APPENDIX 7: FORAMINIFERA AND OSTRACOD ASSESSMENT

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Introduction

Eight sediment subsamples taken from two boreholes, BH02 (at 10.2, 9.59, 6.55, 4.86, 4.79 and 2.5m below GL (Ground Level)) and BH05 (at 7.97 and 4.2m below GL) located on reclaimed farmland adjacent to the river Parrett on the Steart Peninsula, Somerset have been assessed for the presence and environmental significance of their microfaunal contents, predominantly ostracods and foraminifera.

The sampled sediments comprised sands, silts, clays and peats thought to be predominantly mid-Holocene alluvial and terrestrial sediments associated with deposition within the river Parrett and Bristol Channel systems. The peats have been radiocarbon dated yielding middle to late Neolithic dates. Optically Stimulated Luminescence (OSL) dating suggests that sediments in the earlier part of the sequence are Pleistocene (c. MIS (Marine Isotope Stage) 7 to 5e) in date. Ostracods and foraminifera occurred in all but three of the samples. Other plant and animal remains were also recovered from the samples a note of which has been made here. Depths are given in metres below ground level (GL).

Method

Sediment samples of *c.*25g were disaggregated in a weak solution of Hydrogen Peroxide and water, then wet sieved through a 63µm sieve. The sediment was dried and sieved through 500µm, 250µm, 125µm sieves. Microfossils were picked out under 10-60x magnification and transmitted and incident light using a Vickers binocular microscope. Where possible a minimum of one hundred specimens per sample were picked out and kept in card slides. Identification and environmental interpretation of ostracods follows Athersuch *et al*. (1989) and Meisch (2000) and of foraminifera (Murray 1976, 2000).

Results

Abundance of microfaunal remains within the samples is summarised in **Table 1.** Abundance of ostracods was varied and where present, the preservation was in general very good. Five of the samples contained ostracods and foraminifera and where present were generally well preserved with variable abundance.

WA2011_BH02
Six levels were assessed, at 10.2, 9.59, 6.55, 4.86, 4.79 and 2.5m below GL). Foraminifera and ostracods were present in three of the six samples (**Table 1**).

At 10.2 and 9.59m below GL no foraminifera or ostracods were recovered. No other organic remains were recorded within these samples.

At 6.55m below GL. Ostracods were present including valves of *Cyprideis torosa*. Foraminifera were more frequent including *Ammonia beccarrii*, *Elphidium williamsoni* and *Milammina fusca*. Other remains within the sample included a seed and a bryozoan.

4.86m below GL. A hyperabundance of the ostracod *Cyprideis torosa* was recovered. Other ostracod taxa present included *Candona candida*, *Locxoconcha* sp. and *Elofsonia* sp.. Foraminifera recovered included *Ammonia beccarrii*, *Elphidium williamsoni* and *Haynesina germanica*. Other remains ncluded abundant Hydrobid molluscs, bryozoans and some seeds including *Potomageton* sp.

4.79m below GL. No foraminifera or ostracods were recovered from this sample although large numbers of radiate diatoms, and plant remains including *Juncus* sp. were recovered from the sample.

2.50m below GL. Occasional ostracods were recovered including valves of *Cyprideis torosa*. Foraminifera were highly abundant and well preserved within the sample including *Ammonia beccarrii*, *Elphidium williamsoni*, *Haynesina germanica*, *Jadammina macrescens*, Rotaliids and *Trochammina inflata*. Other remains within the sample included a seed of the sedge *Juncus* sp.

WA2011_BH05
Two levels were assessed, at 7.97 and 4.2m below GL. Foraminifera and ostracods were present in both of the samples.

7.97m below GL. This sample contained a number of ostracod species including *Leptocythere pellucida*, *Cyprideis torosa*, *Hirschmannia viridis*, *Loxoconcha rhomboidea* and *Propontocypris* sp.. Foraminifera recovered from th sample included. *Ammonia beccarrii*, *Elphidium williamsoni*, *Haynesina germanica*, *Jadammina macrescens, Miliolinella subrotundata* and *Quinqueoloculina* sp. Other remains within the sample included molluscs, sponge spicules and seeds.

4.2m below GL. Occasional ostracod valves were recovered from this sample including *Leptocythere* sp. Foraminifera were more frequent including *Elphidium williamsoni*, *Haynesina germanica* and *Jadammina macrescens*. Molluscs and radiate diatoms were also recovered within the sample.

Discussion
WA2011_BH102
The lower two samples (at 10.2, 9.59m below GL) within this borehole contained no organic remains and therefore very little can be said of it's contents. It may be that any organic remains have been subject to post depositional dissolution.

At 6.55m below GL the ostracods and foraminfera are indicative of brackish/estuarine (*Ammonia beccarrii*, *Elphidium williamsoni* and *Cyprideis torosa*) saltmarsh (*Milammina fusca*) environments.

At 4.86m below GL the hyperabundance of *Cyprideis torosais* of interest. *Cyprideis torosa* is a euryhaline taxon that can occur in freshwater to hypersaline conditions and it's mass development is usually associated with organic detritus and brackish water (Meisch 2000). The occasional presence of Candoniids (*Candona candida*) is indicative of freshwater input (into a brackish environment) at this level.

At 4.79m below GL the lack of foraminifera and oostarcods (and other calacareous remains id likely doe to a reducing post depositional environment. The frequent remains of radiatre diatoms and plant including sedges (*Juncus* sp.) are indicative of an aquatic, vegetated environment.

The uppermost sample at 2.50m below GL included the brackish tolerant ostracd *Cyprideis torosa* and foraminifera indicative of estuarine and brackish (*Ammonia beccarrii Elphidium williamsoni*, *Haynesina germanica*) and saltmarsh (*Jadammina macrescens Trochammina inflata)* environments.

WA2011_BH05
The basal sample at 7.97m below GL the ostracods and foraminfera recovered included species indicative of deposition within brackish and estuarine environemnts. Leptocythere pellucida was the most frequent ostracod within the sample and is tofday know to inhabit.....(Athersuch et al 1989)

At 4.20m below GL the foraminifera and ostracods recovered were indicative of.....brackish and marine environemnets . The most frequent foraminifera recovered were Haynesina germanica indicative of deposition within ....(Murray 1990)

Recommendations

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- Foraminifera and ostracods should be analysed from the samples already assessed, where present including greater counts and taxonmic work.
- Additional samples from levels is recommended.
- Particular attention should be paid to dated levels (OSL and radiocarbon where practicable), and interstitial samples in order to understand the successive environments.
- From core samples within borehole WA2011_BH02 further samples are recommended from between.....
- From borehole WA2011_ BH05 further samples are recommended from between.....

References

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borehole	BH02	BH02	BH02	BH02	BH02	BH02	BH05	BH05
mOD	-4.76	-4.15	-1.11	0.58	0.65	2.94	-2.24	1.53
Ostracods / **mbGL**	10.2	9.59	6.55	4.86	4.79	2.5	7.97	4.2
Candona sp.								
Candona candida				x				
Cyprideis torosa			x	xxxxx		x	x	
Cytheropteron sp.								
Elofsonia sp.				x				
Hirscmannia viridis							o	
Leptocythere pellucida							xx	
Leptocythere sp.							x	o
Loxoconcha rhomboidea							o	
Loxoconcha sp.				x				
Propontocypris sp.							o	
Broken						o		o
Unidentified			o					o
Foraminfera								
Ammonia beccarii			xx	xx		xxxx	x	
*Elphidium*sp.								
Elphidium williamsoni			xx	x		xxxx	x	x
Haynesina germanica				xx		xx	x	xx
Jadammina macrescens						xx	x	x
Milammina fusca			x					
Miliolinella subrotundata							x	
Quinqueloculina sp.							x	
Rotalids						xx		
Trochammina inflata						xx		
Unidentified								
Animal remains								
Bivalves								o
Bryozoans			o	xxxx				
Fish teeth/bones				x				
Hydrobia				xxx				o
Molluscs							xx	x
Sponge spicules							x	
Plant remains								
Charred grass/stems					x			
Diatoms					xxxxx			x
Juncus sp.					x	o		
Potomageton				x				
Plants unidentified					xxx			
Seed unidentified			o	x	x		xxx	

Table 1. Abundance of taxa per sample in WA2011_BH02 and WA2011_BH05
Abundance:
x – 1-9 specimens
xx – 9-50 specimens
xxx – greater than 50 specimens
xxxx – greater than 100 specimens