

## **Broads Authority Summary Conclusions from Turf Pond Report 2006**

### **Report Conclusions**

- Results are strongly site-specific.
- Marginal/emergent communities become established c.1-2 years following excavation.
- Majority of ponds retained the community that established within years 1-2. For some ponds, this changed around year 10, but some persisted after this.
- Some scarce species appear linked to particular communities, some appeared only in the early stages following excavation, and others didn't appear linked with any particular successional pathway.
- Strongest influence on resulting marginal/emergent turf pond community appears to be the surrounding vegetation (the same communities occurred in ponds at the same site).
- After establishment, community usually persists for c.10yrs
- Not much variation in aquatic communities – limited spread of propagules from surrounding area?
- Average species diversity increased up to yr 4, varied to yr 9 and declined post year 11 (although insufficient data from older ponds).
- Broad Fen broad basin ponds had greatest species diversity (H4 & H5) while pond B at Broad Fen (north of site in solid peat) had lowest species diversity.
- J5 at Woodbastwick had most scarce species.
- Ponds created close to areas of high conservation value tend to have more species and more scarce species.
- Ponds of similar ages are not similar in terms of community across sites

### **Discussion with 2005 Survey Contractors**

Canoco and Twinspan were used to identify similarities and differences within surveyed species in order to demarcate communities – both packages look for the greatest difference between samples. The survey data was hand sorted and these packages used to double-check and identify patterns.

To work effectively, Canoco and Twinspan require survey data to have abundance values – much of the historical turf pond data only recorded presence/absence. The historical data was used, but this meant that communities may have been demarcated based on presence of a species, but the amount of that species could actually be minimal and yet bias the whole result. Because of this, the contractors used the Canoco/Twinspan results to pick out broad patterns only.

### **Thoughts about turf pond creation:**

- Survey results indicate that creating turf ponds encourages scarce fen species, particularly in the middle years of the ponds' life.
- Time of year for excavation may influence amount of seeding that occurs from surrounding fen.
- Larger ponds with varying profile appear to have zones of different Chara species, e.g. Catfield.
- Shape of pond can be important - avoid creating ponds where wind may cause sediment to be disturbed – this will limit charophyte colonisation.
- Majority of turf pond areas represent areas of higher interest within the surrounding fen.
- pH and conductivity measurements were only recorded in some surveys and so could not be assessed as an influencing variable (you need 30 or so records to be able to undertake useful statistical analysis). Future surveys should include these variables – it appeared that increased species-richness was associated with more alkaline sites, but it was not possible to assess this statistically.
- Based on results, recommend new ponds be surveyed pre-creation (this should include survey of area that will surround pond), in year 1, 2 and 3 and then every 3 years – obtaining data on older ponds would be particularly useful.

### **Future Recommendations (if considering turf ponds as a restoration method)**

1. Consider in the light of recent results whether site knowledge provides further explanation of why particular ponds have developed more favourably.
2. Continue to monitor existing ponds on a 3 year rotation to ascertain successional pathways in older ponds.
3. Before deciding on siting of any new ponds, consider objective for creation. If objective is to (re)introduce areas of higher species diversity, it appears that location of the pond in an area of existing high value fen is important.
4. Bearing in mind the uncertainties over potential damage caused by large-scale excavation on substrate and invertebrates, should turf ponds be created unless objective (and likely outcome) is to create high quality fen?
5. Re-visit Kennison's turf pond creation guidelines and update/amend as necessary.
6. Before new ponds are excavated, undertake pre-survey of vegetation in planned pond area and surrounding vegetation.
7. All monitoring should follow existing methodology, incorporating pH and conductivity as standard measurements.