

Landscape Evolution in the Middle Thames Valley Heathrow Terminal 5 Excavations Volume 2

Land and Freshwater Mollusca

(Section 18)



by E.C. Stafford

SECTION 18

LAND AND FRESHWATER MOLLUSCA

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Introduction

The ground conditions of the project area, situated on the edge of the gravel terraces of the River Colne, are generally not conducive to the preservation of mollusc shell. Previous investigations during the 1998 excavations (WPR 98) produced extremely sparse molluscan assemblages from archaeological features. During the 2002 excavations (PSH 02), however, calcareous tufaceous deposits containing shell fragments were recorded both within palaeochannel sequences on Areas 4 and 20, and within the fill of the cursus ditch on Area 15. Intensive sampling at 0.05 m and 0.10 m intervals through the mollusc bearing deposits was therefore undertaken. Together with a limited number of samples from discrete archaeological features, 15 profiles were sampled producing 104 mollusc samples in total.

Due to the large number of profiles sampled it was decided the most efficient approach to assessment would be to examine in detail a representative selection. 52 samples from 9 profiles were assessed to ascertain if land and freshwater mollusca were preserved in the samples, provide some preliminary data on taxonomic content, and to comment on the potential for future more detailed analysis. Following on from the assessment phase, two sequences were selected for full analysis; the tufaceous fill of the eastern cursus ditch, and a palaeochannel sequence from Area 4 though to date to the early Bronze Age, Iron Age and post Roman periods.

Method

All samples were processed at Oxford Archaeology. 2kg of sediment for each sample was disaggregated in water and floated onto 0.5mm mesh. The residues from the samples were retained to 0.5mm. Both flots and residues were airdried. Flotation was extremely

poor in some of the samples, particularly those samples containing tufaceous material. For assessment purposes, therefore, both flots and residues were scanned under a low power binocular microscope at x10 and x20 magnification. The abundance of taxa was recorded on a sliding scale (+ 1-3, ++ 4-25, +++ 26-50, ++++ 51-100, +++++>100) and an estimate made of the total number of individuals in each sample. Those samples subject to detailed analysis were thoroughly sorted and whole shells and apical fragments identified and counted.

The identifications are divided into species groups in the tables of results. Nomenclature follows Kerney (1999) and habitat information has been indicated following Boycott (1934, 1936), Evans 1972, 1984) and Robinson (1988, 1979).

For the freshwater mollusca, habitat preferences consist of

- Slum species that are able to live in water subject to stagnation, drying up and large temperature variations.
- Catholic or intermediate species that tolerate a wide range of conditions except the worst slums.
- Ditch species that require clean slowly moving water often with abundant aquatic plants.
- Flowing water species that require a clean stream with a current.

For the terrestrial fauna, habitat preferences consist of

- Open-country
- Shade-loving
- Catholic or intermediate tolerating a wide range of conditions
- Obligate marsh species
- Terrestrial species that can tolerate wet or damp conditions.

The shell counts and estimates of abundance are presented in tabular format (Tables 1-6) and selected assemblages as percentage frequency histograms (**Figures 1-2**). The species

in the histograms are ordered on the basis of broad habitat groupings with freshwater on the left and terrestrial on the right.

Results

Palaeochannel sequences

Area 20 (Tables 1, 2)

17 samples from four locations were examined from calcareous palaeochannel fills on Area 20. Molluscan preservation was on the whole very poor in the samples examined.

Context 516154, thought to date to the early Bronze Age, consisted of finely laminated silts containing micritic tufa. Two profiles were examined through this context (sample series 19055 and 19035). Molluscan preservation was very poor in series 19055. In series 19035 preservation was better with about fifty identifiable individuals in sample 19039. Of the shells identified, flowing water species predominated (*Valvata piscinalis*, *Bithynia* sp., *Valvata cristata*). Occasional specimens of dry open country terrestrial species (*Vallonia* sp., *Pupilla muscorum*) and catholic species (*Trichia hispida*) were also noted along with marsh species, particularly towards the top of series 19035 (*Vallonia pulchella*, *Carychium minimum*, *Succinea/Oxyloma* sp., *Vertigo antivertigo*).

Two profiles (series 19045 and 19075) were also examined from context 516152, a mixed deposit of silts containing micritic tufa with convoluted bedding, thought to date to the middle to late Iron Age period. Molluscs were virtually absent from series 19045. Preservation was a little better in series 19075, the richest sample, 19077, contained up to 60 identifiable individuals. The assemblages were again dominated by flowing water species, particularly *Bithynia* sp., *Valvata piscinalis* and *Valvata cristata*, with occasional specimens of open country and catholic terrestrial species.

There was a slight indication of variation in the assemblages down profile in both contexts, however the sparsity of shells limits ecological interpretation. At the very least the dominance of *Valvata piscinalis*, *Bithynia* sp. and *Valvata cristata* suggests the deposits were likely to be laid down in clear moving water, rich in calcium carbonate.

This is supported by the fact that the residues contained abundant unidentifiable broken shell fragments indicative of in-channel deposits. The terrestrial assemblage is consistent with an open environment of damp grassland or meadow, though the occurrence of *Oxyloma/Succinea* sp. suggests areas of erect vegetation such as sedges and reeds.

Area 4 (Tables 3, 4)

Two sequences (series 18500 and 18513) were examined from palaeochannel fills on Area 4. The deposits sampled consisted of early Bronze Age and middle to late Iron Age tufaceous deposits, 507006 and 507004 respectively, possibly equivalent to those examined on Area 20, overlain by a grey clay silt dated to the post-Roman period. Molluscan preservation was moderate to very good through both profiles.

The early Bronze Age tufaceous deposit contained useful assemblages. In contrast to Area 20 the lower part of the deposit in series 18513 (**Figure 1**) was dominated by freshwater slum species (*Anisus leucostoma* and *Lymnaea truncatula*) suggestive of marginal areas of standing water with erect vegetation (*Oxyloma/Succinea* sp.), perhaps subject to some seasonal variation. Marsh species were numerous indicative of open wet grassland or meadow (e.g. *Vertigo antivertigo*, *Carychium minimum*, *Vertigo angustior*) whereas species of dry ground were rare consisting wholly of those with catholic affinities.

Flowing water species, *Bithynia* sp., *Valvata piscinalis*, *Valvata cristata* become more abundant towards the top of the context. It may be that this is equivalent to the deposits noted on Area 20 Together with a reduction in the number of slum and marsh species this suggests a gradual change in channel regime to clean flowing water.

The overlying middle to late Iron Age calcareous deposit was dominated again by flowing water species, though slum and marsh species were present in smaller quantities. Occasional open ground terrestrial species were also noted towards the top of the deposit (*Pupilla muscorum*, *Vallonia costata*, *Vallonia excentrica* and *Vertigo pygmaea*). that may indicate drier areas of short turfed, possibly grazed grassland in the catchment.

The post- Roman alluvium was particularly rich with a maximum of 653 individuals per sample noted in series 18513. Although flowing water species dominate the assemblages

there was significant quantities of slum, marsh, and terrestrial open ground species with occasional terrestrial shade-loving elements. The mixed nature of the assemblage is probably a reflection of several sources from which the shell derives, and may be reflective of alluvial/flood events.

Area 15: Cursus ditch [617036] (Table 5)

Eight out of sixteen samples were analysed from an incremental column taken at intervals through a calcareous deposit 617147 from the cursus ditch on Area 15 (**Figure 2**). The deposit contained redeposited oncoidal tufa gravel of probable riverine source. It was originally thought the deposit may have been imported from another area of the site to cover the cursus bank at this location and was subsequently deliberately backfilled into the deeper parts of the cursus ditch perhaps when the bank was levelled or the monument modified.

Molluscan preservation in all samples examined was very good with 765 individuals identified in sample 18264. The samples contained mixed assemblages of freshwater and terrestrial species. It is likely that the freshwater assemblage derives from the redeposited tufa and was dominated by *Valvata cristata*, *Valvata piscinalis* and to a lesser extent *Bithynia* sp. and various freshwater catholic species. It is very likely this tufa formed in-channel in clean fast flowing water.

A component of the terrestrial assemblage may have been living in the vegetation covering the bank or within the ditch itself. The terrestrial assemblage was composed largely of four species, dry land open country species *Pupilla muscorum*, *Vallonia excentrica* and *Vallonia costata*, and the catholic species *Trichia hispida*, consistent with an environment of established dry, short turfed grassland. Shade-loving species were almost entirely absent apart from occasional zonitids and worn apical fragments of the robust shelled Clausiliidae that may well be residual, but perhaps related to a previously more enclosed environment at the site. Of significance is perhaps the consistent presence of *Truncatellina cylindrica* in the samples. This species, although rare today, was more abundant in the Neolithic and Bronze ages following primary clearance, and is found in very dry, short calcareous grassland in sandy or stony ground (Kerney 1999:89).

Since the molluscs from the ditch are likely to reflect very local conditions in the immediate vicinity, it is not possible to say with certainty how extensive the open area around the monument may have been. It is possible, if boundaries were maintained over a substantial period, for a wholly open-country fauna to exist within a 'corridor' providing access to the floodplain, perhaps within a more enclosed environment. One may speculate, however, similar open environments may have existed in the area from which the fauna could colonise. The construction of the monument itself may have provided a route.

There is some indication of variation within the deposit with an increase in the relative abundance of terrestrial species and a reduction in freshwater species up-profile. This may be related to a gradual process of infilling perhaps suggesting the deposit formed incrementally rather than as a single event. This is consistent with the deposit description which suggested the presence of faint bedding structures. Deposition may have occurred by the weathering and erosion of material from the bank and edges of the feature, or one may speculate, episodic activity around the monument, incorporating elements from the contemporary topsoil.

Area 21: Neolithic pit [552395] (Table 6)

Two samples were examined from the fills of a Neolithic pit on Area 21. Mollusc shells were abundant and consisted of mixed assemblages of dominated by flowing freshwater species (*Bithynia* sp., *Valvata piscinalis*, *Valvata cristata*). Freshwater ditch, catholic and slum species were also present in quantities along with terrestrial marsh/wet ground taxa, *Vallonia pulcella*, *Carychium minimum*, *Succinea/Oxyloma* sp. The assemblages suggest a rather open environment, free of heavy shade though very wet ground, possibly seasonally inundated with flood waters depositing fragments of mollusc debris from channel bed deposits. This is supported by the location of the feature on the floodplain in close proximity to a palaeochannel.

Area 49: Bronze Age waterhole (Table 6)

Seven samples were examined from the fills of a BA waterhole on area 49. Mollusc shells were totally absent from all samples.

References

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Table 1 Area 20 Series 19055 and 19035 molluscan assemblages

			Date EBA					
			Series	19055	19055	19055	19055	19035
			Depth	0.00-0.05	0.05-0.10	0.10-0.15	0.15-0.20	19035
			Context	516154	516154	516154	516154	516154
			Sample	19056	19057	19058	19059	19036
								19038
								19039
TAXA								
<i>Valvata cristata</i> (Müller)	F	Fl		-	-	-	+	++
<i>Valvata piscinalis</i> (Müller)	F	Fl		-	-	-	-	++
<i>Bithynia</i> sp.	F	Fl		-	-	-	+	+
<i>Carychium minimum</i> (Müller)	T	(M)		-	-	-	-	-
<i>Lymnaea</i> sp.	F	Sl C		-	-	-	-	-
<i>Planorbis planorbis</i> (Linnaeus)	F	C		-	-	-	-	+
<i>Anisus leucostoma</i> (Millet)	F	Sl		-	-	-	-	+
<i>Ancylus fluviatilis</i> (Müller)	F	Fl		-	-	-	+	-
<i>Oxyloma/Succinea</i> sp.	T	M		-	-	-	-	+
<i>Cochlicopa</i> sp.	T	C		-	-	-	-	-
Vertiginidae	T	O M		-	-	-	-	-
<i>Vertigo antivertigo</i> (Draparnaud)	T	M		-	-	-	-	+
<i>Pupilla muscorum</i> (Linné)	T	O		-	-	-	-	+
<i>Vallonia</i> sp.	T	(M) O		-	-	-	-	++
<i>Vallonia costata</i> (Müller)	T	O		-	-	-	-	+
<i>Vallonia pulchella</i> (Müller)	T	(M)		-	-	-	-	-
<i>Trichia hispida</i> (Linné)	T	C		-	-	-	+	++
<i>Cepaea /Arianta</i> sp.	T	C		-	-	-	+	-
Bivalves	F			-	-	-	+	-
Estimated minimum number of individuals (excl. bivalves)				0	0	0	3	15
Operculae							++++	+

Habitats: F = freshwater species, T= terrestrial species (Fl = flowing water species, Sl = slum species M = obligate marsh species, (M) = terrestrial species that can live in wet conditions, O = open-country species, S = shade-demanding species, C = Catholic species

*=non apical fragment)

		Date	M-LIA								
		Series	19045	19045	19045	19045	19045	19045	19075	19075	19075
	Depth (m)	0.00- 0.05	0.05- 0.10	0.10- 0.15	0.15- 0.20	0.20- 0.25	0.25- 0.30	0.00- 0.05	0.05- 0.10	0.10- 0.15	
	Context	516152	516152	516152	516152	516152	516152	51652	51652	51652	
	Sample	19046	19047	19048	19049	19071	19072	19076	19077	19078	
TAXA	Habitat										
<i>Valvata cristata</i> (Müller)	F Fl	-	-	-	-	-	-	++	++	-	
<i>Valvata piscinalis</i> (Müller)	F Fl	-	-	-	+	-	-	++	++	-	
<i>Bithynia</i> sp.	F Fl	-	-	-	-	-	-	+++	++	-	
<i>Lymnaea</i> sp.	F Sl C	-	-	-	-	-	-	+	+	-	
<i>Lymnaea stagnalis</i> (Linnaeus)	F C	-	-	-	-	-	-	-	+	-	
<i>Anisus leucostoma</i> (Millet)	F Sl	-	-	-	+	-	-	-	-	-	
<i>Gyraulus albus</i> (Müller)	F C	-	-	-	-	-	-	-	+	-	
<i>Ancylus fluviatilis</i> (Müller)	F Fl	-	-	-	-	-	-	-	+	-	
<i>Oxyloma/Succinea</i> sp.	T M	-	-	-	-	-	-	+	+	-	
<i>Cochlicopa</i> sp.	T C	-	-	-	-	-	-	+	+	-	
Vertiginidae	T O M	-	-	-	-	-	-	+	+	-	
<i>Vallonia</i> sp.	T O (M)	-	-	-	-	-	-	-	+	-	
<i>Vallonia pulchella</i> (Müller)	T (M)	+	-	-	-	-	-	-	-	-	
Helicidae	T O C	-	-	-	-	-	-	-	+	-	
<i>Trichia hispida</i> (Linné)	T C	-	-	-	-	-	-	++	+	-	
<i>Cepaea /Arianta</i> sp.	T C	-	-	-	-	-	-	+	+	-	
Bivalves	F	-	-	-	+	-	-	++	+	+	
Estimated minimum number of individuals (excl. bivalves)		1	0	0	5	0	0	50	60	0	
Operculae					+++++	+++++	+++++	+++++	+++++	+++++	

		Date M-LIA									
		Series	19045	19045	19045	19045	19045	19045	19075	19075	19075
		Depth (m)	0.00- 0.05	0.05- 0.10	0.10- 0.15	0.15- 0.20	0.20- 0.25	0.25- 0.30	0.00- 0.05	0.05- 0.10	0.10- 0.15
		Context	516152	516152	516152	516152	516152	516152	51652	51652	51652
		Sample	19046	19047	19048	19049	19071	19072	19076	19077	19078
<hr/>											
TAXA	Habitat										
<i>Valvata cristata</i> (Müller)	F Fl	-	-	-	-	-	-	-	++	++	-
<i>Valvata piscinalis</i> (Müller)	F Fl	-	-	-	+	-	-	-	++	++	-
<i>Bithynia</i> sp.	F Fl	-	-	-	-	-	-	-	+++	++	-
<i>Lymnaea</i> sp.	F Sl C	-	-	-	-	-	-	-	+	+	-
<i>Lymnaea stagnalis</i> (Linnaeus)	F C	-	-	-	-	-	-	-	-	+	-
<i>Anisus leucostoma</i> (Millet)	F Sl	-	-	-	+	-	-	-	-	-	-
<i>Gyraulus albus</i> (Müller)	F C	-	-	-	-	-	-	-	-	+	-
<i>Ancylus fluviatilis</i> (Müller)	F Fl	-	-	-	-	-	-	-	-	+	-
<i>Oxyloma/Succinea</i> sp.	T M	-	-	-	-	-	-	-	+	+	-
<i>Cochlicopa</i> sp.	T C	-	-	-	-	-	-	-	+	+	-
Vertiginidae	T O M	-	-	-	-	-	-	-	+	+	-
<i>Vallonia</i> sp.	T O (M)	-	-	-	-	-	-	-	-	+	-
<i>Vallonia pulchella</i> (Müller)	T (M)	+	-	-	-	-	-	-	-	-	-
Helicidae	T O C	-	-	-	-	-	-	-	-	+	-
<i>Trichia hispida</i> (Linné)	T C	-	-	-	-	-	-	-	++	+	-
<i>Cepaea /Arianta</i> sp.	T C	-	-	-	-	-	-	-	+	+	-
Bivalves	F	-	-	-	+	-	-	-	++	+	+
Estimated minimum number of individuals (excl. bivalves)		1	0	0	5	0	0	0	50	60	0
Operculae					+++++	+++++	+++++	+++++	+++++	+++++	+++++

Table 3: Area 4, series 18513 molluscan assemblages

Taxa	Habitat	Date	EBA					LIA	PRom					
		Context	507006					-005	-004		-003		-002	
		Sample	14	15	16	17	18	19	20	21	22	23	24	
<i>Valvata cristata</i> (Müller)	F Fl		15		13	2		18	74	36	3			
<i>Valvata piscinalis</i> (Müller)	F Fl					3	52	67	186	223	22		1	
<i>Bithynia tentaculata</i> (Linnaeus)	F Fl					1	18	21	161	97	3			
<i>Carychium</i> sp.	T (M) S			1				1	5					
<i>Carychium minimum</i> (Müller)	T (M)		19		5	2	1		1	2				
<i>Lymnaea</i> sp.	F Sl C		2	2			1	6	3	8	1			
<i>Lymnaea truncatula</i> (Müller)	F Sl		12	5	5			2	8	6				
<i>Lymnaea palustris</i> (Müller)	F C		3					1	9	4	1			
<i>Lymnaea peregra/auricularia</i>	F C									1				
<i>Planorbis planorbis</i> (Linnaeus)	F C						2		2	1				
<i>Anisus leucostoma</i> (Millet)	F Sl		39	17	13	1		2	9	8	1			
<i>Bathyomphalus contortus</i> (Linnaeus)	F C								6	1				
<i>Gyraulus albus</i> (Müller)	F C							1	3	4	1			
<i>Gyraulus crista</i> (Linnaeus)	F C					1				1				
<i>Ancylus fluviatilis</i> (Müller)	F Fl								1	1				
<i>Pisidium</i> sp.	F Fl C Sl		6	1	1		6		31	33	3	1	1	
<i>Oxyloma/Succinea</i> sp.	T M		24	13	12	1	2	1	12	13	1			
<i>Cochlicopa</i> sp.	T C			1	1			1	4	7				
<i>Cochlicopa lubrica</i> (Müller)	T C									2				
Vertiginidae	T O M									1				
<i>Vertigo antivertigo</i> (Draparnaud)	T M		5						2					
<i>Vertigo pygmaea</i> (Draparnaud)	T O (M)								5					
<i>Pupilla muscorum</i> (Linné)	T O					1		1	8	2				
<i>Vallonia</i> sp.	T O (M)		6	2	1				46	10			1	
<i>Vallonia costata</i> (Müller)	T O							1	4	1				
<i>Vallonia pulchella</i> (Müller)	T (M)		1		1			1	13	8				
<i>Punctum pygmaea</i> (Draparnaud)	T C								3	1				
<i>Discus rotundatus</i>	T S								2	1				
Zonitidae indet.	T S (M)									2				
<i>Vitrea</i> sp.	T S		1											
<i>Nesovitrea hammonis</i> (Ström)	T C		1		1				1	1				
<i>Oxychilus cellarius</i>	T S								4					
<i>Aegopinella nitidula</i> (Draparnaud)	T S								1					
<i>Monacha granulata</i> (Alder)	T C									2				
<i>Trichia hispida</i> (Linné)	T C		2	2	5		2	2	47	27	2			
<i>Cepaea /Arianta</i> sp.	T C								2					
Minimum number of individuals			136	44	58	12	84	126	653	504	38	1	3	

Table 4: Area 4 Series 18500 molluscan assemblages

			Date EBA		M-LIA			PRom		
			Series	18500	18500	18500	18500	18500	18500	18500
			Context	507006	507006	507005	507005	507005	507004	507003
			Sample	18504	18505	18506	18507	18508	18509	18510
TAXA										
<i>Valvata cristata</i> (Müller)	F	Fl		-	+	++	++	++	++	++
<i>Valvata piscinalis</i> (Müller)	F	Fl		-	-	-	++	+++	+++	+++
<i>Bithynia</i> sp.	F	Fl		-	+	++	++	++	++	++
<i>Carychium</i> sp.	T	(M) S		-	-	-	+	+	-	-
<i>Carychium minimum</i> (Müller)	T	(M)		+	-	-	-	-	-	-
<i>Lymnaea</i> sp.	F	Sl C		-	-	++	++	++	-	++
<i>Lymnaea truncatula</i> (Müller)	F	Sl		-	+	+	+	-	-	+
<i>Lymnaea palustris</i> (Müller)	F	C		-	-	-	Cf+	-	+	+
<i>Lymnaea peregra</i>	F	C		-	-	-	-	-	+	-
<i>Planorbis planorbis</i> (Linnaeus)	F	C		-	-	-	-	-	+	-
<i>Anisus leucostoma</i> (Millet)	F	Sl		+	+	+	+	+	++	-
<i>Gyraulus albus</i> (Müller)	F	C		-	+	-	-	++	+	-
<i>Ancylus fluviatilis</i> (Müller)	F	Fl		-	-	-	-	-	-	+
<i>Oxyloma/Succinea</i> sp.	T	M		+	++	++	+	+	+	-
<i>Cochlicopa</i> sp.	T	C		-	+	+	+	+	-	-
<i>Vertigo antivertigo</i> (Draparnaud)	T	M		-	+	-	-	-	-	-
<i>Vertigo pygmaea</i> (Draparnaud)	T	(M)		-	-	-	-	-	+	+
<i>Pupilla muscorum</i> (Linné)	T	O		-	-	+	-	+	-	+
<i>Vallonia</i> sp.	T	(M) O		-	+	++	-	+	+	+
<i>Vallonia costata</i> (Müller)	T	O		-	-	-	-	-	+	+
<i>Vallonia excentrica</i> (Sterki)	T	O		-	-	-	-	-	-	+
<i>Vallonia pulchella</i> (Müller)	T	(M)		+	-	+	-	+	+	-
Zonitidae	T	S M		-	-	-	+	-	-	-
Helicidae	T	C O		-	-	-	-	-	+	-
<i>Trichia hispida</i> (Linné)	T	C		-	-	+		+	+	+
Bivalves	F			+	+	++	++	-	++	++
Estimated minimum number of individuals (excl. bivalves)				10	20	55	50	100	90	70
Operculae				++	+++	++++	++++	+++++	+++++	++++

Table 5: Area 15 Cursus ditch molluscan assemblages (fill 617047)

		Spit Sample	15 18266	13 18264	11 18248	9 18246	7 18244	5 18242	3 18240	2 18238
Taxa	Habitat									
<i>Valvata cristata</i> (Müller)	F Fl		216	204	162	126	79	42	49	56
<i>Valvata piscinalis</i> (Müller)	F Fl		279	289	230	179	106	48	57	83
<i>Bithynia tentaculata</i> (Linnaeus)	F Fl		50	47	36	34	17	8	15	20
<i>Lymnaea</i> sp.	F Sl C		12	16	1	4	2	2	2	3
<i>Lymnaea truncatula</i> (Müller)	F Sl			2		1	1	1		
<i>Lymnaea palustris</i> (Müller)	F C			2			9	3		
<i>Lymnaea stagnalis</i> (Linnaeus)	F C					1	1			
<i>Bathyomphalus contortus</i> (Linnaeus)	F C		33	28	18	11	7	7	5	4
<i>Gyraulus laevis</i> (Alder)	F C							1		
<i>Gyraulus acronicus</i> (Férussac)	F C			1						
<i>Gyraulus albus</i> (Müller)	F C		30	38	27	14	10	8	8	8
<i>Gyraulus crista</i> (Linnaeus)	F C		5	12	4	5	2	3		3
<i>Ancylus fluviatilis</i> (Müller)	F Fl			3		2	1			
<i>Pisidium</i> spp.	F Sl C Fl		18	20	18	12	5	2	1	3
<i>Pisidium amnicum</i> (Müller)	F Sl C		*	3	*	2	1	2		
<i>Carychium</i> sp.	T S (M)							1		
<i>Cochlicopa</i> sp.	T C		3	2		1	1	5	2	3
<i>Cochlicopa lubrica</i> (Müller)	T C			2			1		2	3
<i>Truncatellina cylindrica</i> (Férussac)	T O		3	2	3	4	2		1	1
<i>Vertigo pygmaea</i> (Draparnaud)	T (M) O					3	1		0	2
<i>Pupilla muscorum</i> (Linné)	T O		14	22	20	28	36	40	76	51
<i>Vallonia</i> sp.	T M O		21	21	19	27	40	36	76	33
<i>Vallonia costata</i> (Müller)	T O		7	28	24	25	27	39	51	38
<i>Vallonia pulchella</i> (Müller)	T M O			1				1	1	2
<i>Vallonia excentrica</i> (Sterki)	T O		3	13	22	13	24	21	31	19
<i>Punctum pygmaea</i> (Draparnaud)	T C					1				
<i>Nesovitrea hammonis</i> (Ström)	T C							1	1	
<i>Aegopinella nitidula</i> (Draparnaud)	T S			1						
<i>Clausilia bidentata</i> (Strom)	T S			2				1		1
cf. <i>Cochlodina laminata</i> (Montagu)	T S							1		
<i>Trichia hispida</i> (Linné)	T C			3	2	13	20	8	20	9
<i>Cepaea /Arianta</i> sp.	T C			3			3	1	3	1
<i>Cepaea</i> sp.	T C			*		*		*		
Minimum number of individuals			694	765	586	506	396	282	401	343

Table 6: Area 49 Waterhole and Area 21 pit molluscan assemblages

		Area 49 Waterhole							Area 21 pit	
		Date	BA						Neo	
		Series	16529	16529	16529	16529	16529	16529	16529	22556
		Depth	0.40- 0.14	0.18- 0.28	0.28- 0.38	0.42- 0.50	0.52- 0.62	0.62- 0.72	0.74- 0.81	0.00- 0.10
		Context	563043	563042	563042	563041	563039	563039	563034	552397
		Sample	16530	16531	16532	16533	16534	16535	16536	22557
										22559
TAXA										
<i>Valvata cristata</i> (Müller)	F	Fl	-	-	-	-	-	-	-	++
<i>Valvata piscinalis</i> (Müller)	F	Fl	-	-	-	-	-	-	-	++
<i>Bithynia</i> sp.	F	Fl	-	-	-	-	-	-	-	++
<i>Carychium minimum</i> (Müller)	T	(M)	-	-	-	-	-	-	-	+
<i>Lymnaea</i> sp.	F	Sl C	-	-	-	-	-	-	-	+
<i>Lymnaea truncatula</i> (Müller)	F	Sl	-	-	-	-	-	-	-	+
<i>Lymnaea palustris</i> (Müller)	F	C	-	-	-	-	-	-	-	-
<i>Planorbis planorbis</i> (Linnaeus)	F	C	-	-	-	-	-	-	-	-
<i>Anisus leucostoma</i> (Millet)	F	Sl	-	-	-	-	-	-	-	+
<i>Bathyomphalus contortus</i> (Linnaeus)	F	C	-	-	-	-	-	-	-	++
<i>Gyraulus albus</i> (Müller)	F	C	-	-	-	-	-	-	-	+
<i>Gyraulus crista</i> (Linnaeus)	F	C	-	-	-	-	-	-	-	+
<i>Ancylus fluviatilis</i> (Müller)	F	Fl	-	-	-	-	-	-	-	-
<i>Acroloxus lacustris</i> (Linnaeus)	F	C	-	-	-	-	-	-	-	-
<i>Oxyloma/Succinea</i> sp.	T	M	-	-	-	-	-	-	-	-
<i>Cochlicopa</i> sp.	T	C	-	-	-	-	-	-	-	-
<i>Vallonia</i> sp.	T	(M) O	-	-	-	-	-	-	-	+
<i>Vallonia costata</i> (Müller)	T	O	-	-	-	-	-	-	-	+
<i>Vallonia pulchella</i> (Müller)	T	(M)	-	-	-	-	-	-	-	-
<i>Punctum pygmaea</i> (Draparnaud)	T	C	-	-	-	-	-	-	-	-
<i>Discus rotundatus</i> (Müller)	T	S	-	-	-	-	-	-	-	+
<i>Vitrea</i> sp.	T	S	-	-	-	-	-	-	-	+
<i>Nesovitrea hammonis</i> (Ström)	T	C	-	-	-	-	-	-	-	-
<i>Trichia hispida</i> (Linné)	T	C	-	-	-	-	-	-	-	+
<i>Cepaea /Arianta</i> sp.	T	C	-	-	-	-	-	-	-	-
<i>Cepaea nemoralis</i>	T	C	-	-	-	-	-	-	-	-
Bivalves			-	-	-	-	-	-	-	+
Estimated minimum number of individuals (excl. bivalves)			0	0	0	0	0	0	0	75
Operculae			-	-	-	-	-	-	-	-

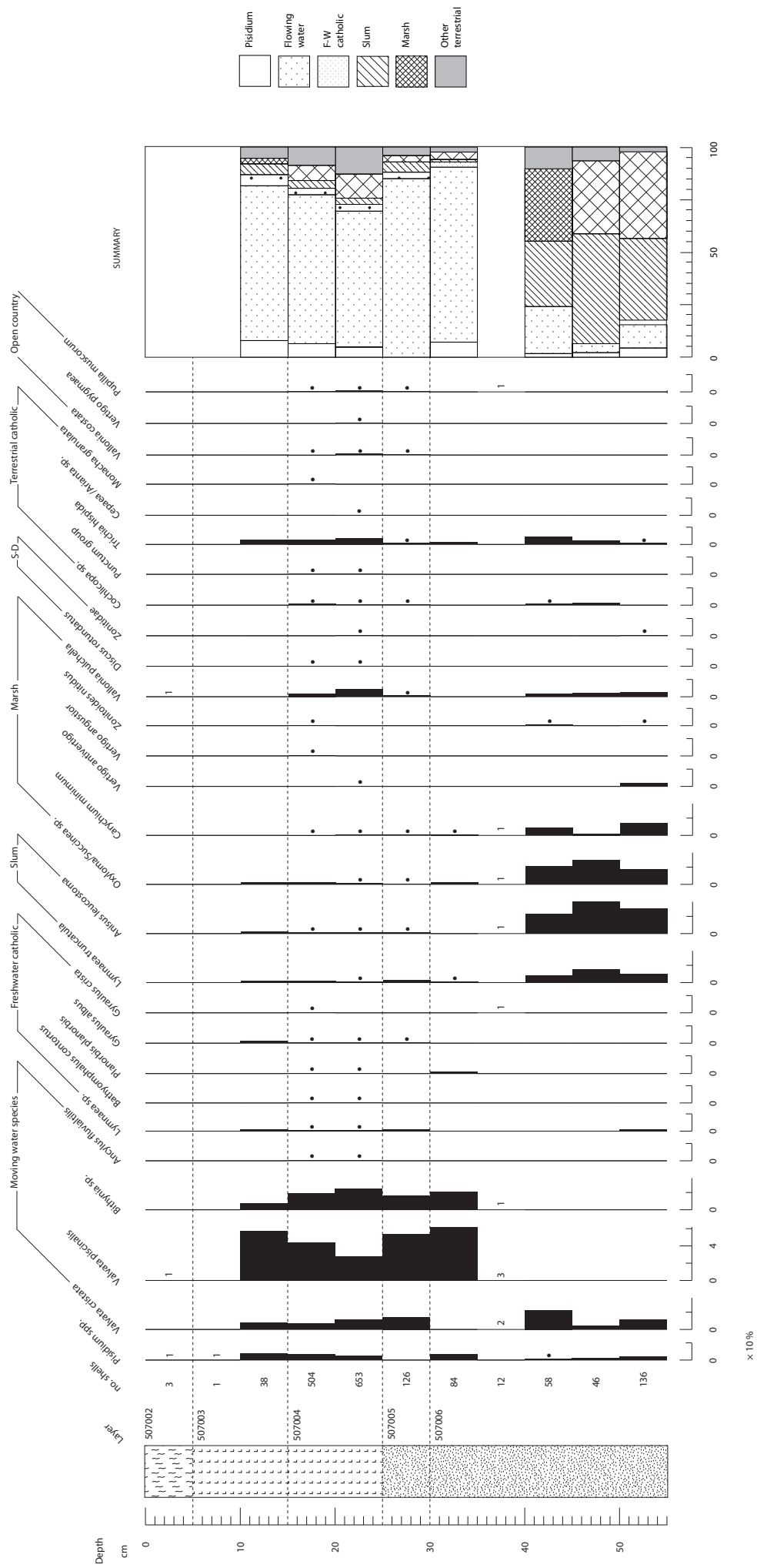
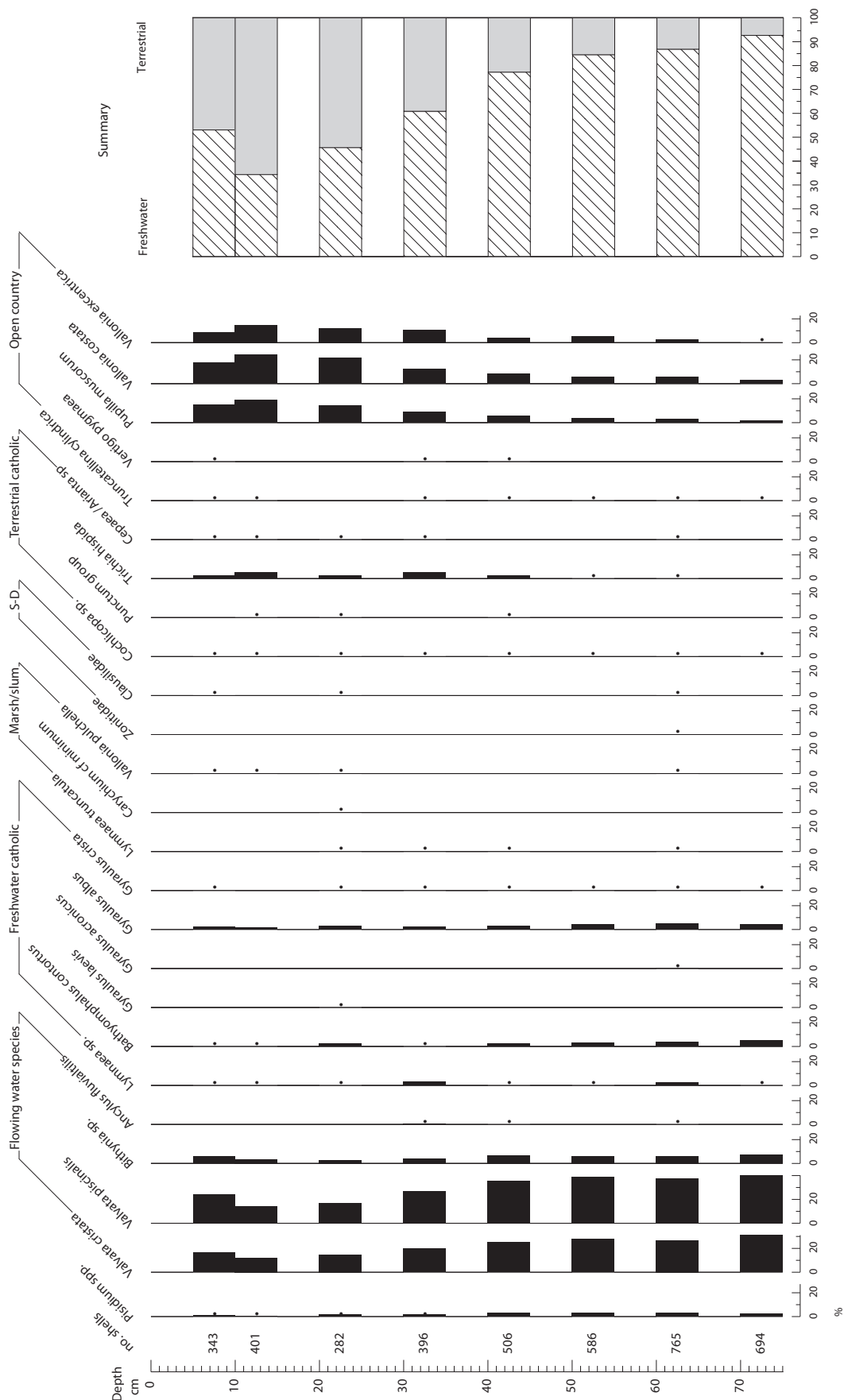


Figure 1 - Molluscan histogram, Area 4 palaeochannel

Figure 2 - Molluscan histogram, fill 617047 from the eastern cursus ditch (Area 15)



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