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In piscibus diversis; the Bone Evidence for Fish Consumption in Roman Britain

By ALISON LOCKER

INTRODUCTION

This paper examines the fish-bone data from Roman sites in Britain. Earlier work collated the evidence from Iron Age sites around the North Sea[1] and sites dating from the first to sixteenth centuries A.D. bordering the southern North Sea.[2] Both of these studies included some Roman assemblages from Britain. For the rest of the country the data remained a dispersed collection of published and unpublished reports. This survey attempts to collate and examine all the evidence from fish-bone assemblages for trends in fish consumption nationally, regionally, and at different types of sites. The evidence for the Iron Age as described by Dobney and Ervynck indicated little and localised consumption of fish. Some trends, observed in a few assemblages, have been used to suggest wider implications for the Roman period, for example Nicholson has suggested there was little evidence for the consumption of deep-sea fish, such as cod and ling, in Northern Britain.[3] The quantities of fish bones are generally much smaller for the Roman period compared with a few centuries later, when fishing for herring and cod became of such commercial importance.[4]

Collating these data was an opportunity to assess whether the cultural effects of the Roman invasion and subsequent occupation discernibly altered patterns of fish consumption in a manner distinct from preceding periods. There could be differences between areas or sites distinctly Roman, such as forts or towns, and native settlements. The indigenous population living close to forts and towns were most likely to absorb new and fashionable trends in food and culture, while other remote communities continued in an Iron Age tradition. By the fourth century most villa-owners were of British stock but had become integrated into Roman provincial *mores*. Similarly, many army officers would have been British strongly influenced by Roman culture, though with a British slant. Changes in culture affect what and how you eat, introducing new foods, cuisine, and meal structures. A mark of distinction and upward mobility, such changes may be visible from the range of fish species that were eaten, represented by surviving fish bones. King has shown evidence of Romanisation reflected in the changing proportions of cattle, sheep, and pig in bone assemblages across the Empire.[5]

However there are some intrinsic problems with Roman fish-bone assemblages; they are often relatively small, even where extensive sieving has been carried out. On sites where all the bone

1 Dobney and Ervynck 2006.
2 Enghoff 2000.
3 Nicholson 1993a.
4 Barrett *et al.* 2004.
5 King 1999.

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was hand-collected the recovery of fish bones is poor to non-existent, and biased towards larger species such as cod. In these circumstances the absence of fish should not be taken as a sign that fish were not eaten, just that they have not been found. However, where a systematic policy of sieving has been implemented and no fish bones have been recovered, it is probable that fish did not feature strongly in the diet. In some older excavations (pre-1970) no sieving was carried out. Today, while economic constraints restrict sampling to certain selected deposits, a programme of fine-screening to recover small fish species, along with other botanical and entomological remains, is standard practice and the great majority of sites included here were sieved. Before discussing these data, a number of secondary sources which reflect fish consumption should be also considered.

SECONDARY SOURCES

Indirect evidence for fish consumption is varied. Associated finds include particular types of amphorae which were used to transport salted fish and fish-sauce across the Empire. Fish sauces, used as a flavouring, were made from fermented small fish and intestines strained to make a sauce of varying quality and price. Morales describes *garum* as the best and *muria* as of medium quality.[6] *Liquamen* was another variety, but there is some confusion over the differences between the three. The residue was sold as an inferior product, *allec*.[7] These amphorae are sometimes stamped with the maker's name, place of origin, and contents, for example the name 'Lucius Tettius Africanus' from Antibes was inscribed on a first-century amphora containing six Spanish mackerel heads found in Southwark, London.[8] Alcock cites finds of amphorae marked as containing fish from the Poultry site, London, possibly sent from Cadiz, and at Peninsular House, London, where amphorae were found in association with fish remains (described below).[9] Imported fish-sauce amphorae have also been found at Chester, Colchester, York, and Gloucester and at a pottery works on the Isle of Grain, Kent, where amphorae were made and *garum* was shipped, but further reference to the latter site remains elusive. Larger salted fish were also shipped in amphorae, either whole or cut in pieces, as *salsamenta*.

Amphorae have been used to calculate the importance of fish products in the Empire. Bekker-Nielsen, reiterating Curtis that fish products have been overshadowed by wine, oil and grain in the study of ancient trade, concluded that in the early days of the Empire, at the height of *garum* production, combined fish products could have been the fourth most important commodity.[10] Ejstrud compared the data for amphorae from five sites in Western Europe,[11] and the evidence supported the importance of the stored-fish trade within the Empire. Britain would have been no exception.

The remains of fishponds have been found at a few villa sites in Britain, such as Shakenoak.[12] It has been suggested that they may have been intended to supply fresh fish rather than serve ornamental purposes. Fish farming was practised in Italy; Columella's commentaries[13] show that marine fish, including bass, sea bream, wrasse and flatfishes, were kept largely as a show of wealth. Freshwater species were favoured by the less affluent. The scarcity of evidence from Roman Britain suggests fishpond culture was an élite occupation associated with very few villas,

6 Morales Muniz 1993, 136.
7 Curtis 1991, 12.
8 Yule 1989; 2005.
9 Alcock 2001, 80.
10 Bekker-Nielsen 2002a, 34; Curtis 1991, 183.
11 Ejstrud 2005.
12 Zeepvat 1988, 23.
13 Forster and Heffner 1968, 401.

and there is no evidence for the fish kept in them. Anecdotal evidence from Rome indicates very high prices for certain species, reflecting the buyer's status. Some were kept as pets, including the infamous moray eel which wore earrings and a necklace and came to Crassus when called as described by Aelian.[14] Traces of prehistoric fish-traps survive as wooden structures in Britain, for example of Bronze Age date from the Severn Estuary and Neolithic structures from the Isle of Wight and Hull.[15] Medieval stone traps and weirs survive and are recorded in the literature. Columella[16] describes the use of natural or enhanced rocky pools on the shore for keeping fish, using the tides to refresh the water, but there are no finds of Roman date from Britain. There is some material evidence for fishing gear, such as hooks, from sites including Fishbourne Palace and the fort at Corbridge.[17]

Literary evidence includes orders for fish-sauce found on writing-tablets from the fort at Vindolanda.[18] Though not from Britain, Apicius' *Artis Magaricae Libri X*, a cookery book no longer attributed solely to Apicius (a first-century gourmet and cookery writer) but a fourth-to-fifth-century compilation, includes recipes for ray, conger eel, eel, grey mullet, perch, sea bream, and scad.[19] These fish could have been caught in British waters and would have been quite familiar to a Mediterranean palate.

The introduction of new cooking methods and cooking utensils to Britain would have impacted on culinary practices, including those for fish. Wilson describes types of frying-pans suited to cooking fish.[20] These could also be used for other purposes, but the range of pots and pans indicates a sophisticated cuisine and many have been found at British sites.[21] These finds are more likely to be associated with the Roman concept of a distinct kitchen space, rather than the Celtic way of roasting and boiling on a central hearth which would have continued unchanged in many native settlements.

There is little artwork reflecting fish consumption from Britain; fish in mosaics tend to be stylised, but their inclusion suggests they were valued.[22] There are some mosaics from Rome and North Africa showing men fishing, and certain types of nets can be identified.[23] Fishing is both from boats and the shore, suggesting it was not a lack of technology that prevented the capture of cod and other large offshore gadids in significant numbers.

Recent studies on isotopes extracted from human bone have been used to measure the consumption of marine resources in individual skeletons. Poundbury cemetery, near Dorchester,[24] has provided some data for differing levels of fish consumption. Late Iron Age and early Roman burials contained plant and animal proteins, but no marine ones. Later Roman burials in mausolea and lead-lined coffins showed evidence of marine proteins, while contemporary burials in wooden coffins did not. This suggests that status may have been attached to fish and other seafood.

Of the secondary sources described above, the inscribed amphorae, orders for *muria* (fish-sauce) from Vindolanda, and the few remains of fish hooks are the most unequivocal secondary evidence of Roman influence on fish consumption in Britain. Isotope readings give some indication for varying consumption of marine resources in general. The rest are tangential, and for direct evidence it is necessary to examine the species and location of the fish bones themselves.

14 Toynbee 1973, 201.
15 Martin Bell, pers. comm.
16 Forster and Heffner 1968, 407.
17 Alcock 2001, 51.
18 Alcock 2001, 81.
19 Flower and Rosenbaum 1980.
20 Wilson 1973, 23.
21 Alcock 2001, 107.
22 Bekker-Nielsen 2002a, 29.
23 Bekker-Nielsen 2002b.
24 Richards and Hedges 1998.

METHODS

A total of 8,796 bones were identified to species or family level from 109 sites grouped into seven regions: the North, Midlands, South/South-East, London (north of the Thames), East London Cemeteries (an atypical group kept separate), Southwark (south of the Thames and five miscellaneous sites), and the South/South-West. Although Britain was the area of study, all the sites, except one in Scotland, were in England with the addition of two 'native settlements' from the Isles of Scilly. The assemblages vary greatly from just one or two bones to over a thousand. No comparison has been made against the number of sites with animal bones, though Dobney and Ervynck found a slight increase in the proportion of Roman animal bone assemblages containing fish over those from the Iron Age in their area of study.[25] However, the numbers of fish bones from many sites were very small.

The data were initially divided by site and date to the nearest century. This gave rise to nearly 40 tables, retained as an archive available from the author. Analysing data divided by date did not give significantly different results than treating each site as a single unit. The tables published here only show the latter. Fish bones were sometimes unquantified, but denoted as present. These are shown by '+' for bones or '*' for scales, marked beside the total or *NISP* (number of identified specimens). Scales were rarely identifiable to species, and if added to the *NISP* their numbers would give undue weighting to one species. While the *NISP* comprised the primary data, the lack of quantification of some bones and scales was problematic for comparing species and sites, as the *NISP* was often incomplete. To reconcile these anomalies the data have also been analysed by the number of occurrences between sites to determine the most important species. A species identified at a site counts as one occurrence, regardless of quantity, and the total number of occurrences for each species is shown in the extreme right-hand column of each table. This method also has the advantage over *NISP* of redressing the over-representation of small species, such as herring, which may have many identified bones but represents relatively little food compared with larger fish. Occurrence also tempers the 'eel effect', as eel have almost double the number of vertebrae of other fish. When ranking the most prolific species by occurrence in the graphs each has been expressed as a percentage of the total number of possible occurrences. This relationship is independent of other species, unlike the *NISP* percentage in which each is a part of the entire quantified assemblage. The *NISP* has been used to compare species within a site. At the base of each table, beneath the *NISP* totals, the number of species identified at each site is shown compared against the regional total. This gives an indication of diversity, influenced to some degree by the size of the assemblage. The majority of the fish were recovered from sieved samples, while some large bones were hand-collected. There were some sites where fish have been noted as present but not identified: the forts at Caernafon and Brecon from the early excavations by Wheeler in the 1920s, also Corbridge and Maryport referred to by Alcock and Davies.[26]

Eighty-two species and families of fish were identified. Table 1 lists them in family order, with an indication of habitat. Some family names have been used, for example the *Cyprinidae* (the carp family), for whom the most reliable species specific elements are the pharyngeal teeth. Other bones are difficult to identify beyond family level. Each site is listed in Table 2, with dates and references, and is assigned an identification number used in the regional tables along with the first three letters of the site name or the site code. Table 3 combines the data from each region and shows the overall occurrence for all sites. Tables 4–10 show the data by site for each region.

FIG. 1 maps the location of each site, marked by number. FIGS 2–8 are all based on occurrence; FIG. 2 is the combined data; FIGS 3–8 indicate the key species by region, occurring at/or greater than 10 per cent.

[25] Dobney and Ervynck 2006.
[26] Alcock 2001, 48; Davies 1971, 129.

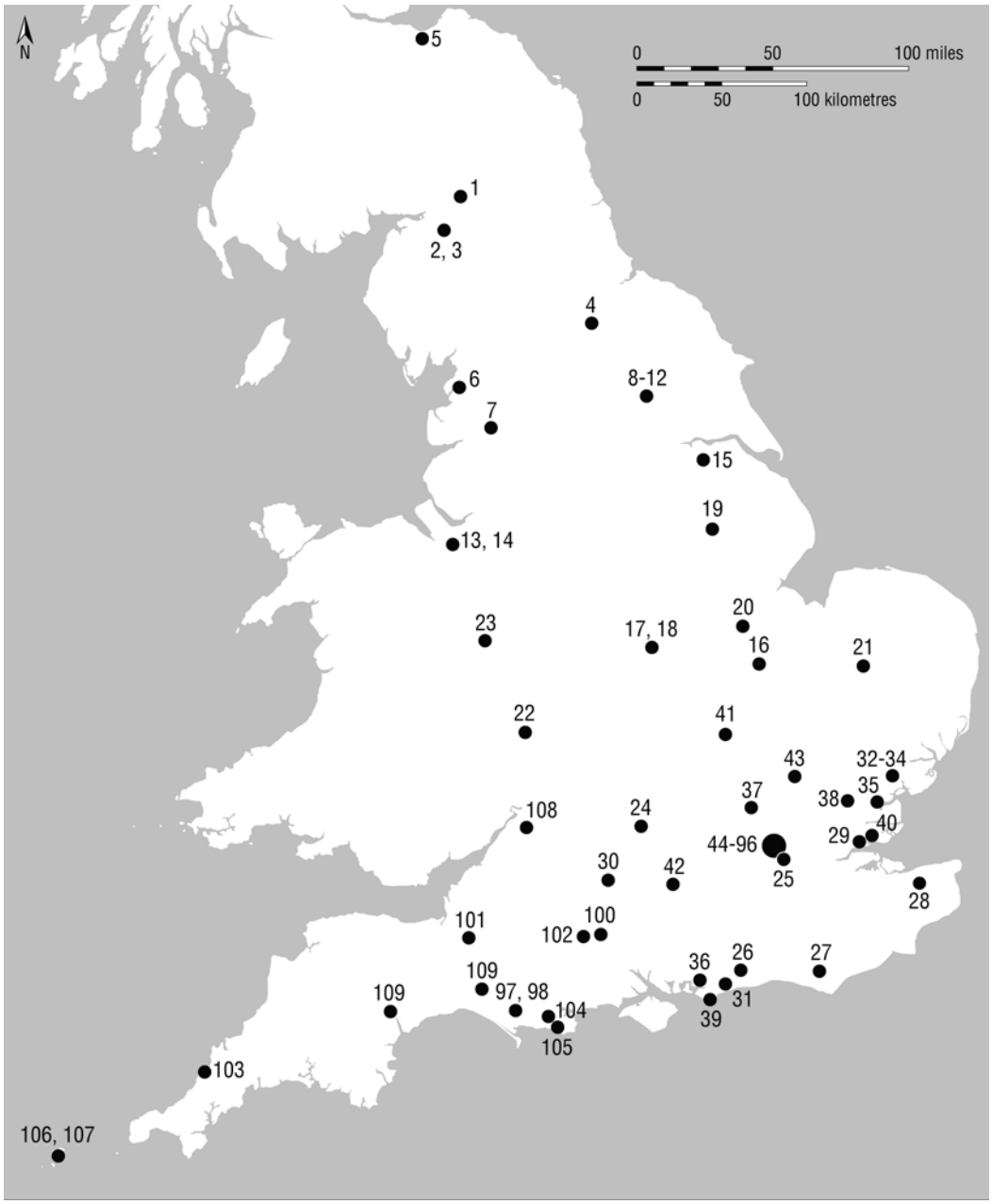

FIG. 1. Map showing location of sites with fish bone; for details of sites see Appendix, Table 2.
(*Drawn by H. Buglass*)

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THE DATA

The combined data for all regions (Table 3) show that some species are very poorly represented throughout, others have a regional preference, often habitat-related, while some are predominant in all regions. FIG. 2 shows eel to be by far the most common by occurrence at 66 per cent (and also by *NISP* 31 per cent). The five most important species are eel, herring, plaice/flounder, cyprinid, and salmonid. Only cyprinids are exclusively freshwater; though eel and salmonid are caught in fresh water, they can also be caught inshore and in estuaries, as can flatfish and herring. The prominence of salmon was an interesting result, and is supported by the *NISP* data. Their bones are regarded as especially friable, affecting preservation, and skull fragments are rare.[27] They are generally regarded as under-represented in bone assemblages.

Sample size influences the number of species that will be present, either by the volume of the sample itself and/or the number of contexts that are analysed, though there is not always a simple correlation between them. The largest sample is from London, which also had the most sites, 26. However only 40 species/groups were present, the same number as for the North and close to that for the Midlands, though both the latter were smaller in sample size and number of sites. The highest number came from the South/South-East with 48 species from 20 sites and a

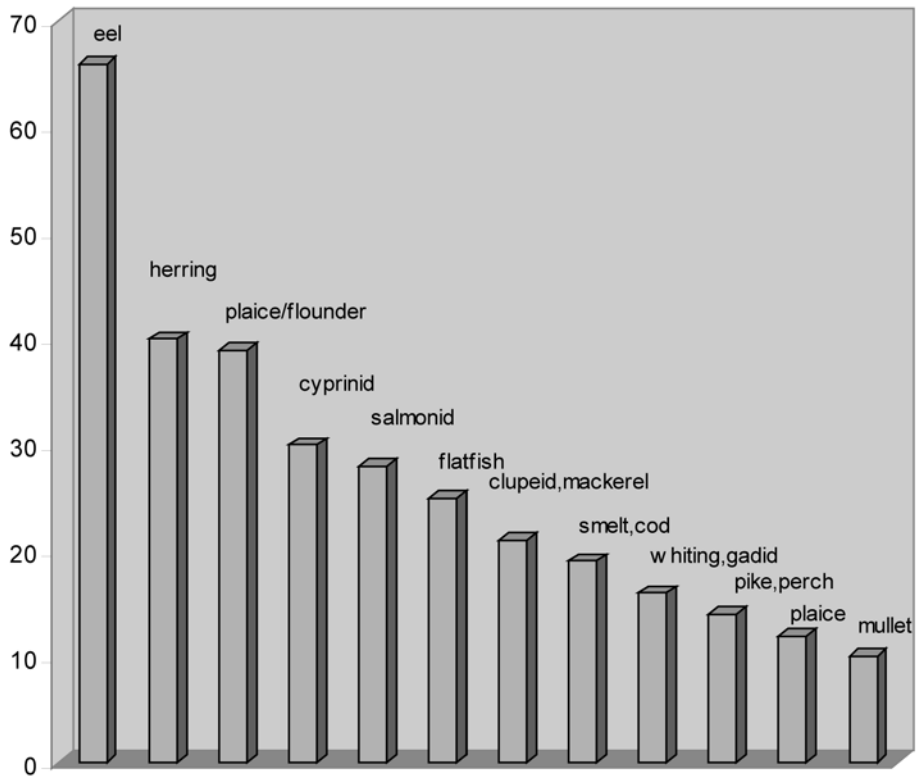

FIG. 2. Percentage of fish species from all sites.

[27] Lubinski 1996.

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sample size only 67 per cent of that from London. These differences are also observable between individual sites, where a small assemblage has more species than a larger assemblage which may be more monospecific, often eel. This demonstrates that the data have a wide range of variables. Significant among these would appear to be the type of site and location; 85 per cent of the identified bones were of urban origin, including London and Southwark, where excavation and sampling has been more intensive and the deposits tend to have greater concentrations of organic material, reflecting a higher density of population. There follows a summary of the main features of the assemblage from each region. Site numbers, in brackets, follow the site names.

THE NORTH (Table 4, FIG. 3)

Carlisle (2, 3) and York (8, 9, 10, 11, 12) contributed 98 per cent of the fish, even though the Bedern (8) and Skeldergate (11) in York were not quantified. The forts produced little bone; the salmonid vertebrae from Birdoswald (1) were probably hand-collected. Ribchester (7) was extensively sieved but produced few fish. There are no villa sites. All the sites are near the coast and estuaries except York, some 36 miles inland, which is reflected in the numbers of cyprinids and pike present. Only one site was north of Hadrian's Wall, Inveresk (5) near Edinburgh. The only possible evidence for imported fish is red mullet and wrasse from Catterick (4); although both can be found off the local coastline, they would be scarce.

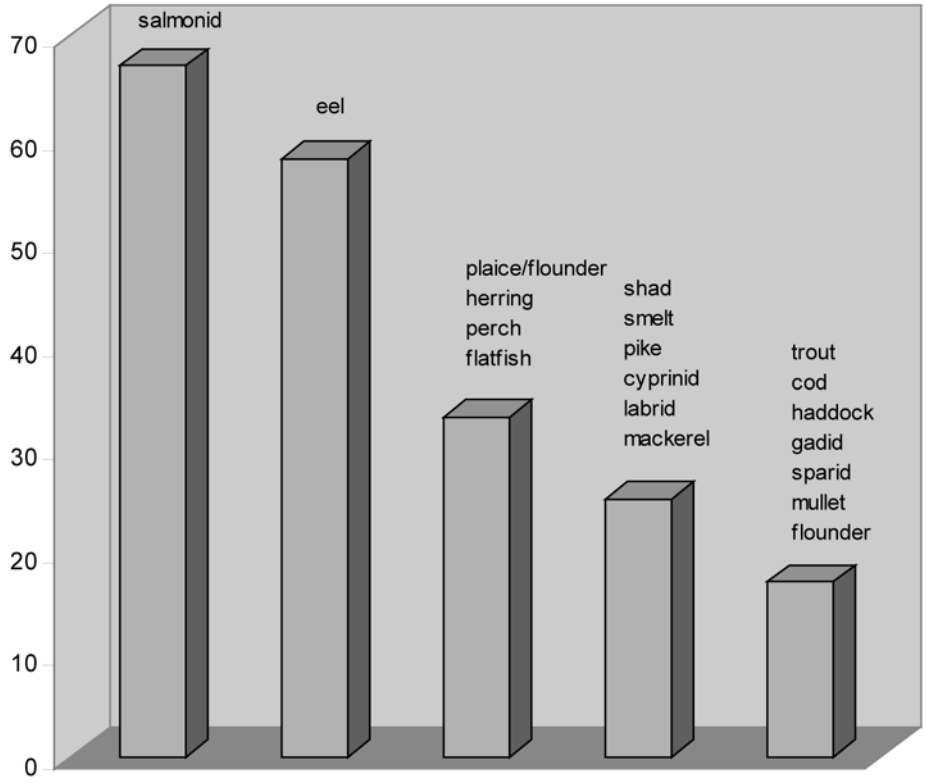

FIG. 3. Percentage of fish species from the North.

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Eel is numerous at both Carlisle and York, as are salmonids, particularly at Carlisle, where local rivers, the Eden and Esk, are still important for salmon today.[28] The seasonal migration of smelt into rivers to spawn was exploited at York. According to Maitland and Campbell the Romans are supposed to have raised smelt in freshwater ponds,[29] but they give no source for this information, and smelt are not found in the Mediterranean. Salmonids take first place by occurrence, as shown in FIG. 3, followed by eel. This is the only area where salmon is the most commonly occurring fish. Flatfishes, plaice/flounder, herring, and perch share third place. Gadids, both large and small, are poorly represented in this region. Not included in the table, for reasons of poor dating, is a single deposit from St Mary Bishophill, York.[30] Described as third- to tenth-century, it may not be Roman. However this unusual assemblage deserves mention as it was composed of the bones of herring, sprat, and non-specific small clupeids. It is typical of the type of deposit attributed to the domestic manufacture of fish-sauce, which has also been identified from Lincoln and London.

THE MIDLANDS (Table 5, FIG. 4)

Towns contributed most of the fish, 96 per cent by *NISP*. The biggest assemblage, Causeway

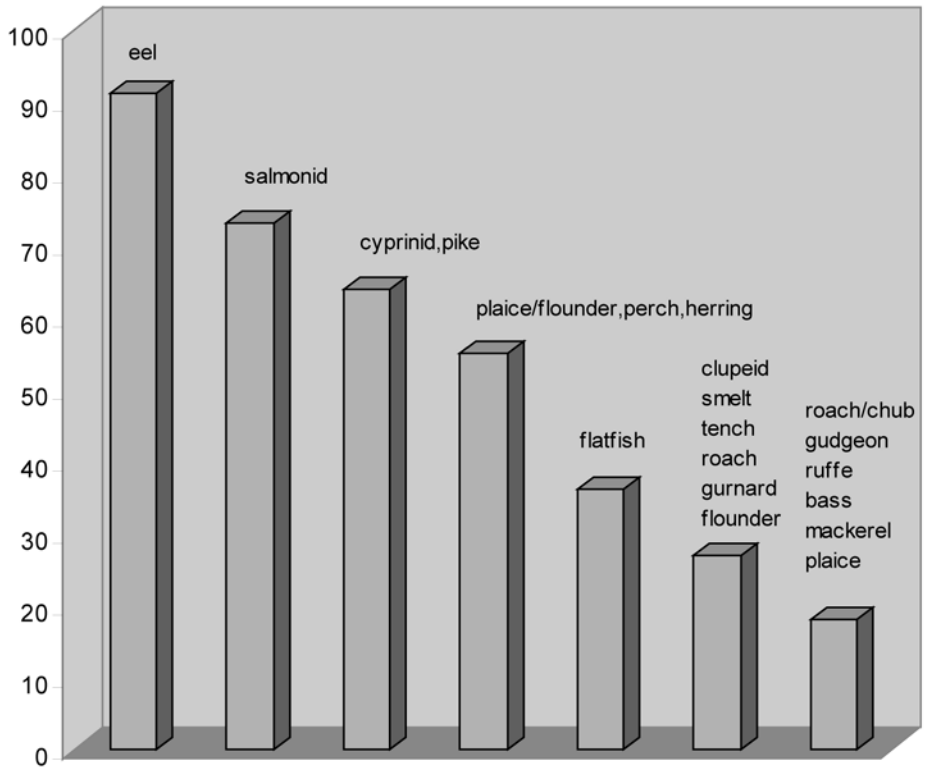

FIG. 4. Percentage of fish species from the Midlands.

[28] Ayton 1998.
[29] Maitland and Campbell 1992, 164.
[30] Jones 1988.

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Lane, Leicester (18), was 48 per cent eel by *NISP*, whereas at Lincoln (19) cyprinids were most common, also 48 per cent. Here, as well as the quantified fish, sand-eel and small clupeids (herring and/or sprat) were found in very large numbers in quayside deposits. A sub-sample of 458 g represented an estimated 2,860 individuals. These small fish may be another example of the domestic manufacture of *garum* or *allec*, though other interpretations have also been considered.[31] The assemblage from the baths-basilica at Wroxeter (23) was dominated by salmon (37 per cent), perch (27 per cent) and pike (25 per cent), probably all caught in the River Severn. There may be some bias towards larger species here, as the fish were recovered by hand-collection, dry-sieving to 5–10 mm, and very limited wet-sieving. Although 50 miles from the sea, marine fish — bass, thin-lipped grey mullet, plaice and mackerel — were identified; they may have been brought there salted (*salsamenta*), or possibly fresh, as discussed below.

Imported species include the Nile catfish spine from the settlement at Dragonby (15), which may have been traded as a single bone. Spanish mackerel was found at Chester (13). The identification of carp (*Cyprinus carpio*) from Lincoln (19) on the basis of a serrated spine, some several centuries earlier than other examples of this fish in Britain, is more safely attributed to barbel, a native species with similar spines, as suggested by Ervynck.[32] Bitterling, also identified from Lincoln, is more usually regarded as an introduced species, though native to Central and Western Europe including France.[33] FIG. 4 shows eel dominant in the Midlands and found in all sites but Wroxeter (23), possibly a factor of the recovery methods at the latter site. Eel is followed by salmonid, then cyprinid and pike, plaice/flounder, perch, herring. This suggests a strong reliance on freshwater fisheries.

THE SOUTH AND SOUTH-EAST (Table 6, FIG. 5)

In contrast to the North and the Midlands, only five of the twenty sites are from towns; the latter produced only 40 per cent of the fish bones. Villas had 49 per cent and other rural sites 11 per cent. This area also had the largest number of species, though not the greatest numbers of sites, or largest sample size. For the region, eel occurs in 70 per cent of all sites, followed by herring and flatfishes (largely plaice and flounder), common in the shallow waters and estuaries of the southern North Sea. From the towns, Canterbury (28) has a small *NISP* sample, largely flatfish. The *colonia* at Colchester is represented by three sites, the largest being Culver Street (32), where eel and herring feature strongly as well as flatfishes and mackerel. Cod, haddock, whiting, and indeterminate gadids were present in small numbers. The inland position of Silchester (42) was reflected in the presence of eel, pike, and cyprinids, but the assemblage also included marine fish — bass, scad, mullet, and wrasse.

The prime high-status rural site of the region is Fishbourne Roman Palace (36). However there is no evidence for either imported or very large fish to denote wealth. Bass could have been caught locally on the South Coast, but may have had some significance in this particular context. Ingrem has suggested a possible feasting episode for these fish remains which were found in a single deposit.[34] The most inland of the villa sites was Castle Copse (30), about 50 miles from the nearest coastline; the assemblage included eel, salmonids, and trout, but few cyprinids. There were also marine fish — bass, scad, sea bream, and flatfishes. Popular in the Mediterranean, bass and scad could also be caught on British southern coastlines. As at Silchester the state of these marine fish would determine their status, to be discussed below. The fish from Gorhambury villa

31 Irving 1996.
32 Ervynck 1997, 253.
33 Maitland and Campbell 1992, 211.
34 Ingrem 2004.

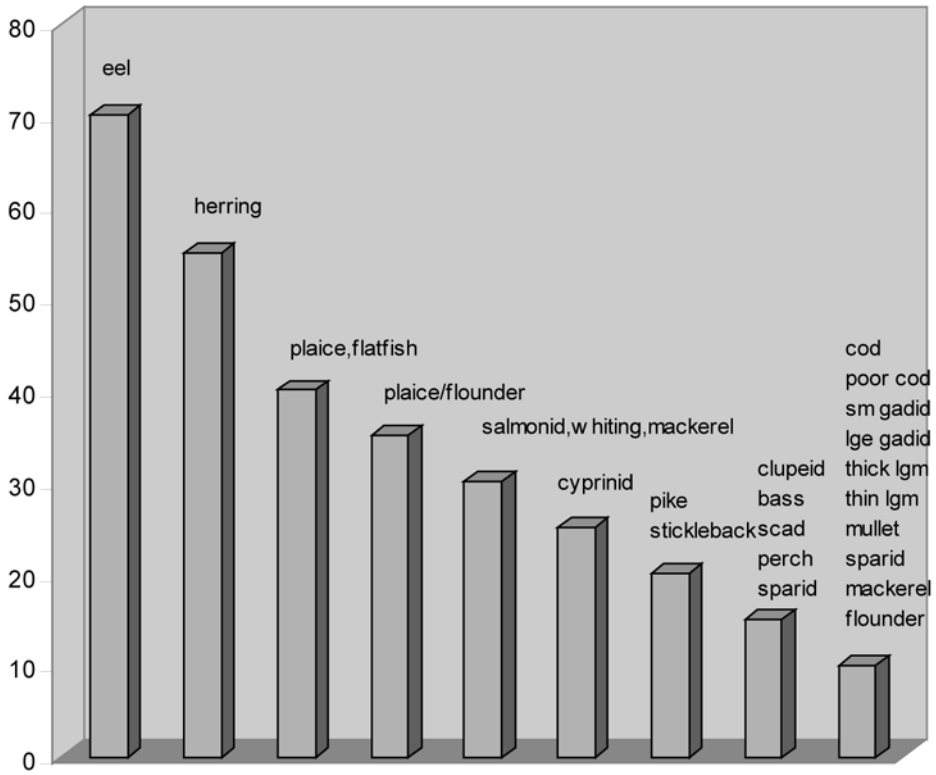

FIG. 5. Percentage of fish species from the South/South-East.

(37) were largely eel, but also included mackerel, and possibly Spanish mackerel. Great Holts Farm (38) is a late Roman farm and villa where imported plants and possibly livestock were of Mediterranean origin. The small assemblage of fish was typically local — eel, herring and flatfish, but also included Spanish mackerel and scad. Elm Farm (35), close to the Blackwater Estuary, also fits this 'locally available but with Mediterranean flavours' pattern, with mackerel and grey mullet among the fish present. Both Great Holts Farm and Elm Farm, though classified as rural settlements, seem to emulate the villa sites, reflecting the 'Romanisation' of native settlements. Spanish mackerel was identified from a Late Iron Age well deposit from Skeleton Green (43), an oppidum, in an assemblage otherwise of local origin and included here as an example of early Roman contact, completely atypical of other Iron Age assemblages. This species is on the edge of its range off the South-West coast and, in accordance with Enghoff,[35] is regarded as imported in these assemblages. In contrast Barton Court Farm (24) is typical of a settlement where fish are poorly represented and only by those available locally, in this instance from fresh water.

LONDON (Table 7, FIG. 6)

The largest sample and number of sites came from this group. The largest assemblage, also

[35] Enghoff 2000.

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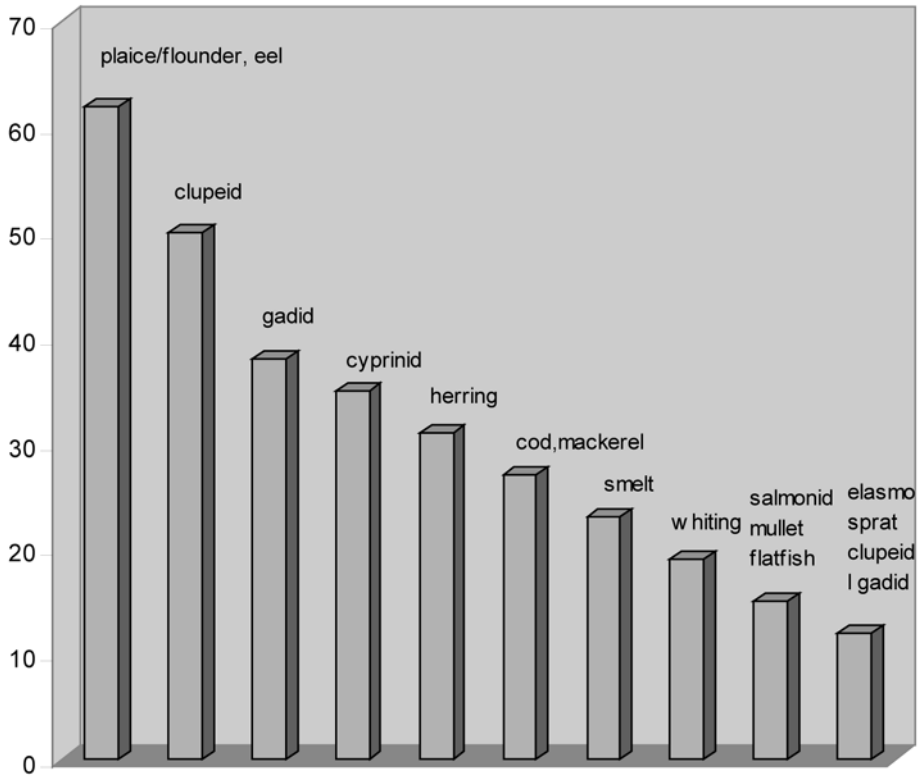

FIG. 6. Percentage of fish species from London.

showing the greatest variety of species, was from 17 Fish Street/Monument Street (59), which influenced the composition of the entire group of 26 sites, many of which had few fish bones. This unusual deposit, a well re-used as a rubbish pit, may be associated with an inn[36] and contributed 57 per cent by *NISP* of the London sample. The variety of species included eel, salmonids, various cyprinids, perch, bass, grey mullet, and flatfishes. The ranking by occurrence seen in FIG. 6, balances the influence of this site on the group. The importance of flatfish (particularly plaice/flounder) and eel is evident, and also fisheries for herring and smelt. Cod is most prominent in this region at 27 per cent, and could have been locally caught in the southern North Sea. There is one unique find of at least three cods heads in a single 'scoop' deposit contemporary with a cemetery at 2–5 Devonshire Square (49), possibly an offering. The fish from Peninsular House (65) have not been quantified as the assemblage was composed of such a large deposit of young herrings and sprats that it was sub-sampled: as many as 6,000 individual herrings and 1,500 sprats were estimated for 1 kg of residue. The associated presence of CAM 186 amphora sherds, used to export fish-sauce from Southern Spain, together with some structural remains, suggest the domestic manufacture of this commodity.

Salmonids feature poorly; fewer here and in Southwark than any other region, although there were salmon fisheries in the Thames until it became too polluted. Wheeler considered that

[36] Rowsome and Burch 1992.

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salmon, although common enough to support fisheries, were never particularly abundant in the Thames, a lowland river with few suitable spawning grounds compared to rivers rising in more upland areas.[37] The Thames also had a rich indigenous fish fauna which would compete with salmon. There is no evidence from these assemblages for imported fish; the species all suggest localised exploitation of the Thames, its estuary, and the inshore waters of the southern North Sea. Fish-sauce was being produced locally, possibly as a cheaper alternative to the imported varieties.

EAST LONDON CEMETERIES (Table 8)

This small group of eight sites has been considered separately and the data have only been tabulated. The fish are all associated with cremations. Some bones are burnt and all are sufficiently linked to both urned and unurned deposits to suggest that they were part of the funeral ceremony.[38] All the fish are small; herring and eel are most common by both occurrence and *NISP*. They could have been caught locally and there may have been some preference for small fish.

SOUTHWARK (Table 9, FIG. 7)

These sites are all south of the Thames, with some miscellaneous exceptions from East London.

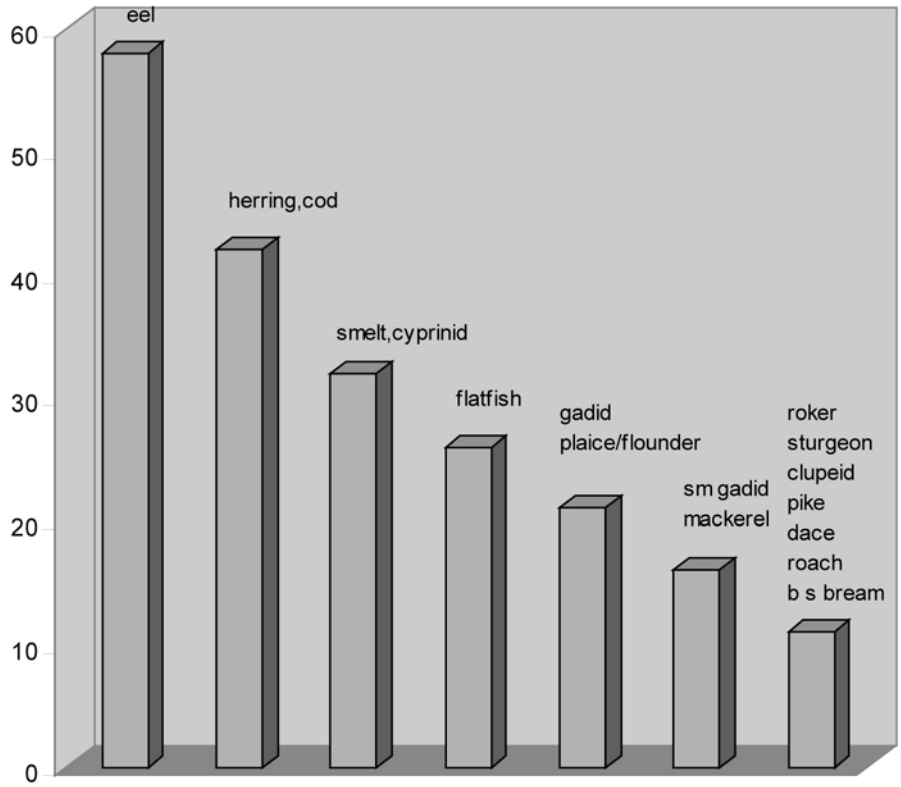

FIG. 7. Percentage of fish species from Southwark.

[37] Wheeler 1979, 51.
[38] Kevin Rielly pers. comm.

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Sites 84, 87 and 94 are along the Highway near Shadwell and Sites 86 and 90 are beside the Roman road to Colchester. None of these produced much fish bone. The size of the sample is small, and one site was not quantified. 31 species/families were identified, comparatively high against the *NISP* total. 57 per cent of all fish bone came from Fennings Wharf (83), mostly eel, herring, smelt and some indeterminate gadids but only eleven species. However three other sites with a low *NISP* count showed a relatively high level of diversity, notably Babe Ruth Bath House (84), where 8 species were identified from 11 bones, Parnell Road (90), 8 species from 16 bones, and Union Street (95), 12 species from 31 bones. This suggests variety, if not quantity. The fish from a second-century well at 1–7 St Thomas' Street (92) were not quantified but included small fish — eel, herring, smelt, and a variety of cyprinids, all of which could have been caught in the Thames. An example of imported *salsamenta* was found in first-century deposits at Winchester Palace (96). Six Spanish mackerel heads were found in an amphora marked as originating in Antibes.

Although many of the fish identified from Southwark were small species, it is notable for the only Roman finds of sturgeon, from Hibernia Wharf (85) and Union Street (95), in third-century deposits. It is surprising that more have not been found; the large distinctively-patterned scutes and spines are easily recognisable and big enough to be hand-collected, compensating for the poor preservation of the cartilaginous skeleton. This fish was highly regarded and, according to Athenaeus, served accompanied by music at Roman banquets.[39] Sturgeon would have been the largest and most distinctive migrant visiting the Thames.

SOUTH AND THE SOUTH-WEST (Table 10, FIG. 8)

This group is the most regionally distinct with regard to the most common species. It also has the least diversity (excluding the East London cemeteries), despite having the third largest *NISP*. Most of the bone came from towns (88 per cent), in particular Dorchester. The fish from County Hall (97) were largely eel with some cyprinids, in contrast to Greyhound Yard (98), dominated by bass, wrasse, mullet, and sea bream. The latter is much more typical of fish assemblages from the South-West, compare the much smaller sample from the settlement site at Newquay (103). Other settlement sites at Ower (104) and Rope Lake (105) produced little bone. The two sites on the Scillies (106, 107) showed exploitation of locally-abundant species: sea bream, wrasse, and grey mullet. Both sites had gadid species: whiting and pollack. Fish from the Uley shrines (108) include bass, bream, and grey mullet, which, in this context, may have religious significance. Salmon, the most numerous fish, could have been caught in the Severn Estuary; they are still found there today and in many other rivers locally, though their numbers have been affected, as elsewhere, by pollution and the alteration of watercourses.[40] Waddon Hill (109), the only fort, had few fish bones. Gadid, bass, and wrasse are referred to in the main report, but were not fully quantified and only shown as present in the table.

Apart from eel, FIG. 8 is dominated by wrasse (labrid), bass, sea bream (sparid), and mullet. These are all common off the south-west coast, as is conger eel — all familiar fish to both Romans and the indigenous population. Salmon fisheries operated not just in the Severn but also along the south-west coast during the mediaeval period[41] and may well have been in use in Roman times. Freshwater fish are not well represented, except cyprinids from County Hall Dorchester (97).

39 Vissler 1991, 225.
40 Ayton 1998.
41 Fox 2001, 60.

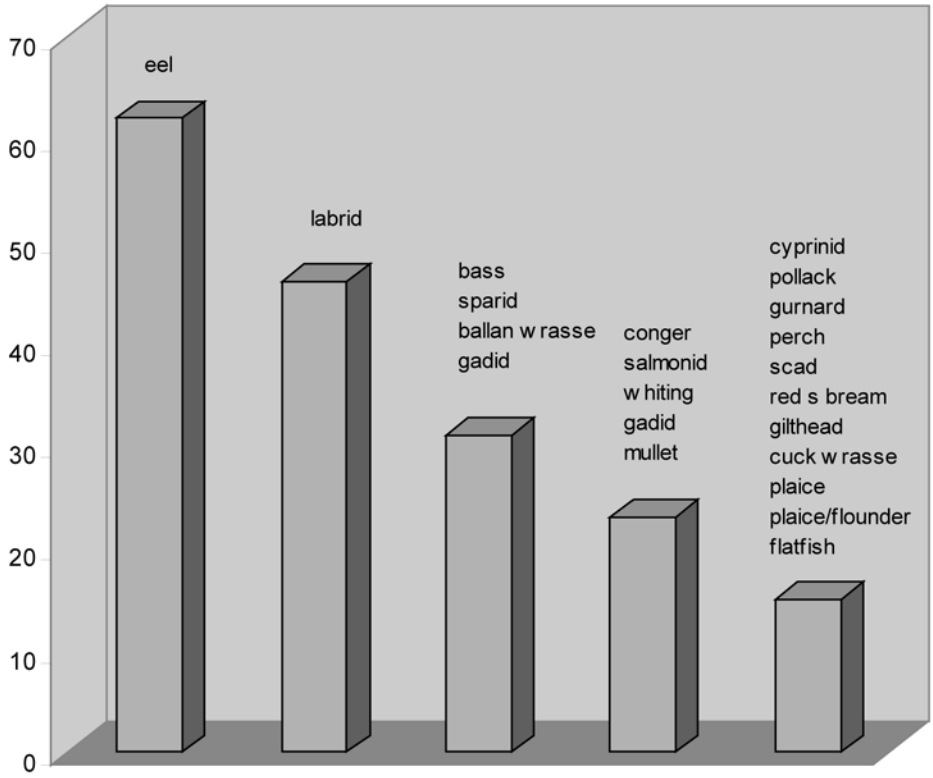

FIG. 8. Percentage of fish species from the South/South-West.

DISCUSSION

King's analysis of cattle, sheep and pig as indicators of dietary change in the Roman Empire found dietary regions were determined by the province, climate, and topography, but also influenced by changing cultural preferences.[42] In Britain this is shown by a rise in beef consumption, whereas in the Iron Age sheep had been more prevalent. The force behind change was the presence of the Roman army, resulting in a 'Gallicization or Germanization of the diet'[43] — particularly evident in military sites and towns. Change within the relative consumption of three major meat species is a much more discernible sign of Roman influence than changes in the pattern of fish consumption, a far smaller component of the diet. Dobney and Ervynck suggested that the role of fish at Romano-British native settlements was similar to that at their Iron Age counterparts, and was not greatly influenced by Roman traditions.[44] Low levels of fish consumption were influenced by economic and subsistence issues and a negative cultural perception of fish. Roman sites showed evidence of developing freshwater fisheries and, to a lesser extent, estuarine and inshore marine fisheries, particularly those associated with high status. The findings here broadly support their

[42] King 1999.
[43] ibid., 189.
[44] Dobney and Ervynck 2006.

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conclusions, though in the South/South-West, apart from the ubiquitous eel, inshore marine and estuarine fishing is more important than freshwater.

Each regional assemblage shows distinctions from the overall sample. The predominance of certain types of sites, proximity to towns, coastlines and rivers are all determining factors for fisheries and marketing. The high proportion of fish bones from urban excavations is not only influenced by population density and corresponding accumulation of waste, but rising numbers of excavations in advance of modern redevelopment projects. In the North, the Midlands, and the South/South-West fish from towns dominate the sample. The sites in London and Southwark are all from urban development. King showed that evidence of Romanisation was greatest at legionary and military sites, then towns and villas, being least at rural settlements.[45] Fish bones are most abundant from Roman towns, many of which had a military presence. The only evidence for *garum*-production is from towns and late in date. The height of production was during the early Empire, so this may be a response to local demand no longer being met by imported goods. At native settlements fish are few and of local origin.[46]

All the villa sites with fish assemblages are in the South/South-East where there are also other rural settlements with fish bones. In some cases the cultural distinction between villa and farm is blurred. The late Roman farm at Great Holts Farm (38) had imported plants and possibly cattle, but no luxury fittings in the villa, such as mosaics.[47] The only indication of Romanisation in the fish assemblage is Spanish mackerel and this site may reflect indigenous aspirations rather than a Roman owner. An inland settlement continuing in an Iron Age tradition, with few and only locally-available fish, is exemplified by Barton Court Farm (24) where there were only local freshwater species. Marine fish could have been brought to Barton Court as they were to Castle Copse (30), but they may have been unaffordable, or even undesirable, reflecting a different attitude to fish.

The villas, being in the South/South-East, are well placed for contact with the latest imported goods. However, although categorised as high-status sites, any supporting evidence from the fish is limited. Finds of Spanish mackerel, regarded as imported '*salsamenta*', are few: Gorhambury villa (37), Skeleton Green (43), Winchester Palace (96), and Chester (13). None were found in the South-West, whose coastline marks the northerly extent of Spanish mackerel as a summer visitor,[48] supporting Enghoff's view that it is imported in Northern Europe.[49] The frequency with which this species has been identified across the Empire has devalued any status. Van Neer and Ervynck cite them as the major *salsamenta* species identified in amphorae, along with sardines (*Sardina pilchardus*).[50] When a food becomes common it loses status, unless further defined by quality and price.

Finds directly associated with fish-sauce are scarce compared to those from around the Mediterranean.[51] Common in Britain are amphora sherds of the types used for salted fish and fish-sauce, some of which are summarised by Alcock.[52] The domestic production of fish-sauce suggests strong demand; the best evidence is from Peninsular House (65), London, with a large assemblage of small fish and associated evidence of amphorae and structural remains. Local fish-sauces were also made in other parts of the Empire,[53] including a quality kosher version at

45 King 1999, 180.
46 Bekker-Nielsen 2002a, 35.
47 Murphy *et al.* 2000, 46.
48 Wheeler 1979, 328.
49 Enghoff 2000.
50 Van Neer and Ervynck 2004, 207.
51 Desse-Berset and Desse 2000.
52 Alcock 2001, 81.
53 van Neer *et al.* 2005.

Masada in the Judean desert.[54] Some local varieties may have been cheaper than importing from the industrial-scale installations on the Mediterranean coast, notably in Spain and North Africa and up into the Black Sea.

The overland transportation of fish could have been as efficient as during the mediaeval period, before the improvements that accompanied increasing industrialisation. Roads would have been the quickest route using wagons, while on trackways pack-horses were used. Boats could also deliver fish on inland waterways, with many more navigable than they are today. Moving stored fish was a comparatively leisurely activity, fresh fish were more urgent. Away from the coast there were a number of choices; fresh fish from local rivers and streams, deliveries of stored fish, fresh marine fish brought in quickly, or even live fish, though there is no supporting evidence for the latter.

The delivery of fresh marine fish to all parts of Roman Britain is a realistic proposition. Hoffmann cites a 150 km zone for the delivery of fresh marine fish in preindustrial Europe.[55] Any site in proximity to a Roman road linked to a port could have fresh marine fish delivered, particularly during winter. The Roman road system was as good as any in mediaeval Britain. Fresh marine fish would have been a particular sign of high status at the most inland sites such as Castle Copse (30) and Silchester (42). Fish were successfully transported live during mediaeval times; species tolerant of low oxygen (eels and carp) were packed in wet straw and moss, while others were moved in barrels of water. As well as freshwater fish, bass, sea bream and grey mullet (all tolerant of low salinity) could also have been kept in ponds, at least for a short time. They would be exclusive and luxurious, defined by the expense of their transportation. Marine fish were kept in ponds in Italy and were fashionable among the élite, but in Britain this is speculative. The few ponds that have been found could have been ornamental and solely used for freshwater fish.

The eel was ubiquitous, but other species showed more specific distributions. Salmon occurred at many sites, particularly in the North and also in the Midlands, and some sites, such as Wroxeter (23), had comparatively large quantities of bones. The river systems with 'salmon runs' are mainly on the West coast of England, the Welsh coast, the North-West, and much of the Scottish coast.[56] They have traditionally been caught by a variety of nets and traps in rivers, estuaries, and along the shore, with similar simple constructions in use since prehistoric times. Perhaps because of the mystery of migration, salmon were revered by the Celts as a sign of wisdom, associated with a severed stone head cult, wells, and streams.[57] Salmon was also regarded as a Celtic totem animal[58] and, according to Matthews,[59] appears more often than any other creature in the Celtic world. A bronze of a fisherman hooking a salmon was found at Lydney Park, a temple to Nodens on the banks of the Severn[60] — a river with a long history of salmon fishing, which probably supplied the Uley shrines (108), where salmon may have had a continuing iconic value. Similarly the migration of eels may have ensured the totemic status of the eel among the Celts, while not prohibiting its consumption. Both these fish are rich in calories and important nutritionally.[61]

The prominence of flatfishes, particularly plaice and flounder, in all regions is a reflection of their distribution around the coastline where they were easily caught in shallow waters, on

54 Lernau *et al.* 1996.
55 Hoffmann 1995, 66.
56 Ayton 1998; Williamson 1991.
57 Ross 1967, 350.
58 White and Talboys 2002, 217.
59 Matthews 2002, 161.
60 Ross 1967, 176.
61 Locker 2006.

shorelines and in estuaries in tidal traps. Of the flatfishes only halibut and turbot might confer status. Halibut was identified from Elm Farm (35), a small immature individual. Turbot was identified from Canterbury (28), Fish Street, London (59), and Exeter (99). These large and prestigious flatfish have only been found in Southern England in this period. Halibut is not found along the Mediterranean coastline, but turbot is common, so the cooking of large flatfishes would have been known, using the Roman cooking-pans introduced to Britain.

Herring, sprats, and shad are all members of the *Clupeidae*; their oily flesh was utilised in all regions. Young herring was favoured for domestic fish-sauce manufacture in Britain, and may have been salted in this period, having the same qualities as mackerel, tunny, and many other oily fish of this family (*Scombridae*) found in the Mediterranean. The *Gadidae*, or cod family, do not seem to have been greatly exploited. This is not attributable to a lack of offshore, deep-water fishing either technologically, as mosaics have shown, or biologically, as the fish move seasonally inshore. Cod has the highest occurrence of all gadids, particularly in London and Southwark, though absent in the Midlands and the South/South-West. Cod is only found in assemblages from towns and the greater occurrence from London and Southwark may suggest a small, localised increase in demand compared with previous periods.

Freshwater species include the large family of cyprinids of which roach, dace, and chub were the most commonly identified. Perch and pike were also important, particularly in the North and Midlands. In London in the large assemblage from Fish Street (59) 46 per cent of the sample was cyprinid; the most common species were roach and dace, although the majority could not be determined above family level. In London perch was only found at this one site, no pike were identified. The Romans seem to have valued marine fish over freshwater; Alcock cites Diocletian's price edict of A.D. 301 for best quality marine fish being double the price of river fish.[62]

The fish 'familiar to a Roman palate', found in the Mediterranean, as opposed to those known to enlisted troops from more northerly parts of the Empire, include bass, sea bream, wrasse, mackerel, red and grey mullet. Also found off parts of the British coast, these fish were common in local fisheries, particularly in the South-West, as reflected in the assemblages from Dorchester (98), Newquay (103), and the Scilly Isles (106, 107). Whether these species were more favoured during the Roman period than previously on mainland Britain is debatable, given the few pre-Roman assemblages for comparison, though it does seem likely. On the Scilly Isles prehistoric collections suggest these fish were always abundant and exploited, a response to a remote environment where marine resources were vital.[63]

CONCLUSIONS

Evidence of 'Romanisation' in Britain from fish assemblages is tenuous. There are no clear indications of change from the Iron Age tradition as found in meat.[64] However, there is some evidence that fish played a more important role in the diet; fish assemblages are both more numerous and more varied, reflecting local marine, estuarine, and freshwater fisheries. Evidence for offshore fishing is rare, but cod may have been more commonly eaten in the Roman period in London than elsewhere. Favoured marine fish were eaten at inland Roman sites, while some native settlements continued to rely on local freshwater species

The best evidence for an imported species is for Spanish mackerel. The finds were, with the

62 Alcock 2001, 49.
63 Ratcliffe and Straker 1996, 37.
64 King 1999.

exception of Chester, from the South of England, the region where Romanisation might be expected to be most evident, being closest to Gaul. Finds of imported fish-sauce and evidence of possible domestic manufacture are exclusive to fish assemblages of Roman date. Red mullet and wrasse from Catterick (4) could also be imported. The Nile catfish spine from Dragonby may be an anomaly, brought in as a single bone; there are no other records of this species in Britain, but it was traded extensively in the Eastern Mediterranean.[65]

Eel ranks as the most common species overall by any measure, but there were regional patterns for other species. Salmon had a high profile, especially in the North and Midlands, and also from sites near the River Severn. It occurs in native settlements, Roman towns, and forts. There may have been a religious association with salmon at the Uley shrines, a continuation of Celtic totemic status. Although salmon would have been unknown in Italy, the military could have encountered it from the Atlantic coasts and rivers of Gaul and Spain, but it was particularly abundant in Britain, together with eel, as observed by Bede in the seventh century.[66] Salmon may represent a native British influence on Roman fish consumption, becoming increasingly popular in this period.

Status is difficult to discern from fish bones. The Poundbury isotope data have been used to suggest that fish, or marine resources in general, were a status food.[67] Status can also be reflected in the size of a fish, but sturgeon — a large fish of impressive appearance and highly-regarded in Rome — was only found at two sites, both in Southwark. Fresh marine fish delivered inland, or kept live in ponds outside their normal environment, would be a mark of status as defined by van Neer and Ervynck,[68] but this cannot be proven. Secondary evidence, such as the vestiges of fish-ponds, hints at some possibilities.

The Roman introduction into Britain of a distinct kitchen space was part of a radical culinary change.[69] Roman cooking utensils and methods would have become desirable and affected the preparation and structure of meals. Perhaps fish became more fashionable? Native Britons in close contact with Romans would have been the first to emulate these changes which filtered through society. Trade in towns spread new goods, such as *salsamenta*, *garum*, *liquamen*, *muria* and *allec* via shops and markets. Some native farms evolved to imitate Roman villas in structure and culture, while the more remote native settlements remained largely unchanged. Most of the fish identified from excavation would have already been familiar to Romans coming to Britain; they feature in contemporary cookery accounts.[70] The ingredients for fish-sauces included fruits and plants that either had to be imported, or the recipe adapted to use indigenous plants.

Unfortunately these changes must remain speculative since the linkage of fish bones to the apparatus of new cooking methods and ingredients is only inferred, largely from contemporary finds and documentary sources. However, it seems likely that the Romanisation of Britain introduced new elevated attitudes to fish as part of a wider culinary change, preparing local fish in a more sophisticated way: early 'fusion cooking' taking place in a new, defined space, the kitchen.

65 van Neer *et al.* 2004.
66 Bede, *Hist. Eccl.* I.1.
67 Richards and Hodges 1998.
68 Van Neer and Ervynck 2004.
69 Alcock 2001, 99.
70 Flower and Rosenbaum 1980.

APPENDIX

TABLE 1. SPECIES LIST (Habitat notes from Wheeler 1978)

Common Name	**Latin name**	**Habitat**	
Elasmobranch	Cartilaginous fish	marine	incl. sharks & rays
Tope	*Galeorhinus galeus*	marine	shark, shore to 200m
Roker	*Raja clavata*	marine	ray common 10-60m
Rajidae	Ray family indet.	marine	all ray species
Sturgeon	*Acipenser sturio*	shallow marine and freshwater	
Eel	*Anguilla anguilla*	migratory	matures in rivers
Conger eel	*Conger conger*	marine	rocky coasts
Herring	*Clupea harengus*	marine	young in estuaries
Sprat	*Sprattus sprattus*	marine	young in estuaries
Shad	*Alosa* sp.	migratory	spawns in rivers
Clupeid	Herring family indet.		herring, sprat & shad
Salmonidae	c.f. *Salmo salar*	migratory	spawns in rivers
Trout	*Salmo trutta*	freshwater	rivers
Grayling	*Thymallus thymallus*	freshwater	rivers and lakes
Smelt	*Osmerus eperlanus*	migratory	spawns in rivers
Pike	*Esox lucius*	freshwater	lowland rivers & lakes
c.f. Crucian carp	*Carassius carassius*	freshwater	native SE England only
Tench	*Tinca tinca*	freshwater	slow rivers, lakes, ponds
Bitterling	*Rhodeus sericus*	freshwater	?introduced
Bream	*Abramis brama*	freshwater	slow, lowland river/lakes
Silver bream	*Blicca bjoerkna*	freshwater	slow, lowland river/lakes
Bleak	*Alburnus alburnus*	freshwater	lowland and upstream
Barbel	*Barbus barbus*	freshwater	lowland rivers, weirpools
Gudgeon	*Gobio gobio*	freshwater	variety of rivers & lakes
Dace	*Leuciscus leuciscus*	freshwater	low/mid river reaches
Chub	*Leuciscus cephalus*	freshwater	mid/upstream rivers
Chub/dace	*Leuciscus leuciscus/cephalus*	freshwater	
Roach/chub	*Rutilus rutilus/Leuciscus cephalus*	freshwater	
Roach	*Rutilus rutilus*	freshwater	lowland rivers & lakes
Roach/rudd	*Rutilus rutilus/Scardinius erythrophthalmus*	freshwater	
Stone loach	*Noemacheilus barbatulus*	freshwater	running water, various
Cyprinidae	Carp family indet.	freshwater	inc Cr. Carp to St. loach
Angler	*Lophius piscatorius*	marine	bottom living to 18m depth
Cod	*Gadus morhua*	marine	seasonally to 600m
Haddock	*Melanogrammus aeglefinus*	marine	seasonally shallow/deep
Whiting	*Merlangius merlangus*	marine	shallow, 30-100m
Poor cod	*Trisopterus minutus*	marine	coastal 24-300m depth
Pollack	*Pollachius pollachius*	marine	inshore to 200m
Saithe	*Pollachius virens*	marine	inshore juv, adult to 250m
Burbot	*Lota lota*	freshwater	lowland slow river/lakes
Small gadid	Sm species of cod family		e.g. whiting, poor cod

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TABLE 1 (Cont.). SPECIES LIST (Habitat notes from Wheeler 1978)

Common Name	Latin name	Habitat	
Large gadid	Lg species of cod family		cod, saithe pollack
Gadidae	Cod family		any member
Ling	*Molva molva*	marine	deep water 3-400m
Hake	*Merluccius merluccius*	marine	inshore summer, & 550m
Garfish	*Belone belone*	marine	surface in and off shore
Sandsmelt	*Atherina presbyter*	shallow marine and freshwater	inshore/estuarine
John dory	*Zeus faber*	marine	inshore 10-50m depth
Stickleback	*Gasterosteus aculeatus*	freshwater to fully marine	
Gurnard	Triglidae	marine	shallow water
Bullhead	*Cottus gobio*	freshwater	stony streams & lakes
Bass	*Dicentrarchus labrax*	marine	inshore & estuaries
Perch	*Perca fluviatilis*	freshwater	slow rivers, lakes, ponds
Ruffe	*Gymnocephalus cernuus*	freshwater	slow rivers, lakes, ponds
Scad	*Trachurus trachurus*	marine	surface, off & onshore
Black sea bream	*Spondyliosoma cantharus*	marine	rocky outcrops
Red sea bream	*Pagellus bogaraveo*	marine	inshore & 100 & 200 m
Gilthead	*Sparus aurata*	marine	sand/mud bottoms - 30m
Sparidae	Sea bream family	marine	black/red, gilthead etc.
Meagre	*Argyrosomus regius*	marine	rare, inshore, estuaries
Red mullet	*Mullus surmuletus*	marine	inshore 3-90m
Thick lipped grey mullet	*Chelon labrosus*	marine	coastal and estuaries
Thin lipped grey mullet	*Liza ramada*	marine	coastal into freshwater
Mugilidae	Grey mullet family	marine	thick & thin lipped
Cuckoo wrasse	*Labrus mixtus*	marine	inshore summer & 180m
Ballan wrasse	*Labrus bergylta*	marine	rocky shores 2-20m
Labridae	Wrasse family	marine	cuckoo, ballan.
Catfish	*Anarhichas lupus*	marine	60-300 m
Sandeel	*Ammodytes tobianus*	marine	tide level to 30m
Mackerel	*Scomber scombrus*	marine	surface on & offshore
Spanish mackerel	*Scomber japonicus*	marine	surface inshore to 300m
Scombridae	Mackerel family	marine	atlantic or spanish
Turbot	*Scophthalmus maximus*	marine	shallow inshore to 80m
Plaice	*Pleuronectes platessa*	marine	sandy bottoms, 0-200m
Flounder	*Platichthys flesus*	marine	0-50m also freshwater
Dab	*Limanda limanda*	marine	sandy bootoms 20-40m
Lemon sole	*Microstomus kitt*	marine	40-200m
Halibut	*Hippoglossus hippoglossus*	marine	deepwater 100-1500m
Pleuronectidae	Right eyed flatfishes	marine	incl. plaice to halibut
Flatfish indet.	Any flatfish	marine	indet. to family or species
Nile catfish	*Synodontis* sp.	freshwater	Traded

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TABLE 2. GAZETEER OF THE SITES WITH FISH BONE DIVIDED BY REGION

North

	Site	Site Type	Date	Ref
1	Birdoswald, Cumbria	fort	C3rd	Smith 1993
2	Carlisle, Castle Street	military	C1st, 2nd	Locker 1985
3	Carlisle, The Lanes	urban	C1st, 2nd	Nicholson 1993b
4	Catterick Bridge, Thornborough Farm	military/civilian	C2nd, 3rd	Stallibrass 2002
5	Inveresk, Edinburgh	military/civilian		Ceron-Carrasco 2002
6	Lancaster			Jones & Shotter 1998
7	Ribchester, The Lanes	military		Nicholson 1993a
8	York, Bedern	well		O'Connor 1988
9	York, Church Street	military		Enghoff 2000
10	York, Fishergate		C1st	Enghoff 2000
11	York, Skeldergate			Enghoff 2000
12	York, Tanner Row			O'Connor 1988

Midlands

	Site	Site Type	Date	Ref
13	Chester, 25 Bridge Street.	garrison town		Jacques *et al.* 2004
14	Chester, Dee House	garrison town	C1st, 2nd, 3rd	Jones 2001
15	Dragonby, Lincs.	settlement	C1st, 4th	Jones 1996
16	Godmanchester, Cambs.	town	C2nd, 3rd	Locker 1993
17	Leicester, Little Lane	town		Nicholson 1992
18	Leicester, Causeway Lane	town	AD 50-200, AD 200-400	Nicholson 1999
19	Lincoln	town	C3rd, 4th	Irving 1996
20	Rectory Farm, West Deeping, Lincs.	settlement		Locker 1998a
21	Thetford, Redcastle Furze	settlement	C1st	Nicholson 1995
22	Worcester, Deansway	town	C1st, 2nd, 3rd	Nicholson & Scott 2004
23	Wroxeter, Shropshire	baths/basilica of town	C4th	Locker 1997a

South/South-East

	Site	Site Type	Date	Ref
24	Barton Court Farm, Abingdon, Oxon.	settlement		Wheeler 1984
25	Beddington, Surrey	villa - well	C4th	Locker unpub
26	Bignor, West Sussex	villa	C3rd/4th	Parfitt 1995
27	Bishopstone, Sussex	settlement	C2nd	Jones 1997
28	Canterbury, Marlowe Car Park	town	C1st, 2nd, 4th	Locker 1986a
29	Canvey Island, Site 1	settlement		Jones 1986
30	Castle Copse, Wilts.	villa	C3rd	Jones 1997
31	Chichester, Chapel Street	town (garden)	C4th	Locker 1981

TABLE 2 (Cont.). GAZETEER OF THE SITES WITH FISH BONE DIVIDED BY REGION

South/South-East (cont.)

	Site	Site Type	Date	Ref
32	Colchester, Culver Street	town	C1st, 2nd, 3rd	Locker 1992a
33	Colchester, Former Post Office	town	C1st, 2nd	Locker 2002
34	Colchester, Gilberd School	town	C1st, 2nd	Locker 1986b
35	Elm Farm, Heybridge, Essex	settlement	C1st, 3rd, 4th	Locker 1998b
36	Fishbourne Palace, nr Chichester, Sussex	villa	Cist	Ingrem 2004
37	Gorhambury, nr St Albans, Herts.	villa	C1st, 2nd, 3rd	Locker 1990
38	Great Holts Farm, Boreham, Essex	villa	C4th	Murphy *et al.* 2000
39	Hayling Island, Sussex	temple	C4th	Locker unpub
40	North Shoebury, Essex	settlement	Roman	Jones 1983
41	Meppershall, Beds.	settlement	C2nd	Locker 2004
42	Silchester, nr Basingstoke, Hants.	town	C3rd, 4th	Hamilton Dyer 1997, 2000, Ingrem 2006
43	Skeleton Green, Stevenage, Herts.	oppidum	LIA/Roman	Wheeler 1981

LONDON

City kindly supplied by Kevin Rielly of MoLAS from the Oracle listings (Liddle & Pipe in prep.)

	Site	Site code	Date	Ref
44	Baltic Exchange/14-21 St Mary Axe, EC3	BAX 95	C2nd, 3rd	oracle
45	Billingsgate Fish Market Lorry Park/Lower Thames St, EC3	BIG 82	C2nd	Locker 1992c
46	28-32 Bishopsgate, EC2	BOP	C2nd	oracle
47	201 Bishopsgate, EC2	BGB 98	C2nd	oracle
48	Monument House/30-35 St Botolph Lane, EC3	BPL 95	C1st, C3rd	oracle
49	2-5 Devonshire Sq/Hounsditch Telephone Exchange, EC2	CDV 99	C2nd	Liddle, J. archive report MoLAS
50	Tanners Hall/13-21 Eastcheap, EC3	ESC 97	C3rd	oracle
51	Lloyds Registry/68-71 Fenchurch Street, EC3	FCC 95	C1st, 2nd, 3rd	oracle
52	168 Fenchurch Street, EC3	FEH 95	C1st	oracle
53	Guildhall, EC2	GYE 92	C2nd, 3rd, 4th	oracle
54	Miles Lane/131-7 Upper Thames Street, EC4	ILA 79	C1st, 2nd: Roman	oracle
55	King Edwards Bldgs/GPO West Yard	KEW 98	C1st	oracle
56	15-17 King St/42-46 Gresham St, EC2	KIG 95	C1st	oracle
57	Regis House/King William St, EC4	KWS 94	C1st, 2nd	oracle
58	Leadenhall Ct/Gracechurch St, EC3	LCT 84	C1st	Locker 1992d
59	17 Fish Street/Monument St, EC3	MFI 87	C1st	oracle

TABLE 2 (Cont.). GAZETEER OF THE SITES WITH FISH BONE DIVIDED BY REGION

LONDON

City (cont.)

	Site	Site code	Date	Ref
60	Northgate House, Moorgate, EC2	MRG 95	C2nd, 3rd	oracle
61	6-9 Newgate St. EC1	NEG 98	C1st, 2nd	oracle
62	29 Gresham St, EC2	NHG 98	C1st, 2nd	oracle
63	No 1 Poultry, EC2	ONE 94	C1st, 2nd, 3rd, 4th	oracle
64	Pudding Lane, EC3	PDN 81	C3rd	oracle
65	Peninsular House/ Lower Thames St, EC3	PEN 79	C3rd	Bateman & Locker 1982
66	Rangoon Street, EC3	RAG 82	C2nd	Locker 1986c
67	St Magnus	SM 82		oracle
68	Billingsgate Bldgs/L Thames St, EC3	TR 74	C1st, 2nd	Wheeler 1974
69	Fleet Valley, EC4	VAL 88	C1st	Locker 1994

(unless otherwise credited the fish listed for London were identified by A. Pipe, C. Ainsley or J. Liddle).

East London cemeteries (all identified by A. Locker, archive reports for MoLAS) (Barber & Bowsher 2000)

	Site	Site code
70	East Tenter St/Scarborough St, E1	ETN 88
71	13 Haydon St, EC3	HAY 86
72	Hooper St, E1	HOO 88
73	49-59 Mansell St/2-8 Alie St, E1	MSL 87
74	31-43 Mansell St/1-15 Alie St, E1	MST 87
75	53-66 Prescot St, E1	PRE 89
76	9 St Claire St, EC3	SCS 83
77	28-29 West Tenter St/59 Mansell St, E1	WTE 90

Southwark and sites in East London

	Site	Site code	Date	Ref
78	Arcadia Buildings, Sylvester St	AB 78	C1st, 4th	oracle
79	New Wolfson Wing, Kings College, SE1	BHB 00	C3rd	Armitage 2002a
80	179 Borough High Street, SE1	179 BHS89	C2nd	oracle
81	199 Borough High Street, SE1	199 BHS	C2nd	Jones 1988b
82	Calverts Buildings, 15-23 Southwark St, SE1		C1st, 2nd	Locker 1991
83	Fennings Wharf, SE1	FW 84	C4th	Locker 1992d
84	Babe Ruth Bathhouse, 172-6 The Highway, E1	HGA 02	C3rd, 4th	Armitage 2005a
85	Hibernia Wharf, SE1	HIB 79	C3rd	oracle

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TABLE 2 (Cont.). GAZETEER OF THE SITES WITH FISH BONE DIVIDED BY REGION

LONDON

Southwark and sites in East London (cont.)

	Site	Site code	Date	Ref
86	Lefevre Road, Bow E3	L R	C2nd, 3rd, 4th	Locker 1998c
87	Shadwell Tower	LD 76	C4th	oracle
88	Long Lane, SE1	LGK 99	C2nd	Armitage 2000a
89	Southwark Cathedral, SE1	MTA 99	C1st	Armitage 2000b
90	Parnell Road, Bow, E3	PRB 95	C2nd, 3rd, 4th	Locker 1998d
91	4-26 St Thomas St, SE1	4STS82	C4th	oracle
92	1-7 St Thomas St, SE1	1-7 ST T	C2nd	Jones 1978
93	Swan St, SE1	SWN 98	C2nd	Armitage 2002b
94	Tobacco Dock, 130-162 The Highway, EI	TOC 02	C3rd, 4th	Armitage 2005b
95	10-18 Union St, SE1	USB 98	C2nd, 3rd	oracle
96	Winchester Palace. SE1	WP 83	C1st	Yule 1989, 2005. Rielly & Locker MoLAS unpub

South & South-West

	Site	Site Type	Date	Ref
97	Dorchester, County Hall, Dorset	town	C1st, 3rd, 4th	Hamilton Dyer 1993a
98	Dorchester, Greyhound Yard, Dorset	town	C1st, 2nd, 3rd, 4th	Hamilton Dyer 1993b
99	Exeter, Devon	town		Wilkinson 1979
100	Figheldean, Wilts.	settlement	Early RB	Hamilton Dyer 1999
101	Ilchester, Great Yard, Somerset	town	C2nd	Locker 1997b
102	Maddington Farm, Shrewton, Wilts.	settlement		Hamilton Dyer 1996
103	Newquay, Cornwall	settlement		Ingrem 2000
104	Ower, Somerset	settlement	C1st, 2nd	Coy 1987
105	Rope Lake, Dorset	settlement		Coy 1987
106	Scillies, Halangy Down	settlement	C3rd	Locker 1996
107	Scillies, May Hill St Martin	settlement		Turk 1984
108	Uley, Gloucestershire	shrines	C1st, 2nd, 4th	Wheeler 1993
109	Wadden Hill, Dorset	fort	C1st	Webster 1964, 1979

TABLE 3. TOTAL NUMBER OF FISH FOR EACH REGION BY NISP TOTAL AND OCCURRENCE

Region	North	Mid-lands	South/ SEast	Lon/ City	Lon/ ELC	Lon/ Sou	South/ SWest	nisp tl	occ/109 sites
Elasmobranch	1	0	1	4	0	0	1	7	6
Tope	0	1	0	0	0	0	0	1	1
Roker	0	0	0	2	0	2	0	4	3
Rajidae	0	0	1	0	0	0	0	1	1
Sturgeon	0	0	0	0	0	6	0	6	2
Eel	571+	413	568	218	25	241+	732+	2768 +	72
Conger eel	0	0	0	1	0	1	13	15	5
Herring	64	99	145+	33+	38	41+	0	420 +	44
Sprat	0	0	+	58+	2	4	0	64 +	6
Shad	6+	0	8	5	12*	2	0	33 *	9
Clupeidae	11	44*	8+	162+	6	5	0	236 +*	23
Salmonidae	252+	151	26	57	3	1	56	546 +	31
Trout	12	1	28	0	0	0	0	41	4
Grayling	14	*	0	0	0	0	0	14 *	2
Smelt	142	19	1	368+	14	22+	0	566 +	21
Pike	22	91*	10	0	1	3+	0	127 +*	17
c.f. Crucian carp	0	0	0	0	0	1	0	1	1
Tench	0	4*	0	0	0	0	0	4 *	3
Bitterling	0	1	0	0	0	0	0	1	1
Bream	0	1	0	0	0	0	0	1	1
Silver Bream	0	0	0	7	0	0	0	7	1
Bleak	1	0	0	0	0	0	0	1	1
Barbel	1	1	0	4	0	0	0	6	4
Gudgeon	0	3	0	11	0	+	0	14 +	4
Dace	4	1	0	21	0	1+	0	27 +	6
Chub	2	4	4	17	0	+	0	27 +	7
Chub/dace	0	1	3	0	0	0	0	4	2
Roach/Chub	0	11	0	0	0	0	0	11	2
Roach	2	4	3	36	0	2	0	47	9
Roach/Rudd	0	1	0	0	0	0	0	1	1
Stone loach	0	6	0	0	0	0	0	6	1
Cyprinidae	350	208	24*	532*	1	25+	85	1225 +*	33
Angler	0	0	0	0	0	0	1	1	1
Cod	2	1	7	57	1	14	0	82	21
Haddock	3	0	5	3	0	+	0	11 +	6
Whiting	1	0	20+	7	4	1	8+	41 +	20
Poor cod	0	0	2	0	0	0	0	2	2
Pollack	0	0	0	0	0	0	1+	1 +	2
Saithe	0	0	1	0	0	0	0	1	1
Burbot	3	0	0	0	0	0	0	3	1
Small gadid	0	0	29	0	0	13	0	42	5
Large Gadid	0	0	8	12	0	0	0	20	5
Gadidae	5	1	0	36+	1	15+	6	64 +	21
Ling	0	0	0	1	0	0	+	1 +	2
Hake	3	0	1	0	0	0	5	9	3

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TABLE 3 (Cont.). TOTAL NUMBER OF FISH FOR EACH REGION BY NISP TOTAL AND OCCURRENCE

Region	North	Mid-lands	South/ SEast	Lon/ City	Lon/ ELC	Lon/ Sou	South/ SWest	nisp tl	occ/109 sites
Garfish	0	0	7	0	0	0	0	7	1
Sandsmelt	0	0	0	+	0	0	0	+	1
John dory	0	0	0	0	0	0	+	+	1
Stickleback	1	0	20+	+	0	18	0	39 +	7
Gurnard	1	4	1	0	0	1	2	9	8
Bullhead	0	1	+	0	0	0	0	1 +	2
Bass	0	2	37	21+	0	0	274+	334 +	11
Perch	75+	138	1*	11	0	0	3*	228 +*	17
Ruffe	0	2	0	0	0	0	0	2	2
Scad	1	0	8	0	0	0	11	20	6
Black sea bream	0	0	0	2	0	3	1	6	5
Red sea bream	0	0	1	+	0	0	10	11 +	4
Gilthead	0	0	1	0	0	0	3	4	3
Sparidae	6+	0	13	1	0	0	57	77 +	10
Meagre	0	0	1	0	0	0	0	1	1
Red mullet	2	0	0	0	0	0	0	2	1
Thick l g mullet	1	0	17	1	0	0	0	19	4
Thin l g mullet	0	3	2	0	0	1	0	6	4
Mugildae	3	34	9	11	0	1	58+	116 +	13
Cuckoo wrasse	0	0	0	0	0	0	1+	1 +	2
Ballan wrasse	1	0	0	0	0	0	17+	18 +	5
Labridae	4	0	1	1	0	0	129+	135 +	11
Catfish	2	0	0	0	0	0	0	2	1
Sandeel	1	40	0	+	0	0	0	41 +	3
Mackerel	4	11	29	22	1	3+	2	72 +	23
Spanish mackerel	0	3	4	0	0	+	0	7 +	4
Scombridae	0	0	3	0	0	0	0	3	1
Turbot	0	0	1	10	0	0	1	12	3
Plaice	3	4	58+	3	0	0	3+	71 +	15
Flounder	6	3	11	10+	1	0	8	39 +	11
Plaice/flounder	63	82	159	399+	11	23	22	759 +	43
Dab	0	0	7	0	1	0	0	8	2
Lemon sole	1	0	0	0	0	0	0	1	1
Halibut	0	0	1	0	0	0	0	1	1
Flatfish	26+	15	153+	7	0	8	24	233 +	27
Nile catfish	0	1	0	0	0	0	0	1	1
Total	**1673+**	**1410***	**1448+***	**2151+***	**122***	**458+**	**1534+***	**8796 +***	
occ/82 sp	**40**	**39**	**48**	**40**	**16**	**31**	**30**		

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TABLE 4. THE NORTH; THE FISH FROM 12 SITES BY *NISP* TOTAL AND OCCURRENCE.

Site & Site no	**1 Bir**	**2 Car C**	**3 Car L**	**4 Cat**	**5 Inv**	**6 Lan**	**7 Rib**	**8 Yor B**	**9 Yor C**	**10 YorF**	**11 YorS**	**12 YorT**	**Total**	**occ/12 sites**
Elasmobranch	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Eel	0	73	353	0	0	0	2	0	29	10	+	104	571 +	7
Herring	0	0	0	1	2	0	0	0	0	50	0	11	64	4
Shad	0	0	1	0	0	0	0	0	0	0	+	5	6 +	3
Clupeid	0	0	0	0	0	0	0	0	0	0	0	11	11	1
Salmonid	+	141	83	1	6	1	3	0	0	0	0	17	252 +	8
Trout	0	0	1	0	0	0	0	0	0	0	0	11	12	2
Grayling	0	0	0	0	0	0	0	0	0	0	0	14	14	1
Smelt	0	0	0	0	0	0	4	0	82	0	0	56	142	3
Pike	0	0	11	0	0	0	0	0	0	1	0	10	22	3
Bleak	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Barbel	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Dace	0	0	0	0	0	0	0	0	0	0	0	4	4	1
Chub	0	0	0	0	0	0	0	0	0	0	0	2	2	1
Roach	0	0	0	0	0	0	0	0	2	0	0	0	2	1
Cyprinidae	0	0	0	0	0	0	1	0	3	0	0	346	350	3
Cod	0	0	1	0	1	0	0	0	0	0	0	0	2	2
Haddock	0	0	2	0	0	0	0	0	0	1	0	0	3	2
Whiting	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Burbot	0	0	0	0	0	0	0	0	0	0	0	3	3	1
Gadidae	0	0	2	0	3	0	0	0	0	0	0	0	5	2
Hake	0	3	0	0	0	0	0	0	0	0	0	0	3	1
Stickleback	0	0	0	0	0	0	0	0	1	0	0	0	1	1
Gurnard	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Perch	0	0	0	0	0	0	0	0	5	1	+	69	75+	4
Scad	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Sparidae	0	0	0	0	0	0	0	+	0	0	0	6	6+	2
Red Mullet	0	0	0	2	0	0	0	0	0	0	0	0	2	1
Thick l g mullet	0	0	0	0	0	0	1	0	0	0	0	0	1	1
Mugildae	0	2	0	1	0	0	0	0	0	0	0	0	3	2
Ballan wrasse	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Labridae	0	2	0	1	1	0	0	0	0	0	0	0	4	3
Catfish	0	0	0	2	0	0	0	0	0	0	0	0	2	1
Sandeel	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Mackerel	0	1	1	0	2	0	0	0	0	0	0	0	4	3
Plaice	0	3	0	0	0	0	0	0	0	0	0	0	3	1
Flounder	0	5	0	0	0	0	0	0	0	0	0	1	6	2
Pleuronectid/P/F	0	13	16	0	0	0	1	0	0	0	0	33	63	4
Lemon sole	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Flatfish	0	20	4	0	2	0	0	0	0	0	+	0	26+	4
Total	**+**	**263**	**475**	**8**	**21**	**1**	**12**	**+**	**123**	**65**	**+**	**705**	**1673+**	
Occ/41 sp	**1**	**10**	**11**	**6**	**11**	**1**	**6**	**1**	**7**	**7**	**4**	**19**		

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TABLE 5. THE MIDLANDS; THE FISH FROM 11 SITES BY *NISP* TOTAL AND OCCURRENCE.

	13 Che	**14 Che**	**15 Dra**	**16 God**	**17 Lei**	**18 Lei**	**19 Lin**	**20 Rec**	**21 The**	**22 Wor**	**23 Wro**	**total**	**occ/11 sites**
Tope	0	0	0	0	0	0	0	0	0	1	0	1	**1**
Eel	10	23	1	35	19	224	64	34	2	1	0	413	**10**
Herring	3	0	0	1	14	76	0	0	3	2	0	99	**6**
Clupeid	0	6	0	0	1*	37	0	0	0	0	0	44 *	**3**
Salmonid	2	42	1	0	1	6	4	0	0	1	94	151	**8**
Trout	0	0	0	0	0	1	0	0	0	0	0	1	**1**
Grayling	0	0	0	0	*	0	0	0	0	0	0	*	**1**
Smelt	0	17	0	0	1	1	0	0	0	0	0	19	**3**
Pike	0	0	1	7	*	6	8	5	0	0	64	91 *	**7**
Tench	0	0	0	0	1*	2	1	0	0	0	0	4 *	**3**
Bream	0	0	0	0	0	0	1	0	0	0	0	1	**1**
Barbel	0	0	0	0	0	0	1	0	0	0	0	1	**1**
Gudgeon	0	0	0	0	1	2	0	0	0	0	0	3	**2**
Bitterling	0	0	0	0	0	0	1	0	0	0	0	1	**1**
Dace	0	0	0	0	0	0	0	1	0	0	0	1	**1**
Roach/chub	0	0	0	0	0	0	2	0	0	0	9	11	**2**
Roach/rudd	0	0	0	0	0	1	0	0	0	0	0	1	**1**
Chub	0	0	0	0	0	0	0	0	0	0	4	4	**1**
Chub/dace	0	0	0	0	0	1	0	0	0	0	0	1	**1**
Roach	0	0	0	1	0	0	2	0	0	0	1	4	**3**
Stone loach	0	0	0	0	0	0	6	0	0	0	0	6	**1**
Cyprinidae	0	0	0	4	4*	47	142	6	0	1	4	208 *	**7**
Cod	0	0	0	0	0	0	0	0	0	1	0	1	**1**
Gadid	0	0	0	0	0	1	0	0	0	0	0	1	**1**
Perch	0	0	0	2	1	23	40	2	0	0	70	138	**6**
Ruffe	0	0	0	0	0	0	1	0	0	0	1	2	**2**
Gurnard	0	0	0	0	1	2	1	0	0	0	0	4	**3**
Bullhead	0	0	0	0	0	0	1	0	0	0	0	1	**1**
Bass	1	0	0	0	0	0	0	0	0	0	1	2	**2**
Thin l g mullet	0	0	0	0	0	0	0	0	0	0	3	3	**1**
Mugilidae	34	0	0	0	0	0	0	0	0	0	0	34	**1**
Sandeel	0	0	0	0	0	0	40	0	0	0	0	40	**1**
Mackerel	0	0	0	0	0	9	0	0	0	0	2	11	**2**
Span mackerel	3	0	0	0	0	0	0	0	0	0	0	3	**1**
Plaice	0	0	0	0	0	0	0	1	0	0	3	4	**2**
Flounder	1	0	0	0	0	1	0	1	0	0	0	3	**3**
PleuronectidP/F	15	28	0	4	0	20	13	2	0	0	0	82	**6**
Flatfish	0	0	0	2	2	10	0	1	0	0	0	15	**4**
Nile catfish	0	0	1	0	0	0	0	0	0	0	0	1	**1**
Total	**69**	**116**	**4**	**56**	**46**	**470**	**328**	**53**	**5**	**7**	**256**	**1410** *	
Occ/39 sp	**8**	**5**	**4**	**8**	**13**	**19**	**17**	**9**	**2**	**6**	**12**		

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TABLE 6. THE SOUTH/SOUTH-EAST; THE FISH FROM 20 SITES BY *NISP* TOTAL AND OCCURRENCE.

Site & Site no.	**24 Bar**	**25 Bed**	**26 Big**	**27 Bis**	**28 Can**	**29 C I**	**30 Cas**	**31 Chi**	**32 Col**	**33 Col**	**34 Col**	**35 Elm**	**36 Fis**	**37 Gor**	**38 Gre**	**39 Hay**	**40 Nor**	**41 Mep**	**42 Sil**	**43 Ske**	**total**	**Occ/20 sites**
Elasmobranch	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	**1**
Rajidae	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Eel	1	0	1	0	0	0	23	0	58	58	12	28	16	236	1	0	28	8	82	16	568	**14**
Herring	0	1	0	0	0	+	12	0	57	13	6	6	4	6	39	0	0	1	0	0	145	+ **11**
Sprat	0	0	0	0	0	0	0	+	0	0	0	0	0	0	0	0	0	0	0	0	+	**1**
Shad	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8	**1**
Clupeid	0	0	0	0	0	+	0	0	0	2	0	0	0	0	0	0	0	0	6	0	8	+ **3**
Salmonid	0	0	0	0	0	0	6	0	2	4	0	3	0	2	0	0	0	0	9	0	26	**6**
Trout	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	28	**1**
Smelt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	**1**
Pike	1	0	0	0	0	0	0	0	0	0	0	1	0	0	6	0	0	0	2	0	10	**4**
Dace/chub	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3	**1**
Chub	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	**1**
Roach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	**1**
Cyprinidae	*	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	0	1	18	0	24	* **5**
Cod	0	0	0	0	1	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	7	**2**
Haddock	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	5	**1**
Whiting	0	0	0	0	0	+	0	0	10	2	4	1	3	0	0	0	0	0	0	0	20	+ **6**
Poor cod	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	**2**
Saithe	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	**1**
Small Gadid	0	0	0	0	0	0	0	0	4	0	0	25	0	0	0	0	0	0	0	0	29	**2**
Large Gadid	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	8	**2**
Hake	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	**1**
Garfish	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	**1**
Stickleback	0	+	0	0	0	+	0	0	19	0	1	0	0	0	0	0	0	0	0	0	20	+ **4**

TABLE 6 (Cont.). THE SOUTH/SOUTH-EAST; THE FISH FROM 20 SITES BY *NISP* TOTAL AND OCCURRENCE.

Site & Site no.	**24 Bar**	**25 Bed**	**26 Big**	**27 Bis**	**28 Can**	**29 C I**	**30 Cas**	**31 Chi**	**32 Col**	**33 Col**	**34 Col**	**35 Elm**	**36 Fis**	**37 Gor**	**38 Gre**	**39 Hay**	**40 Nor**	**41 Mep**	**42 Sil**	**43 Ske**	**total**	**Occ/20 sites**
Bass	0	0	0	0	0	0	2	0	0	0	0	0	15	0	0	0	0	0	20	0	37	**3**
Scad	0	0	0	0	0	0	1	0	0	0	0	0	0	0	6	0	0	0	1	0	8	**3**
Gurnard	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Bullhead	0	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	**1**
Perch	*	0	0	0	0	0	0	0	0	0	0	0	0	*	0	0	0	1	0	0	1	* **3**
Red s bream	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	**1**
Gilthead	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Sparidae	0	0	0	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	8	0	13	**3**
Meagre	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Thick l g mullet	0	0	0	0	0	0	0	0	5	0	0	0	12	0	0	0	0	0	0	0	17	**2**
Thin l g mullet	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2	**2**
Mugilidae	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	8	0	9	**2**
Labridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	**1**
Mackerel	0	0	0	1	1	0	0	0	15	8	0	1	0	0	3	0	0	0	0	0	29	**6**
Span mackerel	0	0	0	0	0	0	0	0	0	0	0	0	0	?2	0	0	0	0	0	2	4	**2**
Scombrid	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3	**1**
Turbot	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Plaice	0	0	0	0	6	0	2	0	32	4	2	5	0	0	0	+	0	0	0	7	58	+ **8**
Flounder	0	0	0	0	0	0	0	0	3	0	0	8	0	0	0	0	0	0	0	0	11	**2**
Plaice/flounder	0	0	0	0	3	0	64	0	0	14	6	40	0	1	31	0	0	0	0	0	159	**7**
Dab	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	7	**1**
Halibut	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	**1**
Flatfish	0	0	0	0	10	+	0	0	13	3	1	118	0	1	0	0	0	0	7	0	153	+ **8**
Total	**2***	**2+**	**1**	**2**	**33**	**+**	**147**	**+**	**235**	**109**	**34**	**256**	**51**	**255**	**86**	**1 +**	**28**	**11**	**163**	**32**	**1448**	**+***
Occ/48 sp	**4**	**4**	**1**	**2**	**8**	**5**	**11**	**1**	**16**	**10**	**9**	**18**	**6**	**10**	**6**	**2**	**1**	**4**	**12**	**5**		

For TABLE 7. LONDON; THE FISH FROM 26 SITES BY *NISP* TOTAL AND OCCURRENCE.
See overleaf pp. 172–3

TABLE 8. EAST LONDON CEMETERIES; THE FISH FROM 8 SITES BY *NISP* TOTAL AND OCCURRENCE.

	70 ETN	***71 HAY***	***72 HOO***	***73 MSL***	***74 MST***	***75 PRE***	***76 SCS***	***77 WTE***	***nisp tl***	***occ/8 sites***
Eel	2	16	2	3	0	1	1	0	**25**	**6**
Herring	1	2	28	1	1	1	0	4	**38**	**7**
Sprat	0	0	2	0	0	0	0	0	**2**	**1**
Herring/sprat	0	0	0	0	0	0	0	6	**6**	**1**
Shad	0	10*	1	0	0	0	0	1	**12***	**3**
Salmonid	0	3	0	0	0	0	0	0	**3**	**1**
Smelt	0	0	2	0	0	0	0	12	**14**	**2**
Pike	0	0	1	0	0	0	0	0	**1**	**1**
Cyprinidae	0	0	1	0	0	0	0	0	**1**	**1**
Cod	0	0	1	0	0	0	0	0	**1**	**1**
Whiting	1	0	1	1	0	0	0	1	**4**	**4**
Gadidae	0	0	1	0	0	0	0	0	**1**	**1**
Mackerel	0	1	0	0	0	0	0	0	**1**	**1**
Flounder	0	0	1	0	0	0	0	0	**1**	**1**
Plaice/flounder	0	2	5	0	0	2	0	2	**11**	**4**
Dab	0	0	0	0	0	0	0	1	**1**	**1**
total	**4**	**34**	**46**	**5**	**1**	**4**	**1**	**27**	**122***	
Occ/16 sp	**3**	**6**	**12**	**3**	**1**	**3**	**1**	**7**		

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TABLE 7. LONDON; THE FISH FROM 26 SITES BY *NISP* TOTAL AND OCCURRENCE.

Site & Site no	**44 BAX**	**45 BIG**	**46 BOP**	**47 BGB**	**48 BPL**	**49 CDV**	**50 ESC**	**51 FCC**	**52 FEH**	**53 GYE**	**54 ILA**	**55 KEW**	**56 KIG**
Elasmobranch	0	0	0	0	1	0	0	0	0	0	0	0	0
Roker	2	0	0	0	0	0	0	0	0	0	0	0	0
Eel	7	1	0	0	16	0	0	26	2	1	2	2	0
Conger eel	0	0	1	0	0	0	0	0	0	0	0	0	0
Herring	0	0	2	0	5	0	0	18	0	0	0	0	0
Sprat	0	0	0	0	0	0	0	0	0	0	0	0	0
Shad	0	0	0	0	0	0	0	0	0	5	0	0	0
Clupeid	25	0	0	+	19	0	0	0	1	1	0	1	0
Salmonid	0	1	0	0	0	0	0	0	0	0	2	0	0
Smelt	3	0	0	0	0	0	0	0	0	0	3	0	0
Silver bream	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbel	1	0	0	0	0	0	0	0	0	0	0	0	0
Gudgeon	0	0	0	0	0	0	0	0	0	0	0	0	0
Dace	0	0	0	0	0	0	0	0	1	0	0	0	0
Chub	0	0	0	0	0	0	0	0	0	0	3	0	0
Roach	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprinidae	5	0	0	0	1	0	0	4	0	1*	2	0	0
Cod	0	0	0	0	0	49	0	0	1	0	1	0	0
Haddock	0	0	0	0	0	0	0	0	0	0	0	0	0
Whiting	0	1	0	0	0	0	0	0	0	0	0	0	0
L Gadid	5	0	0	0	0	0	0	0	0	0	0	0	0
Gadidae	0	0	0	+	5	0	0	1	0	0	1	0	0
Ling	0	0	0	0	0	0	0	0	0	0	0	0	0
Sandsmelt	0	0	0	0	0	0	0	0	0	0	0	0	0
Stickleback	0	0	0	0	0	0	0	0	0	0	0	0	0
Bass	0	0	0	0	0	0	0	0	0	0	0	0	0
Perch	0	0	0	0	0	0	0	0	0	0	0	0	0
Black s bream	0	0	0	0	0	0	0	0	0	0	0	0	0
Red sea bream	0	0	0	0	0	0	0	0	0	0	0	0	0
Sparidae	0	1	0	0	0	0	0	0	0	0	0	0	0
Thick l g mullet	0	0	0	0	0	0	0	0	0	0	1	0	0
Mugilidae	0	0	0	0	0	0	1	0	0	0	0	0	0
Labridae	0	0	0	0	0	0	0	1	0	0	0	0	0
Sandeel	0	0	0	0	0	0	0	0	0	0	0	0	0
Mackerel	6	1	1	0	0	1	0	0	0	0	0	0	0
Turbot	0	0	0	0	0	0	0	0	0	0	0	0	0
Plaice	0	0	0	0	1	0	0	0	0	0	0	0	0
Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0
Plaice/Flounder	6	7	2	0	7	0	0	3	1	8	2	6	11
Flatfish indet	0	1	0	0	0	0	0	0	0	0	0	0	0
Total	**60**	**13**	**6**	**+**	**55**	**50**	**1**	**53**	**6**	**16**	**17**	**9**	**11**
Occ/40 sp	**9**	**7**	**4**	**2**	**8**	**2**	**1**	**6**	**5**	**5**	**9**	**3**	**1**

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57 KWS	58 LCT	59 MFI	60 MRG	61 NEG	62 NHG	63 ONE	64 PDN	65 PEN	66 RAG	67 SM	68 TR	69 VAL	total	occ/26 sites
0	0	0	0	0	2	1	0	0	0	0	0	0	**4**	**3**
0	0	0	0	0	0	0	0	0	0	0	0	0	**2**	**1**
3	2	108	1	17	4	22	0	0	4	0	0	0	**218**	**16**
0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
1	0	4	0	0	0	1	0	+	2	0	0	0	**33 +**	**8**
0	0	0	0	0	0	0	0	+	56	0	2	0	**58 +**	**3**
0	0	0	0	0	0	0	0	0	0	0	0	0	**5**	**1**
0	0	53	8	12	16	24	0	0	1+	1	0	0	**162 +**	**13**
7	0	47	0	0	0	0	0	0	0	0	0	0	**57**	**4**
4	0	126	0	0	0	2	0	0	230+	0	0	0	**368 +**	**6**
0	0	7	0	0	0	0	0	0	0	0	0	0	**7**	**1**
0	0	3	0	0	0	0	0	0	0	0	0	0	**4**	**2**
0	0	11	0	0	0	0	0	0	0	0	0	0	**11**	**1**
0	0	20	0	0	0	0	0	0	0	0	0	0	**21**	**2**
0	0	11	0	0	0	0	0	0	3	0	0	0	**17**	**3**
2	0	34	0	0	0	0	0	0	0	0	0	0	**36**	**2**
9	0	474	0	4	0	32	0	0	0	0	0	0	**532 ***	**9**
1	0	0	0	1	0	3	0	0	0	0	1	0	**57**	**7**
0	0	2	0	1	0	0	0	0	0	0	0	0	**3**	**2**
2	0	0	0	2	1	0	0	0	1	0	0	0	**7**	**5**
6	0	0	0	1	0	0	0	0	0	0	0	0	**12**	**3**
7	0	0	2	7	2	10	0	0	0	0	1	0	**36 +**	**10**
0	0	0	0	0	0	0	0	0	0	1	0	0	**1**	**1**
0	0	0	0	0	0	0	0	0	+	0	0	0	+	**1**
0	0	0	0	0	0	0	0	0	+	0	0	0	+	**1**
0	0	20	0	0	0	0	0	+	0	0	0	0	**20 +**	**2**
0	0	11	0	0	0	0	0	0	0	0	1	0	**12**	**2**
0	0	0	0	0	0	0	0	0	0	1	1	0	**2**	**2**
0	+	0	0	0	0	0	0	0	0	0	0	0	+	**1**
0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
1	0	6	0	0	0	3	0	0	0	0	0	0	**11**	**4**
0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
0	0	0	0	0	0	0	0	+	0	0	0	0	+	**1**
3	0	6	0	0	0	4	0	0	0	0	0	0	**22**	**7**
0	0	10	0	0	0	0	0	0	0	0	0	0	**10**	**1**
0	0	2	0	0	0	0	0	0	0	0	0	0	**3**	**2**
0	0	10	0	0	0	0	0	+	0	0	0	0	**10 +**	**2**
16	0	261	5	4	0	60	0	0	+	0	0	0	**399 +**	**16**
0	0	0	0	0	0	0	1	0	4	0	0	1	**7**	**4**
62	**2+**	**1226**	**16**	**49**	**25**	**162**	**1**	**+**	**301+**	**3**	**6**	**1**	**2151 +***	
13	**2**	**21**	**4**	**9**	**5**	**11**	**1**	**5**	**11**	**3**	**5**	**1**		

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TABLE 9. SOUTHWARK; THE FISH FROM 19 SITES BY *NISP* TOTAL AND OCCURRENCE.

	78 AB	79 BHB	80 BHS	81 BHS	82 CB	83 FW	84 HGA	85 HIB	86 LR	87 LD	88 LGK	89 MTA	90 PRB	91 STS	92 STT	93 SWN	94 TOC	95 USB	96 WP	nisp tl	occ/19 sites
Roker	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	**2**	**2**
Sturgeon	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5	0	**6**	**2**
Eel	0	0	3	16	5	201	2	0	1	0	0	0	3	4	+	0	2	4	0	**241+**	**11**
Conger	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
Herring	0	0	1	0	1	33	1	0	0	0	0	0	1	0	+	0	3	1	0	**41+**	**8**
Sprat	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**	**1**
Shad	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	**2**	**1**
Clupeid	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	**5**	**2**
Salmonid	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
Smelt	0	0	0	6	2	12	0	0	0	0	0	0	1	0	+	0	0	1	0	**22 +**	**6**
Pike	0	0	0	0	0	0	0	0	0	0	0	0	3	0	+	0	0	0	0	**3+**	**2**
cf Crucian carp	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
Gudgeon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	0	0	+	**1**
Dace	0	0	0	0	0	0	0	0	0	0	0	0	1	0	+	0	0	0	0	**1+**	**2**
Chub	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	0	0	+	**1**
Roach	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	**2**	**2**
Cyprinidae	0	0	0	10	2	4	1	0	0	0	0	0	0	0	+	0	0	8	0	**25+**	**6**
Cod	3	0	0	0	0	1	0	1	0	1	1	1	0	0	0	5	0	0	1	**14**	**8**
Haddock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	0	0	0	0	+	**1**
Whiting	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
Sm Gadid	10	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	**13**	**3**
Gadidae	0	0	0	0	0	12	0	0	0	0	0	0	0	2	+	0	0	1	0	**15+**	**4**
Stickleback	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**18**	**1**
Gurnard	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
Black s bream	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	**3**	**2**
Thin l g mullet	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**
Mugilidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**	**1**
Mackerel	0	0	0	0	0	0	2	0	0	0	0	0	0	0	+	0	0	1	0	**3 +**	**3**
Spanish mack	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+	+	**1**
Plaice/flounder	6	0	0	0	0	3	0	0	0	0	9	0	0	0	0	0	0	5	0	**23**	**4**
Flatfish	0	0	0	0	0	1	1	0	1	0	0	0	2	0	0	0	3	0	0	**8**	**5**
Total	**20**	**1**	**6**	**50**	**11**	**273**	**11**	**2**	**4**	**1**	**11**	**1**	**16**	**6**	**+**	**5**	**8**	**31**	**1+**	**458+**	
Occ/31 sp	**4**	**1**	**4**	**4**	**5**	**11**	**8**	**2**	**3**	**1**	**3**	**1**	**8**	**2**	**11**	**1**	**3**	**12**	**2**		

TABLE 10. SOUTH/SOUTH-WEST; THE FISH FROM 13 SITES BY *NISP* TOTAL AND OCCURRENCE.

Site no. & site	**97 Dor**	**98 Dor**	**99 Exe**	**100 Fig**	**101 Ilch**	**102 Mad**	**103 New**	**104 Owe**	**105 Rop**	**106 Sci**	**107 Sci**	**108 Ule**	**109 Wad**	**nisp tl**	**occ/ 13sites**
Elasmo	0	0	0	0	0	0	0	0	0	1	0	0	0	1	**1**
Eel	696	1	0	4	8	2	0	+	0	0	+	21	0	732 +	**8**
Conger eel	0	10	1	0	0	0	0	0	0	2	0	0	0	13	**3**
Salmonid	0	2	4	0	0	0	0	0	0	0	0	50	0	56	**3**
Cyprinidae	81	0	0	0	4	0	0	0	0	0	0	0	0	85	**2**
Angler	0	0	0	0	0	0	1	0	0	0	0	0	0	1	**1**
Whiting	0	0	3	0	0	0	0	0	0	5	+	0	0	8 +	**3**
Pollack	0	0	0	0	0	0	0	0	0	1	+	0	0	1 +	**2**
Gadidae	0	5	1	0	0	0	0	0	0	0	0	0	+	6 +	**3**
Ling	0	0	0	0	0	0	0	0	0	0	+	0	0	+	**1**
Hake	0	0	5	0	0	0	0	0	0	0	0	0	0	5	**1**
John Dory	0	0	0	0	0	0	0	0	0	0	+	0	0	+	**1**
Gurnard	0	1	1	0	0	0	0	0	0	0	0	0	0	2	**2**
Perch	0	0	0	0	*	0	0	0	0	0	0	3	0	3 *	**2**
Bass	0	268	4	0	0	0	0	0	0	0	0	2	+	274 +	**4**
Scad	0	10	0	0	0	0	0	0	0	0	0	1	0	11	**2**
Black sea bream	0	0	0	0	0	0	0	0	0	1	0	0	0	1	**1**
Red sea bream	0	0	0	0	0	0	0	0	0	1	0	9	0	10	**2**
Gilthead	0	0	0	0	0	0	0	2	0	1	0	0	0	3	**2**
Sparidae	9	45	2	0	1	0	0	0	0	0	0	0	0	57	**4**
Mugilidae	0	56	0	0	0	0	0	0	0	0	+	2	0	58 +	**3**
Cuckoo wrasse	0	0	0	0	0	0	1	0	0	0	+	0	0	1 +	**2**
Ballan wrasse	0	0	0	0	0	0	8	0	1	8	+	0	0	17 +	**4**
Labridae	2	103	1	0	0	0	7	0	0	16	0	0	+	129 +	**6**
Mackerel	0	0	0	0	0	0	0	0	0	2	0	0	0	2	**1**
Turbot	0	0	1	0	0	0	0	0	0	0	0	0	0	1	**1**
Plaice	0	0	0	0	0	0	0	0	0	0	+	3	0	3 +	**2**
Flounder	0	0	0	0	0	0	0	0	0	0	0	8	0	8	**1**
Plaice/flounder	0	0	0	0	1	0	0	0	0	0	0	21	0	22	**2**
Flatfish	3	21	0	0	0	0	0	0	0	0	0	0	0	24	**2**
Total	**791**	**522**	**23**	**4**	**14***	**2**	**17**	**2+**	**1**	**38**	**+**	**120**	**+**	**1534**	
Occ/30 sp	**5**	**11**	**10**	**1**	**5**	**1**	**4**	**2**	**1**	**10**	**9**	**10**	**3**		

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Menton, France
galocker@cegetel.net

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