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Moggs Eye, Anderby Creek, Lincolnshire

Waterlogged wood recording and radiocarbon dating of a putative Viking Age ship's timber

Peter Marshall, Steve Allen, Michael Bamforth, Ian Panter, Paula Reimer and Cathy Tyers

Scientific Dating

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Summary

Timbers washed up on the Lincolnshire coast at Moggs Eye, Anderby Creek, East Lindsey and initially thought to be from an early medieval (Viking Age) boat, were found to derive from natural woodland that was growing in the early fourth millennium cal BC.

Contributors

Peter Marshall, Steve Allen, Michael Bamforth, Ian Panter, Paula Reimer and Cathy Tyers

Acknowledgements

Front cover image: recovering timbers from Moggs Eye beach, Anderby creek, Lincolnshire (© Marcus Jecock, Historic England). We would like to the following people for help and assistance with this project: Adam Daubney (Finds Liaison Officer for Lincolnshire), Serena Cant and Marcus Jecock (Historic England), Andy Sherman (CiTIZAN), Alison James and Mark Dunkley (formerly Historic England), David Miller (Lincolnshire Wildlife Trust), Sara Crowe, and Darren Brown.

Front cover photo

Front cover image: recovering timbers from Moggs Eye beach, Anderby Creek, Lincolnshire (© Marcus Jecock, Historic England).

Archive location

Historic England, The Engine House, Fire Fly Avenue, Swindon, SN2 2EH

Historic environment record

Historic Places Team, Place Directorate, Lancaster House, 36 Orchard Street, Lincoln, LN1 1XX

Date of investigation

The timbers were first examined on the beach at Moggs Eye, Anderby Creek by Adam Daubney (Finds Liaison Officer for Lincolnshire) and the original finder on 19 January 2017. Adam undertook a further site visit on 24 January 2017 accompanied by Andy Sherman (CITiZAN) and Alison James (formerly Historic England). Historic England subsequently commissioned recovery of the timbers, that was carried out by York Archaeology Trust staff with assistance from Alison James (formerly Historic England), Marcus Jecock (Historic England), David Miller (Lincolnshire Wildlife Trust) and Sara Crowe on the 31 January 2017. Dendrochronological assessment and sampling of the timbers for radiocarbon dating was undertaken by Cathy Tyers (Historic England) on 8 March 2107, with dating undertaken subsequently at the ^{14}CHRONO Centre, Queen's University Belfast. Following return of the date and independent assessment of the timbers by two wood technologists, Michael Bamforth and Steve Allen, Historic England's Geospatial Imaging Team made a 3D-photogrammetric model of the timbers on 14

November 2017 prior to them being discarded; the 703 images that comprise the model (DP217898–DP218600) are deposited with and are available from the Historic England archive. This report was written and compiled in 2023 by Peter Marshall.

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Introduction

In January 2017 Historic England was informed by Adam Daubney, the Finds Liaison Officer (FLO) for Lincolnshire, that he had been contacted by a member of the public who had found a timber washed up on the Lincolnshire coast at Moggs Eye, Anderby Creek, East Lindsey (TF 54600 77746; Fig. 1) following recent storms. Photographs of the timber on the beach (Fig. 2) showed what appeared to be a T-shaped ship's timber. Preliminary observations of the photographs by several specialists suggested the timber shared attributes with the "kjaerring" or "old woman" rib with mast-step from the reconstruction of the Oseberg ship, found at Tonsberg, Norway, and dated to the early ninth century AD. A similar mast-step is present on one of the Skuldelev vessels, Denmark, dating to the late eleventh century AD (pers. comm. David Gregory, National Museums Denmark). These parallels, together with the North Sea location in which it was discovered, suggested the timber might have come from a Viking-Age vessel. If correctly identified, the timber was clearly of great significance, suggesting a wrecked Viking vessel powered by sail (and also likely, in common with other Viking ship finds, driven by oars) lay somewhere off this stretch of Lincolnshire coast.

At a subsequent visit by the FLO and original finder, the timber was found to have been covered with sand; three further, smaller timbers were located and buried close to the original find. In addition, ten further wooden pieces (smaller than hand size) were recovered from the vicinity and it was noted that quite a few small pieces of wood of similar colour and texture were scattered across the tide lines in the area of the larger piece.

The base of the original T-shaped timber appeared to have recently been wrenched off an *in-situ* piece, so it was thought likely that it had come from an off-shore location rather than eroding out from the 'beach' deposits. Accordingly, it was deemed to be Crown property under the terms of the Merchant Shipping Act 1995 and permission from the Crown Estate was obtained to allow removal of the finds. Furthermore, the Marine Management Organisation advised a marine exemption would also be required prior to the finds being removed.

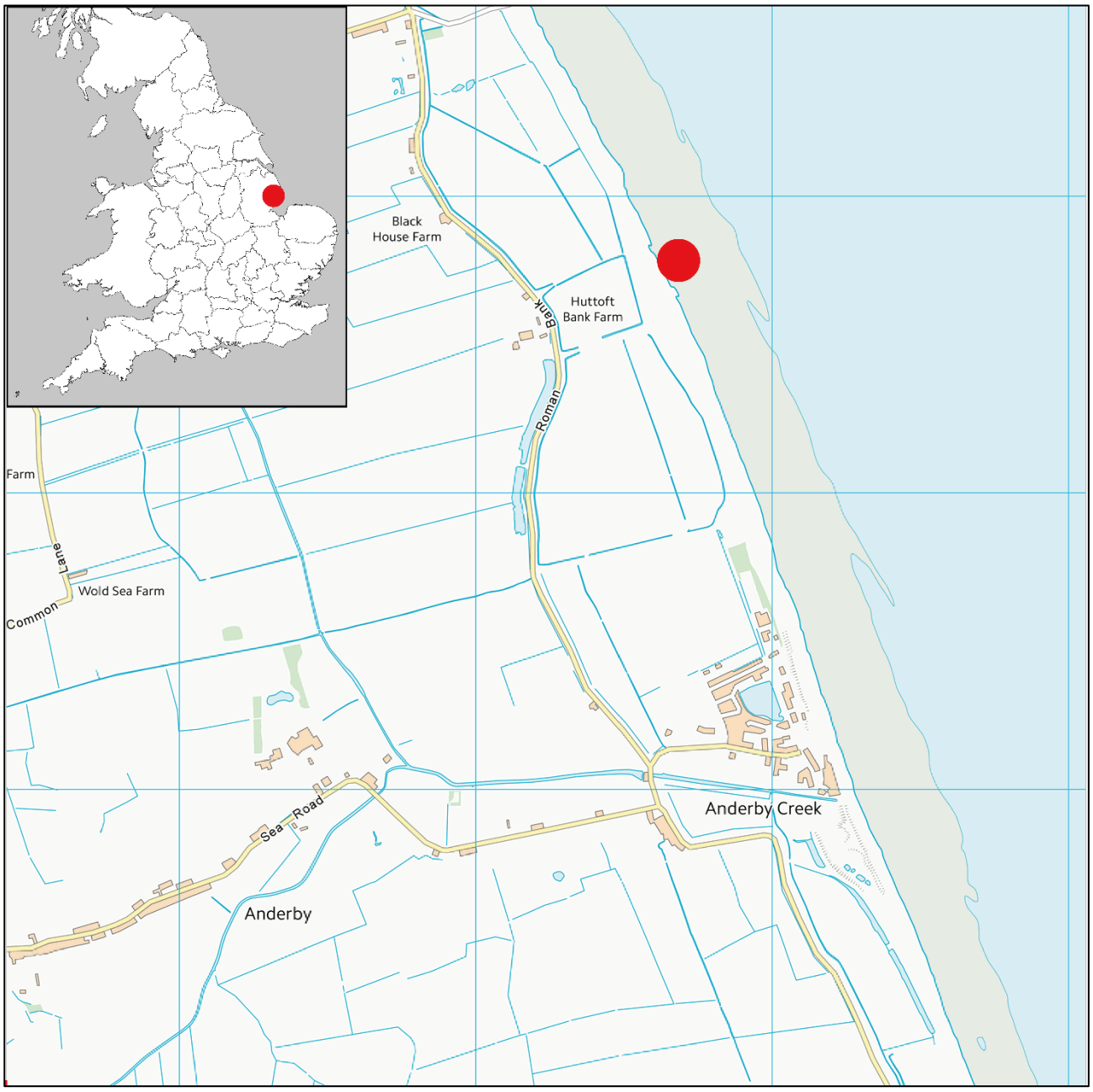

Figure 1: Map to show the approximate location of the timbers found at Moggs Eye, Anderby Creek

Figure 2: Timber on Moggs Eye beach (© Adam Daubney)

Recovery

Once the relevant permissions had been obtained, Historic England commissioned York Archaeological Trust to recover and passively curate the finds. Recovery took place during a low tide at the end of January 2017 and was carried out by York Archaeological Trust staff with assistance from Historic England, Lincolnshire Wildlife Trust and local residents.

A tractor and trailer unit to transport the timbers off the beach were provide by Darren Brown, a local farmer from Huttoft, Alford.

The T-shaped timber (Fig. 3) was carefully transferred onto a long trestle which provided additional support to the wood during transport. Then the trestle with timber was lifted onto the trailer and made ready to be transported off the beach to the car park at Huttoft terrace where both were transferred to a flatbed truck. Additional support was provided by sheets of inert Plastazote™ foam. Each timber was wrapped in capillary matting, sprayed with water then finally wrapped in bubble wrap™ before being taken to York.

Figure 3: Recovery of timber from Moggs Eye beach (© Marcus Jecock, Historic England)

Passive conservation

Once in York, the timbers were transferred to a holding tank for passive conservation and fully submerged under water.

Initial examination of all the timbers showed they exhibited evidence for shipworm activity as well as erosion from water currents, suggesting that they had been exposed on the seabed for some time. This reinforced the initial interpretation that the timbers had been brought ashore from a seabed location. A couple of the timbers were found to be brittle (and fractured easily) — an indication that lignin breakdown had commenced.

Scientific dating

In order to determine the age of the timbers and therefore to understand their potential significance a programme of scientific dating was undertaken by Historic England.

Dendrochronology

A dendrochronological assessment suggested that the T-shaped timber did appear to have a sufficient number of rings to undertake dendrochronological analysis. However, it was decided first to ascertain whether the timbers were medieval or more modern and whether they represented a single vessel or multiple vessels. Therefore, a programme of radiocarbon dating was instigated to determine whether to proceed with dendrochronological analysis.

Radiocarbon dating

Two radiocarbon measurements were obtained on a single sample of waterlogged wood from the T-shaped timber. The sample was processed at ^{14}CHRONO Centre, Queen's University Belfast in 2017 and was dated as described by Reimer et al. (2015). The sample was prepared using an acid-base-acid protocol and graphitised using zinc reduction (Slota et al. 1987). The $\delta^{13}C$ value, relative to VPDB, was obtained by IRMS from the gas combusted for graphitisation. Internal quality assurance procedures and international inter-comparisons (Scott et al. 2010) indicate no laboratory offset and validate the measurement precision quoted.

The conventional radiocarbon ages reported for the sample are listed in Table 1. The quoted errors are the laboratory estimate of the total error in their dating systems.

The two measurements are statistically consistent at 5% level (T′=2.4; T′(5%)=3.8; v=1; Ward and Wilson 1978) and a weighted mean (Moggs Eye (Anderby Creek) 5020±28 BP) has been taken as providing the best estimate for the age of the sample. Calibration using

the program OxCal v4.4 (Bronk Ramsey 2009) and the atmospheric calibration curve for the northern hemisphere published by Reimer et al. (2020) provides a calibrated date for the sample of 3940–3700 cal BC (95% probability). The calibrated date range is quoted in the form recommended by Mook (1986), with the end points rounded outward to 10 years and has been calculated according to the probability method (Stuiver and Reimer 1986). The probability distribution shown in Figure 4 is also derived from the probability method (Stuiver and Reimer 1993).

Table 1: Moggs Eye (Anderby Creek) radiocarbon and associated stable isotope measurements. Replicate measurements have been tested for statistical consistency and combined by taking a weighted mean before calibration as described by Ward and Wilson (1978; T'(5%)=3.8, v=1).

Laboratory Number	**Sample reference and material**	**$\delta^{13}C_{IRMS}$ (‰)**	**Radiocarbon Age (BP)**
UBA-34700-1	Timber 1; waterlogged wood *Quercus* sp. heartwood	−24.8%±0.22	5040±34
UBA-34700-2	Replicate of UBA-34700-1	-	4985±28
Moggs Eye (Anderby Creek)	^{14}C: 5020±28 BP; T′=2.4		

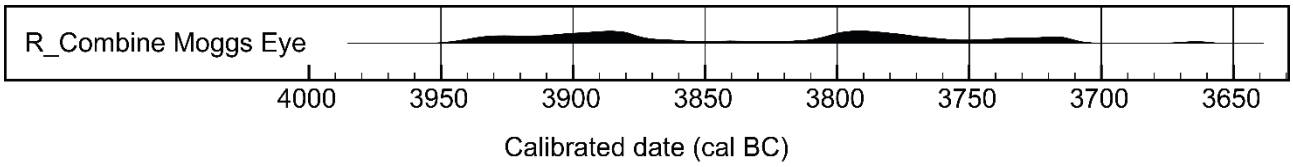

Figure 4: Probability distribution of the date of the timber from Moggs Eye (Anderby Creek). The distribution represents the relative probability that an event occurs at a particular time.

Discussion

The early Neolithic date for the timber was something of a surprise. Although early Neolithic people were seafaring (Scarre 2007), there has been no previous suggestion that they constructed boats with either sails or a mast-step. In order to clarify, therefore, if the timbers were structural fragments from a boat, the opinions of two expert wood technologists were sought.

Waterlogged Wood Assessment (i)

Introduction

A total of five hand-collected pieces of wood (Table 2) consisting of a large tree trunk and four closely associated items were recorded and assessed at YAT by Michael Bamforth in September 2017 with the aim of determining whether the timbers would be suitable for use as part of a boat.

Table 2: Summary record of wood items

Item	Taxa	Type	Condition
T1	oak	timber	2 / poor
T2	oak	timber	2 / poor
T3	oak	timber	2 / poor
T4	oak	timber	2 / poor
T5	oak	timber	2 / poor

Methodology

Assessment and recording were undertaken in accordance with Historic England *Guidelines for the Treatment of Waterlogged Wood* (Brunning and Watson 2010) and recommendations made by the Society of Museum Archaeologists (1993) for the retention of waterlogged wood.

Each discrete item was recorded individually using a pro forma 'timber recording sheet'. Every effort was made to refit broken or fragmented items. However, due to the nature of the material, the possibility remains that some discrete, yet broken items may have been processed as their constituent parts as opposed to as a whole. The metric data were measured with hand tools including rulers and tapes.

The system of categorisation and interrogation developed by Taylor (1998) was adopted and items identifiable to taxa by morphological traits visible with a hand lens – oak (e.g. *Quercus* sp.) – were noted.

Material Condition

The condition scale developed by the Humber Wetlands Project (Table 3) that is based primarily on the clarity of surface data was used to assess the condition of the material. Material is allocated a score dependent on the types of analyses that can be carried out given the state of preservation. The condition score reflects the possibility of a given type

of analysis but does not consider the suitability of the item for a given process. If preservation varies within a discrete item, the section that is best preserved is considered when assigning the item, a condition score.

Table 3: Condition scale used in this report. After Van de Noort et al. (1995, table 15.1)

Condition score		Museum conservation	Technology analysis	Woodland management	Dendro potential	Identification to taxa
5	excellent	yes	yes	yes	yes	yes
4	good	no	yes	yes	yes	yes
3	moderate	no	yes / no	yes	yes	yes
2	poor	no	yes / no	yes / no	yes / no	yes
1	very poor	no	no	no	no	yes / no
0	non- viable	no	no	no	no	no

Although the material remains surprisingly fibrous and hard given its antiquity, the surfaces (with the exception of post-depositional breaks) are all heavily eroded to the extent that almost no sapwood remains. As such it is thought that the erosion has removed all the original surfaces and the wood is therefore scored as 2 (poor, see Table 4). This is below the threshold for reliable survival of woodworking evidence, although some woodworking evidence may remain. Material that scores 2 will be suitable for species identification. The form of the item will probably be visible, and the conversion may be apparent, but it is unlikely that clear tool faceting will be visible.

Table 4: Condition of material

Condition score	Frequency	%
5 / excellent	0	0.0
4 / good	0	0.0
3 / moderate	0	0.0
2 / poor	5	100.0
1 / very poor	0	0.0
0 / non-viable	0	0.0
total	*5*	*100.0*

The wood displays mechanical damage caused by at least two different marine animals. Circular holes between 10 and 25 mm in diameter that travel vertically into the wood from the surface are thought to have been caused by piddock (*Pholadidae*). Smaller (*c.* 1–2mm)

circular holes seen boring into the wood at various angles, similar in appearance to woodworm holes, are thought to be the result of gribble (*Limnoriidae*).

Range and variation

All five items are classed as timber (Table 5) and there is a notable lack of woodworking debris in the form of either wood chips or off-cuts.

Table 5: Wood records by category

Category	Frequency	%
artefact	0	0.0
timber	5	100.0
timber debris	0	0.0
roundwood	0	0.0
roundwood debris	0	0.0
debris	0	0.0
unknown	0	0.0
total	*5*	*100.0*

Item T1

Substantial oak timber describing a tree trunk with three side branches growing perpendicular to the axis of the tree. Where visible the growth rings describe a slow-grown item with widths of *c.* 1mm. What is assumed to be the upper surface in the ground has frequent piddock holes.

The flow of the grain around the side branches and the reconstructed original diameters of the main trunk have allowed the proximal end to be identified (Fig. 5). The proximal end has snapped, with the sharp features present suggesting at least the centre of this break occurred relatively recently. At this point the trunk is approximately half split with the conversion running along this plane for much of the length of the item. All the surfaces are eroded by water action but the split surface of this conversion is less eroded than the surrounding material. This suggests that the conversion occurred after the water wear had commenced, presumably post-deposition. This is further evidenced by the piddock holes truncated by this conversion. The same is true of the major side branch 1 (Fig. 5), which extends for some 1450mm and is fragmented and half split at the distal end. The split surface here appears even fresher with little water wear. This is again assumed to have occurred post-depositionally and is again supported by the truncated piddock holes (Fig. 5). Much of the sapwood is absent and is assumed to have been eroded away. Some sapwood survives around the major side branch 1, on the underside of the timber. Side branch 2 is degraded away as is the slightly protruding side branch 3. A burr lies between

the two. All are extremely unusual in that they extend perpendicular to the axis of the trunk. The distal end, although eroded and degraded, is somewhat angular and although no evidence of faceting remains, this shape would be typical of a trimmed end

Three areas of linear marks or striations were recorded around side branch 1, all of which are heavily eroded or worn and are arranged broadly perpendicular to the axis of the tree (Fig. 5). Given that these marks appear in the heartwood of the timber, it is suggested that they represent post-depositional damage. The timber measures 4550 × 235 × 195mm

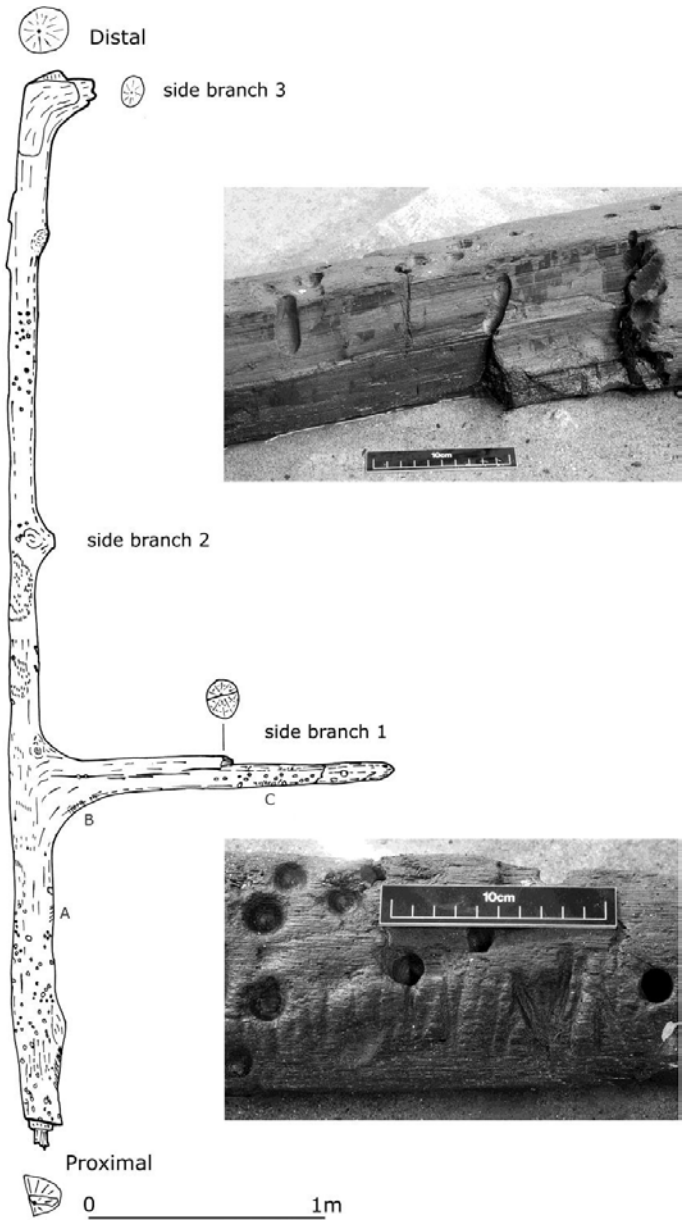

Figure 5: Item T1. Inset (top) shows piddock holes on split face of side branch 1 and inset (bottom) illustrates striations at C (© Michael Bamforth)

Item T2

Oak timber with a slight curve and off-centre pith, suggesting this may be a side branch (Fig. 6). Both ends have degraded / eroded away and all surfaces are heavily eroded with no sapwood remaining. The timber displays moderate gribble damage. The proximal end may be torn and there are concretions present around the stub of a possible side branch. The timber measures 1850 × 120 × 110mm.

Figure 6: Item T2 (scale 100mm) (© Michael Bamforth)

Item T3

Slow grown oak timber (Fig. 7). Both ends have degraded / eroded away. There is moderate gribble and piddock damage. The majority of the surfaces are heavily eroded with no sapwood remaining. However, the item is half split and the split surface is less eroded, suggesting this conversion has occurred post-depositionally. The item has an original diameter of over 130mm and although no mechanical refit could be achieved, is of a suitable size to have perhaps formed part of the trunk of T1. The item measures 1460 × 130 × 120mm.

Figure 7: Item T3 (scale 100mm) (© Michael Bamforth)

Item T4

Oak timber, the slight curve of which suggests this may be a side branch (Fig. 8). Both ends have degraded / eroded away and all surfaces are heavily eroded with no sapwood remaining. The timber displays frequent gribble damage and occasional piddock damage.

The item is converted into a modified radial quarter split from a log with an original diameter of over 200 mm. The item measures 798 × 119 × 112mm.

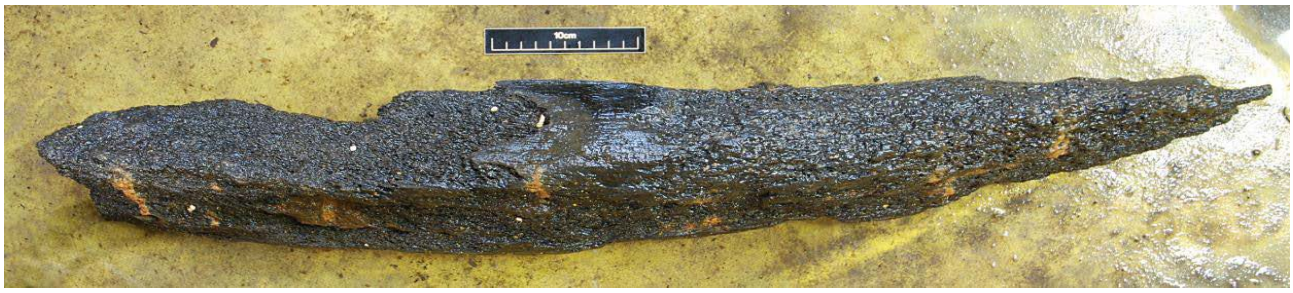

Figure 8: Item T4 (scale 100mm) (© Michael Bamforth)

Item T5

Very slow grown oak timber (Fig. 9). Both ends have degraded / eroded away and one end is fragmented and only partially reconstructible. There is frequent piddock damage. Most of the surfaces are heavily eroded with no sapwood remaining. However, the item is half split and the split surface is less eroded, suggesting this conversion has occurred post-depositionally. The timber has an original diameter of over 120mm and although no mechanical refit could be achieved, is of a suitable size to have perhaps formed part of side branch 1 of T1. The item measures 680 × 120 × 55mm.

Figure 9: Item T5 (scale 100mm) (© Michael Bamforth)

Summary

Woodworking technology

There is no definitive evidence for woodworking displayed on any of the timbers. Differential erosion of the split surfaces strongly suggests that the conversions seen on items T1, T3, T4 and T5 occurred post-depositionally. Similarly, the striations or marks noted on item T1 are also thought to relate to post-depositional damage, as they appear in the heartwood on a heavily water-worn and eroded surface. Finally, the angular distal end of item T1 may represent a trimmed end, but the worn and eroded surface prevents any firm conclusions. On the balance of evidence, it is likely that the timbers are all naturally

accumulated debris and that the surface marks and conversions recorded are the result of natural, post-depositional processes.

Neolithic boats in the UK are limited to hollowed-out log boats, which are known from the 4th millennium cal BC (McGrail 2014). Composite boats of the stitched plank type are known in the UK from the Bronze Age, but the timbers considered herein are of an unsuitable size and conversion to have formed part of such a craft (McGrail 2014).

Woodland reconstruction and species identification

Oak is the only taxa represented. Oak grows in stands and mixed woodland and will also tolerate damp soils (Gale and Cutler 2000) and would have been found growing in all regions of England in the Neolithic period. Oak occurs ubiquitously throughout the prehistoric and historic period as an excellent hardwearing structural timber that has incredibly wide-ranging uses (Gale and Cutler 2000).

Decay analysis

Unless the burial environment that has preserved the material is thought to be under threat, it does not seem necessary to carry out a programme of decay analysis on the assemblage to secure baseline data for the preservation of the waterlogged wood.

Conservation and retention

None of the material is of sufficient interest to warrant conservation and retention

Waterlogged Wood Assessment (ii)

Introduction

On 18th September 2017 Steve Allen (YAT) undertook a visual examination, recording and assessment of the significance of the timber, carried out in accordance with CIfA *Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials* (CIfA 2014). In order to not prejudice the assessment, the then known age of the timber was not communicated.

Methodology

The timber was flat in a just drained storage tank in a well-lit area. It was possible to flip the timber over to examine the lower face without endangering the artefact or requiring lifting equipment. The surfaces were relatively clean and free of sand and other burial deposits. No significant concretions were observed that might obscure the surface.

The upper face as seen was examined and recorded by means of written notes and a measured sketch. The timber was then rotated over its long axis to examine the reverse face.

The timber has evidently been preserved through burial in an anoxic waterlogged environment, largely preserving the form of the object but softening and weakening the wood structure. All surfaces were significantly eroded and one face (the upper face as initially seen) had been badly damaged by worm action (the term used in this report to describe where the wood has been eaten away by colonising invertebrates).

Description

The timber (T1) is a length of oak (*Quercus spp.)* derived from the trunk or main stem of a large tree and has an apparently quartered conversion. Several side branches are present, most of which are reduced to irregular stumps apart from one which forms a perpendicular extension from the main stem. The end of this side branch has been broken away across a major area of worm damage but is refitting. There are several knots present along the length of the timber. One end terminates in a side branch stump, the other end has been recently sampled for radiocarbon dating. Some areas of sapwood are present particularly on the main stem around the side branch stumps but there is no bark. There are no cut joints, fixings or fittings present. Apart from the marks made during the recovery and sampling of the timber there are no surviving toolmarks.

The surfaces of the timber are generally undulating, following the natural pattern of the wood grain. Localised scouring is present where parts of the surface have been differentially exposed to water action. The upper face as stored has multiple worm holes between 10 and 30mm in diameter, piercing its surface, some of which are relatively fresh and others which are partially eroded out. The long 'straight' edge of the timber (ie the opposite edge to that with side branches present) exhibits damage consistent with the timber having being split and torn from the parent tree. This edge truncates several worm holes in section.

Overall dimensions: Length 4.53m, cross section at thickest point 169mm (wide), 132mm (thick). Perpendicular branch extends 1.48m from edge of main stem at the mid-point is 162mm (wide), 120mm (thick).

Assessment

The timber is oak (*Quercus spp.*) which is a tree species native to north-west Europe and the British Isles. Its current appearance suggests it was originally much more complete and has been torn away from the rest of the trunk. This torn surface bisects several worm holes which is strongly indicative that worm damage began on this timber when it was much more complete - nearer to being a length of roundwood, than the current apparently quartered conversion.

No toolmarks are present other than those created during the sampling of the timber for radiocarbon dating. If this piece had been shaped deliberately there is now no surviving evidence.

The overall shape might at first glance suggest it had formed part of a structure. However, if that were the case, then some evidence of deep cut joints should have survived and it would be remarkable that no peg or nail holes, with or without peg stumps or corrosion products from nail shanks, are present. The stumps of the side branches are not flush with the adjacent timber surface and indeed protrude both above and to the side of the adjacent faces. There is no evidence for any attempt to trim or reduce these irregularities. There is no evidence that this timber ever formed part of a structure.

The assessment therefore concludes that this timber is part of a tree that has lain flat on the seabed and been intermittently exposed to marine borers. The original tree trunk has split along the grain; this portion has been torn away from the rest of the trunk and has survived to be washed ashore from its burial spot. In the absence of independent dating it is suggested that this is a piece of a tree derived from a submerged woodland which has been intermittently exposed by water action and has finally been redeposited following

recent storm activity. As such it is indicative of a submerged, possibly prehistoric, landscape off the Lincolnshire coast which is undergoing active erosion.

Recommendations

Unless there is an unforeseen need arising from the result of the radiocarbon dating programme to conduct further sampling, draw or conserve this timber for display in a local museum, it is recommended that the timber is discarded.

Conclusions

The timbers recovered on the Lincolnshire coast at Moggs Eye, Anderby Creek, East Lindsey do not derive from an early medieval boat but from natural woodland that was growing at the beginning of the fourth millennium cal BC. The work highlights the importance of undertaking specialist assessment of finds rather than relying on apparent visual similarities to images obtained from the information superhighway.

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