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CARISBROOKE CASTLE, ISLE OF WIGHT: Fish Remains from the 2008/9 Archaeological Evaluations

Rebecca Nicholson

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SUMMARY
This report presents the analysis of fish remains from evaluations at Carsibrooke Castle, Isle of Wight undertaken in 2008/2009. The small assemblage of around 500 identifiable remains was recovered principally from sieving with only 12 bones retrieved by hand-collection. It is probable that most of the fish comsumed were caught locally, although some preserved fish may have been purchased. The results suggest that fish was was a regular part of the menu in the 12th to 13th century. Taken together with the evidence from mammal and bird remains a diet high in meat is inferred.

Front cover: The Privy Garden, Carisbrooke Castle, looking north to the chapel of St. Nicholas, Great Hall and the Constable's Tower

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INTRODUCTION

The assemblage of fish bones and scales reported here derives from a small-scale evaluation conducted in 2008/2009 in the area of the Privy Garden, located in the south-west quadrant of the medieval castle. The evaluations (in 2006 and 2008/2009) uncovered part of the outer ditch of the Conquest-period ringwork. A late 12th–early 13th century rectangular building was cut into this ditch, and it is likely that some of the remains discussed here represent kitchen and table waste possibly linked to activities which took place within this building (Ayton 2011). Previous excavation of the bailey (Young 2000) retrieved few fish bones (P Smith in Young 2000). Hand recovered bones from this excavation included species typically found in the Solent, including cod (*Gadus morhua*) and conger eel (*Conger conger*).

The remains reported here come from six soil samples, each of 40L, taken from the 2008/2009 evaluations, those from the 2006 evaluation having unfortunately been lost (Ayton 2011). All were processed by water flotation and the heavy residues fully sorted down to 2mm. The samples came from layers and midden deposits of late 12th-13th century - 18th century date (Phases 4a, 4b and 5) but the majority of bones came from 13th century context 8016 and late 12th-early 13th context 8023 (samples 7808 and 7807) and, to a lesser extent, 16th-18th century context 8000 (sample 7805). Only 12 bones were hand retrieved on site.

METHODOLOGY

From the recovered assemblage of fish bone fragments and scales, around 500 items were identified at least to family level (Table 1). All bones and scales were identified using the author's modern comparative collection. The remaining, unidentified, bones were small or tiny fragments and were frequently parts of rays or spines, which are generally considered to be undiagnostic. Fish scales were present in a number of samples, but can difficult to identify as they vary in appearance not only between taxa but also with position along the body. Fragmented scales are particularly problematic. Given these limitations, the majority of scales recovered were identified as sea bream, which have relatively robust and distinctive scales. Where many scales were present they have been counted as 1 in the records and table below where this was the only identification for the taxon in the sample, or 0 where other remains had been identified, to avoid taxa with many surviving and distinctive scales being grossly over-represented. Notes are provided in Appendix 1 to indicate general abundance. Other dermal structures included the distinctive skin bucklers, thorns and prickles from rays. Where possible, attempts were made to

speciate ray (Rajidae) dermal denticles using guidelines in Gravendeel *et al.* (2002).

Bone condition was scored on a subjective scale of very good, good, fair, poor, based on the overall appearance of the bone. Most of the bones scored fair or good, but owing to their generally small size very few bones were measureable. Fish sizes were estimated by a combination of bone measurements and direct visual comparison with bones from comparative modern fishes. Where possible measurements were taken on the premaxilla and dentary of cod family fish (following Wheeler and Jones 1976) as follows: premaxilla - width of the ascending process; dentary - depth from the tooth row to the base of the ridge, taken at the posterior margin of the nutrient foramen (M1) and depth at the symphysis (M2). Eel lengths have been calculated from the total length of the cleithrum (after Libois *et al.* 1987). Other fish sizes have been broadly estimated with reference to modern comparative fish skeletons held by the author. Where measurements were not taken, fish size has been estimated for gadids and flatfishes using the categories “tiny” (0-0.2m), “small” (0.2-0.35m) “medium” (0.35-0.6m) “large” (0.6-1m) “extra large” (>1m). Size estimates for other fish were very subjective, the terms “tiny”, “small”, “medium” and “large” relating to the size-range exhibited in life and represented in modern comparative skeletons.

Full records are presented in Appendix 1 and stored as an Excel 97 spreadsheet as part of the site site archive.

THE ASSEMBLAGE

Bones from herring were numerically dominant in samples from Phase 4a and 4b: 13th century midden context 8016 included a minimum of 14 herrings in the 40L sample (sample 7808). This sample was the richest in terms of fish remains, containing almost 300 identifiable bones from at least 22 species of fish, probably a result of the advantageous conditions for bone preservation afforded by the marine shell. The material from this and related yard surface context 8023 provide a valuable insight into the fish available to, and eaten by, the occupants of the late12th- 13th century castle. It is clear that fish was obtained not only from boats operating in the Solent, but also from local rivers or fishponds. Eels, pike and perch augmented the seafish, which apart from herring included cod, whiting, plaice, sea bream, mackerel, scad, mullet and rays. One of the eels from sample 7808 would have measured about 64cm. Six large salmonid vertebrae, possibly from a single fish, may be from salmon or sea trout, as it is difficult to separate bones from these closely related species. All came from 13th century midden 8016. A conger eel vertebra came from floor deposit 7362, also phased to the late 12th-early 13th century.

Table 1: Quantification of fish remains (number of bone fragments) by Phase from the the evaluations at at Carisbrooke Castle 2008-9

Taxon	**Common name** **Phase**	**4a**	**4b**	**5**	**Total**
cf. *Amblyraja radiata*	starry ray	1	-	-	1
Raja cf. *montagui*	spotted ray	-	2	-	2
Anguillidae	eels	1	-	-	1
Anguilla anguilla	common eel	6	33	-	39
Conger conger	conger eel	1	2	8	11
Clupea harengus	herring	54	214	17	285
Salmonidae	salmonids	-	9	-	9
Esox lucius	pike	5	3	-	8
Cyprinidae	cyprinids	-	-	1	1
Gadidae	cod family	3	4	13	20
Gadus morhua	cod	1	-	8	9
Gadus/Pollachius	cod/saithe/pollack	-	1	-	1
Pollachius sp.	saithe/pollack	-	-	1	1
P. pollachius	pollack	-	-	2	2
Merlangius merlangus	whiting	-	1	-	1
Trisopterus sp.	bib/pout	-	-	2	2
Belone belone	garfish	-	-	1	1
Trachurus trachurus	scad	1	1	-	2
Dicentrarchus labrax	bass	-	-	10	10
cf. *D. labrax*	bass	-	-	1	1
Perca fluviatilis	perch	1	-	1	2
Sparidae	sea breams	3	1	2	6
Labridae	wrasses	-	-	2	2
Mugilidae	mullets	-	1	6	7
Lisa sp.	thin-lipped/golden grey mullet	-	1	-	1
Scomber scombrus	mackerel	1	-	-	1
Gasterostidae	sticklebacks	1	-	1	2
Flatfish		3	1	1	5
Pleuronectidae	right-eyed flatfish	-	40	4	44
Pleuronectes platessa	plaice	-	3	-	3
Unidentified		6	8	10	24
Grand Total		88	325	91	504

Sample 7800, from context 7333, a Phase 4b midden, included bones from herring, conger eel and small gadid(s), probably including pollack.

The Phase 5 assemblage (16th-18th century) came mainly from midden context 8000 (sample 7805). Gadids, including large cod, smaller pollack and pout or bib, were proportionately more frequent in this assemblage than in those from the earlier periods, and at least two small bass were also present in sample 7805. Other taxa included conger eel, wrasse, mullet, seabream and flatfish as well as perch and a small cyprinid, the last two exclusively freshwater fish. A single stickleback bone was present, as was also the case in 12th sample 7807. It

is not clear whether these tiny and spiny fish were eaten, although they are found relatively frequently in sieved samples from medieval urban sites. Hand collected bones from this phase included head bones from at least one large conger eel, a cleithrum and vertebra from large cod, and a garfish dentary. Although it is difficult to speculate from what is, after all, a small assemblage, the fact that the only cod bones recovered are from the appendicular region and vertebral column may indicate the procurement of preserved fish. Stockfish (largely dried cod, haddock, saithe and ling from northern waters) and saltfish (especially salted and pickled herring, cod, eels, whiting and mackerel) were extensively traded during this period.

DISCUSSION

The fish identified in the late 12th-13th century assemblage could all have been caught in local waters, principally in the Solent. Most are sea fish, typical for catches caught in inshore waters. Freshwater fish represented only around 2% of the identified assemblage, or some 11% if the migratory eel, salmonid(s) and the tiny stickleback are included. In the Middle Ages, freshwater fish were often kept in artificial ponds or 'stews' (Drummond and Wilbraham 1991, 39). Eel, bass and grey mullet frequent estuaries and in the case of eel and mullet also may also be found up-river in freshwater areas. Eels of course may spend much of their life in freshwater, migrating to the sea only to breed. All of these fish could have been caught in the tidal sections of the River Medina.

Of the sea fish, larger specimens include cod and haddock, while smaller gadids: whiting, pollack and bib or pout, are also present and clearly made up a significant proportion of the catch at least in the 16th-18th centuries. Bones from right-eyed flatfish (Pleuronectidae) are fairly frequent in all periods, but only plaice was positively identified. Dermal denticles from rays as well as occasional bones from scad, mackerel, conger eel, garfish and wrasse demonstrate the mixed nature of the local catches, as do the sea bream. These were represented only by scales, probably an indication that the fish were descaled prior to cooking and serving. Similar fish assemblages have also been reported in assemblages from Melbourne Street, Southampton (Bourdillon and Coy 1980), Southampton French Quarter (Nicholson 2011) and Southampton Lower High Street (Hamilton-Dyer 1997). Many of the species recovered from the Carisbrooke Castle evaluation were also found in contexts associated with the medieval fish market at St. Michaels, Southampton (Coy and Hamilton-Dyer 1987), although gurnards and hake, present at the Southampton sites are noticeably absent at Carisbrooke. While herring could have been a local catch, since herring shoals are found inshore along the south west coast of England during the winter months, it is probably more likely that they were purchased as salted or pickled fish. The herring industry was well-established in Norfolk

and Suffolk by the twelfth century and by the year 1300 at least Southampton was trading with Lowestoft (Studer 1910, 5 cited in Coy 1980). Herrings, together with mackerel and scad, are oily fish which turn rancid very quickly unless preserved. In the earlier medieval period herrings were prepared by gutting and salting, which allowed the fish to survive transportation inland, but was not suitable for long term storage (Cutting 1955, 57; Locker 2000, 55).

The extent to which fish remains can be used to indicate status is debatable. Some fish, particularly sturgeon, salmon and turbot would have been expensive and so purchased only by wealthy households; however of these only salmon or sea trout was present in the Carisbrooke assemblage. Wealthy households would have consumed more meat (including fish) than the average townsperson or rural peasant, but the relative quantity of meat eaten is hard to establish from archaeological deposits, particularly for small excavations. What can be said, however, is that the Carisbrooke assemblage derived from late 12th-13th century middens and yard surfaces includes a diverse range of fish from a relatively small quantity of soil. This implies that fish were regularly on the menu.

Although freshwater fish generally commanded a high price in the Middle Ages, many of the freshwater fish from Carisbrooke were small specimens and these would have been as cheap as herrings (Dyer 1988, 33). Several bones from large pike were recovered from 13th century midden 8016, and if purchased these would have commanded a high price; in the 15th century a mature pike cost the equivalent of a skilled craftsman's wage for a week (Dyer 1988, 33).

The late 12th-early 13th century Carisbrooke assemblage has many similarities to that recovered from the pre-AD 1320 assemblage from Porchester Castle in terms of identified taxa, bearing in mind the fact that the Porchester bones were all hand-retrieved during excavation. Unlike the Carisbrooke assemblage, large ling were recovered from Porchester (Coy 1980) and were almost certainly purchased as stockfish. Twelfth-thirteenth century deposits from Launceston castle (Cornwall), which were sieved, contained abundant bones from mature hake, undoubtedly a local catch. Other gadids were also frequent, as was conger eel, with scad, gurnards (Triglidae), flatfish (including large turbot: *Scophthalmus maximus*), sea breams, mullet, herring, eel, rays and spurdog (*Squalus acanthius*) also present (Smith 1995). Fifteenth century deposits included a similar range of fish, but herrings were absent and sturgeon (*Accipenser sturio*) was present (ibid.): the latter undoubtedly an indication of 'status' dining.

CONCLUSIONS

Despite the relatively small size of the assemblage, the fact that only a few features were excavated during the evaluations, and that only the sieved bones from the 2008/2009 stage of work have been analysed, the assemblage reported here is considerably larger than that recovered from previous excavations at the Castle. It is likely that most of the fish were caught in local waters, with the exception of the herrings, most of which were probably procured as salted and pickled fish. The purchase of some dried 'stockfish' is also possible. The range of taxa gives an indication of the wide variety of fish available and eaten at Carisbrooke during the 12th-13th and 16th-18th centuries.

While the majority of the fish represented are seafish, a few bones from freshwater fish indicate the importance of this resource despite the proximity of coastal fisheries. Although the larger pike and possibly salmon would have commanded a high price in the Middle Ages, some of the smaller freshwater fish would have been as cheap as herrings; fish which were common in the Carisbrooke assemblage. While it is difficult to infer status from the fish assemblage, the quantity of fish remains from the 12th-13th century middens suggests that fish were eaten regularly and when taken together with evidence from the mammal and bird remains (Ayton 2011) a high meat diet is inferred which would in itself imply wealth and privilege.

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APPENDIX 1: FULL DATASET

Context information

Context	Phase	Date	Context Description
7325	5	16-18th c.	garden soil deposit
7333	4b	13th -15th c.	midden
7353	4b	13th-15th c.	midden
7362	4a	late 12th-early 13th c.	floor deposit
7387	4a	12th c.	fill of foundation trench
8000	5	16-18th c.	midden
8016	4b	13th c.	midden
8023	4a	12th c.	yard surface

Detailed records

Context	Sample	Mesh	Soil vol.	No	Bone	Side	Condition	Fish Size	Species	Comments
7325	7801	4-2mm	40L	1	vertebra		poor		Clupea harengus	
7325	7801	8-4mm	40L	1	scales				Sparidae	
7325	7801	8-4mm	40L	1	quadrate		good	small	cf. Dicentrarchus labrax	
7325	7801	8-4mm	40L	2	caudal vertebra		good		Clupea harengus	
7325	7801	8-4mm	40L	1	precaudal vertebra 3		good	medium	Pleuronectidae	
7325	7801	8-4mm	40L	1	caudal vertebra			medium	Gadidae	calcined
7325	7801	8-4mm	40L	1	scale				Unidentified	
7325	Hand collected		40L	1	cleithrum	R	fair	large	Gadus morhua	prox and middle zone
7325	Hand collected		40L	1	dentary	L	good	medium	Belone belone	
7325	Hand collected		40L	1	premaxilla	L	fair	large	Conger conger	prox end
7325	Hand collected		40L	1	dentary	R	fair	large	Conger conger	distal end
7325	Hand collected		40L	1	cleithrum	R	fair	large	Conger conger	
7325	Hand collected		40L	1	caudal vertebra 5		fair	large	Gadus morhua	
7325	Hand collected		40L	1	cleithrum	R	fair	large	Gadidae	small frag,
7325	Hand collected		40L	1	subopercular		fair	large	Unidentified	fragment -probably gadid
7325	Hand collected		40L	1	spine		good		Unidentified	
7325	Hand collected		40L	1	ceratobranchial		good	large	Gadidae	
7333	7800	>2mm	40L	32	vertebrae		good	medium	Clupea harengus	precaudal and caudal
7333	7800	>2mm	40L	1	articular	R	good	medium	Clupea harengus	

7333	7800	>2mm	40L	2	maxilla	R	good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	urohyal		good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	supramaxilla		good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	opercular		good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	articular	L	good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	maxilla	L	good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	post temporal		good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	basioccipital		good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	supracleithrum		good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	quadrate		good	medium	Clupea harengus	
7333	7800	>2mm	40L	1	caudal vertebra 4		good	small	Gadidae	
7333	7800	>2mm	40L	1	caudal vertebra 5		good	small	Gadidae	
7333	7800	>2mm	40L	2	scales				Unidentified	incomplete
7333	7800	>2mm	40L	1	parasphenoid		fair		Unidentified	probably herring
7333	7800	>4mm	40L	1	urohyal		good	medium	Clupea harengus	
7333	7800	>4mm	40L	5	vertebrae		good	medium	Clupea harengus	
7333	7800	>4mm	40L	1	precaudal vertebra 3		good	small	Gadidae	cf. Pollachius pollachius
7333	7800	>4mm	40L	1	dentary		fair		Conger conger	Small distal frag
7333	7800	>8MM	40L	1	fragments				Unidentified	one may be a post-cleithrum?
7353	Hand collected		40L	1	?subopercular		good	large	Conger conger	
7353	Hand collected		40L	1	quadrate		fair	large	Gadus/Pollachius	
7362	7803	8-4mm	40L	1	vertebra		fair	small	Conger conger	
7362	7803	8-4mm	40L	1	caudal vertebra		good		Clupea harengus	
7387	7806	10-4mm	40L	1	vertebra		fair		Anguilla anguilla	
7387	7806	10-4mm	40L	1	scale				Sparidae	five
7387	7806	10-4mm	40L	1	ceratohyal		poor		Unidentified	
7387	7806	10-4mm	40L	1	ceratohyal		poor		Clupea harengus	
7387	7806	10-4mm	40L	1	hyomandibular		fair		Clupea harengus	
7387	7806	10-4mm	40L	1	hyomandibular		fair	small	Flatfish	

7387	7806	10-4mm	40L	1	dentary	L	fair		Clupea harengus	
7387	7806	10-4mm	40L	1	caudal vertebra		fair		Clupea harengus	
7387	7806	10-4mm	40L	1	Scales				Unidentified	
7387	7806	10-4mm	40L	1	precaudal vertebra 3		fair	medium	Flatfish nfi	
7387	7806	4-2mm	40L	1	vertebra				Clupea harengus	
8000	7805	>10mm	40L	1	ceratohyal		fair	large	Conger conger	
8000	7805	>10mm	40L	1	precaudal vertebra 3		fair	small	Gadidae	
8000	7805	>10mm	40L	3	precaudal vertebra 3		poor	large	Gadus morhua	
8000	7805	>10mm	40L	1	precaudal vertebra 1		poor	large	Gadus morhua	
8000	7805	>10mm	40L	1	precaudal vertebra 2		poor	large	Gadus morhua	
8000	7805	>10mm	40L	1	vertebra		poor	large	Gadus morhua	
8000	7805	>10mm	40L	1	scales				Unidentified	
8000	7805	10-4mm	40L	1	precaudal vertebra		good	small-medium	Conger conger	
8000	7805	10-4mm	40L	3	caudal vertebra		good	small-medium	Conger conger	
8000	7805	10-4mm	40L	3	vertebra		good		Clupea harengus	
8000	7805	10-4mm	40L	2	vertebra		poor	large	Gadidae	prob cod - min of 2 vertebrae broken into frags
8000	7805	10-4mm	40L	3	vertebra		good	medium	Dicentrarchus labrax	
8000	7805	10-4mm	40L	2	vertebra		good	small	Dicentrarchus labrax	
8000	7805	10-4mm	40L	5	vertebra		good	small	Mugilidae	
8000	7805	10-4mm	40L	1	post temporal		fair	medium	Flatfish nfi	
8000	7805	10-4mm	40L	1	scale				Sparidae	several
8000	7805	10-4mm	40L	1	scale				Dicentrarchus labrax	at least one
8000	7805	10-4mm	40L	1	scale				Mugilidae	several?
8000	7805	10-4mm	40L	1	scale				Perca fluviatilis	one
8000	7805	10-4mm	40L	1	scale				Clupea harengus	?several
8000	7805	10-4mm	40L	2	dentary	L	good	small	Dicentrarchus labrax	
8000	7805	10-4mm	40L	1	maxilla		good	small-medium	Pollachius sp.	
8000	7805	10-4mm	40L	2	precaudal vertebra 3		good	medium	Trisopterus sp.	

8000	7805	10-4mm	40L	1	precaudal vertebra 2		fair	small	Pollachius pollachius	
8000	7805	10-4mm	40L	1	precaudal vertebra 3		fair	small	Pollachius pollachius	
8000	7805	10-4mm	40L	2	precaudal vertebra 1		good	small	Gadidae	
8000	7805	10-4mm	40L	2	caudal vertebra 4		fair	small	Gadidae	
8000	7805	10-4mm	40L	1	quadrate		good	small	Gadidae	
8000	7805	10-4mm	40L	1	ectopterygoid		good	small	Gadidae	
8000	7805	10-4mm	40L	2	precaudal vertebra 3		good	small	?Labridae	
8000	7805	10-4mm	40L	1	maxilla		good	small	Dicentrarchus labrax	
8000	7805	10-4mm	40L	2	quadrate		good		Unidentified	
8000	7805	10-4mm	40L	1	precaudal vertebra 1		fair	small	Gadidae	
8000	7805	10-4mm	40L	2	precaudal vertebra 3		fair	medium	Pleuronectidae	
8000	7805	10-4mm	40L	1	caudal vertebra 4		fair	medium	Pleuronectidae	
8000	7805	10-4mm	40L	1	quadrate		good	small	Dicentrarchus labrax	
8000	7805	10-4mm	40L	1	quadrate		good	small	Cyprinidae	
8000	7805	10-4mm	40L	1	vertebra		fair	small	Unidentified	
8000	7805	4-2mm	40L	2	precaudal vertebra 3		good	small	Labridae	
8000	7805	4-2mm	40L	1	?coracoid		good		Gasterostidae	
8000	7805	4-2mm	40L	1	hypural		good		Clupea harengus	
8000	7805	4-2mm	40L	9	vertebra		fair		Clupea harengus	
8000	7805	4-2mm	40L	1	vertebra		fair	small	Unidentified	
8016	7808	>10mm	40L	2	precaudal vertebra 1		fair	large	Salmonidae	prob salmon
8016	7808	>10mm	40L	3	caudal vertebra		fair	large	Salmonidae	prob salmon
8016	7808	>10mm	40L	1	caudal vertebra		fair	large	Esox lucius	
8016	7808	>10mm	40L	1	precaudal vertebra 3		fair	medium	Pleuronectidae	
8016	7808	>10mm	40L	2	vertebra		good		Clupea harengus	
8016	7808	>10mm	40L	1	dentary	R	good	large	Pleuronectes platessa	
8016	7808	>10mm	40L	2	hyomandibular	R	good	large	Pleuronectidae	prob plaice
8016	7808	>10mm	40L	2	maxilla	L,R	good	large	Pleuronectidae	
8016	7808	>10mm	40L	1	hyomandibular	L	fair	large	Pleuronectidae	frag
8016	7808	>10mm	40L	5	caudal vertebra 4		fair	large	Pleuronectidae	
8016	7808	>10mm	40L	1	caudal vertebra 4		fair	medium	Pleuronectidae	
8016	7808	>10mm	40L	1	precaudal vertebra 3		fair	large	Pleuronectidae	

8016	7808	>10mm	40L	1	atlas vertebra		fair	large	Pleuronectidae	prob plaice
8016	7808	>10mm	40L	1	ceratohyal		fair	large	Pleuronectidae	
8016	7808	>10mm	40L	1	anal pterygiophore		fair	large	Pleuronectes platessa	
8016	7808	>10mm	40L	1	preopercular		fair	large	Pleuronectidae	frag
8016	7808	>10mm	40L	1	ectopterygoid		fair	medium	Pleuronectidae	
8016	7808	>10mm	40L	1	articular		fair	large	Pleuronectidae	
8016	7808	10-4mm	40L	27	otic bulla		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	49	vertebra		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	6	basioccipital		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	5	maxilla		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	4	articular		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	4	hyomandibular		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	3	quadrate		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	12	ceratobranchial		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	1	subopercular		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	2	opercular		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	6	dentary		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	2	post temporal		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	3	urohyal		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	3	hypural		fair	medium	Clupea harengus	
8016	7808	10-4mm	40L	1	cleithrum		fair	medium	Clupea harengus	frag
8016	7808	10-4mm	40L	5	vertebra		fair	large	Anguilla anguilla	
8016	7808	10-4mm	40L	1	cleithrum		good		Anguilla anguilla	Chord length=24.7mm
8016	7808	10-4mm	40L	20	vertebrae		fair	medium	Anguilla anguilla	incl. Some medium-large eels
8016	7808	10-4mm	40L	2	dentary	R	fair	medium	Anguilla anguilla	one larger thn the other
8016	7808	10-4mm	40L	1	parasphenoid		fair	large	Anguilla anguilla	
8016	7808	10-4mm	40L	1	atlas vertebra		fair	medium	Merlangius merlangus	
8016	7808	10-4mm	40L	1	caudal vertebra 5		fair	small	Gadidae	
8016	7808	10-4mm	40L	1	premaxilla	L	fair	medium	Pleuronectes platessa	
8016	7808	10-4mm	40L	1	basioccipital		fair	medium	Pleuronectidae	

8016	7808	10-4mm	40L	1	ectopterygoid		fair	medium	Pleuronectidae	
8016	7808	10-4mm	40L	1	vomer		fair	medium	Pleuronectidae	
8016	7808	10-4mm	40L	17	vertebra		fair	medium	Pleuronectidae	caudal and precaudal
8016	7808	10-4mm	40L	1	atlas vertebra		fair	medium-large	Pleuronectidae	
8016	7808	10-4mm	40L	1	scute		good		Trachurus trachurus	
8016	7808	10-4mm	40L	1	epihyal		fair	large	Unidentified	
8016	7808	10-4mm	40L	1	maxilla		good	medium-large	Pleuronectidae	
8016	7808	10-4mm	40L	2	dermal denticle		good		Raja cf. montagui	thorns - large
8016	7808	10-4mm	40L	1	scale		good		Sparidae	38 scales
8016	7808	10-4mm	40L	1	caudal vertebra		good	large	Salmonidae	prob salmon
8016	7808	10-4mm	40L	2	precaudal vertebra		good	small-medium	Salmonidae	
8016	7808	10-4mm	40L	1	atlas vertebra		good	small-medium	Salmonidae	
8016	7808	10-4mm	40L	1	vertebra		good	medium	Lisa sp.	
8016	7808	10-4mm	40L	1	quadrate		fair		Unidentified	
8016	7808	10-4mm	40L	1	caudal vertebra		fair	large	Esox lucius	
8016	7808	10-4mm	40L	1	precaudal vertebra		fair	large	Esox lucius	
8016	7808	10-4mm	40L	1	parasphenoid		fair		Mugilidae	frag.
8016	7808	10-4mm	40L	2	supramaxilla		good		Clupea harengus	
8016	7808	10-4mm	40L	1	subopercular		good		Unidentified	frag: prob herring
8016	7808	10-4mm	40L	2	dentary	R	fair		Anguilla anguilla	
8016	7808	10-4mm	40L	1	dentary	L	good	medium-large	Anguilla anguilla	
8016	7808	10-4mm	40L	2	otic bulla		fair		Clupea harengus	
8016	7808	10-4mm	40L	2	parasphenoid		fair		Clupea harengus	
8016	7808	10-4mm	40L	2	quadrate		fair		Clupea harengus	
8016	7808	10-4mm	40L	5	dentary		fair		Clupea harengus	broken/frags
8016	7808	10-4mm	40L	1	basioccipital		fair	small	Unidentified	
8016	7808	10-4mm	40L	1	hypural		fair		Flatfish nfi	
8016	7808	4-2mm	40L	7	vertebra		fair		Clupea harengus	

8016	7808	4-2mm	40L	1	vertebra		fair		Anguilla anguilla	
8016	7808	4-2mm	40L	1	scale				Sparidae	
8016	7808	4-2mm	40L	3	premaxilla		good		Clupea harengus	
8016	7808	4-2mm	40L	2	articular		fair		Clupea harengus	
8016	7808	4-2mm	40L	1	epihyal		fair		Clupea harengus	
8016	7808	4-2mm	40L	1	hypural		good		Clupea harengus	
8016	7808	4-2mm	40L	4	urohyal		fair		Clupea harengus	
8016	7808	4-2mm	40L	2	maxilla		fair		Clupea harengus	
8016	7808	4-2mm	40L	1	quadrate		fair		Clupea harengus	
8023	7807	>10mm	40L	1	dentary	L	poor	large	Unidentified	prob gadid
8023	7807	>10mm	40L	1	supracleithrum		fair	medium	Gadus morhua	
8023	7807	10-4mm	40L	2	vertebra		fair	medium	Esox lucius	
8023	7807	10-4mm	40L	1	vertebra		fair		Anguillidae	frag
8023	7807	10-4mm	40L	1	vertebra		good		Anguilla anguilla	
8023	7807	10-4mm	40L	1	hypural		good		Clupea harengus	
8023	7807	10-4mm	40L	1	precaudal vertebra 3		good	small	Flatfish nfi	
8023	7807	10-4mm	40L	19	vertebrae		good		Clupea harengus	
8023	7807	10-4mm	40L	1	ceratohyal		fair	medium	Unidentified	probably gadid. Frag
8023	7807	10-4mm	40L	1	hypural		fair		Unidentified	
8023	7807	10-4mm	40L	1	vertebra		fair		Scomber scombrus	frag
8023	7807	10-4mm	40L	1	Scute		good		Trachurus trachurus	
8023	7807	10-4mm	40L	1	opercular		fair		Clupea harengus	
8023	7807	10-4mm	40L	1	ectopterygoid		fair	medium	Gadidae	
8023	7807	10-4mm	40L	1	scale				Perca fluviatilis	ca. 5
8023	7807	10-4mm	40L	1	scale				Sparidae	lots
8023	7807	10-4mm	40L	1	vertebrae		poor		Unidentified	probably gadid. Frag
8023	7807	10-4mm	40L	1	ceratohyal		good		Anguilla anguilla	
8023	7807	4-2mm	40L	3	vertebra		good		Anguilla anguilla	incl. One tiny vertebra
8023	7807	4-2mm	40L	2	caudal vertebra		fair	small	Gadidae	
8023	7807	4-2mm	40L	2	vertebrae		fair	small	Esox lucius	
8023	7807	4-2mm	40L	1	dentary		fair	small	Esox lucius	Prox. Frag.
8023	7807	4-2mm	40L	1	articular		good		Clupea harengus	

8023	7807	4-2mm	40L	25	vertebra		fair		Clupea harengus	
8023	7807	4-2mm	40L	1	scale				Sparidae	many
8023	7807	4-2mm	40L	1	quadrate		good		Clupea harengus	
8023	7807	4-2mm	40L	1	spine		good		Gasterostidae	
8023	7807	4-2mm	40L	1	dermal denticle				cf. Amblyraja radiata	starry skate

* where gadid vertebrae are grouped, this is to distinguish the different kinds of vertebrae in the vertebral column (after Jones 1991, 62). Precaudal 1 are the anterior 3 or 4 abdominal vertebrae; precaudal 2 are the precaudal vertebrae which fllow and have transverse processes roughly at right angles to the dorso-ventral axis of the bone; precaudal 3 are the remaining, midline precaudal vertebrae; caudal 4 are the majority of caudal vertebrae down to the last 10 or so posterior caudal vertebrae which are caudal 5.

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