Historic England

Windsor Castle, Excavations in the Round Tower and the Upper Ward
A preliminary report on the fish remains

Alison Locker

Discovery, Innovation and Science in the Historic Environment

Research Report Series no. 21-2018

Research Report Series 021-2018

WINDSOR CASTLE, EXCAVATIONS IN THE ROUND TOWER (SITE 431) 1989-92 AND THE UPPER WARD (SITE 485) 1992

A PRELIMINARY REPORT ON THE FISH REMAINS

Alison Locker

NGR: SU 97002 77033

ISSN 2059-4453 (Online)

For more information contact Res.reports@HistoricEngland.org.uk
or in writing to:
Historic England, Fort Cumberland, Fort Cumberland Road, Eastney, Portsmouth PO4 9LD

SUMMARY
This preliminary report concentrates on the fish recovered from selected contexts dated to the 11th to mid 14th centuries from excavations in the Round Tower and Upper Ward at Windsor Castle. Nearly 14,000 bones were identified. The majority were from Kitchen deposits and the Strong Room in the Round Tower, largely of 14th date. An intensive sieving program ensured the smallest bones were retrieved with different mesh sizes demonstrating their effect on recovery. Use of a grid to subdivide the kitchen floor during excavation revealed some depositional differences. The assemblage was largely herring and eel by bone number, small cyprinids were also common, particularly dace and some larger fish, which together with pike and perch, may have come from managed ponds. There is documentary evidence regarding the royal ponds, as well as contemporary records of fish served at table. The major gadid food fishes such as cod, whiting and, less numerous, haddock and ling were all present, as were the common flatfishes plaice and flounder. Evidence of status from individual fish by size or rarity was limited, most of the fish were of species and a size commonplace in occupation deposits.

CONTRIBUTORS
Alison Locker. 58, Avinguda del Pessebre, Escaldes-Engordany. AD 700. Andorra.

ACKNOWLEDGEMENTS
I thank Brian Kerr (Historic England) for the additional information in the introduction and conclusion and Polydora Baker (Historic England) for contextual and dating clarification and comments on the report. Steven Brindle kindly shared documentary data.

ARCHIVE LOCATION
The Engine House, Fire Fly Avenue, Swindon, SN2 2EH.

DATE OF RESEARCH
2004-2018.

CONTACT DETAILS
Alison Locker, +376 893 827, galocker@andorra.

CONTENTS

INTRODUCTION

From 1989-1992, excavations were carried out in the Round Tower (Site 431) by the Central Excavation Unit of English Heritage. The Tower was then thought to be a 12th century shell keep built on an 11th century motte, and was excavated following subsidence of the foundations and in advance of underpinning operations. The present timber-framed buildings within the tower date from the mid 14th century, and form four ranges built against the tower walls around an open rectangular courtyard. Fish bones were recovered from sieved samples from a number of rooms in the Tower, using the room numbers allocated by the Royal Household:

- Site Subdivision (SSD) 661, a large room in the centre of the N range. This was a staff kitchen up until the time of the excavation, and had evidently been a kitchen from the medieval period. This produced the most faunal remains.

- SSD 662, the Well Room, a small room immediately to the E of the Kitchen.

- SSD 656, known as the Strong Room, a large room in the centre of the S range.

- SSD 658, a room in the W range, occupying the S half of a larger room that had formed a Hall from at least the 1350s, and an Armoury from c1670.

- SSD 664, a smaller room in the corner between the E and S ranges.

Following the 1992 fire in the Upper Ward, excavation (Site 485) was carried out by the same organisation, known by then as the Central Archaeology Service. Fish bones were found in deposits from areas including:

- SSD 579, the Guard Chamber, a ground floor room set within a turret of the Kitchen Gate, thought to have been built in the 1360s.

- SSD 593, Kitchen Court, a former open courtyard at the centre of the medieval and later kitchen complex, bounded by the Great Kitchen and other associated offices. The Kitchen Court had been occupied by a number of buildings changing through time and in layout, but by the time of the fire had become completely infilled.

- SSD LP4, Lift Pit 4, a small trench NE of the Queen's Presence Chamber to the W of the State Entrance, a position that would formerly have occupied the SE corner of Brick Court, the westernmost of three open courtyard areas within the Upper Ward. Its original incarnation was as the 'Little Cloister' from the Edward III 14th century building campaign.

Provisional Phasing

The contexts from both projects were provisionally phased at assessment, as follows. Note in particular that each provisional phase generally covers major construction episodes and the use of the buildings and areas up to the next major construction

phase, so these form wider dating brackets. For example, Round Tower Provisional Phase 6 covers the major refurbishment of c1670 and the use of the tower up until Wyatville's rebuilding of the 1830s.

Site 431, the Round Tower

- Provisional Phase 1, pre Castle activity. Small amounts of Roman finds and building material form a background to the medieval developments.

- Provisional Phase 2, late 11th century. The construction of the motte and the earliest occupation on its summit, ended by an episode of subsidence.

- Provisional Phase 3, 12th century. The top of the motte was reconstructed and the first defensive circuit in masonry was built around the edge of the summit. The earliest identifiable internal buildings belong to this phase. It's possible that the earliest kitchen deposits really belong to this phase.

- Provisional Phase 4, late 12th century. The construction of the present shell keep, now dated to c1225 following damage sustained in the siege of 1216, with a new set of internal buildings and floor deposits associated with their use.

- Provisional Phase 5, mid 14th century. The Phase 4 internal buildings were demolished, and the surviving timber framed buildings were raised on new foundations, again consisting of four ranges grouped around an open courtyard. They have been dated to 1355 by dendrochronology, supported by very full documentary evidence.

- Provisional Phase 6, 1670. The buildings were modified for Prince Rupert, then resident as constable. This may include some features that date to the Parliamentary occupation of the site, notably metalworking evidence from SSD 658.

- Provisional Phase 7, c1830. The extensive work of Sir Jeffry Wyatville and later alterations.

Site 485, the Upper Ward

Seven main phases of development and use have been established.

- Phase 1, pre late 12th century. The earliest castle, and (now known from architectural fragments) the first palace of Henry I, up to Phase 2.

- Phase 2, late 12th century, Henry II. The construction of much of the masonry defensive circuit, and the remodelling of the King's Houses.

- Phase 3, 13th century, Henry III. Completion of the defences in the 1220s, followed by major building campaigns affecting all parts of the castle.

- Phase 4, 14th century, Edward III. A massive building campaign, affecting the Upper Ward in the 1360s-70s.

- Phase 5, 15th and 16th centuries. Significant alterations and additions to the Royal accommodation in the Upper Ward.

- Phase 6, late 17th century, Charles II. The creation of a baroque palace in a sustained and ambitious building programme.

- Phase 7, 19th and 20th centuries. Reconstruction of much of the castle under the supervision of Sir Jeffry Wyatville; the gothicisation of the castle.

Note on the provisional phasing

Reconsideration of the date of construction of the Round Tower, now thought to have been built in 1224-5, shortens the date range of Round Tower Provisional Phase 4 to c1224-1355. It is possible that the earliest excavated kitchen deposits actually belong to the Provisional Phase 3 structures, but in any case it makes sense to treat these important kitchen deposits as an assemblage. It may be possible to subdivide these further in a subsequent stage of analysis.

Provenance and selection of samples

Although fish bones were recovered from samples dated up to the 19th century, this report concentrates on well-phased deposits from the late 11th to mid 14th centuries. The bulk of the material was dated to the late 12th to mid 14th century.

The Kitchen (SSD 661) and the Strong Room (SSD 656) in the Round Tower (Site 431) were the principal areas from which fish bones were found. Within the Kitchen, layer 2586 yielded most of the remains. This and other layers within the Kitchen were sampled following the discovery of concentrations of fish bones and scales within the room. Layer 1565 in the SSD 656 was sampled in a similar fashion. Smaller quantities of fish were also recovered from the SSDs 662, 664 and 658.

Site 485, the Upper Ward, produced fish from a range of quarters but only well phased deposits dating to Phases 1-4 from the Guard Chamber (SSD 579), the Kitchen Court (SSD 593) and Lift Pit 4 (SSD LP4) were selected for analysis.

Samples and Processing

The fish bones discussed in this report were mainly recovered from the wet-sieved samples of >4mm, >2mm, >1mm and others recovered by flotation. For the Round Tower, the flotation samples were processed by mechanical flotation using a 0.25mm or 0.5mm mesh to collect the flots and a 0.5mm or 1mm mesh to collect the residues (de Rouffignac 1997). For the Upper Ward a 0.5mm flot mesh and 1mm (or in a few cases 0.5mm) residue mesh were used (Burgess nd). All the samples collected for sieving and flotation were processed during or immediately following the excavations in 1992, but only some were sorted at the time (Rouffignac 1997, Burgess nd). Other

samples were not sorted until the early 2000s (Baker 2001). The method of sorting is outlined below.

The data from the flots have been included in the detailed tables to show the proportions of species within each sample, but have not been included in any statistical work.

Sorting of residues and flots

Strategies for sorting residues and flots varied between years and this should be kept in mind when comparing the smaller fractions and species (Burgess nd, de Rouffignac 1997). In general 100% of the >4mm and 25-100% of the 2-4mm fractions were sorted while a smaller proportion of the 1-2mm fractions was sorted, varying from 10-25% (exceptionally the <2mm residues from sample 19649, cxt 18439 in the Upper Ward kitchen was scanned for fish bones and scales and the material added to the >2mm assemblage, Burgess nd, 4). The summary data by fraction are provided in Tables A-O (Appendix 1), archive tables provide details regarding proportion or volume of a fraction sorted for some samples (Appendix 3). The >4mm, 2-4mm and 1-2mm fractions of residues and flots are also referred to as 4mm, 2mm or >2mm and 1mm or >1mm respectively in the report and tables.

Methods

The fish bones were identified to species or family/genera level. Cyprinid species were identified where possible from characteristic pharyngeal bones and, in the case of barbel, from the serrated fin spines. Identified bones are presented as Nisp (Number of identified speciments) in the data tables. Indeterminate material was quantified by number of fragments and scales were identified where possible and classified as <10, <100 and >100, or p pp ppp in the tables. Scales tend to be more numerous in the flot fractions, a reflection of the recovery method. Measurements were taken to estimate the size of individual fishes; fish size was estimated also by comparison to reference material. The term large gadid includes those bone fragments with gadid characteristics and of a size similar to cod, pollack, saithe, haddock and ling (the latter is not a gadid but similar), more than 30cm in length. Small gadid includes immature specimens of the above and whiting. Large and small cyprinid categories are based on size rather than species, except for dace which at 15-25cm average length would be included in the small category.

Results

A total of 13,432 identified fish bones and 12,976 indeterminate fragments were identified from the Round Tower. From the Upper Ward there were 1,940 identified and 2,223 indeterminate fish bones.

The following were identified; elasmobranch indet, roker (*Raja clavata*), Rajidae, eel (*Anguilla anguilla*), conger eel (*Conger conger*), herring (*Clupea harengus*), sprat (*Sprattus sprattus*), shad (*Alosa* sp.), Clupeidae, Salmonidae, smelt (*Osmerus eperlanus*), pike (*Esox lucius*), tench (*Tinca tinca*), bream (*Abramis brama*), barbel

(*Barbus barbus*), dace (*Leuciscus leuciscus*), chub (*Leuciscus cephalus*), roach (*Rutilus rutilus*), Cyprinidae, cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), whiting (*Merlangius merlangus*), Gadidae, ling (*Molva molva*), garfish (*Belone belone*), stickleback (*Gasterosteus aculeatus*), bullhead (*Cottus gobio*), possible bull-rout (cf *Myoxocephalus scorpius*), gurnard (*Triglidae*), perch (*Perca fluviatilis*), scad (*Trachurus trachurus*), mackerel (*Scomber scombrus*), brill (*Scophthalmus rhombus*), plaice (*Pleuronectes platessa*), flounder (*Platichthys flesus*), sole (*Solea solea*) and indeterminate flatfish.

A royal palace is a high status site. Any supporting evidence from the fish bones might be suggested by the presence of certain fish species or particularly large individuals. There are contemporary documentary data that, although not relating directly to Windsor, record the fish consumed during the progress of the king at different venues. This evidence will be compared with the fish bone data from the site, which tends to be dominated in bone numbers by herring, eel and cyprinids, illustrating some of the difficulties in determining status from fish bones since these are commonplace fish.

In addition to herring, eel and cyprinids, gadids and flatfishes (particularly plaice and flounder) were also common. The gadids are a major family of marine food fishes including cod, a prime food fish, and haddock, but these are not numerous; most common are whiting, a comparatively small fish. The few bones identified from larger fishes such as cod and ling were mostly vertebrae, though there were some cod skull elements. This selection may reflect the cleaning of relatively large bone debris from floor layers, rather than the deliberate selection of fish parts or species. Other fish identified consistently, but in comparatively low numbers, include pike, perch, gurnard and mackerel. The poor survival of the elasmobranchs (sharks and rays), which have cartilaginous skeletons, suggests they are probably underrepresented; they were only identified from dermal denticles and loose teeth. In contrast, the distinctive sculptured surface of gurnard skull elements makes even the smallest fragment identifiable to family level, and probably results in the overrepresentation of this group. Therefore, as well as selectivity from mesh size and recovery method, ease of recognition and differing survival rates of individual fish species have to be considered. The ubiquitous eel has approximately double the number of vertebrae (easily identified) compared to most other fish, which is also a source of overrepresentation. These are some of the inherent biases of the raw data and applicable to most fish bone assemblages. Scales vary greatly in number and size between species and different areas of the body. They are often not identifiable to species and they have been quantified in broad degrees of abundance; where possible the species has been noted. Particular abundance of scales in some of the grid squares has suggested the discard of debris from specific fish cleaning activities.

The composition of species is discussed below by context groupings. The status of different species in the diet, whether fresh or stored, is discussed separately.

SITE 431 THE ROUND TOWER

SSD 661 The Kitchen

Appendix 1. Summary Tables A-F.

Appendix 2. Figures 1-6.

Appendix 3. Archive Tables 1-43.

This structure included a small number of samples from contexts predating the 14th century from 4mm residues. The earliest are from Phase 2 (late 11th century), these are shown in Table 1. The fish from three layers in separate contexts were few, but included the typical sequence: eel, herring, pike, cyprinids and flatfish.

Phase 3 (12th century) comprised four fills from 4 contexts shown in Table 2. Most of the fish came from contexts 9619 and 2733, the former included mainly eel, herring, cyprinids and a number of scales. Context 2733 comprised exclusively herring. A single context (Table 3) dated to Phase 3-4, also 12th century, produced a small sample of eel, herring, pike and dace.

All the other contexts from the kitchen are dated to Phase 4 (14th century) and include 4mm, 2mm and 1mm residues and fish recovered from flotation. Comparison between contexts can only be made against similarly recovered material, for example 4mm residues with others from the 4mm mesh. These contexts are shown in Tables 1-15 including a particularly rich layer, context 2586, shown in Tables 22-27, divided by grid, and summarised in Summary Table A. The latter indicates where the largest samples of fish were found, dominated by 2586, a layer across the kitchen floor. Contexts 2722, 2636, 2667, 2716, 2666 and 2551 also contributed significant quantities of fish bone.

The main species and families determined by the number of bones are; eel, herring, pike, cyprinids, gadids and flatfishes. Pike is arguable for inclusion here, but did occur regularly in small numbers, representing individuals of varying size. The large pike specimens may be an indication of status. The data for these groups have been expressed as a percentage of the overall identifiable sample from 4mm residues in Figure 1; only samples of more than 50 bones were included.

Figure 1 clearly shows the dominance of herring, followed by eel and the gadids, comprising mainly whiting and small gadids in the 4mm residue. The cyprinids range between 3 per cent and 20 per cent; within this group the 'small cyprinid' category dominates, comprising between 54 per cent and 86 per cent. These may include many dace, the most commonly identified small cyprinid species. All the species shown here comprise over 93% of the identified fish.

Figure 2 demonstrates that the relative frequency of different cyprinid species varies between contexts in the 4mm residue. For example roach predominate in 2551, dace in 2636, 2666 and the large sample from 2586, while barbel are most common in

2673. In the 2mm residues (Figure 3), all small samples except those from 2586, the large cyprinid category is absent and three small samples include small cyprinid and specifically dace. This is a small species, which rarely exceeds 25cm in length (Wheeler 1979, 126) and most of the dace identified here are less than 15cm. In layer 2586 there are small numbers of roach and barbel. The selectivity in three contexts may also be a consequence of the comparatively small sample size. In the single 1mm residue sample from 2586 (Summary Table C), which includes 24 per cent eel and 38 per cent herring, the 22 per cent cyprinid category is 58 per cent small cyprinid, 30 per cent dace, 1 per cent roach and 10 per cent large cyprinid. The large cyprinid category is absent in the 2mm material, with some fragmentary bone found in the 1mm sample.

The Flot material (Summary Tables D, E and F) includes 91 per cent herring from the 4mm fraction (see sorting method above). The samples from layer 2586 for the 2mm and 1mm fraction show 61 per cent and 2 per cent respectively for herring and a greater species variation, particularly of small cyprinids and stickleback, in the 1mm category. Large numbers of scales were found in all three fractions, amongst which were identified pike, cyprinid, perch and possibly salmonid.

Within the Kitchen, context 2586 was divided into 1m grid squares from which samples were taken. The distribution of fish within these squares does show some patterning. The data for each grid are shown in Tables 22-27 for the 4mm residue, Tables 28-33 for the 2mm residue and Tables 34-39 for the 1mm residue. The Flots for 4mm, 2mm and 1mm are displayed in Tables 40-42. The entire grid data are summarised in Table 43.

Figure 4 (4mm fractions) shows the percentage of identified bone as a proportion of all identified fish from context 2586 from all grid squares. Grids 25/31- 32, 26/31- 32 are the most abundant in fish remains and to a lesser extent 27/31-32. The indeterminate material and scales echo this distribution. In Figure 5 the main species/groups from the 4mm fractions are shown as a percentage of each grid sample for the six most abundant squares (25/31, 25/32, 26/31, 26/32, 27/31 and 27/32). Together these species/groups make up over 94 per cent of all fish in each grid (see the data table for Figure 5). Herring is particularly abundant, although the relative proportion is reduced in grid 27, in which 27/32 yielded the smallest sample. Here the gadid group is proportionately at its greatest, 28 per cent (n = 47), 77 per cent of which are whiting and small gadid. In 27/31 the cyprinid group is at its highest at 13 per cent.

The predominance of herring by bone number, followed by eel, and lesser quantities of cyprinids, gadids and flatfish in the kitchen deposits varies in only two contexts. These are shown in Table 15. Fill 9617 has over one thousand identified bones with only 29 per cent herring, but 45 per cent eel and 18 per cent cyprinid, mainly dace. This is the lowest percentage for herring and the highest for eel in the kitchen deposits. Layer 9545 also shows a reduced proportion of herring (42 per cent) and increased proportions of eel (37 per cent). In both cases the increased quantity of eel is the most obvious change against the decrease in herring. Fill 2673 yielded a low

proportion of herring (equal to 36 per cent) and eel (24 per cent), but a relatively high proportion of cyprinids and gadids (Table 10).

The abundance of scales, the majority of which were not identifiable to species, is indicated in the tables. In context 2586, grid square 25/31 (Table 22) pike, perch, cyprinid and ?salmonid scales were present. In 25/32 only cyprinid was identified, while 26/31 (Table 23) included perch and cyprinid and 27/32 (Table 24) ?salmonid. In 27/31 perch, pike, cyprinid and ?salmonid were identified, distinguished by some characteristic features of their scales; many other species may be present also but could not be identified. Other contexts contained scales, particularly in the 2mm residues (Table 17). Context 2666 included pike and cyprinid, 2667 cyprinid, and from 2636 some ?salmonid, pike, cyprinid and perch scales. When found in quantity scales may be evidence of kitchen preparation waste, the descaling and cleaning of fish prior to cooking.

36 species/groups were identified in the 4mm residues from the kitchen samples. However of these only 10 species/groups contributed over 1 per cent (87 bones) of the identified total. In descending order these are: herring, eel, small cyprinid, whiting, plaice/flounder, pike, small gadid, plaice, dace and large gadid. The majority of species are poorly represented by bone number, these, including roker, salmonids, perch and mackerel, are identified regularly in samples/contexts, but in small numbers. Looking at their presence/absence by occurrence in the main eleven contexts of the kitchen (Summary Table A) the ten species scoring over 1 per cent each occur in at least seven contexts. Though below 1 per cent by bone number cod, gurnard and perch occur in eight contexts, mackerel in seven, roker in six and salmon occur in five. Garfish, only identified from five bones, was found in three contexts, as was ling from three bones. This shows that the frequency with which a species was eaten cannot only be inferred from the number of identified bones, which is a measure of quantity.

In the small samples from two contexts, 2574 and 2678, sample size must affect the number of species present, the rest are all samples of 100 identified bones or more. The plotting of number of identified bones against the number of species/groups in Figure 6, indicates that above a sample size of 200 identified bones the size of the sample does not appear to affect the number of identified species.

Gurnard and to a lesser extent perch are both easily identifiable from particular characteristics of their bones, and consequently may be over represented, since some small fragments can be attributed to family or species. Mackerel occur in many samples/contexts, albeit in low numbers and are easily identified from their distinctive bone texture and vertebrae. As mentioned above roker and other rays are probably under represented as they are only identified from dermal denticles and teeth. Salmon was considered a prestige food, particularly if fresh and feature in contemporary documentary evidence. Low numbers of salmonids (salmon and trout) are likely to reflect naturally poor preservation of the bones of this family. Garfish, scad and shad (a herring relative) are all seasonal catches. Conger eel was only identified from a single context.

Within the gadid group the large species, cod and haddock as well as ling (similar though not a gadid), were uncommon and nearly all identified from vertebral centra, many of which were broken. A greater abundance, particularly of cod, might have been expected, though cod did occur in eight of the eleven contexts. This species was commonly salted and dried and was an important part of the medieval diet, replacing meat during fast times. However there are few large fish bones from this area, which may reflect the cleaning of the kitchen floors.

Among the flatfishes plaice and flounder are by far the most common, with one example of brill and two of sole. There is no evidence of the more prestigious species such as turbot and halibut.

Of all the freshwater taxa pike is the single most important species. As a non-specific group the cyprinids are the most numerous, of which dace is the most common species. Many of the indeterminate small cyprinid bones may be dace, a small low ranking food fish of this family. Bream, the prime pond fish before being usurped by carp, barbel and roach were more highly regarded. Perch is found in low numbers but occurs in many contexts.

Very small species such as stickleback and bullhead are rare in the 4mm residues, their small bones passing through the mesh. They are better represented in the 2mm and 1mm residues and the 2mm and 1mm flot fractions. They may be incidental catches while netting other small fish such as dace, or the stomach contents of predators such as adult pike, or perch.

Residues and flots which were sub-sampled are tabulated in Tables 18-21. They are not directly comparable with the above and therefore have not been used other than to indicate the species distribution within each sample. In the 2-4mm range of both flots and residues there are large numbers of scales (Table 18) with a few ?salmonid, but mainly from pike, cyprinid and perch. Similarly in the 2-4mm residues (Table 20) contexts 2666 and 2668 included pike, perch and cyprinid scales.

SSD 656 The Strong Room

Appendix 1. Summary Tables G and H.

Appendix 2. Figures 7.

Appendix 3. Archive Tables 44-60.

Most of the fish remains from this structure are from one context, layer 1565. Small samples from Phases 2 and 3 contributed little (Table G and Tables 44 and 45). The data from the 4mm residues from other Phase 4 contexts are shown in Tables 46-49. Table 49 shows all the single sample contexts. None of these samples contained much fish bone, identifiable or otherwise. Scales were also scarce, in total less than ten. Despite the small sample size a wide range of species was identified, comparable with those from the Kitchen. In the larger samples, contexts 1595, 1128 and 1129,

herring and eel are the most numerous, but in fill 1583 (Table 47) nine species/ groups were identified amongst 11 identified bones from four samples.

A single sample from the 2mm residue produced only two identifiable bones in context 1590 (Table 50) and there was no flot material.

Layer 1565 was divided into grid squares and sampled in the same manner as layer 2586 from the Kitchen (see Tables 51-57). Though not as rich as layer 2586 the 4mm residues did show some patterning of fish bone density based on the identified fraction (Figure 7). Scales were present but not in the same quantities as found in 2586. The distribution shows that the greatest density lies in the area of 28/14-17, 29/15-17, 30/15-17 and 31/16-17. This is also confirmed from the 4mm residue in Table 58, which summarises the distribution by grid. Squares 28-31 have the largest samples with herring comprising 50-55 per cent in squares 28-30, but only 25 per cent in square 31 where there is also a relatively high proportion of gadids, mostly small gadid, specifically whiting. The only flatfish species identified were plaice and flounder. Of the freshwater species pike was present in the five largest grid samples. As a group the cyprinids, including barbel, dace and roach, were slightly more numerous than pike. Only one perch bone was present. The elasmobranchs were poorly represented both in the 4mm and the 2mm residue (Tables 58 and 59). There was also a small amount of hand-collected material shown in Table 60 with 16 identified bones.

SSD 658 Southern half of Hall in W Range

Appendix 1. Summary Tables I & J.

Appendix 3. Archive Tables 61-62.

A small assemblage was recovered from 4mm and 2mm residues from layers and fills. The 4mm fractions include 32 identified bones, of which approximately two thirds are eel and herring, with some pike, dace, whiting and perch, an impoverished reflection of larger samples. Only one clupeid (herring family) bones and two from eel were found in the 2mm fractions.

SSD 662 The Well Room

Appendix 1. Summary Table K.

Appendix 3. Archive Table 63.

Only a single context from this room was selected for analysis and yielded one eel vertebra, and a scale.

SSD 664 Small Room in SW corner of Tower

Appendix 1. Summary Table L.

Appendix 3. Archive Table 64.

The ten samples from seven contexts dated to Phases 3 to 4 were not rich in fish, with only 58 identified bones in all. However the assemblage is diverse with 13 species or non-specific groups and typical of those from other contexts.

SITE 485 FIRE PROJECT UPPER WARD

SSD 579 The Guard Chamber

Appendix 1. Summary Table M.

Appendix 3. Archive Tables 65-69.

All the fish come from two finds rich contexts, layers 18439 and 18440, dated to Phase 2/3 (late 12th to 13th century), pre-dating the 14th century construction of this Kitchen Gate W Turret. Table 65 shows the 4mm residue fraction from both contexts. The incidence of eel and herring is comparatively low compared to other species, 16 per cent and 22 per cent combined from both contexts. Pike is more numerous than in other areas (18 per cent), the freshwater element also includes bream, dace and perch. Plaice/flounder were the only flatfish identified.

Table 66 shows the 2mm residue from context 18439 (divided into sub samples A and B). This smaller fraction has a higher proportion of eel and herring (25 per cent and 43 per cent) but they are still less dominant than in other contexts in the Round Tower. Cyprinids, particularly small cyprinids are relatively abundant. Whiting are the most numerous gadid in this context, while cod is the only other gadid species identified and, with some large gadid fragments, only present in the 2mm fraction.

Tables 67, 68 and 69 show the fish from the flot fractions. Few fish bones were found although large quantities of scales of indeterminate species were present in some 4mm, 2mm and 1mm meshes.

SSD LP4 Lift Pit 4

Appendix 1. Summary Table N.

Appendix 3. Archive Tables 70-71.

This feature lying west of the other excavated rooms produced few fish bones, all of which are from one context, layer 18330. The tables show the paucity of this material. The 2mm residue yielded the most remains, but they are largely unidentifiable.

SSD 593 Kitchen Court

Appendix 1. Summary Table O.

Appendix 3. Archive Tables 72-81.

This area lies directly south of the main kitchen, which had no surviving Phase 2, 3 or 4 deposits. The Kitchen Court comprises separate rooms for different activities.

For Phase 2 (late 12th century, associated with Henry II) the fish came mainly from Area 5 and are mostly fills from a cesspit (Tables 72-76). The small sample from the 10mm and 4mm residues had no herring, which featured poorly overall in this structure compared to other areas. In the sub-sampled 10mm residues (Tables 74 and 75) eel are abundant in contexts 18171 and 18176, particularly in the 2-4mm and 1-2mm fractions, where herring is present but in lower proportions than other areas. Small cyprinids, specifically dace are relatively common in the 1-2mm fraction. The flots from these contexts (Table 76) produced a similar, but smaller assemblage.

A small quantity of Pre Phase 3 (Table 77) and possible Phase 3 material, dated to the 13th century and associated with Henry III (Tables 78 and 79), was found in Areas 7 and 9, west and north of the rooms of the court. All 4mm residues from Areas 2, 3, 7 and 9 were small samples and unremarkable, the largest being layer 18034 (Table 80). Small gadid was the most numerous group/species. Eel and herring are poorly represented, which would appear to be a true reflection of the deposit rather than the mesh size, since many bones from these species were found in 4mm residues from other contexts.

DISCUSSION

Distribution of species

It is evident that the majority of fish come from The Round Tower excavations and in particular the Kitchen (SSD 661). Most features are dated to Phase 4, the 14th century, in which herring are invariably the most common species by number of bones. In the Upper Ward herring remains the most common species in the main samples, although at a reduced level. Eel is the most numerous species in the Phase 2 sub-sampled fraction of the kitchen court (Tables 74, 75 and 76), from both residues and flots and also in the small Phase 2 sample from the Round Tower Kitchen (Table 1). The quantity of Phase 2, 11th century, samples is low and any interpretation from this material should be regarded with caution. However, the Phase 2 fish do show herring in relatively lower proportions than later phases, with eel and freshwater fish dominant. This is more typical of pre 11th century fish assemblages where herring are largely found in an 'urban' context, before the change towards increased catches of herring and cod, which started around AD 1000 (Barrett *et al* 2004a).

In contexts 2586 (layer in the Round Tower Kitchen) and 1565 (layer in the Strong Room) sampling divided into grid squares has shown concentrations of fish bone in certain areas, accompanied by increased densities of scales. The latter in particular suggests cleaning waste from descaling while preparing fish. They were also found in quantity in 12th century kitchen deposits at St Gregory's Priory, Canterbury (Smith 2001, 313). In contrast there were significant concentrations of fin rays, ribs and vertebrae in the contemporary refectory floor deposits at St Gregory's, which Smith regarded as waste from served food which had fallen to the floor (ibid 316).

Whether the dominance of bones from small fish directly represents the proportions of various fish species prepared in these rooms at Windsor, or is selective, reflecting floor cleaning where larger fragments have been cleared away, is unclear. There is some evidence from the animal bones to suggest the latter and for fish, head bones of the larger species, such as cod, were rare and vertebrae were often broken, a few showing chop marks. Gurnard, with a very characteristic pattern to the robust skull elements and therefore easily identified, was mostly represented by very small fragments. Unfortunately there are no deep features, for example rubbish pits, which might show a greater range of larger species and bones to compare with the floor levels.

The great majority of the fish species identified are most likely to be human food remains given their provenance, primarily from kitchen deposits. They are all species commonly identified in contemporary archaeological deposits. Their role in medieval diet and their possible procurement is described below.

The Marine Species

The elasmobranchs (sharks and rays) survive poorly as already noted. They are often not specifically identifiable from vertebrae, although x-rays have revealed species specific features (Desse 1984). Only one ray species has been identified here,

roker, from characteristic sturdy denticles known as 'bucklers'. Other species can sometimes be identified, also from their denticles (Gravendeel *et al* 2002). There is documentary evidence that some species of ray were traded (Van Buyten 1994). They were marketed dried and salted, as well as fresh. When eaten fresh rays are best after a day or so, once the smell of ammonia has dissipated, an advantage in times of non-mechanised transport. They then deteriorate like any other fish.

Conger eel is poorly represented, not due to poor bone survival, but this species is seldom found in large numbers. It more typically inhabits the rocky coastline of the south-west than the English Channel and southern part of the North Sea. None of the specimens were from large fish and the bones included a few skull fragments suggesting the presence of complete individuals. Conger eel was eaten fresh, but also stored salted and in brine, barrelled as 'collars'.

Herring are ubiquitous, the most numerous species of this and most medieval fish assemblages. Small fish, rich in oil, they were caught in their millions during seasonal spawning migrations. Herring were eaten fresh in the season and also barrelled in salt and brine in quantity, to be eaten by both rich and poor alike. For the wealthy, both secular and religious, eating stored herring served as a visible sign of penance during the many fast days, which amounted to approximately half the year. Salt herring were given as alms and were the staple fish of Medieval England, though later superseded by cod (Locker 2001, Barrett *et al* 2004b). Fresh herring would have been seen as of higher status than stored, particularly when transported inland. Van Neer and Ervynck (2004, 211) have suggested herring changed status from a staple to a luxury food depending on whether it was stored or fresh and where it was eaten. Fresh herring soon deteriorates and requires swift, and therefore more costly, transportation. There is no evidence from the bones to determine their state. Certain gutting procedures carried out prior to salting have been determined from the representation of particular bones in specialised deposits in Denmark and Belgium (ibid and Enghoff 1996, 3), but this was not found at Windsor. The mixed remains of both fresh and stored herring would blur any selective bone distributions. As noted above herring is relatively less well represented against other species in the 11th century deposits compared to the later levels, when it is invariably the most abundant species. This coincides with the beginning of the 'fish event horizon' in the 11th century, from which time the bone evidence from many sites indicates herring and gadids become much more numerous (Barrett *et al* 2004b, 621). These Phase 2 deposits are more reflective of an earlier period when eel and freshwater species tend to dominate assemblages, indicating utilisation of local resources.

Anecdotal remarks are often cited as evidence that salted and pickled herring were universally disliked but endured because there was little choice. This view seems erroneous, herring became the object of a major fishery, with a valuable trade and marketing network, on which fortunes were made. An element of boredom with the same food may prevail at a time when the seasons and long fast periods dictated what was available. However, people will not eat what they really do not like, even under fast conditions or a dearth of other choices, unless starvation beckons. This is exemplified by a more recent example, the import of ten million half-pound tins of snoek from South Africa in 1948, followed by nine million tins of barracouta from

Australia. Despite the austerity of post war rationing, made worse by the most severe winter in living memory in 1947, these fish proved totally unpalatable to the British public and were quietly relabelled as cat food 18 months later (Driver 1983, 41). The view of stored herring as unpopular may perhaps be more a reflection of the modern palate than an objective assessment of medieval diet. However, it was gradually superseded by cod, which may have been partly affected by changes in the domestic local herring fishery and expansion of cod fisheries as much as taste. The latter is supported by surviving documents for Westminster Abbey, where Harvey (1996, 49) has shown the monks had a low regard for herring by the late 15th century, eating far more 'white fish', particularly gadids, but considers that two centuries earlier they would have eaten far more herring.

Relatives of the herring identified here include the shad and sprat. The former, most likely the more common of the two species of shad, the twaite shad, (*Alosa fallax*) enters fresh water to spawn in tidal reaches and is a seasonal fishery in May and June. Sprat, a small herring-like species are common pelagic fish inshore. The young of both sprat and herring are often caught together in tidal reaches of rivers, such as the Thames and eaten fried as a delicacy, called 'whitebait'. Adult sprats were also stored; salted, smoked and kept in brine like herring.

The Gadidae are a major group of food fishes and include cod, a prime and favoured fish throughout history. Others such as haddock have had varying status, but cod has always been highly regarded. The numbers of cod bones in this assemblage are low and are mainly vertebral fragments. While acknowledging this may be biased by the clearing of larger debris from floor levels and, taking into account that a large fish will be represented by fewer bones than the equivalent volume of flesh of a smaller species, cod is poorly represented by bone number in these deposits, as are haddock and ling. However, cod is better represented by context occurrence, shown in Figure 8 and Figure 11. The latter compare data for the Kitchen by context occurrence (in Figure 8) and by context occurrence cumulatively (Figure 11), while Figure 12 shows percentage of the Nisp. Cod is slightly depressed in the species order of magnitude by occurrence, joint ninth in the Kitchen (Figures 8 and 11) against seventh by bone number (Figure 12). Figure 9 shows fish by occurrence in the Strong Room where eel and herring are found most frequently and cod and haddock are not widely occurring.

Analysing the contemporary documentary evidence for royal progresses away from Windsor (discussed below and shown in Figure 10) by occurrence each fish day shows cod and other forms of salted cod (*morr, stok*) were frequently eaten, *morr* even more so than herring (*allec*). Salted cod were headed and had some vertebrae removed during curing, another potential bias against cod survival in the fishbone record. Salting and drying was normally carried out on relatively small cod ranging in length from 40cm to around 70cm live length (McGovern 2005). They were headed and split, retaining the pectoral girdle and some caudal vertebrae. It was easier to produce an even cure on smaller fish as there is less variation in thickness of the flesh. The low numbers of cod bones in this assemblage precluded any study of patterning by anatomy, which might confirm whether some cod were stored. However the contemporary documentary data suggests that much of the cod

consumed at this time was salted and dried. Measurement of four bones indicated specimens of 90-100cm and gutted weight of approximately 7-9kg (Wheeler and Jones 1976, 215), adult fish but not exceptional in size. Some smaller individuals were also present. The measured bones were from the skull indicating some whole fish, which may have been fresh, since stored cod and allied species were usually beheaded prior to curing.

Haddock and ling both featured poorly by bone number in the archaeological sample. In the documentary data only haddock is mentioned. However cod, haddock and ling all score higher by occurrence than bone number as shown below. The few cut and chop marks that were recorded were mainly found on these larger fish, including cut marks on two large gadid branchiostegal rays and four vertebrae chopped obliquely across the body. The most commonly identified gadid is whiting, to which many of the small gadid group may also be attributable.

Garfish was an infrequent find, a fish characterised by its long 'beak'. It has green bones when fresh; this colour is lost on cooking. This fish is good to eat but must have been an occasional treat and does not appear in contemporary household accounts or dietaries. Scad is not found in accounts either; a fish often identified from the characteristic bony scales sited along the lateral line, it was sometimes netted with other fish. It is more commonly eaten in the Mediterranean where it is seasonally abundant. Both these species were only found in the Kitchen of the Round Tower where the largest samples of fish bones were recovered. They would appear to have been eaten rarely rather than a victim of sample size (see Figure 6) as many contexts totalling over 200 fish bones did not contain these species.

Gurnard, also known as 'garnet' in some documentary accounts, is also good to eat and appears in many contexts here and at other sites. However, it may be over represented, as the distinctive sculpturing makes recognition easy, even from small fragments.

Mackerel occurs regularly, albeit in small numbers. An oily fish, it spoils quickly when fresh and consequently was permitted to be sold on Sundays when other fish were not. Mackerel was also salted and sometimes put fresh into pastry to preserve it in the short term, as were other species including flatfishes.

The flatfishes are an important group of food fishes. Plaice and flounder are the dominant species in the Windsor assemblage. Measurements from seventeen bones indicate that plaice were between 29-50cm total length, but large plaice were not noted as a mark of status. Brill and sole were also identified and probably higher ranking than plaice and flounder. However, they were rare and only present in the Round Tower Kitchen and Strong Room. The large flatfishes such as halibut and turbot, absent here, were expensive fish and symbolic of high status particularly if very large. In gastronomic terms increased size, and therefore age, is at the cost of the quality of the flesh, which progressively coarsens. A halibut of record size, perhaps three metres in length, is more a visual symbol than a culinary delight.

Migratory fish

In terms of bone numbers eel is the most frequent migratory species, they were caught in many thousands, by nets, traps and spears. They were also stocked in managed fishponds both within the Great Park and other Royal ponds around the country to which the kitchens at Windsor had ready access (Steane 1988, 47). Rich and oily, eels were eaten fresh, smoked and salted. Measurements here (n = 114 from the Round Tower and n =19 from the Upper Ward) show a range of sizes with 50 per cent between 25-35cm in length (after Libois *et al* 1987). There were also some larger fish; 22 per cent were over 45cm of which five were over 50cm and probably female, as males do not achieve this size. Various names were given to eels reflecting both their size/age and colour and possibly the way in which they were stored; these include dole, pimpernel, shaft and stub (Dietz 1972). Eel is common in fish bone assemblages over a wide range of sites in time and type, and eaten across all levels of society.

The shad, a relative of the herring, which migrates into tidal reaches to spawn, including the Thames, has already been described and was a seasonal fishery (see above).

In the medieval period fresh salmon was a prestige fish. The Royal household regularly ate salmon as indicated in contemporary documents described below. Despite their propensity for poor survival salmon vertebrae and, more unusually, premaxilla and dentary fragments, as well as some scales were found in a number of contexts. The remains of two vertebrae showed evidence of oblique chop marks across the vertebral body. Whether the salmon was fresh is not stated in the documents. Salmon was also stored; salted and smoked until they were hard and dry, a different product to today's smoked fish. They were also barrelled pickled in salt, but the records of the royal progress only refer to numbers of salmon, not barrels. They may have been eaten as fresh and individually salted fish. Fresh salmon would have been regarded as superior to salted salmon as indicated by the Compotus Rolls of St Swithun's Priory, Winchester for the late 14th and early 15th centuries where salt salmon was served as a main course; fresh it was always a side dish (Kitchen 1892, Locker 2006).

Freshwater Fish

Freshwater fish were widely eaten during the medieval period and some species were considered prestigious, especially when from private ponds. These were originally secular and initially royal, introduced with the Normans (Bond 2016, 29), although there is some evidence for their use in Saxon times. Religious houses, also considered high status, then adopted and in many cases improved pond systems from the late 12th century. Large fish were used as prestige dishes on the table or in gift exchange. Riparian rights also gave elite landowners a supply of fish for the table, but private fishponds were in their own right a symbol of wealth and power. Fish were raised in complex waters systems where different species, sizes and ages of fish were farmed. Live fish were transported in barrels of water, or packed in wet straw in the case of

species able to survive a day or so out of water if kept damp, such as eels and later carp.

Pike was one of the prime species for the table. A voracious carnivore, there were established stocking procedures for pike to ensure that they did not eat the other fish which, if too small, became prey. The Windsor pike were from fish of varying sizes, the largest being 50 to 60cm, the maximum size is around 130cm, so these were not exceptional in length. Two of the larger vertebrae showed evidence of chop marks. There were also a number of small fish. The names by which pike were known at this time often relates to their size. *Pikerel* were small fish of edible size and pike once they reached 3lb according to Hickling (1971-2), a 'great pike' referred to a large specimen. The ponds in the King's Park at Marlborough were regularly stocked with pike (Priestley 2000a).

The Cyprinidae, namely tench, bream, barbel, dace, chub and roach were common in all deposits. By far the most commonly identified was dace, a small species. Of 83 measured dace pharyngeals from the Round Tower, 23 were from fish of 0 to 10cm in length, 30 from fish of 11 to 15cm and 27 from fish of 16 to 20cm. Only three were from fish of 20 to 25cm, approaching maximum length. Dace are not acclaimed for their eating qualities and may have been part of a *messe* of small fish that were sometimes eaten. The description of *minnows for an entrée* in the Lenten fast of the monks at St Swithun's Priory Winchester in 1515 (Kitchin 1892, 310) could be a mixture of small fish. Small dace were also identified from 20 pharyngeal bones from fish of 6 to 10cm from the Upper Ward, context 18179, and 27 of a similar size range from 18176. Roach also tended to be small, not larger than 20cm; they normally average 35cm and exceptionally can reach 53cm (Wheeler 1978, 132). Tench were few and small, as were chub, and bream. The largest of the cyprinids was barbel, identified mainly from the serrated dorsal fin rays; two specimens were estimated to be from fish of over 50cm in length. There is no evidence for carp, not currently thought to have been introduced to England until at least the late 15th century (Hoffmann 1995, 68) and they were not found in any later deposits at Windsor. However, a calendar roll for Saturday October 13th 1346, relating to the expenses of the office for the royal kitchen at Canterbury, makes reference to *viii pik' et carp xxii.s* (Priestley 2000b). This is a very early date. It does not seem to be a generic name for a cyprinid as these are mentioned quite specifically, as barbel, bream, roach etc. The documentary data do seem to precede the date of bone finds, but this particular reference is 100 years earlier than that concerning the Duke of Norfolk's ponds in the 1460s cited by Hoffmann (1995, 68). It has been suggested they were brought in for specific feasts rather than introduced into pond culture. There is a documentary record for carp in north eastern France on the Marne dated to 1258 (Hoffmann 1995, 68), so it is feasible that carp could have been introduced into England earlier, however corroborative well dated bone evidence is yet to be discovered.

Perch was present in low numbers in a variety of contexts. The size of these fish ranged from 15 to 35cm, with the majority around 20 to 30cm. This is known as a bony fish to eat, but did well in ponds and was often stocked with other species. Prior More in Worcester included perch in the records of his pond management in

the early 16th century (Hickling 1971-2) and these seem to have been inexpensive compared to pike and tench. Taverner, writing in 1600, considered perch among the best fish for culture along with carp (in first place), bream and tench (Taverner 1600).

All these freshwater species, and also eels, may have been from the Kings own ponds at Windsor. Originally the royal residence, built by Henry III, five miles south of Windsor, there is a record of 500 little pike being put in the king's (Henry III) fishponds in calendar rolls dating to 1247-51. Bream were regularly stocked as well (Priestley 2000a). Later breaching of the ponds by floods resulted in restocking with 300 pike, 300 dace and roach (calendar rolls 1260-7). The royal ponds at Marlborough were among the most important of many across the country during the 12th to 14th centuries, when 28 royal fishponds were in use (Steane 1988). Marlborough seems to have been a great centre for breeding stock to supply both the king and other landowners. Fishpond ownership and management was an expensive pastime and only afforded by the aristocracy, religious houses and wealthy gentry. Some sections of rivers were also leased privately to increase fish supplies (Roberts 1986). The king also requisitioned fish from other pond owners. For example, the Bishop of Winchester was to supply Westminster with pike (salted) and other fish in paste before Christmas in 1240. In 1241 pike (salted) and bream (in paste) were sent to the king at Woodstock. The high regard in which these freshwater fish were held is supported by many recorded instances of poaching. This was particularly common when the ponds were being drained and the fish easily caught (Roberts 1986, 130).

Fish Supply and Storage

The fish identified at Windsor indicate that a wide variety of sources were used. Some marine fish may have been brought in fresh from London, either by a representative of the king directly from the docks, or via a merchant or fishmonger. Windsor is located about 30 miles from the port of London as the crow flies and, particularly during the winter months, fresh marine fish such as cod, haddock, ling and plaice could have been brought to the castle by cart. Similar journeys are recorded in surviving port books and represent the movement of prestige goods to wealthy customers.

Marine fish were also marketed salted, dried and barrelled in brine in large quantities. These had the advantage of long-term storage. The quality of cure varied and the low-grade cures were relatively inexpensive, so some form of stored fish was accessible to a wide range of society. Herring, so plentiful in the Windsor deposits, had many grades and different cures, pickled, salted, dried and smoked. They were barrelled in millions at Great Yarmouth and other ports and described as red and white depending on the cure. Cod were salted (often referred to as *salt fish, morr, haberdine* etc) and dried. Air-dried cod, in which the fish were headed and dried in the round (no salt was used) were authentic stockfish (*stok*) and, strictly speaking, only came from the Lofoten Islands off Norway. However cod headed, split and cured by a combination of salting and drying was often erroneously called stockfish. Haddock, ling and whiting were also salted, though whiting, the most numerous gadid here, may well have been brought in fresh, caught in shallow waters off the

Thames Estuary. Flatfishes, primarily plaice and flounder were trapped along the shoreline and in estuaries, eaten both fresh and salted. Mackerel could be caught seasonally inshore, fresh they deteriorate quickly, but could be kept for a few days in paste, or for long-term storage, salted or pickled.

There is evidence of a supply from seasonal Thames fisheries for shad and smelt, both identified in very small numbers. The Thames may also have been a source of salmon, a prestige fish, described above. The use of managed ponds and stretches of water for eels and freshwater fish, particularly pike and bream, from the king's many residences would have ensured a constant supply for the royal household and has been described above.

Bone frequency and the documentary data

There are no surviving documentary records for the Windsor kitchens at this period, only the references to food provided for Henry III at Windsor from 1238 to 1270 in the Close and Liberate Rolls. References to fish are few, but include six entries for lampreys, three for pike (*pickerel* or *lucettos*) and single references to shad, bream, mackerel, salted herring and salted eels.

There are contemporary records of supplies, including fish, relating to the king's itinerary of 1344-47 around the feasts of Christmas and Easter (Priestley 2000b). From these data 22 'fish days' have been selected to compare with the bone evidence. The documents indicate which fish were more expensive and include some species not identified amongst the bones, in particular lampreys and sturgeon, which were costly fish and indicative of high status. Salmon and pike also are listed regularly along with the more mundane eels, salt cod, herring, plaice and flounder. There are also references as to whether the fish were stored as indicated by the terminology, such as *allec rubris* or red herring and *morr*, salt cod. Some of the fish are described as *in pane*, a sort of paste or pastry, in which they were cooked. This method extended the shelf life of the cooked fish, the pastry providing a seal, but not as long as salted and pickled fish. Porpoise was also eaten occasionally and counted as fish.

In order to compare the bone data to the number of times each fish species/ group occurred during those 22 days, a measure of occurrence by context rather than abundance by bone numbers was employed. The Kitchen (SSD 661) has 38 contexts from 4mm residues and the Strong Room (SSD 656) has 14. These are the two largest context groupings in individual SSDs and a species occurrence in a context scores one regardless of the number of bones. The final score is expressed as a percentage of the total, for example of 38 contexts for the kitchen. This is more favourable to fish such as cod and mackerel, which may occur in a large number of contexts but are represented by few bones. A similar procedure was applied to the documented 22 days. The results are shown in Figures 8 and 9 for the bone data and 10 for the documentary data.

It is clear that, even with this method, the relative frequency of herring and eel remains high in the archaeological samples, particularly in the Kitchen. The cyprinids, especially dace, roach and barbel in the Kitchen, and dace and bream in

the Strong Room are well represented (Figure 8). Pike also features strongly and, to a lesser degree, perch. Marine fish in Kitchen deposits are well represented by plaice/flounder, mackerel and whiting, while in the Strong Room plaice/flounder and whiting occur regularly but mackerel is reduced (Figure 9). Some species, occurring in low numbers when expressed as a proportion of the total number of bones, show to greater advantage by occurrence which is more representative of episodes of consumption than quantity. Pike shows up in nearly half of all contexts (47 per cent and 46 per cent), while mackerel is present in 37 per cent of the kitchen deposits and in 23 per cent in the Strong Room. Dace is still the most frequently identified cyprinid, with barbel common in the kitchen deposits. Of the gadids, whiting is still the most numerous and is a small fish, but the relative importance of cod increases, particularly in the Kitchen. To compare the data displayed in the same manner for bone numbers in the Kitchen see Figure 12, where herring and eel are far in excess of all other species.

The same technique was applied to the 22 'fish' days shown in Figure 10. Many of the categories are self-evident, *morr* is salt cod, *allec* salt herring, *pik/luc* is pike. *Merling* is whiting, *anguille* is eel, *codeling* small cod or other gadid, *mak* is mackerel and *mulett* grey mullet. The main fish consumed are comparable to that shown by the bone data. There are also some luxury fish documented such as lamprey, sturgeon, halibut and a much higher incidence of pike. The occurrence of salt cod (*morr*) in 95 per cent (with stockfish in 36 per cent), and red herring (*allec rubris*) in 91 per cent of the fish days emphasises the importance of these two staple fish, herring and cod, even in the most affluent households in the 12th to 14th centuries. Salmon, at 50 per cent, was also important. Roach, at 55 per cent is most the popular cyprinid, bream and barbel less so, but there is no specific mention of dace. Whiting (*merling*) were eaten regularly as were plaice and flounder.

The absence of lamprey in the bone data is attributable to an absence of bony parts in this fish. The only parts to survive are the teeth set in a round sucker, disc-like, mouth and are found very rarely in archaeological samples. However the documentary data show they were commonly eaten. They were popular with royalty and there were substantial fisheries on many rivers for the river lamprey (*Lampetra fluviatilis*), for example on the Severn. The citizens of Gloucester annually presented a lamprey pie to the sovereign. Henry I and King John are rumoured to have died as a result of a surfeit of lampreys (Maitland and Campbell 1992, 87). Even if historically incorrect it does emphasis the popularity and status associated with this species. Sturgeon (*Acipenser* sp.), a fish belonging to the crown, has often been identified from fragments of the distinctive body scutes and pectoral spines. The skeleton is poorly ossified though some skull bones sometimes survive. However, the distinctive scutes and spines have been identified in small numbers from many sites, particularly in London, for example the site of the Fleet Prison where a large spine was identified (Locker 1994). The large size of sturgeon suggests any remains were unlikely to have been missed during excavation. Sturgeon may be absent because they were not prepared in the kitchen areas excavated or large bones and scutes were cleared from layers and floors. They were also absent among the hand collected mammal and bird assemblages. The documentary data shows sturgeon

served on 6 of the 22 fish days during the royal progress. Some tangible evidence of its consumption at Windsor might be expected.

To assess the effects on the bone data by displaying occurrence as opposed to the number of bones, the samples from the 38 contexts of the Round Tower Kitchen (Figure 8) are displayed by both methods in Figures 11 and 12. In Figure 11 the per cent is the cumulative occurrence of species in the 38 contexts so the total becomes 215. In Figure 12 the species are a percentage of the total identified number of bones (Nisp 5,230; selected data from Summary Table A). Figures 11 and 12 are directly comparable, in Figure 8 each data set, or species, is independent.

The species order remains the same, or very similar, in all three figures. Both context occurrences are exactly the same in rank, and the relationship between the species is the same in both. The Nisp percentage in Figure 12 shows 12 differences out of 15 in rank order compared with occurrence although herring and eel remain at the top and tench, bream, brill and sole at the bottom. There is also a far greater emphasis on herring (58.9 per cent) and eel (26.9 per cent) with a big drop to whiting at third, only 2.9 per cent, with only pike and plaice/flounder over 2 per cent. All the rest apart from dace are less than 1 per cent. While herring and eel are the most numerous species by bone number factors of differential preservation, recognition and floor cleaning discriminate against some other species. Large numbers of herring were consumed testified by their surviving bones, as were eels. Large gadids were also commonly eaten by the court, in the form of stored fish according to the documentary evidence. These could have provided a great deal more flesh than their scarce remains suggest. Based on contemporary evidence for naval and army rations one cod of 70 to 90cm (3 to 4.5kg) was considered equivalent to six to nine whiting (averaging 40cm length, weighing 0.5kg) or 12 to 18 herring (averaging 25cm, weighing 0.25kg), (Locker 2000, 134). In a model sample, where all bones survived from the same weight, of these three species the great predominance of herring by bone number over whiting and in particular cod is obvious. If the cod were stored, then, depending on the method of preservation (they may have been headed and had some of the vertebrae removed), cod would be additionally poorly represented by bone number. The surviving bone evidence is therefore biased heavily towards herring and eel. Comparing the same data by the number of contexts in which a species occurs still shows herring and eel in prime position but presents a less dramatic difference compared to other fish. As in Figures 8 and 9 not all categories were included, more general groups such as large gadid and small cyprinid were excluded as too imprecise. Had they been included small cyprinid would have been present in most contexts, the most common cyprinid species are dace, barbel and roach. Freshwater fish are clearly an important element in this assemblage with pike ranking third by occurrence (Figures 8 and 11) and fourth by Nisp (Figure 12) in the Kitchen deposits. Perch ranks seventh by both methods.

These data, dominated by staple fish such as herring, illustrate the difficulty in ascribing status to archaeological fish samples, where assemblages are dominated by ubiquitous and inexpensive species available to most socio-economic groups. The documentary accounts also emphasise fish that were widely and commonly available including herring and gadids, stored fish, eels, the small flatfishes as well as the

more 'elite' produce of managed ponds including pike. Herring has been described by Smilie (2004, 23) as 'the favoured food of kings and queens and, at the same time, the fodder forced upon marching armies'. Elaborating on the common occurrence of this fish, which turns up in so many contexts, especially in the post Roman era, he later writes 'Herring was the staple diet in British Medieval times, if not wholly liked...often described as the potato of the Middle Ages', here making reference to the perceived lack of enthusiasm for herring where familiarity over long fast periods may have lessened its appeal (ibid). The importance of herring in the Windsor deposits may be more reflective of a period when the rich ate larger quantities of those foods generally available to announce their status, rather than defining themselves by particular types of food (Mennell, 1997, 324). This accords with the third of four levels of food consumption defined by Ervynck *et al* (2003, 429), where affluence is the consumption of goods beyond basic and considered needs, in other words volume. Level four, luxury, is defined by foods that are special, of limited supply and expensive. There were documented status fish such as lampreys and sturgeon, the latter restricted as the property of the crown. The delivery of fresh marine fish inland may also be a mark of luxury, their expense and exclusivity reflected in costs of the swift transportation needed to deliver them inland in prime condition. Therefore the state of the fish is as important as the species. The extensive use of freshwater ponds ensured 'in house' supplies, and there was a hierarchy of species, with pike and bream ranking at the top also determined by size of the fish. So within the elite status of fishpond culture there was a further division denoting affluence or luxury.

The impression from the fish assemblage at Windsor seems to be one of affluence, marked by volume (although this cannot be quantified in any comparative way), while luxury was reserved for particular events. The consumption of herring in high-ranking households during periods of fast was also a way of showing piety during Lent, but there is evidence for a decline in stored fish and particularly herring in the later medieval period. Woolgar (1999, 112) refers to costs and proportions of expenditure on food and drink in three wealthy households in the late 13th, early 15th and early 16th centuries. Staple fish: herring, stockfish and salt fish are 39 per cent of all expenditure in the 13th and 15th centuries dropping to 12 per cent in the 16th century. Within the staple fish category herring are 52,530 by number and 49 per cent by value in the 13th century household. For the 15th century household the balance has changed to 26,640 herring, and 34 per cent of the value, with more being spent on salt and stockfish. This trend away from herring increases in the 16th century accounts. It would be interesting to gauge whether it could also be detected in later deposits from Windsor.

The inference of status from a fish bone assemblage is problematic, whether they were fresh or stored is a marker but difficult to detect. Mennell (1997, 317) has pointed out that documentary records of the great banquets are 'misleading as a guide to medieval appetite', they were the high points and the elite did not eat like that all the time as the kitchen accounts underline. Individual fish may have been very large, or a prestigious species, both potentially detectable in the fish bone assemblage. Within the animal bone assemblage there may be more subtle indications than species, such as the age of the animal and particular cuts and joints revealed in an unequal representation of body parts and therefore bones.

By the end of Henry IIIs reign Priestly (2000a) has shown there were at least six kitchens in the castle, the three main ones being the King's Kitchen in the Lower Ward, the Queen's Kitchen in the Upper Ward and the Kitchen in the Great Tower. The Tower's kitchen is well documented, as is its larder, spence and pantry in 1295 (E101/492/11). A buttery is documented in the Great Tower in 1297-98 (101/492/13) and a bakery in 1334 (SC6 753/8). Steven Brindle (2018) has written:

'The children's household, with the ladies, noble children, 'valets' and servants, probably numbered at least 30 and it sat within a larger resident community, which grew considerably during Henry III's reign to number well over a hundred people. Many of the resident constables, knights, serjeants, upper servants and craftsmen had their own families and servants and there were doubtless many more servants and manual labourers.' (*ibid*, 59)

The kitchens could also be pressed into use for charitable purposes, for example when large numbers of poor people were fed in the Great Hall and the Hall in the Tower on Good Friday in 1241 (Calendar of Liberate Rolls 1240-45, 37).

The question of who these kitchens served is pertinent to any discussion of status, but there is no definitive evidence to confirm that either kitchen area supplied a particular social group within the castle. An inventory of 1334 (SC6 753/8) makes it clear, however, that the Round Tower was a part of the castle in the direct care of the Constable, and it is likely that the Constable and his household would normally have been resident in the building.

The fish assemblages from these excavations are very similar to those from other high ranking establishments such as the Tudor deposits at Little Pickle, near Bletchingly in Surrey possibly associated with Anne of Cleves (Bullock 1994, 270). Here the deposits were sieved through a 6mm mesh, too large to trap the small bones of some fish species, such as herring and eel, which are poorly represented here. Larger fish such as sturgeon, pike, carp, bream, tench and ling were identified as well as large gadids, only represented by the pectoral girdle and caudal vertebrae, indicating stored fish. The very low numbers of small fishes are very likely to be a recovery bias, as recognised by Bullock. From the large fish identified there is evidence of both status, from sturgeon and freshwater species, as well as common commodities such as stored cod, bought to last through several months. The deposits at Nonsuch Palace in Surrey are not attributable to royal occupation but subsequent ownership by the Berkeley family in the 16th and 17th centuries and show high status from their fish and animal remains (Locker 2005). All spoil was passed through a coarse sieve, which although an advanced technique for excavation in the 1950s, only trapped the larger fish bones, consequently herring, eel and other small fish were probably lost. However, large fish including sturgeon, salmon, trout, pike, carp and barbel were identified, as well as conger eel, cod, ling, gurnard, grey mullet, turbot and plaice. A Tudor palace, there were already fishponds on the estate as well as a hunting park. Deer, hare, rabbit and a wide variety of birds were identified. The variety of species in itself suggests status, harking back to a royal past.

Religious houses were often wealthy and considered high status, affluent with hints of luxury, particularly for the Prior and his guests. Reference has already been made to the fish from St Gregory's Priory, Canterbury (Smith 2001). These were largely herring, whiting, flatfishes and eel from the Refectory floor and herring, whiting and flatfish from the Kitchen floor. Other fish including large gadids, cyprinids, sea breams, bass and grey mullet were also present, but there is no particular indication of status. Smith has suggested, on the basis of variation in size within species, that some marine fish were fresh. Situated close to the Channel ports delivery would have been unproblematic. The absence of head bones and certain vertebrae in other fish, the large gadids, suggests they were stored. The higher concentrations of herring in the kitchen might indicate servants ate there, while the monks, eating in the refectory, had more varied fare. There were no fish deposits from the Prior's Lodge, which might have shown whether he and his guests ate better than his monks (ibid 317). At Eynsham Abbey, Oxon (Ayres *et al* 2003), where deposits dated from the Norman period until the Dissolution, the sieved samples contemporary with the Windsor fish, from the Abbey kitchen, were mainly herring and eel, with few large gadids, or flatfishes. There were also pike, perch, cyprinids (dace and roach) and a few salmonid vertebrae. The monks leased a stretch of river and also had their own ponds. However the pike are unremarkable in size and apart from the few bones of salmon, which may or may not have been fresh, there is no suggestion of status. Eynsham started out as a wealthy house in the Norman period but there is some evidence of a later decline. The fish assemblage, apart from a relative increase in herring in the final Dissolution deposits supporting an economic decline, does not contribute particularly to any assessment of the Abbey's status.

A number of excavations in the Reading and Windsor area Hamilton-Dyer (2005) recovered fish bones of contemporary date with the Castle assemblage. Hamilton-Dyer comments that the number of fish bones were few compared to some other inland towns (ibid, 177). Most of the fish were marine, including large gadids and herring, eel was common from sieved deposits but obligate freshwater species were few, the only cyprinid identified was chub. Evidence of status was suggested by a few finds of sturgeon, salmon, burbot and turbot.

CONCLUSIONS

The sites described above demonstrate some of the difficulties in detecting signs of social status from the fish bone evidence. Curiously the better the level of recovery the more difficult this becomes. Little Pickle and Nonsuch Palace, because of the large mesh used in sieving, are biased towards large fish. These are both sites where status foods would be expected to have been signficant. The probable loss of small bones from species such as herring and eel, although acknowledged, nevertheless shifts the emphasis to these larger fish, raising the visibility of fish known to have been eaten by the elite. Conversely Windsor, St Gregory's Priory and Eynsham Abbey, where deposits were screened through a fine mesh size, include all the smaller species whose bones dominate the assemblage in a manner disproportionate to their flesh weight compared to larger fish. In order to assess the degree of bias using bone numbers, the Windsor fish assemblage was also quantified by the number of contexts in which a species was identified. This is a measure of how often compared to how much. It confirmed herring and eel in first and second place, as by bone number where they are even greater in excess of all other species. In general the species order remained very similar by both methods in the kitchen deposits (see Figures 8, 11 and 12). Cod does rank a little higher by bone number than by occurrence, in contrast to what might be predicted for a large fish represented by relatively few bones. It was evidently also restricted to comparatively few contexts. The documentary data, based on occurrence over 22 days (Figure 10, from Priestley 2000b) supports a high consumption of herring, as salted red herring, and salt cod (*morr*). Most of the fish identified at Windsor were also eaten during the royal progress at Christmas and Easter 1344-47 according to the documentary data. In addition lamprey and sturgeon, both high status fish, occur quite frequently, the reasons for the likely absence of both these fish in the bone record has already been discussed. During the royal progress salt herring was eaten on 20 of the 22 fish days and salt cod on 21 days. The next most common species was pike, eaten on 19 days. A variety of cyprinids are also listed, emphasising the importance of river and pond raised fish among the aristocracy. These data support a dependency on stored herring and large gadids for compulsory fish days at this time, even at the very apex of society. Certainly within the royal progress food would have been structured to accommodate different ranks within the court, reinforced by their position at table in relation to the king. There is no way of discerning this structure from the documents. Similarly it is not possible to attribute a hierarchy of fish consumption within the Windsor deposits, since the recipients of the fish from these kitchens are not known.

The basis of fish consumption at the castle from the 11th to 14th centuries, as represented by this assemblage, is centred around herring, mostly stored, eel from ponds and rivers, large gadids (often stored) and small flatfishes. Freshwater fish were supplied from the many royal ponds, particularly pike, perch, dace, barbel and roach. Salmon was also commonly eaten, fresh or stored. These deposits support the concept of status affirmed by quantity, based on herring, eel and gadids. Though there is some evidence of quality from pond fish and salmon, the luxury documented for royal banquets is absent. On the basis of the fish bones this assemblage is indistinguishable from other contemporary houses of the gentry.

Future work

As might have been expected, assessment of the results of the Historic England (formerly English Heritage) work at Windsor has highlighted the significance of the well-documented building sequence, and its excellent evidence for construction, decoration and use of buildings within the castle from the early 12th century through to the present day. Assessment has also demonstrated, however, the importance of the medieval occupation deposits at Windsor, and in particular of the two kitchen assemblages from the 12th-14th centuries including stratified deposits and structures in the Round Tower kitchen. Future work will expand upon this study to cover all the evidence for food procurement, preparation and cooking across this period, as well as looking at all the other evidence for life within the medieval castle. It is hoped that further study of the finds, combined with radiocarbon dating, will also further refine the dating of these deposits.

REFERENCES

Ayres, K, Ingrem, C, Light, L, Locker, A, Mulville, J and Serjeantson, D 2003 'Chapter 10: Mammal, Bird and Fish Remains and Oysters' in Hardy, A, Dodd, A and Kevill, G D (eds) *Ælfric's Abbey. Excavations at Eynsham Abbey, Oxfordshire, 1989-92* (Thames Valley Landscapes **16**). Oxford: Oxford Archaeology Unit, 341-432

Baker, P 2001 'Windsor Castle: Further assessment of animal bones, residues and flots'. Unpublished document. Portsmouth: English Heritage

Barrett, J, Locker, A and Roberts, C 2004a 'The origins of intensive marine fishing in medieval Europe: the English evidence'. *Proceedings of the Royal Society of London B*. **271**, 1-5

Barrett, J, Locker, A and Roberts, C 2004b 'Dark Age Economics' revisited: the English fish bone evidence AD 600 – 1600'. *Antiquity* **78**, 618-636

Bond, J 2016 'Fishponds in the monastic economy in England', in Bonow, M, Olsén, H and Svanberg, I (eds) *Historical Aquaculture in Northern Europe* (Södertörn University Research Report 2016:1). Huddinge: Södertörn University The Library, 29-58

Brindle, S 2018 *Windsor Castle: A Thousand Years of A Royal Palace*. London: Royal Collection Trust

Bullock, A 1994 'Evidence for fish exploitation from Tudor deposits excavated at Little Pickle, Surrey/England in 1989', in Heinrich, D (ed) *Archaeo-Ichthyological Studies. Papers presented at the 6th meeting of the I.C.A.Z Fish Remains Working Group. OFFA* **51**, 267-274

Burgess, S nd 'Windsor Castle Fire Project. CAS Site Code 485. Environmental summary'. Unpublished document. Portsmouth: English Heritage

Desse, G 1984 'Nouvelle contribution à la diagnose des pièces rachidiennes des poissons', in Desse-Berset, N (ed) *2nd Fish Osteoarchaeology meeting*, CNRS (Centre de recherches archéologiques. Notes et Monographies Techniques **16**). Sophia Antipolis – Valbonne: Editions du CNRS, 25-39

Dietz, B (ed) 1972 *The Port and Trade of Early Elizabethan London*. London: London Record Society

Driver, C 1983 *The British at Table 1940-1980*. London: Chatto & Windus

Enghoff, I Bodker 1996 'Denmark's first herring industry?' *Maritime Archaeology Newsletter from Roskilde, Denmark* **6**, 2-4

Ervynck, A, Van Neer, W, Huster-Plogmann, H and Schibler, J 2003 'Beyond affluence: the zooarchaeology of luxury'. *World Archaeology* **34(3)**, 428-441

Gravendeel, R, Van Neer, W and Brinkhuizen, D 2002 'An identification key for dermal denticles of Rajidae from the North Sea'. *International Journal of Osteoarchaeology* **12**, 420-441

Hamilton Dyer, S 2005 'Reading and Windsor: An overview of the animal bone assemblage', in Preston, S (ed) *Reading and Windsor Old and New. (*Thames Valley Archaeological Services Ltd. Monograph **7**). Reading: Thames Valley Archaeological Services Ltd, 176-181

Harvey, B 1996 *Living and Dying in England 1100 – 1500. The Monastic Experience*. Oxford: Clarendon Press

Hickling, C 1971-2 'Prior More's fishponds'. *Medieval Archaeology* **15-16**, 118-123

Hoffmann, R 1995 'Environmental change and the culture of common carp in medieval Europe'. *Guelph Ichthyology Reviews* **3**, 57-85

Kitchin, G 1892 *Compotus Rolls of the Obedientaries of St Swithun's Priory*. Winchester: Warrens

Libois, R, Hallet-Libois, C and Rosoux, R 1987 'Eléments pour l'identification des restes craniens des poissons dulcaquicoles de Belgique et du nord de la France. 1- Anguilliformes, Gasterosteiformes, Cyprinodontoformes et Perciformes' (Fiches d'Ostéologie animale pour l'archéologie. Série A: Poissons **3**). Juan-les-Pins: ADDCA

Locker, A 1994 'The fish bones from the Fleet Valley: Sites VAL 88 and PWB 88' (Museum of London Archaeological Services Archive Report). Unpublished document. London: MoLAS

Locker, A 2001 *The Role of Stored Fish in England 900 – 1750 AD; the Evidence from Historical and Archaeological Data*. Sofia: PGL

Locker, A 2005 'Chapter 21. Animal bone', in M. Biddle, *Nonsuch Palace. The Material Culture of a Noble Restauration Household*. Oxford: Oxbow Books, 439-474

Locker, A 2006. 'Omega 3: Rent, lent, and charity'. *Petits Propos Culinaires*. **80**, 93-121

McGovern, T 2005 *Fish butchery terms*. Zooarch email posting 19/10/05

Mennell, S 1997 'On the civilising of appetite', in Counihan, C and Van Esterik, P (eds) *Food and Culture. A Reader*. New York: Routledge, 315-337

Priestley, S 2000a 'A history of the royal kitchen and associated offices 1066-1485'. Unpublished document. London: English Heritage

Priestley, S 2000b 'Accounts of the kitchen of the King's household Edward I – Edward III'. Unpublished document. London: English Heritage

Roberts, E 1986 'The Bishop of Winchester's fishponds in Hampshire, 1150-1400. Their development, function and management'. *Proceedings of the Hampshire Field Club Archaeological Society* **42**, 126-138

Rouffignac de, C 1997 'CAS 431: Windsor Castle Round Tower excavations: Environmental summary'. Unpublished document. Portsmouth: English Heritage

Smylie, M 2004 *Herring. A History of the Silver Darlings*. Stroud: Tempus

Smith, P 2001 'The fish bones, in Hicks, M and Hicks, A *St Gregory's Priory, Northgate, Canterbury excavations 1988-1991* (The Archaeology of Canterbury New Series **II**). Canterbury: Canterbury Archaeological Trust Ltd, 308-317

Steane, J 1986 'The royal fishponds of medieval England', in Aston, M (ed) *Medieval Fish, Fisheries and Fishponds in England*. Oxford: British Archaeological Report. British Series **182i**, 39-68

Taverner, J 1600 *Certaine experiments concerning fish and fruite: practised by Iohn Tauerner Gentleman, and by him published for the benefit of others*. London: Printed [by Richard Field] for William Ponsonby. [https://quod.lib.umich.edu/e/eebo/A13396.0001.001?view=toc, accessed 6/12/18]

Van Buyten, L 1994 'Données historiques sur le commerce de poissons à Louvain (Brabant, Belgique) au 18ème siècle et leur apport à l'archéologie', in Van Neer, W (ed) *Fish exploitation in the past. Proceedings of the 7th meeting of the ICAZ fish remains working group* (Annales de Musée Royal du l'Afrique Centrale, Sciences Zoologiques **274**). Tervuren: Musée Royal du l'Afrique Centrale, 151-161

Van Neer, W and Ervynck, A 2004 'Remains of traded fish in archaeological sites: Indicators of status, or bulk food?', in Jones O'Day, S, Van Neer, W and Ervynck, A (eds) *Behaviour Behind Bones. The Zooarchaeology of Ritual, Religion, Status and Identity*. Oxford: Oxbow Books, 203-214

Wheeler, A 1978 *Key to the Fishes of Northern Europe*. London: Warne

Wheeler, A and Jones, A 1976 'Fish remains', in Rogerson, A 'Excavations at Fuller's Hill, Great Yarmouth'. *East Anglian Archaeology* **2**, 208-223

Woolgar, C M 1999 *The Great Household in Late Medieval England*. New Haven and London: Yale University Press

APPENDIX 1. SUMMARY TABLES

The Round Tower. Site 431

SSD 661. The Kitchen

Summary Table A. SSD 661. 4mm residues

Context	*2551*	*2574*	*2586*	*2636*	*2666*	*2667*	*2668*	*2673*	*2678*	*2716*	*2722*	*Misc C14th*	*Misc C12th*	*Total*
Elasmo	0	0	4	0	0	1	0	0	0	6	3	0	7	21
Roker	1	0	38	4	6	0	0	0	0	2	7	1	3	62
Ray	0	0	5	0	0	2	0	0	0	0	0	0	0	7
Eel	34	1	326	32	24	96	2	25	0	181	364	27	585	1697
Conger	0	0	0	0	0	2	0	0	0	0	0	0	1	3
Herring	123	2	1679	429	197	344	78	38	9	124	1066	108	417	4614
Shad	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Clupeid	0	0	5	0	0	0	0	0	1	0	0	0	0	6
Salmon	1	0	5	0	0	1	0	0	0	1	7	0	11	26
Pike	8	0	23	1	3	8	0	2	0	13	53	6	48	165
Tench	0	0	1	0	0	0	0	0	0	0	0	0	2	3
Barbel	1	0	2	0	0	0	1	5	0	2	3	3	3	20
Dace	0	0	29	7	2	2	0	2	1	3	14	3	30	93
Dace/Chub	0	0	1	0	0	0	0	0	0	0	1	0	5	7
Roach	3	0	10	1	0	3	0	0	0	3	6	0	7	33
L Cyprinid	4	0	16	4	0	1	0	2	0	1	8	1	12	49
S Cyprinid	14	0	114	14	10	27	3	11	0	31	195	20	172	611
Cod	2	0	32	16	0	3	1	1	0	1	6	0	1	63
Haddock	2	0	2	0	0	1	0	0	0	1	6	0	1	13
Whiting	2	2	235	41	20	47	17	2	0	0	10	9	3	388

L Gadid	1	0	49	13	6	6	0	3	0	1	5	4	1	89
S Gadid	0	0	77	16	3	12	0	3	1	0	1	0	0	113
Ling	0	0	2	1	0	1	0	0	0	0	0	0	0	4
Garfish	0	0	1	0	0	0	0	0	0	2	1	0	1	5
Stickleback	0	0	2	0	0	1	0	0	0	0	0	0	0	3
Bullhead	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Gurnard	1	0	41	2	1	9	0	4	0	1	6	0	1	66
Perch	2	0	11	2	3	4	0	1	0	3	9	0	2	37
Scad	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Mackerel	1	0	8	1	0	2	1	2	0	0	11	3	6	35
Brill	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Plaice	0	0	71	8	3	5	5	0	0	5	2	2	0	101
Flounder	1	0	14	3	1	0	0	0	0	0	0	0	0	19
Pl/Fl	2	2	136	55	0	11	4	3	1	0	23	2	10	249
Sole	0	0	0	0	0	1	0	0	0	0	1	0	0	2
Flatfish	1	0	23	21	1	1	0	0	0	1	0	14	13	75
Total	*204*	*7*	*2962*	*671*	*280*	*594*	*112*	*104*	*13*	*384*	*1809*	*203*	*1342*	*8685*
Indet	*111*	*23*	*3370*	*565*	*375*	*822*	*95*	*71*	*3*	*126*	*1466*	*275*	*1359*	*8661*

Summary Table B. SSD 661. 2mm residue

Context	*2574*	*2586*	*2636*	*2666*	*2667*	*2678*	*9645*	*Total*
Elasmo	0	0	0	1	0	0	0	1
Roker	0	0	0	1	0	0	0	1
Ray	0	16	0	0	0	0	0	16
Eel	0	331	15	55	36	1	7	445
Herring	1	1417	260	165	284	2	0	2129
Sprat	0	11	0	0	0	0	0	11
Barbel	0	3	0	0	0	0	0	3
Dace	0	22	0	1	3	0	0	26
Roach	0	3	0	0	0	0	0	3
L Cyprinid	0	2	0	0	0	0	0	2
S Cyprinid	0	154	9	19	7	0	0	189
Whiting	0	4	0	0	2	0	0	6
L Gadid	0	0	0	1	1	0	0	2
S Gadid	0	5	2	0	1	0	0	8
Stickleback	0	7	0	1	0	0	0	8
Bullhead	0	6	0	2	0	0	0	8
Perch	0	1	0	0	0	0	1	2
Scad	0	1	0	0	0	0	0	1
Mackerel	0	1	0	0	1	0	0	2
Plaice	0	1	0	0	0	0	0	1
Pl/Fl	0	3	0	3	1	0	0	7
Flatfish	0	9	2	0	0	0	0	11
Total	*1*	*1997*	*288*	*249*	*336*	*3*	*8*	*2882*
Indet	*0*	*1324*	*200*	*414*	*236*	*0*	*27*	*2201*

Summary Table C. SSD 661. 1mm residue

Context	*2586*
Ray	17
Eel	87
Herring	135
Sprat	8
Clupeid	12
Salmon	1
Pike	1
Dace	23
Roach	1
L Cyprinid	8
S Cyprinid	45
Stickleback	14
Bullhead	4
Flatfish	2
Total	*358*
Indet	*476*

Summary Table D. SSD 661. 4mm Flot

Sample		*8391*	*8404*	*8451*	*8495*	*6154*	*6134*	
Context	*2586*	*2620*	*2636*	*2667*	*2716*	*2722*	*9535*	*Total*
Eel	5	0	0	0	5	0	0	10
Herring	104	9	24	55	5	29	11	237
S Cyprinid	2	0	0	0	0	0	0	2
Whiting	0	0	2	0	0	0	0	2
L Gadid	1	0	0	0	0	0	0	1
S Gadid	1	0	0	0	0	0	0	1
Gurnard	1	0	0	0	0	0	0	1
Mackerel	1	0	0	0	0	1	1	3
Pl/Fl	1	0	0	1	0	0	0	2
Flatfish	1	0	0	0	0	0	0	1
Total	*117*	*9*	*26*	*56*	*10*	*30*	*12*	*260*
Indet	*40*	*4*	*2*	*5*	*0*	*6*	*0*	*57*
Scale	*ppp*						*p*	

Summary Table E. SSD 661. 2mm Flot

Context	*2586*
Ray	6
Eel	70
Herring	165
Sprat	6
Clupeid	1
Salmon	1
Dace	4
S Cyprinid	11
S Gadid	2
Stickleback	1
Bullrout	1
Pl/Fl	1
Total	*269*
Indet	*333*
Scale	*ppp*

Summary Table F. SSD 661. 1mm Flot

Context	*2586*
Ray	9
Eel	5
Herring	1
Sprat	5
Salmon	1
Smelt	1
Dace	3

Roach	1
S Cyprinid	16
Stickleback	11
Flatfish	1
Total	*54*
Indet	*204*
Scale	*ppp*

SSD 656. The strong Room

Summary Table G. SSD 656. 4mm residues

	Ph 2	*Ph 3*	*Phase 4*					
Context	*1134*	*1531*	*1565*	*1577*	*1583*	*1595*	*misc*	*Total*
Elasmo	0	0	3	0	0	0	2	5
Roker	0	0	1	0	0	0	0	1
Ray	0	0	7	0	0	0	0	7
Eel	1	0	62	0	0	29	57	149
Conger	0	0	8	0	1	1	0	10
Herring	0	1	290	4	2	24	46	367
Salmonid	0	0	2	0	0	0	2	4
Smelt	0	0	2	0	0	0	0	2
Pike	0	0	24	0	0	2	14	40
Bream	0	0	0	0	1	0	1	2
Barbel	0	0	3	0	0	0	0	3
Dace	0	0	2	1	0	1	5	9
Roach	0	0	4	0	0	0	0	4
L Cyprinid	0	0	14	0	2	0	3	19
S Cyprinid	1	0	8	2	1	6	12	30
Cod	0	0	3	0	0	0	1	4
Haddock	0	0	1	0	0	0	0	1
Whiting	0	0	49	1	1	6	20	77
L Gadid	0	0	4	0	0	0	2	6
S Gadid	0	0	25	0	1	3	1	30
?Bullrout	0	0	0	0	0	0	4	4
Gurnard	0	0	21	0	1	1	2	25
Perch	0	0	1	0	0	0	0	1
Mackerel	0	0	0	0	1	4	1	6
Plaice	0	0	4	0	0	0	0	4
Flounder	0	0	1	0	0	0	11	12
Pl/Fl	0	1	39	0	0	0	9	49
Flatfish	0	0	6	0	0	0	0	6
Total	*2*	*2*	*584*	*8*	*11*	*77*	*193*	*877*
Indet	*4*	*5*	*521*	*3*	*20*	*42*	*273*	*868*

Summary Table H. SSD 656. 2mm residue

Context	*1590*
Eel	1
Herring	1
Total	*2*

SSD 658. Room in SW of Range

Summary Table I. SSD 658. 4mm residue

All contexts	
Eel	11
Herring	12
Pike	1
Dace	3
Whiting	2
S Gadid	2
Perch	1
Total	*32*
Indet	36

Summary Table J. SSD 658. 2mm residue

2 contexts	
Eel	2
Clupeid	1
Total	*3*

SSD 662. Well Room

Summary Table K. SSD 662. 4mm residue

Context	*2537*
Eel	1

SSD 664. Small Room in SW corner of Tower

Summary Table L. SSD 664. 4mm residue

All contexts	
Eel	11
Conger	1
Herring	18
Salmonid	1
Pike	5
L Cyprinid	3

S Cyprinid	6
Whiting	1
L Gadid	4
S Gadid	1
Ling	1
Perch	4
Plaice	2
Total	*58*
Indet	*46*

The Upper Ward Site. Site 485

SSD 579. The Guard Chamber

Summary Table M. SSD 579. Phase 2/3

	Res 4mm	*Res 2mm*	*Flot 4mm*	*Flot 2mm*	*Flot 1mm*
Elasmo	1	1	0	0	0
Roker	12	28	0	0	0
Ray	0	7	0	0	2
Eel	24	365	0	6	0
Conger	0	3	0	0	0
Herring	33	635	7	12	0
?Shad	0	1	0	0	0
Sprat	0	0	0	0	1
Clupeid	5	0	0	0	0
Salmonid	1	3	0	0	0
Pike	18	78	2	1	0
Bream	1	0	0	0	0
Barbel	0	2	0	0	0
Dace	2	8	0	0	3
Dace/Chub	0	9	0	0	0
Chub	0	3	0	0	0
Roach	0	5	0	0	0
L Cyprinid	7	3	0	0	0
S Cyprinid	16	172	0	2	0
Cod	0	10	0	0	0
Whiting	10	50	0	0	0
L Gadid	0	13	0	0	0
S Gadid	3	0	0	0	0
Gurnard	0	1	0	0	0
Perch	6	21	0	0	0
Mackerel	2	10	0	0	0
Plaice	0	4	0	0	0
Flounder	0	1	0	0	0
Pl/Fl	3	56	1	0	0

Flatfish	9	0	0	0	0
Total	*153*	*1489*	*10*	*21*	*6*
Indet	*169*	*1420*	*20*	*38*	*16*

Lift Pit 4

Summary Table N. Lift Pit 4. Sample 19594 Context 18330. Phase 4

	Res 4mm	*Res 2mm*	*Res 1mm*	*Flot 4mm*	*Flot 2mm*	*Flot 1mm*
Eel	0	5	1	0	2	0
Herring	0	12	1	0	5	0
Smelt	0	0	1	0	0	4
Pike	0	1	0	1	0	0
S Cyprinid	0	1	1	1	0	0
Whiting	0	2	0	1	3	0
L Gadid	0	1	0	1	0	0
Gurnard	0	2	1	0	1	0
Pl/Fl	1	1	0	0	0	0
Total	*1*	*25*	*5*	*4*	*11*	*4*
Indet	*16*	*150*	*8*	*3*	*57*	*51*

SSD 593. Kitchen Court

Summary Table O. SSD 593

			Phase 2			*Pre 3*	*Ph 3*	*Ph3-4*	*Phase 4*
	Res 10mm	*Res 4mm*	*Flot 4mm*	*Flot 2mm*	*Flot 1mm*	*Res 4mm*	*Res 4mm*	*Res 4mm*	*Res 4mm*
Elasmo	0	1	0	0	0	1	1	0	1
Eel	3	1	0	54	25	1	3	1	1
Herring	0	0	0	5	0	2	0	0	0
Salmonid	1	0	0	1	6	1	0	0	0
Smelt	0	0	0	1	0	0	0	0	0
Pike	0	2	0	1	0	6	2	0	5
Dace	0	0	0	0	7	0	0	0	0
S Cyprinid	0	0	0	1	15	1	0	0	1
Cod	0	0	0	0	0	0	0	0	2
Haddock	0	0	0	0	0	0	0	0	1
Whiting	0	0	0	0	0	0	0	0	2
S Gadid	0	0	0	0	0	1	0	0	24
Gurnard	0	0	0	0	0	0	0	0	12
Perch	0	0	0	0	0	0	1	0	0
Pl/Fl	0	0	0	0	0	0	0	0	8
Flatfish	1	0	0	0	0	0	0	1	10
Total	*5*	*4*	*0*	*63*	*53*	*13*	*7*	*2*	*67*
Indet	*7*	*4*	*6*	*60*	*119*	*2*	*16*	*1*	*61*

APPENDIX 2. THE FIGURES

Figure 1. The main fish species as a % in major contexts in the Kitchen (SSD 661). 4mm residue.

Context (H axis)	2551	2586	2636	2666	2667	2668	2673	2716	2722
Nisp	204	2962	671	280	594	112	104	384	1809

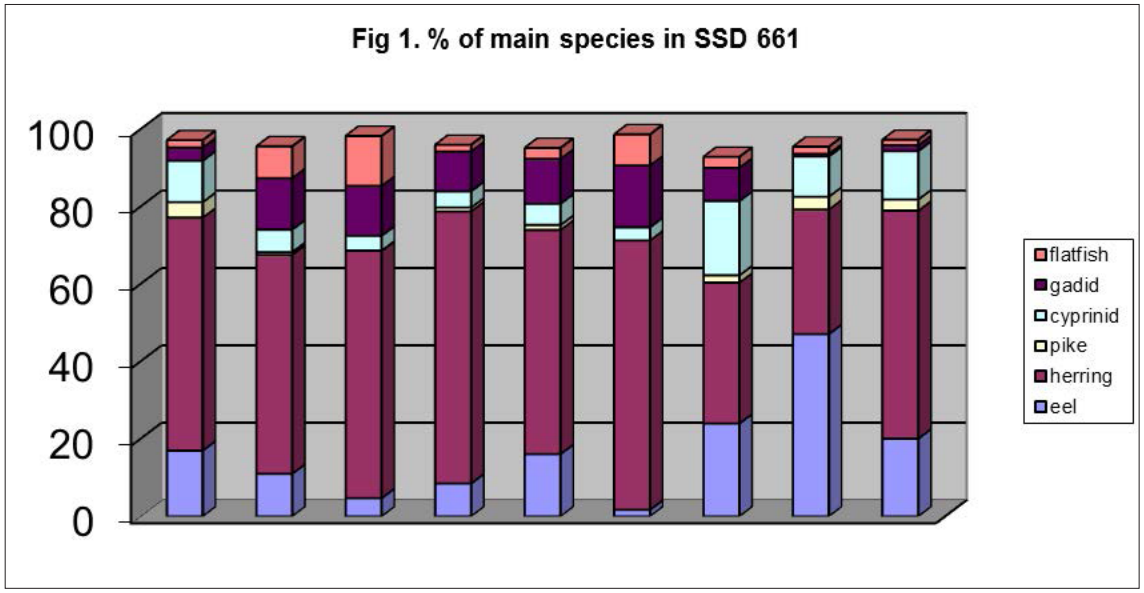


Figure 2. Cyprinids as a % in the major contexts of The Kitchen SSD 661. 4 mm residue.

Context (H axis)	2551	2586	2636	2666	2667	2673	2716	2722
Nisp	22	173	26	12	33	20	40	227

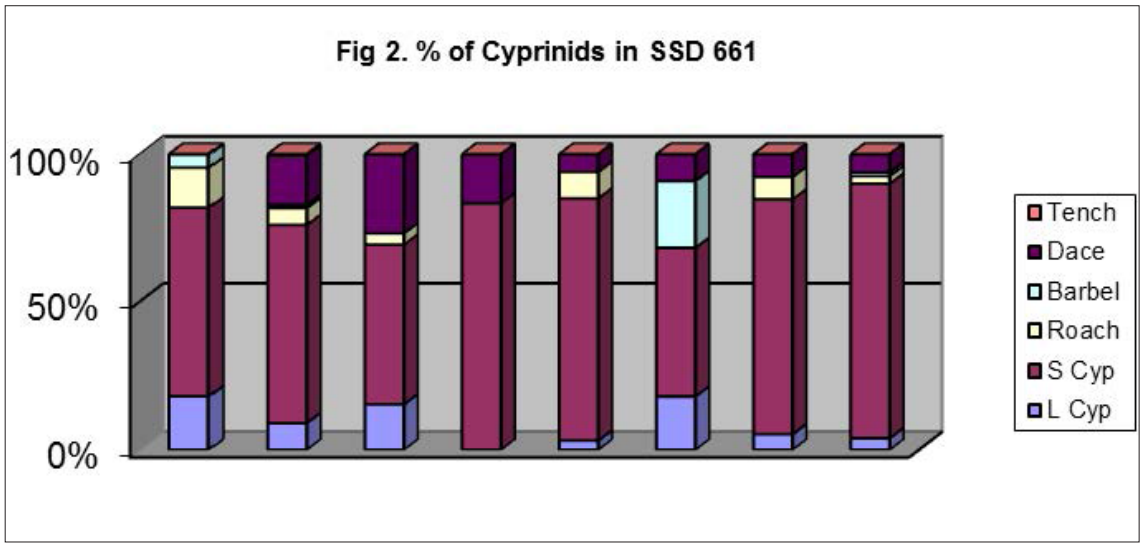


Figure 3. Cyprinids as a % in major contexts of the Kitchen SSD 661.
2mm residue.

Context (H axis)	2586	2636	2666	2667
Nisp	184	9	20	10

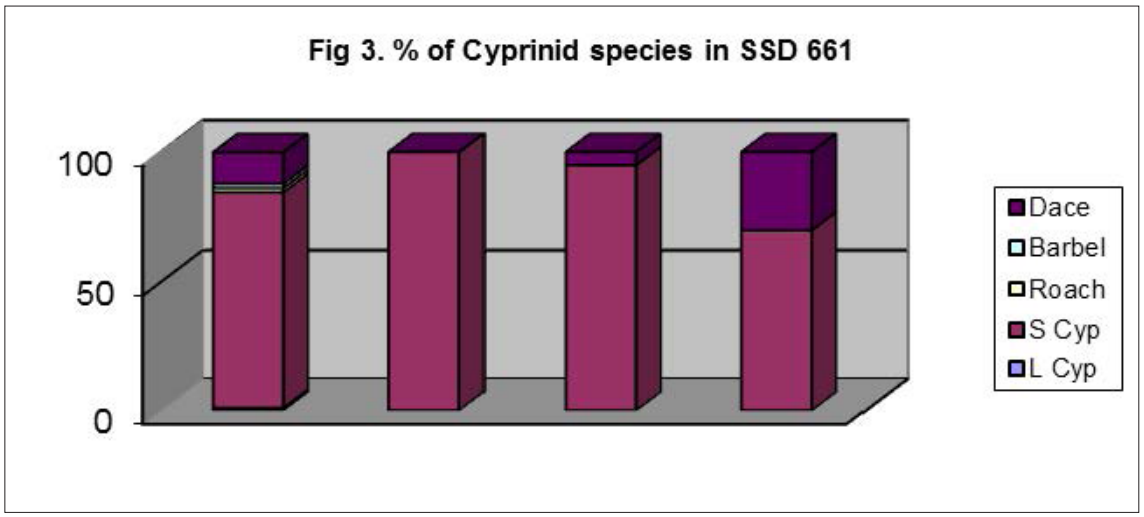
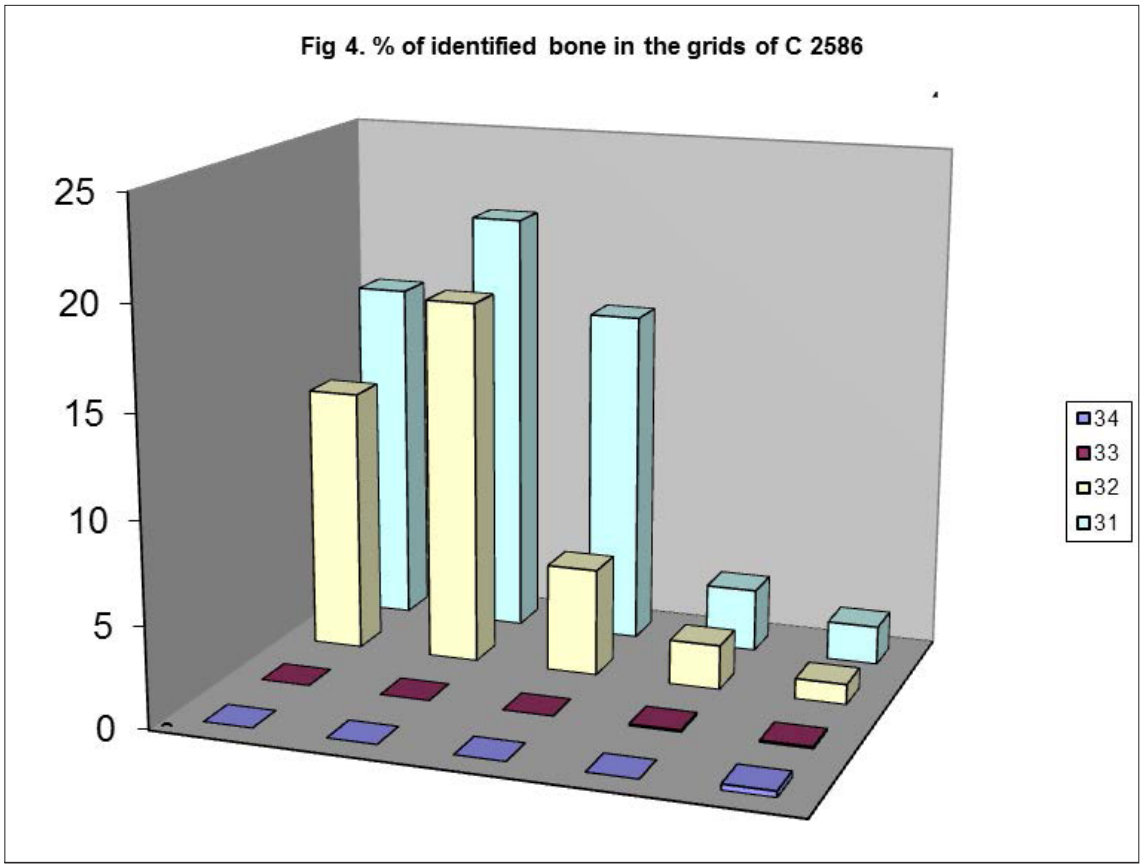


Figure 4. Context 2586 (SSD 661) Distribution of identified fish by % & grid sq.
Total Nisp = 2962.



North grid	31	32	33	34	
East Grid	25	26	27	28	29

Figure 5. Main species/groups by % in grid sq in Context 2586 (SSD 661).

Grid sq	25/31	25/32	26/31	26/32	27/31	27/32
Nisp	502	386	623	534	491	158

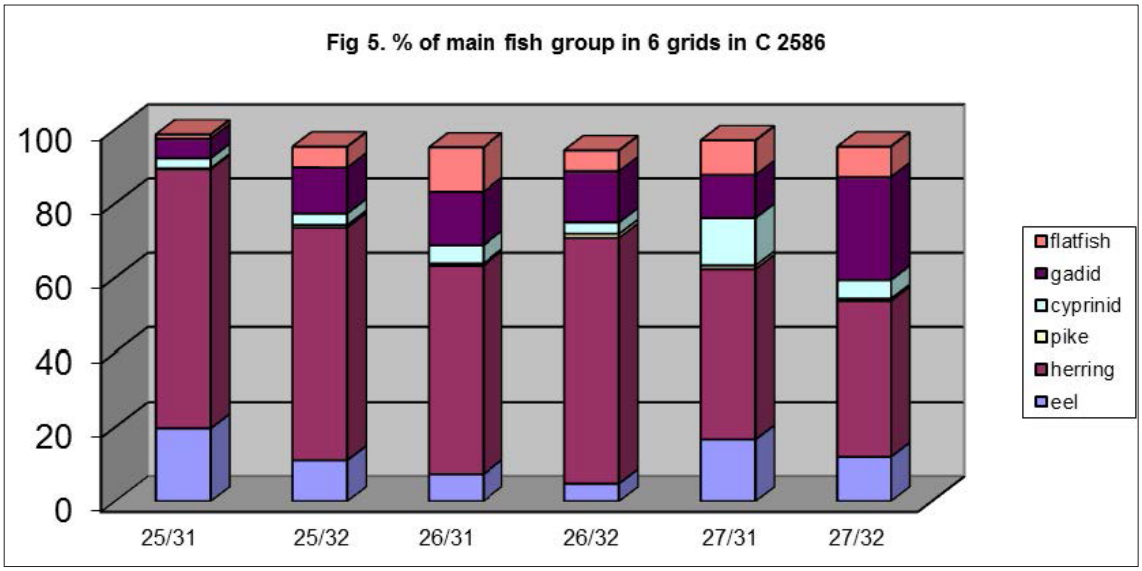


Figure 6. Number of identified bones plotted against number of species/groups in the main contexts of The Kitchen (SSD 661). 4mm residue.

Cont	2551	2574	2586	2636	2666	2667	2668	2673	2678	2716	2722
Nisp	204	7	2962	671	280	594	112	104	14	384	1809
Sp/Gr	19	4	30	20	14	27	9	15	5	21	25

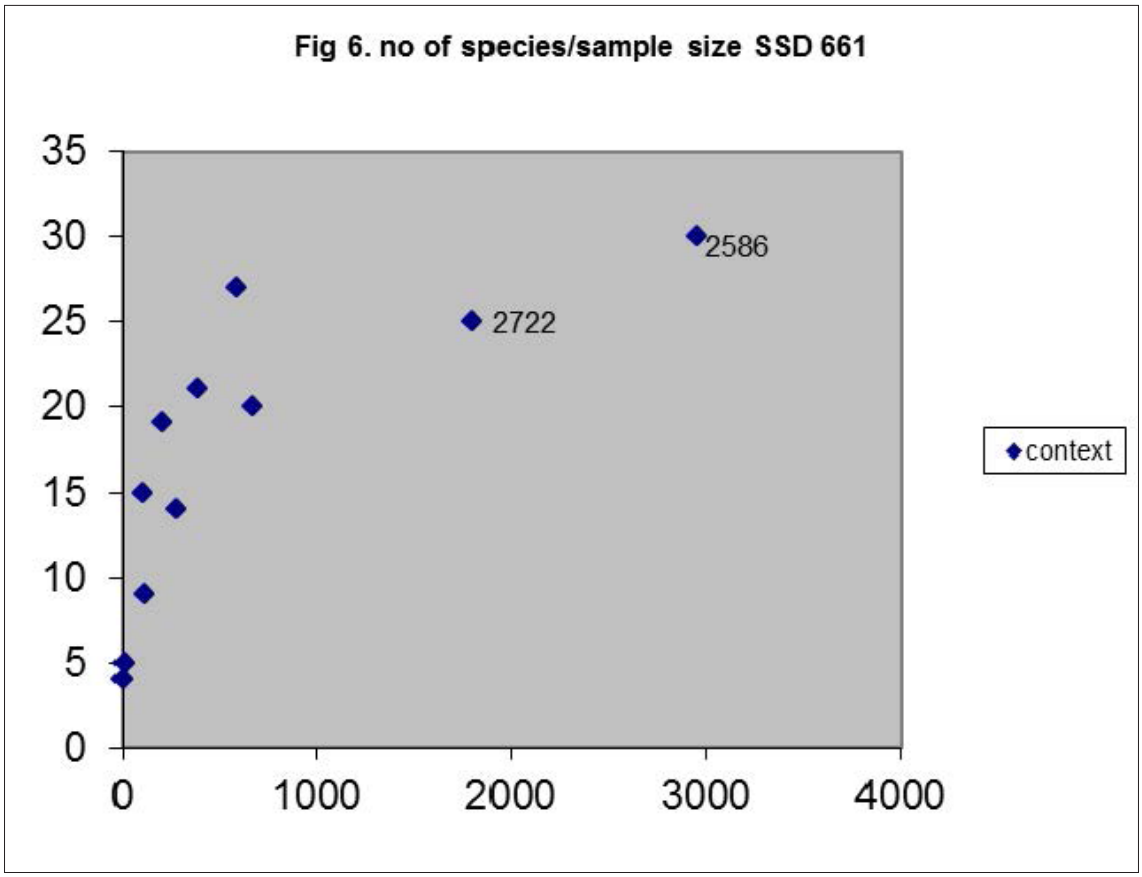


Figure 7. The Strong Room (SSD 656) Context 1565. Distribution of all identified fish by % by grid square. 4mm residue. Total Nisp 584.

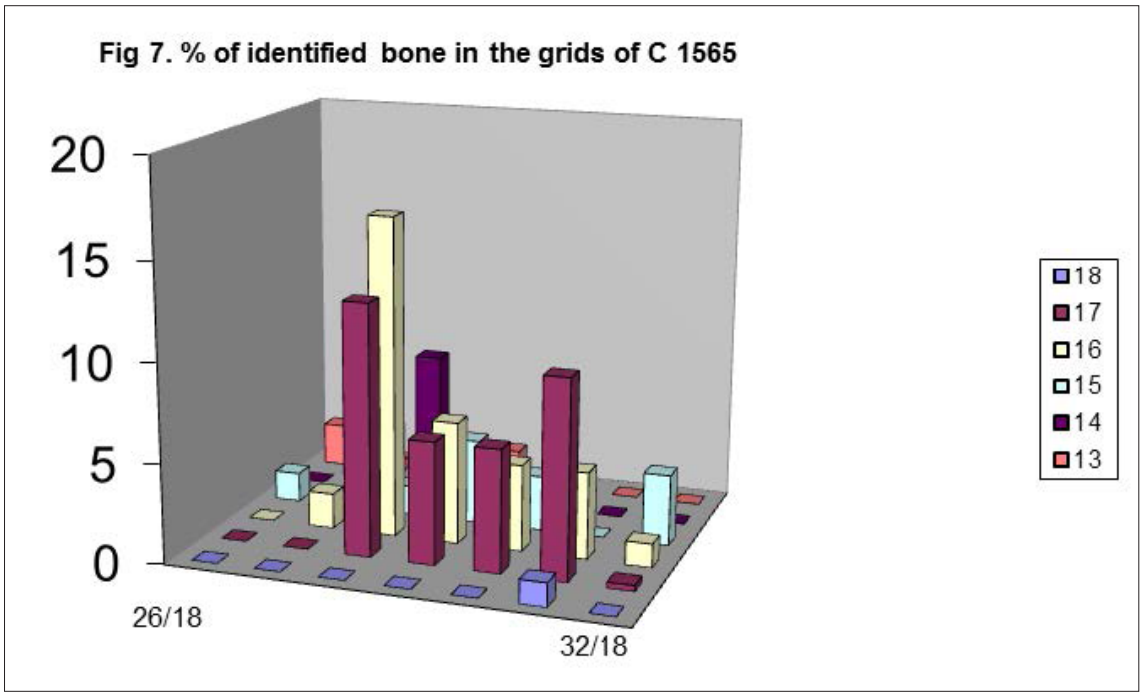


Figure 8. Fish species as a % of 38 possible occurrences in the Kitchen (SSD 661). 4mm residue. Phases 2-4. 4mm residue.

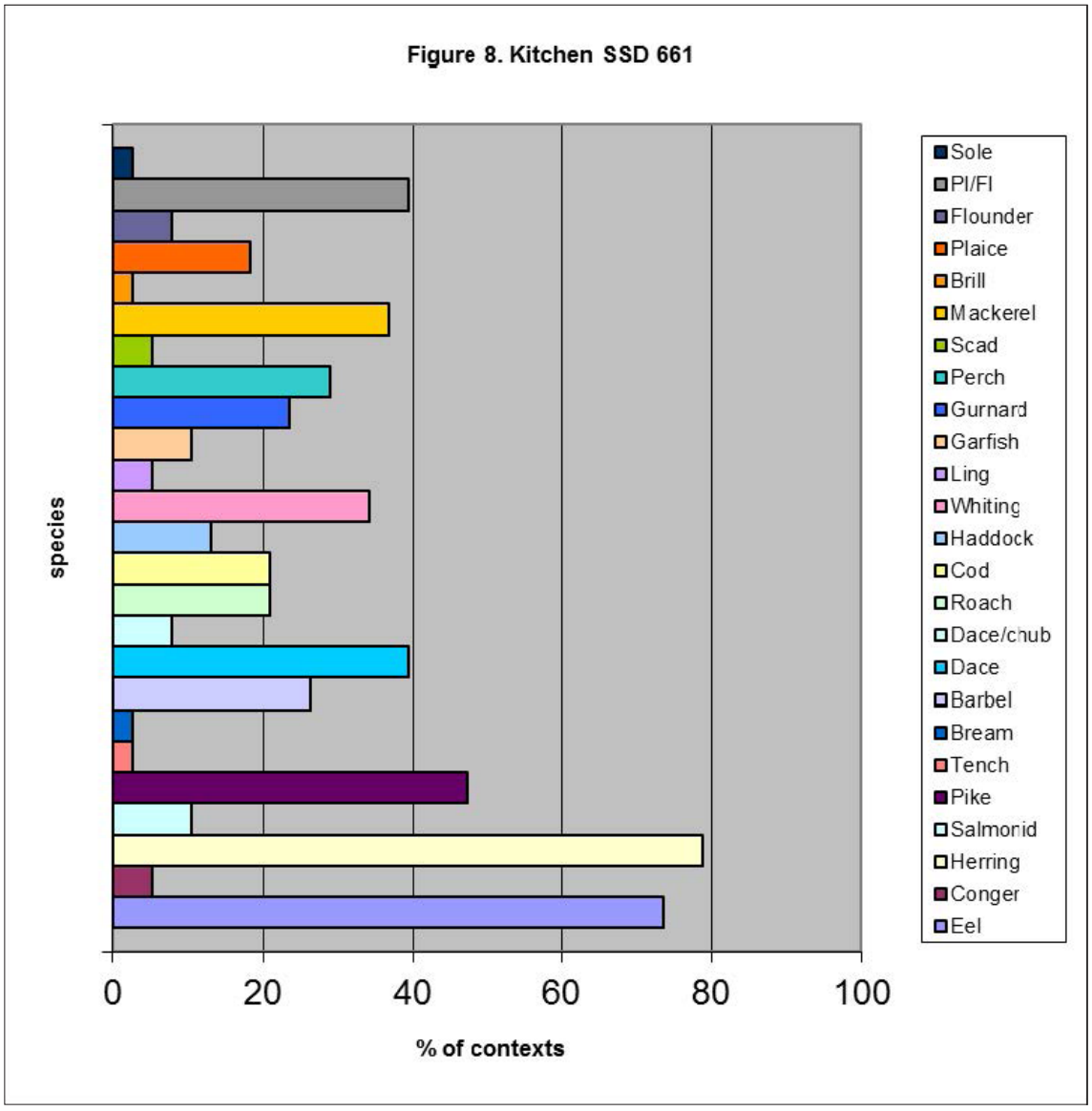


Figure 9. Fish species as a % of 14 possible occurrences in the Strong Room (656). 4mm residue.

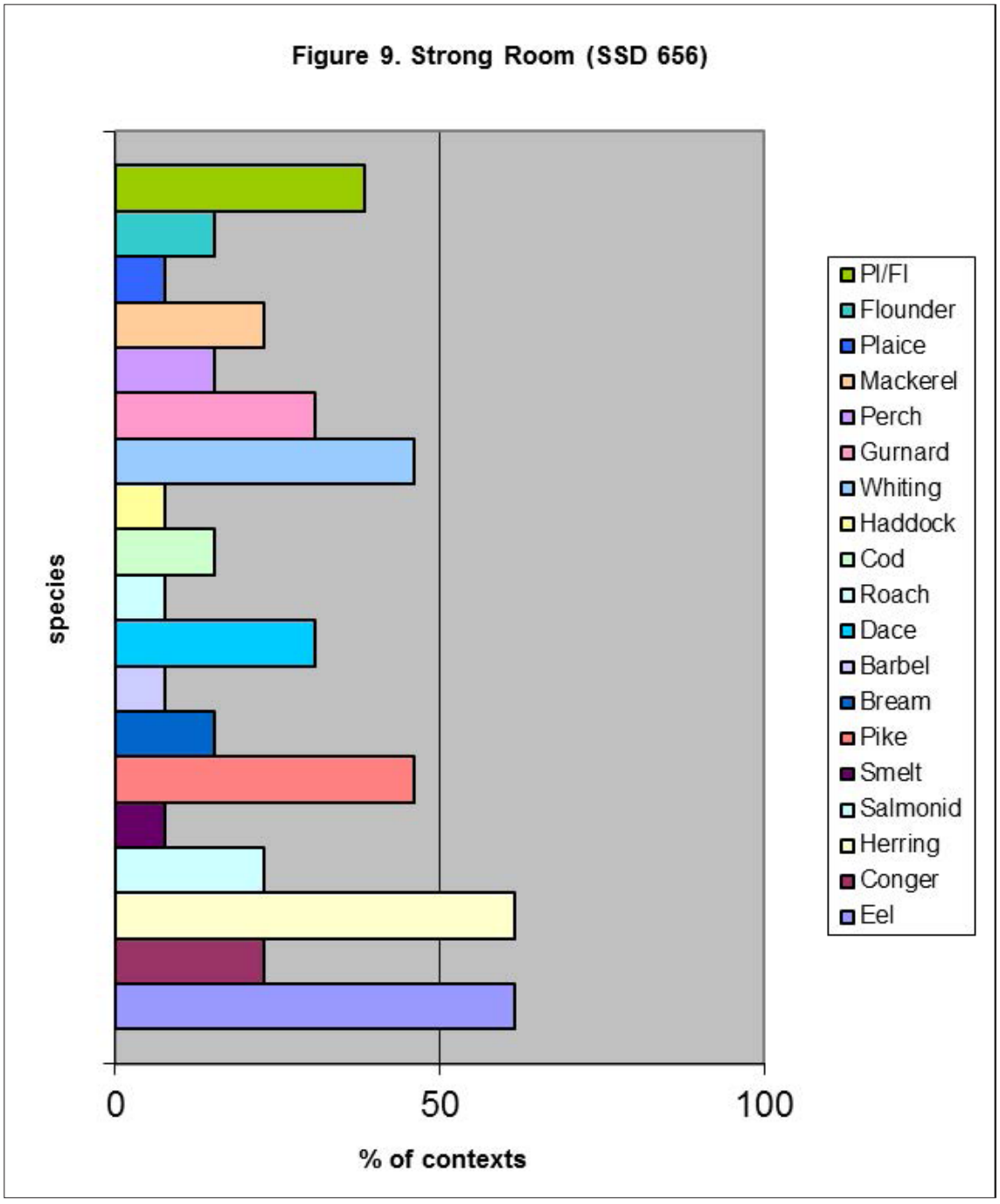


Figure 10. The occurrence of fish over 22 days from documentary evidence, over Easter and Christmas periods 1344-46.

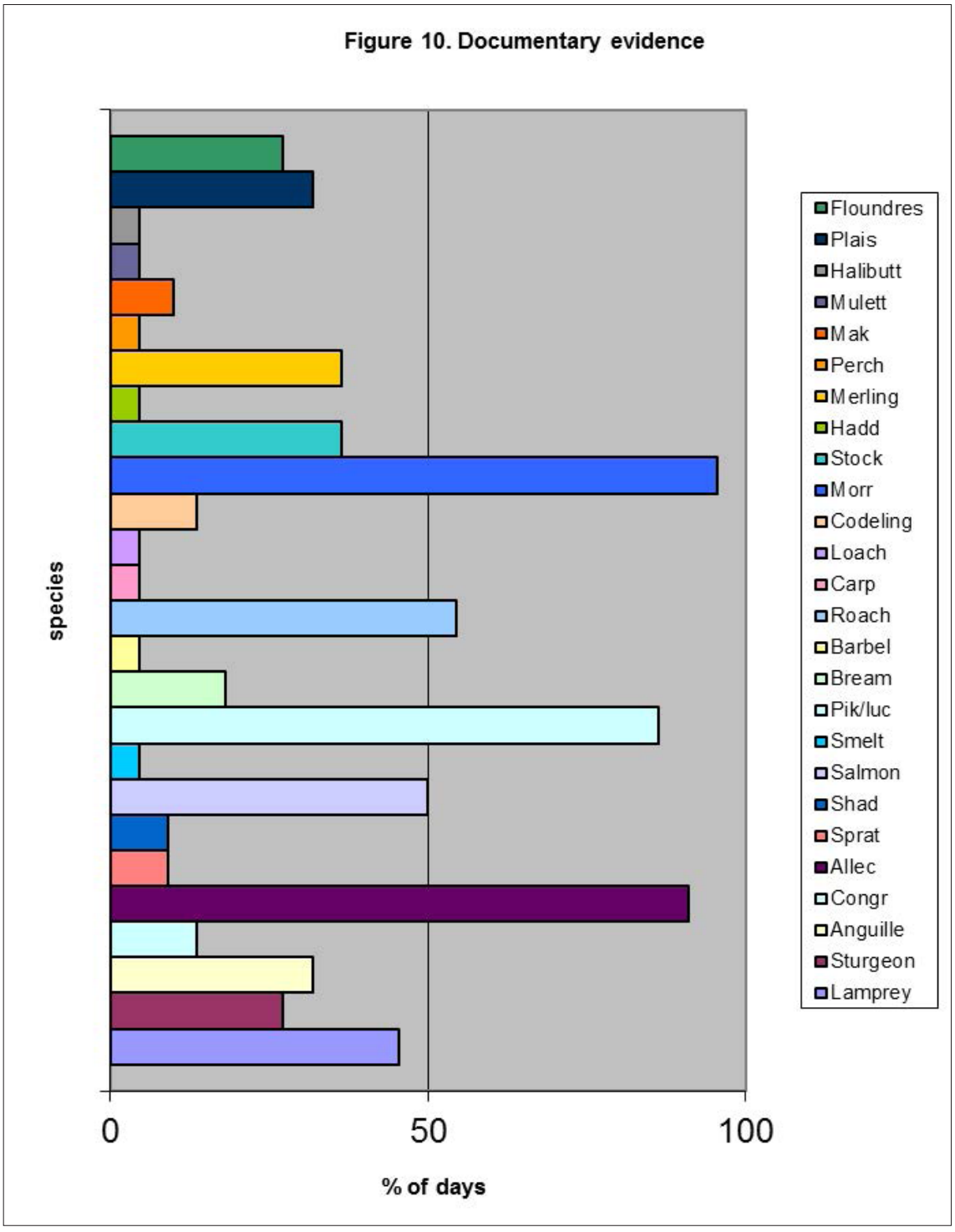


Figure 11. Fish species in the Kitchen deposits (SSD 661) as a % of 215 occurrences, cumulative data from the 38 possible occurrences in Figure 8. 4mm residue.

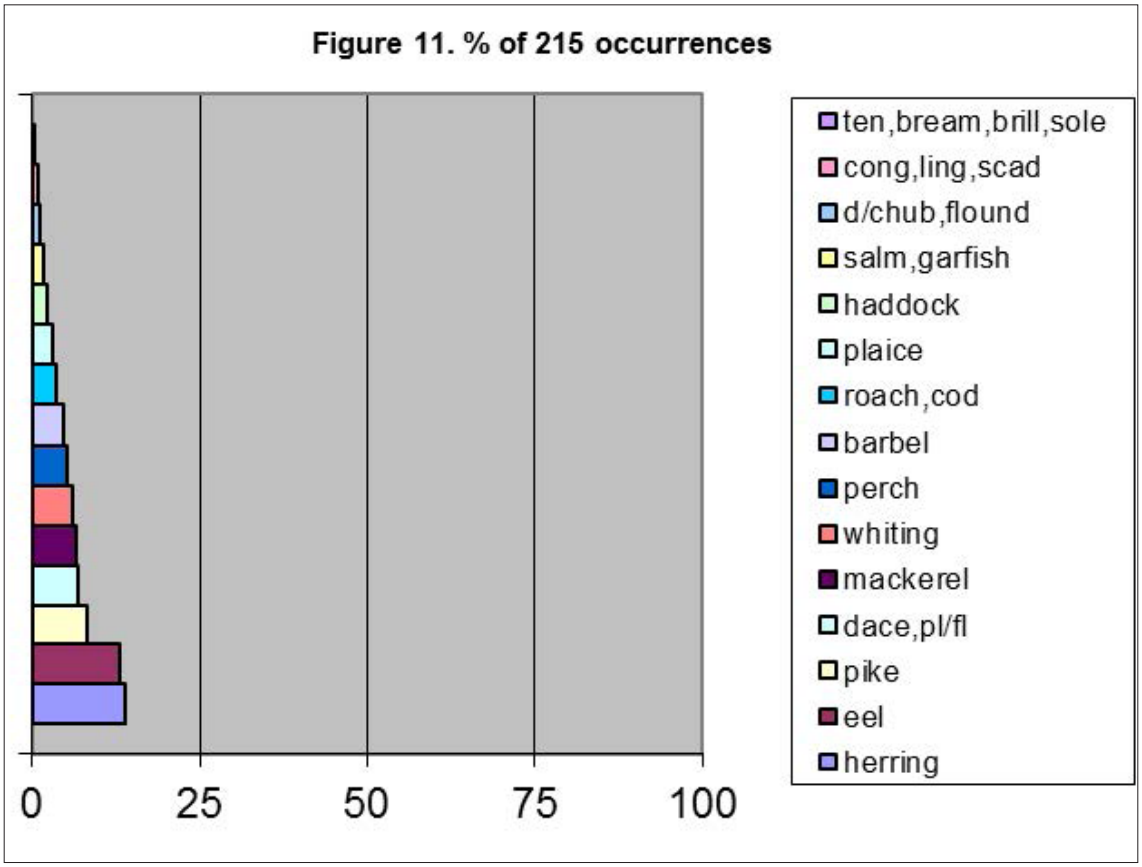
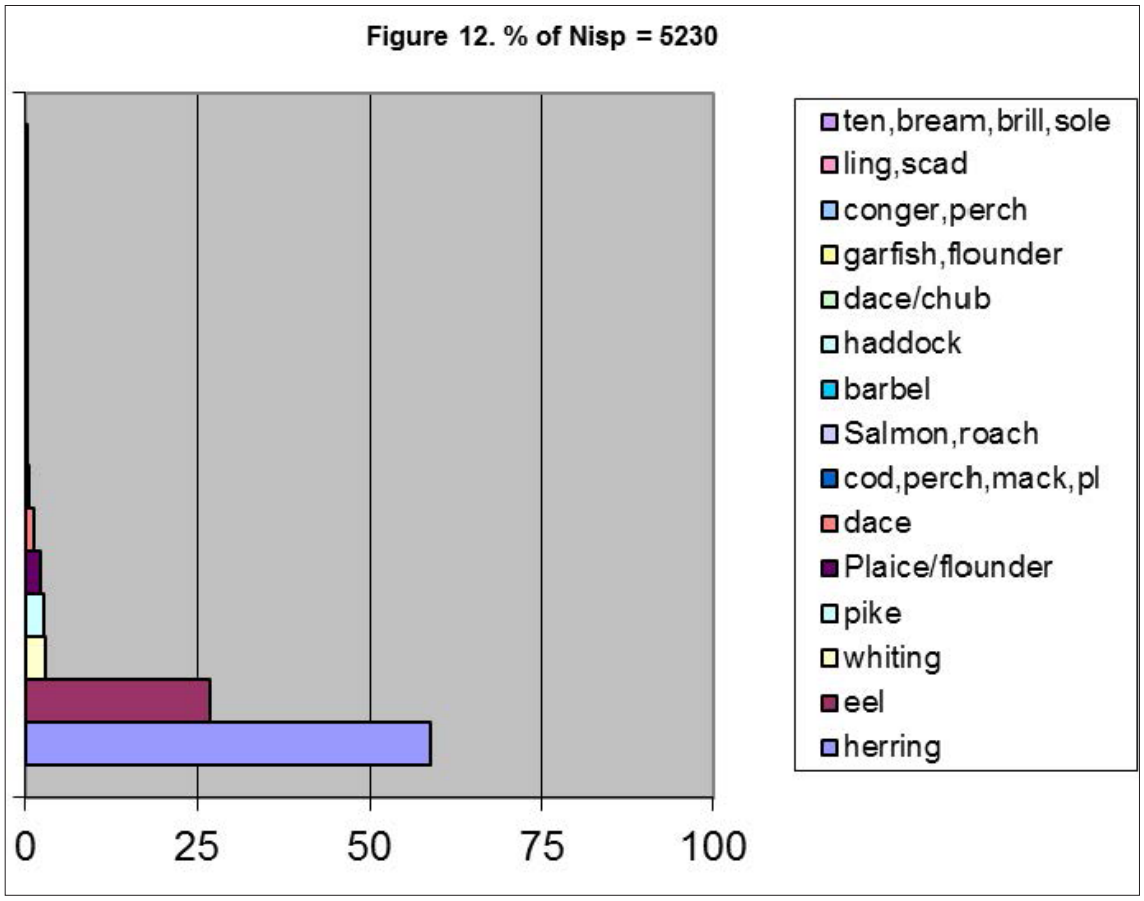


Figure 12. Fish species in the Kitchen (SSD 661) deposits as a % of the Nisp (5230). 4mm residue



APPENDIX 3. ARCHIVE TABLES

The Round Tower. Site 431

SSD 661 – The Kitchen

Table 1. SSD 661. Layers. 4mm res. Phase 2 – L C11th.

Sample	*6130*	*6131*	*6132*	*Total*
Context	*9646*	*9645*	*9641*	
Eel	2	2	5	9
Herring	0	0	3	3
Pike	1	0	1	2
L Cyprinid	1	0	0	1
Perch	0	2	1	3
Mackerel	1	0	0	1
Plaice/Flounder	1	0	0	1
Flatfish	0	1	0	1
Total	*6*	*5*	*10*	*21*
Indet	*8*	*36*	*12*	*56*

Table 2. SSD 661. Fills. 4mm res. Phase 3 – C12th.

Sample	*6123*	*8522*	*13823*	*13829*	*Total*
Context	*9619*	*2733*	*7405*	*7418*	
Eel	48	0	0	1	49
Herring	55	82	0	0	137
Pike	3	0	0	0	3
Bream	1	0	0	0	1
Barbel	2	0	0	0	2
Dace	5	0	0	0	5
Dace/Chub	2	0	0	0	2
L Cyprinid	10	0	0	0	10
S Cyprinid	5	0	0	0	5
L Gadid	3	0	0	0	3
S Gadid	2	0	0	0	2
Garfish	1	0	0	0	1
Gurnard	0	0	0	1	1
Perch	1	0	0	0	1
Mackerel	2	0	0	0	2
Plaice/Flounder	3	0	2	0	5
Total	*143*	*82*	*2*	*2*	*229*
Indet	*114*	*50*	*8*	*2*	*174*
Scale		*pp*			

Table 3. SSD 661. Context 9547. 4mm res. Phase 3-4. C12th.

Sample	*6116*
Eel	11
Herring	8
Pike	2
Dace	1
S Cyprinid	3
Total	*25*
Indet	*16*
Scale	*pp*

Table 4. SSD 661. Context 2551. Layers. 4mm res. Phase 4. C14th.

Sample	*6137*	*6150*	*6151*	*8506*	*8507*	*8508*	*Total*
Roker	0	1	0	0	0	0	1
Eel	2	1	0	0	0	31	34
Herring	20	17	3	7	9	67	123
Salmonid	0	0	0	0	0	1	1
Pike	6	0	0	0	0	2	8
Barbel	0	0	0	0	0	1	1
Roach	0	3	0	0	0	0	3
L Cyp	0	0	0	0	0	4	4
S Cyp	0	0	2	0	0	12	14
Cod	2	0	0	0	0	0	2
Haddock	0	0	0	0	1	1	2
Whiting	0	1	0	0	1	0	2
L Gadid	0	1	0	0	0	0	1
Gurnard	0	0	0	0	0	1	1
Perch	0	0	0	0	0	2	2
Mackerel	0	0	0	0	0	1	1
Pl/Fl	0	0	1	0	0	1	2
Flounder	0	0	0	0	0	1	1
Flatfish	0	0	0	0	0	1	1
Total	*30*	*24*	*6*	*7*	*11*	*126*	*204*
Indet	*36*	*20*	*18*	*8*	*2*	*27*	*111*
Scale	*p*		*p*	*p*		*p*	

Table 5. SSD 661. Context 2574. Layer. 4mm res. Phase 4. C14th.

Sample	*8071*	*8073*	*8075*	*Total*
Eel	1	0	0	1
Herring	0	0	2	2
Whiting	0	0	2	2
Pl/Fl	0	0	2	2
Total	*1*	*0*	*6*	*7*
Indet	*0*	*13*	*10*	*23*
Scale		*p*		

Table 6. SSD 661. Context 2636. Layer. 4mm res. Phase 4. C14th.

Sample	*8280*	*8281*	*8284*	*8285*	*8339*	*8404*	*8473*	*Total*
Roker	2	0	0	0	2	0	0	4
Eel	5	0	16	2	5	4	0	32
Herring	165	15	34	7	51	157	0	429
Pike	1	0	0	0	0	0	0	1
Dace	0	0	0	1	6	0	0	7
Roach	0	0	0	0	1	0	0	1
L Cyp	1	0	2	0	1	0	0	4
S Cyp	0	0	7	2	5	0	0	14
Cod	0	0	0	2	14	0	0	16
Whiting	0	0	6	0	24	11	0	41
L Gadid	3	1	2	0	4	0	3	13
S Gadid	12	1	0	3	0	0	0	16
Ling	0	0	0	0	1	0	0	1
Gurnard	0	0	1	0	1	0	0	2
Perch	0	0	1	1	0	0	0	2
Mackerel	0	0	0	0	1	0	0	1
Plaice	0	0	7	0	0	1	0	8
Flounder	0	0	0	0	3	0	0	3
Pl/Fl	11	1	0	2	38	3	0	55
Flatfish	1	20	0	0	0	0	0	21
Total	*201*	*38*	*76*	*20*	*157*	*176*	*3*	*671*
Indet	*250*	*0*	*106*	*73*	*60*	*73*	*3*	*565*
Scale	*pp*	*p*	*pp*	*p*		*p*		

Table 7. SSD 661. Context 2666. Fill. 4mm res. Phase 4. C14th.

Sample	*8334*	*8335*	*8405*	*Total*
Roker	0	0	6	6
Eel	13	4	7	24
Herring	76	21	100	197
Pike	3	0	0	3
Dace	2	0	0	2
S Cyp	8	0	2	10
Whiting	12	5	3	20
L Gadid	6	0	0	6
S Gadid	1	0	2	3
Gurnard	1	0	0	1
Perch	2	0	1	3
Plaice	3	0	0	3
Flounder	1	0	0	1
Flatfish	1	0	0	1
Total	*129*	*30*	*121*	*280*
Indet	*335*	*0*	*40*	*375*
Scale	*pp*	*p*		

Table 8. SSD 661. C 2667. Layer. 4mm res. Arranged by grid. Phase 4. C14th.

Grid *Sample*	*25/33* *8283*	*25/34* *8282*	*26/32* *8290*	*27/32* *8278*	*27/32* *8279*	*27/32* *8286*	*27/32* *8287*	*28/32* *8298*	*29/32* *8277*	*Total*
Elasmo	0	0	1	0	0	0	0	0	0	1
Ray	0	0	0	0	0	0	0	2	0	2
Eel	0	0	3	2	3	2	0	82	4	96
Conger	0	0	0	0	0	0	1	1	0	2
Herring	4	0	14	8	0	5	2	250	61	344
Shad	0	0	0	0	0	0	0	0	2	2
Salmon	0	0	0	0	0	0	0	1	0	1
Pike	0	0	1	0	0	0	3	3	1	8
Dace	0	0	1	0	0	0	0	0	1	2
Roach	0	0	0	0	0	0	0	1	2	3
L Cyp	0	0	0	0	0	0	0	1	0	1
S Cyp	0	3	0	1	1	0	0	11	11	27
Cod	0	0	0	0	0	0	0	3	0	3
Haddock	0	0	0	0	0	0	0	1	0	1
Whiting	0	0	7	2	0	0	0	38	0	47
L Gadid	0	0	1	0	0	0	0	5	0	6
S Gadid	0	0	2	1	0	0	0	9	0	12
Ling	0	0	1	0	0	0	0	0	0	1
Stickle	0	0	1	0	0	0	0	0	0	1
Bullhead	0	0	1	0	0	0	0	0	0	1
Gurnard	0	0	1	5	0	0	0	3	0	9
Perch	1	0	1	0	0	0	0	1	1	4
Mackerel	0	0	1	1	0	0	0	0	0	2
Plaice	0	0	0	0	0	0	0	5	0	5
Pl/Fl	1	0	2	5	0	0	0	3	0	11
Sole	0	0	0	0	0	0	0	1	0	1

Flatfish	0	0	1	0	0	0	0	0	0	1
Total	*6*	*3*	*39*	*25*	*4*	*7*	*6*	*421*	*83*	*594*
Indet	*23*	*0*	*16*	*31*	*1*	*18*	*11*	*621*	*101*	*822*
Scale	*p*			*p*	*p*	*p*		*pp*		
									Crustacean claw	

Table 9. SSD 661. Context 2668. Layer. 4mm res. Phase 4. C14th.

Sample	*8288*	*8304*	*Total*
Eel	0	2	2
Herring	6	72	78
Barbel	0	?1	1
S Cyp	2	1	3
Cod	1	0	1
Whiting	4	13	17
Mackerel	0	1	1
Plaice	1	4	5
Pl/Fl	4	0	4
Total	*18*	*94*	*112*
Indet	*39*	*56*	*95*
Scale	*pp*	*p*	

Table 10. SSD 661. Context 2673. Layer. 4mm res. Phase 4. C14th.

Sample	*8296*	*8297*	*8306*	*8307*	*8328*	*Total*
Eel	0	0	9	0	16	25
Herring	3	2	17	2	14	38
Pike	0	0	0	2	0	2
Barbel	1	0	0	1	3	5
Dace	0	0	1	0	1	2
L Cyp	0	0	0	0	2	2
S Cyp	2	0	5	0	4	11
Cod	0	0	0	0	1	1
Whiting	0	0	1	0	1	2
L Gadid	0	0	3	0	0	3
S Gadid	3	0	0	0	0	3
Gurnard	0	0	1	0	3	4
Perch	0	0	1	0	0	1
Mackerel	0	0	2	0	0	2
Pl/Fl	0	0	0	0	3	3
Total	*9*	*2*	*40*	*5*	*48*	*104*
Indet	*3*	*17*	*19*	*6*	*26*	*71*

Table 11. SSD 661. Context 2678. Layer. 4mm res. Phase 4. C14th.

Sample	*8374*	*8375*	*8376*	*Total*
Herring	0	0	9	9
Clupeid	0	0	1	1
Dace	0	0	1	1
S Gadid	0	0	1	1
Pl/Fl	0	0	1	1
Total	*0*	*0*	*13*	*13*
Indet	*1*	*2*	*0*	*3*

Table 12. SSD 661. Context 2716. Fill. 4mm res. Phase 4. C14th.

Sample	*8490*	*8491*	*8492*	*8495*	*8498*	*Total*
Elasmo	0	0	1	2	3	6
Roker	0	1	0	1	0	2
Eel	28	11	47	41	54	181
Herring	18	23	49	24	10	124
Salmon	0	0	1	0	0	1
Pike	3	1	2	5	2	13
Barbel	0	0	0	0	2	2
Dace	0	2	0	0	1	3
Roach	0	2	0	0	1	3
L Cyp	0	0	0	0	1	1
S Cyp	3	3	10	7	8	31
Cod	1	0	0	0	0	1

Haddock	0	0	0	1	0	1
L Gadid	1	0	0	0	0	1
Garfish	0	0	0	0	2	2
Gurnard	0	0	0	1	0	1
Perch	1	0	1	1	0	3
Scad	0	0	1	0	0	1
Plaice	2	0	0	3	0	5
Brill	0	1	0	0	0	1
Flatfish	0	0	1	0	0	1
Total	*57*	*44*	*113*	*86*	*84*	*384*
Indet	*30*	*16*	*31*	*21*	*28*	*126*
Scale	*pp*	*pp*		*pp*		

Table 13. SSD 661. Context 2722. Fill. 4mm res. Phase 4. C14th.

Sample	*6088*	*6154*	*8512*	*13801*	*Total*
Elasmo	2	0	0	1	3
Roker	5	0	1	1	7
Eel	190	1	47	126	364
Herring	661	7	118	280	1066
Salmon	3	0	2	2	7
Pike	31	1	10	11	53
Barbel	1	0	1	1	3
Dace	5	0	3	6	14
Dace/ chub	1	0	0	0	1
Roach	2	0	2	2	6
L Cyp	4	0	4	0	8
S Cyp	127	0	20	48	195
Cod	4	0	1	1	6
Haddock	2	1	0	3	6
Whiting	4	1	0	5	10
L Gadid	3	1	0	1	5
S Gadid	1	0	0	0	1
Garfish	1	0	0	0	1
Gurnard	4	0	0	2	6
Perch	3	0	1	5	9
Scad	1	0	0	0	1
Mackerel	6	0	4	1	11
Plaice	0	0	0	2	2
Pl/Fl	11	0	6	6	23
Sole	0	0	1	0	1
Total	*1072*	*12*	*221*	*504*	*1809*
Indet	*735*	*37*	*94*	*600*	*1466*
Scale	*pp*		*ppp*	*ppp*	

Table 14. SSD 661. Single context samples. 4mm res. Phase 4. C14th.

Sample	*Wall* 6102	*fill* 6127	*layer* 6155	*layer* 8072	*fill* 8336	*fill* 8378	*fill* 8382	*fill* 8390	*fill* 8391	*fill* 8393	*fill* 8394	*fill* 8396	*fill* 8397	*fill* 8449	*layer* 8454	*fill* 8489	*Total*
Context	*2714*	*9643*	*2708*	*2575*	*2664*	*2663*	*2662*	*2610*	*2620*	*2629*	*2633*	*2642*	*2638*	*2695*	*2671*	*2710*	
Roker	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Eel	3	2	0	0	12	0	1	0	1	0	1	1	4	2	0	0	27
Herring	1	2	0	1	34	2	0	7	36	0	1	3	9	10	2	0	108
Pike	1	0	1	0	2	0	0	0	0	0	0	0	2	0	0	0	6
Barbel	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	3
Dace	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	3
L Cyp	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
S Cyp	1	0	0	0	7	1	0	0	2	1	0	4	0	0	2	2	20
Whiting	0	0	0	0	1	0	0	0	0	0	0	0	0	8	0	0	9
L Gadid	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4
Mackerel	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	3
Plaice	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Pl/Fl	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
Flatfish	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	14
Total	*8*	*4*	*1*	*1*	*60*	*5*	*1*	*7*	*43*	*1*	*3*	*25*	*17*	*21*	*4*	*2*	*203*
Indet	*14*	*6*	*3*	*1*	*43*	*21*	*1*	*0*	*126*	*0*	*3*	*18*	*12*	*24*	*2*	*1*	*275*
Scales		*p*					*p*					*p*		*p*			*p*

Table 15. SSD 661. Single context samples. 4mm res. Phase 4. C12th.

Sample	*Found*	*layer*	*layer*	*fill*	
	6108	*6115*	*6117*	*6122*	*Total*
Context	*9542*	*9545*	*9549*	*9617*	
Elasmo	0	1	0	6	7
Roker	0	2	0	1	3
Eel	4	83	17	481	585
Conger	1	0	0	0	1
Herring	13	96	3	305	417
Salmon	0	0	0	11	11
Pike	0	8	3	37	48
Tench	0	0	0	2	2
Barbel	0	2	0	1	3
Dace	0	2	2	26	30
Dace/Chub	0	0	0	5	5
Roach	0	1	2	4	7
L Cyp	0	4	2	6	12
S Cyp	2	16	2	152	172
Cod	0	0	0	1	1
Haddock	0	0	0	1	1
Whiting	1	1	0	1	3
L Gad	0	0	0	1	1
Garfish	0	1	0	0	1
Gurnard	0	0	0	1	1
Perch	0	0	0	2	2
Mackerel	1	2	1	2	6
Pl/Fl	0	2	0	8	10
Flatfish	0	5	0	8	13
Total	*22*	*226*	*32*	*1062*	*1342*
Indet	*115*	*245*	*4*	*995*	*1359*
Scale	*p*	*ppp*		*ppp*	

Table 16. SSD 661. Flots. 4mm. Phase 4. C14th.

Sample	*Layer*	*layer*	*fill*	*layer*	*layer*	*fill*	
	6134	*6154*	*8391*	*8404*	*8451*	*8495*	*Total*
Context	*9535*	*2722*	*2620*	*2636*	*2667*	*2716*	
Eel	0	0	0	0	0	5	5
Herring	11	29	9	24	55	5	133
Whiting	0	0	0	2	0	0	2
Mackerel	1	1	0	0	0	0	2
Pl/Fl	0	0	0	0	1	0	1
Total	*12*	*30*	*9*	*26*	*56*	*10*	*143*
Indet	*1*	*6*	*4*	*2*	*5*	*0*	*18*
Scale	*p*	*p*					

Table 17. SSD 661. 2mm res. All phase 4 (C14th) except context 9645 - Phase 2, L C11th.

Samples	*Layer*	*layer*	*fill*	*fill*	*layer*	*layer*	*layer*	*layer*	*layer*	*?*	*layer*	*layer*	
Context	*6131*	*8073*	*8335*	*8405*	*8374*	*8278*	*8279*	*8286*	*8287*	*8529*	*8280*	*8281*	*Total*
	9645	*2574*	*2666*	*2666*	*2678*	*2667*	*2667*	*2667*	*2667*	*2667*	*2636*	*2636*	
Elasmo	0	0	1	0	0	0	0	0	0	0	0	0	1
Roker	0	0	1	0	0	0	0	0	0	0	0	0	1
Eel	7	0	50	5	1	15	5	8	6	2	13	2	114
Herring	0	1	138	27	2	53	18	123	82	8	225	35	712
Dace	0	0	1	0	0	0	0	1	0	2	0	0	4
S Cyp	0	0	19	0	0	1	1	4	0	1	8	1	35
Whiting	0	0	0	0	0	1	1	0	0	0	0	0	2
L Gadid	0	0	1	0	0	0	1	0	0	0	0	0	2
S Gadid	0	0	0	0	0	0	1	0	0	0	2	0	3
Stickleback	0	0	1	0	0	0	0	0	0	0	0	0	1
Bullhead	0	0	2	0	0	0	0	0	0	0	0	0	2
Perch	1	0	0	0	0	0	0	0	0	0	0	0	1
Mackerel	0	0	0	0	0	0	0	1	0	0	0	0	1
Pl/Fl	0	0	3	0	0	0	0	0	1	0	0	0	4
Flatfish	0	0	0	0	0	0	0	0	0	0	0	2	2
Total	*8*	*1*	*217*	*32*	*3*	*70*	*27*	*137*	*89*	*13*	*248*	*40*	*885*
Indet	*27*	*0*	*413*	*1*	*0*	*1*	*20*	*62*	*63*	*90*	*200*	*0*	*877*
Scale		*p*	*ppp*			*pp*	*p*	*pp*		*pp*	*ppp*	*pp*	

Tables 18-21 are for information only.

Table 18. SSD 661. 2-4mm Flots. Phase 4. C12th-14th

Samples	*Fill* 8391	*layer* 8404	*layer* 8451	*fill* 8495	*fill* 6154	*fill* 8512	*fill* 8516	*fill* 6134
Context	2620	2636	2667	2716	2722	2722	2722	9535
Eel	0	0	6	14	13	2	3	0
Herring	5	57	36	14	14	5	18	4
Clupeid	0	0	350	0	0	0	0	0
Dace	0	0	0	0	2	0	1	0
S Cyp	0	1	4	2	5	0	0	0
Stickleback	0	0	0	0	1	0	0	0
Mackerel	0	0	0	0	0	0	0	2
Total	*5*	*58*	*396*	*30*	*35*	*7*	*22*	*6*
Indet	*40*	*30*	*0*	*25*	*60*	*70*	*2*	*50*
Scale		*p*	*ppp*	*pp*	*ppp*	*ppp*	*ppp*	*ppp*

Table 19. SSD 661. 1-2mm Flots. Phase 4. C12th-14th

Sub sample	*Fill* 15%	*layer*	*layer*	*fill*	*fill*	*fill*	*fill* 10%	*fill* 10&15%
		----------10&15%----------						
Sample	8391	8404	8451	8495	6154	8512	8516	6134
Context	2620	2636	2667	2716	2722	2722	2722	9535
Ray	0	0	0	0	1	0	0	0
Eel	0	0	2	2	1	0	1	0
Clupeid	0	2	1	1	1	0	0	2
Dace	0	0	0	2	0	1	0	2
S Cyprinid	0	0	0	0	1	0	0	2
Stickleback	0	2	1	0	0	1	1	0
Bullhead	1	1	4	0	0	0	0	0
Total	*1*	*5*	*8*	*5*	*4*	*2*	*2*	*6*
Indet	*4*	*1*	*4*	*15*	*21*	*14*	*16*	*13*

Table 20. SSD 661. 2–4 mm res. Phase 4. C14th

	Fill	*fill*	*fill*	*layer*	*layer*	*layer*	*layer*	*fill*	*fill*
	90 & 10%	*100ml & rem*	*-100ml & rem-*		*250 & 100ml*		*--100ml & rem--*		
Sample	*8391*	*8336*	*8405*	*8277*	*8288*	*8298*	*8304*	*8307*	*8404*
Context	*2620*	*2664*	*2666*	*2667*	*2667*	*2667*	*2668*	*2673*	*3636*
Roker	0	0	0	1	0	0	0	0	0
Ray	0	0	0	0	0	0	1	0	1
Eel	15	6	20	37	12	10	25	58	10
Herring	58	69	54	299	135	142	201	50	210
Sprat	0	0	0	0	1	0	0	0	0
Shad	0	0	0	0	1	0	0	1	0
Clupeid	0	0	0	41	29	5	24	0	0
Salmonid	0	0	0	0	0	0	0	2	0
Pike	0	0	0	0	0	1	0	2	0
Barbel	0	0	0	0	0	0	2	1	0
Dace	0	2	0	0	0	0	1	2	0
Chub	0	0	0	0	0	0	?1	0	0
S Cyprinid	5	9	1	13	5	2	12	32	1
Whiting	0	0	0	1	4	1	2	0	0
S Gadid	0	0	0	0	1	0	10	3	0
Stickleback	1	0	0	0	0	0	0	0	0
Bullhead	0	0	0	1	1	1	0	0	0
Scad	1	0	0	0	0	0	0	0	0
Plaice	0	0	0	0	0	0	1	2	0
Pl/Flounder	0	2	0	0	0	0	0	0	0
Total	*80*	*88*	*75*	*393*	*189*	*162*	*280*	*153*	*222*
Indet	*0*	*1*	*24*	*209*	*102*	*28*	*63*	*54*	*100*
Scale	*p*	*pp*	*ppp*				*ppp*	*pp*	

Table 21. SSD 661. 1–2 mm res. Phase 4. C14th

	Fill	*layer*	*fill*	*fill*	*layer*	*layer*	*layer*	*layer*	*fill*
					40 & 10% 2nd sample				
	90&10%	*40&10%*	*40&10%*	*10&15%*	*40&10%*	*40&10%*	*40&10%*	*10&40%*	*40&10%*
Sample	*8391*	*8404*	*8336*	*8405*	*8277*	*8288*	*8298*	*8304*	*8307*
Context	*2620*	*2636*	*2664*	*2666*	*2667*	*2667*	*2667*	*2668*	*2673*
Ray	0	0	0	6	0	0	0	2	1
Eel	4	0	4	0	2	0	1	2	10
Herring	3	3	2	0	0	2	1	7	2
Sprat	0	0	0	0	0	0	0	2	0
Clupeid	0	0	0	1	9	0	0	0	0
Smelt	0	0	0	0	1	0	0	0	0
Dace	1	0	0	0	1	0	0	0	1
S Cyprinid	1	0	1	0	5	3	1	3	3
Stickleback	0	0	0	2	0	0	0	0	0
Bullhead	0	0	0	0	0	1	0	0	0
Total	*9*	*3*	*7*	*9*	*18*	*6*	*3*	*16*	*17*
Indet	*6*	*17*	*3*	*8*	*33*	*19*	*2*	*20*	*7*

Table 22. SSD 661. Context 2586. Grid 25. 4mm res. Phase 4. C14th

Grid	*25/31*	*25/31*	*25/31*	*25/32*	*25/32*	*25/32*	
Sample	*8268*	*8270*	*8271*	*8265*	*8399*	*8413*	*Total*
Roker	0	0	0	4	1	0	5
Eel	27	21	51	10	33	0	142
Herring	82	140	127	75	113	53	590
Pike	0	2	0	0	1	2	5
Dace	0	0	1	0	0	0	1
Roach	0	0	0	0	1	0	1

L Cyprinid	0	0	0	3	0	0	3
S Cyprinid	3	5	5	0	8	0	21
Whiting	6	11	2	4	14	10	47
L Gadid	0	0	0	1	1	0	2
S Gadid	5	0	3	6	8	4	26
Gurnard	1	0	4	3	2	0	10
Perch	0	0	0	2	2	1	5
Mackerel	0	0	0	0	1	1	2
Plaice	0	0	0	7	0	0	7
Flounder	0	0	0	4	0	0	4
Pl/Fl	2	1	3	4	6	0	16
Flatfish	0	0	0	1	0	0	1
Total	*126*	*180*	*196*	*124*	*191*	*71*	*888*
Indet	*105*	*204*	*301*	*168*	*56*	*18*	*852*
Scale		*pp*	*pp*	*pp*	*p*	*p*	

Table 23. SSD 661. Context 2586. Grid 26. 4mm res. Phase 4. C14th

Grid	*26/31*	*26/31*	*26/31*	*26/31*	*26/31*	*26/31*	*26/32*	*26/32*	*26/32*	*26/32*	*26/32*	*26/32*	*26/32*	
Sample	*8160*	*8246*	*8247*	*8262*	*8263*	*8526*	*8130*	*8166*	*8176*	*8177*	*8245*	*8264*	*8290*	*Total*
Elasmo	0	0	0	0	0	0	0	0	0	1	0	0	3	4
Roker	2	2	0	1	0	0	0	3	0	0	0	0	0	8
Ray	0	0	0	0	0	1	2	0	0	0	0	0	0	3
Eel	18	0	0	1	6	21	9	11	0	3	0	0	3	72
Herring	126	29	21	25	54	94	94	127	81	21	10	5	14	701
Salmonid	1	0	0	0	2	1	0	0	0	0	0	0	0	4
Pike	0	0	2	0	0	2	3	1	0	1	0	0	1	10
Dace	4	1	0	0	0	3	0	4	1	0	0	0	1	14
Roach	0	0	0	0	0	0	0	2	0	0	0	0	0	2
L Cyprinid	1	1	0	0	1	2	0	1	0	0	0	0	0	6

S Cyprinid	5	1	2	1	4	5	0	4	3	0	0	0	1	26
Cod	6	8	0	0	0	1	6	3	0	0	0	0	0	24
Haddock	1	0	0	0	0	0	0	1	0	0	0	0	0	2
Whiting	14	2	4	0	0	26	11	19	9	1	5	0	7	98
L Gadid	0	0	5	0	1	5	2	0	0	1	1	0	1	16
S Gadid	3	0	2	7	2	3	0	3	0	1	0	1	2	24
Ling	0	?1	0	0	0	1	0	0	0	0	0	0	0	2
Stickleback	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Gurnard	1	4	0	0	0	3	5	0	13	0	0	0	0	26
Perch	1	1	0	1	0	2	0	1	0	0	0	0	0	6
Mackerel	0	0	0	0	2	1	0	1	0	0	0	0	0	4
Plaice	0	0	0	0	4	33	0	5	0	0	0	0	0	42
Pl/Fl	16	7	4	0	0	5	3	8	5	2	4	0	2	56
Flatfish	4	0	0	0	1	0	0	1	0	0	0	0	0	6
Total	*203*	*57*	*40*	*36*	*77*	*210*	*135*	*195*	*112*	*31*	*20*	*6*	*35*	*1157*
Indet	*226*	*51*	*22*	*16*	*42*	*355*	*68*	*66*	*89*	*52*	*8*	*2*	*15*	*1012*
Scale	*pp*				*p*	*p*	*pp*	*p*	*p*					

Table 24. SSD 661. Context 2586. Grid 27. 4mm res. Phase 4. C14th

Grid	*27/31*	*27/31*	*27/31*	*27/31*	*27/31*	*27/32*	*27/32*	*27/32*	*27/32*	*27/32*	
Sample	*8168*	*8170*	*8172*	*8250*	*8251*	*8163*	*8164*	*8269*	*8401*	*8410*	*Total*
Roker	2	0	1	1	2	4	0	1	1	0	12
Ray	1	0	1	0	0	0	0	0	0	0	2
Eel	9	11	43	9	10	1	0	8	8	2	101
Herring	100	38	34	19	33	29	0	19	10	8	290
Pike	3	1	1	0	0	0	0	1	0	0	6
Barbel	0	0	1	0	1	0	0	0	0	0	2
Dace	1	2	3	1	1	1	0	0	0	0	9
Roach	3	0	3	0	0	0	0	0	1	0	7
L Cyprinid	0	0	1	0	0	2	0	1	0	0	4
S Cyprinid	5	3	34	4	0	2	0	0	1	0	49
Cod	5	0	0	0	0	1	0	0	0	0	6
Whiting	13	5	0	3	12	8	0	11	0	9	61
L Gadid	2	0	3	1	0	0	0	0	7	1	14
S Gadid	2	1	3	1	6	1	0	1	4	1	20
Gurnard	5	0	0	0	0	0	0	0	0	0	5
Mackerel	0	0	0	0	1	0	1	0	0	0	2
Plaice	0	7	0	1	0	1	0	0	1	1	11
Pl/Fl	16	1	4	6	6	2	0	0	3	0	38
Flatfish	0	0	4	0	1	0	0	5	0	0	10
Total	*167*	*69*	*136*	*46*	*73*	*52*	*1*	*47*	*36*	*22*	*649*
Indet	*357*	*12*	*396*	*66*	*33*	*109*	*13*	*62*	*30*	*15*	*1093*
Scale	*p*	*pp*	*p*	*p*	*p*	*p*		*p*	*p*		

Table 25. SSD 661. Context 2586. Grid 28. 4mm res. Phase 4. C14th

Grid	*28/31*	*28/31*	*28/32*	*28/32*	*28/32*	*28/32*	*28/32*	*28/33*	
Sample	*8267*	*8411*	*8173*	*8174*	*8175*	*8244*	*8272*	*8112*	*Total*
Roker	0	1	2	0	4	0	0	1	8
Eel	5	2	0	1	1	0	0	0	9
Herring	15	18	10	1	3	1	4	0	52
Clupeid	5	0	0	0	0	0	0	0	5
Salmonid	0	0	0	0	1	0	0	0	1
Pike	0	1	1	0	0	0	0	0	2
Dace	0	5	0	0	0	0	0	0	5
Dace/Chub	1	0	0	0	0	0	0	0	1
L Cyprinid	2	0	0	0	0	0	0	0	2
S Cyprinid	3	1	3	0	1	1	0	0	9
Cod	1	0	0	0	0	1	0	0	2
Whiting	5	1	2	1	4	3	1	3	20
L Gadid	3	1	1	0	1	1	1	0	8
S Gadid	0	0	0	2	0	0	1	0	3
Garfish	0	1	0	0	0	0	0	0	1
Stickleback	0	0	0	0	0	1	0	0	1
Plaice	0	8	0	0	0	3	0	0	11
Flounder	10	0	0	0	0	0	0	0	10
Pl/Fl	5	0	3	0	7	0	0	1	16
Total	*55*	*39*	*22*	*5*	*22*	*11*	*7*	*5*	*166*
Indet	*45*	*42*	*63*	*40*	*20*	*35*	*17*	*17*	*279*
Scale	*p*	*pp*	*p*	*p*	*p*				

Table 26. SSD 661. Context 2586. Grid 29. 4mm res. Phase 4. C14th

Grid	*29/31*	*29/31*	*29/31*	*29/32*	*29/33*	*29/34*	
Sample	*6149*	*8409*	*8412*	*8398*	*8123*	*8403*	*Total*
Roker	2	0	0	2	1	0	5
Eel	0	0	1	1	0	0	2
Herring	0	24	4	17	0	1	46
Tench	0	1	0	0	0	0	1
L Cyprinid	0	0	0	1	0	0	1
S Cyprinid	1	1	3	3	0	1	9
Whiting	0	3	0	0	3	3	9
L Gadid	0	2	0	3	0	4	9
S Gadid	0	0	3	1	0	0	4
Pl/Fl	2	1	3	2	1	1	10
Flatfish	0	6	0	0	0	0	6
Total	*5*	*38*	*14*	*30*	*5*	*10*	*102*
Indet	*5*	*30*	*36*	*37*	*17*	*9*	*134*
Scale		*p*	*pp*	*p*			

Table 27. SSD 661. Context 2586. Grid Summary. 4mm res. Phase 4. C14th

Grid	*25*	*26*	*27*	*28*	*29*	*Total*
Elasmo	0	4	0	0	0	4
Roker	5	8	12	8	5	38
Ray	0	3	2	0	0	5
Eel	142	72	101	9	2	326
Herring	590	701	290	52	46	1679
Clupeid	0	0	0	5	0	5
Salmonid	0	4	0	1	0	5
Pike	5	10	6	2	0	23
Tench	0	0	0	0	1	1
Barbel	0	0	2	0	0	2
Dace	1	14	9	5	0	29
Dace/Chub	0	0	0	1	0	1
Roach	1	2	7	0	0	10
L Cyprinid	3	6	4	2	1	16
S Cyprinid	21	26	49	9	9	114
Cod	0	24	6	2	0	32
Haddock	0	2	0	0	0	2
Whiting	47	98	61	20	9	235
L Gadid	2	16	14	8	9	49
S Gadid	26	24	20	3	4	77
Ling	0	2	0	0	0	2
Garfish	0	0	0	1	0	1
Stickleback	0	1	0	1	0	2
Gurnard	10	26	5	0	0	41
Perch	5	6	0	0	0	11
Mackerel	2	4	2	0	0	8
Plaice	7	42	11	11	0	71
Flounder	4	0	0	10	0	14
Pl/Fl	16	56	38	16	10	136
Flatfish	1	6	10	0	6	23
Total	*888*	*1157*	*649*	*166*	*102*	*2962*
Indet	*852*	*1012*	*1093*	*279*	*134*	*3370*

Table 28. SSD 661. Context 2586. Grid 25. 2mm res. Phase 4. C14th

Grid Sample	*25/31 8268*	*25/31 8270*	*25/31 8271*	*25/32 8265*	*25/32 8399*	*Total*
Ray	0	0	0	3	2	5
Eel	17	23	9	31	52	132
Herring	31	69	90	154	398	742
Sprat	0	0	0	0	7	7
Dace	0	3	0	1	0	4
S Cyprinid	6	9	11	1	18	45
Whiting	0	1	0	2	1	4

Stickleback	0	1	0	2	0	3
Bullhead	0	1	0	0	0	1
Perch	0	1	0	0	0	1
Scad	1	0	0	0	0	1
Mackerel	0	0	0	0	1	1
Plaice	0	0	0	0	1	1
Flatfish	1	0	1	0	0	2
Total	*56*	*108*	*111*	*194*	*480*	*949*
Indet	*42*	*112*	*108*	*104*	*119*	*485*
Scale	*p*	*p*		*pp*	*pp*	

Table 29. SSD 661. Context 2586. Grid 26. 2mm res. Phase 4. C14th

Grid	*26/31*	*26/31*	*26/31*	*26/32*	*26/32*	
Sample	*8160*	*8263*	*8526*	*8130*	*8176*	*Total*
Ray	0	7	0	0	0	7
Eel	7	29	86	8	8	138
Herring	0	85	315	42	87	529
Sprat	0	4	0	0	0	4
Dace	0	4	1	0	3	8
S Cyprinid	0	15	27	2	6	50
S Gadid	1	0	0	0	1	2
Stickleback	0	0	0	0	2	2
Bullhead	0	1	0	0	0	1
Pl/Fl	0	0	3	0	0	3
Flatfish	0	0	3	0	0	3
Total	*8*	*145*	*435*	*52*	*107*	*747*
Indet	*70*	*110*	*70*	*71*	*33*	*354*
Scale	*pp*	*pp*	*p*	*p*	*p*	

Table 30. SSD 661. Context 2586. Grid 27. 2mm res. Phase 4. C14th

Grid	*27/31*	*27/32*	
Sample	*8174*	*8398*	*Total*
Ray	1	1	2
Eel	29	10	39
Herring	13	46	59
Barbel	1	0	1
Dace	2	0	2
Roach	3	0	3
S Cyprinid	38	11	49
S Gadid	2	1	3
Stickleback	0	1	1
Bullhead	0	1	1
Flatfish	4	0	4
Total	*93*	*71*	*164*
Indet	*260*	*70*	*330*
Scale		*pp*	*pp*

Table 31. SSD 661. Context 2586. Grid 28. 2mm res. Phase 4. C14th

Grid	*28/32*
Sample	*8174*
Eel	*9*
Herring	*19*
Dace	*1*
S Cyprinid	*5*
Total	*34*
Indet	*23*
Scale	*pp*

Table 32. SSD 661. Context 2586. Grid 29. 2mm res. Phase 4. C14th

Grid	*29/31*	*29/32*	
Sample	*8412*	*8398*	*Total*
Ray	0	2	2
Eel	8	5	13
Herring	11	57	68
Barbel	2	0	2
Dace	2	5	7
L Cyprinid	0	2	2
S Cyprinid	3	2	5
Stickleback	1	0	1
Bullhead	0	3	3
Total	*27*	*76*	*103*
Indet	*22*	*110*	*132*
Scale	*ppp*	*ppp*	

Table 33. SSD 661. Context 2586. Grid Summary. 2mm res. Phase 4. C14th

Grid	*25*	*26*	*27*	*28*	*29*	*Total*
Ray	5	7	2	0	2	16
Eel	132	138	39	9	13	331
Herring	742	529	59	19	68	1417
Sprat	7	4	0	0	0	11
Barbel	0	0	1	0	2	3
Dace	4	8	2	1	7	22
Roach	0	0	3	0	0	3
L Cyprinid	0	0	0	0	2	2
S Cyprinid	45	50	49	5	5	154
Whiting	4	0	0	0	0	4
S Gadid	0	2	3	0	0	5
Stickleback	3	2	1	0	1	7
Bullhead	1	1	1	0	3	6
Perch	1	0	0	0	0	1
Scad	1	0	0	0	0	1

Mackerel	1	0	0	0	0	1
Plaice	1	0	0	0	0	1
Pl/Fl	0	3	0	0	0	3
Flatfish	2	3	4	0	0	9
Total	*949*	*747*	*164*	*34*	*103*	*1997*
Indet	*485*	*354*	*330*	*23*	*132*	*1324*

Table 34. SSD 661. Context 2586. Grid 25. 1mm res. Phase 4. C14th

Grid	*25/32*	*25/32*	
Sample	*8265*	*8265*	*Total*
Ray	0	1	1
Eel	1	7	8
Herring	1	4	5
Clupeid	0	12	12
S Cyprinid	5	3	8
Total	*7*	*27*	*34*
Indet	*5*	*21*	*26*

Table 35. SSD 661. Context 2586. Grid 26. 1mm res. Phase 4. C14th

Grid	*26/31*	*26/31*	*26/31*	*26/32*	
Sample	*8160*	*8526*	*8263*	*8170*	*Total*
Ray	1	0	1	1	3
Eel	56	0	2	0	58
Herring	126	1	0	1	128
Sprat	0	0	8	0	8
Pike	1	0	0	0	1
Dace	6	2	3	0	11
Roach	0	1	0	0	1
L Cyprinid	0	0	0	4	4
S Cyprinid	17	5	2	1	25
Stickleback	0	4	0	0	4
Bullhead	1	0	0	1	2
Flatfish	0	1	0	0	1
Total	*208*	*14*	*16*	*8*	*246*
Indet	*170*	*150*	*16*	*32*	*368*
Scale		*ppp*			

Table 36. SSD 661. Context 2586. Grid 27. 1mm res. Phase 4. C14th

Grid	*27/31*	*27/32*	
Sample	*8172*	*8164*	*Total*
Ray	0	8	8
Eel	5	4	9
Herring	0	1	1
Salmonid	0	1	1

Dace	1	3	4
L Cyprinid	4	0	4
S Cyprinid	3	2	5
Flatfish	1	0	1
Total	*14*	*19*	*33*
Indet	*5*	*29*	*34*

Table 37. SSD 661. Context 2586. Grid 28. 1mm res. Phase 4. C14th

Grid	*28/32*
Sample	*8174*
Eel	3
Herring	1
Dace	2
S Cyprinid	1
Bullhead	1
Total	*8*
Indet	*7*

Table 38. SSD 661. Context 2586. Grid 29. 1mm res. Phase 4. C14th

Grid	*29/31*	*29/31*	*29/31*	
Sample	*8398*	*8409*	*8412*	*Total*
Ray	3	2	0	5
Eel	1	7	1	9
Dace	3	2	1	6
S Cyprinid	3	0	3	6
Stickleback	0	10	0	10
Bullhead	0	0	1	1
Total	*10*	*21*	*6*	*37*
Indet	*4*	*36*	*1*	*41*

Table 39. SSD 661. Context 2586. Grid summary. 1mm res. Phase 4. C14th

Grid	*25*	*26*	*27*	*28*	*29*	*Total*
Ray	1	3	8	0	5	17
Eel	8	58	9	3	9	87
Herring	5	128	1	1	0	135
Sprat	0	8	0	0	0	8
Clupeid	12	0	0	0	0	12
Salmonid	0	0	1	0	0	1
Pike	0	1	0	0	0	1
Dace	0	11	4	2	6	23
Roach	0	1	0	0	0	1
L Cyprinid	0	4	4	0	0	8
S Cyprinid	8	25	5	1	6	45
Stickleback	0	4	0	0	10	14

Bullhead	0	2	0	1	1	4
Flatfish	0	1	1	0	0	2
Total	*34*	*246*	*33*	*8*	*37*	*358*
Indet	*26*	*368*	*34*	*7*	*41*	*476*

Table 40. SSD 661. Context 2586. All Grids. 1mm Flot. Phase 4. C14th

Grid	*25/31*	*26/31*	*26/31*	*26/32*	*27/31*	*29/31*	*29/32*		
Sample	*8270*	*8160*	*8526*	*8167*	*8172*	*8409*	*8398*	*8152*	*Total*
Eel	0	0	2	2	0	1	0	0	5
Herring	11	11	43	8	25	3	0	3	104
S Cyprinid	0	2	0	0	0	0	0	0	2
L Gadid	0	0	1	0	0	0	0	0	1
S Gadid	0	0	1	0	0	0	0	0	1
Gurnard	0	0	1	0	0	0	0	0	1
Mackerel	0	0	1	0	0	0	0	0	1
Pl/FL	0	1	0	0	0	0	0	0	1
Flatfish	0	0	1	0	0	0	0	0	1
Total	*11*	*14*	*50*	*10*	*25*	*4*	*0*	*3*	*117*
Indet	*5*	*3*	*12*	*7*	*8*	*3*	*1*	*1*	*40*
Scale		*p*	*pp*	*p*			*p*	*pp*	

Table 41. SSD 661. Context 2586. All Grids. 2mm Flot. Phase 4. C14th

Grid	*25/31*	*26/31*	*26/31*	*27/31*	*26/32*	*27/32*	*29/31*	*29/32*	
Sample	*8270*	*8160*	*8526*	*8172*	*8167*	*8164*	*8409*	*8398*	*Total*
Ray	6	0	0	0	0	0	0	0	6
Eel	26	7	29	3	2	3	0	0	70
Herring	62	7	68	16	2	3	2	5	165
Sprat	4	0	1	0	0	1	0	0	6
Clupeid	0	0	1	0	0	0	0	0	1
Salmonid	0	1	0	0	0	0	0	0	1
Dace	3	0	0	0	0	1	0	0	4
S Cyprinid	4	3	2	1	1	0	0	0	11
S Gadid	0	0	0	0	0	2	0	0	2
Stickleback	0	0	0	0	0	0	1	0	1
c.f. bullrout	0	0	1	0	0	0	0	0	1
Pl/Fl	0	0	0	0	0	0	0	1	1
Total	*105*	*18*	*102*	*20*	*5*	*10*	*3*	*6*	*269*
Indet	*100*	*6*	*132*	*0*	*30*	*15*	*0*	*50*	*333*
Scale	*ppp*	*pp*	*ppp*	*ppp*	*pp*	*p*	*pp*	*p*	

Table 42. SSD 661. Context 2586. All Grids. 1mm Flot. Phase 4. C14th

Grid	*25/31*	*26/31*	*26/31*	*26/32*	*27/31*	*29/31*	*29/32*	
Sample	*8270*	*8160*	*8526*	*8167*	*8172*	*8409*	*8398*	*Total*
Ray	3	6	0	0	0	0	0	9
Eel	4	0	0	0	0	1	0	5
Herring	0	0	1	0	0	0	0	1
Sprat	2	3	0	0	0	0	0	5
Salmonid	0	1	0	0	0	0	0	1
Smelt	0	0	0	0	0	0	1	1
Dace	0	1	2	0	0	0	0	3
Roach	0	0	1	0	0	0	0	1
S Cyprinid	3	3	5	2	3	0	0	16
Stickleback	0	5	4	0	1	0	1	11
Flatfish	0	0	1	0	0	0	0	1
Total	*12*	*19*	*14*	*2*	*4*	*1*	*2*	*54*
Indet	*8*	*55*	*113*	*9*	*12*	*4*	*3*	*204*
Scale		*p*	*pp*					

Table 43. SSD 661. Context 2586. Summary Table. Phase 4. C14th

	4 mm res	*2 mm res*	*1 mm res*	*4 mm flot*	*2 mm flot*	*1 mm flot*	*Total*
Elasmo	4	0	0	0	0	0	4
Roker	38	0	0	0	0	0	38
Ray	5	16	17	0	6	9	53
Eel	326	331	87	5	70	5	824
Herring	1679	1417	135	104	165	1	3501
Sprat	0	11	8	0	6	5	30
Clupeid	5	0	12	0	1	0	18
Salmonid	5	0	1	0	1	1	8
Smelt	0	0	0	0	0	1	1
Pike	23	0	1	0	0	0	24
Tench	1	0	0	0	0	0	1
Barbel	2	3	0	0	0	0	5
Dace	29	22	23	0	4	3	81
Dace/Chub	1	0	0	0	0	0	1
Roach	10	3	1	0	0	1	15
L Cyprinid	16	2	8	0	0	0	26
S Cyprinid	114	154	45	2	11	16	342
Cod	32	0	0	0	0	0	32
Haddock	2	0	0	0	0	0	2
Whiting	235	4	0	0	0	0	239
L Gadid	49	0	0	1	0	0	50
S Gadid	77	5	0	1	2	0	85
Ling	2	0	0	0	0	0	2
Garfish	1	0	0	0	0	0	1

Stickleback	2	7	14	0	1	11	35
Bullhead	0	6	4	0	0	0	10
Bullrout	0	0	0	0	1	0	1
Gurnard	41	0	0	1	0	0	42
Perch	11	1	0	0	0	0	12
Scad	0	1	0	0	0	0	1
Mackerel	8	1	0	1	0	0	10
Plaice	71	1	0	0	0	0	72
Flounder	14	0	0	0	0	0	14
PL/FL	136	3	0	1	1	0	141
Flatfish	23	9	2	1	0	1	36
Total	*2962*	*1997*	*358*	*117*	*269*	*54*	*5757*
Indet	*3370*	*1324*	*476*	*40*	*333*	*204*	*5747*

The Strong Room SSD 656

Table 44. SSD 656. Context 1134. Layer. 4mm res. Phase 2. L C11th

Sample	*6119*
Eel	1
S Cyprinid	1
Total	*2*
Indet	*4*

Table 45. SSD 656. Context 1531. Layer. 4mm res. Phase 3. C12th

Sample	*6076*	*6082*	*Total*
Herring	0	1	1
PL/Fl	1	0	1
Total	*1*	*1*	*2*

Table 46. SSD 656. Context 1577. Fill. 4mm res. Phase 4. C14th

Sample	*8193*	*8194*	*Total*
Herring	0	4	4
Dace	1	0	1
S Cyprinid	1	1	2
Whiting	0	1	1
Total	*2*	*6*	*8*
Indet	*0*	*3*	*3*

Table 47. SSD 656. Context 1583. Fill. 4mm res. Phase 4. C14th

Sample	*8415*	*8421*	*8431*	*8432*	*Total*
Conger	1	0	0	0	1
Herring	0	0	0	2	2
Bream	0	0	0	1	1
L Cyprinid	2	0	0	0	2
S Cyprinid	0	0	1	0	1
Whiting	0	0	0	1	1
S Gadid	0	1	0	0	1
Gurnard	0	1	0	0	1
Mackerel	0	1	0	0	1
Total	*3*	*3*	*1*	*4*	*11*
Indet	*6*	*4*	*7*	*3*	*20*
Scale				*p*	

Table 48. SSD 656. Context 1595. Fill. 4mm res. Phase 4 C14th

Sample	*8355*	*8426*	*8428*	*8351*	*Total*
Eel	15	0	8	6	29
Conger	1	0	0	0	1
Herring	11	1	12	0	24
Pike	2	0	0	0	2
Dace	1	0	0	0	1
S Cyprinid	2	0	3	1	6
Whiting	5	0	0	1	6
S Gadid	0	0	3	0	3
Gurnard	0	0	0	1	1
Mackerel	0	2	1	1	4
Total	*37*	*3*	*27*	*10*	*77*
Indet	*13*	*0*	*16*	*13*	*42*

Table 49. SSD 656. Single context samples. 4mm res. Phase 4. C12th-14th

	Fill	*fill*	*fill*	*fill*	*layer*	*fill*	*fill*	*cut*	*fill*	
Sample	*6066*	*8430*	*8354*	*8429*	*8420*	*8417*	*8422*	*6065*	*6065*	*Total*
Context	*1125*	*1579*	*1581*	*1587*	*1590*	*1592*	*1589*	*1128*	*1129*	
Elasmo	0	0	0	0	0	0	0	0	2	2
Eel	0	2	0	1	2	0	1	34	17	57
Herring	2	0	0	0	3	0	0	27	14	46
Salmonid	0	0	0	0	1	0	0	1	0	2
Pike	1	0	0	0	1	0	0	8	4	14
Bream	0	0	0	0	0	?1	0	0	0	?1
Dace	0	0	0	0	0	0	0	0	5	5
L Cyprinid	0	0	0	0	0	0	0	3	0	3
S Cyprinid	0	0	0	0	0	0	1	11	0	12
Cod	0	0	1	0	0	0	0	0	0	1

Whiting	19	0	0	1	0	0	0	0	0	20
L Gadid	0	0	0	0	0	0	0	1	1	2
S Gadid	0	1	0	0	0	0	0	0	0	1
?Bullrout	4	0	0	0	0	0	0	0	0	4
Gurnard	0	0	0	0	0	0	0	1	1	2
Mackerel	0	0	0	0	0	0	0	0	1	1
Flounder	11	0	0	0	0	0	0	0	0	11
Pl/Flounder	0	0	0	0	1	1	0	4	3	9
Total	*37*	*3*	*1*	*2*	*8*	*2*	*2*	*90*	*48*	*193*
Indet	*8*	*3*	*2*	*2*	*8*	*13*	*5*	*231*	*1*	*273*
Scale	*p*	*p*						*p*		

Table 50. SSD 656. Context 1590. Layer. 2mm res. Phase 4. C13th

Sample	*8420*
Eel	1
Herring	1
Total	*2*
Indet	*2*

Table 51. SSD 656. Context 1565. Layer. Grid 26. 4mm res. Phase 4. C13th

Grid	*26/13*	*26/15*	
Sample	*6142*	*8233*	*Total*
Herring	6	9	15
L Cyprinid	1	0	1
Cod	2	0	2
Whiting	1	0	1
Pl/Fl	1	0	1
Flatfish	2	0	2
Total	*13*	*9*	*22*

Table 52. SSD 656. Context 1565. Layer. Grid 27. 4mm res. Phase 4. C13th

Grid	*27/13*	*27/14*	*27/14*	*27/15*	*27/15*	*27/16*	
Sample	*8200*	*8197*	*6136*	*6144*	*8196*	*8223*	*Total*
Herring	3	0	4	0	0	11	18
Roach	0	0	1	0	0	0	1
L Cyprinid	0	0	0	1	0	0	1
S Gadid	0	1	1	0	0	0	2
Pl/Fl	1	0	2	0	0	0	3
Total	*4*	*1*	*8*	*1*	*0*	*11*	*25*
Indet	*13*	*0*	*13*	*7*	*1*	*16*	*50*
Scale			*p*				

Table 53. SSD 656. Context 1565. Layer. Grid 28. 4mm res. Phase 4. C13th

Grid	*28/14*	*28/14*	*28/14*	*28/15*	*28/15*	*28/16*	*28/16*	*28/16*	*28/16*	*28/16*	*28/17*	*28/17*	
Sample	*6146*	*6147*	*6156*	*8195*	*8205*	*6143*	*8192*	*8202*	*8212*	*8234*	*8227*	*8249*	*Total*
Roker	0	0	0	0	0	0	0	1	0	0	0	0	1
Eel	1	0	5	1	0	0	1	7	1	0	1	9	26
Conger	3	0	0	1	0	0	0	0	0	0	0	1	5
Herring	1	8	11	2	1	22	1	10	22	0	6	28	112
Pike	0	1	2	0	0	0	0	0	0	0	0	0	3
L Cyprinid	1	1	0	1	0	2	1	0	1	0	0	0	7
S Cyprinid	0	0	2	0	0	0	1	0	0	0	0	0	3
Cod	0	0	0	0	0	0	0	0	1	0	0	0	1
Haddock	0	0	0	0	0	0	1	0	0	0	0	0	1
Whiting	0	2	0	2	0	3	0	3	0	0	5	13	28
L Gadid	0	0	0	0	0	0	0	1	0	0	0	0	1
S Gadid	0	0	0	0	0	1	0	0	2	2	0	3	8
Gurnard	1	0	0	0	0	0	0	3	0	0	0	4	8
Perch	0	1	0	0	0	0	0	0	0	0	0	0	1
Flounder	0	0	0	0	0	0	0	0	0	0	1	0	1
Pl/Fl	0	4	0	0	1	2	2	3	1	0	0	3	16
Total	*7*	*17*	*20*	*7*	*2*	*30*	*7*	*28*	*28*	*2*	*13*	*61*	*222*
Indet	*7*	*33*	*35*	*9*	*6*	*32*	*13*	*29*	*7*	*1*	*9*	*26*	*207*
Scale									*p*				

Table 54. SSD 656. Context 1565. Layer. Grid 29. 4mm res. Phase 4. C13th

Grid	*29/13*	*29/14*	*29/15*	*29/16*	*29/17*	*29/17*	*29/17*	
Sample	*8190*	*8239*	*8222*	*8232*	*8228*	*8219*	*8238*	*Total*
Elasmo	1	0	1	0	0	0	0	2
Ray	0	0	0	1	0	0	0	1
Eel	1	0	3	3	4	1	5	17
Conger	1	0	0	0	0	0	1	2
Herring	2	3	17	29	0	1	9	61
Salmonid	0	1	0	0	0	0	0	1
Pike	0	1	3	0	0	0	1	5
Roach	0	0	0	1	0	1	0	2
L Cyprinid	2	0	0	0	0	0	0	2
S Cyprinid	1	0	0	1	0	0	1	3
S Gadid	1	0	0	0	0	0	1	2
Gurnard	0	0	0	0	0	9	2	11
Plaice	1	0	0	0	0	0	0	1
Pl/Fl	1	0	1	1	0	3	1	7
Total	*11*	*5*	*25*	*36*	*4*	*15*	*21*	*117*
Indet	*15*	*4*	*31*	*2*	*4*	*3*	*22*	*81*
Scale			*p*					

Table 55. SSD 656. Context 1565. Layer. Grid 30. 4mm res. Phase 4. C13th

Grid	*30/14*	*30/15*	*30/15*	*30/16*	*30/17*	
Sample	*8359*	*8236*	*8360*	*8276*	*8216*	*Total*
Eel	0	0	3	0	2	5
Herring	0	1	3	14	25	43
Pike	0	0	2	8	2	12
Barbel	0	0	2	1	0	3
L Cyprinid	0	0	0	1	1	2
S Cyprinid	0	0	1	0	0	1
Whiting	0	2	0	1	0	3
S Gadid	0	0	0	0	2	2
Gurnard	0	0	0	1	1	2
Plaice	0	0	0	0	2	2
Pl/Fl	0	1	0	0	1	2
Total	*0*	*4*	*11*	*26*	*36*	*77*
Indet	*6*	*7*	*35*	*25*	*42*	*115*

Table 56. SSD 656. Context 1565 Layer. Grid 31. 4mm res. Phase 4. C 13th

Grid	*31/16*	*31/16*	*31/16*	*31/17*	*31/17*	*31/17*	*31/18*	
Sample	*8357*	*8385*	*8406*	*8386*	*8407*	*8387*	*8285*	*Total*
Elasmo	1	0	0	0	0	0	0	1
Ray	6	0	0	0	0	0	0	6
Eel	0	0	0	6	5	1	0	12

Conger	0	0	0	1	0	0	0	1
Herring	5	4	1	2	8	2	1	23
c.f. Smelt	2	0	0	0	0	0	0	2
Pike	1	0	0	0	1	0	0	2
Dace	0	0	0	0	0	2	0	2
Roach	1	0	0	0	0	0	0	1
L Cyprinid	0	0	0	0	1	0	0	1
S Cyprinid	0	0	0	0	1	0	0	1
Whiting	3	0	0	8	0	0	1	12
L Gadid	0	0	0	0	2	1	0	3
S Gadid	0	0	0	0	10	0	0	10
Plaice	0	1	0	0	0	0	0	1
Pl/Fl	0	1	0	4	0	0	5	10
Flatfish	0	0	0	0	3	0	0	3
Total	*19*	*6*	*1*	*21*	*31*	*6*	*7*	*91*
Indet	*0*	*4*	*1*	*4*	*23*	*3*	*10*	*45*
Scale						*p*		

Table 57. SSD 656. Context 1565. Layer. Grid 32. 4mm res. Phase 4. C13th

Grid	*32/15*	*32/16*	*32/17*	
Sample	*8242*	*8384*	*8273*	*Total*
Eel	1	0	1	2
Herring	14	4	0	18
Salmonid	0	1	0	1
Pike	0	2	0	2
Whiting	5	0	0	5
S Gadid	0	0	1	1
Flatfish	1	0	0	1
Total	*21*	*7*	*2*	*30*
Indet	*16*	*4*	*3*	*23*
Scale		*p*	*p*	

Table 58. SSD 656. Context 1565. Layer. Summary of combined grids. 4mm res. Phase 4. C13th

Grid	*26*	*27*	*28*	*29*	*30*	*31*	*32*	*Total*
Elasmo	0	0	0	2	0	1	0	3
Roker	0	0	1	0	0	0	0	1
Ray	0	0	0	1	0	6	0	7
Eel	0	0	26	17	5	12	2	62
Conger	0	0	5	2	0	1	0	8
Herring	15	18	112	61	43	23	18	290
Salmonid	0	0	0	1	0	0	1	2
c.f. Smelt	0	0	0	0	0	2	0	2
Pike	0	0	3	5	12	2	2	24
Barbel	0	0	0	0	3	0	0	3

Dace	0	0	0	0	0	2	0	2
Roach	0	1	0	2	0	1	0	4
L Cyprinid	1	1	7	2	2	1	0	14
S Cyprinid	0	0	3	3	1	1	0	8
Cod	2	0	1	0	0	0	0	3
Haddock	0	0	1	0	0	0	0	1
Whiting	1	0	28	0	3	12	5	49
L Gadid	0	0	1	0	0	3	0	4
S Gadid	0	2	8	2	2	10	1	25
Gurnard	0	0	8	11	2	0	0	21
Perch	0	0	1	0	0	0	0	1
Plaice	0	0	0	1	2	1	0	4
Flounder	0	0	1	0	0	0	0	1
Pl/Fl	1	3	16	7	2	10	0	39
Flatfish	2	0	0	0	0	3	1	6
Total	*22*	*25*	*222*	*117*	*77*	*91*	*30*	*584*
Indet	*0*	*50*	*207*	*81*	*115*	*45*	*23*	*521*

Table 59. SSD 656. Context 1565. Layer. Grids 30 & 31. 2mm res. Phase 4. C13th

Grid	*30/15*	*31/17*	
Samples	*8360*	*8387*	*Total*
Eel	1	2	3
Herring	15	0	15
Roach	2	0	2
Tench	0	1	1
S Cyprinid	2	0	2
S Gadid	0	1	1
Total	*20*	*4*	*24*
Indet	*24*	*50*	*74*

Table 60. SSD 656. Context 1565. Layer. Hand collected. Phase 4. C13th

Context	*1565*
Herring	9
Whiting	1
S Gadid	1
Gurnard	2
Brill	1
Sole	1
Flatfish	1
Total	*16*
Indet	*20*

Southern half of Hall in W Range. SSD 658

Table 61. SSD 658. All contexts. 4mm residue. Phase 3 – 6

Phase		*3*	*4*	*4*	*4*	*3-6*	*3-6*
	Layer	*fill*	*fill*	*fill*	*fill*	*cut*	
Sample	*6085*	*6068*	*6061*	*8462*	*8459*	*6065*	*Total*
Context	7148	7142	7137	2158	2111	2134	
Eel	0	1	6	0	0	4	11
Herring	6	0	2	0	0	4	12
Pike	0	0	1	0	0	0	1
Dace	0	0	1	0	0	2	3
Whiting	0	0	1	0	0	1	2
S Gadid	0	0	0	0	0	2	2
Perch	0	0	0	0	0	1	1
Total	*6*	*1*	*11*	*0*	*0*	*14*	*32*
Indet	*0*	*2*	*25*	*0*	*1*	*8*	*36*
Scale				*p*			

Table 62. SSD 658. All contexts. 2mm res. Phases 2 – 3. C11th – 12th

Phase		*2*	*3*
	Layer	*layer*	
Sample	*6092*	*6085*	*Total*
Context	7153	7148	
Eel	1	1	2
Clupeid	0	1	1
Total	*1*	*2*	*3*

Well Room. SSD 662

Table 63. SSD 662. Context 2537. Layer. Phase 3. C12th

Sample	*8478*
Eel	1
Indet	*1*
Scale	*p*

Small Room in SW corner of the Tower. SSD 664

Table 64. SSD 664. All contexts. 4mm res. Phases 3–4. C12th – 14th

Phase	*-3-*	*-4-*	*-------3-------*		*----------4----------*						
	Fill	*fill*	*fill*	*fill*	*fill*	*fill*	*fill*	*fill*	*layer*	*layer*	
Sample	*13825*	*13827*	*6145*	*8261*	*8253*	*8254*	*8249*	*8260*	*8257*	*8258*	*Total*
Context	*7411*	*7413*	*3093*	*3093*	*3063*	*3063*	*3085*	*3091*	*3101*	*3101*	
Eel	0	1	0	6	1	0	1	1	1	0	11
Conger	0	0	0	0	1	0	0	0	0	0	1
Herring	0	0	0	4	7	0	1	4	1	1	18
Salmon	0	0	0	0	0	0	0	1	0	0	1
Pike	0	0	2	2	0	0	0	0	1	0	5
L Cyprinid	0	0	0	2	0	0	1	0	0	0	3
S Cyprinid	0	0	0	1	0	0	1	1	1	2	6
Whiting	0	0	0	0	1	0	0	0	0	0	1
L Gadid	1	0	0	1	0	0	0	1	1	0	4
S Gadid	0	0	0	0	0	0	0	0	1	0	1
Ling	0	0	0	0	0	0	0	1	0	0	1
Perch	0	0	0	0	0	1	1	0	0	2	4
Plaice	0	0	0	0	2	0	0	0	0	0	2
Total	*1*	*1*	*2*	*16*	*12*	*1*	*5*	*9*	*6*	*5*	*58*
Indet	*0*	*6*	*1*	*2*	*20*	*0*	*0*	*13*	*2*	*2*	*46*
Scale						*p*		*p*			*p*

Site 485. The Upper Ward

Guard Chamber. SSD 579

Table 65. SSD 579. 4mm res. Phase 2/3. C 12th/13th

Sample	*19649B*	*19650*	
Context	*18439*	*18440*	*Total*
Elasmo	0	1	1
Roker	6	6	12
Eel	9	15	24
Herring	13	20	33
Clupeid	0	5	5
Salmonid	0	1	1
Pike	7	11	18
Bream	1	0	1
Dace	0	2	2
L Cyprinid	0	7	7
S Cyprinid	6	10	16
Whiting	4	6	10
S Gadid	1	2	3
Perch	4	2	6
Mackerel	0	2	2
Pl/Fl	3	0	3
Flatfish	9	0	9
Total	*63*	*90*	*153*
Indet	*55*	*114*	*169*

Table 66. SSD 579. Context 18439. Layer. 2mm res. Phase 2/3. C12th/13th

Sample	*19696 A*	*19649B*	*Total*
Elasmo	0	1	1
Roker	9	19	28
Ray	0	7	7
Eel	82	283	365
Conger	0	3	3
Herring	129	506	635
? Shad	0	1	1
Salmonid	2	1	3
Pike	9	69	78
Barbel	2	0	2
Dace	1	7	8
Dace/Chub	0	9	9
Chub	2	1	3
Roach	2	3	5
L Cyprinid	3	0	3
S Cyprinid	42	130	172
Cod	2	8	10

Whiting	3	47	50
L Gadid	2	11	13
Gurnard	0	1	1
Perch	3	18	21
Mackerel	1	9	10
Plaice	0	4	4
Flounder	0	1	1
Pl/Fl	18	38	56
Total	*312*	*1177*	*1489*
Indet	*319*	*1101*	*1420*

Table 67. SSD 579. Context 18439. Layer. 4mm Flots. Phase 2/3. C 12th/13th

Samples	*19649*	*19696B*	*Total*
Herring	4	3	7
Pike	1	1	2
Pl/Fl	0	1	1
Total	*5*	*5*	*10*
Indet	*10*	*10*	*20*
Scale	*ppp*	*pp*	

Table 68. SSD 579. Context 18439. Layer. 2mm Flot. Phase 2/3. C 12th/13th

Sample	*19649*
Eel	6
Herring	12
Pike	1
S Cyprinid	2
Total	*21*
Indet	*38*
Scale	*ppp*

Table 69. SSD 579. Context 18439. Layer. 1mm Flot. Phase 2/3. C 12th/13th

Sample	*19649*
Ray	2
Sprat	1
Dace	3
Total	*6*
Indet	*16*
Scale	*pp*

Lift Pit 4. SSD ?

Table 70. Lift pit 4. Context 18330. Layer. Residues. Phase 4. C14th

Sample	*4 mm 19594*	*2 mm 19594*	*1 mm 19594*	*Total*
Eel	0	5	1	6
Herring	0	12	1	13
Smelt	0	0	1	1
Pike	0	1	0	1
S Cyprinid	0	1	1	2
Whiting	0	2	0	2
L Gadid	0	1	0	1
Gurnard	0	2	1	3
Pl/Fl	1	1	0	2
Total	*1*	*25*	*5*	*31*
Indet	*16*	*150*	*8*	*176*

Table 71. Lift Pit 4. Context 18330. Layer. Flots. Phase 4. C 14th

Sample	*4 mm 19594*	*2 mm 19594*	*1 mm 19594*	*Total*
Eel	0	2	0	2
Herring	0	5	0	5
Smelt	0	0	4	4
Pike	1	0	0	1
S Cyprinid	1	0	0	1
Whiting	1	3	0	4
L Gadid	1	0	0	1
Gurnard	0	1	0	1
Total	*4*	*11*	*4*	*19*
Indet	*3*	*57*	*51*	*111*

Kitchen Court. SSD 593

Table 72. SSD 593. 593(6). 10mm res. Phase 2. C12th/13th

Sample	*19548*	*19549*	*19551*	*19555*	*19556*	
Context	*18172*	*18173*	*18175*	*18171*	*18176*	*Total*
Eel	0	0	0	1	2	3
Salmonid	1	0	0	0	0	1
Flatfish	0	0	1	0	0	1
Total	*1*	*0*	*1*	*1*	*2*	*5*
Indet	*4*	*1*	*2*	*0*	*0*	*7*

Table 73. SSD 593. 593(6). Context 18170. 4mm res. Phase 2. C12th

Sample	*19557*
Elasmo	1
Eel	1
Pike	2
Total	*4*

Table 74. SSD 593. 593(6). Sample 19555, Context 18171. 1mm from 10mm res. Phase 2. C12th

	Not counted in overall totals						
	>4mm 100ml	*2-4mm 40%*	*2-4mm 205ml*	*1-2mm 40%*	*1-2mm 10%*	*2mm 40ml scan*	*Total*
Elasmo	1	0	0	0	0	0	1
Roker	1	1	0	0	0	0	2
Ray	0	0	0	16	2	0	18
Eel	1	102	493	118	32	10	756
Herring	3	23	64	8	0	0	98
Clupeid	0	0	2	8	0	0	10
Salmonid	0	3	8	25	0	3	39
Pike	0	0	1	3	0	0	4
Dace	0	0	0	67	16	1	84
S Cyprinid	0	0	12	11	3	1	27
Stickleback	0	0	0	2	2	0	4
Bullhead	0	0	0	1	0	0	1
Total	*6*	*129*	*580*	*259*	*55*	*15*	*1044*
Indet	*3*	*21*	*43*	*700*	*85*	*15*	*867*

Table 75. SSD 593. 593(6). Sample 19556, Context 18176. 1mm from 10mm res. Phase 2. C 12th

	Not counted in overall totals								
	>4mm 500 res	*2-4mm 40%*	*2-4mm 100ml*	*1-2mm 40%*	*1-2mm 10%SRSTD*	*1-2mm 10%SCSTD*	*1-2mm 10%SCSTD*	*1-2mm 40%*	*Total*
Eel	10	100	53	61	24	0	0	0	248
Clupeid	0	4	3	0	0	0	0	0	7
Salmonid	0	1	2	0	0	0	0	0	3
Smelt	0	0	0	4	2	0	0	0	6
Pike	0	0	0	3	0	0	0	0	3
Dace	0	1	0	38	17	0	0	0	56
S Cyprinid	0	0	0	13	13	0	0	0	26
Stickleback	0	0	0	10	5	0	0	0	15
Bullhead	0	0	0	1	0	0	0	0	1
Total	*10*	*106*	*58*	*130*	*61*	*0*	*0*	*0*	*365*
Indet	*3*	*16*	*18*	*940*	*222*	*22*	*18*	*55*	*1294*

Table 76. SSD 593. 593(6) or (5)?. Flots. Fills. Phase 2. C12th

Sample	*>2mm* *19555*	*>1mm* *19555*	*>4mm* *19556*	*>2mm* *19556*	*>1mm* *19556*	
Context	*18171*	*18171*	*18176*	*18176*	*18176*	*Total*
Eel	8	9	0	46	16	79
Herring	4	0	0	1	0	5
Salmonid	1	0	0	0	0	1
Smelt	0	1	0	1	5	7
Pike	1	0	0	0	0	1
Dace	0	2	0	0	5	7
S Cyprinid	0	6	0	1	9	16
Total	*14*	*18*	*0*	*49*	*35*	*116*
Indet	*25*	*60*	*6*	*35*	*59*	*185*

Table 77. SSD 593. 593(3). Washing up China. Layers. 4mm res. Pre Phase 3

Sample	*19521*	*19520*	*19525B*	*19529B*	*19524A*	*19524B*	
Context	*18041*	*18043*	*18043*	*18043*	*18117*	*18117*	*Total*
Elasmo	0	0	1	0	0	0	1
Eel	0	0	0	0	0	1	1
Herring	0	1	1	0	0	0	2
Salmonid	0	0	0	0	0	1	1
Pike	2	3	0	0	0	1	6
S Cyprinid	0	0	0	0	1	0	1
S Gadid	0	0	0	0	0	1	1
Flatfish	0	0	0	1	0	0	1
Total	*2*	*4*	*2*	*1*	*1*	*4*	*14*
Indet	*0*	*1*	*0*	*0*	*0*	*1*	*2*

Table 78. SSD 593. 4mm residue. Phase ?3. ? C13th

Sample	*593(7)* *19542A*	*593(7)* *19543*	*593(9)* *19545B*	*593(9)* *19546*	
Context	*18139*	*18138*	*18162*	*18165*	*Total*
Elasmo	0	0	1	0	1
Eel	3	0	0	0	3
Pike	1	0	1	0	2
Perch	1	0	0	0	1
Total	*5*	*0*	*2*	*0*	*7*
Indet	*2*	*1*	*2*	*1*	*6*

Table 79. SSD 593. 593 (7). Context 18136. Layer. 4mm res. Phase 3-4. Medieval

Sample	*19541B*
Eel	1
Total	*1*
Indet	*1*

Table 80. SSD 593. 4mm res. Phase 4. C13th

Sample	*593(3) 16003*	*593(3) 16006*	*593(3) 19501*	*593(2) 19511*	*593(9) 19537A*	*593(9) 19537B*	
Context	*15038*	*15040*	*18034*	*18078*	*18159*	*18159*	*Total*
Elasmo	0	0	1	0	0	0	1
Eel	0	0	1	0	0	0	1
Pike	0	0	2	0	1	2	5
S Cyprinid	0	0	0	0	0	1	1
Cod	0	0	2	0	0	0	2
Haddock	0	0	1	0	0	0	1
Whiting	0	0	2	0	0	0	2
S Gadid	0	0	20	0	0	4	24
Gurnard	0	0	12	0	0	0	12
Pl/Fl	0	0	7	0	1	0	8
Flatfish	0	0	1	1	0	8	10
Total	*0*	*0*	*49*	*1*	*2*	*15*	*67*
Indet	*1*	*1*	*40*	*2*	*2*	*15*	*61*

Table 81. SSD 593. 593(3). Context 18034. Hand collected. Phase 4. C13th

S Gadid	1
Total	*1*
Indet	*8*

Historic England Research and the Historic Environment

We are the public body that looks after England's historic environment. We champion historic places, helping people understand, value and care for them.

A good understanding of the historic environment is fundamental to ensuring people appreciate and enjoy their heritage and provides the essential first step towards its effective protection.

Historic England works to improve care, understanding and public enjoyment of the historic environment. We undertake and sponsor authoritative research. We develop new approaches to interpreting and protecting heritage and provide high quality expert advice and training.

We make the results of our work available through the Historic England Research Report Series, and through journal publications and monographs. Our online magazine Historic England Research which appears twice a year, aims to keep our partners within and outside Historic England up-to-date with our projects and activities.

A full list of Research Reports, with abstracts and information on how to obtain copies, may be found on www.HistoricEngland.org.uk/researchreports

Some of these reports are interim reports, making the results of specialist investigations available in advance of full publication. They are not usually subject to external refereeing, and their conclusions may sometimes have to be modified in the light of information not available at the time of the investigation.

Where no final project report is available, you should consult the author before citing these reports in any publication. Opinions expressed in these reports are those of the author(s) and are not necessarily those of Historic England.

The Research Report Series incorporates reports by the expert teams within the Research Group of Historic England, alongside contributions from other parts of the organisation. It replaces the former Centre for Archaeology Reports Series, the Archaeological Investigation Report Series, the Architectural Investigation Report Series, and the Research Department Report Series

ISSN 2398-3841 (Print)
ISSN 2059-4453 (Online)