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GLASTONBURY LAKE VILLAGE
GODNEY
SOMERSET

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SUMMARY
During excavations at Glastonbury Lake Village in 2014, samples of the waterlogged wood and peat deposits were recovered. This report presents the results of the wood recording (including identifications, ring counts, season of felling, and amount of compression) carried out on the wood samples taken from a range of contexts associated with settlement mounds and palisade features, and a wood reburial site. Much of the material was compressed to some degree, which, together with poor preservation sometimes made wood identifications difficult or impossible. Of the seven wood types identified, *Alnus* (alder) and *Populus/Salix* (poplar/willow) dominate and were probably locally-sourced.

CONTRIBUTORS
The bulk of the wood identification and recording work was carried out by Zoë Hazell, with supplementary work by Dana Challinor. Some additional wood identification results included here were undertaken by Richard Brunning and Nigel Nayling.

ACKNOWLEDGEMENTS
Thanks to Richard Brunning (South West Heritage Trust) for his help and advice, for his comments on earlier drafts of this report and for supplying Figure 1. Thanks too to Gill Campbell (Historic England) for comments on the final draft.

ARCHIVE LOCATION
As of November 2017, the samples analysed by Z Hazell are in cold storage at Fort Cumberland (except those already returned to R Brunning for decay analysis). The remainder are to be returned to the South West Heritage Trust in due course.

DATE OF RESEARCH
2015

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Cover image: Looking north across the site of Glastonbury Lake Village towards the July 2014 excavations. Remains of the Iron Age hut sites are visible as low, grassy mounds. Photo: Z. Hazell © Historic England.

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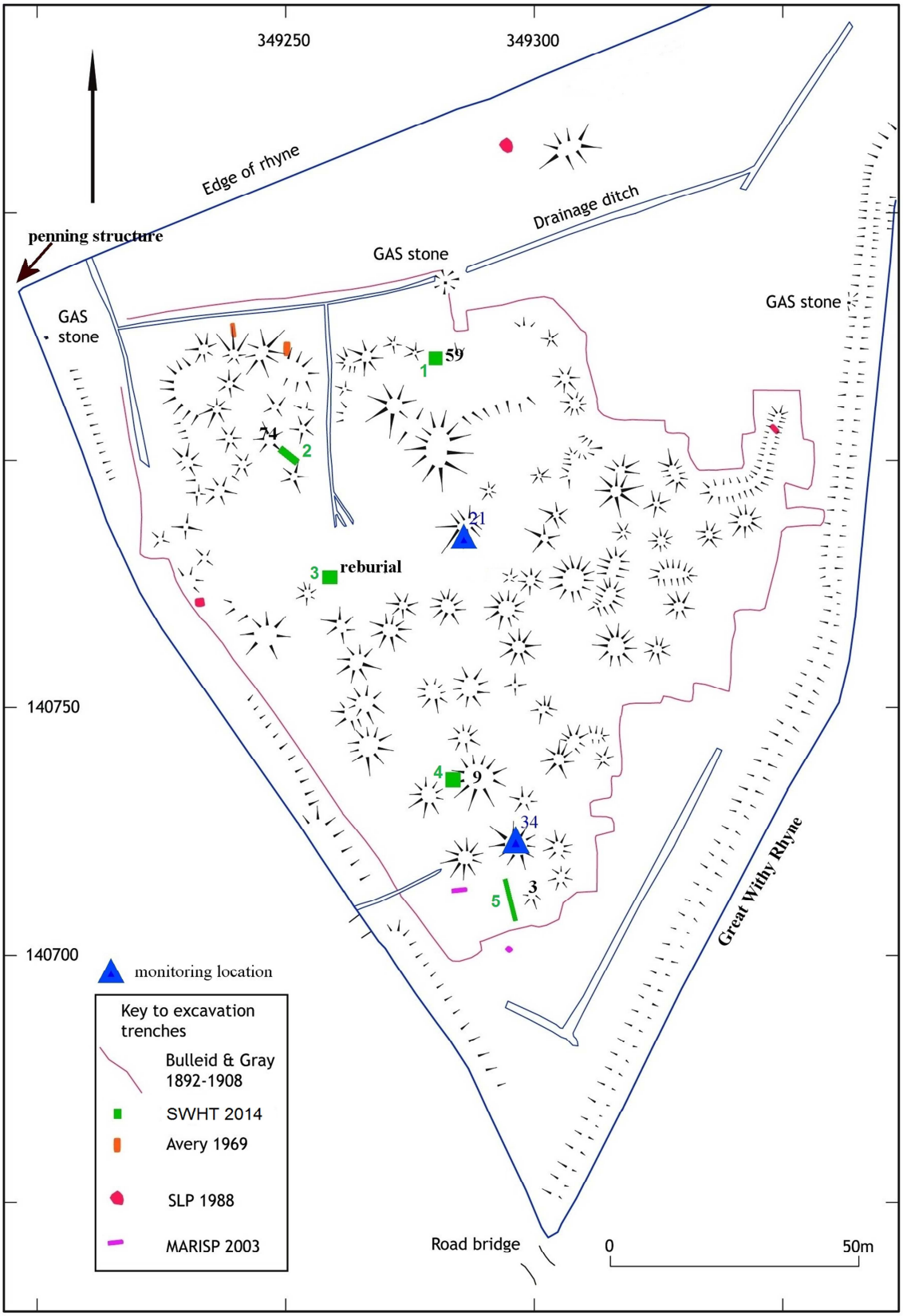
1 INTRODUCTION

In the late 1800s-early 1900s the Iron Age site Glastonbury Lake Village, Godney, Somerset (Scheduled Monument 406) was subjected to extensive excavations by Bulleid and Gray (1911, 1917). This was followed more recently in 1984 by Coles et al (1988), and then in the summer of 2014 when excavations led by R. Brunning (South West Heritage Trust ref. 71/2014; Historic England ref. Pr6989) were carried out in order to i) assess the condition of the *in situ* archaeological remains, ii) derive a more-detailed chronology and iii) to initiate longterm hydrological monitoring. As part of this most-recent work, a series of waterlogged wood samples were taken for wood identifications, condition assessment, dendrochronology and radiocarbon dating. Over 300 samples were recovered from the trenches that targeted settlement mounds and palisade features, as well as a wood reburial site where Bulleid and Gray had reburied timbers from their excavations. See Figure 1 for a site map showing the locations of the five 2014 trenches.

Figure 1. Site map showing the location of excavations at the site. Image courtesy of R. Brunning (South West Heritage Trust).



2 WATERLOGGED WOOD RECORDING

The majority of the wood fragments sampled were recorded and identified by Z. Hazell (ZH) with additional identifications carried out by D. Challinor (DC), and R. Brunning (RB) and/or N. Nayling (NN). Where the methods differed slightly between analysts, this has been explained in the following text, as necessary.

2.1 Methods

Perpendicular (maximum and minimum) dimensions of the fragments were measured using either Mitutoyo CD-8”CW digital callipers (mms; 2dps) (ZH) or manual callipers (mms; to the nearest mm) (DC). Where the fragments are complete roundwood cross-sections, this allows the amount of compression of the wood remains to be calculated. If a fragment had very different amounts of compression at each end, then two sets of measurements were taken (one at each end) (ZH).

The cross-section of each sample was cleaned and examined under low-power, light incident microscopes (a combination of Leica MZ95 and MS5 (ZH) and Meiji EMZ-2 (DC)). This was to record:

- whether it was a complete, roundwood cross-section (with/without bark),
- the presence/absence of any bark,
- the presence/absence of the pith (and record its shape, if distinctive),
- measure the total width of the rings (where possible, this was the radius from the pith to the bark-xylem boundary (where the bark was present)),
- the number of growth rings,
- any evidence of working, and
- any evidence of degradation (eg radial splits, insect damage, degree of decomposition).

For each sample, thin-sections of the wood were made by hand using a double-edged razor blade, along each of the three planes of identification (TS = transverse section, TLS = tangential longitudinal section and RS = radial section). The thin-sections were mounted in water under cover-slips on glass slides, and examined under high-power, light transmitting microscopes (Leica DM2500 (ZH) and Meiji ML8530(DC)) between magnifications of x100 to x400.

Where bark was present, a thin-section of the outer rings as seen on the TS plane was taken in order to try and see at what point through the plant’s growth cycle it was felled (ie if earlywood and/or latewood vessels were present). Sometimes, if the wood was degrading at the bark contact, it was not possible to produce a thin section. Often it was not possible to determine what stage/s of growth were present in the outer most ring, such as: i) when the wood was severely compressed, ii) the bark had detached slightly allowing degradation of the outermost edge of wood, or iii) the outer ring was extremely narrow. Given

that this characteristic depends on identifying the presence/absence of earlywood and latewood vessels, it was not possible to do this on samples for which the wood identifications were 'Indeterminate'. Those fragments with only larger earlywood pores have been classed as Spring/Summer, and those with at least some smaller vessels visible have been categorised as Autumn/Winter felling – however, it should be noted that it is not possible to be sure that the latewood growth is complete.

Average ring widths were calculated for wood fragments where the complete radius (ie pith to xylem-bark boundary) was present, and was measured. This was not done on samples that could not be identified (ie on the 'Indeterminate' category). On some samples, both maximum and minimum radial measurements were recorded, and the mean of the two values was used for calculations (ZH). For samples where the radius was not measured separately, an approximation was calculated from an average of the two diameter measurements (DC).

2.1.1 Identifications

Wood taxonomy identifications followed the descriptions/keys in Schweingruber (1982), Gale and Cutler (2000) and Hather (2000). It was not uncommon that wood samples could not be identified due to them having been greatly compressed and/or degraded, resulting in diagnostic features not being preserved.

Where samples were identifiable to some level (if not genus, then to family) the following types were found:

Betulaceae: this refers to the Birch Family, which includes *Betula* (birch), *Alnus* (alder), *Corylus* (hazel) and *Carpinus* (hornbeam). Samples that looked as though they had a Betulaceae-like vessel pattern in the TS, but could not be identified to species level, are listed as Betulaceae. Often, the compression of the wood meant that vessel patterns and the presence/absence of aggregate rays could not be determined confidently. Depending on the selection of taxonomic features visible, it was possible to narrow down some identifications to: **Betulaceae group 1** (the presence of narrowly-spaced bars of the scalariform perforation plates suggesting either *Alnus* or *Betula*) and **Betulaceae group 2** (the presence of aggregate rays (but no scalariform plates seen/preserved) indicating either *Alnus, Corylus* or *Carpinus*[1]). Where sufficient features *were* present, the following two genera were identified:

- ***Alnus* sp.** (alder) (Betulaceae): is diffuse to semi-ring porous, with radial chains of vessels. It has uniseriate rays, but with biseriate rays within its aggregate rays, and scalariform perforation plates (10-20, narrowly spaced bars). Where preserved, the medium-sized vessel pits can help with identifications, particularly if other diagnostic features are

[1] No distinction was made here on the basis of spiral thickenings, although in principle, where preserved, the presence of spiral thickenings could be used to positively identify *Carpinus*.

not observed. At this site, a Y-shaped pith was commonly associated with *Alnus* remains (ZH).

- ***Betula* sp.** (birch) (Betulaceae): is diffuse to semi-ring porous, with radial chains of vessels. It has rays 2-4 cells wide, no aggregate rays[2], and scalariform perforation plates (10-15 narrowly-spaced bars). Where preserved, the tiny-sized vessel pits can help with identifications, particularly if other diagnostic features are not observed.

In some cases, *Alnus* could be differentiated from *Corylus* by the presence of long perforation plates. Where the characteristic aggregate rays were not visible (which may lead to confusion with *Betula*) *Alnus* was confirmed by the presence of long radial files, dominance of uniseriate rays and the absence of the diagnostic inter-ray vessel pitting of *Betula*.

***Fraxinus* sp.** (ash) (Oleaceae): this wood is identified by the combination of: ring porous vessel structure, with radially-paired vessels in the early and latewood. It has rays 2-3 cells wide, and simple perforation plates.

***Populus*/*Salix* sp.** (poplar/willow) (Salicaceae): it is not possible to reliably distinguish these two taxa on the basis of their anatomical features. The character of this wood is diffuse porous (solitary vessels and short radial chains of 2-3 vessels), with uniseriate rays, simple perforation plates and large, polygonal vessel pits. In the case of the wood chips (DC), the rays were recorded as predominantly homogenous, which is sometimes considered a characteristic of poplar. However, this distinction is not always considered reliable (Gale and Cutler 2000, pp. 193 and 241).

***Prunus* sp.** (cherries, plums etc.) (Rosaceae): the diagnostic features used to identify this wood are: semi-ring to diffuse porous vessel patterning, simple perforation plates, rays greater than three cells wide, and distinctive spiral thickenings. Distinguishing between the native *Prunus* species is not always straightforward. For Sample 131 (DC), the rays did not seem large enough (mostly ≤4 seriate) for *P. spinosa* (blackthorn), and *P. padus* (bird cherry) has a more northern native distribution. However, the condition of the specimen was not good enough to make a confident identification of *P. avium* (wild cherry).

***Quercus* sp.** (oak) (Fagaceae): this wood was identified by: the ring porous (earlywood) vessel pattern, with a flame-like pattern of the smaller, latewood vessels, together with the occurrence of uniseriate and wide, multiseriate rays, and simple perforation plates.

[2] Schweingruber (1990: 217) observed that aggregate rays can occur 'very rarely' in *B. pendula* and *B. pubescens* (and *B. aetnensis* – not native to the B Isles), although indistinct. He noted too that distinct aggregate rays can occur in *B. humilis* (shrubby birch) and that this feature was a distinguishing feature between that and *B. nana* (dwarf birch) (Schweingruber (1990: 219). Fortunately, neither of those two is native to SW England, with *B. humulis* not present in the British Isles.

***Rhamnus* sp.** (Rhamnaceae): this has a very distinctive, diffuse porous, flame-like vessel patterning throughout a growth ring. The rays are 2-3 cells wide, and the vessels have simple perforation plates and spiral thickenings.

2.1.2 Taxa

Plant taxonomy and floral statuses follow Stace (2010).

- ***Alnus* sp.** (alder) (Betulaceae): the only native species is *A. glutinosa* (alder).

- ***Betula* sp.** (birch) (Betulaceae): there are three native species – *B. pendula* (silver birch), *B. pubescens* (downy birch) (although hybrids also occur) and *B. nana* (dwarf birch). *B. nana* is unlikely as it is found in more upland moor and bog areas, limited to northern England and parts of mainland Scotland.

- ***Fraxinus* sp.** (ash) (Oleaceae): the only native ash is *F. excelsior* (ash).

- ***Populus*/*Salix* sp.** (poplar/willow) (Salicaceae): the native poplars are *P. tremula* (aspen) and *P. nigra* ssp *betulifolia* (black-poplar). The willow genus is more complex (with many hybrids); the native ones most commonly associated with damp/wet conditions are: *S. fragilis* var. *fragilis* (crack willow)[3], *S. pentandra* (bay willow), *S. x meyeriana* (shiny-leaved willow), *S. purpurea* (purple willow), *S. calodendron* (holme willow), *S. x stipularis* (eared osier), *S. caprea* (goat willow), *S. cinerea* (grey willow), *S. myrsinfolia* (dark-leaved willow) and *S. repens* (creeping willow). The absence of *Populus* and the presence of *Salix* in the pollen record (Fyfe and Perez, 2015) suggest that the wood type here is probably that of *Salix*, rather than *Populus*.

- ***Prunus sp.*** (cherries, plums etc) (Rosaceae): as well as the native *P. avium* (wild cherry) this family includes the native *P. spinosa* (blackthorn) and *P. padus* (bird cherry).

- ***Quercus* sp.** (oak) (Fagaceae): due to the presence of the flame-like latewood vessel patterning, it was possible to say that the *Quercus* sp (Fagaceae family) was a deciduous taxon, and within the British Isles, this includes only *Q. robur* (pedunculate oak) and *Q. petraea* (sessile oak) (Gale and Cutler 2000: 204).

- ***Rhamnus* sp.** (Rhamnaceae): the only species native to the British Isles is *R. cathartica* (buckthorn).

[3] This variant is classed under *S.* x *fragilis* (hybrid crack willow); whilst the other variants are thought to be archaeophytes, S. *fragilis* var. *fragilis* is the only hybrid that "could be native in S[outh] Br[itain]" (Stace, 2010: 323).

3 RESULTS AND DISCUSSION

In total 248 fragments were examined and recorded by ZH, 53 by DC, and 24 by RB/NN (totalling 325, including a few duplicates). A table of the full results is presented in Appendix 1, but the results are summarised in Table 1 and in Figure 2 (without duplicates)[4].

3.1 Wood identifications

Seven taxa (or taxa types) were identified, all of which are hardwoods: *Alnus*, *Betula*, *Fraxinus*, *Populus/Salix*, *Prunus*, *Quercus* and *Rhamnus*. In addition, undifferentiated Betulaceae and unidentifiable ('Indeterminate') wood types were present. Samples were dominated by (cf) *Alnus* and (cf) *Populus/Salix* types, with fewer occurrences of *Betula, Fraxinus, Prunus, Quercus* and *Rhamnus*. *Alnus* was present in 22 of the 29 Structural Groups (SGs) and *Populus/Salix* in 23. All the remaining wood types (excluding the Betulaceae and Indeterminate groups) are present in only two or three of the 29 SGs.

Of the less common wood types recovered:

- *Fraxinus* was recovered only from the reburied/backfill material (Trench 3) of Bulleid and Gray's original excavation, so its provenance is unknown;

- most of the *Quercus* remains derived from the backfill material (Trench 3), but those that were from *in situ* features were from SG2 (the palisade main line), SG10 (oak posts associated with oak beam south of mound 74), SG15 (stake cluster north of doorway), SG16 (stake cluster south of doorway), SG29 (collapsed birch [sic] palisade and associated woven elements) and SG30 (horizontal material between central and southern palisades over 29 – top layer);

- a single *Prunus* fragment each was identified from both SG14 (the eastern stake line) and SG25(from/associated with the large palisade at the northern end);

- *Rhamnus* was identified from SG2 (the palisade main line), SG21 (horizontal timbers and brushwood (beneath) at north end) and unknown affiliations in Trench 5;

- *Betula* remains were recovered from SG25 (from/associated with the large palisade at the northern end) and SG31 (horizontal material between central and southern palisades over SG29 – lower layer), as well as the backfill material (Trench 3).

[4] The wood identification results presented here include all the identifications available at the time of writing, from ZH, DC and RB/NN. All the other data presented (eg ring counts, felling season etc) are the results from ZH and DCs' analyses only.

The wood chip assemblage consists of only *Alnus* and *Populus/Salix*. This is not surprising, given the dominance of these two wood types at the site.

Preservation condition was variable at the site. Where it was not possible to identify wood types, this was due to:

- compression of the remains (many samples had been compressed into an oval cross-section, meaning that a lot of the wood features required for identification were distorted, and/or lost)

and/or

- degradation of features (diagnostic features – particularly perforation plates – were not always preserved).

Trenches 1 and 2 contained the highest proportions of 'Indeterminate' identifications, with up to half of the samples unidentifiable. This compared with just over 10% of those sampled from Trench 3 and Trench 4.

Table 1. Summary results table showing the taxa present in each structural group. Betulaceae group 1 = *Alnus/Betula* and Betulaceae group 2 = *Alnus/Corylus/Carpinus*. Number of taxa excludes Indeterminate category.

Trench number	Structural group	Structural group description	Taxa												
			Betulaceae family					Other wood types							
			(cf) *Alnus*	(cf) *Betula*	(cf) Betulaceae	Betulaceae group 1	Betulaceae group 2	*Fraxinus*	(cf) *Populus/Salix*	*Prunus*	*Quercus*	*Rhamnus*	Indeterminate	Number of taxa	Number of fragments
1	1	Mound 59 roundhouse wall							✓					1	4
	2/?2	Palisade main line	✓				✓		✓		✓	✓	✓	5	28
	3/?3	Palisade slightly to west	✓						✓				✓	2	6
	4	Horizontal wood in palisade area							✓				✓	1	13
	5	Small roundwood under palisade							✓				✓	1	4
2	7	Horizontal timbers of mound 74 first floor	✓			✓							✓	2	18
	8	Brushwood under mound 74 floor timbers											✓	0	1
	9	Wall line of mound 74 associated with first floor							✓				✓	1	10
	10	Oak posts associated with oak beam south of mound 74 removed by Bulleid and Gray									✓			1	3
3	Unassigned			✓				✓	✓		✓		✓	3	27

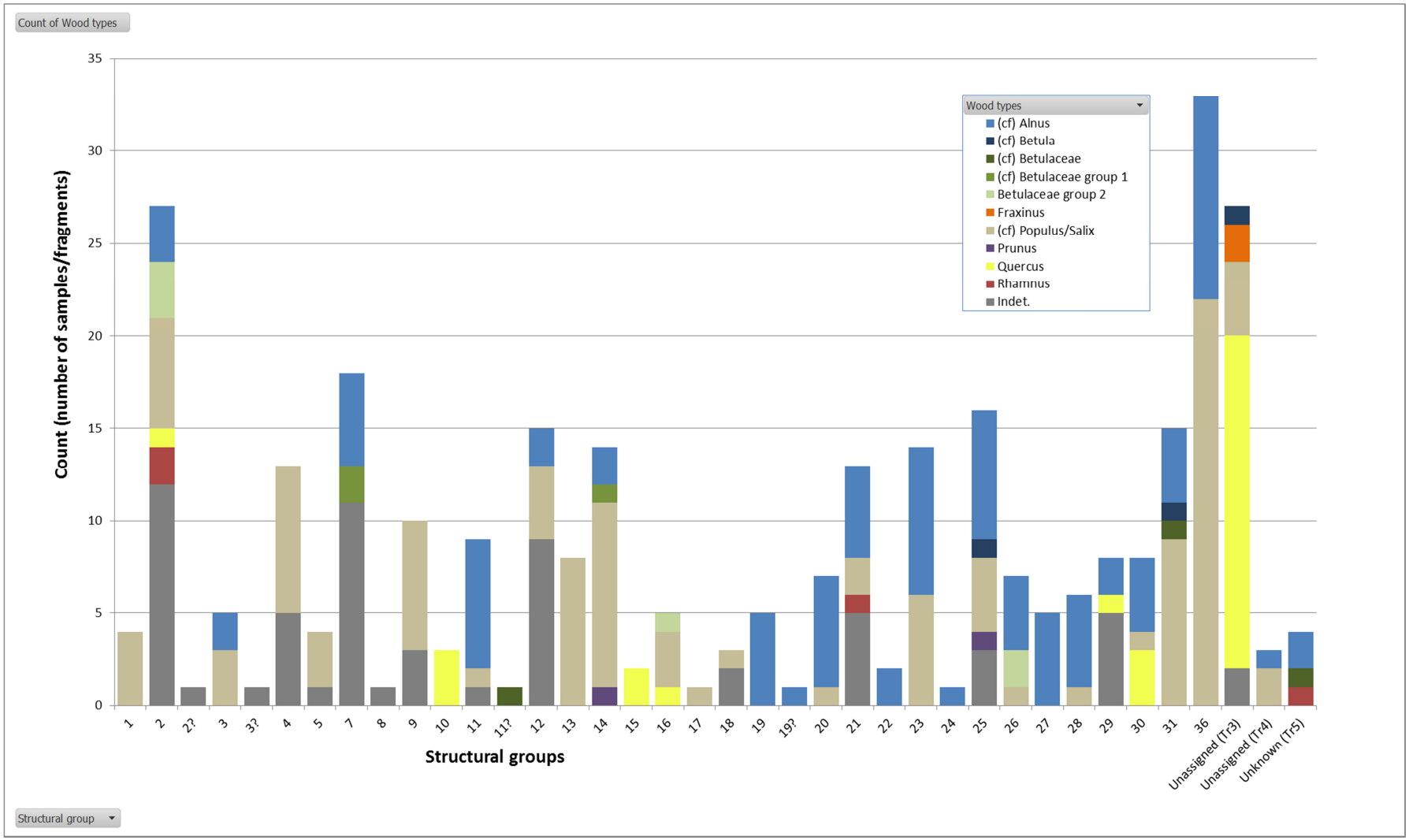
Trench number	Structural group	Structural group description	Taxa												Number of taxa	Number of fragments
			Betulaceae family					Other wood types								
			(cf) *Alnus*	(cf) *Betula*	(cf) Betulaceae	Betulaceae group 1	Betulaceae group 2	*Fraxinus*	(cf) *Populus/Salix*	*Prunus*	*Quercus*	*Rhamnus*	Indeterminate			
4	11/?11	Large horizontal timbers of first floor associated with early doorway	✓		✓				✓				✓		3	10
	12	Brushwood to west of 11 possibly associated with early doorway	✓						✓				✓		2	15
	13	Western stake line – possible walls of floors 2 and 4							✓						1	8
	14	Eastern stake line possibly associated with walls of floors 1, 5, 6 and 7	✓			✓			✓	✓					4	14
	15	Stake cluster north of doorway									✓				1	2
	16	Stake cluster south of doorway					✓		✓		✓				3	5
	17	Timbers west of mound 9							✓						1	1
	18	Stake in NE corner outside mound 9							✓				✓		1	3
	Unassigned		✓						✓						2	3
	Woodchip assemblage	Woodchip floor	✓						✓						2	33

Trench number	Structural group	Structural group description	Taxa											Number of taxa	Number of fragments
			Betulaceae family					Other wood types							
			(cf) *Alnus*	(cf) *Betula*	(cf) Betulaceae	Betulaceae group 1	Betulaceae group 2	*Fraxinus*	(cf) *Populus/Salix*	*Prunus*	*Quercus*	*Rhamnus*	Indeterminate		
5	19/?19	Northern most palisade line	✓											1	6
	20	2nd palisade line from north end	✓						✓					2	7
	21	Horizontal timbers and brushwood (beneath) at north end	✓						✓			✓	✓	3	13
	22	Stakes under brushwood of 21	✓											1	2
	23	Central palisade line retaining 21	✓						✓					2	14
	24	Isolated stake between central and southern palisades	✓											1	1
	25	Large palisade at northern end and associated horizontal timbers and brushwood	✓	✓					✓	✓			✓	4	16
	26	Palisade line north of 25	✓				✓		✓					3	7
	27	Palisade line north of 26	✓											1	5
	28	Palisade line north of 27	✓						✓					2	6
	29	Collapsed birch [sic] palisade and associated woven elements	✓								✓		✓	1	8

5 continues/...

Trench number	Structural group	Structural group description	Taxa												Number of taxa	Number of fragments
			Betulaceae family					Other wood types								
			(cf) *Alnus*	(cf) *Betula*	(cf) Betulaceae	Betulaceae group 1	Betulaceae group 2	*Fraxinus*	(cf) *Populus/Salix*	*Prunus*	*Quercus*	*Rhamnus*	Indeterminate			
.../5 continued	30	Horizontal material between central and southern palisades over 29 – top layer	✓						✓		✓				3	8
	31	Horizontal material between central and southern palisades over 29 – lower layer	✓	✓	✓				✓						4	15
	Unknown		✓		✓							✓			3	4
TOTALS		Number of contexts where taxon occurs	22	3	3	2	3	1	23	2	6	3	14			
		Number of individual fragments examined	94	3	3	3	6	2	112	2	29	4	62			**320**

Figure 2. Summary wood identification result (as counts), by structural group (n = 320).



3.2 Growth rings and measurements

Results relating to the number of growth rings and their widths are summarised in Table 2, and then presented in more detail below. Unless stated otherwise, the results are only those from fragments that had both the pith and the bark present ie from a complete radial section; no fragments of *Fraxinus* fitted that criterion.

Table 2. Summary growth ring data (counts and average ring widths) for samples where a complete radial section was present (ie where the pith and bark were present) (n = 103). [a] = amalgamated (cf) Betulaceae, Betulaceae group 1 and Betulaceae group 2, n/r = not relevant (where only one fragment was suitable, hence no average can be calculated).

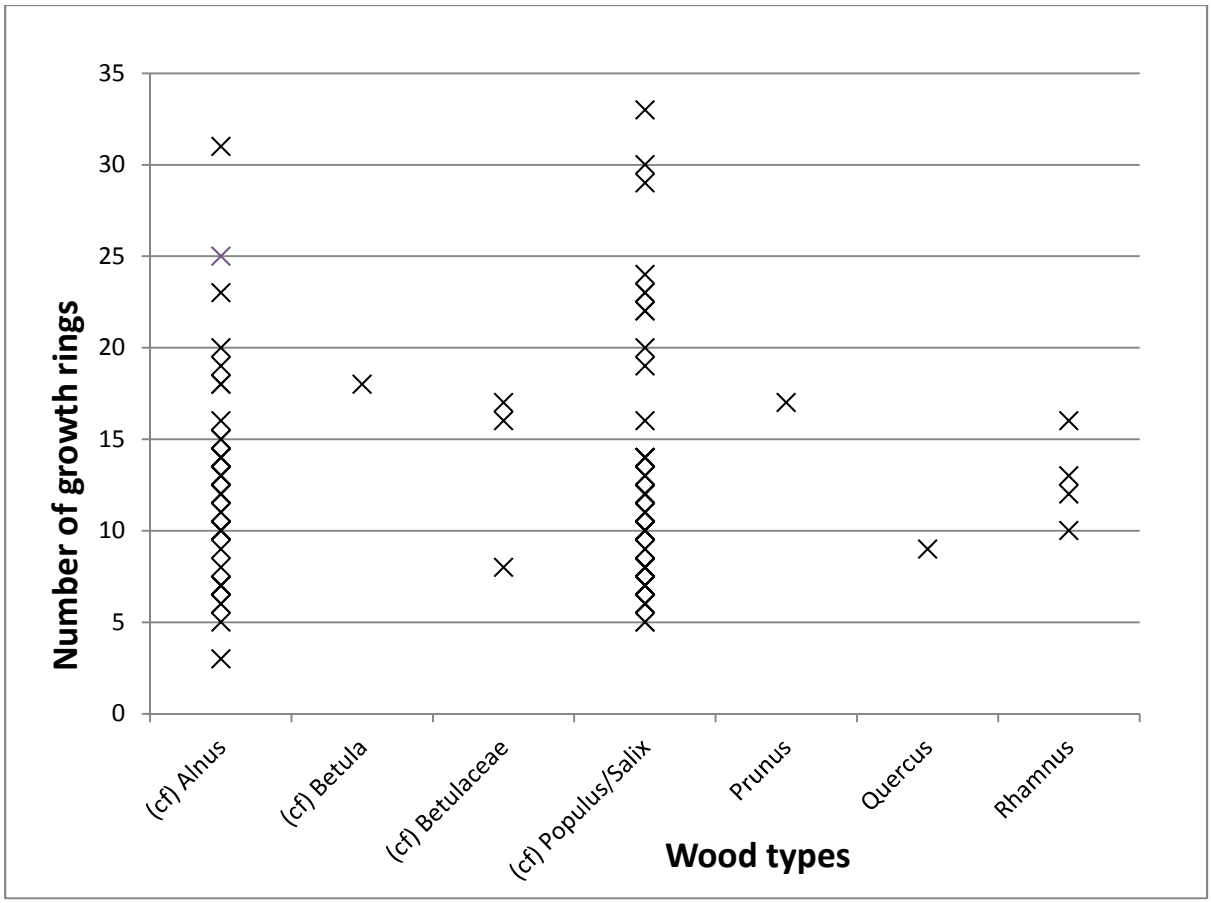
Wood types	**Number of samples (n)**	**Number of growth rings**			**Average ring width (mm)**			**Radius (mm)**		
		Min.	Max.	Av.	Min.	Max	Av.	Min.	Max.	Av.
(cf) *Alnus*	38	3	31	13	0.90	4.26	2.46	6.01	69.89	29.52
(cf) *Betula*	1	-	18	n/r	-	3.42	n/r	-	61.58	n/r
(cf) Betulaceae[a]	3	8	17	14	2.12	2.49	2.27	17.62	39.82	31.15
Fraxinus	0	-	-	-	-	-	-	-	-	-
(cf) *Populus/Salix*	55	5	33	12	0.42	4.45	1.75	4.16	61.20	20.22
Prunus	1	-	17	n/r	-	0.95	n/r	-	16.17	n/r
Quercus	1	-	9	n/r	-	3.07	n/r	-	27.59	n/r
Rhamnus	4	10	16	13	0.99	2.70	1.68	15.80	35.07	20.99

3.3 Number of growth rings

Figure 3 shows the count of the number of growth rings for each sample[5]. *Alnus* and *Populus/Salix* have the broadest spread of results (although they are by far the most abundant wood types of those remains sampled), with both tending to cluster between 5-15 total rings. Overall, for the assemblage as a whole, most results fall between 5-20 growth rings.

[5] In many cases, the growth ring counts were absolute counts. However, where growth rings were unclear, and final counts had a level of uncertainty (indicated by any of: ?, *c*, +, > or a range), these results have been simplified to a single number (in order to make calculations and/or plot results). Samples with a 'greater than' ring count will be a minimum number of rings.

Figure 3. Growth ring counts, for fragments with the bark and pith present (n = 103).



Because the results in Table 2 and Figure 3 only show those fragments with a complete radial section, it does not provide information on the maximum number of growth rings for samples that may have more rings, but are only partial remains; that information is presented in Table 3. It shows that the wood type with the most number of growth rings present in any fragment, is *Quercus*, which is not surprising given the long-lived characteristic of this wood type. *Alnus* has the next most number of rings in any sample, with 37.

Table 3. The maximum number of growth rings observed, irrespective of pith and bark presence, from all the samples recorded by ZH and DC (except the woodchips). * = amalgamated (cf) Betulaceae, Betulaceae group 1 and Betulaceae group 2.

Wood types	**Maximum number of growth rings**
(cf) *Alnus*	37
(cf) *Betula*	25
(cf) Betulaceae*	17
Fraxinus	25
(cf) *Populus/Salix*	33
Prunus	17
Quercus	45
Rhamnus	16

Figure 4 shows the radial measurements of the fragments (calculated as an average of multiple measurements made on single (compressed) fragments). All are under 70mm, which would equate to a maximum diameter of 140mm. *Alnus* and *Populus/Salix* have wide ranges, from *c* 5mm to 60/70mm. The *Populus/Salix* measurements cluster under 30mm, whereas the *Alnus* results may have two clusters, between c 17-26mm and c 38-50mm.

Figure 4. Radial distances, for fragments with bark and pith present (n = 103).

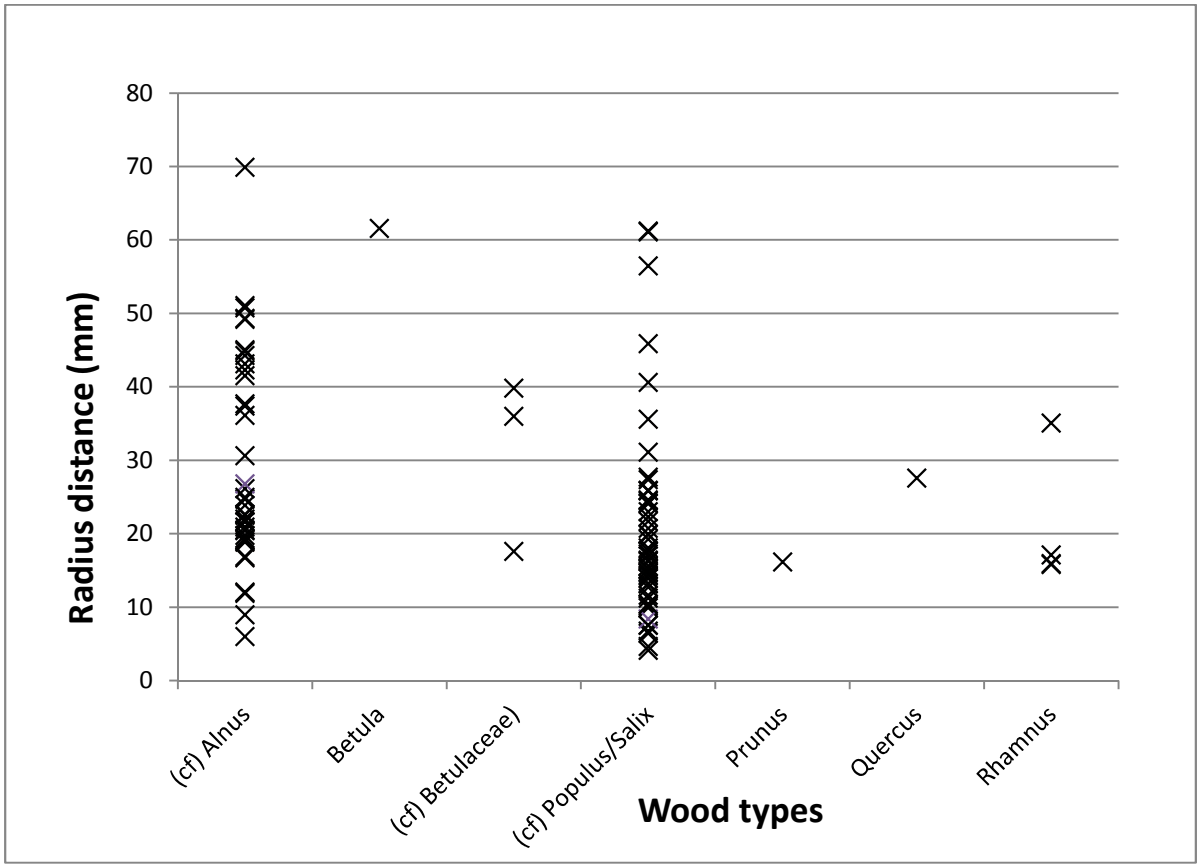


Figure 5 shows the average ring widths of the same 103 fragments, calculated from the previous measurements. Again, *Alnus* and *Populus/Salix* have the largest ranges, from *c* 1.0-4.5mm and 0.5-3.0mm, respectively. The remaining fragments are between *c* 1.0-3.5mm.

Figure 5. Average ring widths, calculated for fragments with bark and pith present (n = 103).

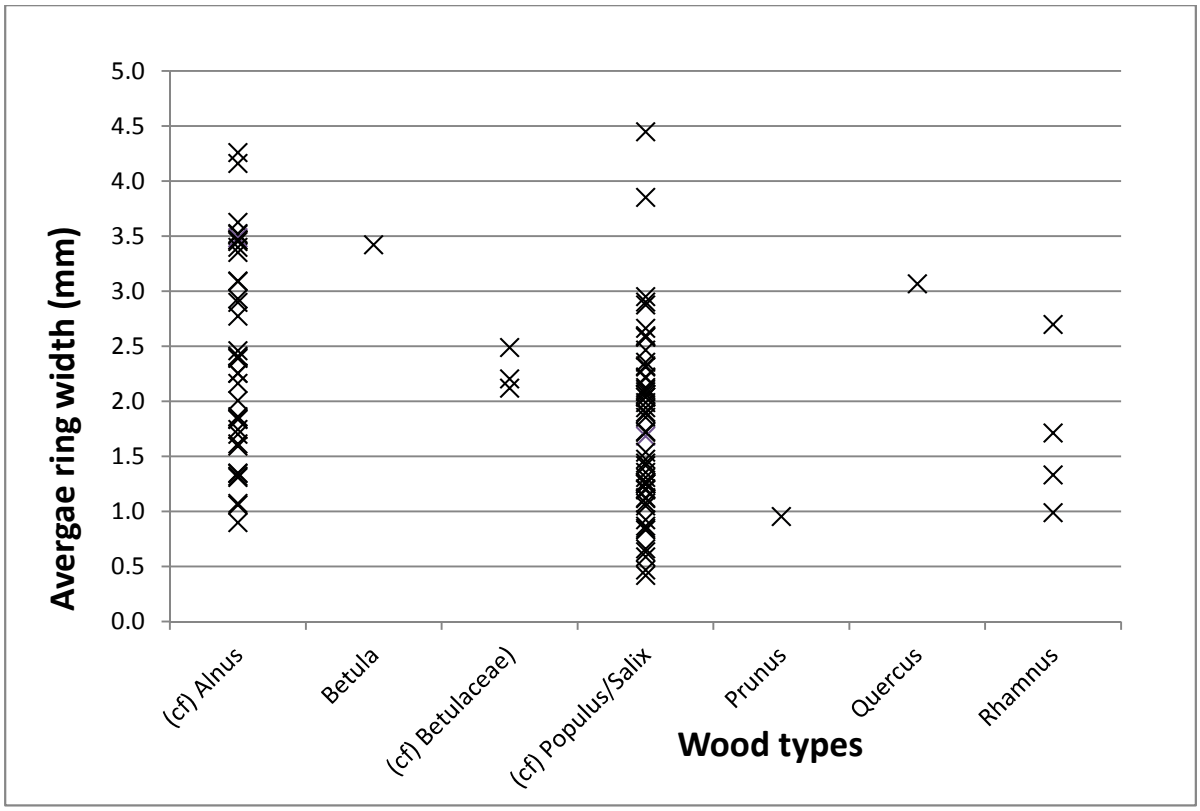
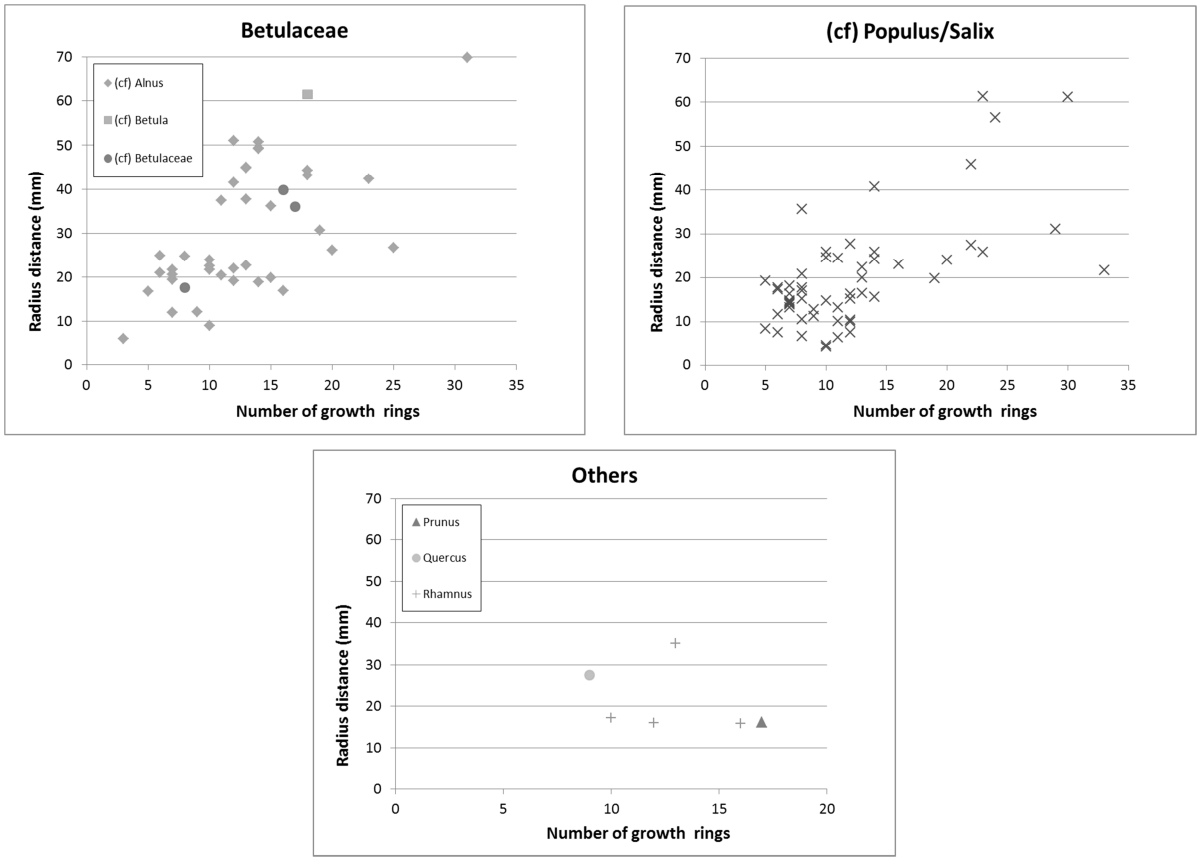


Figure 6 shows the graphs of growth rings and radial measurement. Overall there is a broad spread of measurements, not displaying patterns typically associated with coppicing. This would concur with Brunning (pers. comm.) who did not identify any morphological evidence of coppicing in the material during the excavation and sampling stages. However the data for the *Alnus* and *Populus/Salix* fragments do seem to demonstrate some degree of clustering, particularly those remains with fewer than 15 rings and less than 30mm radius (extrapolated as a roundwood diameter of up to 60mm).

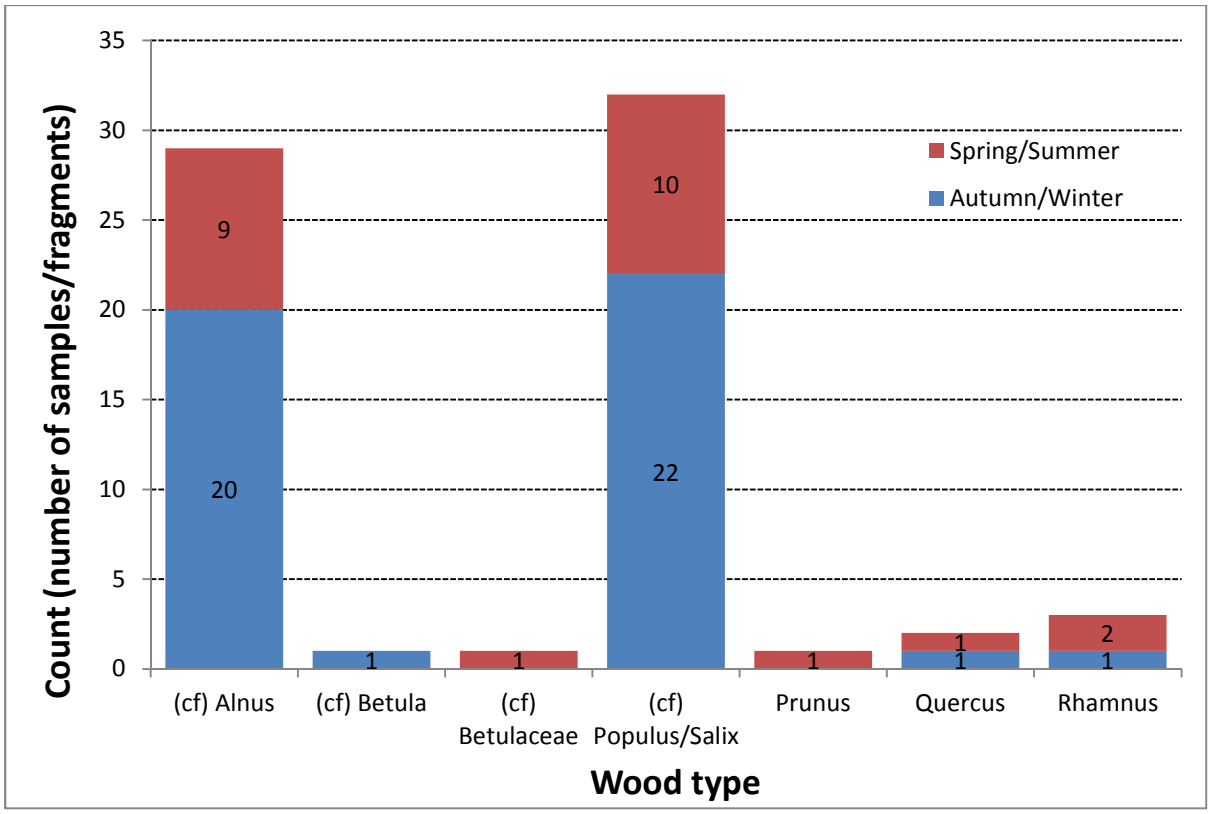
Figure 6. Growth ring counts radial distance, for fragments with bark and pith present (n = 103).



3.4 Season of felling

For the majority of the fragments, the season of felling could not be reliably determined due to a variety of the following reasons: absence of bark, degradation of the outer wood edge, compression of the wood, and/or the outer growth ring being too narrow. For some fragments, the data were not available. Figure 7 shows the results of the fragments which had an outermost growth ring suitable for determining the season of felling (based on the presence/absence of larger earlywood vessels and smaller latewood vessels). For both *Alnus* and *Populus/Salix* the majority were felled later in the growth year, when (at least some) latewood growth had occurred.

Figure 7. Felling season information, for samples that were identifiable, not including 'Indeterminate' felling season results.



3.5 Worked wood

In total, nine fragments showed indications of (possible?) cut surfaces. These were: 92, 166, 168, 170, 199, ?229, ?246, ?250 and ?300.

3.6 Insect degradation

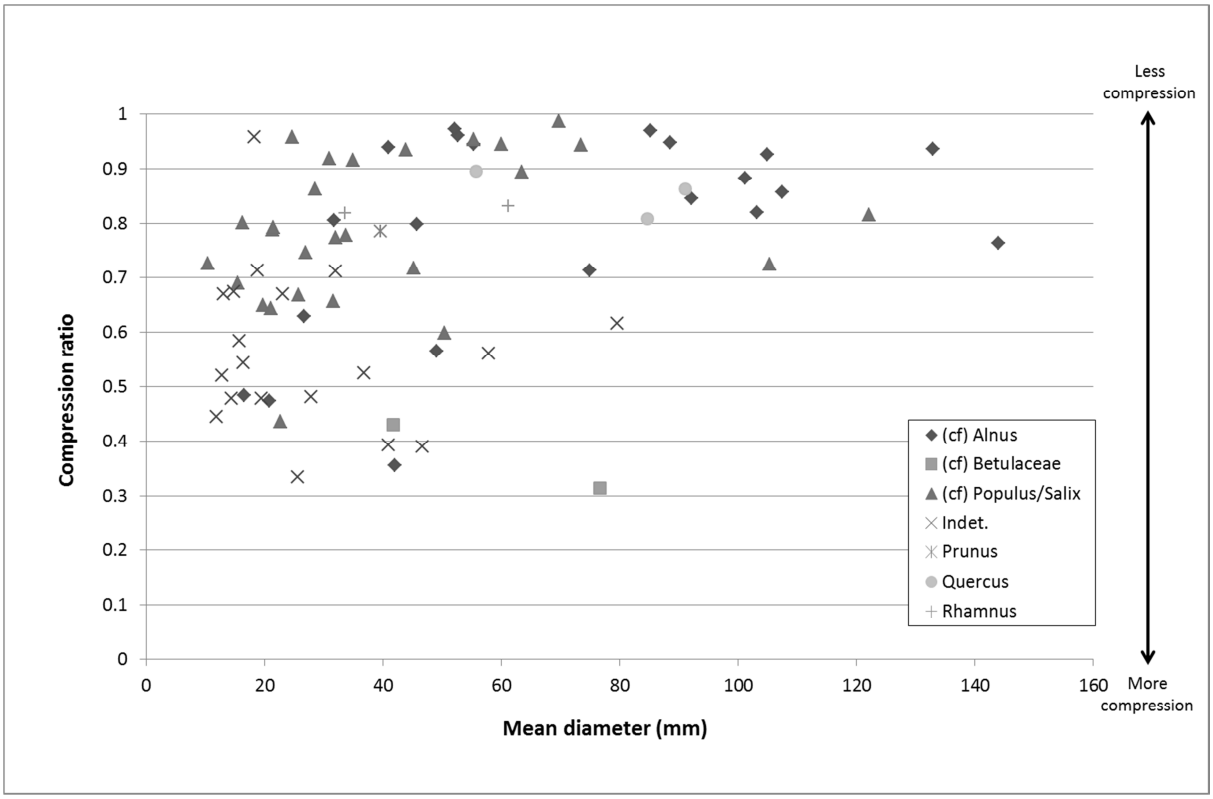
Three fragments showed evidence of degradation by beetles, in the form of their galleries within the wood. These fragments were: 199, 204a and 204b, all of which were remains of wood reburied by Bulleid and Gray, and recovered from Trench 3. The wood appears to be compressed, suggesting that identifying the beetle types may not be possible, as the shape and size of the galleries has been altered (less circular and more oval). It is not clear whether this damage was already present when the timbers were first used at the site, or whether it has occurred subsequently, such as at the time of the 1800-1900 excavations.

3.7 Compression of the remains

A compression ratio was calculated for the fragments that had more than ¾ of the bark remaining around the outside edge (n = 75). Any less than this amount of bark meant that it was less likely that the cross section being measured for the two diameter measurements was complete – if any part of the wood was missing (decayed/eroded) then that would have underestimated the diameter. Where both ends of the wood sample had been measured due to different amounts of compression along the fragment, the results of the most compressed end were

plotted. Figure 8 shows the results, by taxa. Most of the wood types show a range in the amount of compression, with fragments with average diameters below 80mm showing greater compression. Most of the indeterminate samples tend to be smaller diameter pieces, with compression ratios as low as 0.3-0.4; reason in itself for making them hard/impossible to identify.

Figure 8. Wood compression data for the suitable fragments (n = 75).



4 SUMMARY AND CONCLUSIONS

In total, the results of the wood identifications and wood recording of the samples recovered from the 2014 excavations at Glastonbury Lake Village, show the dominance of *Alnus* (alder) and *Populus/Salix* (poplar/willow), together with some *Betula* (birch), *Fraxinus* (ash), *Prunus* (cherries), *Quercus* (oak) and *Rhamnus* (buckthorn). Alder and poplar/willow, together with birch and buckthorn, are all taxa associated with damp and/or peaty soils, and so are likely to have been sourced from, or very near to, the site. The large sample size (*c* 300) suggests that the limited number of wood types identified at the site as a whole (seven) is real, rather than a result of a small sample size.

Of the fragments with a complete radial section, the majority had between 5-20 growth rings. Of those that had a clear outer ring for determining the felling season, most had at least some latewood vessels present, suggesting that they could have been felled in Autumn/Winter, as would be expected when the tree is dormant. Although it seems unlikely that coppicing was taking place (an absence of morphological evidence, together with a broad spread of sizes and ring counts), and

rather that unmanaged alder/willow carr was being exploited (possibly with the assistance of beavers (Brunning, pers. comm.)), much of the material examined (particularly of *Alnus* and *Populus/Salix*) seemed to derive from stems younger than 15 years and less than 60mm in diameter. This selection was likely driven by the requirement for similar- and regularly-sized timbers for the production of uniform structures, such as the palisade.

The highest proportion of unidentifiable remains (not identifiable due to poorly preserved wood) is in Trenches 1 and 2, in the north of the site. Reasons for this are likely to be a complex mix of factors, including the site's hydrological conditions both at the time of use and at the time of the Bulleid and Gray excavations, and the extent and duration of the remains' exposure (degree of desiccation) during those works (Brunning, pers. comm.).

5 REFERENCES

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APPENDIX 1

Summary results; table of the wood identifications and fragment sizes, where recorded and made available for this report. Sample selection for analysis was done by R. Brunning; some were not deemed suitable, for example, those from the backfill of the Bulleid and Gray excavations.

Analysts were: ZH = Zoë Hazell, DC = Dana Challinor, RB = Richard Brunning, NN = Nigel Nayling. Any size data of fragments not analysed by ZH or DC were not included in this summary – please see associated specialist reports, such as that on the dendrochronological aspects. No diameter measurements were recorded for the woodchips (Samples 310–314, 316, 318, 320, 322, 324, 326, 330-334, 342, 347, 349, 356–357, 360, 362, 372, 374–375, 377–380) due to the inherently fragmented nature of those remains.

Wood no.	Wood type	Size (mm) (max by min diameter)	Number of rings	Analyst
10	cf *Populus/Salix*	13.51 x 11.61	10	ZH
11	cf *Populus/Salix*	18.10 x 14.51	6	ZH
12	*Populus/Salix*	50.71 x 48.57	c 16	ZH
13	Betulaceae group 2	53.77 x 28.82; 65.55 x 56.88	c 8	ZH
14	cf *Populus/Salix*	38.23 x 25.12	≥7	ZH
15	*Populus/Salix*	68.64 x 45.25	16	ZH
16	Indet.	61.57 x 27.83	c 16	ZH
17	Indet.	58.08 x 23.30	>12	ZH
18	Indet.	48.35 x 25.35	≥11	ZH
19	Indet.	48.01 x 22.20	5	ZH
20	Indet.	58.19 x 36.75	16	ZH
21	*Alnus*	87.56 x 62.36	≥13	ZH
22	Indet.	44.59 x 21.39	13	ZH
23	Indet.	57.20 x 34.04	7	ZH
24	Indet.	44.29 x 19.05	7	ZH
25	cf *Alnus*	48.87 x 41.61	10	ZH
26	*Alnus*	69.12 x 57.12	Indet	ZH
27	cf *Populus/Salix*	17.85 x 14.81	11	ZH
28	Indet.	21.33 x 11.59	8	ZH
29	Indet.	16.51 x 7.35	c 5	ZH
30	Betulaceae group 2	68.34 x 32.49	c 13	ZH
31	cf *Populus/Salix*	63.08 x 37.79	c 14	ZH
32	cf *Populus/Salix*	122.16 x 88.41	22	ZH
33	*Populus/Salix*	75.54 x 71.28	13	ZH
34	Indet.	19.46 x 9.31	c 6	ZH
35	Indet.	42.81 x 24.39	c 10	ZH
36	cf *Populus/Salix*	22.60 x 22.74; 25.62 x 16.48	c 12	ZH
37	Indet.	49.91 x 34.61	≥7	ZH
38	*Rhamnus*	66.79 x 55.53	c 13	ZH
39	Indet.	40.60 x 22.58	>14	ZH
40	Indet.	43.12 x 26.62	>16	ZH
41	*Populus/Salix*	56.72 x 54.10	20	ZH
42	Indet.	50.53 x 41.48; 49.94 x 25.31	c 13	ZH
43	Indet.	54.13 x 22.81	>6	ZH
44	Betulaceae group 2	71.59 x 29.74	>12	ZH
45	Indet.	21.95 x 15.66	9	ZH
46	Indet.	44.77 x 19.56	Indet.	ZH
47	*Quercus*			?RB

Wood no.	Wood type	Size (mm) (max by min diameter)	Number of rings	Analyst
48	*Quercus*			?RB
49	*Quercus*			?RB
51	Indet.	52.44 x 22.62; 39.17 x 20.88	>14	ZH
52	Indet.	34.73 x 11.96	Indet.	ZH
53	Indet.	27.11 x 13.12	Indet.	ZH
54	Indet.	37.49 x 26.68	Indet.	ZH
55	Indet.	53.72 x 21.84; 35.26 x 9.28	Indet.	ZH
56	Indet.	54.76 x 33.64	Indet.	ZH
57	cf *Alnus*	45.60 x 23.24	Indet.	ZH
58	Indet.	50.60 x 28.92	Indet.	ZH
59	cf Betulaceae	43.22 x 23.30	Indet.	ZH
60	cf *Alnus*	47.28 x 22.13; 32.27 x 23.33	>6	ZH
61	cf *Alnus*	85.26 x 44.93	>10	ZH
62	*Alnus*	59.99 x 32.22; 45.31 x 21.45	>11	ZH
63	Indet.	67.08 x 26.21	Indet.	ZH
64	Indet.	62.42 x 37.99	Indet.	ZH
65	Indet.	30.55 x 21.07; 29.09 x 16.83	Indet.	ZH
66	Indet.	59.98 x 32.28	Indet.	ZH
67	Indet.	25.95 x 14.31	c 8	ZH
68	*Populus/Salix*	6 x 10	c 5	DC
70	*Populus/Salix*	24 x 41	12	DC
71	Indet.	22.35 x 10.38	9	ZH
72	Indet.	18.16 x 12.08	9	ZH
72	cf *Populus/Salix*	14 x 16	c4	DC (duplicate)
73	*Populus/Salix*	21 x 35	6+	DC
74	Indet.	19.96 x 11.66	>4	ZH
75	*Populus/Salix*	23.98 x 23.24	17	ZH
76	cf *Populus/Salix*	33.27 x 23.45	13	ZH
77	cf Betulaceae	68.46 x 39.00	Indet.	ZH
78	cf *Alnus*	42.98 x 32.30	Indet.	ZH
79	cf *Populus/Salix*	25.38 x 18.02	c 7	ZH
80	Indet.	15.62 x 10.46	c 9	ZH
81	*Quercus*	58.86 x 52.73	9	ZH
82	Indet.	48.85 x 17.74	>9	ZH
84	*Populus/Salix*	32.83 x 16.99	>10	ZH
85	cf *Populus/Salix*	38.72 x 28.77	>11	ZH
87	*Rhamnus*	29.61 x 24.83	16	ZH

Wood no.	Wood type	Size (mm) (max by min diameter)	Number of rings	Analyst
88	cf *Populus/Salix*	38.04 x 29.58	12	ZH
89	*Populus/Salix*	62.07 x 39.51	8	ZH
90	*Populus/Salix*	36.19 x 27.98	10	ZH
91	*Populus/Salix*	30.90 x 30.29; 30.89 x 20.63	7	ZH
92	*Alnus*	35.92 x 34.30	>14	ZH
93	cf *Populus/Salix*	60.73 x 37.86	14	ZH
94	*Populus/Salix*	36.46 x 33.43	14	ZH
95	cf *Populus/Salix*	18.39 x 12.68	c 8	ZH
96	cf *Populus/Salix*	12.08 x 8.77	10	ZH
97	*Alnus*	42.96 x 32.11	c 16	ZH
98	*Populus/Salix*	52.68 x 37.79	c 14	ZH
99	cf *Populus/Salix*	33.89 x 36.82	>17	ZH
100	*Populus/Salix*	25.22 x 24.19	11	ZH
101	*Populus/Salix*	35.28 x 22.61; 31.58 x 13.81	c 11	ZH
102	*Populus/Salix*	34 x 40	5	DC
103	*Alnus*	32.86 x 20.66	7	ZH
104	cf *Populus/Salix*	23.91 x 18.84	?5	ZH
105	cf *Populus/Salix*	27.51 x 19.19	c 9	ZH
106	cf *Populus/Salix*	18.61 x 11.50	Indet.	ZH
107	Indet.	9.82 x 5.05	c 5	ZH
108	Indet.	24.85 x 15.61	Indet.	ZH
109	Indet.	22.00 x 13.39	Indet.	ZH
110	cf *Alnus*	28.30 x 13.43	Indet.	ZH
111	Indet.	27.71 x 11.42	Indet.	ZH
112	Indet.	18.47 x 10.23	Indet.	ZH
113	*Populus/Salix*	23.93 x 15.53	Indet.	ZH
114	Indet.	38.46 x 12.88	Indet.	ZH
116	*Populus/Salix*	47.08 x 45.00	10	ZH
117	*Populus/Salix*	46.02 x 45.84	c 8	ZH
118	*Populus/Salix*	28 x 40	8	DC
119	cf *Populus/Salix*	34.06 x 19.90	c 8	ZH
120	*Populus/Salix*	29 x 43	4+	DC
121	Indet.	26.44 x 12.65	Indet.	ZH
122	Indet.	28.46 x 16.91	Indet.	ZH
123	Indet.	58.66 x 23.12	Indet.	ZH
124	*Populus/Salix*	30.92 x 23.06	9	ZH
125	*Betula/Alnus*	27 x 36	7+	DC
126	*Populus/Salix*	30.41 x 21.27	c 8	ZH
127	*Populus/Salix*	24 x 34	6	DC

Wood no.	Wood type	Size (mm) (max by min diameter)	Number of rings	Analyst
128	*Alnus*	77.10 x 49.24	≥12	ZH
129	*Alnus*	38 x 44	7	DC
130	*Populus/Salix*	32.23 x 29.64	8	ZH
131	*Prunus*	27r x 34	c9	DC
132	*Populus/Salix*	17r x 26	7	DC
133	cf *Alnus*	116.22 x 77.02	Indet.	ZH
134	*Alnus*	59.94 x 33.11	c 20	ZH
135	*Alnus*	137.25 x 128.64	>19	ZH
136	*Alnus*	61.96 x 22.09	Indet.	ZH
137	cf Betulaceae	116.84 x 36.61	Indet.	ZH
138	*Populus/Salix*	70.80 x 57.03	>8	ZH
139	*Quercus*	97.71 x 84.32	44	ZH
140	*Alnus* 140 [a]	115.60 x 99.17	c 14	ZH
	cf *Alnus* 140 [b]	163.26 x 124.71	c 31	ZH
141	cf *Alnus*	94.69 x 50.70	16	ZH
142	*Alnus*	63.79 x 49.26	>20	ZH
143	cf *Alnus*	44.58 x 24.70	Indet.	ZH
144	Indet.	48.04 x 24.88	Indet.	ZH
145	*Alnus*	75.61 x 51.09	19	ZH
146	cf *Populus/Salix*	139.19 x 75.76	c 30	ZH
147	*Alnus*	95.37 x 57.20	c 18	ZH
148	*Quercus*	120.34 x 45.97	Indet.	ZH
149	*Populus/Salix*	25 x 32	7	DC
150	*Populus/Salix*		-	DC
151	Betulaceae group 2	114.48 x 58.03	Indet.	ZH
152	*Populus/Salix*	14 x 22	c4	DC
153	*Populus/Salix*	38 x 39	5	DC
154	*Populus/Salix*	32 x 33	7	DC
156	*Quercus*			?RB
157	*Quercus*			?RB
158	*Populus/Salix*	41 x 42	8	DC
159	*Populus/Salix*	70.13 x 69.24	?29	ZH
161	*Populus/Salix*	155.30 x 105.24	>11	ZH
162	*Alnus*	53.66 x 51.62	12	ZH
163	*Populus/Salix*	30.62 x 26.44	12	ZH
164	*Alnus*	23.03 x 19.04	10	ZH
165	*Populus/Salix*	61.76 x 58.35	>18	ZH
166	*Populus/Salix*	60.38 x 44.40	>7	ZH
167	*Populus/Salix*	134.57 x 109.76	23	ZH
168	*Alnus*	35.21 x 28.34	9	ZH

Wood no.	Wood type	Size (mm) (max by min diameter)	Number of rings	Analyst
169	cf *Populus/Salix*	59.79 x 50.03; 63.88 x 63.13	10	ZH
170	*Betula*	141.32 x 113.52	18	ZH
171	cf *Populus/Salix*	66.99 x 59.95	c 23	ZH
172	*Alnus*	89.36 x 81.84	17	ZH
173	cf *Alnus*	78.46 x 76.62	c 15	ZH
174	*Alnus*	65.69 x 63.46	20	ZH
175	*Alnus*	33 x 34	5	DC
176	*Alnus*	76.02 x 72.13	18	ZH
177	*Alnus*	40.34 x 38.33	9	ZH
178	*Alnus*	67.02 x 63.05	c 15	ZH
179	*Alnus*	47.08 x 45.94	c 15	ZH
180	*Alnus*	42.70 x 39.76	11	ZH
181	*Alnus*	88.03 x 71.17	c 13	ZH
182	cf *Alnus*	67.86 x 64.08	15	ZH
183	*Alnus*	56.97 x 53.84	8	ZH
184	*Populus/Salix*	54.93 x 48.42	11	ZH
185	*Populus/Salix*	29.71 x 28.90	6 or 7	ZH
186	*Populus/Salix*	28.79 x 16.00	7	ZH
187	*Populus/Salix*	34 x 35	6	DC
188	cf *Populus/Salix*	44.99 x 32.71	>11	ZH
189	Indet.	74.25 x 41.63	Indet.	ZH
190	Indet.	68.04 x 30.36	Indet.	ZH
191	cf *Populus/Salix*	152.33 x 139.70	c 20	ZH
192	*Alnus*	46.21 x 44.53	10	ZH
193	cf *Populus/Salix*	37.86 x 35.06	6	ZH
194	*Populus/Salix*	45.33 x 42.37	13	ZH
198	*Quercus*			?RB
199	Indet.	42.92 x 11.90	16	ZH
200	cf *Populus/Salix*	43.94 x 37.76	>9	ZH
201	*Fraxinus*	30.23 x 14.10	4	ZH
202	*Quercus*			?RB
203	*Quercus*			?RB
204a	Indet.	32.73 x 11.54	Indet.	ZH
204b	cf *Betula*	55.69 x 12.65	c 8	ZH
205	*Populus/Salix*	55.41 x 29.40	9 or 10	ZH
206	*Quercus*			?RB/NN
207	*Quercus*			?RB/NN
208	*Quercus*			?RB
209	*Quercus*			?RB
210	cf *Populus/Salix*	44.42 x 26.93	c 18	ZH

Wood no.	Wood type	Size (mm) (max by min diameter)	Number of rings	Analyst
211	*Quercus*			?RB/NN
212	*Quercus*			?RB
213	*Quercus*			?RB/NN
214	*Quercus*			?RB/NN
215	*Quercus*			?RB
216	*Quercus*			?RB
217	*Quercus*			?RB
218	*Quercus*			?RB
219	*Quercus*			?RB
220	*Quercus*			?RB
221	*Quercus*			?RB
222	*Fraxinus*	40.45 x 12.07	25	ZH
223	cf *Populus/Salix*	105.26 x 89.17	c 24	ZH
224	*Alnus*	59.95 x 55.63	>12	ZH
225	Indet.	20.67 x 12.72	>8	ZH
226	*Populus/Salix*	23.99 x 19.00	c 8	ZH
227	Indet.	27.65 x 18.5	Indet.	ZH
228	Indet.	31.29 x 14.01	c 7	ZH
229	*Alnus*	76.47 x 48.87	≥24	ZH
230	cf *Alnus*	62.64 x 35.46	>12	ZH
231	Indet. 231a	90.79 x 35.75	Indet.	ZH
	Indet. 231b	18.69 x 17.91	Indet.	ZH
232	*Rhamnus*	36.66 x 36.10	c 10	ZH
233	*Alnus*	73.16 x 68.12	>37	ZH
234	*Alnus*	123.70 x 45.10	>23	ZH
235	cf *Alnus*	84.10 x 79.32	23	ZH
236	*Alnus*	52.84 x 43.99	20	ZH
237	*Alnus*	39.91 x 36.14	12	ZH
238	*Populus/Salix*	25.50 x 22.49	6	ZH
239	*Alnus*	72.13 x 68.63	14	ZH
240	*Rhamnus*	37.01 x 30.30	12	ZH
241	*Alnus*	69.30 x 45.37	Indet.	ZH
242	cf *Populus/Salix*	158.95 x 116.82	>32	ZH
243	*Alnus*	55.80 x 54.31	c 12	ZH
244	*Alnus*	69.22 x 65.06	>15	ZH
245	*Populus/Salix*	100.18 x 73.87	>29	ZH
246	*Alnus*	54.76 x 50.81	c 13	ZH
247	*Populus/Salix*	115.16 x 111.87	?30	ZH
248	*Populus/Salix*	104.76 x 82.67	?22	ZH
249	*Populus/Salix*	114.00 x 93.54	c 19	ZH

Wood no.	Wood type	Size (mm) (max by min diameter)	Number of rings	Analyst
250	*Populus/Salix*	58.80 x 56.62	12	ZH
251	*Alnus*	71.11 x 66.41	c 24	ZH
252	*Alnus*	78.84 x 76.66	c 26	ZH
253	*Alnus*	107.36 x 100.95	c 25	ZH
254	*Quercus*	93.68 x 75.71	>20	ZH
255	cf *Alnus*	65.96 x 51.39	25	ZH
256	*Alnus*	86.47 x 83.86	c 23	ZH
257	*Quercus*			?RB
260	*Populus/Salix*	59.73 x 53.47	c 22	ZH
261	*Alnus*	54.56 x 48.42	10	ZH
262	cf *Alnus*	113.45 x 92.99	>22	ZH
263	*Quercus*	174.77 x 110.75	>45	ZH
264	Betulaceae (ID from bark)	61.48 x 45.32; 58.43 x 25.20	>12	ZH
265	*Alnus*	80.52 x 69.03	>12	ZH
266	cf *Alnus*	82.48 x 73.51	15	ZH
267	*Alnus*	74.11 x 64.05	11	ZH
268	*Populus/Salix*	41.08 x 36.53	13	ZH
269	*Populus/Salix*	48.28 x 42.77	19	ZH
270	cf *Alnus*	50.88 x 40.61	7	ZH
271	*Populus/Salix*	70.50 x 48.35	33	ZH
272	*Populus/Salix*	56.27 x 47.45	13	ZH
273	*Alnus*	109.94 x 87.85	c 17	ZH
274	*Betula*	76.67 x 37.30	>25	ZH
275	*Alnus*	114.13 x 94.40	c 15	ZH
276	*Prunus*	44.35 x 34.83	17	ZH
277	*Alnus*	87.78 x 81.31	c 10	ZH
278	Indet.	17.78 x 11.99	c 6	ZH
279	Indet.	18.78 x 14.30; 16.53 x 9.30	c 10	ZH
280	Indet.	16.80 x 8.75	≥6	ZH
281	Indet. 281a	26.31 x 14.58	?8	ZH
	Indet. 281b	24.99 x 13.43	c 7	ZH
282	Indet.	41.00 x 21.98	Indet.	ZH
283	Indet.	27.81 x 18.55	Indet.	ZH
284	Indet.	37.64 x 18.14	Indet.	ZH
285	*Alnus*	81.74 x 66.15	c 13	ZH
286	*Alnus*	88.48 x 77.63	>19	ZH
287	cf *Alnus*	75.24 x 64.67	>15	ZH
288	Betulaceae group 2	78.54 x 53.78	17	ZH
289	cf Betulaceae	90.35 x 80.81	16	ZH

Wood no.	Wood type	Size (mm) (max by min diameter)	Number of rings	Analyst
291	Indet.	98.42 x 60.66	c 22	ZH
292	*Populus/Salix*	92.61 x 77.56	c 14	ZH
293	cf Alnus	84.32 x 64.03	>15	ZH
294	Betulaceae group 2	68.61 x 30.94	>10	ZH
295	*Alnus*	107.44 x 94.88	14	ZH
296	*Alnus*	82.06 x 78.50	13	ZH
297	*Populus/Salix*	34.92 x 31.86	10 to 12	ZH
297	*Populus/Salix*	33 x 35	12	DC (duplicate)
298	*Alnus*	99.13 x 90.67	14	ZH
299	*Alnus*	52.08 x 47.23	6	ZH
300	*Alnus*	42.22 x 39.65	7	ZH
301	*Alnus*	94.32 x 92.10	13	ZH
302	*Alnus*	52.92 x 51.45	6	ZH
303	*Alnus*	90.83 x 86.15	12	ZH
304	*Alnus*	102.51 x 88.03	c 18	ZH
305	*Alnus*	108.86 x 100.91	12	ZH
306	*Alnus*	99.82 x 84.39	>16	ZH
307	*Populus/Salix*	58.25 x 18.53	12	ZH
308	cf *Alnus*	22.25 x 10.78	3	ZH
309	*Alnus*	22.95 x 5.32	5	ZH
310	*Populus/Salix*			DC
311	*Populus/Salix*			DC
312	*Alnus*			DC
313	*Alnus*			DC
314	*Populus/Salix*			DC
316	*Populus/Salix*			DC
318	*Alnus*			DC
318	*Alnus*			DC
320	*Populus/Salix*			DC
322	*Populus/Salix*			DC
324	*Populus/Salix*			DC
326	*Alnus*			DC
330	*Populus/Salix*			DC
331	*Populus/Salix*			DC
332	*Populus/Salix*			DC
333	*Populus/Salix*			DC
334	*Alnus*			DC
342	*Populus/Salix*			DC
347	*Populus/Salix*			DC
349	*Populus/Salix*			DC

Wood no.	Wood type	Size (mm) (max by min diameter)	Number of rings	Analyst
356	*Populus/Salix*			DC
357	*Alnus*			DC
360	*Populus/Salix*			DC
362	*Alnus*			DC
372	*Populus/Salix*			DC
374	*Populus/Salix*			DC
375	*Alnus*			DC
377	*Populus/Salix*			DC
378	*Populus/Salix*			DC
378	*Populus/Salix*			DC
379	*Populus/Salix*			DC
380	*Alnus*			DC

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