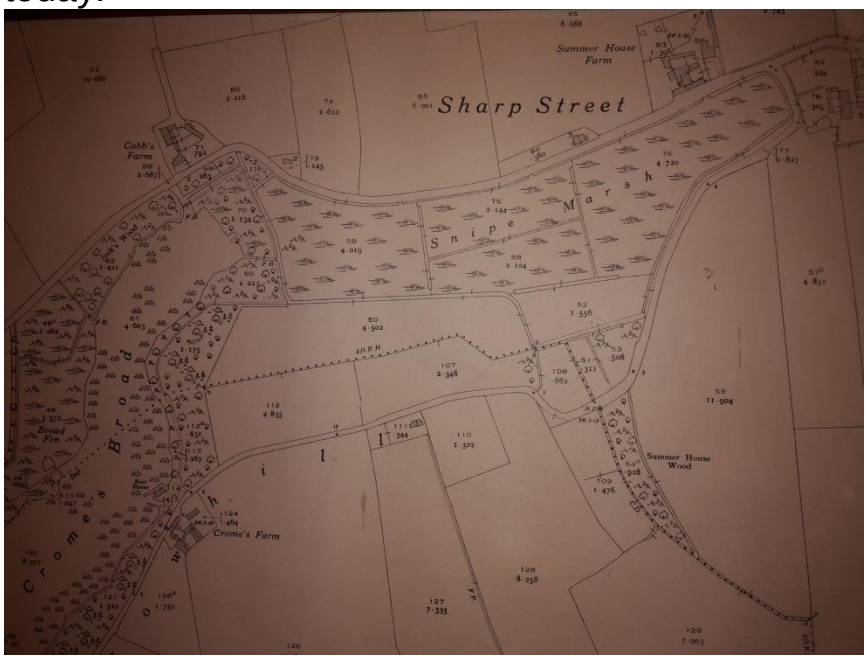
Mary Barnard of Keith Mount Liming Ltd tested the field and ditches on 1st December 2014 using test tubes and Barium Sulphate solution. See Scan 1065 attached.
Water leaving Andrew Alston's farm at Sharp Street, Grove farm ponds and water up to the water control structure had a ph of 6.8. Generally the surface water laying on the Eastern marsh was 6.8 but sample point 6 had a ph of 5.0 and sample point 7 had a ph of 6.0. Both were difficult samples to take as the surface water was very shallow and the puddles were only about 6 inches across. The soil below the surface was about ph 6 but difficult to test accurately as surface water fell into the dug hole. However the Broads Authority had recently dug out some invasive weed at point 13 and this gave access to take a sample which was 6.0. This shows that the soil below (which only had a small amount of peat on the surface at this point) was slightly acidic.
Sample 4 was ditch water in a ditch where there was no obvious movement of water. This was ph 6.
The conclusions are that rainwater on the surface soon percolates into the peaty soil. Sample point 4, which was a deep ditch and had no flow, did not show any high ph water coming from below. The boundary ditches were shallow and all had ph 6.8 which shows that the water is coming from Grove farm direction.

Water levels in Snipe marsh and Crome's Broad.

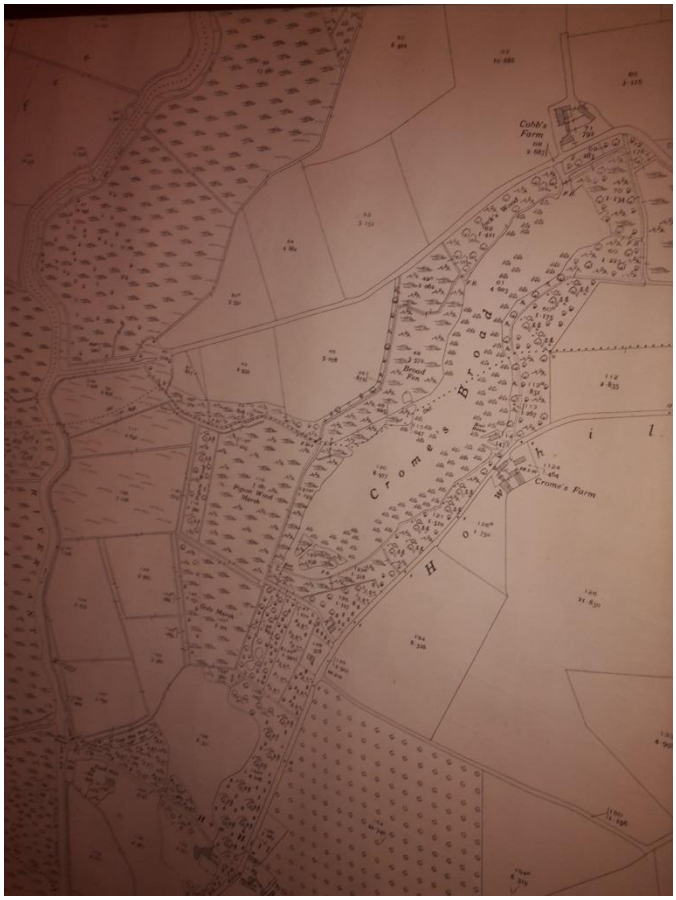
The Environment Agency gauge board TG31/794 is positioned close to a hide on the edge of Crome's Broad. From a document by @one Alliance (Hydrological Investigations for WREP March 2008) I have been able to show that during the signal test of Anglian Water Ludham test pump between 20th October and 30th December 2007 that the water levels in Crome's Broad (ABM26A) remained constant except during two rainfall events when the water levels rose by around 50mm but soon went back to resting position. This is not surprising as Crome's broad is sluiced. See Scan 1078 attached. On 12th December 2014 the Environment Agency have supplied the data from the gauge board TG31/794 but 3 days over a weekend is too short a time scale to fully comprehend the data supplied.
Interestingly, over the last week (7-14th December) water levels in the Ant valley have risen considerably by around 12 inches and my lower lying marshes are flooded more than at any time since I have owned them (1990). Most of this is due to water coming up from below. The levels in Snipe Marsh don't appear to have risen much at all. This sheds considerable doubt that Snipe marsh is actually groundwater fed.

Historic land use 1800-2014

In 1940 all of Snipe marsh was marsh and the wood at the Western end did not exist. More interesting is the fact that in 1886 and 1800's there were very few trees around Crome's broad. In fact most marshes were either Fen or grazing grass. There is a comment on 1886 map to say Clayrack marshes were liable to flooding. This is unlikely today with the BESL flood defences in place.
The ditch system around Snipe marsh does not seem to have changed and the marsh was still connected to the river in 1940. The drainage system along Sharp Street was in place in 1940 indicating that a flow of water into Snipe marsh has been there since before 1940. There was a sluice to the North of Pigeon Wood Marsh in the same position as it is today.



Snipe marsh 1940 OS map



Crome’s broad 1940 OS map. Note how few trees were there.

Scan 1077 attached. 1886 map and 1800’s map of Crome’s Broad. Showing considerable land management changes from marshes, cut in the summer for hay to trees today.

Water control in How Hill.

There are comments in some of the @one alliance reports about strange piezometers readings near Toad Hole sluice at How Hill.
The Broads Authority has “turfed out” a small 4 acre marsh to the South West of Pigeon Wood marsh. The surface appears to have been lowered by about 18 inches. The reed quality in this small marsh looks excellent and the water seems to be kept at around 6 inches deep. The remaining area of Clayrack marshes, Pigeon Wood Marsh, Gale marsh and Broad Fen marsh all have serious terrestrialisation problems. The Broads Authority have overcome the problem of keeping the water level in this small marsh at a lower level than the remaining marshes by having a portable pump that can either reduce or increase water levels in this small marsh. This is further evidence that the Broads Authority are aware of terrestrialisation in Broadland and appear to be doing something about it but on Catfield Fen, they take the view that terrestrialisation is not the problem.


Portable pump on Clayrack marshes at How Hill.

The pumps inlet and output can easily be changed to reverse flows. The question is, should this application be licenced as it's more than 20cm/day?

Conclusions:
1. Should Snipe marsh be assessed by Environment Agency's Groundwater model as a Calcareous surface water fed Fen as there is definitely ph6.8 surface water feeding into it and no signs of any groundwater input considering the groundwater levels in the adjacent ponds are around 80cm higher than marsh surface water levels. The deepest ditch on Snipe marsh has surface water ph of 6.0, if it was groundwater fed it should be higher ph.
2. Has the Environment Agency's Groundwater model had the correct water table entered into it for Snipe marsh? Should the entered figure be 80cm higher?
3.Gauge board TG31/794 (also called ABM26A) is in a water body that includes Snipe marsh. All the water is the same level. We have been told that there is no water level data for Snipe marsh. This water body is sluiced and seems to respond upwards during rainfall.
4.Is Snipe marsh groundwater fed? [redacted] says it is rainwater fed, drain fed and river fed in 1995.
5. The fish in the pond at Catfield Lake has never had any issues because the pond is continuous fed from groundwater and there is always sufficient water depth in this shallow pond.
5.The BA/BESL sluice installed in 2008 is the main issue affecting water levels in Snipe marsh and ecology. Water levels historically varied with

river levels, now water levels are static. There was no assessment by Natural England during the sluice's progress through planning permission in 2008 and the Broads Authority have changed the management of the flood defence sluice by never opening it.
6. Broads Authority ponies appear to eat S24 species on Snipe marsh
7. The historic land use dating back to early 1800's shows a considerable change to land management and shows a very bad terrestrialisation issue at How Hill.
8. Broads Authority pump on Clayrack marshes seems to be responsible for lowering water levels in piezometers near Toad Hole Sluice.