McDONALD INSTITUTE MONOGRAPHS

Must Farm pile-dwelling settlement

Volume 2. Specialist reports

Edited by Rachel Ballantyne, Anwen Cooper, David Gibson, Mark Knight & Iona Robinson Zeki

CAU Must Farm/Flag Fen Basin Depth & Time Series – Volume II

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With contributions from
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Kim Vickers, Harry Kenward & Laura Girvan

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Sheila Hamilton-Dyer

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Rachel Ballantyne

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Chapter 12. Fibres and fabrics
Susanna Harris & Margarita Gleba

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Chapter 14. Wooden artefacts use-wear
Hermine Xhauflair, Donald Horne, Vanessa Forte, Christian Casseyas, Michael Bamforth & Rachel Ballantyne

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Chapter 20. Worked stone, unworked stone and unworked flint
Simon Timberlake & Giulio Lucarini

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Chapter 22. Seeds and fruits
Rachel Ballantyne

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Chapter 31. Stable isotope analysis of seeds and bones
Emma Lightfoot, Rachel Ballantyne & Tamsin C. O'Connell

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Summary

The Must Farm pile-dwelling settlement (Cambridgeshire, UK) is one of the most extraordinary Bronze Age sites in Europe. The settlement, which was built over a slow-flowing, freshwater distributary of the River Nene, on the south-eastern edge of the Flag Fen Basin, comprised five stilt-raised houses, enclosed by a curving palisade. Built in the mid-9th century BC, the settlement was destroyed by fire less than a year after construction. Though the occupants escaped, the conflagration sent the remains of all five buildings and their artefact-rich contents to the riverbed. Fire, water and burial in oxygen-depleted silts provided the conditions for exceptional preservation. The site's stratigraphic simplicity, it's short-lived duration and the vertical collapse of buildings gave the remains a pristine quality, allowing spatially and temporally coherent household inventories to be identified.

Amongst the wealth of things recovered were delicate textiles (yarns, cloth and knotted nets), wooden artefacts (bobbins, containers, withies, furniture, hafts for metal tools and wheels), complete pottery sets (jars, bowls and cups), bronze toolkits (axes, sickles, gouges, spears and razors) and numerous beads (glass, tin, amber and faience). The settlement's biological remains – animal bones (red deer, pig/wild boar, sheep and pike), charred plants and seeds, human and animal dung and microscopic remains (e.g. parasite eggs) – included elements seldom encountered in British prehistory. These challenge many of our ideas about the material worlds that people inhabited, shedding new light on aspects of architecture, foodways, woodland management, landscape change and the nature of wetland living.

This second volume presents detailed specialist analyses to accompany the narrative synthesis given in Volume 1. The specialist contributions are rich in detail and diverse in terms of the approaches taken, providing information in formats appropriate to differing fields of study. Volume 2 is split into six sections. Section 1, *Social and practical context*, presents the fieldwork methods used, in relation to the project's research aims, including that of public outreach (Ch1–Ch2). Section 2, *River*, provides detailed specialist perspectives on the history and character of the river that was the immediate setting of the Must Farm pile-dwelling settlement (Ch3–Ch8). Section 3, *Construction*, considers the materials used in the settlement's architecture, examining both the extensive use of structural wood and the more limited use of clay to augment the structures. Section 4, *Material culture*, details the various material assemblages of the settlement, exploring how the objects and materials which animated life in the settlement were made, stored, used and discarded (Ch12–Ch21). Section 5, *Biological remains*, focuses on the impressive, sometimes unparalleled, insights that biological remains such as animal bone, organic residues in pots, and coprolites, can shed on prehistoric life (Ch22–31). Finally, Section 6, *Aspects of time*, presents evidence relating to the duration of the settlement and to its premature destruction by fire (Ch32–33).

Conventions and settlement terminology

Conventions

Context numbers are given in square brackets (e.g. [3208]).

Catalogue numbers are given in triangular brackets (e.g. <5600>).

Wood numbers are given the prefix WD (e.g. WD3601).

Spot finds are given the prefix SF (e.g. SF4230).

Feature numbers were not generally utilized during the project , but where used are given the prefix F. (e.g. F.901).

Figure 0.01. *Collapsed remains of Must Farm pile-dwelling settlement, looking east: Structure 1 (foreground).*

Site grid references are four-figure co-ordinates for 1 m square locations derived from the British National Grid. A site co-ordinate for the 1 m square 63E/22N = 523663E 296822N on the National Grid. In the text, spatial locations are given as eastings and northings on the 1 m site grid (e.g. 72E/25N). Where given in tables these are abbreviated (e.g. 72/25).

All calibrated radiocarbon dates are given as 'cal BC'. Radiocarbon dates from Must Farm, given in Chapter 33, were calibrated using the IntCal20 curve (Reimer et al. 2020), applied using the OxCal v4.3 computer program (https://c14.arch.ox.ac.uk/oxcal/; Bronk Ramsey 1995; 2001; 2009; 2017). Uncalibrated radiocarbon dates, where cited by chapter authors, are given as 'BP'. Dates derived from dendrochronology are given as 'BC' or 'AD'.

Settlement terminology

The names used in this publication for the various elements of the pile-dwelling settlement are given in Figure 0.02.

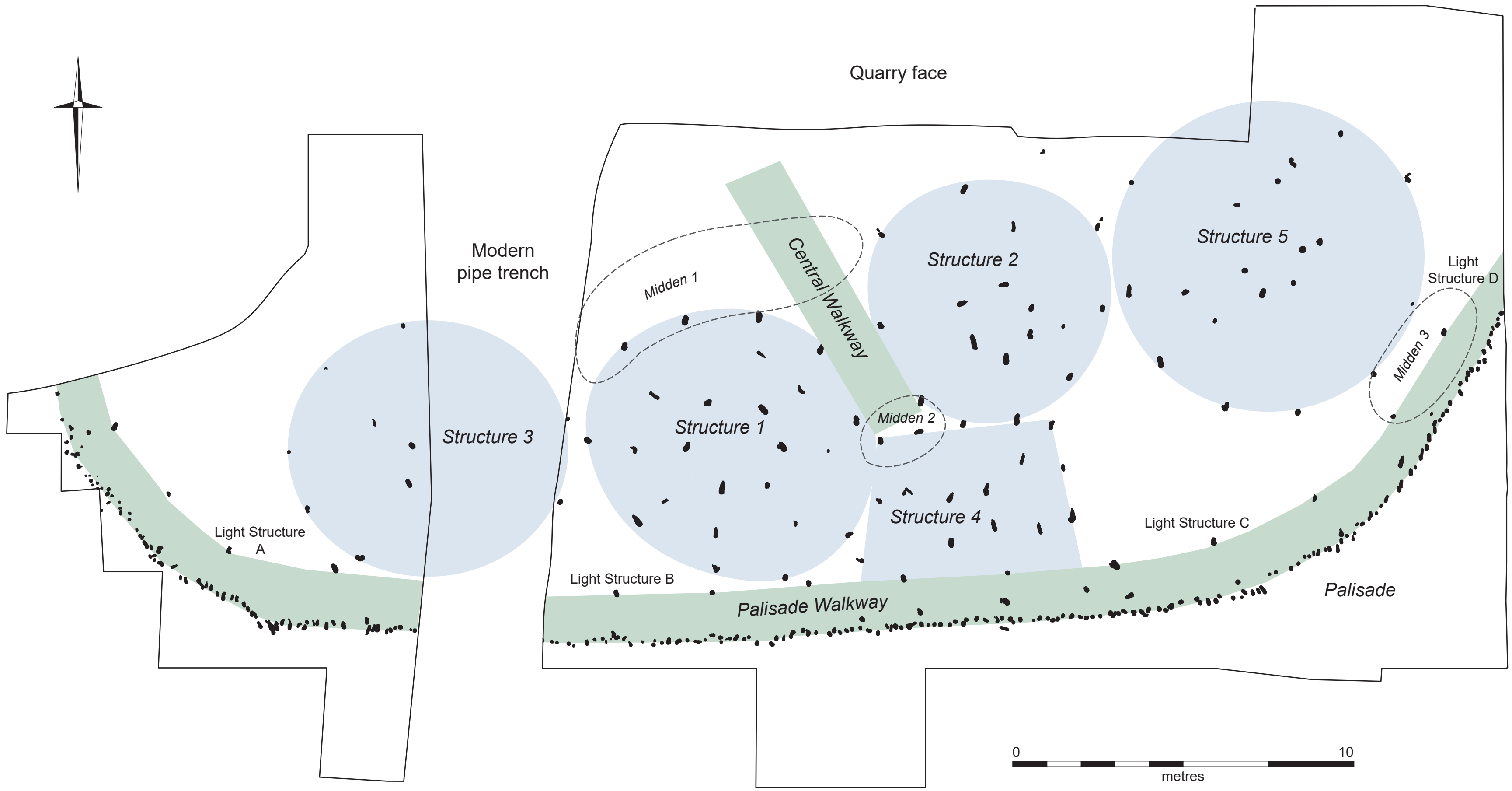

Figure 0.02. *Schematic plan of Must Farm Late Bronze Age pile-dwelling settlement (Image: CAU)*

The term 'Must Farm pile-dwelling settlement', sometimes abbreviated to 'Must Farm' or 'pile-dwelling', is used to refer to the collective elements of the pile-built settlement, rather than to a singular dwelling. Where 'Must Farm' is used without further qualification, the term is referring to the Late Bronze Age pile-dwelling settlement. It is important to bear in mind, however, that 'Must Farm' is a substantial investigative area within a working quarry. Other remarkable features from Must Farm – the prehistoric boats and fishing equipment from the paleochannel upstream of the pile-dwelling and the dryland palaeolandscape – will be published elsewhere.

Approach to the volume

This rich body of work is, for obvious reasons, not a text to be read from cover to cover. Rather, readers are invited to make their own narrative journeys – to explore the extraordinary insights into Late Bronze Age life provided by rare survivals such as textiles, carved wooden objects and wild food remains; to dive into the detail of specialist approaches not usually encountered in the context of development-led investigations (from diatoms to ceramic petrography and fire investigations); to follow up curiosities sparked by their reading of the interpretative account provided in Volume 1.

Chapter 6

Chironomids

Cath Langdon

6.01. Introduction

Ten sediment samples were analysed for chironomid diversity, preservation and concentration from the 2006 palaeochannel section (see Ch1, this volume, Figure 1.17). These samples were initially assessed for suitability for full analysis by Langdon (2018). Parallel sampling was undertaken for diatoms (Ch3, this volume) and pollen (Ch7, this volume) from the same monolith tin sequence (Ch1, this volume, Figure 1.17).

The head capsules of subfossil chironomids (larvae of non-biting midges) are usually well preserved in sediments within aquatic environments and can be identified to genus or sometimes to a higher taxonomic level. Chironomids can be used to reconstruct many different environmental variables, depending on the relative environmental stressors. Where climate is a limiting factor to chironomid emergence, they can be used as palaeotemperature indicators, however, in this context, where human related factors dominate, they are being used to understand potential anthropogenic environmental impacts. A large proportion of chironomid taxa have relatively narrow ecological optima (are stenotopic) and as such different assemblages reflect particular environments and these can be extremely sensitive to conditions within a water body (Walker 2001). They can reveal the nature of changing environmental conditions and where human stressors dominate can be good indicators of increased levels of organic detritus, changes in sediment regime, and nutrient status and so provide important context to the environment of archaeological investigations (O'Brien et al. 2005; Ruiz et al. 2006; Taylor et al. 2017a; 2017b).

6.02. Methodology

Due to the relatively low head capsule concentrations (10 g^{-1} in some instances) encountered during the initial assessment, relatively large sediment samples of between 1.5 g and 4.5 g were prepared for chironomid analysis. Samples were heated to 80°C in 10% KOH for 3 minutes or until fully disaggregated and sieved through 180 μm and 90 μm meshes. Both size fractions were retained for analysis and subsequently agitated for 10–15 seconds in a sonic bath and re-sieved to further clean them prior to picking. Fractions were examined at ×20 and ×30 magnification and chironomid remains picked and mounted in hydromatrix on microscope slides.

Chironomid remains were identified and recorded under ×100–×400 magnifications under a high-powered microscope and were identified to genus, sub-genus or species-type following Weiderholm (1983) and Brooks et al. (2007). Percentages were calculated in Excel and the chironomid diagram (Figure 6.01) was plotted using Tilia and Tilia View (Grimm 2011). For presentation purposes and ease of interpretation chironomid types associated with rheophilic (flowing) influences, coarse sediments, eutrophic tendencies, oligotrophic tendencies and macrophytes have been separately grouped (Figure 6.01). The data was also analysed using the Shannon-Wiener diversity index. Detrended correspondence analysis (DCA) of the fossil chironomid taxa was undertaken using PAST (Hammer et al. 2001) with square root transformations of species data and down weighting of rare taxa. DCA is used as an indicative guide only to community changes over time, based on chironomid abundances of 40–75. Typically, abundances for full assessments would be of >50 head capsules per sample, as this has been shown to be statistically significant in reconstructing past environmental change (Heiri & Lotter 2001; Quinlan & Smol 2001). However, this was only the case for a single sample with particularly low chironomid concentrations and absolute numbers were still considered acceptable for analysis. An attempt has also been made to quantitatively model total phosphorus (TP) using chironomid percentage data in R (Lotter et al. 1998; Clerk et al. 2000; Brooks et al. 2001; Langdon et al. 2006). The results of the statistical data are presented in Figure 6.03 and the results are described in Section 6.03, below.

6.03. Results (Table 6.01)

As previously found at assessment stage, despite the dried-out nature of the sediment sampled and the length of time the samples had been stored (since 2006), well preserved chironomids were found, although some fossils were fragmented or broken making identification more difficult in places. This is consistent with the findings of Ruiz et al. (2006) who note the potential of archived samples for chironomid analysis, due to the relative robustness of the head capsules. Concentrations were variable with numbers of head capsules g^{-1} varying from between 10 (93 cm depth, occupation layer) and 42.5 (158 cm depth). Total head capsules ranged from 40 to 75 individuals per sample analysed. Full count data are presented in Appendix 6.01.

The chironomid diagram (Figure 6.01 – presented over two sheets) has been split into four zones by eye, for ease of interpretation and discussion, and these are described independently below from the base of the zone upwards. A selected taxa diagram is also presented (Figure 6.02). The zones broadly correlate with the lower silts, shell-rich silts, occupation layer/conflagration layer and post-conflagration silts.

6.04. Discussion

The sediments from Must Farm clearly offer the potential for studying the local environment through chironomid analysis and the results show a sequence of changes during the development of the sediments. Whilst some of the changes in fossil chironomid assemblages appear to correlate with phases of anthropogenic impact it is important to realize that any anthropogenic effects are superimposed on changes in a complex physical environment (Ruiz et al. 2006).

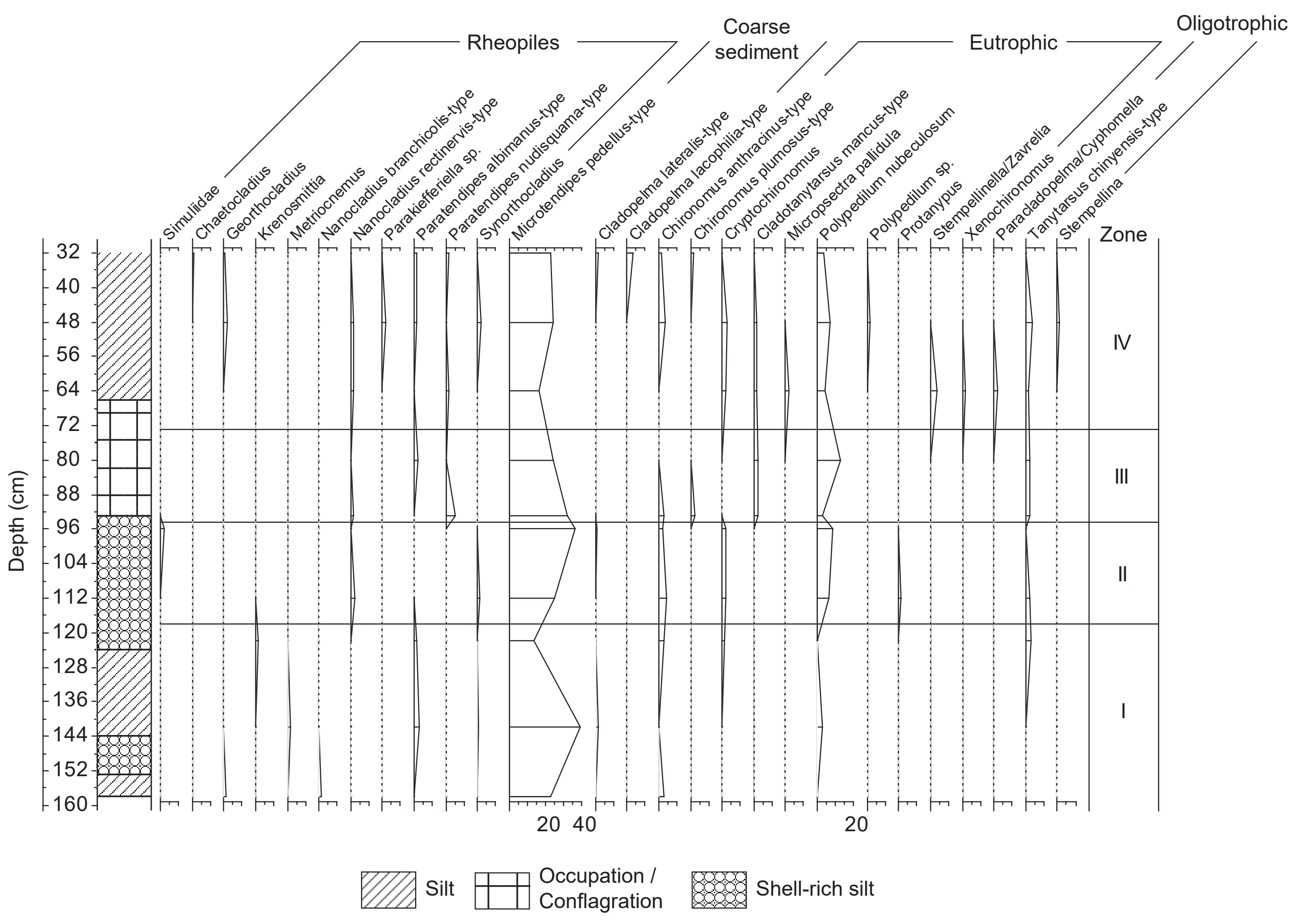

Figure 6.01 *(continues on next page). Chironomid percentage diagram (all) (Image: C. Langdon).*

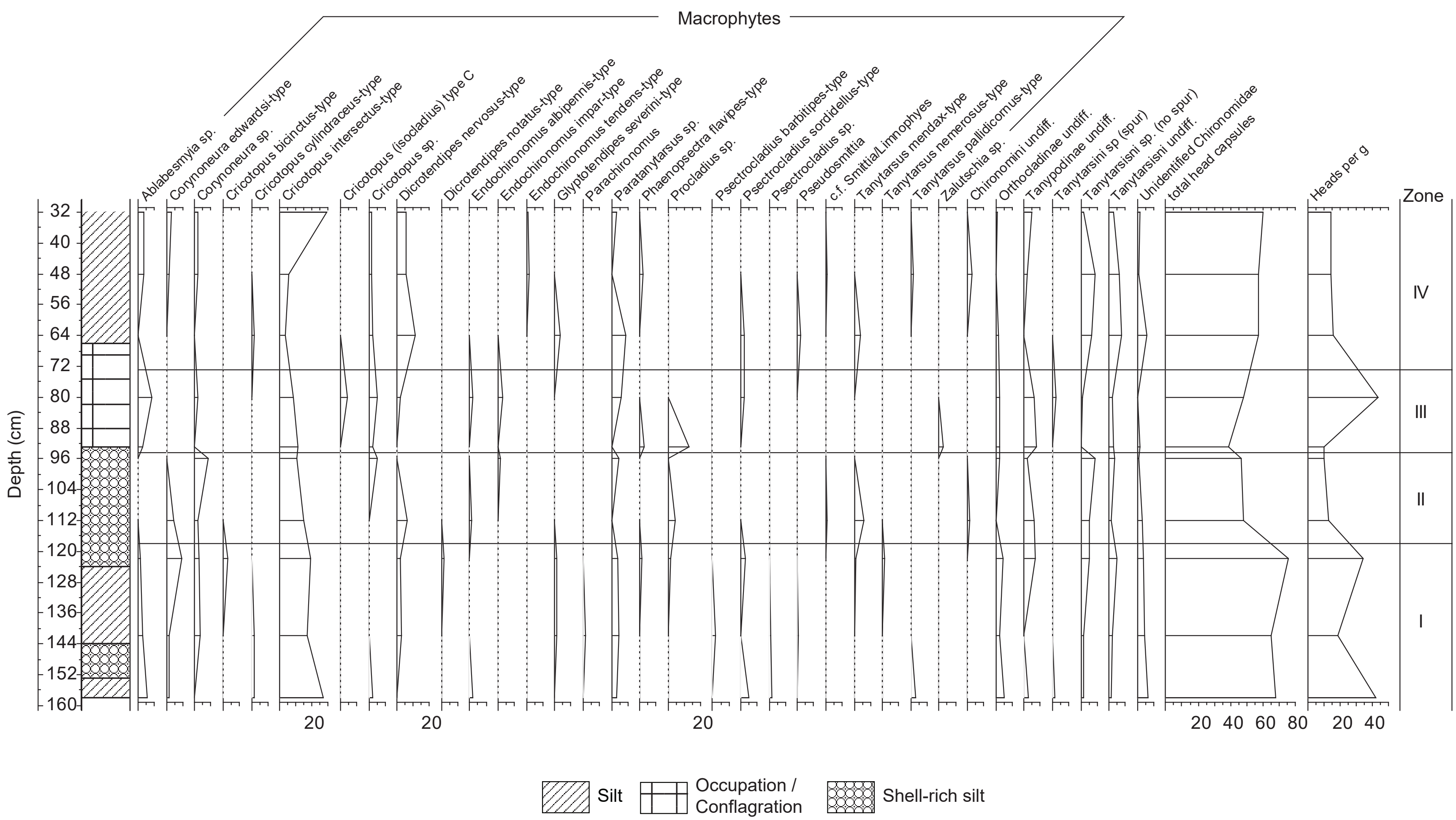

Figure 6.01 *(cont.).*

Table 6.01. *Summary of chironomid analysis results.*

Zone	Description
IV 73 cm–32 cm Post-conflagration silts	Zone delimited by a decrease in head capsule concentration to 20 g^{-1} and an increase in *Dicrotendipes nervosus* to 12% from zone III, and which stays at 7–12% for the rest of the zone. Incidence of rheophilic taxa increases (*Chaetocladius*, *Nanocladius rectinervis*-type, *Paratendipes albimanus*-type, *Paratendipes nudisquama*-type, *Georthocladius*, *Parakiefferiella* and *Synorthocladius*; all <5%). Meanwhile *Microtendipes pedellus*-type is at *c.* 20% throughout. There is a decline in *Cricotopus* (to <5%) until the zone end where it rises to 25%. With the decline in *Cricotopus* is a slight increase in taxa associated with increased nutrient input (*Microspectra pallidula*-type, *Stempellinella* and *Xenochironomus*) and a rise in total phosphorus all at 32 cm from a minimum of 35 μg L^{-1} at 48 cm to 90.6 μg L^{-1}. *Paratanytarsus* declines as the zone progresses, with a general increase in *Tanytarsini* types.
III 94.5 cm–73 cm Occupation and conflagration layers	Zone delimited due to a statistically significant change at 93 cm associated with TP also reflected in the DCA; a marked rise in TP to 125 μg L^{-1}, which then drops to 56 μg L^{-1} at 80 cm. There is also a decline in species diversity at the same depth and a general decline in *Cricotopus intersectus*-type from 15% to 8% as the zone progresses. *Cladotanytarsus mancus*-type appears for the first time at 93 cm and *Microtendipes pedellus*-type declines from 35% to 20% by the zone end. *Polypedilum nubeculosum*-type declines to <3% at 93 cm from the previous zone, before recovering to 18% at 80 cm. There is a peak in the rheophilic *Paratendipes nudisquama*-type at 93 cm (5%) as well as in *Procladius* to nearly 20% at the same depth. *Procladius* disappears at 80 cm and *Ablabesmyia* becomes more frequent. *Phaenopsectra flavipes*-type and *Zalutschia* are also recorded at 93 cm and a first incidence of *Chironomus plumosus*-type.
II 118 cm–94.5 cm Shell-rich silts	*Polypedilum nubeculosum*-type increases from zone I (12–15%) and *Microtendipes pedellus*-type increases from 20–40% as the zone progresses. There is also some change in taxa associated with flowing water with <3% *Nanocladius rectinervis*-type, *Synorthocladius* and Simuliidae (the latter, a biting larvae). Types associated with macrophytes include *Cricotopus intersectus*-type (declines slightly from 18–12%), *Dicrotendipes nervosus*-type, *Procladius* and *Tanytarsus mendax*-type (*c.* 5%). <3% *Cladopelma lateralis*-type, associated with coarse sediment, is also recorded. *Cryptochironomus*, *Chironomus anthracinus*-type and *Polypedilum nubeculosum*-type are recorded (<5%) and *Tanytarsus chinyensis*-type (<5%). TP levels remain at *c.* 70 μg L^{-1} and there is a notable decline in head capsule concentrations to 10 g^{-1}.
I 168 cm–118 cm Lower silts, shell lenses	Zone defined by levels of *Microtendipes pedellus*-type up to 40% and *Cricotopus intersectus*-type between 20–25%. Other taxa associated with macrophytes include *Glytotendipes severini*-type (2–4%), *Ablabesmyia* (5–2%), *Paratanytarsus* (<2%), *Tanytarsus nemorosus*-type (2%), *Psectrocladius sordidellus*-type and *Dicrotendipes nervosus*-type (4%). Rheophilic taxa include *Paratendipes albimanus*-type, *Krenosmittia*, *Metriocnemus* and *Georthocladius* (all at <5%). Total phosphorus reconstruction values decline towards the zone end, from 70 μg L^{-1} to 46 μg L^{-1}.

The lower silts (158 cm–118 cm)

MUS06 [381a], MUS06 [381b] and MUS06 [367a]

The chironomid assemblage from Zone I (158–118 cm), silt layer with some shell lenses, likely reflects a slow flowing water body (*Krenosmittia* and *Paratendipes albimanus*-type) with a coarse, open substrate. *Microtendipes pedullus*-type typically exists in more coarse sediments and is typical of shallow and lentic water bodies, often low in organics. Inferred water quality seems generally good with a decline in TP towards the end of the zone from 70 μg L^{-1} to 46 μg L^{-1}. *Cricotopus intersectus*-type, *Coryoneura edwardsi*-type, *Dicrotendipes nervosus*-type, *Glytotendipes severini*-type, *Paratanytarsus* and *Ablabesmyia* are all taxa associated with macrophytes (Langdon et al. 2010) and can be indicative of relatively good water quality. *Cricotopus*, in particular suggests the presence of emergent vegetation and is often found on *Potamogeton* and Nymphaeaceae (Brodersen et al. 2001). Radiocarbon dates were uncertain with waterlogged seeds dated to 3000±29 uncal BP; 1390–1355 cal BC (OxA-36404) and twigs to 3349±30 uncal BP; 1695–1530 cal BC (SUERC-76591) at a depth equivalent to 122 cm.

The shell-rich silts (118 cm–94.5 cm depth)

MUS06 [367b] and [367c] both equivalent to MUS15 [3221]

During Zone II there is a marked reduction in head capsule concentration (to *c.* 10 g^{-1}). This is most likely as a result of an increase in sedimentation rate introducing woody fragments and freshwater mollusc shells, much of it considered to be washed out 'brash' from upstream (see Ch9, this volume, Section 9.02, *Interpretative discussion of the palaeochannel fills*). The increase in *Microtendipes pedellus*-type as this zone progresses may also be indicative of an inwash of coarse material. Whilst rheophilic taxa are not abundant, some flowing water is indicated by the presence of *Nanocladius rectinervis*-type, *Synorthocladius* and Simuliidae (biting gnat larvae). The latter are of interest as these attach to emergent macrophytes or rocks and filter feed from fast flowing water, and therefore infer a significant rheophilic influence in locations where they are recorded (Brooks et al. 2007). This fits with the theory of upstream inwash from the sedimentary evidence.

In this context there is probably quite a complex taphonomic picture of inwashed and *in situ* chironomids, as further emphasized by the radiocarbon results (Ch33, this volume, Section 33.08). Derivation issues are more problematic in palaeochannel samples of this nature, however, Greenwood et al. (2003) noted in their studies of caddisfly larvae from such environments that when the fossil assemblages were compared with modern analogues the fossil material had not travelled a great distance from source and was therefore representative of the local environment. A control site would help to resolve these taphonomic issues. Again, radiocarbon dates for this horizon are uncertain with waterlogged seeds dated to 2958±30 uncal BP; 1265–1050 cal BC (UBA-35748) and waterlogged twigs to 3494±28 uncal BP; 1895–1740 cal BC (OxA-36405) at a depth equivalent to 100 cm. The older dates could be related to reworked material introduced during this phase of inwash (Ch33, this volume, Section 33.08).

Although there is a relative decline in chironomid types associated with emergent macrophytes during this phase there is still evidence of local macrophyte growth. Meanwhile, *Polypedilum nubeculosum*-type (an indicator of a relatively productive lake system) increases significantly from the previous zone and is concurrent with an increase in *Chironomus anthracinus*-type and the first incidence of *Protanypus* which remains throughout the zone. These aforementioned types can be associated with an increase in eutrophication and are concurrent with a slight increase in total phosphorus from the end of the previous zone (72 μg L^{-1} and 74 μg L^{-1}) which surmises some decline in water quality. Despite this, inferred water quality was likely still fairly good with some emergent macrophytes and a coarse substrate.

The occupation layer and conflagration layer (94.5 cm–73 cm)

MUS15 [3224] and MUS06 [370] equivalent to MUS15 [3207]

The sample situated at 93 cm in the occupation layer [3224] was added to the profile as part of full analysis and was not included in the assessment. The layer has been dated by association with radiocarbon wiggle matching of ash uprights to 865–840 cal BC (95% probability; Ch33, this volume, Section 33.07). This level sits alone as rather distinct (also indicated by the

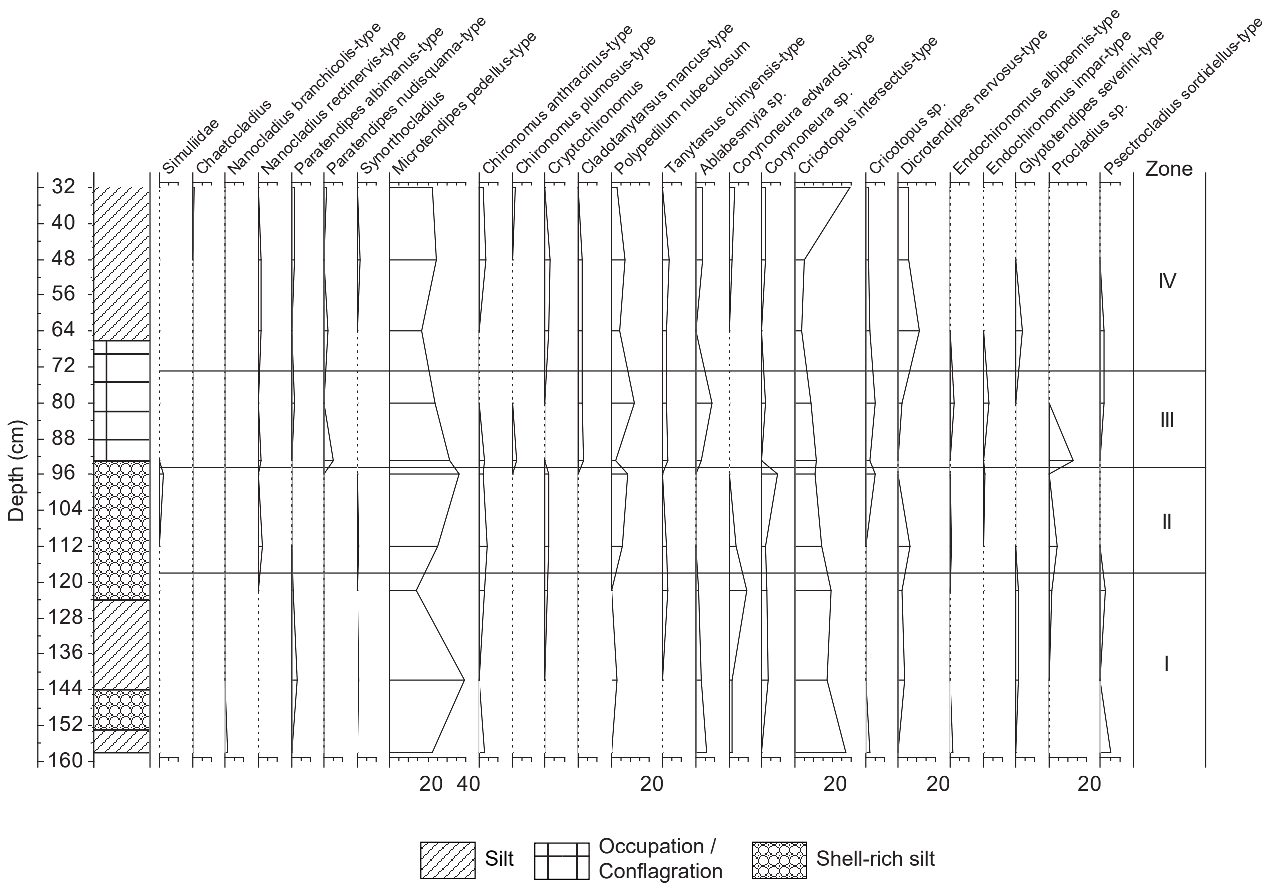

Figure 6.02. *Chironomid percentage diagram (selected taxa) (Image: C. Langdon).*

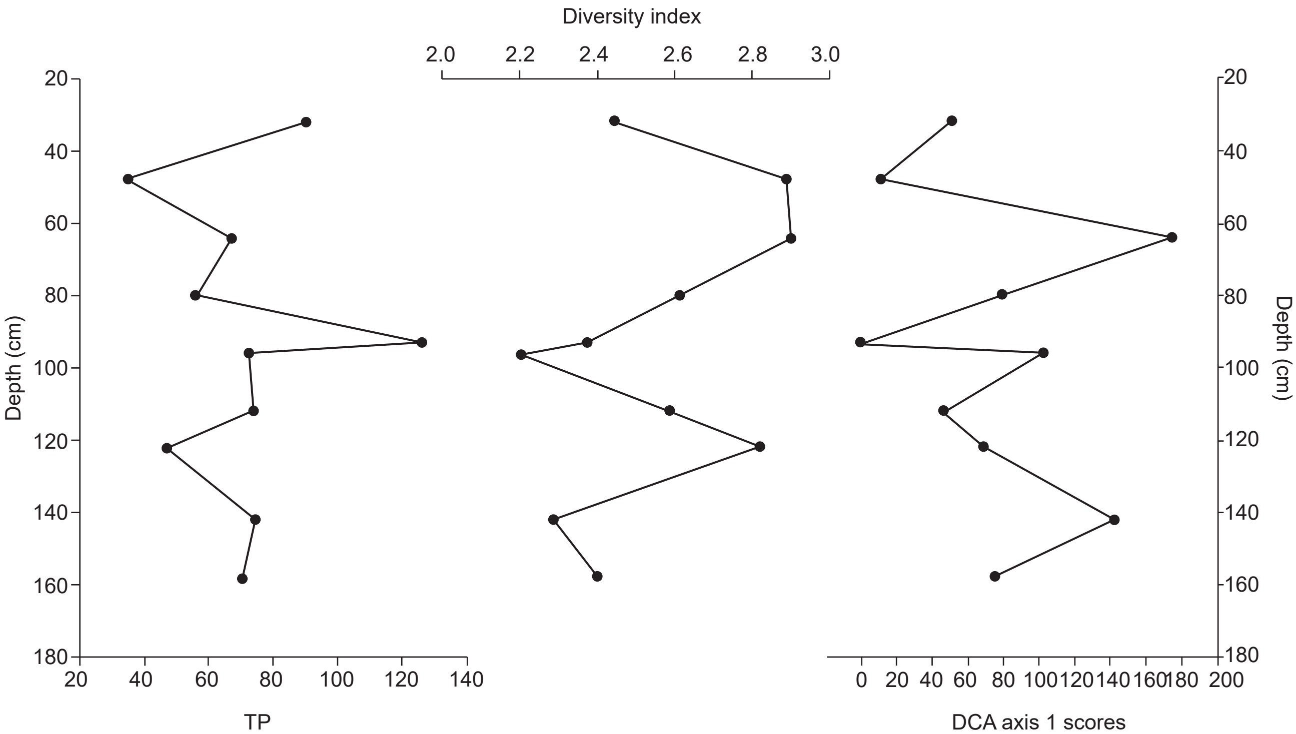

Figure 6.03. *Results of statistical data (Image: C. Langdon).*

DCA axis 1 scores) but has been included in a zone with the conflagration layer for ease of interpretation and discussion. At 93 cm depth there is a low level of species diversity which may be related to a decline in water quality and which could correlate with an increase in local pollution.

Evidence for a reduction in water quality at 93 cm depth is further notable from the total phosphorus transfer function where there is a considerable increase in reconstruction values (to 125 μg L^{-1}). Total phosphorus is a useful tool to add to diatom-based inferences of nutrient status providing a broader picture of nutrient enrichment (Brooks et al. 2001). The transfer function is based on ecosystem response to higher nutrient loading (Ruiz et al. 2006), for example increased production of algae causing a change in chironomid food supply. However, in this context the chironomid communities may be responding to increased, and more localized, nutrient input from another source, such as agriculture. Particularly in pastoral areas, phosphorus and nitrogen from manure accumulate in the surrounding soils and these can be deposited into local streams, rivers and lakes where the phosphorus dissolves and encourages macrophyte and phytoplankton growth (Carpenter et al. 1998; Carpenter 2005). To fully assess this, a control site away from the direct area of occupation would be of benefit. A small peak in *Chironomus plumosus*-type just during the occupation horizon may also indicate a decline in water quality and increase in nutrient enrichment. Similarly, the peak in *Procladius* at 93 cm depth, a taxon that can survive during periods of anoxia, is associated with increased eutrophication (Langdon et al. 2006).

As with the previous zones there is some evidence of flowing water with an increase in *Paratendipes nudisquama*-type at 93 cm depth although, as throughout the profile, these species are not abundant and there are fewer in the conflagration zone, suggesting possible stagnation of the water body at this time. A decline in *Cricotopus* and *Coryoneura* is generally apparent throughout the zone which may also suggest fewer emergent plants and additionally, *Cladotanytarsus mancus*-type appears during this phase (and remains at <5% for the rest of the profile), a taxon often found in sandy substrates which can be negatively associated with macrophytes. The continued presence of *Microtendipes pedellus*-type further indicates a coarse substrate, although numbers decline into the conflagration layer concurrent with an increase in *Polypedilum nubeculosum*-type. This increase in the latter taxon may be as the result of an increase in input of finer organic detritus during this conflagration zone. A change here is further demonstrated in the DCA and may have been as a result of the settling out of fine particulate matter as water stagnated and perhaps shallowed (as suggested by a decline in numbers of rheophilic taxa) and/or because of human activity and associated inwash at the site.

Post-conflagration silts (73 cm–32 cm)

MUS06 [357] equivalent to MUS15 [3206], and MUS06 [356] equivalent to MUS15 [3201]
The decline in the number of head capsules to <20 g^{-1} throughout this zone attests to a possible increase in sedimentation rate during this phase of the profile. The continued presence of *Microtendipes pedullus*-type still suggests a coarse substrate whilst *Paratendipes* types, *Nanocladius rectinervis* and *Georthocladius* may be associated with flowing water, the latter associated with moss in bogs and seepages or small streams (Cranston et al. 1983). *Chironomus anthracinus*-type, and notably *Chironomus plumosus*-type, can be associated with some level of nutrient enrichment during this phase and both taxa are often early colonizers after a period of environmental disturbance (Brooks et al. 2007), perhaps in this case post-conflagration. The increase in *Paratanytarsus* from Zone III to IV may initially indicate a well developed submerged macrophyte community, however, the decline in this towards the end of Zone IV and increase in *Cricotopus* types suggests a change to more emergent macrophytes towards the end of the zone and perhaps some shallowing of the water (O'Brien et al. 2005). *Chaetocladius* also appears towards the end of the zone and can be semi-terrestrial in habitat, which might indicate a period of more rapid sedimentation. The increase in *Dicrotendipes nervosus*-type also suggests the presence of macrophytes, but again this taxon declines at the end of the zone. This pattern can be seen in the results of the total phosphorus reconstruction with values that tend to decline as the zone progresses reaching a minimum of 35 $\mu g\ L^{-1}$ at 48 cm depth, which indicates water of good quality. This significantly increases with the change in assemblage at 32 cm depth to 90 $\mu g\ L^{-1}$, a change that may be as a result of increased nutrient input due to human activity and/or reduced water depth.

The sediments at a depth equivalent to 37 cm have been more reliably radiocarbon dated than in other zones 2698±30 uncal BP; 905–805 cal BC (waterlogged seeds) (UBA-35750) and 2661±30 uncal BP; 845–790 cal BC (waterlogged twigs) (SUERC-76592).

6.05. Conclusions

This study gives an interesting and complex insight into water quality, substrate type and nutrient status of the channel temporally. However, in order to maximize the usefulness of the data presented in this chapter, it would be of use to know the 'natural' background conditions and associated chironomid communities so as to assess the extent to which the assemblages presented here were responding to the local environment and human action. Despite these limitations, a number of interpretations can be made from the evidence.

During the pre-occupation silts, water was relatively slow flowing and of a good quality with abundant emergent macrophytes and a coarse substrate. A reduction in chironomid head capsule concentrations and some increase in rheophilic types within the shell-rich silts suggests a phase of inwash concurrent with other sedimentary evidence. The substrate was still coarse and the water of a good quality with abundant macrophytes.

During the occupation layer there was a considerable decline in water quality and increase in levels of total phosphorus to the highest recorded. This was concurrent with a decline in species diversity and in aquatic macrophytes. The conflagration layer saw a further decline in macrophytes and some possible stagnation of the water body and settling of finer silts within the coarse substrate. Further corroborating evidence for water quality occurs in the associated coleopteran assemblage, where the dominance of water beetles indicates a permanent, mesotrophic, well vegetated, and possibly shaded aquatic habitat that included many phytophagous species of aquatic plants (Ch5, this volume, Section 5.03, *Palaeoenvironment*). It is also conjectured from the remains of eel and stickleback in the occupation/conflagration layers that '… eutrophic conditions might be encountered round the structures with low oxygen levels from decaying plant and other midden material' (Ch8, this volume, Section 8.02, *Fish – Food for people or incidental?*). However, it should be noted that any changes in water quality associated with the pile-dwelling settlement may have been very transient as they are much more subtle in the diatom and ostracod assemblages (Chapters 3 and 4, this volume).

The post-conflagration silts saw a marked decline in total phosphorus and some aquatic macrophytes were present, however, water quality deteriorated towards the end of the zone and there may have been some shallowing of the river.

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Must Farm pile-dwelling settlement

The Late Bronze Age pile-dwelling settlement at Must Farm is one of the most important and best-preserved prehistoric sites to have been systematically excavated in Europe. The settlement comprised a curving palisade enclosing five stilt-raised houses erected above a freshwater river channel at the edge of one most Britain's most intensively studied and internationally renowned Bronze Age landscapes: the Flag Fen Basin.

Built in the mid-9th century BC, the pile-dwelling was engulfed by a catastrophic fire less than a year after construction, sending the buildings and their artefact-rich contents into the sluggish waters below. A combination of fire, water and rapid burial ensured extraordinary levels of preservation, whilst the manner of collapse and brevity of settlement gave the structural remains, and their vibrant material assemblages, a pristine quality. Each household had its own inventory comprising combinations of delicate textiles, wooden containers, hafts and wheels, complete pottery sets, bronze toolkits and the scattered remnants of necklaces of glass beads. Food remains included butchered wild and domestic animal bones, charred plants and seeds, and even the burnt residues of individual meals.

This comprehensive and methodologically innovative investigation, incorporating an array of scientific studies and collaborations amongst leading specialists, provides unprecedented insights into the nature of daily life and domestic practice in Bronze Age society. These challenge many expectations about the material worlds that people inhabited, shedding new light on aspects of architecture, material abundance, foodways, woodland management, landscape change and wetland living. The collective results are truly ground-breaking for Wetland Archaeology and wider Bronze Age studies. Volume 1 provides a thematic interpretive synthesis of the site, with a focus on landscape, architecture and occupation, whilst Volume 2 offers in-depth studies of the river setting, construction, dating, material culture and biological remains.

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